Monitoring patient status over time using common pain and musculoskeletal outcome measures

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</table>

Glossary of Terms

Concurrent validity: Validity is established by comparing and new outcome instrument with a criterion measure, or gold standard, both of which are administered at the same time (Streiner and Norman 1995).

Content validity: Content validity is defined as ‘the extent to which the content of the instrument appears logically to examine and comprehensively include the full scope of the characteristics or domains it is intended to measure’ (Bowling 1997).

Construct validity: The assessment of construct validity is an ongoing process, involving the comparison of outcome instrument findings to other evidence (Beatie 2001, Bowling 1997). In general, construct validity is established through the development of hypotheses concerning the behaviour of the outcome instrument, in various situations and populations.

Face validity: Face validity implies ‘whether on the face of it, the instrument appears to be assessing the desired qualities.’ (Streiner and Norman 1995).

Sensitivity to detect change over time: Sensitivity can be defined as the ‘ability to detect change statistically, whether it is relevant (to the patient or clinician) or not.’ (Fortin et al 1995).

Test-retest reliability: Test-retest reliability provides information about the extent to which the same results are gained on repeated use of the outcome instrument over time, when no change is expected (Beatie 2001, Simmons et al 1999).

Validity: Validity provides evidence that an outcome instrument measures what it is supposed to measure (Andresen 2000, Bowling 1997).

References


Introduction

Background

The Outcomes Calculator has been under development for since 1999, in a series of staged research strategies. Preliminary investigations comprised:

- Investigation of requirements of funding bodies regarding health outcomes derived from treatment by clinicians (Grimmer et al 2000, Grimmer and Milanese 2002)
- Literature review to assess evidence of validity, reliability, sensitivity to change and clinical utility of common measures of health outcome used by clinicians, as well as other measures of health outcome that may be useful for clinicians (Bialocerkowski et al 2002, Bialocerkowski et al 2003, Grimmer and Milanese 2002)
- Discussions with health Australian clinicians regarding the barriers and facilitators to regular use of health outcomes in clinical practice (Research Committee APA 1999, Grimmer et al 2000), and

The term ‘outcome’ incorporates the health gain and costs associated with treatment. For the management of many conditions, this involves an episode of care (a number of linked occasions of service). Currently the most common type of outcome information is on cost, or number of contacts with the patient. Our investigations highlighted that most clinicians collect no standard information from patients on health outcome, despite this being the most important information required by health funders. What information is collected is non-standardised, collected at variable time frames throughout the episode, and is usually handwritten in patient notes, which makes it inefficient and less than useful for clinical benchmarking. The need for a simple, efficient mechanism for collecting standard information routinely on patient progress was identified from our preliminary investigations. The Outcomes Calculator software was developed to address this need.

Aim of the Outcomes Calculator

The Outcomes Calculator aims to facilitate the use of standardised outcome measures in clinical practice to monitor change in patient status over time. Patients complete selected outcome measures prior to, or following treatment (without reference to the clinician) and the data can be entered into the Outcomes Calculator by administrative staff. This avoids the potential bias by the clinician and ensures that the patient’s view of their condition is recognised. The Outcome Calculator automatically computes the score for each outcome measure and uses available norms for comparison (for example: for joint range of motion). Summarising outcome in this way would assist in communicating patient progress, between clinicians, patients and funders.
Outcome measures

The outcome measures contained within the CAHE Outcomes Calculator Version 5 have been selected on their psychometric properties (validity, reliability, sensitivity to detect change over time and clinical utility for patient populations with peripheral joint disorders). The outcome measures represent a range of aspects of functioning and/or disability (Grimmer and Milanese 2002), which are measured at the level of body functions/structure, the individual and society, as defined by the International Classification of Functioning (World Health Organization 2001). Table 1.1 provides a schematic overview of the International Classification of Functioning, whilst Figure 1.1 provides definitions regarding the components associated with functioning/disability.

The outcome measures contained in this Version 5 of the CAHE Outcomes Calculator are presented in Table 1.2. This table defines the level of measurement for each of the outcome measures (according to the World Health Organization's (2001) International Classification of Functioning definitions).

Permission to use the outcome instruments in the calculator has been obtained from each of the developers. Contact details of the instrument developers are enclosed in this manual. This manual also provides some ideas for use of patient details for determining the quality of treatment, using expected benchmarks, population norms, and clinical reasoning.

Table 1.1: An overview of the International Classification of Functioning: functioning and disability (World Health Organization 2001)

<table>
<thead>
<tr>
<th>Components</th>
<th>Body Functions and structures</th>
<th>Activities and Participation</th>
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<tr>
<td>Domains</td>
<td>Body Functions</td>
<td>Life areas</td>
</tr>
<tr>
<td></td>
<td>Body Structures</td>
<td>(tasks, actions)</td>
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<tr>
<td>Constructs</td>
<td>Change in body functions</td>
<td>Capacity executing tasks</td>
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<tr>
<td></td>
<td>(physiological)</td>
<td>in a standard environment</td>
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<tr>
<td></td>
<td>Change in body structures</td>
<td>Performance executing tasks</td>
</tr>
<tr>
<td></td>
<td>(anatomical)</td>
<td>in the current environment</td>
</tr>
<tr>
<td>Positive aspects</td>
<td>Functional and structural</td>
<td>Activities</td>
</tr>
<tr>
<td></td>
<td>integrity</td>
<td>Participation</td>
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<tr>
<td>Negative aspect</td>
<td>Impairment</td>
<td>Activity Limitation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Participation Restriction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Disability</td>
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</table>

In the context of health:

- **Body functions** are the physiological functions of body systems (including psychological functions).
- **Body structures** are anatomical parts of the body such as organs, limbs and their components.
- **Impairments** are problems in body function or structure such as a significant deviation or loss.
- **Activity** is the execution of a task or action by an individual.
- **Participation** is involvement in a life situation.
- **Activity limitations** are difficulties an individual may have in executing activities.
- **Participation restrictions** are problems an individual may experience in involvement in life situations.
<table>
<thead>
<tr>
<th>Measurement construct</th>
<th>Outcome measure</th>
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<tr>
<td>Impairment</td>
<td>GPQ, GCPS, SF_MPQ, BI, Joint range of Motion</td>
</tr>
<tr>
<td>Impairment/Activity Limitation</td>
<td>LBOS, DASH, ULFI, ASES-Shoulder form, SPADI, SRQ, Penn Shoulder Score, PREE, PRTE, PRWE, Boston Questionnaire, AAOS Lower Limb, AAOS Hip &amp; Knee, Harris Hip Score, Non-arthritic Hip Score, KPS, AAOS Foot &amp; Ankle, FAAM, Kaikkonen Functional Score</td>
</tr>
</tbody>
</table>
| Activity Limitation / Participation Restriction | GPSS  
DHI  
MiDAS  
WL-26  
TUG  
NDI  
NPDS  
WDQ  
Copenhagen Neck Functional Disability Scale  
NBQ  
NPQ  
RMQ Questionnaire  
ODI  
BBQ  
Quebec Back Pain Disability Scale  
BPFS  
UEFI  
SDQ-NL  
SDQ-UK  
OSS  
SST  
Michigan Hand Outcomes Score  
LEFS  
OHS  
KOS  
OKS  
FFI  
FABQ  
RADLS  
OMPSQ  
WHMPl |
|---|---|
| Impairment/Activity Limitation/Participation Restriction | WOSI  
WORC  
WOOS  
HOOS  
FAOS |
| Psychological Responses to Impairment/Activity Limitation/Participation Restriction | Tampa Scale of Kinesiophobia (TSK)  
Pain Self-Efficacy Questionnaire (PSEQ)  
Centre for Epidemiologic Studies Depression Scale (CES-D)  
Modified Somatic Perception Questionnaire (MSPQ)  
Kessler Psychological Distress Scale (KPDS) |
| Quality of Life | RAND 36 |
### Table 1.3: Contact details of developers of selected outcome measures

*CAHE has been given permission to use these outcome measures in its Outcomes Calculator by the developers.*

<table>
<thead>
<tr>
<th>Instruments</th>
<th>Developers/Contact Persons</th>
</tr>
</thead>
</table>
| Glasgow Pain Questionnaire         | Dr A. J. Asbury [aja1p@clinmed.gla.ac.uk]  
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| Graded Chronic Pain Scale          | Michael Von Korff [vonkorff.m@ghc.org]  
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Phone 206-287-2874, Fax 206-287-2871 |
| Short-Form McGill Pain Questionnaire | Dr Ronald Melzack [melzack@psych.mcgill.ca]  
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# iCAHE Musculoskeletal Outcomes Calculator: User Manual

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BH5 2DF, England.  
jbolton@aecc-chiropractic.ac.uk
<table>
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<tr>
<th>Questionnaire/Scale</th>
<th>Contact Information</th>
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<tbody>
<tr>
<td>Quebec Back Pain Disability Scale</td>
<td>Jacek Kopec, MD, PhD</td>
</tr>
<tr>
<td></td>
<td>Assistant Professor</td>
</tr>
<tr>
<td></td>
<td>Department of Health Care and Epidemiology</td>
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<tr>
<td></td>
<td>University of British Columbia</td>
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<tr>
<td></td>
<td>Phone: 604-871-4588</td>
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<tr>
<td></td>
<td><a href="mailto:jacek.kopec@ubc.ca">jacek.kopec@ubc.ca</a></td>
</tr>
<tr>
<td>Back Pain Functional Scale</td>
<td>Prof. Paul Stratford</td>
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<td></td>
<td>McMaster University, Faculty of Health</td>
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<td></td>
<td>Sciences, Institute for Applied Health</td>
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<td></td>
<td>Sciences</td>
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<td></td>
<td>Rm 430 1400 Main Street West, Hamilton,</td>
</tr>
<tr>
<td></td>
<td>Ontario L8S 1C7 Canada</td>
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<tr>
<td></td>
<td><a href="mailto:stratfor@mcmaster.ca">stratfor@mcmaster.ca</a></td>
</tr>
<tr>
<td>Low Back Outcome Score</td>
<td>Prof. Charles Greenough</td>
</tr>
<tr>
<td></td>
<td>Clinical Director</td>
</tr>
<tr>
<td></td>
<td>Regional Spinal Cord Injury Centre</td>
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<tr>
<td></td>
<td>James Cook University Hospital, Middlesbrough</td>
</tr>
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<td></td>
<td><a href="mailto:Charles.Greenough@stees.nhs.uk">Charles.Greenough@stees.nhs.uk</a></td>
</tr>
<tr>
<td>Disabilities of the Arm, Shoulder and Hand (DASH)</td>
<td>Ms. Kristina Buccat</td>
</tr>
<tr>
<td></td>
<td>Administrative Assistant</td>
</tr>
<tr>
<td></td>
<td>DASH Outcome Measure</td>
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<tr>
<td></td>
<td>Institute for Work &amp; Health</td>
</tr>
<tr>
<td></td>
<td>481 University Avenue, Suite 800</td>
</tr>
<tr>
<td></td>
<td>Toronto, Ontario</td>
</tr>
<tr>
<td></td>
<td>Canada M5G 2E9</td>
</tr>
<tr>
<td></td>
<td>Telephone Number: (416) 927-2027 extension</td>
</tr>
<tr>
<td></td>
<td>2173</td>
</tr>
<tr>
<td></td>
<td>Fax Number: (416) 927-4167</td>
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<td></td>
<td><a href="mailto:kbuccat@iwh.on.ca">kbuccat@iwh.on.ca</a></td>
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<td></td>
<td><a href="mailto:dash@iwh.on.ca">dash@iwh.on.ca</a></td>
</tr>
<tr>
<td>Upper Limb Functional Index (ULFI)</td>
<td>Mr. C. Philip Gabel, Msc, PT</td>
</tr>
<tr>
<td></td>
<td>Sports and Spinal Physiotherapist</td>
</tr>
<tr>
<td></td>
<td>PO Box 760, Coolum, Queensland 4573,</td>
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<td></td>
<td>Australia</td>
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<tr>
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<td>McMaster University, Faculty of Health</td>
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</tr>
<tr>
<td></td>
<td>6300 N. River Road</td>
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<td>Suite 727, Rosemont, Illinois 60018 USA</td>
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| Shoulder Disability Questionnaire – Netherlands (SDQ-NL) | Dr. Danielle A.W.M. van der Windt  
UHD, EMGO Instituut en afdeling Huisartsgeneeskunde, VU medisch centrum, Van der Boechorststraat 7, 1081 BT Amsterdam, The Netherlands  
dawm.vanderwindt@vumc.nl  
G.J.M.G. van der Heijden, PhD  
UMC Utrecht, Juliuscentrum (D01.335),  
Postbus 58800  
3508 GA Utrecht  
g.vanderheijden@umcutrecht.nl |
| Shoulder Disability Questionnaire – United Kingdom (SDQ-UK) | Prof. Alan Silman.  
Professor of Rheumatic Disease Epidemiology  
University of Manchester, Oxford Road, Manchester M13,  
9PT, United Kingdom  
Alan.Silman@manchester.ac.uk |
| Oxford Shoulder Score (OSS)                           | Jill Dawson, DPhil  
Senior Research Scientist  
Department of Public Health  
University of Oxford, Old Road Campus  
Oxford OX3 7LF United Kingdom  
Jill.Dawson@dphpc.ox.ac.uk |
| Shoulder Pain & Disability Index (SPADI)               | Kathryn E. Roach, PhD, PT  
Associate Professor and Assistant Chair- Research  
University of Miami, Miller School of Medicine  
Department of Physical Therapy, 5915 Ponce De Leon building, 5th floor, Coral Gables, Florida 33146 USA  
keroach@miami.edu |
| Simple Shoulder Test (SST)                            | Dr. Frederick Matsen  
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### Western Ontario Rotator Cuff Index (WORC)

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<thead>
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</table>
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<td></td>
<td>Senior Research Scientist</td>
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<td>Department of Public Health</td>
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<td>University of Oxford, Old Road Campus</td>
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<td>Oxford OX3 7LF United Kingdom</td>
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<td><a href="mailto:Jill.Dawson@dphpc.ox.ac.uk">Jill.Dawson@dphpc.ox.ac.uk</a></td>
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<td>Foot Functional Index (FFI)</td>
<td>Kathryn E. Roach, PhD, PT</td>
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<td></td>
<td>Associate Professor and Assistant Chair- Research</td>
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<td>University of Miami, Miller School of Medicine</td>
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<td></td>
<td>Department of Physical Therapy, 5915 Ponce De Leon building, 5th floor, Coral Gables, Florida 33146 USA</td>
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<td><a href="mailto:keroach@miami.edu">keroach@miami.edu</a></td>
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<td>American Academy of Orthopaedic Surgeons (AAOS) – Foot &amp; Ankle Questionnaire</td>
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<td>Foot and Ankle Outcome Score (FAOS)</td>
<td>Professor Ewa Roos</td>
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<td>Institute of Sports Science and Clinical Biomechanics</td>
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<td>Faculty of Health Sciences, University of Southern Denmark, Campusvej 55, DK-5230 Odense, Denmark</td>
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<td><a href="mailto:eroos@health.sdu.dk">eroos@health.sdu.dk</a></td>
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<td>Functional Ankle Ability Measure (FAAM)</td>
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<td>Duquesne University, Department of Physical Therapy</td>
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<td>114 Rangos School of Health Sciences, Pittsburgh, PA, USA</td>
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<td></td>
<td><a href="mailto:martinr280@duq.edu">martinr280@duq.edu</a></td>
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<td>Kaikonen Functional Scale (KFS)</td>
<td>Dr. Pekka Kanus</td>
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<td>Accident &amp; Trauma Research Centre, UKK Institute for Health Promotion Research, P.O. Box 30, FIN-33501 Tampere, Finland.</td>
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<td><a href="mailto:pekka.kannus@uta.fi">pekka.kannus@uta.fi</a></td>
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<td>Tampa Scale of Kinesiophobia</td>
<td>Steve Woby, PhD (<a href="mailto:steve.woby@pat.nhs.uk">steve.woby@pat.nhs.uk</a>)</td>
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<tr>
<td></td>
<td>Research Fellow (joint post)</td>
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<td>Centre for Rehabilitation Science, University of Manchester Department of Physiotherapy, North Manchester General Hospital</td>
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<td>Pain Self-efficacy questionnaire</td>
<td>Michael Nicholas</td>
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<td></td>
<td>A/ Professor, Clinical &amp; Research Psychologist Director of the ADAPT Pain Management Program</td>
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<td>University of Sydney</td>
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<td><a href="mailto:miken@med.usyd.edu.au">miken@med.usyd.edu.au</a></td>
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<td>National Institute of Mental Health</td>
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<th>Modified Somatic Perception Questionnaire</th>
<th>Chris J. Main (<a href="mailto:c.j.main@cphc.keele.ac.uk">c.j.main@cphc.keele.ac.uk</a>)</th>
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<td>Prestwich Hospital, Bury New Road,</td>
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<td>Prestwich, Manchester, England M25 7BL,</td>
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<th>Kessler Psychological Distress Scale</th>
<th>Ronald C. Kessler, PhD (<a href="mailto:kessler@hcp.med.harvard.edu">kessler@hcp.med.harvard.edu</a>)</th>
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<td>Harvard Medical School</td>
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<td>Department of Health Care Policy</td>
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<td>Boston, MA 02115-5899</td>
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<td>Phone: 1 617-432-3587</td>
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<td>Fax: 1 617-432-3588</td>
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<th>Patient Satisfaction subscales</th>
<th>Dan Cherkin, PhD [<a href="mailto:cherkin.d@ghc.org">cherkin.d@ghc.org</a>]</th>
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<td>Seattle, WA 98101</td>
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<td>Tel: (206) 287-2875, Fax: (206) 287-2871</td>
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References


General Musculoskeletal Pain/Functional Scales

Appropriate measurement of pain has long been the subject of academic and clinical debate. Pain is often multidimensional in nature, and its measurement is by necessity, subjective, as the way it is perceived is relative to individual experience and personality. A number of different ways of measuring pain have consequently been developed. A clinician’s choice of pain measures depends on the purpose of measurement, the ease of administering the instrument in the clinical setting and the way in which pain measure will be analysed.

Uni-dimensional measures

Pain intensity and frequency are the two most commonly measured constructs of pain in the clinical setting (Melzack 1975). To appropriately describe a patients’ pain experience, these constructs should be measured and interpreted together, as a change in one construct may not reflect a change in the other. For instance, it is important to distinguish the patient who suffers moderate pain, but for only a small part of the day, from the patient who suffers moderate pain every hour of the day. Measurement of intensity, or frequency alone in this instance would be insufficient to tell the whole story. Therapists are encouraged to collect information on both intensity and frequency.

Measurement

The Outcomes Calculator provides three options to measure pain intensity, and three options of measure frequency. Where numbers are collected, the Outcomes Calculator interprets outcome throughout the episode of care in terms of change in raw score, and change relative to the initial score. The desired ‘benchmark’ of treatment in each case is no pain, thus desirable change over time should be downwards towards no pain (frequency and intensity), or towards 100% improvement in both pain constructs.

Information on intensity and frequency should be recorded, and combined as appropriate, to demonstrate change in more than one construct. For instance if the Verbal Graphic Frequency Rating Scale is chosen, then so should the Verbal Graphic Intensity Rating Scale, so that changes in pain intensity and pain frequency can be illustrated using the same measurement scale.

Time frames of measurement

Therapists are encouraged to choose matching time frames for measuring pain frequency and intensity, as well as matching measurement options of intensity and frequency, so that they can produce meaningful combinations of the uni-dimensional measurement concepts. If the time frame ‘in the last day’ is chosen for frequency, then the same time frame should be chosen for intensity. It is important to clarify that ‘average’ pain intensity is measured in this calculator.

Validity and reliability

The validity of measurement of pain intensity and frequency using scales consisting of numbers or words continues to be debated. Therapists using uni-dimensional pain scales need to remember that these are an attempt to measure only two aspects of what is essentially a multidimensional pain experience. The reliability of patient’s assessment of pain intensity and frequency is constrained by the changing nature of pain over time, particularly when pain is acute.
Recording

If staff in a clinic decide to record pain intensity and frequency using a consistent approach (such as an 11 point scale as illustrated above), they may also choose to record change in pain using a graph already printed onto the patient record card, that allows them to enter scores in a standard way at each assessment, and evaluate change over time.

Interpretation

Change over time is assessed by change in raw score, or percentage change from initial (baseline measure). Slowing of the rate of change, or the amount of different between subsequent treatments (as indicated by a levelling off of the graph), could indicate decreasing effectiveness of the treatment. The goal of pain management is to return the injured worker to pre-morbid condition (i.e. without any pain, or to their pre-morbid pain intensity and frequency state).

Combining scales

Where therapists choose number-based measurement options and the same time frames of measurement, this provides the opportunity to combine the intensity and frequency measures into a composite score. The most usual approach is to multiply the intensity and the frequency measures to provide a score of pain intensity*frequency over a set time period. Possible choices and combinations using the metrics in this calculator are outlined below.

<table>
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<tr>
<th>Pain Frequency</th>
<th>1. NIRS</th>
<th>2. VGIRS</th>
<th>3. AVAIS</th>
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</thead>
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<tr>
<td>1. Time count</td>
<td>Multiply</td>
<td>Multiply</td>
<td></td>
</tr>
<tr>
<td>2. VGFRS</td>
<td>Graph</td>
<td>Graph simultaneously</td>
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</tr>
<tr>
<td>3. AVAFS</td>
<td>Multiply</td>
<td>Multiple</td>
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</table>

Options for Uni-dimensional Pain Frequency Scales

1. **Time count:** How many days in the past week have you experienced pain? OR How many hours in the past day have you experienced pain? OR How many hours in the past 2 days have you experienced pain?

This frequency measure of pain provides a whole number that describes pain frequency in the recent past (a week, two days or one day). It is assumed that the level of pain experienced is abnormal for the patient, and is therefore memorable for them. This question is appropriate for initial and review assessments’, providing that the time period between questioning is appropriate (i.e. for the first option there should have been a week between questioning, and for the second and third there should have been at least one – two days). The time period for questioning should be indicated on the calculator using the drop down menu. The ‘benchmark’ should be steady movement throughout the episode of care towards zero days per week pain, or zero hours per day of pain.
2. **Verbal Graphic Frequency Rating Scale (VGFRS)**: How often in the last (…) have you experienced pain? Please choose one of the categories.

No Pain | Occasional | Half the time | Most of the time | Pain all the time

This scale reflects a set of ordered descriptive categories of pain frequency which the Outcomes Calculator represents on the y axis of the outcomes graph. A standard time frame of questioning should be used, such as ‘the last day’, ‘the last two days’ etc. The time period for questioning should be indicated on the drop-down menu on the calculator. The ‘benchmark’ should be steady movement throughout the frequency categories during the episode of care towards ‘no pain’.

3. **Absolute Visual Analogue Frequency Scale (AVAFS)**: How often in the last (…) have you experienced pain? This line represents a continuum of pain frequency experiences, where one end of the line represents no pain and the other represents pain occurring all the time. Please make a mark on the line which best represents your pain frequency in the last …..

No Pain | Pain all the time

Consequently, the Absolute Visual Analogue Frequency Scale reflects an abstract approach to measuring pain frequency (hence the use of the word ‘absolute’, which is conceptually category- and number-free, and where the patient places a mark on a 10cm line indicating the level of pain frequency. There is debate about whether on repeated testing, therapists should discuss with patients what their previous scores were. The ‘number’ is read by the therapist from the left hand side of the line using a centimetre ruler, and entered into the calculator using up to two decimal places. The ‘benchmark’ should be steady movement throughout the episode of care towards zero.

**Options for Uni-dimensional Pain Intensity Scales**

1. **Numeric Intensity Rating Scale (NIRS)**: In the last …., on a scale of 0 – 10, where 10 is pain as bad as it can be, where would you rate your pain, on average?

This approach to measuring pain intensity provides an ordered numeric ranking of pain intensity experience, using an intuitive whole number scale (0-10). It is assumed that the level of pain experienced is abnormal for the patient, and is therefore memorable for them. The Outcomes Calculator also assumes that the patient’s response represents ‘average’ pain over the given time period. If the therapist’s intentions are to measure ‘worst’ pain, they should indicate this on their patient notes. There is no option on the calculator for doing this. Pain intensity can be measured at any time interval using this scale (every day to every week etc). The calculator gives options for time frames. Once chosen, these should be standard throughout an episode of care, and should reflect the choices for the measure of frequency, so that reporting can occur within the same time frame.

**Reliability & validity**

High test–retest reliability has been observed in both literate and illiterate patients with rheumatoid arthritis (r = 0.96 and 0.95, respectively) before and after medical consultation (Hawker et al. 2011). As for construct validity, the NRS was found to be highly correlated to the VAS in patients with...
rheumatic and other chronic pain conditions (pain>6 months): correlations range from 0.86 to 0.95 (Hawker et al. 2011). The NRS tool is also found to be valid for measuring both intensity and unpleasantness of acute pain in children. This scale was found to be the most responsive and the best at being able to detect sex differences in pain intensity when compared to Visual Analogue Scale (VAS), Verbal Rating Scale (VRS), and the Faces Pain Scale-Revised (FPS-R) (Ferreira-Valente, Pais-Ribeiro & Jensen 2011). This is supported by the authors who found in their review that the compared with the VAS and VRS, NRS scale had better compliance rates, better responsiveness and ease of use, and good applicability relative to VAS/VRS (Hjermstad et al. 2011).

2. Verbal Graphic Intensity Rating Scale (VGIRS)

| No Pain | Mild | Moderate | Strong | Pain as bad as it has ever been |

This scale reflects a set of ordered descriptive categories of pain intensity which the Outcomes Calculator represents on the y axis of the outcomes graph. A standard time frame of questioning should be used, such as ‘the last day’, ‘the last two days’ etc. The time period for questioning should be indicated on the drop-down menu on the calculator. The ‘benchmark’ should be steady movement throughout the intensity categories during the episode of care towards ‘no pain’.

Reliability & validity

There is strong support for the validity of this scale studied for detecting changes in pain intensity brought about by 4 different temperature changes (Ferreira-Valente, Pais-Ribeiro & Jensen 2011).

3. Absolute Visual Analogue Intensity Scale (10cm long) how bad has your (average) pain been in the last (….)? This line represents a continuum of pain intensity experiences, where one end of the line represents no pain and the other represents pain as bad as it can be. Please make a mark on the line which best represents your pain frequency in the last ..... 

| No Pain | Pain as bad as it can be |

The Absolute Visual Analogue Intensity Scale (AVAIS) reflects an abstract approach to measuring pain intensity (hence the use of the word ‘absolute’), which is conceptually category- and number-free, and where the patient places a mark on a 10cm line indicating the level of pain intensity. It is generally assumed that that this is the ‘average’ pain experience. If therapists are seeking information on the worst pain over the prescribed time period, they should mark this on the patient’s clinical notes. If the ‘worst pain’ is measured, it should be accompanied by additional information about what activity/activities were associated with this pain. There is debate about whether, on repeated testing, therapists should discuss with patients their previous scores. The ‘number’ is read by the therapist from the left hand side of the line using a centimetre ruler, and entered into the calculator using up to two decimal places. The ‘benchmark’ should be steady movement throughout the episode of care towards zero.

Reliability & validity
This scale has been found to be reliable in children presenting to the emergency department with acute pain. The repeatability coefficient of the VAS for these children was 12 mm when the pain did not change (Bailey, Gravel & Daoust 2012). There is strong support for the validity of this scales studied for detecting changes in pain intensity brought about by 4 different temperature changes (Ferreira-Valente, Pais-Ribeiro & Jensen 2011).

Test–retest reliability has been shown to be good, higher among literate (r = 0.94, P < 0.001) than illiterate patients (r = 0.71, P < 0.001) before and after attending a rheumatology outpatient clinic. The construct validity for VAS, in patients with a variety of rheumatic diseases, has been shown to be highly correlated with a 5-point verbal descriptive scale (“nil,” “mild,” “moderate,” “severe,” and “very severe”) and a numeric rating scale (with response options from “no pain” to “unbearable pain”), with correlations ranging from 0.71–0.78 and 0.62–0.91, respectively (Hawker et al. 2011).

References


Glasgow Pain Questionnaire (GPQ) (Thomas et al 1996)

Background

The Glasgow Pain Questionnaire was developed to assess both the descriptive (frequency, intensity) and reactive dimensions of pain (ability to cope with pain, emotional reaction to pain, restriction of daily activity to pain), in a wide range of individuals irrespective of the chronicity of their pain, their diagnosis or area of injury (Thomas et al 1996).

Measurement

The Glasgow Pain questionnaire is a 24-item, self-administered questionnaire which assesses five pain domains: pain frequency, pain intensity, ability to cope with pain, emotional reaction to pain and restriction of daily activity due to pain. Patients complete all items in the questionnaire, by selecting the “true” or “false” option that corresponds to each statement regarding their pain during the last month.

Scoring

Thomas et al (1996) recommend that a weighted numeric score is assigned to the all of the true responses, rather than simply counting the total number of true responses, as occurs in other scales. The weighted scores, for each pain domain, are subsequently tallied to produce domain scores. The minimum domain score equates numerically to 0 and is interpreted as no pain (frequency or intensity), no difficulties coping with pain, no emotional reaction to pain or no restriction of activities of daily living due to pain. The maximum domain score equates numerically to 10 and is interpreted as constant pain, maximum pain intensity, extreme difficulty coping with pain, extreme emotional reaction due to pain or extreme restriction of activities of daily living due to pain.

The domains and item scores within each domain are provided in Table 2.1.

The benchmark for this scale is decreasing scores throughout the episode of care, to zero.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Comparison

The Glasgow pain questionnaire should be completed on repeated occasions of testing, and the domain scores compared in order to obtain an understanding of any change in the pain experience. Over time, the items or domains where the response remains the same can be flagged as the pain elements that are not responding to intervention.

Interpretation

Clinicians can choose the most appropriate way to tell the story of change in pain dimensions over time using the Glasgow Pain Questionnaire. Clinicians need to decide whether to compare the subsequent domain score with the initial or previous domain score.

Scoring options include:
1. Change in domain scores (for each of the five pain domains), between the initial and subsequent assessments, can be calculated by:
   
   \[
   \text{Change} = (\text{initial domain score} - \text{subsequent domain score})
   \]

2. Change in domain scores (for each of the five pain domains), between the previous and subsequent assessments, can be calculated by:

   \[
   \text{Change} = (\text{previous domain score} - \text{subsequent domain score})
   \]

Regardless of the scoring method used, a decrease in the patient's pain experience is interpreted as a decrease in total scores, on repeated measurements. Moreover, responses to the individual questions as well as the total score should be recorded to facilitate comparisons of pain status over time.

**Validity, reliability and sensitivity to detect change over time**

The Glasgow Pain Questionnaire has been tested thoroughly and convincingly for validity of measurement of the pain experience, reliability of administration and responses, and sensitivity to change over time in individuals with rheumatic disease (Thomas et al 1996), occupational health disorders (Thomas et al 1996) and chronic pain conditions (Penny et al 1999, Smith et al 2001, Thomas et al 1996).

---

**Table 2.1: Weights of items contained in the Glasgow Pain Questionnaire**

<table>
<thead>
<tr>
<th>Glasgow Pain Questionnaire pain domains</th>
<th>Weight for true responses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency</strong></td>
<td></td>
</tr>
<tr>
<td>I rarely have pain</td>
<td>0.3846</td>
</tr>
<tr>
<td>I had the occasional pain or discomfort</td>
<td>0.7692</td>
</tr>
<tr>
<td>I often had some pain or discomfort</td>
<td>2.3077</td>
</tr>
<tr>
<td>I had pain frequently</td>
<td>2.6923</td>
</tr>
<tr>
<td>I had pain all the time</td>
<td>3.8462</td>
</tr>
<tr>
<td><strong>Intensity</strong></td>
<td></td>
</tr>
<tr>
<td>The pain was mild</td>
<td>0.5556</td>
</tr>
<tr>
<td>The pain was uncomfortable</td>
<td>1.3889</td>
</tr>
<tr>
<td>The pain was moderate</td>
<td>1.3889</td>
</tr>
<tr>
<td>I had some strong pain</td>
<td>1.9444</td>
</tr>
<tr>
<td>The pain was severe</td>
<td>2.2222</td>
</tr>
<tr>
<td>The pain was intense</td>
<td>2.5000</td>
</tr>
<tr>
<td><strong>Ability to cope</strong></td>
<td></td>
</tr>
<tr>
<td>The pain was a little difficult to cope with</td>
<td>1.4815</td>
</tr>
<tr>
<td>At times the pain was a bit hard to bear</td>
<td>2.2222</td>
</tr>
<tr>
<td>Sometimes I couldn’t stand the pain</td>
<td>2.9630</td>
</tr>
<tr>
<td>The pain was unbearable at times</td>
<td>3.3333</td>
</tr>
<tr>
<td><strong>Emotional reaction</strong></td>
<td></td>
</tr>
<tr>
<td>I felt upset by the pain</td>
<td>2.0000</td>
</tr>
<tr>
<td>The pain got me down</td>
<td>2.4000</td>
</tr>
<tr>
<td>Pain had made me feel miserable</td>
<td>2.8000</td>
</tr>
<tr>
<td>I felt the pain was wearing me down</td>
<td>2.8000</td>
</tr>
<tr>
<td><strong>Restriction of daily activity</strong></td>
<td></td>
</tr>
<tr>
<td>Pain upset my normal routine</td>
<td>1.6216</td>
</tr>
<tr>
<td>My social life was affected by pain</td>
<td>1.8919</td>
</tr>
<tr>
<td>Pain stopped me from doing the things that I wanted</td>
<td>1.8919</td>
</tr>
<tr>
<td>I could hardly move for the pain</td>
<td>2.1622</td>
</tr>
<tr>
<td>Pain made everything come to a standstill</td>
<td>2.4324</td>
</tr>
</tbody>
</table>
References


GLASGOW PAIN QUESTIONNAIRE

We would like you to answer some questions about any pain or discomfort you may have had in the last month. We are interested in all kinds of pain, even if it was mild or did not last for very long.

Answering the question is simple. Below is a list of descriptions of pain. For each pain description tick the box under TRUE if you have had pain or discomfort like that at any time in the last month. Tick the box under FALSE if you have not had pain like that described in the last month.

Please make sure you tick one TRUE or FALSE for every question. If you are not sure whether to answer TRUE or FALSE think if you could have said the phrase truthfully at any time in the last month.

<table>
<thead>
<tr>
<th>In the last month:</th>
<th>TRUE</th>
<th>FALSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>The pain was mild</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>The pain got me down</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Pain upset my normal routine</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I had pain quite frequently</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>The pain was moderate</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>The pain was unbearable at times</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Pain made everything come to a standstill</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Pain has made me feel miserable</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I had the occasional pain or discomfort</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Sometimes I just couldn’t stand the pain</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>The pain was severe</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I could hardly move for the pain</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I felt upset by the pain</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I had pain all the time</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>The pain was intense</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I often had some pain or discomfort</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>At times the pain was a bit hard to bear</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Pain stopped me from doing the things I wanted to do</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>The pain was uncomfortable</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>My social life was affected by pain</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I rarely had any pain</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>The pain was difficult to cope with</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I felt the pain was wearing me down</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I had some strong pain</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
Graded Chronic Pain Scale (GCPS) (Korff et al 1992)

Background

The Graded Chronic Pain Scale was developed, by Von Korff et al (1992), as a simple method to classify the magnitude of chronic pain in the general population and studies of chronic pain patients in primary care settings. The most current version is published in the Second Edition of Turk and Melzack's Handbook of Pain Assessment (2001).

Measurement

The Graded Chronic Pain Scale consists of eight items, of which three measure pain intensity, two measure frequency and four assess interference of activities of daily living due to pain. Six items require the responses to be graded on an 11-point ordered, categorical scale (0-10), and the remaining items require the patient to provide information on pain frequency (Von Korff 2001).

Scoring

Characteristic Pain Intensity is a 0 to 100 score derived from Questions 2-4:

\[
\text{Mean [Pain Right Now, Worst Pain, Average Pain]} \times 10
\]

Disability Score is a 0 to 100 score derived from Questions 6-8:

\[
\text{Mean [Daily Activities, Social Activities, Work Activities]} \times 10
\]

Disability Days is from Question 5. If using the 3 month version, multiply Disability Days by 2 before calculating Disability Points.

Disability Points Add the indicated points for Disability Days (Question 5) and for Disability Score.

Disability Score

<table>
<thead>
<tr>
<th>Sum of questions 6-8</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-49</td>
<td>1 point</td>
</tr>
<tr>
<td>50-69</td>
<td>2 points</td>
</tr>
<tr>
<td>70+</td>
<td>3 points</td>
</tr>
</tbody>
</table>

Disability Days (If using 3 month version, multiply Disability Days by 2)

<table>
<thead>
<tr>
<th>Question 5</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-14 days</td>
<td>1 point</td>
</tr>
<tr>
<td>15-30 days</td>
<td>2 points</td>
</tr>
<tr>
<td>31+ days</td>
<td>3 points</td>
</tr>
</tbody>
</table>
Graded Chronic Pain Classification

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 0</td>
<td>No pain problem (prior six months or three months)</td>
</tr>
<tr>
<td>Grade I</td>
<td>Characteristic Pain Intensity less than 50 and less than 3 Disability Points.</td>
</tr>
<tr>
<td>Grade II</td>
<td>Characteristic Pain Intensity of 50 or greater and less than 3 Disability Points.</td>
</tr>
</tbody>
</table>

High Interference

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade III</td>
<td>3-4 Disability Points, regardless of Characteristic Pain Intensity.</td>
</tr>
<tr>
<td>Grade IV</td>
<td>5-6 Disability Points regardless of Characteristic Pain Intensity.</td>
</tr>
</tbody>
</table>

Chronicity Classification

- Non-Persistent Pain: 1-89 pain days (Question 1)
- Persistent Pain: 90-180 pain days (Question 1)

Recording

The entire questionnaire should be completed at each administration. The Graded Chronic Pain Scale can be used for a three month reporting interval as well as a six month interval. The only change in scoring required for the three month interval is doubling the number of pain disability days recorded in the six month version. The earlier version of the Scale recorded only back/head/facial pain, whereas the version reported in this manual is an adaptation that is published in the Second Edition of Turk and Melzack's Handbook of Pain Assessment. This version permits asking about a longer list of pain sites, and then grading only the most bothersome pain problem if the patient has more than one. This book is now the definitive reference on Graded Chronic Pain Scale. Items 1 and 3 could be completed if the instrument is used in less than a six-month period. On re-assessment the entire instrument should be re-administered, on a separate recording sheet (Von Korff et al 1992).

Comparison

The main value of this instrument appears to be in obtaining a composite view of the chronic pain experience as a baseline, and as a description of the impact of chronic pain on lifestyle. The retrospectivity of pain assessment (previous six months) in six of the seven questions precludes repeated measurements being taken in less than a six-month period. Thus, comparisons could be taken after a second / third etc six month period using the entire instrument. Two items (Q1 and 4) regarding pain today, and the number of pain days per week of disability, could be used on repeated administrations in less than six-month periods of re-assessment to estimate improvements.
Interpretation

The Graded Chronic Pain Scale ranks the magnitude of chronic pain in a hierarchical structure, so that lower levels of severity (grades I and II) are differentiated by pain intensity and high levels of severity by interference with activities. Thus, interpretation of changes in pain should be based on the grade of the reported pain. For example, patients at higher levels of severity (grades III and IV) can show improvement by reporting a decrease in disability even if pain intensity or persistence does not decrease. In contrast, improvements in pain, at grades I and II, would be reflected a decrease in pain intensity (Von Korff et al 2000). Regardless of the severity of chronic pain, a decrease in the patient’s pain experience is interpreted as a decrease in the scores for each item, a decrease in the magnitude of characteristic pain intensity, disability and persistence and a decrease in chronic pain grade, on repeated measurements.

Validity, reliability and sensitivity to detect change over time

The Graded Chronic Pain Scale has undergone considerable testing for validity, in that the constructs of the scale measure lifestyle impact as well as frequency and intensity in patients who suffer with chronic pain (Von Korff 2001). High levels of concurrent validity have been demonstrated between the Graded Chronic Pain Scale and use of healthcare and medicines, depression and other outcome measures such as the SF-36 and Glasgow Pain Questionnaire, in patients from general practice (Smith et al 1997, Penny et al 1999), those who filled analgesic prescriptions (Penny et al 1999) and individuals with chronic temporo-mandibular joint disorders, headaches and low back pain (Underwood et al 1999, Von Korff et al 1992). High levels of test-retest reliability, over a one-month period, have been demonstrated with patients with lower back pain (Underwood et al 1999) and patients recruited from general practice (Smith et al 1997). There is little evidence of validity or reliability in patients who receive treatment in a pain clinic (Von Korff et al 1992) or evidence of the Graded Chronic Pain Scale’s sensitivity to detect change over time.

References


Graded Chronic Pain Scale

Ask the following questions about the anatomically defined pain site (or sites) of interest, or the most bothersome site of pain identified by filter questions (see Table 4)

1. On how many days in the last six months have had [ANATOMICAL SITE] pain?  
   PAIN DAYS

   IF PAIN NOT PRESENT IN THE PRIOR SIX MONTHS, SKIP THE REMAINING QUESTIONS

2. How would you rate your [ANATOMICAL SITE] pain on a 0 to 10 scale at the present time, that is right now, where 0 is "no pain" and 10 is "pain as bad as could be"?
   
<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
</table>
   No Pain | Pain as bad as it can be

3. In the past six months (or three months), how intense was your worst pain rated on a 0 to 10 scale where 0 is "no pain" and 10 is "pain as bad as could be"?
   
<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
</table>
   No Pain | Pain as bad as it can be

4. In the past six months (or three months), on the average, how intense was your pain rated on a 0 to 10 scale where 0 is "no pain" and 10 is "pain as bad as could be"? [That is, your usual pain at times you were experiencing pain]
   
<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
</table>
   No Pain | Pain as bad as it can be

5. About how many days in the last six months (or three months) have you been kept from your usual activities (work, school or housework) because of [ANATOMICAL SITE] pain?
   
   DISABILITY DAYS
   ____  ____  ____

6. In the past six months (or three months), how much has [ANATOMICAL SITE] pain interfered with your daily activities rated on a 0 to 10 scale where 0 is "no interference" and 10 is "unable to carry on any activities"?
   
<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
</table>
   No Pain | Pain as bad as it can be
7. In the past six months (or three months), how much has [ANATOMICAL SITE] pain interfered with your ability to take part in recreational, social and family activities where 0 is "no interference" and 10 is "unable to carry on any activities"?

   0 1 2 3 4 5 6 7 8 9 10
No Pain                           Pain as bad as it can be

8. In the past six months (or three months), how much has [ANATOMICAL SITE] pain interfered with your ability to work (including housework) where 0 is "no interference" and 10 is "unable to carry on any activities"?

   0 1 2 3 4 5 6 7 8 9 10
No Pain                           Pain as bad as it can be

Questions used to identify a single anatomical site for Graded Chronic Pain Scale questions

1. In the past 6 months, did you have?
   NO   YES   Don't know
   a. Back pain 1 2 8
   b. Neck pain 1 2 8
   c. Headache or migraine? 1 2 8
   d. Stomach ache or abdominal pain? 1 2 8
   e. Joint pain in your arms, hands, legs or feet? 1 2 8
   f. Chest pain? 1 2 8
   g. Facial ache or pain (in the jaw or the joint in front of the ear)? 1 2 8

(IF MORE THAN ONE PAIN PROBLEM ASK Q2, OTHERWISE SKIP TO Q3)

2. Which pain bothered you the most in the past 6 months?
   a. Back 1
   b. Neck 2
   c. Headache 3
   d. Abdominal 4
   e. Joint 5
   f. Chest 6
   g. Facial 7
   h. Don't know 8

If more than one pain problem reported, ask pain grading questions about the pain problem at the anatomical site that bothered the respondent the most in the last six months. If 'several' pain problems were most bothersome, ask person to pick one for pain grading questions.
Short-form McGill Pain Questionnaire (SF-MPQ) (Melzack 1987)

This questionnaire was developed by Ronald Melzack and reproduced with permission only for clinical use in this calculator. Those wishing to use this instrument for research or commercial purposes should contact the author for individual permission for use. Copyright R. Melzack, 1970, 1987.

Background

This instrument aims to evaluate the intensity of pain experienced by an individual, to monitor pain over time and to determine the effectiveness of any interventions. It was developed on post-surgical, obstetric, and low back and neck-and-shoulder pain patients, whose pathology was non-specific. It is a self-administered questionnaire, originally designed in English.

Measurement and Scoring

Section A contains 15 representative words from the sensory and affective categories of the full version MPQ. The first 11 descriptors represent the sensory component, and the final 4 descriptors (beginning with ‘tiring-exhausting’) represent the affective component. Scores for each component (sensory and affective) are obtained by summing the intensity ratings (0–3) for the words selected by the patient. A total score is obtained by summing the sensory and affective scores. In the following example the sensory component score = 5, the affective score = 4, and the total score = 9.

<table>
<thead>
<tr>
<th>None (0)</th>
<th>Mild (1)</th>
<th>Moderate (2)</th>
<th>Severe (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Throbbing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shooting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stabbing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sharp</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cramping</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gnawing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hot-burning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aching</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Splitting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tiring-exhausting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sickening</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fearful</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Punishing-cruel</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Two other separate sections provide additional information on pain. Section B = an AVAS scale to describe symptom intensity using a 10 cm line on which patients rate their pain intensity during the last week, and Section C = a single choice of words which describe the current pain nature/presentation to which a score is ascribed. A total score can be computed as the sum of A, B and C, however it is usual to separate the scores for the three sections.
Interpretation

Score reduction over time is the most logical approach to interpretation, and comparisons could be made using raw scores over the episode of care, or percentage change compared with the initial (baseline) score.

Validity, reliability and sensitivity to change

Internal consistency has not been undertaken using psychometric studies in English. However in a study of 100 women with Fibromyalgia and Osteoarthritis, Burckhardt and Bjelle (1993) evaluated the Swedish version of this questionnaire. The results indicate the Cronbach’s alphas in a range of 0.73 to 0.89 indicating good internal consistency. Test–retest reliability in the above population ranged from 0.43 to 0.73 (Burckhardt and Bjelle 1993). Validity has been assessed in terms of concurrent validity, in which SF-MPQ correlated highly with the major Pain Rating Index (PRI) indices of the Long-form McGill Pain Questionnaire (LF-MPQ) and was sensitive to traditional clinical therapies. The sensory, affective and total scores of the SF and LF were significantly correlated. As related to pain intervention, the SF and LF MPQ demonstrated the significant effects of analgesic drugs, epidural blocks and TENS in musculoskeletal pain patients. Similarly, Burckhardt and Bjelle (1993) also identified significant convergent construct validity between SF-MPQ and other pain measurements. Sensitivity of the SF-MPQ has been demonstrated by Melzack (1987) in which the SF-MPQ was able to differentiate between differences from treatment over the progress of treatment.

Hawker et al. (2011) report on the findings of a study where for internal consistency, using the SF-MPQ in rheumatoid arthritis (RA) and fibromyalgia patients, Cronbach’s alphas were estimated at alpha= 0.73–0.89. In the same study, they report, test–retest reliability ranged from 0.45–0.73 for 1-month and 3-month intervals. They found that among rheumatology patients, test–retest reliability was 0.79–0.93 at intervals of 1 to 3 days. While in an OA population, high intraclass correlations were demonstrated for the total, sensory, affective, and average pain scores (5-day period): 0.96, 0.95, 0.88, and 0.89. They found the SF-MPQ to have more content validity among patients with fibromyalgia than for those with RA. For construct validity, the SF-MPQ was found to be moderately correlated with both the Western and Ontario and McMaster Universities Osteoarthritis Index and the Short Form 36 Health Survey bodily pain scales (r = 0.36 and -0.36, respectively; P < 0.01) in 200 patients with hip and knee OA. Cross cultural validity was tested and the internal consistency of SF-MPQ was found to be high: Hispanics 0.90 and non-Hispanics 0.89 (Zinke et al. 2010).

References

Short-Form McGill Pain Questionnaire (SF-MPQ)

A. Please describe your pain during the last week. (Check off one box per line.)

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Throbbing</td>
<td>0 □</td>
<td>1 □</td>
<td>2 □</td>
<td>3 □</td>
</tr>
<tr>
<td>2. Shooting</td>
<td>0 □</td>
<td>1 □</td>
<td>2 □</td>
<td>3 □</td>
</tr>
<tr>
<td>3. Stabbing</td>
<td>0 □</td>
<td>1 □</td>
<td>2 □</td>
<td>3 □</td>
</tr>
<tr>
<td>4. Sharp</td>
<td>0 □</td>
<td>1 □</td>
<td>2 □</td>
<td>3 □</td>
</tr>
<tr>
<td>5. Cramping</td>
<td>0 □</td>
<td>1 □</td>
<td>2 □</td>
<td>3 □</td>
</tr>
<tr>
<td>6. Gnawing</td>
<td>0 □</td>
<td>1 □</td>
<td>2 □</td>
<td>3 □</td>
</tr>
<tr>
<td>7. Hot-burning</td>
<td>0 □</td>
<td>1 □</td>
<td>2 □</td>
<td>3 □</td>
</tr>
<tr>
<td>8. Aching</td>
<td>0 □</td>
<td>1 □</td>
<td>2 □</td>
<td>3 □</td>
</tr>
<tr>
<td>9. Heavy (like a weight)</td>
<td>0 □</td>
<td>1 □</td>
<td>2 □</td>
<td>3 □</td>
</tr>
<tr>
<td>10. Tender</td>
<td>0 □</td>
<td>1 □</td>
<td>2 □</td>
<td>3 □</td>
</tr>
<tr>
<td>11. Splitting</td>
<td>0 □</td>
<td>1 □</td>
<td>2 □</td>
<td>3 □</td>
</tr>
<tr>
<td>12. Tiring-Exhausting</td>
<td>0 □</td>
<td>1 □</td>
<td>2 □</td>
<td>3 □</td>
</tr>
<tr>
<td>13. Sickening</td>
<td>0 □</td>
<td>1 □</td>
<td>2 □</td>
<td>3 □</td>
</tr>
<tr>
<td>14. Fear-causing</td>
<td>0 □</td>
<td>1 □</td>
<td>2 □</td>
<td>3 □</td>
</tr>
<tr>
<td>15. Punishing-Cruel</td>
<td>0 □</td>
<td>1 □</td>
<td>2 □</td>
<td>3 □</td>
</tr>
</tbody>
</table>

B. Please rate your pain during the last week.

The following line represents pain of increasing intensity from “no pain” to “worst possible pain”. Place a vertical mark (|) across the line in the position that best describes your pain during the last week.

<table>
<thead>
<tr>
<th>No Pain</th>
<th>Worst Possible Pain</th>
<th>Score in mm (Investigator’s use only)</th>
</tr>
</thead>
</table>

C. Current pain intensity

0 □ No pain
1 □ Mild
2 □ Discomforting
3 □ Distressing
4 □ Horrible
5 □ Excruciating
Generic Patient-Specific Scale (GPSS) (Stratford et al 1995)

Background

The Patient-specific scale is a generic outcome instrument that assesses problem areas that are specific to each individual (Stratford et al 1995). This type of outcome measure is based on the patient-centred (generated) approach, where patients identify their most problematic areas of functioning. This outcome measure can be applied to any injured individual irrespective of their diagnosis or area of injury (Donnelly and Carswell 2002).

Measurement

Patients nominate five activities which they feel are constrained by their condition. These activities are unique to the patient, and can reflect family, recreational and / or work-related activities. For each of these activities, the patient rates the extent to which the activity is constrained, on an 11 point scale (0 - 10), with 0 equating to ‘do it with no problems’ and 10 equating to ‘can’t do it at all’. Over time, this scale also provides the opportunity for patients to nominate other activities which are constrained by their problem, should any of the initial five activities no longer be considered to be constrained.

Scoring

A total score can be determined by summing the responses for the five nominated activities at any one point in time. Alternatively, each activity score can be used for ongoing assessment.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Comparison

Change in scores over time can be computed for total as well as individual activity scores.

Interpretation

Clinicians can choose the most appropriate way to tell the story of change in status over time using the generic patient-specific scale. Clinicians need to decide whether to compare the:

- Subsequent assessment score with the initial or previous score;
- Total scores or scores for each nominated activity; and
- Raw scores or percentage change.
Scoring options in the calculator include:

1. Change in raw scores, between the initial and subsequent assessments, for each activity, can be calculated by:
   \[(\text{initial activity 1 score} - \text{subsequent activity 1 score})\]

2. Change in raw scores, between the previous and subsequent assessments, for each activity, can be calculated by:
   \[(\text{previous activity 1 score} - \text{subsequent activity 1 score})\]

3. Change in total raw score, between the initial and subsequent assessments for all the activities nominated, can be calculated by:
   \[(\text{initial total score} - \text{subsequent total score})\]

4. Change in total raw score, between the previous and subsequent assessments for all the activities nominated, can be calculated by:
   \[(\text{previous total score} - \text{subsequent total score})\]

5. Percentage change, between the initial and subsequent assessments, for each activity, can be calculated by
   \[
   \left(\frac{\text{initial activity 1 score} - \text{subsequent activity 1 score}}{\text{initial activity 1 score}}\right) \times 100
   \]

6. Percentage change, between the previous and subsequent assessments, for each activity, can be calculated by:
   \[
   \left(\frac{\text{previous activity 1 score} - \text{subsequent activity 1 score}}{\text{previous activity 1 score}}\right) \times 100
   \]

7. Percentage change in total score, between the initial and subsequent assessments for all the activities nominated, can be calculated by:
   \[
   \left(\frac{\text{initial total score} - \text{subsequent total score}}{\text{initial total score}}\right) \times 100
   \]

8. Percentage change in total score, between the previous and subsequent assessments for all of the activities nominated can be calculated by:
   \[
   \left(\frac{\text{previous total score} - \text{subsequent total score}}{\text{previous total score}}\right) \times 100
   \]

The most important information at present is provided by the scores assigned to the difficulty of undertaking the activity. Summing the scores into an overall index of activity (disability) has the same issues as summing the information from any other ordered categorical scale. Identifying those activities which do not change over time may assist the clinician to identify aspects of the patient’s problem which is not being assisted by treatment. Regardless of the scoring method used, a decrease in the patient’s disability is interpreted as a decrease in each activity score or the total score, on repeated measurements.
Validity, reliability and sensitivity to detect change over time

This scale uses patient-identified activities, and seems valid for each patient using the scale. High levels of concurrent validity have been demonstrated with the Roland Morris Questionnaire, for individuals with low back pain (Stratford et al 1995), physical factor component of the SF-36 for individuals with knee dysfunction (Chatman et al 1997), and the neck disability index, for individuals with cervical disorders (Westaway et al 1998). High levels of test-retest reliability have been demonstrated with patients with lower back pain, knee dysfunction and cervical disorders. The patient-specific scale appears to be a more sensitive measure to detect change in these populations compared with standard self-report health status questionnaires (Chatman et al 1997, Stratford et al 1995, Westaway et al 1998). However, this outcome measure is generic and little research regarding its validity, reliability and sensitivity to detect change over time has been undertaken on a range of diagnoses or areas of injury.

References

Generic patient-specific scale

INITIAL ASSESSMENT
Please identify up to 5 important activities related to your usual duties at work or at home that you are unable to do, or have difficulty with, as a result of your health problem. Write them in the box below.

Today, how difficult do you find each of these activities? (Put a number in the box against today’s date indicating your level of difficulty. Use the scale below for each activity)

0 1 2 3 4 5 6 7 8 9 10
Do it with no problems Can’t do it at all

Dates

A. ACTIVITY

1
2
3
4
5

For recording other difficulties which the patient may identify at later dates

1
2
3
4
5

AT FOLLOW-UP VISITS

On previous visits, you had difficulty with the activities on the above list. Today, how much difficulty do you have with these activities? (Please rate your level of difficulty in the appropriate box using the scale above)

This form is adapted with permission of the authors and publisher, from Stratford P, Gill C, Westaway M and Binkley J (1995): Physiotherapy Canada 47 (4): 262.
Dizziness Handicap Inventory (DHI) (Jacobson and Newman 1990)

Reproduced with permission by developers Dr. G.P. Jacobson and Dr. C.W. Newman

**Background**

This instrument evaluates the self-perceived handicapping effects imposed by vestibular system disease. It was developed on patients presenting for vestibulometric tests, with non-specific pathologies. It is designed as a self-administered questionnaire and was originally developed in English.

**Measurement and Scoring**

This is a 25 item instrument, which records answers as Yes, No, Sometimes. Three subscales are reported (functional, emotional and physical). The questions corresponding to each subscale are shown in the table below. Domain scores and a total score are generated from the sum of differential numeric scores assigned to these categories (for ease of computation the CAHE Outcomes Calculator scores Yes=1, occasionally=0.5 and No=0).

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Corresponding questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional</td>
<td>3, 5, 6, 7, 12, 14, 16, 19, 24</td>
</tr>
<tr>
<td>Emotional</td>
<td>2, 9, 10, 15, 18, 20, 21, 22, 23</td>
</tr>
<tr>
<td>Physical</td>
<td>1, 4, 8, 11, 13, 17, 25</td>
</tr>
</tbody>
</table>

**Comparison and Interpretation**

Comparison between repeated scores could be made between raw scores, or as percentage change from baseline (original) score.

**Validity, Reliability and Sensitivity**

The authors demonstrate a Cronbach’s coefficient alpha for final version: 0.89 (total score); 0.85 (functional subscale); 0.72 (emotional subscale) and 0.78 (physical subscale). Test-retest reliability is reported as Pearson product-moment correlation coefficient (same day): 0.97 (total score); 0.94 (functional subscale), 0.97 (emotional subscale) and 0.92 (physical subscale). Construct validity is reported as, with the exception of the physical subscale, mean values for DHI functional and emotional subscores increased significantly (p=0.001) with increases in the frequency of dizziness episodes. There is no comment on sensitivity.

The DHI in Italian is found to be reliable and is recommended as a measure of disability in patients with dizziness and unsteadiness with a Cronbach α coefficients for internal consistency of 0.92 and 0.82, 0.84 and 0.75 for the sub-scale functional, emotional and physical, respectively (Nola et al. 2010).

**References**


### Dizziness Handicap Inventory

1. Does looking up increase your problem?  
   - Yes  
   - Sometimes  
   - No  

2. Because of your problem, do you feel frustrated?  
   - Yes  
   - Sometimes  
   - No  

3. Because of your problem, do you restrict your travel for business or recreation?  
   - Yes  
   - Sometimes  
   - No  

4. Does walking down the aisle of a supermarket increase your problem?  
   - Yes  
   - Sometimes  
   - No  

5. Because of your problem, do you have difficulty getting into or out of bed?  
   - Yes  
   - Sometimes  
   - No  

6. Does your problem significantly restrict your participation in social activities such as going out to dinner, going to movies, dancing, or to parties?  
   - Yes  
   - Sometimes  
   - No  

7. Because of your problem, do you have difficulty reading?  
   - Yes  
   - Sometimes  
   - No  

8. Does performing more ambitious activities like sports, dancing, household chores such as sweeping or putting dishes away increase your problem?  
   - Yes  
   - Sometimes  
   - No  

9. Because of your problem, are you afraid to leave your home without having some one accompany you?  
   - Yes  
   - Sometimes  
   - No
10. Because of your problem, have you been embarrassed in front of others?
   - Yes
   - Sometimes
   - No

11. Do quick movements of your head increase your problem?
   - Yes
   - Sometimes
   - No

12. Because of your problem, do you avoid heights?
   - Yes
   - Sometimes
   - No

13. Does turning over in bed increase your problem?
   - Yes
   - Sometimes
   - No

14. Because of your problem, is it difficult for you to do strenuous housework or yardwork?
   - Yes
   - Sometimes
   - No

15. Because of your problem, are you afraid people may think you are intoxicated?
   - Yes
   - Sometimes
   - No

16. Because of your problem, is it difficult for you to walk by yourself?
   - Yes
   - Sometimes
   - No

17. Does walking down a sidewalk increase your problem?
   - Yes
   - Sometimes
   - No

18. Because of your problem, is it difficult for you to concentrate?
   - Yes
   - Sometimes
   - No
<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>19. Because of your problem, is it difficult for you to walk around your house in the dark?</td>
<td>Yes, Sometimes, No</td>
</tr>
<tr>
<td>20. Because of your problem, are you afraid to stay home alone?</td>
<td>Yes, Sometimes, No</td>
</tr>
<tr>
<td>21. Because of your problem, do you feel handicapped?</td>
<td>Yes, Sometimes, No</td>
</tr>
<tr>
<td>22. Has your problem placed stress on your relationships with members of your family or friends?</td>
<td>Yes, Sometimes, No</td>
</tr>
<tr>
<td>23. Because of your problem, are you depressed?</td>
<td>Yes, Sometimes, No</td>
</tr>
<tr>
<td>24. Does your problem interfere with your job or household responsibilities?</td>
<td>Yes, Sometimes, No</td>
</tr>
<tr>
<td>25. Does bending over increase your problem?</td>
<td>Yes, Sometimes, No</td>
</tr>
</tbody>
</table>
Migraine Disability Assessment Questionnaire (MIDAS)

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Background

This instrument assesses headache-related disability with the aim of improving migraine care. It was developed on individuals using a computer-assisted telephone interview diagnosis of migraine headache (reliability study), or physician confirmed migraine diagnosis (validity study). The pathology of the headaches was not specified. The instrument is a self-administered questionnaire, written originally in English.

Measurement and Scoring

The instrument contains 7 items of which 5 are used to derive the MIDAS score. These five items record the number of days in the past three months on which migraine interfered with usual activities.

<table>
<thead>
<tr>
<th>Grading System for MIDAS Questionnaire</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Score</strong></td>
</tr>
<tr>
<td>(sum of Q’s 1-5)</td>
</tr>
<tr>
<td>0-5</td>
</tr>
<tr>
<td>6-10</td>
</tr>
<tr>
<td>11-20</td>
</tr>
<tr>
<td>21+</td>
</tr>
</tbody>
</table>

Validity, Reliability and Sensitivity

The instrument has a reported high internal consistency using Cronbach’s coefficient alpha: 0.76 (US); 0.73 (UK). Its test-retest reliability is reported by Pearson correlation coefficients (21 or 22 days): 0.80 (total score) and ranged from 0.54-0.68 (US) and 0.52-0.82 (UK) for individual questions. Face validity is indicated as 89% of primary care physicians, neurologists and headache specialists sampled rated the MIDAS as “very easy”, “easy” or “not difficult” to complete; MIDAS scores correlated with physician judgements about pain, disability and the need for medical care. Content validity is indicated by Pearson correlation coefficients between individual MIDAS items and composite measures from a 90-day diary (“gold standard”) ranged from 0.50 to 0.77 and between the total score and the equivalent diary measure (0.63) indicate that the MIDAS provides a reasonably accurate composite measure of headache related disability. There is no information on Sensitivity.

Reference

### The Midas Questionnaire

**Instructions**: Please answer the following questions about ALL your headaches you have had over the last three months. Write your answer in the box next to each question. Write zero if you did not do the activity in the last 3 months.

<table>
<thead>
<tr>
<th></th>
<th>Question</th>
<th>Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>On how many days in the last 3 months did you miss work or school because of your headaches?</td>
<td>days</td>
</tr>
<tr>
<td>2</td>
<td>How many days in the last 3 months was your productivity at work or school reduced by half or more because of your headaches?</td>
<td>days</td>
</tr>
<tr>
<td></td>
<td><em>(Do not include days you counted in question 1 where you missed work or school)</em></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>On how many days in the last 3 months did you not do household work because of your headaches?</td>
<td>days</td>
</tr>
<tr>
<td>4</td>
<td>How many days in the last 3 months was your productivity in household work reduced by half or more because of your headaches?</td>
<td>days</td>
</tr>
<tr>
<td></td>
<td><em>(Do not include days you counted in question 3 where you did not do household work)</em></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>On how many days in the last three months did you miss family, social or leisure activities because of your headaches?</td>
<td>days</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td>days</td>
</tr>
<tr>
<td>A</td>
<td>On how many days in the last 3 months did you have a headache? <em>(If a headache lasted more than 1 day, count each day)</em></td>
<td>days</td>
</tr>
<tr>
<td>B</td>
<td>On a scale of 0-10, on average how painful were these headaches? <em>(Where 0 = no pain at all, and 10 = pain as bad as it can be)</em></td>
<td>days</td>
</tr>
</tbody>
</table>

Please note: Questions A and B measure the frequency of Migraine and the severity of headache pain. They are not used to reach the MIDAS score.

**Measurement**

Each of the questions asks for a categorical response to a positive question, as opposed to the affirming responses to negative questions in the last three disability indexes (for neck and back pain). The WL-26 is thus more in line with the 2000 WHO classifications of disease, with the focus on activity and ability, rather than disability. Each question receives a 1 for the response of ‘all of the time’, 0.5 for a response of ‘half of the time’ and a 0 for a negative response (‘none of the time’). The total score is the sum of the numbers assigned to each category. More information about the instrument can be obtained from [www.benamick.com](http://www.benamick.com).

**Validity and reliability**

There is some evidence of the validity of this questionnaire in capturing information on an injured worker’s ability to manage the behavioural aspects of the workplace and his/her responsibilities within it. There is little published on the reliability of responses to date.

**Comparison**

Comparison over time is by comparing change in the overall scores, and also in the individual items, as discussed with other similar scales (for instance the Roland Morris Questionnaire). As this instrument aims to measure positive responses, an increase in the total score (and a decrease in the number of responses that attract a 0) is the goal of treatment.

**Recording**

The entire questionnaire needs to be completed at each administration.

**Interpretation**

Obtaining 26 positive responses is the goal of this questionnaire, therefore interpretation of the information provided by this instrument over time is to seek decreases between the actual score and the possible total. This could be provided by either a decrease in the difference between the raw score and the possible total (26), or a decrease in the percentage deficit, using the formula

\[
\frac{(26 - \text{raw score})}{26} \times 100
\]

**References**

**Work-Related Disability (WI-26)**

This instrument seeks responses in three categories to the following questions over the previous four week period (none of the time, half of the time, all of the time)

*In the last four weeks how often did the following things occur?*

1. Getting to work on time.
2. Sticking to a routine or schedule without having to rearrange or reassign your work tasks.
3. Working without taking frequent rests or breaks to avoid discomfort.
4. Working the required number of hours.
5. Handling very demanding or stressful work situations.
6. Doing your work without becoming tense or frustrated.
7. Doing your work carefully.
8. Satisfying those people who judge your work.
10. Finishing work on time.
11. Handling the workload.
12. Lifting, carrying, or moving objects at work weighing 10 pounds or less.
13. Lifting, carrying, or moving objects at work weighing more than 10 pounds.
14. Walking more than one block or climbing up or down one flight of stairs while working.
15. Sitting, standing, or staying in one position for longer than 15 minutes while working.
16. Bending, twisting, or reaching while working.
17. Using hand-operated tools or equipment (for example, pen, drill, sander, keyboard, or computer mouse).
18. Using your upper body to operate tools or equipment (upper body means arms, head, neck, shoulders, or upper back).
19. Using your lower body to operate tools or equipment (lower body means legs, knees, feet, or lower back).
20. Keeping your mind on your work.
21. Keeping track of more than one task or project at the same time.
22. Concentrating on your work.
23. Remembering things having to do with your work.
24. Talking with people in person, in meetings, or on the phone.
25. Controlling irritability or anger towards people when working.
26. Helping other people to get work done
Timed Up and Go Test [TUGT] (Mathias et al 1986) (adapted by Podsaidlo and Richardson 1991)

Measurement

Measurement is continuous integer measure of time measured in seconds. This can be compared with benchmarks (see below). Since the late 1980s, this test has been used to assess dynamic balance in various populations include the elderly, children and those with disabilities (Habib et al 1999, MacKnight and Rockwood 1995). After the original reported test (Mathais et al 1986), there are several versions of the test reported in the literature, including versions of the Timed up and go Test (TUGT) (Podaïllo and Richardson 2000), and the Expanded Timed Get Up and Go Test (ETGUGT)(Wall et al 2000). See test instructions on pp 39 for details of test variations.

Validity and reliability

The test has acceptable face and content validity, in that it assesses dynamic balance during functional tasks (transfers and walking). The only difficulty is that a significant proportion of the elderly are unable to stand or walk unassisted (MacKnight and Rockwood 1995). Evidence of validity and reliability is provided for the TUGT in a number of publications. Podsaidlo and Richardson (2000) demonstrated good to excellent correlations between the Timed Up and Go Test, and the Berg-Balance Scale, gait speed and Barthel Index of ADL. When testing on lower limb amputees, Schoppen et al (1999) showed moderate to good relationships between TUGT and Croningen Activity Restriction Scale (GARS) and the physical subscales of the Sickness Impact Profile 68 items version. Shumway-Cook et al (2000) found high sensitivity and specificity when using the scale to predict people likely to fall.

High inter-and intra-rater reliability has been reported (Podsaidlo and Richardson 2000, Schoppen et al 1999, Shumway-Cook et al 2000) for a range of clinicians, such as doctors, physiotherapists, occupational therapists and medical students, when the Timed Up and Go Test was used within a 24 hour period (Podaïllo and Richardson 1991).

The TUG is found to be an appropriate tool for clinical assessment of functional mobility even in healthy older adults (Herman, Giladi & Hausdorff 2010). It does not suffer from ceiling effect limitations, is normally distributed and is apparently related to executive function. The Timed Up and Go Test with dual task for predicting the risk of falls was found to be faster, have simpler performance, possess high criterion validity and very good retest reliability (Hofheinz & Schusterschitz 2010). A Smartphone-based instrumented Timed Up and Go was found to have excellent inter-rater and intra-rater reliability. Thus, suggesting that a smartphone has the potential to become a pervasive and low-cost tool for the quantitative analysis of balance and mobility (Mellone, Tacconi & Chiari 2012). The reliability and validity of the TUG instrument was found to be high in a population of seniors living in their own homes or in institutions; however it should not be used to discriminate between persons with a high or low fall risk in old age (Rydwik et al. 2011). The instrumented TUG test is sensitive to untreated Parkinsons Disease (PD) and could potentially detect progression of PD and response to symptomatic and disease-modifying treatments (Zampieri et al. 2010).

Comparison
The time taken to complete TUGT is positively predictive of the level of functional mobility (i.e. the more time taken, the more dependent in activities of daily living). ETGUGT is shown to sensitively differentiate between different levels and types of functional disability (Wall et al 2000).

**Recording**

This test was originally scored by the clinician, on a five-point ordinal scale, which indicated the degree to which the patient was at risk of falling. “Normal” meant that there was no risk of the patient falling at the time of the test (or at any other time) and “severely abnormal” meant that the patient was at risk of falling whilst performing the test (Mathias et al 1986). The time taken to complete the Timed Up and Go Test can also be recorded and is usually used for reassessment (MacKnight and Rockwood 1995).

1. Normal
2. Very slightly abnormal
3. Mildly abnormal
4. Moderately abnormal
5. Severely abnormal (Mathias et al 1986)

The test outcome is recorded now in seconds, and requires no specific form or instrument for recording. The form of the TUGT which is used should be noted. The test requires a stopwatch, a chair of appropriate height (with or without arms), and tape marked on a walkway to identify the length of the walk test.

**Interpretation**

TUGT According to Shumway-Cook et al (2000), the cut off for TUGT alone is 13.5 seconds or longer, at which point there is an overall correct prediction rate of 90% for fallers. This value differs from Podsaidlo and Richardson (2000), who identified that patients who took less than 20 seconds to complete the test were independently mobile of basic transfers (tub, shower) and could climb stairs and go outside alone. Those who took over 30 seconds to complete the test were dependent on help for basic transfers, and were unable to go outside alone.

Shumway-Cook et al (2000) suggest that the cut off value for TUGT_cognitive is 15 seconds or longer, with an overall correct prediction rate of fallers of 87%, and for TUGT_manual it is 14.5 seconds or longer with a 90% correct prediction rate for fallers.

For the ETGUGT, an at-risk group of patients who were known fallers, or had a fear of falling, were significantly differentiated by this test from groups of non-impaired young, and non-impaired elderly patients (Wall et al 2000). On average they took 10 seconds longer than the non-impaired subjects to complete the task.

**References**


**Timed ‘Up & Go’ Test (TUGT)**

Patients are timed (in seconds) when performing the relevant version of TUGT. There are three suggested conditions for testing.

1. **TUGT Alone:** from sitting in a chair, stand up, walk three metres, turn around, walk back, and sit down (*Schoppen et al 1999, Shumway-Cook et al 2000*)
2. **TUGT_cognitive:** Complete task 1 while counting backwards from a randomly selected number between 20 and 100. (*Shumway-Cook et al 2000*)
3. **TUGT_manual:** Complete task 1 while carrying a full cup of water (*Shumway-Cook et al 2000*)

*Schoppen et al (1999) (pp10) suggests that the chair should have a seat height of 46cm, with an arm height of 67 cm. Subjects should use their regular footwear and their usual walking aids. ‘After the patient states that he or she is ready, the test starts. On the word ‘go’, the patient stands, walks to a line on the floor 3 metres away (on a standard short-piled carpet with a length of 4 metres and a width of 1 metre), turns, walks back to the chair and sits down. The end of the test is defined when the patient’s buttocks first touch the seat surface. Patients choose their own comfortable and safe walking speed.’*

**Extended Timed ‘get up & go’ Test (ETGUGT)**

‘A 10 metre walkway is used for better delineation of the component phases of the test’ (*Wall et al 2000 pp2*). An armless chair is used, of the same seat height as the TUGT, positioned at the start of the walkway. ‘Coloured electrical tape is placed on the floor at 2, 8, 9 and 10 metres. The final metre of the walkway is taped off (as in a box), indicates the area in which the subjects were asked to turn around’. The same instructions were given as in the TUGT.

Differences are in the measurements that are taken. The stopwatch is activated on the word ‘Go’, and interim measures are taken when:

a. the subject is standing upright
b. as the subject passed the 2 metre mark
c. as the subject passed the 8 metre mark
d. as the subjects passed the 8 metre mark when returning
e. as the subject passed the 2 metre mark when returning’

The stopwatch is stopped when the subject is seated.

**The phases of the task** are isolated as:

<table>
<thead>
<tr>
<th>Phase</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Go – a</td>
<td>Sit to stand</td>
</tr>
<tr>
<td>a – b</td>
<td>Gait 1 initiation</td>
</tr>
<tr>
<td>b – c</td>
<td>Walk 1</td>
</tr>
<tr>
<td>c – d</td>
<td>Turn Around</td>
</tr>
<tr>
<td>d – e</td>
<td>Walk 2</td>
</tr>
<tr>
<td>e – f</td>
<td>Slow down, stop, turn around and sit down</td>
</tr>
</tbody>
</table>
Fear-Avoidance Beliefs Questionnaire

Background

The Fear-Avoidance Beliefs Questionnaire (FABQ) was developed to measure patients’ beliefs about how physical activity and work affect their low back pain. It can help identify patients for whom psychosocial interventions may be beneficial.

Measurement

The FABQ is a 16-item, self-administered questionnaire where patient rates how much physical activity and work affects their low back pain, on a 7-point scale (0-6), with 0 as “completely disagree” and 6 with “completely agree.” There are 2 subscales: scale 1 is the fear-avoidance beliefs about work and scale 2 is the fear-avoidance beliefs about physical activity.

Scoring

Scale 1 is the sum of scores obtained from items 6-7, 9-12 and 15, with 42 as the maximum possible score. Scale 2 or fear-avoidance beliefs about physical activity is the sum of scores from items 2-5, with 24 as the maximum possible score. The minimum score is 0 which equates to having no avoidance beliefs on work and physical activity secondary to low back pain.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Comparison

The FABQ should be completed on repeated occasions of testing, and the scores should be compared between testings in order to obtain an understanding of any change in the pain experience.

Interpretation

Cut-point scores for the activity scale (>29) and the work scale (>32) have been reported as clinical indicators of poor outcome for patients with low back pain presentations. A cut-off score for the activity scale (>15) to identify patients with significant issues of fear avoidance has been proposed by Burton et al (1999), while Fritz and George (2002) reported that the FABQ work scale scores above 34 were associated with an increased risk of not returning to work.

Validity, reliability and internal consistency

The FABQ developmental literature reports high Pearson r values for intratester reliability and test-retest, high Kappa statistics> 0.7 and Cronbach’s alpha statistics (>0.8) for internal consistency and sound comparison testing for criterion and construct validity. Wadell et al reported an internal consistency of (alpha) 0.88 for scale 1 and 0.77 for scale 2.

The FABQ is moderately correlated with the Modified Somatic Perception Questionnaire with a Pearson r-value of 0.4 and highly correlated with the Tampa scale (TSK11). The reliability and validity of the FABQ to
screen Upper Extremity compensated injured workers for FAB was limited as there was a high ceiling effect, and lower than desired reliability for individual discrimination (Inrig et al. 2012).
References


Fear-Avoidance Beliefs Questionnaire

Here are some of the things which other patients have told us about their pain. For each statement please circle any number from 0 to 6 to say how much physical activity such as bending, lifting, walking or driving affect or would affect your back pain.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Completely disagree</th>
<th>Unsure</th>
<th>Completely agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. My pain was caused by physical activity.</td>
<td>0</td>
<td>1</td>
<td>2 3 4 5 6</td>
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<tr>
<td>2. Physical activity makes my pain worse.</td>
<td>0</td>
<td>1</td>
<td>2 3 4 5 6</td>
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<tr>
<td>3. Physical activity might harm my back.</td>
<td>0</td>
<td>1</td>
<td>2 3 4 5 6</td>
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<td>4. I should not do physical activities which (might) make my pain worse.</td>
<td>0</td>
<td>1</td>
<td>2 3 4 5 6</td>
</tr>
<tr>
<td>5. I cannot do physical activities which (might) make my pain worse.</td>
<td>0</td>
<td>1</td>
<td>2 3 4 5 6</td>
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<tr>
<td>6. My pain was caused by my work or by an accident at work.</td>
<td>0</td>
<td>1</td>
<td>2 3 4 5 6</td>
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<tr>
<td>7. My work aggravated my pain.</td>
<td>0</td>
<td>1</td>
<td>2 3 4 5 6</td>
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<td>8. I have a claim for compensation for my pain.</td>
<td>0</td>
<td>1</td>
<td>2 3 4 5 6</td>
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<td>9. My work is too heavy for me.</td>
<td>0</td>
<td>1</td>
<td>2 3 4 5 6</td>
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<td>10. My work makes or would make my pain worse.</td>
<td>0</td>
<td>1</td>
<td>2 3 4 5 6</td>
</tr>
<tr>
<td>11. My work might harm my back.</td>
<td>0</td>
<td>1</td>
<td>2 3 4 5 6</td>
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<tr>
<td>12. I should not do my normal work with my present pain.</td>
<td>0</td>
<td>1</td>
<td>2 3 4 5 6</td>
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<tr>
<td>13. I cannot do my normal work with my present pain.</td>
<td>0</td>
<td>1</td>
<td>2 3 4 5 6</td>
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<tr>
<td>14. I cannot do my normal work till my pain is treated.</td>
<td>0</td>
<td>1</td>
<td>2 3 4 5 6</td>
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<tr>
<td>15. I do not think that I will be back to my normal work within 3 months.</td>
<td>0</td>
<td>1</td>
<td>2 3 4 5 6</td>
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<tr>
<td>16. I do not think that I will ever be able to go back to that work.</td>
<td>0</td>
<td>1</td>
<td>2 3 4 5 6</td>
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</table>
Resumption of Activities of Daily Living Scale

Background

The Resumption of Activities of Daily Living (RADL) Scale assesses the extent of recovery from the time of injury to the initiation of treatment, and concurrent with the course of treatment, using the individual's customary level of functioning as benchmark (Williams, 1998).

Measurement and Scoring

The scale consists of 12 items, with scores ranging from 0-100 (0%=not at all, 100%=complete resumption). The total RADL score can be calculated by summing the responses and dividing by the number of items answered. At least 9 out of the 12 items should be answered in order to calculate a total score.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Comparison

The RADL should be completed on repeated occasions of testing, and the scores should be compared between testings in order to obtain an understanding of any change in the recovery pattern.

Interpretation

No cut-off scores are provided, although higher scores indicate higher likelihood for resuming activities of daily living.

To determine change in status over time, the clinician may compare the subsequent assessment score with the initial or previous score (initial total score – subsequent total score). A minimal change of 16 points (from the maximum of 100 points) represents a clinically important difference.

Validity, reliability and internal consistency

The RADL developmental literature has strong evidence of psychometric properties, with high internal consistency and test-retest reliability as assessed by high ICC values (0.8) and moderate Pearson r-values (0.4). It also appears to be responsive to change over a 3-week period in a rehabilitation clinic.

References

Resumption of Activities of Daily Living Scale

Since your injury, to what extent have you resumed your usual activities in each of the following areas? If you do not do an activity, put N/A (nonapplicable) beside the scale. As you rate each activity, think of how you are today. Circle the number on the scale for each question.

1. **Sleeping patterns**
   - 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
   - Not at all
   - Moderate resumption
   - Complete resumption

2. **Sexual activity**
   - 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
   - Not at all
   - Moderate resumption
   - Complete resumption

3. **Self-care** (e.g. washing, dressing)
   - 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
   - Not at all
   - Moderate resumption
   - Complete resumption

4. **Light household chores** (e.g. doing dishes, making beds, preparing meals)
   - 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
   - Not at all
   - Moderate resumption
   - Complete resumption

5. **Heavy household chores** (e.g. yardwork, cleaning windows, doing laundry)
   - 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
   - Not at all
   - Moderate resumption
   - Complete resumption

6. **Shopping**
   - 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
   - Not at all
   - Moderate resumption
   - Complete resumption

7. **Socialising with friends and family inside your home**
   - 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
   - Not at all
   - Moderate resumption
   - Complete resumption

8. **Socialising with friends and family outside your home**
   - 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
   - Not at all
   - Moderate resumption
   - Complete resumption

9. **Travelling** (in cars, buses, etc) for less than 30 minutes
   - 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
   - Not at all
   - Moderate resumption
   - Complete resumption
10. **Travelling (in cars, buses, etc) for longer than 1 hour**

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<tr>
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<td>Not at all</td>
<td>Moderate resumption</td>
<td>Complete resumption</td>
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11. **Engaging in your usual recreational activities**

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<td>Moderate resumption</td>
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12. **Engaging in your usual paid employment**

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<tr>
<td></td>
<td>Not at all</td>
<td>Moderate resumption</td>
<td>Complete resumption</td>
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Örebro Musculoskeletal Pain Screening Questionnaire (ÖMPSQ)

Background

The Örebro Musculoskeletal Pain Screening Questionnaire (ÖMPSQ) identifies how likely it is that workers with soft tissue injury will develop long term problems (screening for yellow flags). This screening questionnaire, when completed four to 12 weeks after musculoskeletal injury, predicts long term disability and failure to return to work. Identification, through the ÖMPSQ, of individuals at risk of failing to return to work due to personal and environmental factors provides the opportunity for treating practitioners to apply appropriate interventions (including the use of activity programs based on cognitive behavioural strategies) to reduce the risk of long term disability in injured workers.

Measurement and Scoring

For question 5, the number of pain sites indicated is multiplied by two – this is the score (maximum score allowable is 10). For questions 6 and 7 the score is the number bracketed after the ticked box. For questions 8, 9, 10, 11, 13, 14, 15, 18, 19 and 20 the scores is the number that has been ticked or circled. For questions 12, 16, 17, 21, 22, 23, 24 and 25 the score is 10 minus the number that has been circled.

The total (ÖMPSQ) score is obtained by calculating the sum of scores for questions 5 to 25.

Interpretation

A cut-off score of 105 has been found to predict, with 95% accuracy, those who will recover and with 81% accuracy, those who will have no further sick leave in the next six months. Prediction of long term sick leave (more than 30 days within the next six months) was found to be 67% accurate.

Validity, reliability and internal consistency

The ÖMPSQ is considered to be valid and reliable in predicting long-term disability – the reliability of this tool in predicting failure to return to work outcomes has been demonstrated in an Australian population. Note that the instrument has not been validated as an outcome measure; rather it is normally used as a predictor.

The ÖMPSQ has been shown to be valid, have high reliability, internal consistency and predictive ability in an acute/subacute low back pain working population (Gabel et al. 2011). The ÖMSQ retains the predictive capacity intent of the original-ÖMPQ and provides clinicians and insurers with identification of patients with potentially high and low risks of unfavourable outcomes (Gabel et al. 2012). When compared with the STarT Back Tool, the ÖMPSQ was better at discriminating pain intensity in individuals with low back pain (Hill et al. 2010).

References


Örebro Musculoskeletal Pain Screening Questionnaire (ÖMPSQ)

1. Name ___________________________ Phone _______________ Date _______________

2. Date of Injury ______________________ Date of birth ____________________________

3. Male ☐ Female ☐

4. Were you born in Australia?   Yes ☐ No ☐

These questions and statements apply if you have aches or pains, such as back, shoulder or neck pain. Please read and answer questions carefully. Do not take too long to answer the questions; however it is important that you answer every question. There is always a response for your particular situation.

5. Where do you have pain? Place a tick () for all appropriate sites.
   ☐ Neck        ☐ Shoulder        ☐ Arm        ☐ Upper Back
   ☐ Lower Back  ☐ Leg            ☐ Other (state)

6. How many days of work have you missed because of pain during the past 18 months? Tick () one
   ☐ 0 days (1)   ☐ 1-2 days (2)   ☐ 3-7 days (3)   ☐ 8-14 days (4)
   ☐ 15-30 days (5) ☐ 1 month (6)  ☐ 2 months (7)  ☐ 3-6 months (8)
   ☐ 6-12 months (9) ☐ over 1 year (10)

7. How long have you had your current pain problem? Tick () one.
   ☐ 0-1 weeks (1) ☐ 1-2 weeks (2) ☐ 3-4 weeks (3) ☐ 4-5 weeks (4)
   ☐ 6-8 weeks (5) ☐ 9-11 weeks (6) ☐ 3-6 months (7) ☐ 6-9 months (8)
   ☐ 9-12 months (9) ☐ over 1 year (10)

8. Is your work heavy or monotonous? Circle the best alternative.
   0 1 2 3 4 5 6 7 8 9 10
   Not at all Extremely

9. How would you rate the pain that you have had during the past week? Circle one.
   0 1 2 3 4 5 6 7 8 9 10
   No pain                      Pain as bad as it could be

10. In the past three months, on average, how bad was your pain on a 0-10 scale? Circle one.
    0 1 2 3 4 5 6 7 8 9 10
    No pain            Pain as bad as it could be

11. How often would you say that you have experienced pain episodes, on average, during the past three months? Circle one.
    0 1 2 3 4 5 6 7 8 9 10
    Never          Always
12. Based on all things you do to cope, or deal with your pain, on an average day, how much are you able to decrease it? Circle the appropriate number.

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<tbody>
<tr>
<td></td>
<td>Can’t decrease it at all</td>
<td>Can decrease it completely</td>
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13. How tense or anxious have you felt in the past week? Circle one.

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<th>9</th>
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<tbody>
<tr>
<td></td>
<td>Absolutely calm and relaxed</td>
<td>As tense and anxious as I’ve ever felt</td>
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14. How much have you been bothered by feeling depressed in the past week? Circle one.

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<tr>
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<td>Not at all</td>
<td>Extremely</td>
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15. In your view, how large is the risk that your current pain may become persistent? Circle one.

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<tbody>
<tr>
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<td>No risk</td>
<td>Very large risk</td>
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16. In your estimation, what are the chances that you will be able to work in six months? Circle one.

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<tbody>
<tr>
<td></td>
<td>No chance</td>
<td>Very large chance</td>
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17. If you take into consideration your work routines, management, salary, promotion possibilities and work mates, how satisfied are you with your job? Circle one.

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<tbody>
<tr>
<td></td>
<td>Not satisfied at all</td>
<td>Completely satisfied</td>
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</table>

Here are some of the things that other people have told us about their pain. For each statement, circle one number from 0 to 10 to say how much physical activities, such as bending, lifting, walking or driving, would affect your pain.

18. Physical activity makes my pain worse.

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Completely disagree</td>
<td>Completely agree</td>
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19. An increase in pain is an indication that I should stop what I’m doing until the pain decreases.

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<tr>
<td></td>
<td>Completely disagree</td>
<td>Completely agree</td>
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</table>
20. **I should not do my normal work with my present pain.**

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|   |   |   |   |   |   |   |   |   |   |   |    |

Here is a list of five activities. Circle the one number that best describes your current ability to participate in each of these activities.

21. **I can do light work for an hour.**

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<tbody>
<tr>
<td></td>
<td>Can’t do it because of pain problem</td>
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|   |   |   |   |   |   |   |   |   |   | Can do it without pain being a problem |    |

22. **I can walk for an hour.**

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<tr>
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<td>Can’t do it because of pain problem</td>
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|   |   |   |   |   |   |   |   |   |   | Can do it without pain being a problem |    |

23. **I can do ordinary household chores.**

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<tbody>
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<td>Can’t do it because of pain problem</td>
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|   |   |   |   |   |   |   |   |   |   | Can do it without pain being a problem |    |

24. **I can do the weekly shopping.**

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|   |   |   |   |   |   |   |   |   |   | Can do it without pain being a problem |    |

25. **I can sleep at night.**

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|   |   |   |   |   |   |   |   |   |   | Can do it without pain being a problem |    |
West Haven Yale Multidimensional Pain Inventory

Background

The West Haven Yale Multidimensional Pain Inventory (WHYMPI) is designed to provide a brief, psychometrically-sound, and comprehensive assessment of the important components of the chronic pain experience. The WHYMPI is a 52-item, 12-scale inventory that is divided into three parts. Part I includes five scales designed to measure important dimensions of the chronic pain experience including; 1) perceived interference of pain in vocational, social/recreational, and family/marital functioning, 2) support or concern from spouse or significant other, 3) pain severity, 4) perceived life control, and 5) affective distress. Part II assesses patients’ perceptions of the degree to which spouses or significant others display Solicitous, Distracting or Negative responses to their pain behaviors and complaints. Part III assesses patients’ report of the frequency with which they engage in four categories of common everyday activities; Household Chores, Outdoor Work, Activities Away from Home, and Social Activities.

<table>
<thead>
<tr>
<th>Availability</th>
<th>The WHYMPI is available without cost or requirement for explicit permission: <a href="http://www1.va.gov/Pain_Management/page.cfm?pg=2">http://www1.va.gov/Pain_Management/page.cfm?pg=2</a></th>
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<tr>
<td>Cut-off scores</td>
<td>Scoring and cut-point data are available from the norms website.</td>
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<tr>
<td>Norms</td>
<td>Normative data are available from the following website: <a href="http://www1.va.gov/Pain_Management/page.cfm?pg=2">http://www1.va.gov/Pain_Management/page.cfm?pg=2</a></td>
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Measurement and Scoring

Patient’s responses to WHYMPI items are made on a 7-point scale. The test may be hand scored or with the use of a computer scoring program.

**Part I**
- Interference: \((\text{Question 2}+3+4+8+9+13+14+17+19)/9\)
- Support: \((\text{Question 5}+10+15)/3\)
- Pain Severity: \((\text{Question 1}+7+12)/3\)
- Life-Control: \((\text{Question 11}+16)/2\)
- Affective Distress: \(((6-\text{Question 6})+18+20)/3\)

**Part II**
- Negative Responses: \((\text{Question 1}+4+7+10)/4\)
- Solicitous Responses: \((\text{Question 2}+5+8+11+13+14)/6\)
- Distracting Responses: \((\text{Question 3}+6+9+12)/4\)

**Part III**
- Household Chores: \((\text{Question 1}+5+9+13+17)/5\)
- Outdoor Work: \((\text{Question 2}+6+10+14+18)/5\)
- Activities Away from Home: \((\text{Question 3}+7+11+15)/4\)
- Social Activities: \((\text{Question 4}+8+12+16)/4\)
- General Activity: \((\text{Sum of all questions in Part III})/18\)

*** To account for sporadic missing data, sums should be divided by the number of non-missing items. Any scale with more than 25% of its items missing should be considered missing.
Recording

A separate recording sheet is provided to facilitate repeated measures over time. The experience of chronic pain is assessed on repeated occasions using this inventory in order to obtain an understanding of any change in the status of the patient.

Validity, reliability and internal consistency

Kerns, Turk and Rudy (1985) demonstrated that the internal reliability coefficients of all WHYMPI scales range from .70 to .90; the test-retest reliabilities of these scales over a 2-week interval range from .62 to .91.

The validity of the WHYMPI has been supported by the results of confirmatory and exploratory factor analytic procedures. The procedures revealed that the WHYMPI scales were significantly correlated with several criterion measures of anxiety, depression, marital satisfaction, pain severity, and health locus of control.

In a study by Bernstein IH et al in 1995, WHYMPI was found to have met the standards of reliability and convergent validity, and was thought to be an improvement over current psychometric devices used in the same end.

When tested among patients with temporomandibular problems, the internal consistency (Cronbach α) for each and every one of the MPI scales are satisfactory, exceeding the α of .70.

References

Bernstein IH, Jaremko ME, Hinkley BS. On the utility of the West Haven Yale Multidimensional Pain Inventory. Spine 1995;
West Haven Yale Multidimensional Pain Inventory

BEFORE YOU BEGIN, PLEASE ANSWER 2 PRE-EVALUATION QUESTIONS BELOW:

1. Some of the questions in this questionnaire refer to your “significant other”. A significant other is a person with whom you feel closest. This includes anyone that you relate to on a regular or infrequent basis. It is very important that you identify someone as your “significant other”. Please indicate below who your significant other is (check one):

- Spouse
- Partner/Companion
- Housemate/Roommate
- Friend
- Neighbor
- Parent/Child/Other relative
- Other (please describe):

2. Do you currently live with this person? YES NO

When you answer questions in the following pages about “your significant other”, always respond in reference to the specific person you just indicated above.

A. In the following 20 questions, you will be asked to describe your pain and how it affects your life. Under each question is a scale to record your answer. Read each question carefully and then circle a number on the scale under that question to indicate how that specific question applies to you.

1. Rate the level of your pain at the present moment.

0 1 2 3 4 5 6
No pain Very intense pain

2. In general, how much does your pain problem interfere with your day to day activities?

0 1 2 3 4 5 6
No interference Extreme interference

3. Since the time you developed a pain problem, how much has your pain changed your ability to work?

0 1 2 3 4 5 6
No change Extreme change
____ Check here, if you have retired for reasons other than your pain problem

4. How much has your pain changed the amount of satisfaction or enjoyment you get from participating in social and recreational activities?

0 1 2 3 4 5 6
No change Extreme change

5. How supportive or helpful is your spouse (significant other) to you in relation to your pain?

0 1 2 3 4 5 6
Not at all supportive Extremely supportive

6. Rate your overall mood during the past week.

0 1 2 3 4 5 6
Extremely low mood Extremely high mood
7. On the average, how severe has your pain been during the last week?
   0 1 2 3 4 5 6
   Not at all severe       Extremely severe

8. How much has your pain changed your ability to participate in recreational and other social activities?
   0 1 2 3 4 5 6
   No change       Extreme change

9. How much has your pain changed the amount of satisfaction you get from family-related activities?
   0 1 2 3 4 5 6
   No change       Extreme change

10. How worried is your spouse (significant other) about you in relation to your pain problem?
    0 1 2 3 4 5 6
    Not at all worried       Extremely worried

11. During the past week, how much control do you feel that you have had over your life?
    0 1 2 3 4 5 6
    Not at all in control       Extremely in control

12. How much suffering do you experience because of your pain?
    0 1 2 3 4 5 6
    No suffering       Extreme suffering

13. How much has your pain changed your marriage and other family relationships?
    0 1 2 3 4 5 6
    No change       Extreme change

14. How much has your pain changed the amount of satisfaction or enjoyment you get from work?
    0 1 2 3 4 5 6
    No change       Extreme change

   __ Check here, if you are not presently working.

15. How attentive is your spouse (significant other) to your pain problem?
    0 1 2 3 4 5 6
    Not at all attentive       Extremely attentive

16. During the past week, how much do you feel that you’ve been able to deal with your problems?
    0 1 2 3 4 5 6
    Not at all       Extremely well

17. How much has your pain changed your ability to do household chores?
    0 1 2 3 4 5 6
    No change       Extreme change
18. During the past week, how irritable have you been?

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<th>Score</th>
<th>Not at all irritable</th>
<th>Extremely irritable</th>
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19. How much has your pain changed your friendships with people other than your family?

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20. During the past week, how tense or anxious have you been?

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B. In this section, we are interested in knowing how your significant other (this refers to the person you indicated above) responds to you when he or she knows that you are in pain. On the scale listed below each question, circle a number to indicate how often your significant other generally responds to you in that particular way when you are in pain.

1. Ignores me.

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2. Asks me what he/she can do to help.

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3. Reads to me.

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4. Expresses irritation at me.

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5. Takes over my jobs or duties.

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6. Talks to me about something else to take my mind off the pain.

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7. Expresses frustration at me.

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8. Tries to get me to rest.

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C. Listed below are 18 common daily activities. Please indicate how often you do each of these activities by circling a number on the scale listed below each activity. Please complete all 18 questions.

9. Tries to involve me in some activity
   
   Never
   0 1 2 3 4 5 6
   
   Very often

10. Expresses anger at me.
    
    Never
    0 1 2 3 4 5 6
    
    Very often

11. Gets me some pain medications.
    
    Never
    0 1 2 3 4 5 6
    
    Very often

12. Encourages me to work on a hobby.
    
    Never
    0 1 2 3 4 5 6
    
    Very often

13. Gets me something to eat or drink.
    
    Never
    0 1 2 3 4 5 6
    
    Very often

14. Turns on the T.V. to take my mind off my pain
    
    Never
    0 1 2 3 4 5 6
    
    Very often

1. Wash dishes.
   
   Never
   0 1 2 3 4 5 6
   
   Very often

2. Mow the lawn.
   
   Never
   0 1 2 3 4 5 6
   
   Very often

3. Go out to eat.
   
   Never
   0 1 2 3 4 5 6
   
   Very often

4. Play cards or other games.
   
   Never
   0 1 2 3 4 5 6
   
   Very often

5. Go grocery shopping.
   
   Never
   0 1 2 3 4 5 6
   
   Very often
6. Work in the garden.
   0 1 2 3 4 5 6
   Never Very often

7. Go to a movie.
   0 1 2 3 4 5 6
   Never Very often

8. Visit friends.
   0 1 2 3 4 5 6
   Never Very often

9. Help with the house cleaning.
   0 1 2 3 4 5 6
   Never Very often

10. Work on the car.
    0 1 2 3 4 5 6
    Never Very often

11. Take a ride in a car.
    0 1 2 3 4 5 6
    Never Very often

12. Visit relatives.
    0 1 2 3 4 5 6
    Never Very often

13. Prepare a meal.
    0 1 2 3 4 5 6
    Never Very often

14. Wash the car.
    0 1 2 3 4 5 6
    Never Very often
15. Take a trip.
   Never
   0 1 2 3 4 5 6 Very often

16. Go to a park or beach.
   Never
   0 1 2 3 4 5 6 Very often

17. Do a load of laundry.
   Never
   0 1 2 3 4 5 6 Very often

18. Work on a needed house repair.
   Never
   0 1 2 3 4 5 6 Very often
Spine Specific Scales

- Cervical Spine Scales

Neck Disability Index (NDI) (Vernon and Mior 1991)

Background

The Neck Disability Index, developed in the early 1990s, is based on the items contained in Oswestry Disability Index (for low back pain sufferers). The final version of the Neck Disability Index contains five scales from the original Oswestry Disability Index (of which two required major modifications: pain intensity and sleep) and five new scales (Vernon and Mior 1991). It therefore contains 10 scales, which assess limitations in activities of daily living due to a neck disorder.

Measurement

The Neck Disability Index consists of 10 sections: pain intensity, personal care, lifting, reading, headaches, concentration, work, driving, sleeping and recreation. Six possible response options are provided for each section. The responses for each section are measured by a 0 to 5 degree of difficulty scale, with 0 equating to no disability and 5 equating to extreme disability. For each section, individuals place a tick next to the response option that best describes their status on the day of assessment (Vernon and Mior 1991).

Scoring

Scoring for the Neck Disability Index is identical to that for the Oswestry Disability Index (Fairbank and Pynsent 2000). The section scores are first tallied to produce a total raw score. The total score is derived by:

\[
\text{total raw score} / (5 \times \text{number of sections answered}) \times 100
\]

and is expressed as a percentage. The minimum score is 0, which equates to no disability due to neck pain, whereas the maximum score is 100 and equates to extreme disability due to neck pain.

Recording

A separate recording sheet is provided to facilitate repeated measures over time. The entire instrument should be administered and scored on every assessment.

Comparison

Comparisons can be made over time by comparing the total score between two occasions of testing.

Interpretation

Clinicians can choose the most appropriate way to tell the story of change in status over time using the generic patient-specific scale. Clinicians need to decide whether to compare the: Subsequent assessment score with the initial or previous score; and Raw scores or percentage change.
Scoring options include:

1. Change in total raw score, between the initial and subsequent assessment calculated by:
   \[(\text{initial total score} - \text{subsequent total score})\]

2. Change in total raw score, between the previous and subsequent assessments calculated by:
   \[(\text{previous total score} - \text{subsequent total score})\]

3. Percentage change in total score, between the initial and subsequent assessment calculated by
   \[
   \left(\frac{\text{initial total score} - \text{subsequent total score}}{\text{initial total score}}\right) \times 100
   \]

4. Percentage change in total score, between the previous and subsequent assessments calculated:
   \[
   \left(\frac{\text{previous total score} - \text{subsequent total score}}{\text{previous total score}}\right) \times 100
   \]

If raw scores are used to assess change in status over time, a minimal change of 5 points or 10% is required to be confident (at a 90% level) that a change in status has occurred (Vernon and Mior 1991).

In addition, valuable information may also be obtained by examining the responses to individual questions, to assess whether patients are reporting consistent problems with some aspects of the low back pain experience, which may not be responding to treatment. Regardless of the scoring method used, a decrease in the patient’s disability due to a neck disorder is interpreted as a decrease in the total score or a decrease in section scores, on repeated measurements.

Validity, reliability and sensitivity to detect change over time

The Neck Disability Index has been tested for validity, reliability and sensitivity to detect change over time. It has been reported to have acceptable face validity, in that it assesses a limited range of physical functions applicable for those with neck disorders, which include pain intensity, personal care, lifting, reading, headaches, concentration, work, driving, sleeping and recreation (Vernon and Mior 1991).

Results of the Neck Disability Index have been compared with a variety of physical function and pain outcome measures, in order to determine construct validity. As hypothesised, the Neck Disability Index was strongly associated with results from the McGill Pain Questionnaire (Vernon and Mior 1991), pain intensity measured on a visual analogue scale (Hains et al 1998, Marchiori and Henderson 1996), overall improvement, measured on a visual analogue scale (Vernon and Mior 1991) and scores obtained from the patient-specific functional scale (Westaway et al 1998). Moderate strength associations were found between the Neck disability Index and the Mental and Physical Summary Scores on the SF-36 and work status (Riddle and Stratford 1998). However weak associations were found between the Neck Disability Index and the active range of movement of the cervical spine (in the directions of flexion, extension, rotation and lateral flexion) (Riddle and Stratford 1998).

High levels of test-retest reliability have been demonstrated in patients suffering from cervical pain, with administrations of the questionnaire being conducted over various periods of time, such as within two days (Vernon and Mior 1991) and 72 hours apart (Westaway et al 1998). It is recommended that a change of five points or 10 percent is required to indicate a clinically significant change in status (at a 90 percent confidence level) (Westaway et al 1998).
Non-surgical neck pain patients with an eight point decrease and patients after a cervical spinal fusion with a ten point decrease on this scale can detect a minimally clinically important change in arm or neck pain (Carreon et al. 2010). NDI has been found to have acceptable reliability to measure functional limitation and disability in patients with neck pain when translated to Thai (Uthaikhup, Paungmali & Pirunsan 2011), Finnish (Salo et al. 2010) and Dutch (Jorritsma et al. 2010) languages. NDI has exhibited fair test-retest reliability and adequate responsiveness in patients with cervical radiculopathy (Yong et al. 2010). The present version of the NDI in Polish, has proven to be reliable, valid, have excellent internal consistency, test-retest concurrent validity, and good concurrent validity for patients with degenerative changes in the cervical spine (Misterska, Jankowski & Glowacki 2011).

References


Neck Disability Index

This questionnaire has been designed to give us information as to how your neck pain has affected your ability to manage in everyday life. Please answer every section and mark in each section only the box that applies to you. We realize you may consider that two or more statements in any one section relate to you, but please just mark the box that most closely describes your pain.

### Section 1 - Pain Intensity
- I have no pain at the moment.
- The pain is very mild at the moment.
- The pain is moderate at the moment.
- The pain is fairly severe at the moment.
- The pain is very severe at the moment.
- The pain is the worst imaginable at the moment.

### Section 2 - Personal Care (Washing Dressing etc)
- I can look after myself normally without causing extra pain.
- I can look after myself normally but it causes extra pain.
- It is painful looking after myself and I am slow and careful.
- I need some help but manage most of my personal care.
- I need help every day in most aspects of self care.
- I do not get dressed, I wash with difficulty and stay in bed.

### Section 3 - Lifting
- I can lift heavy weights without causing extra pain.
- I can lift heavy weights but it gives extra pain.
- Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently positioned, for example on a table.
- Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned.
- I can lift very light weights.
- I cannot lift or carry anything at all.

### Section 4 - Reading
- I can read as much as I want to with no pain in my neck.
- I can read as much as I want to with a slight pain in my neck.
- I can read as much as I want with moderate pain in my neck.
- I can’t read as much as I want because of moderate pain in my neck.
- I can hardly read at all because of severe pain in my neck.
- I can not read at all.

### Section 5 - Headaches
- I have no headaches at all.
- I have slight headaches which come infrequently.
- I have moderate headaches which come infrequently.
- I have moderate headaches which come frequently.
- I have severe headaches which come frequently.
- I have headaches most of the time.

### Section 6 - Concentration
- I can concentrate fully when I want to with no difficulty.
- I can concentrate fully when I want to with slight difficulty.
- I have a fair degree of difficulty in concentrating when I want to.
- I have a lot of difficulty in concentrating when I want to.
- I have a great deal of difficulty in concentrating when I want to.
- I cannot concentrate at all.
### Section 7 - Work
- I can do as much work as I want to.
- I can only do my usual work, but no more.
- I can do most of my usual work but no more.
- I cannot do my usual work.
- I can hardly do any work at all.
- I can't do any work at all.

### Section 8 - Driving
- I can drive my car without any neck pain.
- I can drive my car as long as I want with slight neck pain.
- I can drive my car as long as I want with moderate neck pain.
- I can't drive my car as long as I want because of moderate pain in my neck.
- I can hardly drive at all because of severe pain in my neck.
- I can't drive my car at all.

### Section 9 - Sleeping
- I have no trouble sleeping.
- My sleep is slightly disturbed (less than 1 hr. sleepless).
- My sleep is mildly disturbed (1-2 hrs. sleepless).
- My sleep is moderately disturbed (2-3 hrs. sleepless).
- My sleep is greatly disturbed (3-5 hrs. sleepless).
- My sleep is completely disturbed (5-7 hrs. sleepless).

### Section 10 - Recreation
- I am able to engage in all my recreation activities with no neck pain at all.
- I am able to engage in all my recreation activities with some pain in my neck.
- I am able to engage in most, but not all of my usual recreation activities because of pain in my neck.
- I am able to engage in few, but not all of my usual recreation activities because of pain in my neck.
- I can hardly do any recreation activities because of pain in my neck.
- I can’t do any recreation activities at all.
Neck Pain and Disability Scale (NPAD) (Wheeler et al 1999)

The instrument is reproduced with permission from author Anthony H Wheeler and Paula Goolkasian

Background

This measure has been specifically designed to measure the intensity of neck pain, its interference with vocational, recreational, social and functional aspects of living; and the presence and extent of associated emotional factors. It has been developed on people with neck pain, suffering (reporting) segmental and soft tissue involvement; myofascial pain and post operation pain syndrome. It uses a 20 item self-administered questionnaire, designed originally in English.

Measurement and Scoring

The NPDS measures 20 items using a 10cm six point VAS scale (0-5) where 0 is no problem and 5 represents the greatest problems. Patients record the number most appropriate to their problems against each scale, and the individual question scores are summed for a total score. There are four reported domains (factors) within the instrument, in which Factor 1 (specific problems with the neck) includes items 7, 16, 17, 18, Factor 2 (pain intensity) includes items 1, 2, 3, 5, 6, 20, Factor 3 (emotional, affective, cognitive) includes items 13, 14, 15, and Factor 4 (physical function) includes items 4, 8, 9, 10, 11, 12, 19).

Recording

The total instrument is administered each time.

Comparison

The total scores are compared for subsequent administrations of the instrument to determine change over time.

Interpretation

Clinicians can choose the most appropriate way to tell the story of change in status over time using the NPDS. Initial and subsequent scores can be examined in factors, classifications of neck pain (as listed below), change in raw or percentage scores compared with the initial or previous scores.

The authors suggest that a total score of 0-22 indicates none problems - minimal problems, 23-40 indicates mild problems, 41-57 indicates moderate problems, 58-74 indicates moderate to severe problems, 75-92 indicates severe problems, and 93-100 indicates extreme pain, suffering and disability.

Validity, Reliability and Sensitivity to change over time

It has high reported levels of internal consistency Coefficient alpha 0.93 (Wheeler et al 1999), and test-retest reliability co-efficient 0.93 (Goolkasian et al 2002). Pietrobon et al (2002) however question the appropriateness of such values as this coefficient measures correlation among items that measure only a single construct, unlike the NPAD which is multidimensional. Face validity tests suggests that neck pain patients demonstrated higher scores than pain free controls (t=17.22, p<0.0001) (Wheeler et al 1999);
patients with lower back and leg pain scored significantly lower (t=5.58, p<0.01) (Wheeler et al 1999) than patients with neck pain.

Construct validity has been demonstrated by moderate to high correlations between NPAD and Global Assessment of Improvement (0.59, p<0.01) (Goolkasian et al 2002), NPAD and pressure algometry (0.34, p=0.02) (Goolkasian et al 2002), NPAD and pain disability index (0.74, p<0.01) (Goolkasian et al 2002) and NPAD and neck disability index (0.72, p<0.01) (Goolkasian et al 2002). Convergent/Divergent Validity has been demonstrated by changes in NPAD scores which were correlated with Algometer scores taken at trigger points (-0.5, p<0.01) and but not at control points (-0.15, p=0.32) (Goolkasian et al 2002). The instrument’s author provides evidence that instrument is a more sensitive measure than the Oswestry Disability Questionnaire for evaluation of cervical spine pain and disability. No formal sensitivity analysis has been undertaken however (Wheeler et al 1999).

The Dutch translation of the NPAD scale is found to be reliable for measuring pain and disability in patients with chronic neck pain (Jorritsma et al. 2010). It is also shown to be a reliable and valid instrument for assessing disability when translated to Finnish (Salo et al. 2010) and Thai languages (Uthaikhup, Paungmali & Pirunsan 2011).

References


Neck Pain and Disability Scale (NPAD)

Name_________________________ Date ___/___/____

Last First Middle Initial Month Day Year

ID Number___________ Chart Number___________ Examiner’s Initials_______

PLEASE MAKE AN “X” ALONG THE LINE TO SHOW HOW FAR FROM NORMAL TOWARD THE WORST POSSIBLE SITUATION YOUR PAIN PROBLEM HAS TAKEN YOU

1. How bad is your pain today?

|_______|________|________|________|________|________|5

NO PAIN MOST SEVERE PAIN

2. How bad is your pain on average?

|_______|________|________|________|________|________|5

NO PAIN MOST SEVERE PAIN
3. How bad is your pain at its worst?
   0|_________|_________|_________|_________|_________|5
   NO PAIN                  CANNOT TOLERATE

4. Does your pain interfere with your sleep?
   0|_________|_________|_________|_________|_________|5
   NOT AT ALL              CAN’T SLEEP

5. How bad is your pain with standing?
   0|_________|_________|_________|_________|_________|5
   NO PAIN                  MOST SEVERE PAIN

6. How bad is your pain with walking?
   0|_________|_________|_________|_________|_________|5
   NO PAIN                  MOST SEVERE PAIN

7. Does your pain interfere with driving or riding in a car?
   0|_________|_________|_________|_________|_________|5
   NOT AT ALL              CAN’T DRIVE OR RIDE

8. Does your pain interfere with social activities?
   0|_________|_________|_________|_________|_________|5
   NOT AT ALL              ALWAYS

9. Does your pain interfere with recreational activities?
   0|_________|_________|_________|_________|_________|5
   NOT AT ALL              ALWAYS

10. Does your pain interfere with work activities?
    0|_________|_________|_________|_________|_________|5
    NOT AT ALL              CAN’T WORK

11. Does your pain interfere with personal care (eating, dressing, bathing, etc.)?
    0|_________|_________|_________|_________|_________|5
    NOT AT ALL              ALWAYS

12. Does your pain interfere with personal relationships (family, friends, sex, etc.)?
    0|_________|_________|_________|_________|_________|5
    NOT AT ALL              ALWAYS

13. How has your pain changed your outlook on life and the future (depression, hopelessness)?
    0|_________|_________|_________|_________|_________|5
    NO CHANGE              COMPLETELY CHANGED

14. Does pain affect your emotions?
    0|_________|_________|_________|_________|_________|5
    NOT AT ALL              COMPLETELY

15. Does your pain affect your ability to think or concentrate?
    0|_________|_________|_________|_________|_________|5
    NOT AT ALL              COMPLETELY
16. How stiff is your neck?
   0|________|________|________|________|________|5
   NOT STIFF  CAN’T MOVE NECK

17. How much trouble do you have turning your neck?
   0|________|________|________|________|________|5
   NO TROUBLE  CAN’T MOVE NECK

18. How much trouble do you have looking up and down?
   0|________|________|________|________|________|5
   NO TROUBLE  CAN’T LOOK UP OR DOWN

19. How much trouble do you have working overhead?
   0|________|________|________|________|________|5
   NO TROUBLE  CAN’T WORK OVERHEAD

20. How much do pain pills help?
   0|________|________|________|________|________|5
   COMPLETE RELIEF  NO RELIEF

TOTAL SCORE  

AGE________ OCCUPATION_______________________________________
Whiplash Disability Questionnaire (WDQ) (Pinfold et al 2004)

Reproduced with permission from author Kenneth Niere

Background

This instrument is designed to measure functional limitations associated with whiplash injury. It was developed on clients receiving treatment for symptoms associated with a whiplash (acceleration-deceleration) injury. It is a self-administered questionnaire, originally written in English.

Measurement and scoring

The instrument has 13 items; all scored on an 11 point VAS, from 0 – 10, with 0 being no problem and 10 being worst problem ever. The score can be calculated as the sum of the responses to the 13 items, or if patients have left specific questions blank, the summed score would be on the total number of items completed. The lowest score possible for the WDQ is 0 (indicating no disability) and the highest 130 (indicating maximum disability).

Comparison

Comparison can be made between scores on repeated administrations of the instrument throughout the episode of care.

Interpretation

Clinicians can choose the most appropriate way to tell the story of change in status over time using the WDQ. Clinicians should decide whether to compare the:

Subsequent assessment score with the initial or previous score; and
Raw scores or percentage change.

Scoring options include:

Change in total raw score, between the initial and subsequent assessment calculated by:
(initial total score – subsequent total score)
Change in total raw score, between the previous and subsequent assessments calculated by:
(previous total score – subsequent total score)
Percentage change in total score, between the initial and subsequent assessment calculated by
((initial total score – subsequent total score) / initial total score) * 100
Percentage change in total score, between the previous and subsequent assessments calculated:
((previous total score – subsequent total score) / previous total score) * 100

There is no indication of what is the minimum amount of change which is clinically significant.
Validity, Reliability and Sensitivity to change over time.

This instrument is reported as having high internal consistency with Cronbach’s coefficient alpha: 0.96 (Pinfold et al 2004). Test-retest reliability is supported by an intraclass correlation coefficient: 0.90 (short term – 24 hours); 0.86 (medium term - 1 month); 0.93 (‘stable subjects’ reporting no change in their condition) (Willis et al 2004). Content validity is established by wording of some items on questionnaire being modified to make intent clearer after feedback from Victorian Transport Accident Commission medical panel; however no items were deleted or added, thus providing ‘acceptable’ content validity (Pinfold et al 2004). Responsiveness has been assessed by correlation between differences in scores from baseline to 1 month, with patient perceived change value of r0.67. Responsiveness statistic was 1.06 (improved subjects)/-1.84 (deteriorated subjects). Minimal detectable change statistic was 15 points (Willis et al 2004). There is no information on sensitivity to change over time.

References

La Trobe University, School of Physiotherapy: Whiplash Disability Questionnaire

This questionnaire has been designed to provide information on the impact that your whiplash injury and symptoms have upon your lifestyle. Please circle a number in each section to indicate how you have been affected by the whiplash injury and symptoms. If one or more questions are not relevant to you, please leave that section blank.

Date: __________/_________/_________  Name: ________________________________________

1. How much **pain** do you have today?

   0  1  2  3  4  5  6  7  8  9  10

   No Pain  Worst pain imaginable

2. How much do your whiplash symptoms interfere with your **personal care** (washing, dressing etc)?

   0  1  2  3  4  5  6  7  8  9  10

   Not at all  Unable to perform

3. How much do your whiplash symptoms interfere with your **work/home/study duties**?

   0  1  2  3  4  5  6  7  8  9  10

   Not at all  Unable to perform

4. How much have your whiplash symptoms interfered with **driving or using public transport**?

   0  1  2  3  4  5  6  7  8  9  10

   Not at all  Unable to travel in car/use public transport

5. How much do your whiplash symptoms interfere with **sleep**?

   0  1  2  3  4  5  6  7  8  9  10

   Not at all  Cannot sleep

6. How often do you experience **tiredness / fatigue** as a result of your whiplash injury / symptoms?

   0  1  2  3  4  5  6  7  8  9  10

   Not at all  Always
7. How much do your whiplash symptoms interfere with **social activity**?

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<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<th>10</th>
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<tbody>
<tr>
<td></td>
<td>Not at all</td>
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<td></td>
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<td></td>
<td>Unable to socialise</td>
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</table>

8. How much do your whiplash symptoms interfere with **sporting activity**?

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<tr>
<td></td>
<td>Not at all</td>
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<td>Unable to participate</td>
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</table>

9. How much do your whiplash symptoms interfere with **non-sporting leisure activity**?

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<tbody>
<tr>
<td></td>
<td>Not at all</td>
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<td></td>
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<td>Unable to participate</td>
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</table>

10. How often do you experience **sadness / depression** as a result of your whiplash injury / symptoms?

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<td>Not at all</td>
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<td>Always</td>
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</table>

11. How often do you experience **anger** as a result of your whiplash injury / symptoms?

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<th>10</th>
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<tr>
<td></td>
<td>Not at all</td>
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<td>Always</td>
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</table>

12. How often do you experience **anxiety** as a result of your whiplash injury / symptoms?

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<tr>
<td></td>
<td>Not at all</td>
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<td></td>
<td></td>
<td>Always</td>
</tr>
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</table>

13. How much difficulty do you have **concentrating** as a result of your whiplash injury / symptoms?

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<th></th>
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<th>2</th>
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<tr>
<td></td>
<td>No difficulty</td>
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<td>Unable to Concentrate</td>
</tr>
</tbody>
</table>
Copenhagen Neck Functional Disability Scale (CN-FDS) (Jordan et al 1998)

Reproduced with permission from Claus Manniche

Background

This instrument is designed to assess disability related to the neck. It was developed on people who had undergone neck surgery (sample 1), chronic neck pain (sample 2) and chronic mechanical neck pain (sample 3). Pathologies investigated include cervical disc herniation; musculoskeletal condition and non-specific pathologies. It is a self-administered questionnaire, originally developed in Danish.

Measurement and Scoring

There are 15 items in this instrument, answered Yes, Occasionally or No. A total score is generated from differential numeric scores assigned to these categories (see table below). Questions 1-5 are “positive directed” (yes indicates good function) and questions 6-15 are “negative” directed (yes indicates poor function).

<table>
<thead>
<tr>
<th>Response</th>
<th>Points for “positive directed”</th>
<th>Points for “negative directed”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Occasionally</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

Comparison and Interpretation

Comparison between repeated scores could be made between raw scores, or as percentage change from baseline (original) score.

Validity, reliability and sensitivity to change

Internal consistency of this instrument is demonstrated by a Cronbach’s coefficient for the entire scale of 0.9. For short term test-retest reliability Pearson’s correlation coefficients are reported of 0.99 (sample 1) and 0.96 (sample 2), and intra-class correlation coefficient 0.99 (sample 1) and 0.95 (sample 2). Construct validity is demonstrated by Pearson’s correlation coefficients for CN-FDS and self-reported pain scores 0.83 (sample 1), for baseline values of disability and pain scores (sample 3) 0.64, Spearman rank correlation coefficient for CN-FDS and patient’s global assessment 0.56 (sample 1). Responsiveness has been demonstrated in sample 3 as the correlation of relative change in individual pain scores to relative changes in disability scores at conclusion of treatment (r=0.49); 4 months (r=0.48); 12 months (r=0.54) indicating a relatively strong and continuously positive correlation. There is no information on sensitivity. The present version of the Cn-FDS in Polish has proven to be reliable, valid, have excellent internal consistency, test-retest reliability, and good concurrent validity for patients with degenerative changes in the cervical spine (Misterska, Jankowski & Glowacki 2011).

Reference

Copenhagen Neck Disability Scale

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>Occasionally</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Can you sleep at night without neck pain interfering?</td>
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<tr>
<td>2. Can you manage daily activities without neck pain reducing activity levels?</td>
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<tr>
<td>3. Can you manage daily activities without help from others?</td>
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<tr>
<td>4. Can you manage putting on your clothes in the morning without taking more time than usual?</td>
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<tr>
<td>5. Can you bend over the washing basin in order to brush your teeth without getting neck pain?</td>
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<tr>
<td>6. Do you spend more time than usual at home because of neck pain?</td>
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<tr>
<td>7. Are you prevented from lifting objects weighing from 2-4kg due to neck pain?</td>
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<tr>
<td>8. Have you reduced your reading activity due to neck pain?</td>
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<tr>
<td>9. Have you been bothered by headaches during the time that you have had neck pain?</td>
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<tr>
<td>10. Do you feel that your ability to concentrate is reduced due to neck pain?</td>
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<tr>
<td>11. Are you prevented from participating in your usual leisure time activities due to neck pain?</td>
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<tr>
<td>12. Do you remain in bed longer than usual due to neck pain?</td>
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<tr>
<td>13. Do you feel that neck pain has influenced your emotional relationship with your nearest family?</td>
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<tr>
<td>14. Have you had to give up social contact with other people during the past two weeks due to neck pain?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Do you feel that neck pain will influence your future?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Neck Bournemouth Questionnaire

Background

The Neck Bournemouth Questionnaire (NBQ) is a modification of the Back Bournemouth Questionnaire. The seven items of the original Bournemouth Questionnaire intended for back pain were chosen to reflect different aspects of pain including sensory pain intensity, functional status, social activity, anxiety and depression, fear avoidance, and locus of control. The same core items were used for the NBQ, with minor modifications in wording to reflect neck function. One of the seven items in the original questionnaire, namely disability in ADL, was changed to exclude those activities likely to be affected by back pain and replace them with activities likely to be affected by neck pain.

The NBQ comprehensively incorporates salient dimensions of bio-psychosocial pain model used in neck studies.

Scoring

An 11-point numerical rating scale is used as the scaling response for each of the items in the questionnaire. The total score is equal to the sum of points given to each of the 7 items in the NBQ.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

The higher the score, the greater the impact of neck pain on the patient’s life.

Internal consistency, reliability and validity

In its developmental stage, the instrument demonstrated high internal consistency on 3 administrations (Cronbach’s alpha =0.87, 0.91, 0.92). All of the items significantly contributed to the total score (item-corrected total score correlations >0.43) and to the instrument’s responsiveness to clinical change (item change-corrected total change score correlations >0.42). The instrument was found to be reliable in test-retest administrations in stable subjects (ICC = 0.65). The instrument demonstrated acceptable construct validity and longitudinal construct validity with established external measures. The treatment effect size of the instrument was found to be high (1.67).

Gay et al (2007) compared the sensitivity of the Neck Disability Index (NDI) and NBQ in a sample of patients with chronic uncomplicated neck pain who were treated with physical therapy and massage or mobilization. Results have shown that NDI and NBQ had similar sensitivity to change (Standardized response means were 1.21 and 1.17, respectively). Both questionnaires were more sensitive to change than the pain Visual Analog Scale (0.68). The NBQ had good convergent validity with the NDI with strong correlation between them in regard to pre-treatment and post-treatment scores. Although the NBQ had slightly higher internal consistency than the NDI, their overall performance was similar in this sample.

Schmitt et al. (2013) found the NBQ translated into Dutch to be a multidimensional questionnaire with content validity for four of the five components of the International Classification of Functioning, Disability and Health (i.e. impairment, activity, participation and personal factors). The German NBQ is a valid and reliable outcome measure that has been successfully translated and culturally adapted (Soklic, Peterson & Humphreys 2012). It has been found to be shorter, easier to use, and more responsive to change than the NDI and NPAD.
References


Neck Bournemouth Questionnaire

Instructions: The following scales have been designed to find out about your back pain and how it is affecting you. Please answer ALL the scales, and mark the ONE number on EACH scale that best describes how you feel.

1. Over the past week, on average, how would you rate your neck pain?
   No pain | Worst pain possible
   0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

2. Over the past week, how much has your neck pain interfered with your daily activities (housework, washing, dressing, lifting, reading, driving)?
   No interference | Unable to carry out activity
   0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

3. Over the past week, how much has your neck pain interfered with your ability to take part in recreational, social, and family activities?
   No interference | Unable to carry out activity
   0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

4. Over the past week, how anxious (tense, uptight, irritable, difficulty in concentrating/relaxing) have you been feeling?
   Not at all anxious | Extremely Anxious
   0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

5. Over the past week, how depressed (down-in-the-dumps, sad, in low spirits, pessimistic, unhappy) have you been feeling?
   Not at all depressed | Extremely depressed
   0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

6. Over the past week, how have you felt your work (both inside and outside the home) has affected (or would affect) your neck pain?
   Have made it no worse | Have made it much worse
   0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

7. Over the past week, how much have you been able to control (reduce/help) your neck pain on your own?
   Completely control it | No control whatsoever
   0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10
Northwick Park Questionnaire

Background

The Northwick Park Questionnaire (NPQ), adapted from the Oswestry Low Back Pain Questionnaire, was developed to measure neck pain and the consequent patient disability. The NPQ is a nine-item scale/section that covers the following areas: neck pain intensity, neck pain and sleeping, pins and needles/numbness in the arms at night, duration of symptoms, carrying, reading & watching TV, working/housework, social activities, driving. Each section contains five statements of increasing difficulty and client is asked to choose only one that closely describes his/her current status. In addition to questions 1 through 9, all follow-up questionnaires contained a 10th question asking patients how their pain compared with that reported the last time.

Scoring

Each item is scored 0-4, and the total score is converted into percentage.

If all nine sections are completed, the NPQ percentage is calculated as:

\[
\frac{\text{Total Score}}{36} \times 100
\]

If one section (e.g. driving) is not applicable, the score is calculated as:

\[
\frac{\text{Total Score}}{32} \times 100
\]

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

Higher percentage indicates greater disability.

Internal consistency, reliability and validity

In its development stage, the questionnaire showed good short-term repeatability (r = 0.84, K = 0.62). Mean scores for each section tended to rise with that of the pain section showing internal consistency. Question 10 evaluated the patient’s assessment of change in their condition and there were significant correlations between Q10 and changes in total NPQ scores.

Lee et al (2006) examined the correlation of Northwick Park Neck Pain Questionnaire and the Medical Outcomes 36-Item Short-Form Health Survey on patients with neck pain in the course of physiotherapy. The results showed that both the Northwick Park Neck Pain Questionnaire and the Medical Outcomes 36-Item Short-Form Health Survey were able to differentiate patients with neck pain in health and diseased states. The Spearman’s correlation coefficients between the Northwick Park Neck Pain Questionnaire and the 36-Item Short-Form Health Survey physical and mental component summary scores at entry of physiotherapy were -0.64 with the physical component summary score and -0.44 with the mental component summary score, and, at discharge from physiotherapy, were -0.75 with the physical component summary score and -0.46 with the mental component summary score.
References


Northwick Park Questionnaire
The questionnaire has been designed to give us information as to how your NECK PAIN has affected your ability to manage in everyday life. Please answer every question and mark in each section ONLY THE ONE BOX which applies to you. We realize you may consider that two of the statements in any one section relates to you but PLEASE JUST MARK THE BOX WHICH MOST CLOSELY DESCRIBES YOUR PROBLEM.
### Section 1 - Neck Pain Intensity

- I have no pain at the moment.
- The pain mild at the moment.
- The pain is moderate at the moment.
- The pain is severe at the moment.
- The pain is the worst imaginable at the moment.

### Section 2 - Neck Pain and Sleeping

- My sleep is never disturbed by pain
- My sleep is occasionally disturbed by pain
- My sleep is regularly disturbed by pain
- Because of pain I have less than 5 hours of sleep in total
- Because of pain I have less than 2 hours of sleep in total

### Section 3 - Pins & Needles OR numbness in the arm at night

- I have no pins & needles or numbness at night
- I have occasional pins & needles or numbness at night
- My sleep is regularly disturbed by pins & needles or numbness
- Because of pins & needles I have less than 5 hours sleep in total
- Because of pins & needles or numbness I have less than 2 hours sleep in total

### Section 4 - Duration of symptoms

- My neck and arms feel normal all day
- I have symptoms in my neck or arms on waking, which lasts less than 1 hour
- Symptoms are present on and off for a total period of 1-4 hours
- Symptoms are present on and off for a total of more than 4 hours
- Symptoms are present continuously all day

### Section 5 - Carrying

- I can carry heavy objects without extra pain
- I can carry heavy objects, but they give me extra pain
- Pain prevents me from carrying heavy objects, but I can manage medium weight objects
- I can only lift light weight objects
- I cannot lift anything at all

### Section 6 - Reading & Watching TV

- I can do this as long as I wish with no problems
- I can do this as long as I wish, if I’m in a suitable position
- I can do this as long as I wish, but it causes extra pain
- Pain causes me to stop doing this sooner than I would like
- Pain prevents me from doing this at all
Section 7 - Working/Housework Etc
- I can do my usual work without pain
- I can do my usual work but it gives me extra pain
- Pain prevents me from doing my usual work for more than half the usual time
- Pain prevents me from doing usual work for more than a quarter the usual time
- Pain prevents me from working at all

Section 8 - Social Activities
- My social life is normal and cause no extra pain
- My social life is normal, but increases the degree of pain
- Pain has restricted my social life, but I am still able to go out
- Pain has restricted my social life to the home
- I have no social life because of pain

Section 9 - Driving (Omit 9 if you never drive a car when in good health)
- I can drive whenever necessary without discomfort
- I can drive whenever necessary, but with discomfort
- Neck pain or stiffness limit my driving occasionally
- Neck pain or stiffness limit my driving frequently
- I cannot drive at all due to neck symptoms

**Compared with the last time you answered this questionnaire, is your neck pain:**
- Much better
- Slightly better
- The same
- Slightly worse
- Much worse
Roland-Morris Low Back pain and Disability Questionnaire

Background

The Roland-Morris Low Back Pain and Disability Questionnaire was developed in the early 1980’s as a method of assessing a patient’s perception of their limitations in their activities of daily living because of low back pain (Roland and Morris 1983). Roland and Morris (1983) selected 24 items from the Sickness Impact Profile, as they were likely to be related to physical functions that could be affected by low back pain. The Roland-Morris Low Back Pain and Disability Questionnaire was originally developed for use in research (as an outcome measure in clinical trials) but has frequently been used in the clinical setting as a method of monitoring the progress of patients who suffer from low back pain (Roland and Fairbank 2000).

Measurement

The Roland-Morris Low Back Pain and Disability Questionnaire consists of 24 items. Individuals place a tick next to each item that applies to them, on the day of assessment.

Scoring

The numbers of ticks that appear on the questionnaire are tallied. The minimum score is 0, which equates to no disability due to low back pain. The maximum score is 24, which equates to extreme disability due to low back pain.

Recording

A separate recording sheet is provided to facilitate repeated measures over time. The entire instrument should be administered and scored on every assessment.

Comparison

Comparisons can be made over time by comparing the total score between two occasions of testing.

Interpretation

Clinicians can choose the most appropriate way to tell the story of change in status over time using the generic patient-specific scale. Clinicians need to decide whether to compare the:

- Subsequent assessment score with the initial or previous score; and
- Raw scores or percentage change.
Scoring options include:

1. Change in total raw score, between the initial and subsequent assessment calculated by:  
   \[ \text{(initial total score} - \text{subsequent total score)} \]

2. Change in total raw score, between the previous and subsequent assessments calculated by:  
   \[ \text{(previous total raw score} - \text{subsequent total raw score)} \]

3. Percentage change in total score, between the initial and subsequent assessment calculated by:  
   \[ \frac{(\text{initial total score} - \text{subsequent total score})}{\text{initial total score}} \times 100 \]

4. Percentage change in total score, between the previous and subsequent assessments calculated by:  
   \[ \frac{(\text{previous total score} - \text{subsequent total score})}{\text{previous total score}} \times 100 \]

If raw scores are used to assess change in status over time, a minimal change of 4 points (from the maximum of 24 points) is required to be clinically confident, at a 90% level, that a change in status has occurred (Stratford et al 1996). Valuable information may also be obtained by examining the responses to individual questions, to assess whether patients are reporting consistent problems with some aspects of the low back pain experience, which may not be responding to treatment. Regardless of the scoring method used, a decrease in disability due to low back pain is interpreted as a decrease in the total score, on repeated measurements.

Validity, reliability and sensitivity to detect change over time

The Roland-Morris Low Back Pain and Disability Questionnaire has been extensively tested for validity, reliability and sensitivity to detect change over time. It has been reported to have acceptable face validity, in that it assesses a limited range of physical functions, which include walking, bending, sitting, lying, dressing, sleeping, self-care and daily activities (Roland and Fairbank 2000). It, however, does not address psychological or social problems that may be associated with low back pain.

The Roland-Morris Low Back Pain and Disability Questionnaire scores have been compared with a wide variety of physical function, pain and psychological outcome measures, in order to determine construct validity. As hypothesised, the Roland-Morris Low Back Pain and Disability Questionnaire score was strongly associated with the Sickness Impact Profile (Deyo 1986, Patrick et al 1995), the Quebec Back Scale (Kopec et al 1996) and the Oswestry Questionnaire (Leclaire et al 1997, Stratford et al 1994). In addition, moderate strength associations were found between pain ratings and the Roland-Morris Low Back Pain and Disability Questionnaire (Roland and Morris 1983, Deyo 1986). However, only moderate to weak associations were found between the Roland-Morris Low Back Pain and Disability Questionnaire score and objective lumbar measures, such as range of lumbar flexion (Deyo 1986, Ongley et al 1987) and straight leg raise (Deyo 1986). A weak association also existed between the Roland-Morris Low Back Pain and Disability Questionnaire score and measures of psychological distress associated with low back pain (Deyo 1986, Jesen et al 1992).

High levels of test-retest reliability have been demonstrated in patients suffering from low back pain, with administrations of the questionnaire being conducted over various periods of time, such as on the same day (Roland and Morris 1983), one week apart (Johansson and Lindberg 1998) and over a period of more than two weeks (Deyo and Centor 1986, Jensen et al 1992). However, Davidson and Keating (2002) found low levels of reliability when the Roland-Morris Low Back Pain and Disability Questionnaire was administered over a six week period to patients who were receiving physiotherapy for their low back pain. The Roland-Morris Low Back Pain and Disability Questionnaire is at least as sensitive to detect change in status over time compared with the Sickness Impact Profile.
Impact Profile (Deyo and Centor 1986, Jensen et al 1992) and it is suggested that a change of four points is required to indicate a clinically significant change in status (Stratford et al 1996). The Italian RMDQ is proven to be sensitive in detecting clinical changes after conservative treatment for subacute and chronic LBP (Monticone et al 2012).

References


The Roland-Morris Low Back Pain and Disability Questionnaire

Patient name: ______________________________________ File # ____________ Date: ___________

Please read instructions: when your back hurts, you may find it difficult to do some of the things you normally do. Mark only the sentences that describe you today.

☐ I stay at home most of the time because of my back.
☐ I change position frequently to try to get my back comfortable.
☐ I walk more slowly than usual because of my back.
☐ Because of my back, I am not doing any jobs that I usually do around the house.
☐ Because of my back, I use a handrail to get upstairs.
☐ Because of my back, I lie down to rest more often.
☐ Because of my back, I have to hold on to something to get out of an easy chair.
☐ Because of my back, I try to get other people to do things for me.
☐ I get dressed more slowly than usual because of my back.
☐ I only stand up for short periods of time because of my back.
☐ Because of my back, I try not to bend or kneel down.
☐ I find it difficult to get out of a chair because of my back.
☐ My back is painful almost all of the time.
☐ I find it difficult to turn over in bed because of my back.
☐ My appetite is not very good because of my back.
☐ I have trouble putting on my sock (or stockings) because of the pain in my back.
☐ I can only walk short distances because of my back pain.
☐ I sleep less well because of my back.
☐ Because of my back pain, I get dressed with the help of someone else.
☐ I sit down for most of the day because of my back.
☐ I avoid heavy jobs around the house because of my back.
☐ Because of back pain, I am more irritable and bad tempered with people than usual.
☐ Because of my back, I go upstairs more slowly than usual.
☐ I stay in bed most of the time because of my back.

Score: __________ Improvement: __________ %
Oswestry Disability Index (ODI) (Fairbank et al 1980)

Background

The Oswestry Disability Index as developed in 1976 by John O’Brien, in a clinic that treated patients with chronic low back pain (Fairbank and Pynsent 2000). The original aim of the questionnaire was to systematically record limitations of activities of daily living due to low back pain (Roland and Fairbank 2000). The Oswestry Disability Index was first published in 1980 (Fairbank et al 1980) and has since undergone various revisions (Boden 1998, Deyo et al 1998, Fairbank 1995, Hudson-Cook et al 1989, Hupli et al 1997, Meade et al 1995). Version 2.0 of the Oswestry Disability Index is used in the Outcomes Calculator, as it is a validated and improved version of the original Oswestry Disability Questionnaire (Roland and Fairbank 2000).

Measurement

The Oswestry Disability Index (Version 2) consists of 10 sections: pain intensity, personal care, lifting, walking, sitting, standing, sleeping, sex life, social life and travelling. Six possible response options are provided for each section. The responses for each section are measured by a 0 to 5 degree of difficulty scale, 0 equating to no disability and 5 equating to the extreme disability. For each section, individuals place a tick next to the response option that best describes their status on the day of assessment (Roland and Fairbank 2000).

Scoring

The scores for each section are tallied to produce a total raw score. The total score is derived by:

\[
\text{total raw score} / (5 \times \text{number of sections answered}) \times 100
\]

and is expressed as a percentage (Fairbank and Pynsent 2000). The minimum score is 0, which equates to no disability due to low back pain, whereas the maximum score is 100 and equates to extreme disability due to low back pain.

Recording

A separate recording sheet is provided to facilitate repeated measures over time. The entire instrument should be administered and scored on every assessment.

Comparison

Comparisons can be made over time by comparing the total score between two occasions of testing.
Interpretation

Clinicians can choose the most appropriate way to tell the story of change in status over time using the generic patient-specific scale. Clinicians need to decide whether to compare the:

- Subsequent assessment score with the initial or previous score; and
- Raw scores or percentage change.

Scoring options include:

1. Change in total raw score, between the initial and subsequent assessment calculated by:
   \[(\text{initial total score} - \text{subsequent total score})\]

2. Change in total raw score, between the previous and subsequent assessments calculated by:
   \[(\text{previous total score} - \text{subsequent total score})\]

3. Percentage change in total score, between the initial and subsequent assessment calculated by
   \[\left(\frac{\text{(initial total score} - \text{subsequent total score})}{\text{initial total score}}\right) \times 100\]

4. Percentage change in total score, between the previous and subsequent assessments calculated by:
   \[\left(\frac{\text{(previous total score} - \text{subsequent total score})}{\text{previous total score}}\right) \times 100\]

In addition, valuable information may also be obtained by examining the responses to individual questions, to assess whether patients are reporting consistent problems with some aspects of the low back pain experience, which may not be responding to treatment. Regardless of the scoring method used, a decrease in disability due to low back pain is interpreted as a decrease in the total raw score or a decrease in the raw domain scores, on repeated measurements.

Validity, reliability and sensitivity to detect change over time

The Oswestry Disability Index has been extensively tested for validity, reliability and sensitivity to detect change over time. It has been reported to have acceptable face validity, in that it assesses a limited range of physical functions, which include pain intensity, personal care, lifting, walking, sitting, standing, sleeping, sex life, social life and traveling (Roland and Fairbank 2000). It, however, does not assess a patient’s ability to bend, kneel, twist, turn or do sudden movements or the patient’s emotional state.

The results of the Oswestry Disability Index have been compared with a wide variety of physical function, pain and psychological outcome measures, in order to determine construct validity. As hypothesised, the Oswestry Disability Index was strongly associated with the Low Back Outcome Scale (Greenough and Fraser 1992), Pain Disability Index (Gronblad et al 1993), Roland-Morris Low Back Pain and Disability Questionnaire (Co et al 1993), Waddell Disability Index (Waddell and Main 1984) and the SF-36 (Taylor et al 1999). In addition, moderate strength associations were found between the Oswestry Disability Index and ratings of pain, such as pain intensity as measured by a visual analogue scale (Gronblad et al 1992) and the McGill Pain Questionnaire (Haas and Nyiendo 1992, Melzack 1975), and psychological tests, such as the Minnesota Multiphasic Personality Inventory (Millard
and Jones 1991). The Oswestry Disability Index has been found to be a predictor of isokinetic performance (Kaivanto et al 1995) and isometric endurance of the lumbar musculature (Kuukkanen and Malka 1996). However, a weak association exists between the Oswestry Disability Index and lumbar range of movement (Gronblad et al 1997).

High levels of test-retest reliability have been demonstrated in patients suffering from low back pain, with administrations of the questionnaire being conducted over various periods of time, such as within 24 hours (Fairbank et al 1980), four days apart (Kopec et al 1996), after a week (Gronblad et al 1993) and six weeks apart (Davidson and Keating 2002). The Oswestry Disability index is more sensitive to detect change in status over time compared with the Sickness Impact Profile (Deyo and Centor 1986). It is recommended that a change of four points is required to indicate a clinically significant change in status (Meade et al 1990).

The Italian version of the ODI is proven to be sensitive in detecting clinical changes after conservative treatment for subacute and chronic LBP. The Spanish version of the ODI was evaluated in Columbia and was found to be reliable and valid tool for follow-up and assessment in patients with back pain (Payares et al. 2011).

References


Oswestry Disability Index (Version 2.0)
Could you please complete this questionnaire? It is designed to give us information as to how your back (or leg) trouble has affected your ability to manage in everyday life.

Please answer every section. Mark one box only in each section that most closely describes you today.

<table>
<thead>
<tr>
<th>Section 1- Pain Intensity</th>
<th>Section 4- Walking</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ I have not pain at the moment.</td>
<td>☐ Pain does not prevent me walking any distance.</td>
</tr>
<tr>
<td>☐ The pain is very mild at the moment.</td>
<td>☐ Pain prevents me walking more than 1 mile.</td>
</tr>
<tr>
<td>☐ The pain is moderate at the moment.</td>
<td>☐ Pain prevents me walking more than ¾ mile.</td>
</tr>
<tr>
<td>☐ The pain is fairly severe at the moment.</td>
<td>☐ Pain prevents me walking more than 100 yards.</td>
</tr>
<tr>
<td>☐ The pain is very severe at the moment.</td>
<td>☐ I can only walk using a stick or crutches.</td>
</tr>
<tr>
<td>☐ The pain is the worst imaginable at the moment.</td>
<td>☐ I am in bed most of the time and have to crawl to the toilet.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section 2- Personal Care (Washing, Dressing, etc.)</th>
<th>Section 5- Sitting</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ I can look after myself normally without causing extra pain.</td>
<td>☐ I can sit in any chair as long as I like.</td>
</tr>
<tr>
<td>☐ I can look after myself normally but it is very painful.</td>
<td>☐ I can only sit in my favourite chair as long as I like.</td>
</tr>
<tr>
<td>☐ It is painful to look after myself and I am slow and careful.</td>
<td>☐ Pain prevents me from sitting more than 1 hour.</td>
</tr>
<tr>
<td>☐ I need some help but manage most of my personal care.</td>
<td>☐ Pain prevents me from sitting more than half an hour.</td>
</tr>
<tr>
<td>☐ I need help every day in most aspects of self care.</td>
<td>☐ Pain prevents me from sitting more than 10 mins.</td>
</tr>
<tr>
<td>☐ I do not get dressed, wash with difficulty and stay in bed.</td>
<td>☐ Pain prevents me from sitting at all.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section 3- Lifting</th>
<th>Section 6- Standing</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ I can lift heavy weights without extra pain.</td>
<td>☐ I can stand as long as I want without extra pain.</td>
</tr>
<tr>
<td>☐ I can lift heavy weights but it gives extra pain</td>
<td>☐ I can stand as long as I want but it gives me extra pain.</td>
</tr>
<tr>
<td>☐ Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently positioned, e.g., on a table.</td>
<td>☐ Pain prevents me from standing for more than 1 hour.</td>
</tr>
<tr>
<td>☐ Pain prevents me from lifting heavy weights but I can manage light to medium weights if they are conveniently positioned.</td>
<td>☐ Pain prevents me from standing for more than half and hour.</td>
</tr>
<tr>
<td>☐ I can lift only very light weights.</td>
<td>☐ Pain prevents me from standing for more than 10 minutes.</td>
</tr>
<tr>
<td>☐ I cannot lift or carry anything at all.</td>
<td>☐ Pain prevents me from standing at all.</td>
</tr>
</tbody>
</table>
### Section 7- Sleeping
- My sleep is never disturbed by pain.
- My sleep is occasionally disturbed by pain.
- Because of pain I have less than 6 hours’ sleep.
- Because of pain I have less than 4 hours sleep.
- Because of pain I have less than 2 hours sleep.
- Pain prevents me from sleeping at all.

### Section 8- Sex Life
- My sex life is normal and causes no extra pain.
- My sex life is normal but causes some extra pain.
- My sex life is nearly normal but is very painful.
- My sex life is severely restricted by pain.
- My sex life is nearly absent because of pain.
- Pain prevents any sex life at all.

### Section 9- Social Life
- My social life is normal and causes me no extra pain.
- My social life is normal but increases the degree of pain.
- Pain has no significant effect on my social life apart from limiting my more energetic interests, e.g., dancing, etc.
- Pain has restricted my social life and I do not go out as often.
- Pain has restricted my social life to my home.
- I have no social life because of pain.

### Section 10- Travelling
- I can travel anywhere without extra pain.
- I can travel anywhere but it gives extra pain.
- Pain is bad but I manage journeys over 2 hours.
- Pain restricts me to journeys of less than 1 hour.
- Pain restricts me to short necessary journeys under 30 minutes.
- Pain prevents me from travelling except to receive treatment.
Backache Index

Background

The Backache index (BAI) was developed to facilitate standardized measuring procedure of impairment in patients with back complaints without using inclinometers. It includes the presence or absence of pain with respect to different lumbar movements resulting in outcome scores for five impairment examinations of the trunk. The tests consisted of one flexion test, both sides of lateral flexion and extension combined with both sides of lateral flexion.

Scoring

Each of the five active ranges of motion is actively performed by the patient standing relaxed in an erect position. The observer makes his assessment by using a scoring system that includes pain factors obtained by asking the patient, and combined with the stiffness estimation at the end of the different lumbar motions. The results are recorded using a four-point score, where:

0: no irritation and full range of motion
1: irritation but no pain at full range of motion
2: pain but full range of motion is possible
3: severe pain and reduced range of motion (muscular contractions possible)

The Backache index is equal to the sum of scores for the five lumbar movements, with the maximum score of 15.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

Higher score means greater back impairment.

Minimal clinically important difference to detect changes in pain rating, disability and lumbar spine impairment should be equal or more than one point.

Validity and reliability

The validity of the BAI was explored by using Pearson’s product correlation coefficients between the BAI and the other measures assessed at baseline, for example, pain sensitivity, pain descriptions, and disability indexes. A good and significant correlation was found between the BAI and the Oswestry Disability Index (R=0.62), followed by the McGill Pain Questionnaire (MPQ)-Total Pain Rating Index (R=0.57). The correlation between the BAI and the MPQ-total number of words chosen in the sensory, affective, and evaluative subscales was significantly moderate (R=0.48), less with the VAS (R=0.46), but poor with the MPQ-Quality of Life Index (R=0.43).

There was no significant difference (p=0.65) between the mean BAI of one observer (4.45±2.4) and the results of retesting by another observer (4.35±2.3). The inter-observer (absolute) agreement of all five outcomes between the two observers (n=20) was good and excellent for the BAI with an ICC α=0.955.

References

**Backache Index**

**Subject info...** M / F Age...years; Ht...cm; Wt...Kg; Phys. activ.: 1 = yes / 2 = no

**Type of LBP:** 1 = central LBP; 2 = bilat. LBP; 3 = LBP with ref. pain to the buttock; 4 = LBP with ref. pain to the leg.

**Duration of LBP:** 1 = <6 weeks; 2 = >6 weeks.

**History of LBP:** 1 = never / 2 = once 6 weeks LBP.

**Date...**....consultation. **Examiner...**...Before / After therapy.

**Instructions** for the use of the tests for patients with LBP: the observer notes down the extent of the active motions and quotes the intensity of pain according to a scale from 0 to 3. In total there are 5 lumbar movements and outcomes. The sum of 5 scores = the BACKACHE INDEX or BAI with a maximum of 15 points.

<table>
<thead>
<tr>
<th>Outcome impairment examination of the trunk</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>No irritation and full range of motion</td>
<td>0</td>
</tr>
<tr>
<td>Irritation but no pain at full range of motion</td>
<td>1</td>
</tr>
<tr>
<td>Pain but full range of motion is possible</td>
<td>2</td>
</tr>
<tr>
<td>Severe pain and reduced range of motion</td>
<td>3</td>
</tr>
</tbody>
</table>

**1st test = Flexion**

1st Outcome = L & R side together

**2nd test = L lateral flexion**

2nd Outcome = from midline to L side

**3rd test = R lateral flexion**

3rd Outcome = from midline to R side

**4th test = Extension & Left side bending**

4th outcome = from midline to L side

**5th test = Extension & Right side bending**

5th outcome = from midline to R side

**Sum of the 5 outcome scores = BAI =**
Back Bournemouth Questionnaire

Background

The Back Bournemouth Questionnaire (BBQ) is a brief comprehensive and easy outcome measure for patients with low back pain. This consists of 7 measures considered important for monitoring patients and is suitable for outpatient practice. Seven aspects of the back pain experience were selected for inclusion in the questionnaire, sensory component of pain intensity; functional status in terms of day-to-day activity and social activity; the affective domains of anxiety and depression; and the cognitive/behavioural expressions of fear-avoidance beliefs about work activity and pain locus control.

Scoring

An 11-point numerical rating scale is used as the scaling response for each of the items in the questionnaire. The total score is equal to the sum of points given to each of the 7 items in the BBQ.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

The higher the score, the greater the impact of back pain on the patient’s life.

Internal consistency, reliability and validity

The BBQ demonstrated good internal consistency, indicating that all the item scores can be summed to give a total score. For each of the three administrations of the BBQ, pre-test, re-test, post-test, Cronbach’s alpha was approximately 0.9.

The ICC of the total score of the BBQ on the basis of 2 administrations in stable patients was 0.95 (n = 61), indicating strong agreement between total scores in these patients. The limits of agreement (equal to the absolute mean difference between test-retest observations ±2 standard error of the differences) were 2.6 and 4.5, demonstrating that change scores greater than 4.5 are indicative of real change beyond the variability in change scores in stable subjects who used this scale.

The instrument demonstrated acceptable construct and longitudinal construct validity with established external measures. The effect size of the instrument was high (1.29) and comparable with established measures.

The German version of the BQ for Low back pain was successfully tested for validity, consistency, and responsiveness against the German versions of the ODI and the SF-36 (Blum-Fowler et al. 2013). It is shorter, covers more domains than the ODI and is more sensitive to change than the other questionnaires.

References


Back Bournemouth Questionnaire

**Instructions**: The following scales have been designed to find out about your back pain and how it is affecting you. Please answer ALL the scales, and mark the ONE number on EACH scale that best describes how you feel.

Over the past week, on average, how would you rate your back pain?

<table>
<thead>
<tr>
<th>No pain</th>
<th>Worst pain possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Over the past week, how much has your back pain interfered with your daily activities (housework, washing, dressing, walking, climbing stairs, getting in/out of bed/Chair)?

<table>
<thead>
<tr>
<th>No interference</th>
<th>Unable to carry out activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Over the past week, how much has your back pain interfered with your ability to take part in recreational, social, and family activities?

<table>
<thead>
<tr>
<th>No interference</th>
<th>Unable to carry out activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Over the past week, how anxious (tense, uptight, irritable, difficulty in concentrating/relaxing) have you been feeling?

<table>
<thead>
<tr>
<th>Not at all anxious</th>
<th>Extremely Anxious</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Over the past week, how depressed (down-in-the-dumps, sad, in low spirits, pessimistic, unhappy) have you been feeling?

<table>
<thead>
<tr>
<th>Not at all depressed</th>
<th>Extremely depressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Over the past week, how have you felt your work (both inside and outside the home) has affected (or would affect) your back pain?

<table>
<thead>
<tr>
<th>Have made it no worse</th>
<th>Have made it much worse</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Over the past week, how much have you been able to control (reduce/help) your back pain on your own?

<table>
<thead>
<tr>
<th>Completely control it</th>
<th>No control whatsoever</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

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Quebec Back Pain Disability Scale

Background

The Quebec Back Pain Disability Scale is a 20-item self-administered instrument that measures functional disability in patients with back pain. The patient indicates the perceived difficulty associated with completing simple physical activities.

Scoring

Patient rates each item on a 0-5 scale, where
0: not difficult at all
1: minimally difficult
2: somewhat difficult
3: fairly difficult
4: very difficult
5: unable to do

The total score can be calculated by summing the 20 individual item scores.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

Higher score indicates greater disability.

A change of at least 15 points (and possibly as much as 19 points) in the score would be necessary to be 90% confident that real change had occurred (Davidson and Keating, 2002).

Internal consistency, reliability and validity

This scale was reported to have a test-retest reliability of 0.92, and Cronbach’s alpha coefficient of 0.96. The scale correlated as expected with other measures of disability, pain, medical history, and utilization variables, work-related variables, and socio-demographic characteristics.

Davidson and Keating in 2002 examined five commonly used questionnaires for assessing disability in people with low back pain. Results have shown that measurements obtained with the modified Oswestry Disability Questionnaire, the SF-36 Physical Functioning scale, and the Quebec Back Pain Disability Scale were the most reliable and had sufficient width scale to reliably detect improvement or worsening in most subjects. Intraclass correlation coefficients calculated to measure reliability for the subjects who were classified as “unchanged” and those who were self-rated as “about the same” were greater than .80 for the Oswestry and Quebec questionnaires and the SF-36 Physical Functioning scale and less than .80 for the Waddell and Roland-Morris questionnaires and the SF-36 Role Limitations–Physical and Bodily Pain scales.

The Quebec back Pain Disability Scale was found to be valid and reliable when translated to Polish (Misterska, Jankowski & Glowacki 2011).

References

The Quebec Back Pain Disability Scale

This questionnaire is about the way your back pain is affecting your daily life. People with back problems may find it difficult to perform some of their daily activities. We would like to know if you find it difficult to perform any of the activities listed below, because of your back. For each activity there is a scale of 0 to 5. Please choose one response option for each activity (do not skip any activities) and circle the corresponding number.

Today, do you find it difficult to perform the following activities because of your back?

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>0 Not difficult at all</th>
<th>1 Minimally difficult</th>
<th>2 Somewhat difficult</th>
<th>3 Fairly difficult</th>
<th>4 Very difficult</th>
<th>5 Unable to do</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Get out of bed</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Sleep through the night</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>Turn over in bed</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Ride in a car</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>Stand up for 20-30 minutes</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>Sit in a chair for several hours</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>Climb one flight of stairs</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>Walk a few blocks (300-400 m)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>Walk several kilometers</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>Reach up to high shelves</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11</td>
<td>Throw a ball</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12</td>
<td>Run one block (about 100m)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13</td>
<td>Take food out of the refrigerator</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14</td>
<td>Make your bed</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>15</td>
<td>Put on socks (pantyhose)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>16</td>
<td>Bend over to clean the bathtub</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>17</td>
<td>Move a chair</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>18</td>
<td>Pull or push heavy doors</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>19</td>
<td>Carry two bags of groceries</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>20</td>
<td>Lift and carry a</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Add the numbers for a total score: __________
Back Pain Functional Scale

Background

The Back Pain Functional Scale (BPFS) was developed to evaluate functional ability in patients with back pain. BPFS consists of 12 items that reflect different activities that are likely to be affected by back pain.

Scoring

Each of the 12 items in the questionnaire is scored on a 6-point scale (0-5 points). Adjectives with approximately equal interval properties define the scale points. Total score is equal to the sum of points given to each item, so that BPFS scores can vary from 0, the lowest functional level, to 60, the highest functional level.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

Lower score indicates greater disability.

Internal consistency, reliability and validity

In the developmental literature, the BPFS was compared with the Roland Morris Questionnaire (RMQ), which has psychometric equal to or better than other low back pain measures. The internal consistency of the BPFS was 0.93 (95% CI: 0.90–0.96) compared with 0.87 (95% CI: 0.82–0.92) for the RMQ. The reliability coefficients for the BPFS and RMQ were 0.88 (95% CI: 0.77, 0.94) and 0.81 (95% CI: 0.62, 0.91), respectively. Both measures were capable of differentiating among levels of work status (BPFS: $F_{2,69}=12.42$, $P<0.001$; RMQ: $F_{2,69}=11.79$, $P<0.001$) and smoking status (BPFS: $F_{1,74}=6.52$, $P=0.013$; RMQ: $F_{1,74}=3.90$, $P=0.052$). The BPFS was also able to detect differences in location of symptoms (BPFS: $F_{1,72}=3.86$, $P=0.054$; RMQ: $F_{1,72}=2.62$, $P=0.110$) and education level (BPFS: $F_{1,73}=4.16$, $P=0.045$; RMQ: $F_{1,73}=2.39$, $P=0.126$). There was a strong linear association between BPFS scores and RMQ scores ($r = 0.79$: 95% CI; 0.69, 0.86). The BPFS’s ability to detect change was also evaluated by comparing BPFS change scores with RMQ change scores. Results demonstrated a correlation of 0.82 between BPFS and RMQ change scores.

References

**Back Pain Functional Scale**

On the questions listed below we are interested in knowing whether you are having **ANY DIFFICULTY** at all with the activities **because of your back problem** for which you are currently seeking attention.

Please provide an answer for each activity.

Today, do you or would you have any DIFFICULTY at all with the following activities **BECAUSE OF YOUR BACK PROBLEM**?

<table>
<thead>
<tr>
<th>Activity</th>
<th>Unable to perform activity</th>
<th>Extreme difficulty</th>
<th>Quite a bit of difficulty</th>
<th>Moderate difficulty</th>
<th>A little bit of difficulty</th>
<th>No difficulty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any of your usual work, housework, or school activities</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Your usual hobbies, recreational, or sporting activities</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Performing heavy activities around your home</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Bending or stooping</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Putting on your shoes or socks (pantyhose)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Lifting a box of groceries from the floor</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Sleeping</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Standing for 1 hour</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Walking a mile</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Going up or down 2 flights of stairs (about 20 stairs)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Sitting for 1 hour</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Driving for 1 hour</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

**Total Score: _____/60**
Low Back Outcome Score Scale

Background
The Low Back Outcome Score (LBOS) scale was developed as a method of measuring outcome in patients with lumbar spine disorders. LBOS contains measures of functional disability and “passive” activities such as analgesic use. Analgesic use provides a measure of the patient’s response to pain as recorded on the visual analogue scale, and also gives a measure of how the severity of the pain is perceived by the patient in terms of need for treatment.

Scoring
The LBOS measures pain and disability. Pain is measured by means of a linear scale from 0 to 10 cm with 0 = no pain and 10 = worst possible pain imaginable. Points are assigned as follows:

<table>
<thead>
<tr>
<th>Score</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
<td>9</td>
</tr>
<tr>
<td>3-4</td>
<td>6</td>
</tr>
<tr>
<td>5-6</td>
<td>3</td>
</tr>
<tr>
<td>7-10</td>
<td>0</td>
</tr>
</tbody>
</table>

Each response to the disability questions is assigned corresponding points. Total score is equal to the sum of points for all the 13 parameters.

Recording
A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation
Overall scores can vary from 0 (very disabled)-75 (not at all disabled). Clients are classified in one of four categories depending on their overall scores.

<table>
<thead>
<tr>
<th>Score</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;/= 65</td>
<td>Excellent</td>
</tr>
<tr>
<td>50-64</td>
<td>Good</td>
</tr>
<tr>
<td>30-49</td>
<td>Fair</td>
</tr>
<tr>
<td>0-29</td>
<td>Poor</td>
</tr>
</tbody>
</table>

Lower score indicates greater disability.

Internal consistency, reliability and validity
The developmental literature reported that the LBOS has concurrent validity against the Oswestry Low Back Pain Disability Score (0.87), and the Waddell Disability Index (0.87).

In 2002, Holt et al conducted a prospective test-retest study to validate the internal consistency and test-retest reliability of the LBOS among new and follow-up patients attending an outpatient clinic in United Kingdom because of lumbar back pain. A test of internal consistency conducted with the study sample achieved a Cronbach alpha coefficient of 0.85. Overall agreement for test–retest reliability was 84%, and the reliability coefficient (k) reached a range of 0.51 to 0.86 (P < 0.05).

References
Low Back Outcome Score Scale

Please mark on the line below how much pain you have had from your back on average over the past week.

<p>| | | | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>No Pain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maximum pain possible</td>
</tr>
</tbody>
</table>

Please tick the answer which most closely describes you on each of the following six sections.

At present are you working
- Full time at your usual job [□ 9]
- Full time at a lighter job [□ 6]
- Part time [□ 3]
- Not working/unemployed [□ 0]
- Disability benefit [□ 0]
- Housewife/student/retired [□ score as for chores]

At present can you undertake household chores or odd jobs
- Normally [□ 9]
- As much as usual but more slowly [□ 6]
- A few not as many as usual [□ 3]
- Not at all [□ 0]

At present can you undertake sports or active pursuits (e.g., dancing)
- As much as usual [□ 9]
- Almost as much as usual [□ 6]
- Some, much less than usual [□ 3]
- Not at all [□ 0]

Do you have to rest during the day because of pain?
- Not at all [□ 6]
- A little [□ 4]
- Half the day [□ 2]
- Over half the day [□ 0]

How often do you have a consultation with a doctor or have any treatment (e.g., physiotherapy) for your pain?
- Never [□ 6]
- Rarely [□ 4]
- About once a month [□ 2]
- More than once a month [□ 0]

How often do you have to take pain killers for your pain?
- Never [□ 6]
- Occasionally [□ 4]
- Almost every day [□ 2]
- Several times each day [□ 0]
Please tick the box that best describes how much your back pain affects the following activities.

<table>
<thead>
<tr>
<th>Activity</th>
<th>No effect</th>
<th>Mildly/Not much</th>
<th>Moderately/Difficult</th>
<th>Severely/Impossible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex life</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Sleeping</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Walking</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Sitting</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Travelling</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Dressing</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
Peripheral Joint Range of Motion

Background

The range of motion can be measured of any joint in the body, and is integral to effective physical treatment (Dorinson and Wagner 1948, Miller 1985). Clinical training teaches clinicians about the directions of movement applicable to, and expected from, healthy joints and specific tests for joint performance have been described to detect joint laxity and other abnormalities (American Academy of Orthopaedic Surgeons 1988).

Measurement

Joint range of motion is usually measured, in the clinical setting, by a plastic hand-held goniometer using standardised procedures, such as those produced by the American Academy of Orthopaedic Surgeons (1988) and the American Society of Hand Therapists (Adams et al 1992). Joint range of motion can be assessed actively or passively, in various planes of movement and in varied starting positions.

Scoring

All movements are measured from a starting position of zero degrees (American Academy of Orthopaedic Surgeons 1988). Degrees of motion are added in the direction that the joint moves away from the zero starting point (Adams et al 1992).

Recording

Joint range of motion should be recorded in a standard fashion on patient notes, to facilitate comparison of change in movement over time. Recording of joint range of motion should consider the position of the patient, (for example: supine, sitting, etc), whether the joint was moved actively or passively, the amount of pressure that was applied to the joint, the plane of movement and from which end of the planar range the movement was commenced. Table 4.1 lists the planes of movement that are contained in the Outcomes Calculator.

| Table 3.1: Planes of joint range of motion contained in the Outcomes Calculator |
|------------------|-----------------|----------------|---------------|---------------|---------------|---------------|
| Shoulder | Elbow | Wrist | Hip | Knee | Ankle |
| Flexion | X | X | X | X | X |
| Extension | X | X | X | X | X |
| Abduction | X | | | | X |
| Adduction | | | | | X |
| External rotation | X | | | | X |
| Internal rotation | X | | | | X |
| Horizontal abduction | X | | | | |
| Horizontal adduction | X | | | | |
| Pronation | | X | X | | |
| Supination | | X | X | | |
| Radial deviation | | | | X | |
| Ulnar deviation | | | | X | |
| Dorsiflexion | | | | | X |
| Plantarflexion | | | | | X |
| Inversion | | | | | X |
| Eversion | | | | | X |
Comparison

Comparisons can be made over time by comparing joint range of motion between two occasions of testing or within one occasion of testing when joint motion is compared with the ipsilateral side, work tasks requirements or population norms. Benchmarks for Range of Movement are that the patient’s progress are that the Range of Movement approaches the patient’s ‘other’ side or the population norms for a person of that age.

Interpretation

Clinicians can choose the most appropriate way to tell the story of change in status over time using the generic patient-specific scale. Clinicians need to decide whether to compare the:

- Subsequent range of motion with the initial or previous range of motion;
- Raw difference in range of motion or percentage change;
- The range of motion of the ‘other’ (probably) injured side (limbs) with the range of motion of the uninjured side, at any one point in time
- Range of motion, at any one point in time, with requirements for work place tasks or
- Range of motion, at any one point in time, with population norms, relevant for age and gender. Population norms for adults, in the absence of musculoskeletal disorders, are contained in Table 4.2.

Scoring options in the calculator include:

1. Change in range of motion, between the initial and subsequent assessment can be calculated by:
   \[(\text{initial range of motion} - \text{subsequent range of motion})\]

2. Change in range of motion, between the previous and subsequent assessments can be calculated by:
   \[(\text{previous range of motion} - \text{subsequent range of motion})\]

3. Percentage change in range of motion, between the initial and subsequent assessment, calculated by:
   \[
   \frac{(\text{initial range of motion} - \text{subsequent range of motion})}{\text{initial range of motion}} \times 100
   \]

4. Percentage change in range of motion, between the previous and subsequent assessments calculated by:
   \[
   \frac{(\text{previous range of motion} - \text{subsequent range or motion})}{\text{previous range of motion}} \times 100
   \]

5. Change in range of motion, between the injured and uninjured side, at any one point in time, can be calculated by:
   \[(\text{range of motion uninjured side} - \text{range of motion injured side})\]
6. Percentage change in range of motion between the injured and uninjured side, at any one point in time, can be calculated by:
   \[
   \frac{\text{range of motion uninjured side} - \text{range of motion injured side}}{\text{range of motion uninjured side}} \times 100
   \]

7. Difference in range of motion, between subsequent range of motion and population norms for range of motion, can be calculated by:
   \[
   \text{Subsequent range of motion} - \text{population norms for range of motion}
   \]

8. Difference in range of motion, between subsequent range of motion and range of motion required for requirements of workplace tasks, can be calculated by:
   \[
   \text{Subsequent range of motion} - \text{range of motion requirements for workplace tasks}
   \]

Regardless of the scoring method used, an increase in the patient’s range of motion is interpreted as an increase in raw scores (in degrees) or a decrease in the difference between raw scores and a point of references, such as norms.

### Table 3.2: Published normal range of motion values (in degrees) (Miller 1995)

<table>
<thead>
<tr>
<th>Joint</th>
<th>Range of Motion Values (in degrees)</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shoulder</td>
<td>Flexion</td>
<td>180</td>
<td>180</td>
<td>150</td>
<td>90*</td>
</tr>
<tr>
<td></td>
<td>Extension</td>
<td>45</td>
<td>45</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>Abduction</td>
<td>180</td>
<td>180</td>
<td>150</td>
<td>90*</td>
</tr>
<tr>
<td></td>
<td>Internal rotation</td>
<td>90</td>
<td>90</td>
<td>60*</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>External rotation</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>Horizontal abduction</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Horizontal adduction</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Elbow</td>
<td>Flexion</td>
<td>135</td>
<td>145</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>Pronation</td>
<td>90</td>
<td>80</td>
<td>80</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Supination</td>
<td>90</td>
<td>70</td>
<td>80</td>
<td>90</td>
</tr>
<tr>
<td>Wrist</td>
<td>Flexion</td>
<td>60</td>
<td>80</td>
<td>70</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>Extension</td>
<td>55</td>
<td>55</td>
<td>60</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Radial deviation</td>
<td>35</td>
<td>20</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Ulnar deviation</td>
<td>75</td>
<td>40</td>
<td>30</td>
<td>65</td>
</tr>
<tr>
<td>Hip</td>
<td>Flexion</td>
<td>120</td>
<td>125</td>
<td>100</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td>Extension</td>
<td>45</td>
<td>50</td>
<td>30</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Abduction</td>
<td>45</td>
<td>45</td>
<td>40</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Adduction</td>
<td>—</td>
<td>—</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Internal rotation</td>
<td>—</td>
<td>30</td>
<td>40</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>External rotation</td>
<td>—</td>
<td>50</td>
<td>50</td>
<td>45</td>
</tr>
<tr>
<td>Knee</td>
<td>Flexion</td>
<td>135</td>
<td>140</td>
<td>120</td>
<td>130</td>
</tr>
<tr>
<td></td>
<td>Extension</td>
<td>45</td>
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<td>15</td>
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<td>Adduction</td>
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<td>40</td>
<td>45</td>
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<td></td>
<td>Adduction</td>
<td>—</td>
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<td>20</td>
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<tr>
<td></td>
<td>Internal rotation</td>
<td>—</td>
<td>30</td>
<td>40</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>External rotation</td>
<td>—</td>
<td>50</td>
<td>50</td>
<td>45</td>
</tr>
</tbody>
</table>

* These “normal” values are associated with manual muscle testing (MMT), and the authors list only the part of the movement attributable to the deltoid muscle.

* Tested with the shoulder in 0° of abduction.

**This** is the only article in which the methodology for obtaining normal values was reported. The values presented represent the means of measurements taken on 109 men ranging in age from 18 months to 54 years.

**Validity, reliability and sensitivity to detect change over time**

Joint movement is often used as a proxy measure for joint health, and decisions on patient status and prognosis are often made on joint range of movement (Michels 1982, Miller 1985). However, there is no clear relationship between joint range of motion and function (Wright 1999). Regardless, joint range of motion should be measured with a standard instrument, with standard protocols to assist in instrument placement, body placement, alignment of joint and instrument, and recording of information (Salter 1955).
Most joint range of movement measurement in clinical practice uses a goniometer. Reliability and sensitivity to detect change over time is dependent on the accurate position of the goniometer (American Academy of Orthopedic Surgeons 1988). In their manual, this group considered that the goniometer was most useful for range of motion measurements when bony landmarks are able to be accurately identified and marked for re-measurement purposes. Clinical practice facilities employing more than one physical treatment practitioner should attempt to standardise the way that the clinicians undertake measurement of joint range of motion, so that clinicians can be confident in the reliability and interpretability of their measurements (Miller 1985).

'Eyeballing' is a common clinical method of assessing joint range of motion (Michels 1985). It was widely promoted by the Association of American Orthopedic Surgeons (1988), and methods of developing skills in 'eyeballing' have been described by Salter (1955) and Rowe (1964). The most common measurement using 'eyeballing' is the extent of the straight leg raise, in supine. Other 'eyeballing' approaches use known angles (such as the 90 degree end of the plinth) as a marker for movement assessment.

There is little convincing evidence of the reliability of 'eyeballing' however, in the 'usual' clinical practice, which does not have standards for assessment, or training programs for its staff in measurement protocols. 'Eyeballing' is particularly inaccurate when it is used to assess change in range of movement over time (Michels 1985), as it is subject not only to potential measurement error but also to bias in recall.

Linear measurements (or distances from a fixed point) are another way of describing joint range of motion, particularly when several joints are involved in the movement (American Academy of Orthopedic Surgeons 1988). This method of measuring is found commonly when describing flexion or lateral flexion range of movement of the back (i.e. distance the fingertips are from the floor, or along the legs at the end of the range of movement) or in the hand (distance the tip of the finger is from the palm) (Gerhardt and Russe 1975).

References

Upper Extremity Scales

- Upper Extremity General Scales

Disabilities of the Arm, Shoulder and Hand (DASH)

Background

The Disabilities of the Arm, Shoulder and Hand (DASH) was designed to assess physical function and symptoms in patients with any or several musculoskeletal disorders of the upper limb. A self-report questionnaire consisting of 30 questions, five of which are related to symptoms and 25 related to functional tasks. The questionnaire was designed to help describe the disability experienced by people with upper-limb disorders and also to monitor changes in symptoms and function over time.

The DASH Outcome Measure contains two optional, four-item modules intended to measure symptoms and function in athletes, performing artists and other workers whose jobs require a high degree of physical performance. The goal of the optional modules is to identify the specific difficulties that professional athletes/performing artists or other groups of workers might experience but which may not affect their activities of daily living and consequently may go “undetected” in the 30-item portion of the DASH.

Scoring

The DASH is scored in two components: the disability/symptom questions (30 items, scored 1-5) and the optional high performance sport/music or work section (4 items, scored 1-5).

Disability/Symptom Score

At least 27 of the 30 items must be completed for a score to be calculated. The assigned values for all completed responses are simply summed and averaged, producing a score out of five. This value is then transformed to a score out of 100 by subtracting one and multiplying by 25. This transformation is done to make the score easier to compare to other measures scaled on a 0-100 scale.

\[
DASH\ \text{disability/symptom score} = \left[\frac{\text{sum of } n\ \text{responses} - 1}{5}\right] \times 25, \text{ where } n\ \text{is equal to the number of completed responses.}
\]

Optional Modules (Sport/Music or Work)

The same procedure described above is followed to calculate the optional four-item module score. All four questions must be answered in order to calculate the score. Simply add up the assigned values for each response and divide by four (number of items); subtract one and multiply by 25 to get a score out of 100.

For Missing Items:

If more than 10 percent of the items (that is, more than three items) are left blank by the respondent, a DASH disability/symptom score may not be calculated. By this same rule (that is, no more than 10 percent of the items can be left blank), no missing values can be tolerated in the high-performance sports/performing arts or work module because the module consists of only four items.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.
Interpretation

Higher score means greater disability.

Validity, reliability, internal consistency and responsiveness to detect change over time

Reliability, validity and responsiveness of the DASH have been evaluated in patients with disorders of all major areas of the extremity, i.e., shoulder, elbow, wrist and hand. Test—retest reliability has been demonstrated in patients with shoulder pain (Spearman correlation = 0.90, P < 0.01) and in those with elbow disorders (ICC = 0.92). Test—retest reliability has been demonstrated in both proximal and distal upper extremity disorder populations (ICC = 0.96), which exceeds recommended standards for test—retest reliability. A study examining the reliability of the DASH in patients with shoulder pain found the internal reliability (Cronbach’s alpha) of the questionnaire to be 0.96, suggesting the DASH may contain some redundant questions for this population. Construct validity of the DASH has been evaluated by examining its correlation with the SF-36. It was found that the DASH correlated well with most of the dimensions of the SF-36 (range, -0.36 to -0.62), thus supporting the construct validity of the DASH as a measure of health status. When assessing responsiveness of the DASH following surgery, Beaton and colleagues were able to demonstrate a change in patients after surgical treatment (SRM, 0.74-0.80), as well as in those who scored >5 on a global question with a 10-point scale (SRM, 0.92-1.40). When assessing the use of the DASH, it was found to have an equal or better responsiveness than the joint-specific measures used in both a wrist or hand sample and a shoulder sample in 16 of the 18 comparisons.

Beaton (2001) has reported the minimal detectable change at the 95% confidence level for the DASH to be 12.7 points.

The DASH questionnaire has been found to be more correlated with disability days in patients with hand injuries (Horng et al. 2010). Psychological factors on the questionnaire are found to be the strongest determinants of the health related quality of life and disability. The DASH is a valid and reliable instrument to use to measure functional outcome and health state values in patients with proximal humeral fractures (Slobogean, Noonan & O’Brien (2010)).

An 11 item short measure of physical function and symptoms related to upper-limb musculoskeletal disorders (QuickDASH) was developed (Beaton et al 2005) in order to reduce administrative burden and eliminate item redundancy. On assessing it for psychometric properties, unidimensionality has not been confirmed (Franchigoni et al. 2011). It has been found to be more useful group decisions than for everyday clinical application (i.e. monitoring outcome in single patients). There is evidence that the QuickDASH is a responsive instrument when utilised in patients seen in private practice over a typical treatment interval (Polson et al. 2010).

References


Hunsaker FG, Cioffi DA, Amadio PC, Wright JG, Caughlin B. The American Academy of Orthopaedic Surgeons Outcomes Instruments – Normative Values
Offenbaecher M, Ewert T, Sangha O, Stucki G. Validation of a German version of the disabilities of arm, shoulder, and hand questionnaire (DASH-G). J Rheumatol 2002;29:401-2.
Disabilities of the Arm, Shoulder and Hand (DASH)

Please rate your ability to do the following activities in the last week by circling the number below the appropriate response.

No difficulty
Mild difficulty
Moderate difficulty
Severe difficulty
Unable

1. Open a tight or new jar
2. Write
3. Turn a key
4. Prepare a meal
5. Push open a heavy door
6. Place an object on a shelf above the head
7. Do heavy household chores (e.g., wash walls, wash floors)
8. Garden or doing yard work
9. Make a bed
10. Carry a shopping bag or briefcase
11. Carry a heavy object (over 5 kilograms)
12. Change a light bulb overhead
13. Wash or blow-dry your hair
14. Wash your back
15. Put on a pullover sweater
16. Use a knife to cut food
17. Recreational activities that require little effort (e.g., card playing, knitting, etc.).
18. Recreational activities that require taking some force or impact through the arm shoulder or hand (e.g., golf, hammering, tennis, etc.).
19. Recreational activities that require moving the arm freely (e.g., playing frisbee, badminton, etc.).
20. Manage transportation needs (getting from one place to another)
21. Sexual activities
22. During the past week, to what extent has your arm, shoulder or hand problem interfered with your normal social activities with family, friends, neighbours, or groups?

23. During the past week, were you limited in your work or other daily activities as a result of your arm, shoulder or hand problem?

24. Arm, shoulder or hand pain

25. Arm, shoulder or hand pain when you performed any specific activity

26. Tingling (pins and needles) in your arm, shoulder or hand

27.Weakness in your arm, shoulder or hand

28. Stiffness in your arm, shoulder or hand

29. During the past week, how much difficulty have you had sleeping because of the pain in your arm, shoulder or hand?

30. I feel less capable, less confident or less useful because of my arm, shoulder or hand problem.
**Work Module (Optional)**

The following questions ask about the impact of your arm, shoulder or hand problem on your ability to work (including homemaking if that is your main work role).

Please indicate what your job/work is: ___________________________ or p: I do not work. (You may skip this section.)

Please circle the number that best describes your physical ability in the past week. Did you have any difficulty?

- **No difficulty**
- **Mild difficulty**
- **Moderate difficulty**
- **Severe difficulty**
- **Unable**

1. Using your usual technique for your work? 1 2 3 4 5
2. Doing your usual work because of arm, shoulder or hand pain? 1 2 3 4 5
3. Doing your work as well as you would like? 1 2 3 4 5
4. Spending your usual amount of time doing your work? 1 2 3 4 5

**Sports/Performing Arts Module (Optional)**

The following questions relate to the impact of your arm, shoulder or hand problem on playing your musical instrument or sport or both.

If you play more than one sport or instrument (or play both), please answer with respect to that activity which is most important to you.

Please indicate the sport or instrument which is most important to you: ___________________________

p: I do not play a sport or an instrument. (You may skip this section.)

Please circle the number that best describes your physical ability in the past week. Did you have any difficulty?

1. Using your usual technique for playing your instrument or sport? 1 2 3 4 5
2. Playing your musical instrument or sport because of arm, shoulder or hand pain? 1 2 3 4 5
3. Playing your musical instrument or sport as well as you would like? 1 2 3 4 5
4. Spending your usual amount of time practicing or playing your instrument or sport?
Upper Limb Functional Index (ULFI)

Background

The Upper Limb Functional Index (ULFI) is a viable clinical outcome tool for the determination of upper limb status and impairment.

Scoring

Scoring the upper part (Part 1) is made by counting the number of checked boxes and recording the total in the space “Total ULFI Points.” The total ULFI points is multiplied by 4 to convert it to an IMPAIRMENT %. ABILITY% can be obtained by subtracting Impairment percentage from 100. Example: The patient checks 20 boxes. = 20 x 4 is 80/100 or 80 % DISABILITY.

100 - 80 = 20 % ABILITY

PSI scoring: Assume the patient lists three activities which he rates at 4, 5 and 6 for a total of 15. 15 goes in the Total spot in the PSFS score box. The Total Score, which is 15, is divided by the number of activities listed (3) and multiplied by 10 to get the % score for the PSFS = 50 %.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

Higher score means greater disability.

Validity, reliability and sensitivity/responsiveness to detect change over time

The ULFI correlated with the DASH (r = 0.85; 95% CI) and UEFS (r = 0.78; 95% confidence interval [CI]), demonstrated test–retest reliability (intraclass correlation coefficient = 0.96; 95% CI) and internal consistency (Cronbach alpha = 0.89). The change scores of the ULFI with standard error of the measurement was 4.5% or 1.13 ULFI-points and minimal detectable change at the 90% CI was 10.4% or 2.6 ULFI-points. Responsiveness indices were standardized response mean at 1.87 and effect size at 1.28. The ULFI demonstrated an impairment range of 0–100%, with no missing responses and a combined patient completion and therapist scoring time of less than 3 minutes.

The ULFI in Spanish is found to be a valid upper limb outcome measure with similar psychometric properties to the English language version (Cuesta-Vargas & Gabel 2013). A study was conducted to assess if the ULFI’s clinimetric properties are improved by modification to a three-point response option. It found that the ULFI three-point response option improved reliability (0.98), internal consistency (α=0.92), concurrent validity (r=0.86), and responsiveness (Gabel et al. 2010).

References


Your upper limb (arm) may make it difficult to do some of the things you normally do. This list contains sentences people often use to describe themselves when they have such problems. Think of yourself over the last few days.

If an item describes you, mark the box. If not, leave the box blank. If an item partly describes you Use a Half (½) mark.

DUE TO MY ARM:

Part 1

☐ 1. I stay at home most of the time.
☐ 2. I change position frequently for comfort.
☐ 3. I avoid heavy jobs eg. cleaning, lifting more than 5kg or 10lbs, gardening etc.
☐ 4. I rest more often.
☐ 5. I get others to do things for me.
☐ 6. I have pain almost all the time.
☐ 7. I have difficulty lifting and carrying (eg bags, shopping up to 5kg or 10lbs).
☐ 8. My appetite is now different.

☐ 9. My walking or normal recreation activity is affected.
☐ 10. I have difficulty with normal home or family duties and chores.
☐ 11. I sleep less well.
☐ 12. I need assistance with personal care eg. washing and hygiene.
☐ 13. My regular daily activities (work, social contact) are affected.
☐ 14. I am more irritable and / or bad tempered.
☐ 15. I feel weaker and / or stiffer.
☐ 16. My transport independence is affected (driving, public transport).

☐ 17. I have difficulty putting my arm into a shirt sleeves or need assistance dressing.
☐ 18. I have difficulty writing or using a key board and / or "mouse".
☐ 19. I am unable to do things at or above shoulder height.
☐ 20. I have difficulty eating and /or using utensils (eg knife, fork, spoon, chop sticks).
☐ 21. I have difficulty holding and moving dense objects (eg mugs, jars, cans).
☐ 22. I tend to drop things and/or have minor accidents more frequently.
☐ 23. I use the other arm more often.
☐ 24. I have difficulty with buttons, keys, coins, taps/faucets, containers or screw-top lids.
☐ 25. I have difficulty opening, holding, pushing or pressing (eg triggers, lever, heavy doors).

ULFI SCORE: To Score the Upper Part – Add the Marked Boxes:
TOTAL ULFI Points =
Total Points (x 4) =
Impair[(Disability) % =
100-Impairment% =
Ability % =
Part 2

**Patient Specific Index (PSI):** Think of 5 activities that are important to you and affected by your arm problem. If you cannot think of 5, choose from the ones you have marked above. Score each activity on a scale range as follows, you may use Half (½) marks if you wish:

- **0 = BEST:** Never affected/Can do activity normally
- **10 = WORST:** Always affected/Can’t do activity at all

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

Total PSFS = ____

***PSFS (Patient Specific Functional Score)***

Part 3 (% for the Patient Specific Functional Score)

What is your current % of Pre-injury Duties?

_______%

Part 4

Think of yourself **over the last few days: due to your arm** - assess your **Overall Status** compared to your normal or pre-injury level?

<table>
<thead>
<tr>
<th>Pre-injury or Normal</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worst Possible</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Upper Extremity Functional Index (UEFI)

Background

The Upper Extremity Functional Index is a self-report measure of functional status in patients with upper extremity problems.

Scoring

UEFI items are scored on a 5-point scale (0-4). Total UEFI is obtained by getting the sum of scores for all items and can vary from 0 to 80.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

Lower score means greater disability.

Validity, reliability and sensitivity to detect change over time

Test-retest reliability, cross-sectional validity, and longitudinal validity (sensitivity to change) coefficients were calculated for UEFI. Test-retest reliability estimates of 0.95 and 0.94 were obtained for the UEFI and UEFS (Upper Extremity Functional Status) respectively. The measures demonstrated similar levels of cross sectional validity. Correlations of 0.70 and 0.44 were noted between a pooled index of change and the UEFI and UEFS change scores respectively.

References

**Upper Extremity Functional Index (UEFI)**

We are interested in knowing whether you are having any difficulty at all with the activities listed below *because of your upper limb* problem for which you are currently seeking attention. Please provide an answer for each activity.

**Today, do you or would you have any difficulty at all with:**

<table>
<thead>
<tr>
<th>Activities</th>
<th>Extreme difficulty or unable to perform activity</th>
<th>Quite a bit of difficulty</th>
<th>Moderate difficulty</th>
<th>A little bit of difficulty</th>
<th>No difficulty</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Any of your usual work, housework, or school activities</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. Your usual hobbies, recreational or sporting activities</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. Lifting a bag of groceries to waist level</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. Lifting a bag of groceries above your head</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. Grooming your hair</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6. Pushing up on your hands (eg from bathtub or chair)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. Preparing food (eg. peeling, cutting)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8. Driving</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9. Vacuuming, sweeping or raking</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10. Dressing</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11. Doing up buttons</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12. Using tools or appliances</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13. Opening doors</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14. Cleaning</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>15. Tying or lacing shoes</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>16. Sleeping</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>17. Laundering clothes (eg. washing, ironing, folding)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>18. Opening a jar</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>19. Throwing a ball</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>20. Carrying a small suitcase with your affected limb</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

**Column Total**

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Minimum Level of Detectable Change (90% Confidence): 9 points SCORE: _____/ 80
Shoulder Scales

American Shoulder and Elbow Surgeons Standardized Shoulder Assessment Form (Patient Self-report Section) (ASES-s)

Background

The American Shoulder and Elbow Surgeons Standardized Shoulder Assessment Form (ASES-s) contains both a patient-derived subjective assessment and a physician-derived objective assessment. The subjective patient self-report section consists of two equally weighted domains, pain and function, and has been widely used for outcomes assessment in patients with shoulder instability, rotator cuff disease, and glenohumeral arthritis.

Scoring

The questionnaire consists of 2 subscales, pain and function/disability. Pain is rated using a 10cm visual analogue scale. There are 10 items on the function/disability scale, each rated on 4-point Likert scale for level of difficulty.

Pain subscale = (Pain raw score) x 5; Function/disability subscale = 10 item total x 5 divided by 3. Total score = pain subscale (50% of total score) + function/disability subscale (50% of total score).

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

Lower score means greater pain and disability.

Validity, reliability and sensitivity to detect change over time

In a study involving patients with shoulder dysfunction, the test-retest reliability (intraclass correlation coefficient [1-way random-effects], 0.84; 95% CI lower limit, 0.75) and internal consistency (Cronbach α, 0.86) values were acceptable. The standard error of the measure was 6.7 ASES points (90% CI, 11.0). Construct and discriminant validity was demonstrated. Responsiveness was demonstrated with a standardized response mean of 1.5 and an effect size of 1.4. The minimal detectable change was 9.7 ASES points (90% CI, 16), and the minimal clinically important difference was 6.4 ASES points. (Michener LA, McClure PW, Sennett BJ, 2002)

There was acceptable test-retest reliability for the overall American Shoulder and Elbow Surgeons shoulder scale (intraclass correlation coefficient = 0.94) and ten of eleven domains. There was acceptable internal consistency for patients with instability (Cronbach alpha = 0.61), rotator cuff disease (0.64), and arthritis (0.62). There were acceptable floor and ceiling effects for patients with instability (0% and 1.3%, respectively), rotator cuff disease (0% for both), and arthritis (0% for both). There was acceptable and appropriate criterion validity, with significant correlations (p < 0.05) between the overall American Shoulder and Elbow Surgeons scale and the physical functioning, role-physical, and bodily pain domains of the Short
Form-12 scale, and non-significant correlations (p > 0.05) with the role-emotional, mental health, vitality, and social function domains.
There was acceptable construct validity, with all twenty-three hypotheses demonstrating significance \( p < 0.05 \), and acceptable responsiveness to change for patients with instability (standardized response mean, 0.93), rotator cuff disease (1.16), and arthritis (1.11). (Kocher MS, Horan MP, Briggs KK et al, 2005)

The Turkish version of the ASES is found to be a valid and reliable shoulder assessment form that can be used for numerous shoulder disorders (Celik et al. 2013). When translated into German it represents a valid and reliable instrument for evaluating self-rated outcome in German-speaking patients with elbow pathology (John et al. 2010).

**References**


American Shoulder and Elbow Surgeons Standardized Shoulder Assessment Form (Patient Self-report Section) (ASES-S)

Pain

How bad is your pain today (mark line)?

No pain at all

Pain as bad as it can be

Function: Circle the number in the box that indicates your ability to do the following activities.

0: Unable to do
1: Very difficult to do
2: Somewhat difficult
3: Not difficult

<table>
<thead>
<tr>
<th>Activity</th>
<th>Right Arm</th>
<th>Left Arm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Put on a coat</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>2. Sleep on your painful or affected side</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>3. Wash back/do up bra in back</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>4. Manage toileting</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>5. Comb hair</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>6. Reach a high self</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>7. Lift 10 lbs above shoulder</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>8. Throw a ball overhead</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>9. Do usual work – List:</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>10. Do usual sport – List:</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
</tbody>
</table>
Shoulder Disability Questionnaire (SDQ-NL)

Background

The Shoulder Disability Questionnaire (SDQ) is a pain related disability questionnaire, which contains 16 items describing common situations that may induce symptoms in patients with shoulder disorders. All items refer to the preceding 24 hours.

Response options are either 'yes', 'no', or 'not applicable'. The 'not applicable' category should be used when the situation at issue has not occurred during the preceding 24 hours.

Scoring

A final score is calculated by dividing the total number of positively scored items (scored as ‘yes’) by the total number of applicable items (16 minus the number of items scores as ‘not applicable’). This score is subsequently multiplied by 100, resulting in a final score ranging between 0 and 100.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

Higher score indicates greater disability.

Validity and sensitivity/responsiveness to detect change over time

Content Validity The 16 items were drawn from a 60-item list sent to practitioners and researchers who were asked to select the items most frequently mentioned by patients and estimate their sensitivity to change on a Likert scale. These rating were used to construct the 16-item scale.

Guyatt Responsiveness Index (RI). The RI = 1.89–2.22 RI = mean change in “improved” patients/ SD of the change score in “stable” patients. The authors suggest scores > 1 are responsive in proportion to the magnitude of the score. Smallest clinically relevant change estimated to be 3 items (18.7%).

Calibrated Responsiveness Ratio (CRR). The CRR = (median change in “Improved” patients–median change in “stable” patients)/(interquartile range in “stable” patients) which was 1.14. The authors suggest scores <1 are unresponsive. They suggest that the scale discriminates well between improved and stable patients when between 10% and 60% of items change.

References

Shoulder Disability Questionnaire (SDQ-NL)

Instruction: When your shoulder hurts, you may find it difficult to do certain things you normally do. This list contains 16 sentences that people have used to describe themselves when they have shoulder pain. When you read the sentences, you may find that some stand out because they describe you today (last 24 hours). As you read the list, think of yourself today (last 24 hours). Ask yourself if you performed the activity.

Examples for completion
- You did not perform the activity in the last 24 hours, for example: you did not lie on your shoulder in the last 24 hours: put a check mark in the box for NA (not applicable).

My shoulder hurts when I lie on it.
- You did perform the activity in the last 24 hours, for example: you opened or closed a door in the last 24 hours. If your shoulder was painful during opening or closing a door; put a check mark in the box for YES.

My shoulder hurts when I open or close a door.
- You did perform the activity in the last 24 hours, for example: you did lean on your elbow or hand in the last 24 hours. If your shoulder did not hurt during leaning on your elbow or hand; put a check mark in the box for NO.

My shoulder hurts when I lean on my elbow or hand.

1. I wake up at night because of shoulder pain. □ NA □ YES □ NO
2. My shoulder hurts when I lie on it. □ NA □ YES □ NO
3. Because of pain in my shoulder it is difficult to put on a coat or a sweater. □ NA □ YES □ NO
4. My shoulder hurts during my usual daily activities. □ NA □ YES □ NO
5. My shoulder hurts when I lean on my elbow or hand. □ NA □ YES □ NO
6. My shoulder hurts when I move my arm. □ NA □ YES □ NO
7. My shoulder hurts when I write or type. □ NA □ YES □ NO
8. My shoulder is painful when I hold the driving wheel of my car or handle bars of my bike. □ NA □ YES □ NO
9. When I lift and carry something my shoulder hurts. □ NA □ YES □ NO
10. During reaching and grasping above shoulder level my shoulder hurts. □ NA □ YES □ NO
11. My shoulder is painful when I open or close a door □ NA □ YES □ NO
12. My shoulder is painful when I bring my hand to the back of my head. □ NA □ YES □ NO
13. My shoulder is painful when I bring my hand to my buttock. □ NA □ YES □ NO
14. My shoulder is painful when I bring my hand to my low back. □ NA □ YES □ NO
15. I rub my painful shoulder more than once during the day. □ NA □ YES □ NO
16. Because of my shoulder pain I am more irritable and bad tempered with people than usual. □ NA □ YES □ NO
Shoulder Disability Questionnaire – United Kingdom (SDQ-UK)
a.k.a. Croft Disability Questionnaire

Background

The Croft Disability Questionnaire is a self-administered questionnaire designed to evaluate the amount of restriction in everyday activities as a result of shoulder symptoms. This comprised 22 questions that require a yes or no answer to a series of upper limb functional tasks and is based on 11 of the 12 disability categories in the Functional Limitations Profile. The questionnaire is self-administered and has been tested for its validity and reliability.

Scoring

One point is given for every item answered with “yes” and no point for items answered with “no.” A score of 0 indicates no shoulder disability, whereas a score of 5 or more indicates a significant level of shoulder disability. Total score can be calculated by getting the number of yes responses.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

Higher score indicates greater disability.

Validity, reliability, and sensitivity/responsiveness to detect change over time

In a study where four shoulder questionnaires, namely, SDQ-NL, SDQ-UK, SPADI and SRQ, were analysed, all of them demonstrated face and content validity for the assessment of shoulder pain and disability. Strongest correlations were found for SDQ-UK with EuroQol 5 score. All shoulder questionnaires correlated poorly with active movement at the painful shoulder. All tests of responsiveness indicated that the shoulder questionnaires were at least moderately able to detect true change over time. SDQ-UK was the most stable in subjects who rated themselves as unchanged. SPADI and SRQ performed better on ROC analysis than SDQ-NL and SDQ-UK (areas under the curve of 0.87, 0.85, 0.77, and 0.77, respectively).

*SDQ-NL (Shoulder Disability Questionnaire – Netherlands)*

*SPADI (Shoulder Pain and Disability Index)*

*SRQ (Shoulder Rating Questionnaire)*

Minimum level of detectable change at 90% confidence level is 3 points.

References


Croft Disability Questionnaire

When your shoulder hurts, you may find it difficult to do some of the things you normally do. This list contains some sentences that people have used to describe themselves when they have trouble with their shoulder. When you read them you may find that some stand out because they describe you TODAY. As you read them, think of yourself TODAY.

When you read a sentence that describes you today, please tick the YES box. If the sentence does not describe you, then tick the NO box and go on to the next one. Please only tick the YES box for a sentence if you are sure that it describes you today.

1. Because of pain in my shoulder, I move my arm or hand with some difficulty.  
2. I do not bath myself completely because of my shoulder.  
3. Because of my shoulder trouble, I get dressed with help from someone else.  
4. I get dressed more slowly than usual because of my shoulder.  
5. Because of my shoulder trouble, I fasten my clothing with some difficulty (eg buttons, zips, shoelaces or bra).  
6. I have trouble putting on a jumper, shirt, blouse or jacket because of my shoulder problem.  
7. Because of my shoulder problem, I change position frequently in bed at night.  
8. I cannot lie on my right side at night because of my shoulder.  
9. I cannot lie on my left side at night because of my shoulder.  
10. I stay at home most of the time because of my shoulder problem.  
11. Because of my shoulder problem, I do less of the daily household jobs than I would usually do.  
12. I avoid heavy jobs around the house because of my shoulder trouble.  
13. Because of my shoulder, I do no carry any shopping or more active pastimes.  
14. Because of my shoulder trouble, I am cutting down on some of my usual sports or more active pastimes.  
15. Because of my shoulder trouble, I am not doing any of my usual physical recreation or more active pastime.  
16. Because of my shoulder, I try to get other people to do things for me.  
17. My shoulder makes me more irritable and bad tempered with people than usual.
18. Because of my shoulder, I have more minor accidents (eg dropping things).

19. I sleep less well because of my shoulder.

20. Because of my shoulder, I rest more often during the day.

21. My appetite is not very good because of my shoulder problem.

22. Because of my shoulder, I have trouble writing or typing.

Oxford Shoulder Score (OSS)

Background

The Oxford Shoulder Score (OSS) is a patient-completed outcome measure primarily developed for the assessment of outcomes of shoulder surgery (excluding shoulder stabilisation). The OSS was designed to be joint specific in order that it should be as sensitive to the outcome of shoulder surgery as possible and to be influenced as little as possible by other co-morbidities.

Scoring

Each question on the OSS should be scored 0 to 4, with 4 representing the best. When the 12 items are summed, this produces overall scores that run from 0 to 48 with 48 being the best outcome.

Each of the 12 questions on the Oxford shoulder score is scored in the same way with the score decreasing as the reported symptoms increase (ie. become worse). All questions are laid out similarly with response categories denoting least (or no) symptoms being to the left of the page (scoring 4) and those representing greatest severity lying on the right hand side (scoring 0). eg. question 1:

<table>
<thead>
<tr>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Unbearable</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

The overall score is reached by simply summing the scores received for individual questions. This results in a continuous score ranging from 0 (most severe symptoms) to 48 (least symptoms).

Missing values/notes for analysis.
We also propose that, if, after repeated attempts to obtain complete data from an individual, only one or two questions have been left unanswered, it is reasonable to enter the mean value representing all of their other responses, to fill the gaps. If more than two questions are unanswered it is recommend that an overall score should not be calculated. If patients indicate two answers for one question it is recommend that the convention of using the worst (most severe) response is adopted.

**Recording**

A separate recording sheet is provided to facilitate repeated measures over time.
Interpretation

Lower score indicates greater pain and disability.

Validity, reliability, and sensitivity/responsiveness to detect change over time

The single score derived from the questionnaire had a high internal consistency. Reproducibility, examined by test-retest reliability, was found to be satisfactory. The validity of the questionnaire was established by obtaining significant correlations in the expected direction with the Constant score and the relevant scales of the SF36 and the Stanford Health Assessment Questionnaire (HAQ). Sensitivity to change was assessed by analysing the differences between the preoperative scores and those at follow-up. Changes in scores were compared with the patients’ responses to postoperative questions about their condition. The standardised effect size for the new questionnaire compared favourably with that for the SF36 and the HAQ.

The OSS has been shown to have particularly high responsiveness that is comparable to the clinician assessed Constant–Murley score. It likely also has measurement properties that are generally superior to older patient-reported instruments which were developed at a time when psychometric methods to develop and test new instruments were not well appreciated or applied. Due to the fact that the OSS has been evaluated independently and found to be a highly reliable and responsive system for the assessment of shoulder surgery, there is some justification for using this score in isolation.

The Dutch version of the OSS has been found to be valid and its application and evaluation in clinical trials proved feasible and understandable (Berendes et al. 2010). Additionally, in accordance with the English version of the OSS, the Italian version proved to be a reliable, valid, and reproducible measure of shoulder pain perception in Italian-speaking patients (Murena et al. 2010).

References


## Oxford Shoulder Score (OSS)

During the past 4 weeks........ [✓] tick one box for each question

1. **During the past 4 weeks....**
   
   *How would you describe the worst pain you had from your shoulder?*

<table>
<thead>
<tr>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Unbearable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>[ ]</td>
<td></td>
<td>[ ]</td>
</tr>
</tbody>
</table>

2. **During the past 4 weeks....**

   *Have you had any trouble dressing yourself because of your shoulder?*

<table>
<thead>
<tr>
<th>No trouble at all</th>
<th>A little bit of trouble</th>
<th>Moderate trouble</th>
<th>Extreme difficulty</th>
<th>Impossible to do</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td></td>
<td>[ ]</td>
</tr>
</tbody>
</table>

3. **During the past 4 weeks....**

   *Have you had any trouble getting in and out of a car or using public transport because of your shoulder?*

<table>
<thead>
<tr>
<th>No trouble at all</th>
<th>A little bit of trouble</th>
<th>Moderate trouble</th>
<th>Extreme difficulty</th>
<th>Impossible to do</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td></td>
<td>[ ]</td>
</tr>
</tbody>
</table>

4. **During the past 4 weeks....**

   *Have you been able to use a knife and fork - at the same time?*

<table>
<thead>
<tr>
<th>Yes, Easily</th>
<th>With little difficulty</th>
<th>With moderate difficulty</th>
<th>With extreme difficulty</th>
<th>No, Impossible</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>

5. **During the past 4 weeks....**

   *Could you do the household shopping on your own?*

<table>
<thead>
<tr>
<th>Yes, Easily</th>
<th>With little difficulty</th>
<th>With moderate difficulty</th>
<th>With extreme difficulty</th>
<th>No, Impossible</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>

6. **During the past 4 weeks....**

   *Could you carry a tray containing a plate of food across a room?*

<table>
<thead>
<tr>
<th>Yes, Easily</th>
<th>With little difficulty</th>
<th>With moderate difficulty</th>
<th>With extreme difficulty</th>
<th>No, Impossible</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>

During the past 4 weeks.... [✓] tick one box for each question
### During the past 4 weeks........

**Could you brush/comb your hair with the affected arm?**

<table>
<thead>
<tr>
<th></th>
<th>Yes, Easily</th>
<th>With little difficulty</th>
<th>With moderate difficulty</th>
<th>With extreme difficulty</th>
<th>No, Impossible</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### During the past 4 weeks........

**How would you describe the pain you usually had from your shoulder?**

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Very mild</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### During the past 4 weeks........

**Could you hang your clothes up in a wardrobe, - using the affected arm?**

<table>
<thead>
<tr>
<th></th>
<th>Yes, Easily</th>
<th>With little difficulty</th>
<th>With moderate difficulty</th>
<th>With great difficulty</th>
<th>No, Impossible</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### During the past 4 weeks........

**Have you been able to wash and dry yourself under both arms?**

<table>
<thead>
<tr>
<th></th>
<th>Yes, Easily</th>
<th>With little difficulty</th>
<th>With moderate difficulty</th>
<th>With extreme difficulty</th>
<th>No, Impossible</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### During the past 4 weeks........

**How much has pain from your shoulder interfered with your usual work (including housework)?**

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>A little bit</th>
<th>Moderately</th>
<th>Greatly</th>
<th>Totally</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### During the past 4 weeks........

**Have you been troubled by pain from your shoulder in bed at night?**

<table>
<thead>
<tr>
<th></th>
<th>No nights</th>
<th>Only 1 or 2 nights</th>
<th>Some nights</th>
<th>Most nights</th>
<th>Every night</th>
</tr>
</thead>
</table>
Shoulder Pain and Disability Index (SPADI)

Background
The Shoulder Pain and Disability Index (SPADI) was developed to measure the pain and disability associated with shoulder pathology. The SPADI is a self-administered index consisting of 13 items divided into two subscales: pain and disability.

Scoring
A numeric score can be calculated by arbitrarily dividing the horizontal line into 12 segments of equal length. A number ranging from 0-10 is attached to this segment to produce a score for each item. The subscale scores are calculated by adding the item scores for that subscale and dividing this number by the maximum score possible for the items that are deemed applicable by the subject. This number is then multiplied by 100. Any item marked by the subject as not applicable will not be included in the maximum possible score. If a subject marked more than two items not applicable, no score will be calculated. The total SPADI score can be calculated by averaging the pain and disability subscale scores.

Recording
A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation
Higher score indicates greater impairment.

Validity, reliability, internal consistency and sensitivity to detect change over time
Test-retest reliability of the SPADI total and subscale scores ranged from 0.6377 to 0.6552. Internal consistency ranged from 0.8604 to 0.9507. SPADI total and subscale scores were highly negatively correlated with shoulder range of motion supporting the criterion validity of the index. Principal components factor analysis with and without varimax rotation supported the construct validity of the total SPADI and its subscales. High negative correlations between changes in SPADI scores and changes in shoulder ROM indicated the SPADI detected changes in clinical status over time intervals.

In a study done by Roddey et al (2000) comparing UCLA Shoulder Scale and simple Shoulder Test with SPADI, all scales demonstrated good internal consistency, suggesting that all items for each scale measured the same construct.

Scores on the SPADI reflected change in the external criterion measure of the patient’s rating of themselves as “cured/improved,” “the same,” or “worse” after 12 weeks. An ROC curve was constructed to determine the amount of change that differentiates those patients who have improved from those who have remained stable or deteriorated. A change of greater than 10 SPADI points is highly specific.

The cross-culturally adapted version of the English SPADI into a regional Indian language (Tamil) was found to be easy to use with high internal consistency (α > 0.95) and is a reliable (ICC >0.90) and valid measure of shoulder pain and disability in the Tamil speaking population (Jeldi et al. 2012).
References
Shoulder Pain and Disability Index (SPADI)

INVOLVED SHOULDER(S)  1. RIGHT  2. LEFT  3. BOTH

The line next to each item represents the amount of pain you have in each situation. The far left of the line represents "No pain" and the far right of the line represents "Worst pain imaginable". Place a mark on the line to indicate how much pain you had during the past week in each of the following situations. Mark the NA if you did not experience this situation during the past week.

Pain Scale

A. How severe is your shoulder pain?

1. At its worst?
2. When lying on the involved side?
3. When reaching for something on a high shelf?
4. When touching the back of your neck?
5. When pushing with the involved arm?

Total ______/ Possible______ =________ %

Disability Scale

B. How much difficulty do you have?

1. Washing your hair?
2. Washing your back?
3. Putting on an undershirt or pullover shirt?
4. Putting on a shirt that buttons down the front?
5. Putting on your pants?
6. Placing an object on a high shelf?
7. Carrying a heavy object of 10 pounds or more?
8. Removing something from your back pocket?

Total _____/ Possible______ =_______ %
Simple Shoulder Test (SST)

Background

The Simple Shoulder Test (SST) was developed to assess the functional limitations of the affected shoulder in the context of the patient’s activities of daily living. The SST consists of 12 questions with yes (1) or no (0) response options. Each question asks the patient to determine whether the injury affects his or her ability to perform a physical function.

Scoring

Each item answered with “yes” is awarded one point and no point for items answered with “no.” Total score can be calculated by getting the number of yes responses divided by the number of items answered multiplied by 100.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

Lower score means greater pain and disability.

Validity, reliability, and sensitivity/responsiveness to detect change over time

The SST demonstrated acceptable test-retest reliability (intraclass correlation coefficient >0.90) and content validity (floor and ceiling effects <10%). Correlations with the physical functioning component of the Short Form 12 were significant \( r = 0.439, P < .05 \); however, the correlations were not significant when stratified by age group (>60 years) \( r = 0.271, P = .349 \) and injury type (rotator cuff injury) \( r = 0.337, P = .085 \). Correlations with the American Shoulder and Elbow Surgeons were also significant \( r = 0.807, P = .001 \). The construct validity of the SST was acceptable, with all 8 hypotheses demonstrating significance \( P < .05 \). The SST was responsive to change (effect size, 0.81; standardized response mean, 0.81). However, there were differences after stratification for age group and injury type.

The Dutch version of the SST seems to be a reliable and valid instrument for evaluating functional limitations in patients with shoulder complaints (Van Kampen et al. 2012).

References

Simple Shoulder Test (SST)

Circle YES or NO to whether you can or think you can do the following:

- Is your shoulder comfortable with your arm at rest by your side? **YES NO**
- Does your shoulder allow you to sleep comfortably? **YES NO**
- Can you reach the small of your back to tuck in your shirt with your hand? **YES NO**
- Can you place your hand behind your head with the elbow straight out to the side? **YES NO**
- Can you place a coin on a shelf at the level of your shoulder without bending your elbow? **YES NO**
- Can you lift one pound (a full pint container) to the level of your shoulder without bending your elbow? **YES NO**
- Can you lift eight pounds (a full gallon container) to the level of your shoulder without bending your elbow? **YES NO**
- Can you carry twenty pounds at your side with the affected extremity? **YES NO**
- Do you think you can toss a softball underhand ten yards with the affected extremity? **YES NO**
- Do you think you can toss a softball overhand twenty yards with the affected extremity? **YES NO**
- Can you wash the back of your opposite shoulder with the affected extremity? **YES NO**
- Would your shoulder allow you to work full time at your regular job? **YES NO**
Shoulder Rating Questionnaire (SRQ)

Background

The Shoulder Rating Questionnaire (SRQ) is a self-administered questionnaire designed to assess the severity of symptoms related to and the functional status of the shoulder. It includes domains of global assessment, pain, daily activities, recreational and athletic activities, work, satisfaction and areas for improvement. Each domain is graded separately and weighted to produce total score. A final, non-graded domain allows the patient to select two areas in which he or she believes improvement is most important.

Scoring

The global assessment domain (Question 1) consists of a ten-centimeter-long visual analog scale. A visual analog scale is a straight line, the ends of which are defined as the extreme limits of the response or sensation to be measured. In this case, the scale is from 0 (very poorly) to 10 (very well), with interval scores measured in millimetres between 0 and the mark made by the patient.

Each of the other scored domains consists of a series of multiple-choice questions with five selections scored from 1 (poorest) to 5 (best). Each domain is scored separately by averaging the scores of the completed questions and multiplying by two. Thus, the possible score for each domain ranges from 2 (poorest) to 10 (best).

The pain domain consists of four questions that assess the severity of pain at rest (Question 2) and during activities (Question 3), the frequency of pain that interferes with sleep (Question 4), and the frequency of severe pain (Question 5).

The daily activities domain consists of six questions, including one that requires a general assessment of the limitation of daily activities (Question 6) and a series of questions that assess difficulty with typical daily activities, such as putting on or removing a pullover shirt, combing hair, reaching shelves above the head, scratching or washing the lower back, and carrying groceries (Questions 7 to 11).

The recreational and athletic activities domain consists of three questions. One asks for a general assessment of limitation during recreational and athletic activities (Question 12), another requires an assessment of the degree of difficulty in throwing a ball overhand or serving in tennis (Question 13), and the third allows the patient to select an activity that he or she particularly enjoys and to assess his or her limitation in that activity (Question 14).

The work domain includes a non-graded question that categorizes the form of work (Question 15) and four graded questions that assess the frequency of inability to do any work (Question 16), inability to work efficiently (Question 17), and the need to work a shorter day (Question 18) or to change the manner in which usual work is performed (Question 19).

The satisfaction domain (Question 20) consists of a single question that asks the patient to grade his or her over-all satisfaction from poor to excellent. This domain is not included in the total score but rather is scored and presented separately.
Finally, the importance domain (Question 21) allows the patient to rank the two areas in which he or she most desires improvement. These are rated 1, for most important, and 2, for second most important. This does not contribute to the total score but can be used with the scores of the individual domains to determine if substantial improvement has occurred in the areas most important to the patient or to individualize the weighting method used to determine the over-all score.

The maximum score is 15 points for global assessment (domain score multiplied by 1.5; score range, 0 to 15 points), 40 points for pain (domain score multiplied by four; score range, 8 to 40 points), 20 points for daily activities (domain score multiplied by two; score range, 4 to 20 points), 15 points for recreational and athletic activities (domain score multiplied by 1.5; score range, 3 to 15 points), and 10 points for work (domain score multiplied by one; score range, 2 to 10 points). Therefore, the total possible score ranged from 17 to 100 points.

**Recording**

A separate recording sheet is provided to facilitate repeated measures over time.

**Interpretation**

Lower score means greater pain and disability.

**Validity, reliability, internal consistency and responsiveness to detect change over time**

The validity of the scale was demonstrated by moderate-to-high correlation of the domains and individual questions of the Shoulder Rating Questionnaire with those of the Arthritis Impact Measurement Scales 2. Validity was supported further by significant correlation of the scores in each domain with the level of satisfaction in that domain and by significantly lower scores in domains that patients selected as areas important for improvement. The over-all scale and each domain were internally consistent (Cronbach alpha, 0.71 to 0.90). Reproducibility was evaluated by repeated administration of the questionnaire after a mean of three days to forty patients whose condition was clinically stable. Reproducibility of the over-all questionnaire and individual domains was excellent (Spearman-Brown index, 0.94 to 0.98). Individual questions were reproducible, with a weighted kappa value of more than 0.7 for each. Responsiveness was evaluated by comparison of the preoperative and postoperative scores of thirty patients who had a satisfactory result one year after an operation on the shoulder. The over-all Shoulder Rating Questionnaire and each domain were responsive to clinical change as demonstrated by favourable standardized response means (range, 1.1 to 1.9) and indices of responsiveness (range, 1.1 to 2.0).

**References**

Shoulder Rating Questionnaire (SRQ)

Which is your dominant arm?  
Left or Right

For which shoulder(s) have you been evaluated or treated?  
Left  Right  Both

Please answer the following questions regarding the shoulder for which you have been evaluated or treated. If a question does not apply to you, leave that question blank. If you indicated that both shoulders have been evaluated or treated, please complete a separate questionnaire for each shoulder and mark the corresponding side (Left or Right) at the top of each form.

1. Considering all the ways that your shoulder affects you, mark X on the scale below for how well you are doing.  
Very poorly { 1 2 3 4 5 6 7 8 9 10 } Very well

The following questions refer to pain.

2. During the past month, how would you describe the usual pain in your shoulder at rest?  
A. Very severe  
B. Severe  
C. Moderate  
D. Mild  
E. None

3. During the past month, how would you describe the usual pain in your shoulder during activities?  
A. Very severe  
B. Severe  
C. Moderate  
D. Mild  
E. None

4. During the past month, how often did the pain your shoulder make it difficult for you to sleep at night?  
A. Every day  
B. Several days per week  
C. One day per week  
D. Less than one day per week  
E. Never

5. During the past month, how often have you had severe pain in your shoulder?  
A. Every day  
B. Several days per week  
C. One day per week  
D. Less than one day per week  
E. Never
The following questions refer to daily activities

6. Considering all the ways you use your shoulder during daily personal and household activities (i.e. dressing, washing, driving, household chores, etc.), how would you describe your ability to use your shoulder?
   A. Very severe limitation; unable
   B. Severe limitation
   C. Moderate limitation
   D. Mild limitation
   E. No limitation

Questions 7-11: During the past month, how much difficulty have you had in each of the following activities due to your shoulder?

7. Putting on or removing a pullover sweater or shirt.
   A. Unable
   B. Severe difficulty
   C. Moderate difficulty
   D. Mild difficulty
   E. No difficulty

8. Combing or brushing your hair.
   A. Unable
   B. Severe difficulty
   C. Moderate difficulty
   D. Mild difficulty
   E. No difficulty

9. Reaching shelves that are above your head.
   A. Unable
   B. Severe difficulty
   C. Moderate difficulty
   D. Mild difficulty
   E. No difficulty

10. Scratching or washing your lower back with your hand
    A. Unable
    B. Severe difficulty
    C. Moderate difficulty
    D. Mild difficulty
    E. No difficulty

11. Lifting or carrying a bag of groceries (8-10 lbs or 3-6-4-5 kilograms)
    A. Unable
    B. Severe difficulty
    C. Moderate difficulty
    D. Mild difficulty
    E. No difficulty
The following questions refer to recreational or athletic activities.

12. Considering all the ways you use your shoulder during recreational or athletic activities (i.e. baseball, golf, aerobics, gardening, etc.), how would you describe the function of your shoulder?
   A. Very severe limitation; unable
   B. Severe limitation
   C. Moderate limitation
   D. Mild limitation
   E. No limitation

13. During the past month, how much difficulty have you had throwing a ball overhand or serving in tennis due to your shoulder?
   A. Very severe limitation; unable
   B. Severe limitation
   C. Moderate limitation
   D. Mild limitation
   E. No limitation

14. List one activity (recreational or athletic) that you particularly enjoy and then select the degree of limitation you have, if any, due to your shoulder? __________________________
   A. Very severe limitation; unable
   B. Severe limitation
   C. Moderate limitation
   D. Mild limitation
   E. No limitation

The following questions refer to work.

15. During the past month, what has been your main form of work?
   A. Paid work (list type) ___________________
   B. Housework
   C. School work
   D. Unemployed
   E. Disabled due to your shoulder
   F. Disabled secondary to other causes
   G. Retired

If you answered D, E, F, or G to the above question, please skip questions 16-19 and go on to question 20.

16. During the past month, how often were you unable to do any of your usual work because of your shoulder?
   A. All days
   B. Several days per week
   C. One day per week
   D. Less than one day per week
   E. Never
17. During the past month, on the days that you did work, how often were you unable to do your work as carefully or as efficiently as you would like because of your shoulder?
   A. All days
   B. Several days per week
   C. One day per week
   D. Less than one day per week
   E. Never

18. During the past month, on the days that you did work, how often did you have to work a shorter day because of your shoulder?
   A. All days
   B. Several days per week
   C. One day per week
   D. Less than one day per week
   E. Never

19. During the past month, on the days that you did work, how often did you have to change the way that your usual work is done because of your shoulder?
   A. All days
   B. Several days per week
   C. One day per week
   D. Less than one day per week
   E. Never

The following questions refer to satisfaction and areas of improvement

20. During the past month, how would you rate your overall degree of satisfaction with your shoulder?
   A. Poor
   B. Fair
   C. Good
   D. Very good
   E. Excellent

21. Please rank the 2 areas in which you would most like to see improvement (place a 1 for the most important, a 2 for the second most important).
   Pain ____
   Daily personal and household activities ____
   Recreational or athletic activities ____
   Work ____
Penn Shoulder Scale (PSS)

Background

The Penn Shoulder Scale (PSS) is a 100-point shoulder-specific self-report questionnaire that consists of 3 subscales, including pain, satisfaction, and function. The pain subscale consists of 3 pain items that address pain at rest, with normal activities and with strenuous activities. All are based on a 10-point numeric rating scale with end points of “no pain” and “worst possible pain.” Patient satisfaction with shoulder function is also assessed with a 10-point numeric rating scale. The endpoints are “not satisfied” and “very satisfied.” The function subsection is based on a sum of 20 items, each with a 4-point Likert scale. Most patients complete the scale in less than 10 minutes, and the clinician can typically calculate the final scores in less than 2 minutes.

Scoring

In the pain subscale, points are awarded for each item by subtracting the number circled from the maximum of 10. Therefore, a patient is awarded 30 points for complete absence of pain. If a patient is not able to use the arm for normal or strenuous activities, 0 points are scored for that item. In the patient satisfaction subscale, a maximum of 10 points for this section indicates that the patient is “very satisfied” with the current level of function of their shoulder. The function subsection is based on a sum of 20 items, each with a 4-point Likert scale. The response options include 0 (can’t do at all), 1 (much difficulty), 2 (with some difficulty), and 3 (no difficulty). A patient is awarded 60 points if all activities can be performed without difficulty. Because some items in this subscale may not be applicable to all patients, the response option “did not do before injury” is available. For scoring purposes, the total possible point for the function subscale is reduced by 3 when this option is circled. Scoring is based on a percentage of the total possible points.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

The total PSS maximum score of 100 indicates high function, low pain, and high satisfaction with the function of the shoulder.

Validity, reliability, internal consistency and responsiveness to detect change over time

Reliability analysis revealed a test-retest ICC of 0.94 (95% CI, 0.89-0.97). Internal consistency analysis revealed a Cronbach alpha of 0.93. The standard error of measurement (SEM) was ± 8.5 scale points (based on a 90% CI) and the minimal detectable change (MDC) was ±12.1 scale points (based on a 90% CI). The minimal clinically important difference (MCID) for improvement was 11.4 points. Pearson product moment correlation coefficients between the PSS and the Constant Shoulder Score (CSS) and American Shoulder and Elbow Surgeons Shoulder Score (ASES) were 0.85 and 0.87, respectively. Responsiveness analysis revealed an effect size of 1.01 and a standardized response mean of 1.27. The PSS has been translated into Portuguese and culturally adapted to become the Brazilian version. Its psychometric properties are reported to have been tested (Napoles et al. 2010).

References
Penn Shoulder Scale (PSS)

The Penn Shoulder Score, Part 1: Pain and Satisfaction Subscales

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Please circle the number closest to your level of pain or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>satisfaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain at rest with your arm by your side:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 5 6 7 8 9 10 Worst pain possible</td>
<td>(10 – # circled)</td>
<td></td>
</tr>
<tr>
<td>No pain</td>
<td>(Score 0 if not applicable)</td>
<td></td>
</tr>
<tr>
<td>Pain with normal activities (eating, dressing, bathing):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 5 6 7 8 9 10 Worst pain possible</td>
<td>(10 – # circled)</td>
<td></td>
</tr>
<tr>
<td>No pain</td>
<td>(Score 0 if not applicable)</td>
<td></td>
</tr>
<tr>
<td>Pain with strenuous activities (reaching, lifting, pushing,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>pulling, throwing):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 5 6 7 8 9 10 Worst pain possible</td>
<td>(10 – # circled)</td>
<td></td>
</tr>
<tr>
<td>No pain</td>
<td>(Score 0 if not applicable)</td>
<td></td>
</tr>
<tr>
<td>Pain score:</td>
<td>=____/30</td>
<td></td>
</tr>
<tr>
<td>How satisfied are you with the current level of function of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>your shoulder?</td>
<td>____/10 (# circled)</td>
<td></td>
</tr>
<tr>
<td>No pain</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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The Penn Shoulder Score: Function Subscale

<table>
<thead>
<tr>
<th>Please circle the number that best describes the level of difficulty you might have performing each activity</th>
<th>No difficulty</th>
<th>Some difficulty</th>
<th>Much difficulty</th>
<th>Can’t do at all</th>
<th>Did not do before injury</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reach the small of your back to tuck in your shirt with your hand</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>2. Wash the middle of your back/hook bra</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>3. Perform necessary toileting activities</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>4. Wash the back of opposite shoulder</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>5. Comb hair</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>6. Place hand behind head with elbow held straight out to the side</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>7. Dress self (including put on coat and pull shirt off overhead)</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>8. Sleep on affected side</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>9. Open a door with affected arm</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>10. Carry a bag of groceries with affected arm</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>11. Carry a briefcase/small suitcase with affected arm</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>12. Place a soup can (1-2 lb) on a shelf at shoulder level without bending elbow</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>13. Place a one gallon container (8-10 lb) on a shelf at shoulder level without bending elbow</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>14. Reach a shelf above your head without bending your elbow</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>15. Place a soup can (1-2 lb) on a shelf overhead without bending your elbow</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>16. Place a one gallon container (8-10 lb) on a shelf overhead without bending your elbow</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>17. Perform usual sport/hobby</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>18. Perform household chores (cleaning, laundry, cooking)</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>19. Throw overhand/swim/overhead racquet sports (circle all that apply to you)</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>20. Work full-time at your regular job</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>X</td>
</tr>
</tbody>
</table>

SCORING
Total of columns = _____ (a)
Number of Xs × 3 = _____(b), 60 - _____(b) = _____ (c) (if no Xs are circled, function score = total of columns)
Function Score = _____(a) + _____(c) = _____ × 60 _____/60

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Western Ontario Shoulder Instability Index (WOSI)

**Background**

The Western Ontario Shoulder Instability Index (WOSI) was developed to evaluate disease-specific quality of life of patients with symptomatic instability of the shoulder. The WOSI has 21 items. The first domain, which is physical symptoms, contains 10 items. The remaining domains are sports, recreation, and work (4 items); lifestyle (4 items); and emotions (3 items).

**Scoring**

The response options for each item consist of a 100-mm line, anchored at both ends by the extremes of the item being measured. The distance from the left side of the line and the score out of 100 is calculated, recorded to the nearest 0.5mm). Total score for each domain can be calculated (Physical Symptoms/1000; Sports/Recreation/Work/400; Lifestyle/400; Emotions/300) or the total score for the domains can be summed for an aggregate score out of 2100. Sometimes, a percentage score is reported. Since the worst possible score is 2100, the aggregate score is subtracted from 2100 and divided by 2100 x 100 for the %. E.g. if a patient’s total aggregate score = 1625; then the percentage score would be:

\[
\frac{2100-1625}{2100} = 22.6\%
\]

**Recording**

A separate recording sheet is provided to facilitate repeated measures over time.

**Interpretation**

Higher score indicates greater physical symptoms and poor quality of life.

**Validity, reliability and responsiveness/sensitivity to detect change over time**

Construct validation demonstrated that this index correlated predictably with other measures. Reliability was very high at 2 weeks and 3 months, and the index was more responsive (sensitive to change) than five other shoulder measurement tools (the Disabilities of the Arm, Shoulder and Hand scale; The American Shoulder and Elbow Surgeons Standardized Shoulder Assessment Form; the UCLA Shoulder Rating Scale; the Constant Score; and the Rowe Rating Scale), a global health instrument (the SF12), and range of motion.

The WOSI questionnaire in Japanese is a reliable (α= 0.84; r = 0.91; ICC=0.91) self-assessment tool that is comparable with the original English version and can be used when evaluating patients with shoulder instability in the Japanese population (Hatta et al. 2011). The German translation of the WOSI was also found to be a valid and reliable (α= 0.92; r = 0.92) tool, applicable to measure outcomes on patients with shoulder instability (Hofstaetter et al. 2010).
### Construct Validation Showing Correlations Between the WOSI and Other Outcome Measures

<table>
<thead>
<tr>
<th>Outcome measure</th>
<th>Pearson product-moment correlation</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Baseline</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$r$, A priori prediction</td>
<td>$r$ Actual</td>
</tr>
<tr>
<td>DASH</td>
<td>0.7</td>
<td>0.768</td>
<td>0.7</td>
</tr>
<tr>
<td>UCLA shoulder rating scale</td>
<td>0.5</td>
<td>0.649</td>
<td>0.5</td>
</tr>
<tr>
<td>Constant score</td>
<td>0.6</td>
<td>0.590</td>
<td>0.6</td>
</tr>
<tr>
<td>Global change</td>
<td>NA</td>
<td>NA</td>
<td>0.6</td>
</tr>
<tr>
<td>Rowe rating scale</td>
<td>0.5</td>
<td>0.609</td>
<td>0.5</td>
</tr>
<tr>
<td>ASES</td>
<td>0.5</td>
<td>0.552</td>
<td>0.5</td>
</tr>
<tr>
<td>SF12 physical score</td>
<td>0.5</td>
<td>0.656</td>
<td>0.4</td>
</tr>
<tr>
<td>SF12 mental score</td>
<td>0.2</td>
<td>0.115</td>
<td>0.2</td>
</tr>
<tr>
<td>Range of motion</td>
<td>0.3</td>
<td>0.394</td>
<td>0.2</td>
</tr>
</tbody>
</table>

* Not applicable.

### Reliability of the WOSI and its Domains as Shown by Intra-class Correlation Coefficients at 2 Weeks and 3 Months After Original Administration of the WOSI

<table>
<thead>
<tr>
<th>Domain</th>
<th>Intra-class correlation coefficient ($r$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 weeks</td>
</tr>
<tr>
<td>WOSI total score</td>
<td>0.949</td>
</tr>
<tr>
<td>Physical symptoms</td>
<td>0.941</td>
</tr>
<tr>
<td>Sport/recreation/work</td>
<td>0.719</td>
</tr>
<tr>
<td>Lifestyle</td>
<td>0.878</td>
</tr>
<tr>
<td>Emotions</td>
<td>0.885</td>
</tr>
</tbody>
</table>

### References


Western Ontario Shoulder Instability Index (WOSI)

Instructions: You are asked to indicate on this part of the questionnaire, the amount of a symptom you have experienced in the past week as related to your problematic shoulder. Simply place an “X” on the line that corresponds accurately with your symptoms.

Note**
1. The further to the right you put your “X”, the more you experience that symptom.
2. The further left you put your “X” the less you experience that symptom.
3. Please do not place your “X” outside the line.
4. If you have any questions regarding the intent of any particular question, please ask.

Section A: Physical Symptoms
1. How much pain do you experience in your shoulder with overhead activities?

<table>
<thead>
<tr>
<th>No Pain</th>
<th>Extreme Pain</th>
</tr>
</thead>
</table>

2. How much aching or throbbing do you experience in your shoulder?

<table>
<thead>
<tr>
<th>No Aching/Throbbing</th>
<th>Extreme Aching/Throbbing</th>
</tr>
</thead>
</table>

3. How much weakness or lack of strength do you experience in your shoulder?

<table>
<thead>
<tr>
<th>No Weakness</th>
<th>Extreme Weakness</th>
</tr>
</thead>
</table>

4. How much fatigue of lack of stamina do you experience in your shoulder?

<table>
<thead>
<tr>
<th>No Fatigue</th>
<th>Extreme Fatigue</th>
</tr>
</thead>
</table>

5. How much clicking, cracking, or snapping do you experience in your shoulder?

<table>
<thead>
<tr>
<th>No Clicking</th>
<th>Extreme Clicking</th>
</tr>
</thead>
</table>

6. How much stiffness do you experience in your shoulder?

<table>
<thead>
<tr>
<th>No Stiffness</th>
<th>Extreme Stiffness</th>
</tr>
</thead>
</table>

7. How much discomfort do you experience in your neck muscles as a result of your shoulder?

<table>
<thead>
<tr>
<th>No Discomfort</th>
<th>Extreme Discomfort</th>
</tr>
</thead>
</table>

8. How much feeling of instability or looseness do you experience in your shoulder?

<table>
<thead>
<tr>
<th>No Instability</th>
<th>Extreme Instability</th>
</tr>
</thead>
</table>

9. How much do you compensate for your shoulder with other muscles?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Extreme</th>
</tr>
</thead>
</table>

10. How much loss of range of motion do you have in your shoulder?
<table>
<thead>
<tr>
<th>Section B: Sports/Recreation/Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. How much has your shoulder limited the amount you can participate in sports or recreational activities?</td>
</tr>
<tr>
<td>Not Limited</td>
</tr>
<tr>
<td>12. How much has your shoulder affected your ability to perform the specific skills required for your sport or work? (If your shoulder affects both sports and work, consider the area that is most affected.)</td>
</tr>
<tr>
<td>Not Affected</td>
</tr>
<tr>
<td>13. How much do you feel the need to protect your arm during activities?</td>
</tr>
<tr>
<td>Not at all</td>
</tr>
<tr>
<td>14. How much difficulty do you experience lifting heavy objects below shoulder level?</td>
</tr>
<tr>
<td>No Difficulty</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section C: Lifestyle</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. How much fear do you have of falling on your shoulder?</td>
</tr>
<tr>
<td>No Fear</td>
</tr>
<tr>
<td>16. How much difficulty do you experience maintaining your desired level of fitness?</td>
</tr>
<tr>
<td>No Difficulty</td>
</tr>
<tr>
<td>17. How much difficulty do you have “roughhousing or horsing around” with family or friends?</td>
</tr>
<tr>
<td>No Difficulty</td>
</tr>
<tr>
<td>18. How much difficulty do you have sleeping because of your shoulder?</td>
</tr>
<tr>
<td>No Difficulty</td>
</tr>
</tbody>
</table>
Section D: Emotions

19. How conscious are you of your shoulder?

| Not Conscious | Extremely conscious |

20. How concerned are you about your shoulder becoming worse?

| No Concern | Extremely concerned |

21. How much frustration do you feel because of your shoulder?

| No Frustration | Extremely frustrated |
Western Ontario Rotator Cuff Index (WORC)

Background

The Western Ontario Rotator Cuff Index (WORC) is a self-report questionnaire developed specifically to evaluate disability in persons with pathology of the rotator cuff of the shoulder. WORC consists of 21 items representing five domains each with a visual analogue scale type response option. The 5 domains include: 1) physical symptoms, 2) sports and recreation, 3) work, 4) social function, and 5) emotions.

Scoring

The response options for each item consists of a 100-mm line, anchored at both ends by the extremes of the item being measured. The distance from the left side of the line and the score out of 100 is calculated, recorded to the nearest 0.5mm). Total score for each domain can be calculated (Physical Symptoms/600; Sports and Recreation/400; Work/400; Lifestyle/400; Emotions/300) or the total score for the domains can be summed for an aggregate score out of 2100. Sometimes, a percentage score is reported. Since the worst possible score is 2100, the aggregate score is subtracted from 2100 and divided by 2100 x 100 for the %. e.g. if a patient’s total aggregate score = 1625; then the percentage score would be:

\[
\frac{2100-1625}{2100} = 22.6\%
\]

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

Higher score indicates greater physical symptoms and disability.

Validity, reliability and sensitivity/responsiveness to detect change over time

In a preliminary report of the psychometric properties of WORC, Pearson correlation coefficients between the initial scores and the change scores at 6 months postoperatively of the WORC, Constant-Murley shoulder form, and American Shoulder and Elbow Surgeons standardized shoulder assessment form were high (P < .01). The WORC was sensitive to detect change: F = 28.041 and P < .000 at 3 months and F = 66.927 and P < .000 at 6 months postoperatively.

In a study examining the validity of the original 5-domain model of the WORC, Correlations ranged from .09 to .70 between all the items, from .29 to .70 between items within a subscale, and from .53 to .72 between subscale scores. Cronbach’s alpha was .93 for the total scale, and .72 to .82 for the subscales. The factor analysis produced 3 factors that explained 57% of the variance. The first factor included symptoms and emotional items, the second included strength items and the third included daily activities.

A study examining the validity and reliability of the WORC found it to have high internal consistency, moderate to good construct validity, high test-retest reliability, and good responsiveness in patients with a variety of rotator cuff (RC) problems except for patients with severe symptoms (Witte et al. 2012). These findings support the use of the WORC as a condition-specific self-reported outcome measure in most RC patients.
References


Western Ontario Rotator Cuff Index (WORC)

Section A: Physical Symptoms

INSTRUCTIONS TO PATIENTS

The following questions concern the physical symptoms you have experienced due to your shoulder problem. In all cases, please enter the amount of the symptom you have experienced in the last week. (Please mark your answers with a slash "/")

1. How much sharp pain do you experience in your shoulder?
   - No pain
   - Extreme pain

2. How much constant, nagging pain do you experience in your shoulder?
   - No pain
   - Extreme pain

3. How much weakness do you experience in your shoulder?
   - No weakness
   - Extreme weakness

4. How much stiffness or lack of range of motion do you experience in your shoulder?
   - No stiffness
   - Extreme stiffness

5. How much are you bothered by clicking, grinding or crunching in your shoulder?
   - None
   - Extreme

6. How much discomfort do you experience in the muscles of your neck because of your shoulder?
   - No discomfort
   - Extreme discomfort

SECTION B: Sports/Recreation

INSTRUCTIONS TO PATIENTS

The following section concerns how your shoulder problem has affected your sports or recreational activities in the past week. For each question, please mark your answers with a slash "/".

7. How much has your shoulder affected your fitness level?
   - Not affected
   - Extremely affected
8. How much difficulty do you experience doing push-ups or other strenuous shoulder exercises because of your shoulder?

No difficulty

9. How much has your shoulder affected your ability to throw hard or far?

Not affected

10. How much difficulty do you have with someone or something coming in contact with your affected shoulder?

No fear

SECTION C: Work

INSTRUCTIONS TO PATIENTS

The following section concerns the amount that your shoulder problem has affected your work around or outside of the home. Please indicate the appropriate amount for the past week with a slash "/".

11. How much difficulty do you experience in daily activities about the house or yard?

No difficulty

12. How much difficulty do you experience working above your shoulder?

No difficulty

13. How much do you use your uninvolved arm to compensate for your injured one?

No at all

14. How much difficulty do you experience lifting heavy objects at or below shoulder level?

No difficulty

SECTION D: Lifestyle

INSTRUCTIONS TO PATIENTS

The following section concerns the amount that your shoulder problem has affected or changed your lifestyle. Again, please indicate the appropriate amount for the past week with a slash "/".

15. How much difficulty do you have sleeping because of your shoulder?

No difficulty

16. How much difficulty have you experienced with styling your hair because of your shoulder?

No difficulty

17. How much difficulty do you have “roughhousing or horsing around” with family or friends?

No difficulty
18. How much difficulty do you have dressing or undressing?

<table>
<thead>
<tr>
<th>No difficulty</th>
<th>Extreme difficulty</th>
</tr>
</thead>
</table>

### SECTION E: Emotions

#### INSTRUCTIONS TO PATIENTS

The following questions relate to how you have felt in the past week with regard to your shoulder problem. Please indicate your answer with a slash "/".

19. How much frustration do you feel because of your shoulder?

<table>
<thead>
<tr>
<th>No frustration</th>
<th>Extreme frustration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

20. How “down in the dumps” or depressed do you feel because of your shoulder?

<table>
<thead>
<tr>
<th>None</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

21. How worried or concerned are you about the effect of your shoulder on your occupation?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Extreme concerned</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Western Ontario Osteoarthritis of the Shoulder (WOOS) Index

Background

The Western Ontario Osteoarthritis of the Shoulder (WOOS) Index was designed to be used as the primary outcome measure in clinical trials evaluating the treatment of patients with OA of the shoulder or to be used by clinicians for ongoing evaluation of patients in their practice. WOOS Index contains 19 items, each with a visual analogue response option for the four domains (six questions for pain and physical symptoms, five questions for sport, recreation and work, five questions for lifestyle function and three questions for emotional function).

Scoring

The response options for each item consists of a 100-mm line, anchored at both ends by the extremes of the item being measured. The distance from the left side of the line and the score out of 100 is calculated, recorded to the nearest 0.5mm. Total score for each domain can be calculated (Physical Symptoms/600; Sports/Recreation/Work/500; Lifestyle/500; Emotions/300) or the total score for the domains can be summed for an aggregate score out of 1900. Sometimes, a percentage score is reported. Since the worst possible score is 1900, the aggregate score is subtracted from 1900 and divided by 1900 x 100 for the %.

\[
\text{e.g. if a patient's total aggregate score = 1625; then the percentage score would be:} \\
\frac{1900-1625}{1900} = 14.5\%
\]

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

Higher score indicates greater physical symptoms and poor quality of life.
Validity, reliability and sensitivity/responsiveness to detect change over time

Construct validation showing correlations between the WOOS and other outcome measures

<table>
<thead>
<tr>
<th>Outcome Measure</th>
<th>Pearson product–moment correlation (Baseline)</th>
<th>Change Score (Actual)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$r$, A priori prediction</td>
<td>$r$ Actual</td>
</tr>
<tr>
<td>UCLA shoulder rating scale</td>
<td>0.5</td>
<td>0.630</td>
</tr>
<tr>
<td>Constant score</td>
<td>0.6</td>
<td>0.730</td>
</tr>
<tr>
<td>Global change</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>ASES</td>
<td>0.5</td>
<td>0.590</td>
</tr>
<tr>
<td>McGill pain questionnaire</td>
<td>0.4</td>
<td>0.578</td>
</tr>
<tr>
<td>McGill VAS</td>
<td>0.4</td>
<td>0.407</td>
</tr>
<tr>
<td>SF12 physical score</td>
<td>0.5</td>
<td>0.650</td>
</tr>
<tr>
<td>SF12 mental score</td>
<td>0.3</td>
<td>0.460</td>
</tr>
<tr>
<td>Range of motion</td>
<td>0.3</td>
<td>0.607</td>
</tr>
</tbody>
</table>

Reliability of the WOOS and its domains as shown by intraclass correlation coefficients at 3 months after original administration of the WOOS

<table>
<thead>
<tr>
<th>Domain</th>
<th>Intraclass correlation coefficient ($r$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WOOS total score</td>
<td>0.964</td>
</tr>
<tr>
<td>Physical symptoms</td>
<td>0.946</td>
</tr>
<tr>
<td>Sports/recreation/work</td>
<td>0.939</td>
</tr>
<tr>
<td>Lifestyle</td>
<td>0.869</td>
</tr>
<tr>
<td>Emotions</td>
<td>0.907</td>
</tr>
</tbody>
</table>

In its developmental literature, WOOS proved to be valid by demonstrating predicted correlations with previously published shoulder measures, global health status measure and range of motion. The instrument was also more responsive than other shoulder measurement tools, a global health status measure and range of motion.

A study to assess the validity, reliability, and responsiveness of the WOOS when translated into Swedish on patients with subacromial pain found that it performs similarly to the original Canadian version (Klintberg et al. 2012).

References


Western Ontario Osteoarthritis of the Shoulder (WOOS) Index

**SECTION A: Physical Symptoms**

**INSTRUCTIONS TO PATIENTS**

The following questions concern the physical symptoms you have experienced due to your shoulder problem. In all cases, please enter the amount of the symptom you have experienced in the last week. (Please mark your answers with a slash “/”.)

1. How much pain do you experience in your shoulder with movement?

<table>
<thead>
<tr>
<th>No pain</th>
<th>Extreme pain</th>
</tr>
</thead>
</table>

2. How much constant, nagging pain do you have in your shoulder?

<table>
<thead>
<tr>
<th>No pain</th>
<th>Extreme pain</th>
</tr>
</thead>
</table>

3. How much weakness do you experience in your shoulder?

| No weakness | Extreme weakness |

4. How much stiffness do you experience in your shoulder?

| No stiffness | Extreme stiffness |

5. How much grinding do you experience in your shoulder?

| None | Extreme |

6. How much is your shoulder affected by the weather?

| Not affected | Extremely affected |

**SECTION B: Sports/Recreation/Work**

**INSTRUCTIONS TO PATIENTS**

The following section concerns how your shoulder problem has affected your sports or recreational activities in the past week. For each question, please mark your answers with a slash “/”.

7. How much difficulty do you experience working or reaching above shoulder level?

| No difficulty | Extreme difficulty |
8. How much difficulty do you experience with lifting objects (e.g., grocery bags, garbage can etc.) below shoulder level?

| No difficulty | Extreme difficulty |

9. How much difficulty do you experience doing repetitive motions below shoulder level such as raking, sweeping or washing floors because of your shoulder?

| No difficulty | Extreme difficulty |

10. How much difficulty do you experience pushing or pulling forcefully because of your shoulder?

| No difficulty | Extreme difficulty |

11. How troubled are you by an increase in pain in your shoulder after activities?

| Not at all | Extremely troubled |

**SECTION C: Lifestyle**

**INSTRUCTIONS TO PATIENTS**

The following section concerns the amount that your shoulder problem has affected or changed your lifestyle. Again, please indicate the appropriate amount for the past week with a slash “/”.

12. How much difficulty do you have sleeping because of your shoulder?

| No difficulty | Extreme difficulty |

13. How much difficulty have you experienced with styling your hair because of your shoulder?

| No difficulty | Extreme difficulty |

14. How much difficulty do you have maintaining your desired level of fitness because of your shoulder?

| No difficulty | Extreme difficulty |

15. How much difficulty do you experience reaching behind to tuck in a shirt, get a wallet from your back pocket or do up clothing because of your shoulder?

| No difficulty | Extreme difficulty |

16. How much difficulty do you have dressing or undressing?

| No difficulty | Extreme difficulty |
SECTION D: Emotions

INSTRUCTIONS TO PATIENTS

The following questions relate to how you have felt in the past week with regard to your shoulder problem. Please indicate your answer with a slash “/”.

17. How much frustration or discouragement do you feel because of your shoulder?

<table>
<thead>
<tr>
<th>No frustration</th>
<th>Extreme frustration</th>
</tr>
</thead>
</table>

18. How worried are you about what will happen to your shoulder in the future?

<table>
<thead>
<tr>
<th>Not worried at all</th>
<th>Extremely worried</th>
</tr>
</thead>
</table>

19. How much of a burden do you feel you are on others?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Extreme burden</th>
</tr>
</thead>
</table>
Elbow, Forearm and Hand

**Patient Rated Elbow Evaluation (PREE)**

**Background**

The PREE consists of two sections investigating pain and function. All questions are scored using a 10-point ordered categorical scale. The pain section has four questions that rate pain from ‘no pain’ to ‘worst ever’. In addition, there is a question that rates how often the patient has pain (‘never’ to ‘always’). These questions are answered in relation to the patients’ average pain over the previous week. The scale for the function questions ranges from ‘no difficulty’ to unable to do’. The function section has 11 questions regarding specific activities of daily living and 4 questions regarding personal care, household work, occupational work and recreational activities. These last four questions are answered from the perspective of performing ‘usual activities’ prior to encountering problems with the elbow.

**Scoring**

*To minimize non-response, forms should be checked once they have been completed by patients.

**Computing the Subscales**

- **Pain Score** = Sum of the 5 pain items (out of 50) → Best Score = 0, Worst Score = 50
- **Function Score** = Sum of the 15 function items, Divided by 3 (out of 50) → Best Score = 0, Worst Score = 50

**Computing the Total Score**

- **Total Score** = Sum of pain + function scores → Best Score = 0, Worst Score = 100

*Note: responses to the twenty items are totaled out of 100, where pain and disability are equally weighted*

**Sample Scoring**

1. **PAIN**

   Rate the average amount of pain in your elbow over the past week by circling the number that best describes your pain on a scale from 0 to 10. A zero (0) means that you did not have any pain, and a ten (10) means that you had the worst pain you have ever experienced.

   **Sample scale:**
   
<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Pain</td>
<td>Worst Ever</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   **RATE YOUR PAIN:**

   - When it is at its worst
   - At rest
   - When lifting a heavy object
   - When doing a task with repeated elbow movement
   - How often do you have pain?

   **Pain score = 5 + 4 + 7 +8 +9 = 33/50**
Function score = \( \frac{(7 + 6 + 5 + 8 + 6 + 8 + 5 + 6 + 7 + 7 + 5 + 4 + 5)}{3} = \frac{30}{50} \)

Total score = 33 + 30 = 63/100

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

The total PREE score rates pain and disability equally. Higher scores indicate more pain and disability.

Validity, reliability, internal consistency

For the test-retest reliability study, 50 patients with various elbow pathologies completed a second set of the PREE two to seven days after their clinic visit. The pain subscale’s individual items had excellent reliability (ICC = 0.74 to 0.87), whereas the function subscale’s individual items demonstrated moderate to high reliability (ICC = 0.60 to 0.88). Both the pain and function subscale scores showed excellent reliability (ICC = 0.88, 0.89, respectively). The highest reliability was demonstrated by the PREE total score (ICC = 0.95).
For the validity study, patients (n=70) with various elbow pathologies completed the PREE, the American Shoulder and Elbow Surgeons Elbow Index (ASES-e), the Disabilities of the Arm, Shoulder, Hand (DASH), and the SF-36 on two separate occasions. High correlations (r = 0.93, 0.96) were found between the PREE and ASES-e pain scales (hypothesis #1). Moderate correlations (r = -0.61, -0.73) were found between the PREE and ASES-e function scales (hypothesis #2). Moderate correlations (r = 0.68 to 0.89) were also found between the PREE subscales and total scores and the DASH (hypothesis #3). The PREE correlated higher with the DASH (r = 0.68 to 0.89) than the SF-36 physical component summary score (r = -0.63 to 0.56) (hypothesis #4). The PREE also correlated higher with the SF-36 physical component summary score (r = -0.63 to 0.56) than the SF-36 mental component summary score (r = -0.23 to 0.23) (hypothesis #5).

References


Patient Rated Elbow Evaluation

The questions below will help us understand the amount of difficulty you have had with your elbow in the past week. You will be describing your average elbow symptoms over the past week on a scale 0-10.

1. **PAIN**

   Rate the average amount of pain in your elbow over the past week by circling the number that best describes your pain on a scale from 0-10. A zero (0) means that you did not have any pain and a ten (10) means that you had the worst pain you have ever experienced.

<table>
<thead>
<tr>
<th>RATE YOUR PAIN:</th>
<th>No Pain</th>
<th>Worst Ever</th>
</tr>
</thead>
<tbody>
<tr>
<td>When it is at its worst</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>At rest</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>When lifting a heavy object</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>When doing a task with repeated elbow movement</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>How often do you have pain?</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td>Never Always</td>
</tr>
</tbody>
</table>

2. **FUNCTION**

   **A. SPECIFIC ACTIVITIES**

   Rate the amount of difficulty you experienced performing each of the items listed below, over the past week, by circling the number that best describes your difficulty on a scale of 0-10. A zero (0) means you did not experience any difficulty and a ten (10) means it was so difficult you were unable to do.

<table>
<thead>
<tr>
<th>Specific Activities</th>
<th>No Difficulty</th>
<th>Unable To Do</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combing my hair</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>Eating with a fork or spoon</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>Pulling a heavy object</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>Using my arm to rise from a chair</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>Carrying a 10lb object with my arm at my side</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>Throwing a small object, such as a tennis ball</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>Using a telephone</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>Doing buttons on the front of my shirt</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>Washing my opposite armpit</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>Tying my shoe</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>Turning the doorknob and open a door</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
</tbody>
</table>

   **B. USUAL ACTIVITIES**

   Rate the amount of difficulty you experienced performing your usual activities in each of the areas listed below, over the past week, by circling the number that best describes your difficulty on a scale of 0-10. By “usual activities”, we mean the activities that you performed before you started having a problem with your elbow. A zero (0) means you did not experience any difficulty and a ten (10) means it was so difficult you were unable to do any of your usual activities.

<table>
<thead>
<tr>
<th>Usual Activities</th>
<th>No Difficulty</th>
<th>Unable To Do</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal activities (dressing, washing)</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>Household work (cleaning, maintenance)</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>Work (your job or everyday work)</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>Recreational activities</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
</tbody>
</table>
Patient Rated Tennis Elbow Evaluation (PRTEE)

Background

The Patient Rated Tennis Elbow Evaluation (PRTEE) formerly known as the Patient-Rated Forearm Evaluation Questionnaire, is a 15-item questionnaire designed to measure forearm pain and disability in patients with lateral epicondylitis (also known as “tennis elbow”). The PRTEE allows patients to rate their levels of tennis elbow pain and disability from 0 to 10, and consists of 2 subscales:

1. Pain subscale (0 = no pain, 10 = worst imaginable)
   - Pain - 5 items
2. FUNCTION subscale (0 = no difficulty, 10 = unable to do)
   - Specific activities - 6 items
   - Usual activities - 4 items

Scoring

*To minimize non-response, forms should be checked once they have been completed by patients.

Computing the Subscales

Pain Score = Sum of the 5 pain items (out of 50)   [Best Score = 0, Worst Score = 50]
Function Score = Sum of the 10 function items, Divided by 2 (out of 50)   [Best Score = 0, Worst Score = 50]

Computing the Total Score

Total Score = Sum of pain + function scores   [Best Score = 0, Worst Score = 100]

Note: Responses to the fifteen items are totalled out of 100, where pain and disability are equally weighted

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

The total PRTEE score rates pain and disability equally. Higher score indicates more pain and functional disability (e.g., 0 = no disability).

Validity, reliability, internal consistency

To test the PRTEE’s test-retest reliability, 47 patients with unilateral lateral epicondylitis completed the PRTEE on two consecutive days. The pain (ICC = 0.89), function (1CC=0.83), and the total (ICC = 0.89) scores all demonstrated excellent reliability. When the reliability was assessed by subgroups (men vs. women; chronic vs. acute; work-related vs. non-work-related), the ICCs were all greater than 0.75. Concurrent validity was assessed by correlating the PRTEE scores with the pain-free grip strength. The total PRTEE score (r = -0.36) and the pain subscale (r = -0.37) had a significant moderate correlation with the pain-free grip strength but not the function subscale (r = -0.30).

A study conducted to perform a cross-cultural adaptation of the English version of the Patient-rated Tennis Elbow Evaluation (PRTEE) into Canadian French found that this version of the PRTEE demonstrated good acceptability, construct validity, internal consistency (α=0.93), and responsiveness, it may be used in both research and clinical setting (Blanchette & Normand 2010).

References
Patient Rated Tennis Elbow Evaluation

The questions below will help us understand the amount of difficulty you have had with your arm in the past week. You will be describing your average arm symptoms over the past week on a scale 0-10. Please provide an answer for all questions. If you did not perform an activity because of pain or because you were unable then you should circle a “10”. If you are unsure please estimate to the best of your ability. Only leave items blank if you never perform that activity. Please indicate this by drawing a line completely through the question.

<table>
<thead>
<tr>
<th>1. PAIN in your affected arm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate the average amount of pain in your arm over the past week by circling the number that best describes your pain on a scale from 0-10. A zero (0) means that you did not have any pain and a ten (10) means that you had the worst pain imaginable.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RATE YOUR PAIN:</th>
<th>No Pain</th>
<th>Worst Imaginable</th>
</tr>
</thead>
<tbody>
<tr>
<td>When you are at rest</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>When doing a task with repeated arm movement</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>When carrying a plastic bag of groceries</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>When your pain was at its least</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>When your pain was at its worst</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. FUNCTIONAL DISABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. SPECIFIC ACTIVITIES</td>
</tr>
<tr>
<td>Rate the amount of difficulty you experienced performing each of the tasks listed below, over the past week, by circling the number that best describes your difficulty on a scale of 0-10. A zero (0) means you did not experience any difficulty and a ten (10) means it was so difficult you were unable to do it at all.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Task</th>
<th>No Difficulty</th>
<th>Unable To Do</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turn a doorknob or key</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>Carry a grocery bag or briefcase by the handle</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>Lift a full coffee cup or glass of milk to your mouth</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>Open a jar</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>Pull up pants</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>Wring out a washcloth or wet towel</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
</tbody>
</table>

B. USUAL ACTIVITIES

Rate the amount of difficulty you experienced performing your usual activities in each of the areas listed below, over the past week, by circling the number that best describes your difficulty on a scale of 0-10. By “usual activities”, we mean the activities that you performed before you started having a problem with your arm. A zero (0) means you did not experience any difficulty and a ten (10) means it was so difficult you were unable to do any of your usual activities.

<table>
<thead>
<tr>
<th>Area</th>
<th>No Difficulty</th>
<th>Unable To Do</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Personal activities (dressing, washing)</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>2. Household work (cleaning, maintenance)</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>3. Work (your job or everyday work)</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>4. Recreational or sporting activities</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
</tbody>
</table>
Patient Rated Wrist Evaluation

Background

The Patient Rated Wrist Evaluation (PRWE) is a 15-item questionnaire that equally rates wrist-related pain and disability in functional activities. The PRWE consists of two sections investigating pain and function from the perspective of the patient. There are five questions that require the individual to rate their pain doing activities such as at rest, repeated motion, and lifting. Functional items are divided into two categories, specific and usual activities. There are six specific tasks such as turning a doorknob, cutting meat, fastening a button, and four usual activity categories, self-care, work, household duties, and recreation. The PRWE can be divided into three sub-scales, pain, specific activities, and usual activities.

Scoring for all the questions is via a 10-point, ordered, categorical scale ranging from ‘no pain’ or ‘no difficulty’ to ‘worst pain’ or ‘unable to do’. The instrument was originally designed for the assessment of distal radial fractures and wrist injuries.

Scoring

*To minimize non-response, check forms once patients complete them.

Computing the Subscales

Pain Score = Sum of the 5 pain items (out of 50) → Best Score = 0, Worst Score = 50

Function Score = Sum of the 10 function items, Divided by 2 (out of 50) → Best Score = 0, Worst Score = 50

Computing the Total Score

Total Score = Sum of pain + function scores → Best Score = 0, Worst Score = 100

Note: responses to the fifteen items are totaled out of 100, where pain and disability are equally weighted

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

The total PRWE score rates pain and disability equally. Higher scores represent greater pain and functional disability.

Validity, reliability, internal consistency
The test-retest reliability of the PRWE has been assessed with an interval of between 2 and 7 days in patients with subacute distal radial fractures, still involved in physiotherapy, and in those who had completed their treatment regimens. A third group in this study was analysed for the test-retest reliability, with an interval of 1 year in patients with scaphoid non-union. All three groups exhibited ICC values ≥0.90. In addition, the PRWE has been shown to be more responsive than both the DASH and SF-36 in a distal radial fracture population, with baseline SRM values of 2.27, 2.01, and 0.92, respectively.

For the validity study, patients with distal radius (n=101) and scaphoid fractures (n=35) completed the PRWE and the SF-36, and had their grip strength, dexterity, and range of motion tested at baseline, two-month, three-month, and six-month follow-ups. Improvements in the PRWE and SF-36 scores of distal radius group over time were evaluated to assess construct validity. The PRWE had a statistically significant 74% improvement over 6 months, whereas the SF-36 physical summary score had a statistically significant 16% improvement.

To determine the criterion validity, Pearson correlations were conducted between the PRWE and the SF-36 subscales or impairment measurements. Moderate correlations were found between the PRWE total and impairment measures (r = -0.52, -0.61, for radius and scaphoid groups, respectively). The PRWE scores correlated higher with the SF-36 physical component summary scores (r = -0.46 to -0.63) than the SF-36 mental component summary scores (r = -0.30 to -0.41).

A study testing the reliability, validity, and responsiveness of the Japanese version of PRWE (PRWE-J) found that it has evaluation capacities equivalent to those of the original English version with Cronbach’s α coefficients for the pain, functional and whole scale of 0.90, 0.95 and 0.95 respectively (Imaeda et al. 2010). And the intraclass correlation coefficients (ICCs) for the same were 0.86, 0.93, and 0.92, respectively. Another study in assessing the cross cultural adaptation and psychometric properties of the Hindi version of the PRWE, found it to be a reliable and valid tool and can be used in patients with wrist/hand injuries whose primary language is Hindi (Mehta et al. 2012). PRWEHindi demonstrated excellent test-rest reliability (ICC = 0.81) and internal consistency (CA = 0.89). Moderate to low correlations (r<0.7) were observed between the PRWE-Hindi and other measures of pain and disability.

References


Patient Rated Wrist Evaluation
The questions below will help us understand how much difficulty you have had with your wrist in the past week. You will be describing your average wrist symptoms over the past week on a scale of 0-10. Please provide an answer for ALL questions. If you did not perform an activity, please ESTIMATE the pain or difficulty you would expect. If you have never performed the activity, you may leave it blank.

1. PAIN
   Rate the average amount of pain in your wrist over the past week by circling the number that best describes your pain on a scale from 0-10. A zero (0) means that you did not have any pain and a ten (10) means that you had the worst pain you have ever experienced or that you could not do the activity because of pain.

   **Sample scale**
   
   ![Sample scale]

   **RATE YOUR PAIN:**
   
<table>
<thead>
<tr>
<th>At rest</th>
<th>0 1 2 3 4 5 6 7 8 9 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>When doing a task with a repeated wrist movement</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>When lifting a heavy object</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>When it is at its worst</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>How often do you have pain?</td>
<td>Never 0 1 2 3 4 5 6 7 8 9 10</td>
</tr>
</tbody>
</table>

2. FUNCTION
   A. SPECIFIC ACTIVITIES
   Rate the amount of difficulty you experienced performing each of the items listed below - over the past week, by circling the number that describes your disability on a scale of 0-10. A zero (0) means you did not experience any difficulty and a ten (10) means it was so difficult you were unable to do it at all.

   **Sample scale**
   
   ![Sample scale]

   **No Difficulty**
<table>
<thead>
<tr>
<th>Amount of difficulty</th>
<th>0 1 2 3 4 5 6 7 8 9 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turn a door knob using my affected hand</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>Cut meat using a knife in my affected hand</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>Fasten buttons on my shirt</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>Use my affected hand to push up from a chair</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>Carry a 10lb object in my affected hand</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>Use bathroom tissue with my affected hand</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
</tr>
</tbody>
</table>

   **No Difficulty**
<table>
<thead>
<tr>
<th>Amount of difficulty</th>
<th>0 1 2 3 4 5 6 7 8 9 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal care activities (dressing, washing)</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>Household work (cleaning, maintenance)</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>Work (your job or usual everyday work)</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>Recreational activities</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
</tr>
</tbody>
</table>

   **Comment/Interpretations:**
**Boston Questionnaire**

**Background**

The Boston Questionnaire is self-administered and assesses the severity of symptoms and the functional status of carpal tunnel syndrome patients. The symptom severity scale consists of 11, and the functional status scale of 8 questions. Each question has a 1-to-5 scale, in which 1 indicates no symptom and 5 indicates the severe symptoms. The symptom severity scale assesses the symptoms with respect to severity, frequency, time and type. The functional status scale assesses the effect of the carpal tunnel syndrome on daily living.

**Scoring**

The overall symptom severity score is calculated as the mean of the scores for the eleven individual items. The remainder of the questionnaire comprised the Functional Status Scale, the score for which is calculated as the mean of all eight items. Items left unanswered or that are not applicable are not included in the calculation of the overall score.

**Recording**

A separate recording sheet is provided to facilitate repeated measures over time.

**Interpretation**

Lower score indicates greater disability.

**Validity, reliability, internal consistency and responsiveness to detect change over time**

The reproducibility, internal consistency, validity, and responsiveness to clinical change of scales for the measurement of severity of symptoms and functional status were evaluated in a clinical study. The scales were highly reproducible (Pearson correlation coefficient, $r = 0.91$ and 0.93 for severity of symptoms and functional status, respectively) and internally consistent (Cronbach alpha, 0.89 and 0.91 for severity of symptoms and functional status, respectively). Both scales had positive, but modest or weak, correlations with two-point discrimination and Semmes-Weinstein monofilament testing (Spearman coefficient, $r = 0.12$ to 0.42).

**References**

Boston Questionnaire

SYMPTOM SEVERITY SCALE

The following questions refer to your symptoms for a typical twenty-four-hour period during the past two weeks (circle one answer to each question).

How severe is the hand or wrist pain that you have at night?
1 I do not have hand or wrist pain at night.
2 Mild pain
3 Moderate pain
4 Severe pain
5 Very severe pain

How often did hand or wrist pain wake you up during a typical night in the past two weeks?
1 I Never
2 Once
3 Two or three times
4 Four or five times
5 More than five times

Do you typically have pain in your hand or wrist during the daytime?
1 I never have pain during the day.
2 I have mild pain during the day.
3 I have moderate pain during the day.
4 I have severe pain during the day.
5 I have very severe pain during the day.

How often do you have hand or wrist pain during the daytime?
1 Never
2 Once or twice a day
3 Three to five times a day
4 More than five times a day
5 The pain is constant.

How long, on average, does an episode of pain last during the daytime?
1 I never get pain during the day.
2 Less than 10 minutes
3 10 to 60 minutes
4 Greater than 60 minutes
5 The pain is constant throughout the day.

Do you have numbness (loss of sensation) in your hand?
1 No
2 I have mild numbness.
3 I have moderate numbness.
4 I have severe numbness.
5 I have very severe numbness.
Do you have weakness in your hand or wrist?
1 No weakness
2 Mild weakness
3 Moderate weakness
4 Severe weakness
5 Very severe weakness

Do you have tingling sensations in your hand?
1 No tingling
2 Mild tingling
3 Moderate tingling
4 Severe tingling
5 Very severe tingling

How severe is numbness (loss of sensation) or tingling at night?
1 I have no numbness or tingling at night.
2 Mild
3 Moderate
4 Severe
5 Very severe

How often did hand numbness or tingling wake you up during a typical night during the past two weeks?
1 Never
2 Once
3 Two or three times
4 Four or five times
5 More than five times

Do you have difficulty with the grasping and use of small objects such as keys or pens?
1 No difficulty
2 Mild difficulty
3 Moderate difficulty
4 Severe difficulty
5 Very severe difficulty
FUNCTIONAL STATUS SCALE

On a typical day during the past two weeks have hand and wrist symptoms caused you to have any difficulty doing the activities listed below? Please circle one number that best describes your ability to do the activity.

<table>
<thead>
<tr>
<th>Activity</th>
<th>No difficulty</th>
<th>Mild difficulty</th>
<th>Moderate Difficulty</th>
<th>Severe difficulty</th>
<th>Cannot Do at All Due to Hand or Wrist Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Writing</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Buttoning of clothes</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Holding a book while reading</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Gripping of a telephone handle</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Opening of jars</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Household chores</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Carrying of grocery bags</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Bathing and dressing</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Michigan Hand Outcomes Questionnaire

Background

The Michigan Hand Outcomes Questionnaire was developed to measure health state domains important to patients with hands disorders. The instrument can be used to evaluate a patient prior to hand surgery and to monitor function after the surgery.

Scoring

In the pain scale, high scores indicate greater pain, while in the other five scales, high scores denote better hand performance.

The raw scale score for each of the six scales is the sum of the responses of each scale item. The raw score is converted to a score ranging from 0-100. The response categories for one of the questions is reversed and re-coded. For the Pain scale, a higher score indicates more pain. For the other five scales, higher scores indicate better hand performance.

The score for the affected hand is obtained by selecting either the right or the left hand score. If both hands are affected (ex. rheumatoid arthritis patients), the right and left hand scores are averaged to get the score.

Missing values in each scale may affect the validity of the scores. If 50% or more of the items in a scale are missing, then that particular scale cannot be scored. For scales with less than 50% missing, the average of the existing scale items may be imputed for the missing items. For example, the Aesthetics scale has 4 questions. If only 2 questions are answered and 2 are missing the scale cannot be scored because 50% of the responses are missing. If 3 questions are answered and 1 is missing, the responses for the answered questions are averaged and this average value is entered as the value for the missing response. The scale is then scored as usual.

An overall MHQ score can be obtained by summing the scores for all six scales after reversing the pain scale (pain=100-pain score) and then dividing by six.

The MHQ is scored using this general algorithm.

<table>
<thead>
<tr>
<th>MHQ Scoring Algorithm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>Overall hand function</td>
</tr>
<tr>
<td>Activities of daily living</td>
</tr>
<tr>
<td>Work</td>
</tr>
</tbody>
</table>
Pain

Question 2 (iva2, ivb2): 1=5, 2=4, 4=2, 5=1

5 to 25

If Question 2 (iva1, ivb1)=5, then pain score=0
If Question 2 (iva1, ivb1) ≠5, then pain score =-(raw score-25)/20*100

Aesthetics

Question 1 (va1, vb1): 1=5, 2=4, 4=2, 5=1

4 to 16

=(raw score-4)/16*100

Satisfaction

None

6 to 30

=-(raw score-30)/24*100

*The response categories for some of the questions are reversed and are recoded.
**Sum of the responses for each scale.
*** For the pain scale, higher scores indicate more pain. For the other five scales, higher scores indicate better hand performance.
The scores are normalized to a range of 0 to 100.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

For the pain scale, higher scores indicate more pain. For the other five scales, higher scores indicate better hand performance.

Validity, reliability, internal consistency

Test-retest reliability using Spearman's correlation demonstrated substantial agreement, ranging from 0.81 for the aesthetics scale to 0.97 for the ADL scale. In testing for internal consistency, Cronbach's alphas ranged from 0.86 for the pain scale to 0.97 for the ADL scale (values >0.7 for Cronbach's alpha are considered a good internal consistency). Correlation between scales gave evidence of construct validity. In comparing similar scales in the MHQ and the Short Form-12, a moderate correlation (range,0.54-0.79) for the ADL, work performance, and pain scales was found. In evaluating the discriminate validity of the aesthetics scale, a significant difference (p = .0012) was found between the aesthetics scores for patients with carpal tunnel syndrome and patients with rheumatoid arthritis.

A study comparing the responsiveness of the Michigan Hand Outcomes Questionnaire (MHQ) with that of the Disabilities of the Arm, Shoulder, and Hand (DASH) questionnaire in patients with hand injuries found MHQ might be slightly more sensitive to functional changes in the hands while DASH had a better association with disability (Horng et al. 2010). The Turkish version of the MHQ has been found to have excellent test–retest reliability (0.79-0.96) and validity (α = 0.85-0.96), and it is an adequate and useful instrument for measuring functional disability in hand disorders of Turkish-speaking patients (Oksuz et al. 2011). The MHQ is easily administered, reliable, and valid to measure rheumatoid hand function, and can be used to measure outcomes in rheumatic hand disease (Waljee et al. 2010). The MHQ demonstrated good test–retest reliability (r = 0.66, P < 0.001). Cronbach’s alpha scores were high for ADL (α= 0.90), function (α= 0.87), aesthetics (α= 0.79), and satisfaction (α= 0.89), indicating redundancy (Poole 2011).

Waljee et al. (2011) conducted a study to develop and assess the psychometric properties of a brief-MHQ with 12 items. They performed item reduction based on clinical relevance and 2 items were chosen from each scale of the original questionnaire that were highly correlated with the summary MHQ score (r= 0.99, p<0.001). They found the 12-item brief MHQ to be an efficient and versatile outcomes instrument specific
to hand disability that retains the psychometric properties of the original MHQ. Thus they conclude that the brief MHQ is an important tool to measure patient outcomes and the quality of care in hand surgery.

References

Michigan Hand Outcomes Questionnaire

Instructions: This survey asks for your views about your hands and your health. This information will help keep track of how you feel and how well you are able to do your usual activities. Answer EVERY question by marking the answer as indicated. If you are unsure about how to answer a question, please give the best answer you can.

I. The following questions refer to the function of your hand(s)/wrist(s) during the past week. (Please circle one answer for each question.). Please answer EVERY question, even if you do not experience any problems with the hand and/or wrist.

A. The following questions refer to your right hand/wrist.

(Code: Very Good=1, Good=2, Fair=3, Poor=4, Very Poor=5)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Very Good</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Very Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>ia1</td>
<td>1. Overall, how well did your right hand work?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>ia2</td>
<td>2. How well did your right fingers move?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>ia3</td>
<td>3. How well did your right wrist move?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>ia4</td>
<td>4. How was the strength in your right hand?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>ia5</td>
<td>5. How was the sensation (feeling) in your right hand?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

B. The following questions refer to your left hand/wrist.

(Code: Very Good=1, Good=2, Fair=3, Poor=4, Very Poor=5)
### Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Very Good</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Very Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>ia1 1. Overall, how well did your <strong>right</strong> hand work?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>ia2 2. How well did your <strong>right</strong> fingers move?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>ia3 3. How well did your <strong>right</strong> wrist move?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>ia4 4. How was the strength in your <strong>right</strong> hand?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>ia5 5. How was the sensation (feeling) in your <strong>right</strong> hand?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

II. The following questions refer to the ability of your hand(s) to do certain tasks *during the past week*. (Please circle one answer for each question.). If you do not do a certain task, please estimate the difficulty with which you would have in performing it.

A. How difficult was it for you to perform the following activities using your **right hand**?

*(Code: Not at all Difficult=1, A little Difficult=2, Somewhat Difficult=3, Moderately Difficult=4, Very Difficult=5)*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Not at All Difficult</th>
<th>A Little Difficult</th>
<th>Somewhat Difficult</th>
<th>Moderately Difficult</th>
<th>Very Difficult</th>
</tr>
</thead>
<tbody>
<tr>
<td>iia1 1. Turn a door knob</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>iia2 2. Pick up a coin</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>iia3 3. Hold a glass of water</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>iia4 4. Turn a key in a lock</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>iia5 5. Hold a frying pan</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

B. How difficult was it for you to perform the following activities using your **left hand**?

*(Code: Not at all Difficult=1, A little Difficult=2, Somewhat Difficult=3, Moderately Difficult=4, Very Difficult=5)*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Not at All Difficult</th>
<th>A Little Difficult</th>
<th>Somewhat Difficult</th>
<th>Moderately Difficult</th>
<th>Very Difficult</th>
</tr>
</thead>
<tbody>
<tr>
<td>iib1 1. Turn a door knob</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>iib2 2. Pick up a coin</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>iib3 3. Hold a glass of water</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
C. How difficult was it for you to perform the following activities using both of your hands?

(Code: Not at all Difficult=1, A little Difficult=2, Somewhat Difficult=3, Moderately Difficult=4, Very Difficult=5)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Not at All Difficult</th>
<th>A Little Difficult</th>
<th>Somewhat Difficult</th>
<th>Moderately Difficult</th>
<th>Very Difficult</th>
</tr>
</thead>
<tbody>
<tr>
<td>iic1 1. Open a jar</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>iic2 2. Button a shirt/blouse</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>iic3 3. Eat with a knife/fork</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>iic4 4. Carry a grocery bag</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>iic5 5. Wash dishes</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>iic6 6. Wash your hair</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>iic7 7. Tie shoelaces/knots</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

III. The following questions refer to how you did in your normal work (including both housework and school work) during the past four weeks. (Please circle one answer for each question.)

(Code: Always=1, Often=2, Sometimes=3, Rarely=4, Never=5)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>iii1 1. How often were you unable to do your work because of problems with your hand(s)/wrist(s)?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>iii2 2. How often did you have to shorten your work day because of problems with your hand(s)/wrist(s)?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>iii3 3. How often did you have to take it easy at your work because of problems with your hand(s)/wrist(s)?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>iii4 4. How often did you accomplish less in your work because of</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
problems with your hand(s)/wrist(s)?

<table>
<thead>
<tr>
<th>iii5</th>
<th>5. How often did you take longer to do the tasks in your work because of problems with your hand(s)/wrist(s)?</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

IV. The following questions refer to how much pain you had in your hand(s)/wrist(s) during the past week. (Please circle one answer for each question.)

A. The following questions refer to pain in your right hand/wrist.

**Variables**

**iva1**

1. How often did you have pain in your right hand/wrist?
   1. Always
   2. Often
   3. Sometimes
   4. Rarely
   5. Never

If you answered Never to question IV-A1 above, please skip the following questions and go to the next page.

**iva2**

2. Please describe the pain you had in your right hand/wrist.
   1. Very mild
   2. Mild
   3. Moderate
   4. Severe
   5. Very severe

(Code: Always=1, Often=2, Sometimes=3, Rarely=4, Never=5)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>iva3</strong></td>
<td>3. How often did the pain in your right hand/wrist interfere with your sleep?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td><strong>iva4</strong></td>
<td>4. How often did the pain in your right hand/wrist interfere with your daily activities (such as eating or bathing)?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td><strong>iva5</strong></td>
<td>5. How often did the pain in your right hand/wrist make you unhappy?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

B. The following questions refer to pain in your left hand/wrist.

(Code: Always=1, Often=2, Sometimes=3, Rarely=4, Never=5)

**Variables**
ivb1  1. How often did you have pain in your left hand/wrist?
   1. Always
   2. Often
   3. Sometimes
   4. Rarely
   5. Never

If you answered Never to question IV-B1 above, please skip the following questions and go to the next page.

(Code: Very Mild=1, Mild=2, Moderate=3, Severe=4, Very Severe=5)

ivb2  2. Please describe the pain you had in your left hand/wrist.
   1. Very mild
   2. Mild
   3. Moderate
   4. Severe
   5. Very severe

(Code: Always=1, Often=2, Sometimes=3, Rarely=4, Never=5)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>ivb3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables</th>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>ivb4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables</th>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>ivb5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

V. A. The following questions refer to the appearance (look) of your right hand during the past week. (Please circle one answer for each question.)

(Code: Strongly Agree=1, Agree=2, Neither Agree nor Disagree=3, Disagree=4, Strongly Disagree=5)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree nor Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>va1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree nor Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>va2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
### B. The following questions refer to the appearance (look) of your **left** hand during the past week.

(Please circle one answer for each question.)

**Variables**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree nor Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>vb1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>vb2</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>vb3</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>vb4</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

### VI. A. The following questions refer to your satisfaction with your **right** hand/wrist during the past week.

(Please circle one answer for each question.)

**Variables**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Very Satisfied</th>
<th>Somewhat Satisfied</th>
<th>Neither Satisfied nor Dissatisfied</th>
<th>Somewhat Dissatisfied</th>
<th>Very Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>via1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>via2</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>via3</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
### Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handed</td>
<td></td>
</tr>
<tr>
<td>Handinj</td>
<td></td>
</tr>
<tr>
<td>Jobchg</td>
<td></td>
</tr>
<tr>
<td>Jobchgdesc</td>
<td></td>
</tr>
<tr>
<td>Jobnowdesc</td>
<td></td>
</tr>
</tbody>
</table>

**Handed**

1. Are you right-handed or left-handed? **Code**
   1. Right-handed
   2. Left-handed
   3. Both

**Handinj**

2. Which hand gives you the most problem? **Code**
   1. Right hand
   2. Left hand
   3. Both

**Jobchg**

3. Have you changed your job since you had problem with your hand(s)? **Code**
   1. Yes
   2. No

**Jobchgdesc**

Please describe the type of job you did **before** you had problem with your hand(s).

**Jobnowdesc**

Please describe the type of job you are doing **now**.

### B. Satisfaction with your left hand/wrist during the past week

- **via4**
  4. Strength of your right hand
  
- **via5**
  5. Pain level of your right hand
  
- **via6**
  6. Sensation (feeling) of your right hand

<table>
<thead>
<tr>
<th>Variables</th>
<th>Very Satisfied</th>
<th>Somewhat Satisfied</th>
<th>Neither Satisfied nor Dissatisfied</th>
<th>Somewhat Dissatisfied</th>
<th>Very Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>vib1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>vib2</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>vib3</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>vib4</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>vib5</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>vib6</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
**iCAHE Musculoskeletal Outcomes Calculator: User Manual**

---

**Sex**
4. What is your gender?
   - Male: 1
   - Female: 2

**Race**
5. What is your ethnic background?
   - White: 1
   - Black: 2
   - Hispanic: 3
   - Asian or Pacific Islander: 4
   - American Indian or Alaskan Native: 5
   - Other (Please specify.): 6

**Hieduc**
6. What is the highest level of education you received?
   - Less than high school graduate: 1
   - High school graduate: 2
   - Some college: 3
   - College graduate: 4
   - Professional or graduate school: 5

**Income**
7. What is your approximate family income including wages, disability payment, retirement income and welfare?
   - Less than $10,000: 1
   - $10,000 - $19,999: 2
   - $20,000 - $29,999: 3
   - $30,000 - $39,999: 4
   - $40,000 - $49,999: 5
   - $50,000 - $59,999: 6
   - $60,000 - $69,999: 7
   - More than $70,000: 8

**Workcomp**
8. Is your injury covered by Workers’ Compensation?
   - Yes: 1
   - No: 2

---

**Brief Michigan Hand Outcome Questionnaire**

<table>
<thead>
<tr>
<th>MHQ domain</th>
<th>Question</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function</td>
<td>Overall, how well did you hand work</td>
<td></td>
</tr>
<tr>
<td></td>
<td>How was the sensation in your hand</td>
<td></td>
</tr>
<tr>
<td>ADLs</td>
<td>Hold a frying pan</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Button a shirt/blouse</td>
<td></td>
</tr>
<tr>
<td>Work</td>
<td>How often were you unable to do your work in the last week because of your hands/wrists</td>
<td></td>
</tr>
<tr>
<td></td>
<td>How often did you take longer to do tasks in your work because of problems with your hands/wrists</td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>-----------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Pain</td>
<td>How often did the pain in your hands/wrists interfere with your daily activities</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Describe the pain in your hands/wrists</td>
<td></td>
</tr>
<tr>
<td>Aesthetics</td>
<td>I am satisfied with the look of my hands</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The appearance of my hands interferes with my normal daily activities</td>
<td></td>
</tr>
<tr>
<td>Satisfaction</td>
<td>Motion of your fingers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Motion of your wrist</td>
<td></td>
</tr>
</tbody>
</table>
6. Lower Extremity Scales

- Lower Extremity General Scales

**American Academy of Orthopaedic Surgeons (AAOS): Lower Limb Questionnaire**

**Background**

The Lower Limb Questionnaire is designed to be administered to patients 18 years of age or older. It can be used to assess non-specific general lower limb problems or as a general instrument for all patients in a practice that sees a large number and wide variety of lower limb complaints, or where there is insufficient office staff to keep track of several different lower limb questionnaires. The lower limb questionnaire measures a core disability index.

**Scoring**

The individual’s Standardized score is based on the mean of items that make up the scale. Before computing this, all items must be recalibrated so that they are all in the same metric. The most straightforward way to understand the scoring is that each response is rescaled so that every item has a value in the range 0 through 5 (i.e., lowest score possible = 0 and maximum score possible = 5) for each item.

<table>
<thead>
<tr>
<th>Question Number</th>
<th>Rescaling algorithm</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(Q1 -1)* 5/4</td>
<td>Value ranging from 0-5</td>
</tr>
<tr>
<td>2</td>
<td>(Q2 -1)*5/4</td>
<td>Value ranging from 0-5</td>
</tr>
<tr>
<td>3</td>
<td>(Q3 - 1) if rated 1-6; a rating of 7 (could not do for other reason) is considered missing</td>
<td>Value ranging from 0-5</td>
</tr>
<tr>
<td>4</td>
<td>(Q4 - 1) if rated 1-6; a rating of 7 (could not do for other reason) is considered missing</td>
<td>Value ranging from 0-5</td>
</tr>
<tr>
<td>5</td>
<td>(Q5 - 1) if rated 1-6; a rating of 7 (could not do for other reason) is considered missing</td>
<td>Value ranging from 0-5</td>
</tr>
<tr>
<td>6</td>
<td>(Q6 - 1)*5/6</td>
<td>Value ranging from 0-5</td>
</tr>
<tr>
<td>7</td>
<td>(Q7 - 1)</td>
<td>Value ranging from 0-5</td>
</tr>
</tbody>
</table>

Next, all of the items comprising a given scale are averaged over the number of items answered.

This average of the rescaled values is multiplied by a constant so that each scale’s resulting value falls between 0 and 100. If these values are scored in a way such that high scores represent the least disability (i.e., reversed), this number must be subtracted from 100 to reverse score the scale.

**Recording**

A separate recording sheet is provided to facilitate repeated measures over time.

**Interpretation**

Lower score indicates greater symptoms and disability.
Validity, reliability and sensitivity/responsiveness to detect change over time

Initial testing for reliability and validity of all AAOS outcomes instruments was conducted in collaboration with the Council of Musculoskeletal Specialty Societies (COMSS) and the Council of Spine Societies (COSS). On the basis of these findings, the instruments were further tested using a general population in the Normative Data Study. Analysis of the normative data using a Multitrait/Multi-item Analysis Program, showed all sub-scales within each of the core instruments exhibited high internal reliability, as well as discriminant and convergent validity. Items within each of the sub-scales contributed roughly equal proportions of information to the total scale scores.

The Lower Limb Core Scale and the Hip and Knee Core Scale, each consisting of seven items addressing pain, stiffness and swelling, and function, performed at an acceptable level when tested for validity, reliability and sensitivity to change. Additional Sports/Knee and Foot and Ankle Modules proved to have internal and retest reliability of 0.80 or better, comparable with the values for well-established measures such as the Short Form-36 (SF-36). All of the new scales were moderately to strongly correlated with other measures of pain and function, such as physician ratings, the SF-36, and the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). Seventy-one patients provided follow-up information for the analysis of sensitivity to change. The Lower Limb Core was found to contribute independently to the prediction of the transition score based on the patient and physician assessments of change.

References

American Academy of Orthopaedic Surgeons (AAOS): Lower Limb Questionnaire

Instructions

Please answer the following questions for the lower limb being treated or followed up. If it is BOTH lower limbs, please answer the questions for your worse side. All questions are about how you have felt, on average, during the past week. If you are being treated for an injury that happened less than one week ago, please answer for the period since your injury.

1. During the **past week**, how **stiff** was your lower limb? (Circle one response.)
   - 1 Not at all
   - 2 Mildly
   - 3 Moderately
   - 4 Very
   - 5 Extremely

2. During the **past week**, how **swollen** was your lower limb? (Circle one response.)
   - 1 Not at all
   - 2 Mildly
   - 3 Moderately
   - 4 Very
   - 5 Extremely

During the **past week**, please tell us about how painful your lower limb was during the following activities. (Circle ONE response on each line that best describes your average ability.)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Not painful</th>
<th>Mildly Painful</th>
<th>Moderately Painful</th>
<th>Very Painful</th>
<th>Extremely Painful</th>
<th>Could not do because of lower limb pain</th>
<th>Could not do for other reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Walking on flat surfaces?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>4. Going up or down stairs?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>5. Lying in bed at night?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

6. Which of the following statements **best** describes your ability to get around most of the time during the **past week**? (Circle one response.)
   - 1 I did not need support or assistance at all.
   - 2 I mostly walked without support or assistance.
   - 3 I mostly used one cane or crutch to help me get around
   - 4 I mostly used two canes, two crutches or a walker to help me get around.
   - 5 I used a wheelchair.
   - 6 I mostly used other supports or someone else had to help me get around.
   - 7 I was unable to get around at all.

7. How difficult was it for you to put on or take off socks/stockings during the **past week**? (Circle one response.)
   - 1 Not at all difficult
   - 2 A little bit difficult
   - 3 Moderately difficult
   - 4 Very difficult
   - 5 Extremely difficult
   - 6 Cannot do it at all
American Academy of Orthopaedic Surgeons (AAOS): Hip and Knee Questionnaire

Background

The Hip and Knee Questionnaire is designed to be administered to patients 18 years of age or older, and can be used to assess hip and knee conditions and treatment improvements. Indices for measuring a general hip and knee core functionality, right hip pain, left hip pain, right knee pain, and left knee pain are included.

Scoring

The individual's Standardized score is based on the mean of items that make up the scale. Before computing this, all items must be recalibrated so that they are all in the same metric. The most straightforward way to understand the scoring is that each response is rescaled so that every item has a value in the range 0 through 5 (i.e., lowest score possible = 0 and maximum score possible = 5) for each item.

Rescaling algorithm for the Hip and Knee Score

<table>
<thead>
<tr>
<th>Question Number</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(Q1 -1)*5/4</td>
</tr>
<tr>
<td>2</td>
<td>(Q2 -1)*5/4</td>
</tr>
<tr>
<td>3</td>
<td>(Highest non-7 rated item Q3a-Q3d - 1) if rated 1-6; a rating of 7 (could not do for other reason) is considered missing</td>
</tr>
<tr>
<td>4</td>
<td>(Highest non-7 rated item Q4a-Q4d - 1) if rated 1-6; a rating of 7 (could not do for other reason) is considered missing</td>
</tr>
<tr>
<td>5</td>
<td>(Highest non-7 rated item Q5a-Q5d - 1) if rated 1-6; a rating of 7 (could not do for other reason) is considered missing</td>
</tr>
<tr>
<td>6</td>
<td>(Q6 - 1)*5/6</td>
</tr>
<tr>
<td>7</td>
<td>(Q7 - 1)</td>
</tr>
</tbody>
</table>

Next, all of the items comprising a given scale are averaged over the number of items answered.

This average of the rescaled values is multiplied by a constant so that each scale's resulting value falls between 0 and 100. If these values are scored in a way such that high scores represent the least disability (i.e., reversed), this number must be subtracted from 100 to reverse score the scale.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

Lower score indicates greater symptoms and disability.
Validity, reliability and sensitivity/responsiveness to detect change over time

Initial testing for reliability and validity of all AAOS outcomes instruments was conducted in collaboration with the Council of Musculoskeletal Specialty Societies (COMSS) and the Council of Spine Societies (COSS). On the basis of these findings, the instruments were further tested using a general population in the Normative Data Study. Analysis of the normative data using a Multitrait/Multi-item Analysis Program, showed all sub-scales within each of the core instruments exhibited high internal reliability, as well as discriminant and convergent validity. Items within each of the sub-scales contributed roughly equal proportions of information to the total scale scores.

The Lower Limb Core Scale and the Hip and Knee Core Scale, each consisting of seven items addressing pain, stiffness and swelling, and function, performed at an acceptable level when tested for validity, reliability and sensitivity to change. Additional Sports/Knee and Foot and Ankle Modules proved to have internal and retest reliability of 0.80 or better, comparable with the values for well-established measures such as the Short Form-36 (SF-36). All of the new scales were moderately to strongly correlated with other measures of pain and function, such as physician ratings, the SF-36, and the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). Seventy-one patients provided follow-up information for the analysis of sensitivity to change. The Lower Limb Core was found to contribute independently to the prediction of the transition score based on the patient and physician assessments of change.

Hip and Knee AAOS questionnaire was developed for use in research as well as in the clinic. On assessing its psychometric properties it is found that the measures combined with the SF-36 will provide useful information concerning orthopedic outcome in patients with lower extremity diagnoses (Nilsdotter & Bremander 2011). Reliability testing resulted in an internal consistency, for patients with hip/knee diagnosis, of Cronbach’s alpha of 0.80 and test–retest with the Pearson’s correlation coefficient $r = 0.91$.

References


American Academy of Orthopaedic Surgeons (AAOS)
Hip and Knee Questionnaire

Instructions

Please answer the following questions for the hip/knee being treated or followed up. If it is BOTH hip/knees, please answer the questions for your worse side. All questions are about how you have felt, on average, during the past week. If you are being treated for an injury that happened less than one week ago, please answer for the period since your injury.

1. During the past week, how stiff was your hip/knee? (Circle one response.)

   1 Not at all  2 Mildly  3 Moderately  4 Very  5 Extremely

2. During the past week, how swollen was your hip/knee? (Circle one response.)

   1 Not at all  2 Mildly  3 Moderately  4 Very  5 Extremely

The following instructions are for questions 3-5.
During the past week, please tell us about how painful your hips/knees were during the following activities. (Circle ONE response on each line that best describes your average ability for each joint.)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Not painful</th>
<th>Mildly Painful</th>
<th>Moderately Painful</th>
<th>Very Painful</th>
<th>Extremely Painful</th>
<th>Could not do because of hip/knee pain</th>
<th>Could not do for other reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Walking on flat surfaces?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>a. Right hip</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>b. Left hip</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>c. Right knee</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>d. Left knee</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>4. Going up or down stairs?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>a. Right hip</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>b. Left hip</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>c. Right knee</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>d. Left knee</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>5. Lying in bed at night?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>a. Right hip</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>b. Left hip</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>c. Right knee</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>d. Left knee</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>
6. Which of the following statements best describes your ability to get around most of the time during the past week? (Circle one response.)
   1 I did not need support or assistance at all.
   2 I mostly walked without support or assistance.
   3 I mostly used one cane or crutch to help me get around.
   4 I mostly used two canes, two crutches or a walker to help me get around.
   5 I used a wheelchair.
   6 I mostly used other supports or someone else had to help me get around.
   7 I was unable to get around at all.

7. How difficult was it for you to put on or take off socks/stockings during the past week? (Circle one response.)
   1 Not at all difficult
   2 A little bit difficult
   3 Moderately difficult
   4 Very difficult
   5 Extremely difficult
   6 Cannot do it at all
Lower Extremity Functional Scale (LEFS)

Background

The Lower Extremity Functional Scale (LEFS) can be used to evaluate the functional impairment of a patient with a disorder of one or both lower extremities. It can be used to monitor the patient over time and to evaluate the effectiveness of an intervention.

Scoring

A total LEFS score can be determined by summing the responses for all activities at any one point in time.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

Lower score indicates greater disability.

Validity, reliability and internal consistency

Test-retest reliability of the LEFS scores was excellent ($R_{\text{test}}$=.94 [95% lower limit confidence interval (CI) 5.89]). Correlations between the LEFS and the SF-36 physical function subscale and physical component score were $r=.80$ (95% lower limit CI 5.73) and $r=.64$ (95% lower limit CI 5.54), respectively. There was a higher correlation between the prognostic rating of change and the LEFS than between the prognostic rating of change and the SF-36 physical function score. The potential error associated with a score on the LEFS at a given point in time is 65.3 scale points (90% CI), the minimal detectable change is 9 scale points (90% CI), and the minimal clinically important difference is 9 scale points (90% CI).

- The Minimal Detectable Change (MDC) is 9 scale points.
- The Minimal clinically Important Difference (MCID) is 9 scale points.

A study reporting on the psychometric properties of the Dutch translation of the LEFS found this version was feasible, had good internal consistency (0.96), good reliability (ICC = 0.86), good construct and discriminant validity, and showed no floor or ceiling effects. The minimal detectable change (MDC$_{90}$) was ten points (Hoogeboom et al. 2012).

References


Lower Extremity Functional Scale (LEFS)

Patient instructions: Today do you or would you have any difficulty at all with these activities?

<table>
<thead>
<tr>
<th>Response</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unable to perform activity or extreme difficulty</td>
<td>0</td>
</tr>
<tr>
<td>Quite a bit of difficulty</td>
<td>1</td>
</tr>
<tr>
<td>Moderate difficulty</td>
<td>2</td>
</tr>
<tr>
<td>A little bit of difficulty</td>
<td>3</td>
</tr>
<tr>
<td>No difficulty</td>
<td>4</td>
</tr>
</tbody>
</table>

(1) any of your usual work housework or school activities  
(2) your usual hobbies recreational or sporting activities.  
(3) getting into or out of the bath  
(4) walking between rooms  
(5) putting on your shoes or socks  
(6) squatting  
(7) lifting an object like a bag of groceries from the floor  
(8) performing light activities around your home  
(9) performing heavy activities around your home  
(10) getting into or out of a car  
(11) walking 2 blocks (about 1/6th mile or about 250 meters)  
(12) walking 1 mile (1.6 km)  
(13) going up or down 10 steps (about 1 flight of stairs)  
(14) standing for 1 hour  
(15) sitting for 1 hour  
(16) running on even ground  
(17) running on uneven ground  
(18) making sharp turns while running fast  
(19) hopping  
(20) rolling over in bed  

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Hip Scales

Hip Harris Score

Background

The Harris Hip Score is a disease-specific test used to provide an evaluation system for various hip disabilities and methods of treatment. This rating system is not self-administered (staff administered). The Harris hip score gives a maximum of 100 points and the domains include pain, function, deformity, and motion. Pain and function were the two basic considerations and received the heaviest weighting (44 and 47 points). Range of motion (ROM) and deformity are seldom of primary importance and thus received five and four points, respectively. Function was subdivided into activities of daily living (14 points) and gait (33 points).

Scoring

1. Pain

<table>
<thead>
<tr>
<th>Amount of Pain</th>
<th>Description</th>
<th>Points Alotted</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Occasional ache or awareness of pain of low grade, no compromise of activities</td>
<td>44</td>
</tr>
<tr>
<td>Slight Pain</td>
<td>No effect on average activities, rarely may have moderate pain following unusual activities, may take aspirin</td>
<td>40</td>
</tr>
<tr>
<td>Mild Pain</td>
<td>Pain tolerable but makes concessions to his pain. Some limitation of ordinary activities but able to work regularly, May require occasional medicine stronger than aspirin.</td>
<td>30</td>
</tr>
<tr>
<td>Moderate Pain</td>
<td>Severe pain at times, but ambulatory; serious limitation of activities; takes pain medicine stronger than aspirin usually or frequently</td>
<td>20</td>
</tr>
<tr>
<td>Marked Pain</td>
<td>Severe pain even in bed; Pain forces patient to bed; Crippled by pain; bedridden.</td>
<td>10</td>
</tr>
<tr>
<td>Totally Disabled</td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>
### Function

#### 2A. Gait

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. None</td>
<td>11</td>
<td>a. None</td>
<td>11</td>
</tr>
<tr>
<td>b. Slight</td>
<td>8</td>
<td>b. Cane for long walks</td>
<td>7</td>
</tr>
<tr>
<td>c. Moderate</td>
<td>5</td>
<td>c. Cane most of the time</td>
<td>5</td>
</tr>
<tr>
<td>d. Severe</td>
<td>0</td>
<td>d. One crutch</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>e. Two canes</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>f. Two crutches</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>g. Not able to walk</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Normally</td>
<td>4</td>
<td>a. With ease</td>
<td>5</td>
</tr>
<tr>
<td>b. Using railing</td>
<td>2</td>
<td>b. With difficulty</td>
<td>2</td>
</tr>
<tr>
<td>c. In any manner</td>
<td>1</td>
<td>c. Unable</td>
<td>0</td>
</tr>
<tr>
<td>d. Unable to do stairs</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Points</th>
<th>2. B.4 Transportation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Able to enter public transportation</td>
<td>1</td>
</tr>
</tbody>
</table>

### Range of Motion

<table>
<thead>
<tr>
<th>Arc of Motion</th>
<th>Index</th>
<th>Maximum possible value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-45° (45°)</td>
<td>1.0</td>
<td>45</td>
</tr>
<tr>
<td>45-90° (45°)</td>
<td>0.6</td>
<td>27</td>
</tr>
<tr>
<td>90-110° (20°)</td>
<td>0.3</td>
<td>6</td>
</tr>
<tr>
<td>110-130° (20°)</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Abduction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-15° (15°)</td>
<td>0.8</td>
<td>12</td>
</tr>
<tr>
<td>15-20° (5°)</td>
<td>0.3</td>
<td>1.5</td>
</tr>
<tr>
<td>20-45° (25°)</td>
<td>0.0</td>
<td>0</td>
</tr>
</tbody>
</table>
To determine the rating for motion the number of degrees of motion in each designated arc is multiplied by the corresponding index factor. For example, a patient with a 30-degree flexion contracture who has further flexion to 100 degrees but lacks rotation and has no motion in the abduction-adduction range would be rated for motions as follows:

- 15 degrees in the 0 to 45-degree range of flexions (that is, from the 30-degree flexion contracture further to 45 degrees of flexion), or 15 X 1.0 (index value) = 15 points;
- 45-degrees in the flexion arc from 45 to 90 degrees, or 45 degrees X 0.6 (index value) = 27 points;
- 10 degrees in the flexion arc from 90 to 110 degrees, or 10 X 0.3 (index value) = 3 points;
- No points for rotations or abductions-adduction;

Total point score is forty-five.

The sum of the point scores for the individual arcs is then multiplied by 0.05 to obtain the number of points for the over-all evaluation of the range of motion.

This patient would receive 0.05 X 45 or 2.3 points for motion. All of these calculations can be performed automatically during data processing so that the surgeon need only record the range of motion as the usual way.

4. Deformity
The final four points of the over-all total of one hundred are given for the absence of deformity. Any of the following constitutes a significant deformity and eliminates these four points: A permanent flexion contracture greater than 30 degrees, fixed adduction of more than 10 degrees, fixed internal rotations of more than 10 degrees or a limb-length discrepancy of more than 3.2 centimetres.

Synopsis of the Evaluation System

I. Pain (44 possible)
A. None or ignores it 44
B. Slight, occasional, no compromise in activities 40
C. Mild pain, no effect on average activities, rarely moderate pain with unusual activity, may take aspirin 30
D. Moderate pain, tolerable but makes concessions to pain
   Some limitation of ordinary activity or work. May require occasional pain medicine stronger than aspirin 20
E. Marked pain, serious limitation of activities 10
F. Totally disabled, crippled, pain in bed, bedridden 0
II. Function (47 possible)
   A. Gait (33 possible)
      1. Limp
         a. None 11
         b. Slight 8
         c. Moderate 5
         d. Severe 0
      2. Support
         a. None 11
         b. Cane for long walks 7
         c. Cane most of the time 5
         d. One crutch 3
         e. Two canes 2
         f. Two crutches 0
         g. Not able to walk (specify reasons) 0
   B. Activities (14 possible)
      1. Stairs
         a. Normally without using a railing 4
         b. Normally using a railing 2
         c. In any manner 1
         d. Unable to do stairs 0
      2. Shoe and socks
         a. With ease 4
         b. With difficulty 2
         c. Unable 0
      3. Sitting
         a. Comfortably in ordinary chair one hour 5
         b. On a high chair one half hour 3
         c. Unable to sit comfortably in any chair 0
      4. Enter public transportation 1
   III. Absence of deformity points (4) are given if the patient demonstrates:
      A. Less than 30 degrees fixed flexion contracture
      B. Less than 10 degrees fixed adduction
      C. Less than 10 degrees fixed internal rotations in extension
      D. Limb-length discrepancy less than 3.2 centimetres
   IV. Range of motions (index values are determined by multiplying the degrees of motion possible in each arc by the appropriate index)
      A. Flexion 0-45 degrees x 1.0
         45-90 degrees x 0.6
         90-110 degrees x 0.3
      B. Abduction 0-15 degrees x 0.8
         15-20 degrees x 0.3
         Over 20 degrees x 0
      C. External rotation in extension 0-15 degrees x 0.4/15 degrees x 0
      D. Internal rotation in extension any x 0
      E. Adduction 0-15 degrees
      To determine the over-all rating for range of motions, multiply the sum of the index values X 0.05. Record Trendelenburg test as positive, level, or neutral.
Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

A total Harris hip score below 70 points was considered a poor result, 70 to 80 fair, 80 to 90 good, and 90 to 100 excellent.

Validity, reliability and sensitivity/responsiveness to detect change over time

The pain domain in the Harris hip score correlated at least as well as with pain in the Western Ontario and McMaster University Osteoarthritis Index and the Medical Outcomes Study 36-Item Short-Form Health Survey as with function in the Western Ontario and McMaster University Osteoarthritis Index and the Medical Outcomes Study 36-Item Short-Form Health Survey. The same results were obtained when comparing the domains of function in the three scores with pain domains. That is, corresponding domains correlate better than different domains, supporting high construct validity.

For reliability of Hip Harris Score, physicians’ and physiotherapists’ evaluations were studied. The reliability for total score was excellent (physician r = 0.94, physiotherapist r = 0.95). The reliability in domains was also high, and the disease-specific tests showed the highest values. The physiotherapist and orthopaedic surgeon showed excellent test and retest reliability in the domains of pain (0.93 and 0.98, respectively) and function (0.95 and 0.93, respectively). The correlation was significant at the 0.01 level (two-tailed). Deformity and ROM showed high values, but when items were compared in these domains there was no significant correlation in the motion, except for flexion and abduction. No correlation could be found for deformity because all patients received a full score. The sitting item (can the patient sit comfortably in a chair for 1 or 1/2 hour, or is he or she unable to sit comfortably?) showed the lowest significant value, and pain had the highest value.

The HHS is widely used throughout the world for evaluating outcome after hip arthroplasty and THR (Nilsdotter & Bremander 2011). The HHS has also been proven appropriate to measure outcome after interventions such as physical therapy and femoral neck fractures. However there are unacceptable ceiling effects that severely limit its validity though it can be used for short-term follow up studies if you are aware of this problem (Wamper et al. 2010).

References

Nilsdotter AK, Lohmander LS, Klassbo M, Roos EM. Hip Disability and Osteoarthritis Outcome Score (HOOS) — validity and responsiveness in total hip replacement. BMC Musculoskeletal Disorders 2003, 4:10
Hip Disability and Osteoarthritis Outcome Score (HOOS)

Background
Hip Disability and Osteoarthritis Outcome Score (HOOS) was developed as an instrument to assess patient’s opinion about their hip and associated problems. It is intended to be used for hip disability, with or without osteoarthritis. HOOS consists of 5 subscales; Pain, other Symptoms, Function in daily living (ADL), Function in sport and recreation (Sport/Rec) and hip related Quality of life (QOL). Standardized answer options are given (5 Likert boxes) and each question gets a score from 0 to 4.

Scoring
A normalized score (100 indicating no symptoms and 0 indicating extreme symptoms) is calculated for each subscale.

Scores are assigned to the ratings where None = 0, Mild = 1, Moderate = 2, Severe = 3, Extreme = 4. Sum of the scores for each subscale is computed and divided by the possible maximum score for the scale.

Pain \[100 \text{ - Total score P1-P10 } \times 100 \]
\[\frac{40}{40}\]

Symptoms \[100 \text{ - Total score S1-S5 } \times 100 \]
\[\frac{20}{20}\]

ADL \[100 \text{ - Total score A1-A17 } \times 100 \]
\[\frac{68}{68}\]

Sport and Rec \[100 \text{ - Total score SP1-SP4 } \times 100 \]
\[\frac{16}{16}\]

QoL \[100 \text{ - Total score Q1-Q4 } \times 100 \]
\[\frac{16}{16}\]

For Missing Data: If a mark is placed outside a box, the closest box is used. If two boxes are marked, the box which indicates the most severe problems has to be chosen. If more than two items are omitted, the response is considered invalid.

Recording
A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation
Lower score means greater symptoms and disability.

Validity, reliability and sensitivity/responsiveness to detect change over time

The HOOS met set criteria of validity and responsiveness. The responsiveness (SRM) for the two added subscales sport and recreation and quality of life were 1.29 and 1.65, respectively. Patients ≤ 66 years of age (range 49–66) reported higher responsiveness in all five subscales than patients >66 years of age (range 67–85) (Pain SRM 2.60 vs.1.97, other symptoms SRM 3.0 vs. 1.60, activity of daily living SRM 2.51 vs. 1.52, sport and recreation function SRM 1.53 vs. 1.21 and hip related quality of life SRM 1.95 vs. 1.57).

The Korean version of HOOS showed satisfactory internal consistency (0.78-0.93), test-retest reliability (Cronbach’s α> 0.7), convergent validity, and responsiveness (Lee et al. 2011). Thus the HOOS questionnaire developed in West is, with transcultural adaptation, relevant for use among patients in East
Asia. The HOOS questionnaire has been validated in Swedish, Dutch and French (Ornetti et al. 2010) and on testing for reliability the internal consistency ranged from 0.82 to 0.98 (Cronbach’s $\alpha$ coefficient).

**References**


**Hip Disability and Osteoarthritis Outcome Score (HOOS)**

- **Today's date:** _____/_____/______  
- **Date of birth:** _____/_____/______  
- **Name:** __________________________

**INSTRUCTIONS:** This survey asks for your view about your hip. This information will help us keep track of how you feel about your hip and how well you are able to do your usual activities. Answer every question by ticking the appropriate box, only one box for each question. If you are uncertain about how to answer a question, please give the best answer you can.

**Symptoms**  
These questions should be answered thinking of your hip symptoms and difficulties during the **last week**.

**S1.** Do you feel grinding, hear clicking or any other type of noise from your hip?

- Never  
- Rarely  
- Sometimes  
- Often  
- Always

**S2.** Difficulties spreading legs wide apart

- None  
- Mild  
- Moderate  
- Severe  
- Extreme

**S3.** Difficulties to stride out when walking

- None  
- Mild  
- Moderate  
- Severe  
- Extreme

**Stiffness**  
The following questions concern the amount of joint stiffness you have experienced during the **last week** in your hip. Stiffness is a sensation of restriction or slowness in the ease with which you move your hip joint.

**S4.** How severe is your hip joint stiffness after first wakening in the morning?

- None  
- Mild  
- Moderate  
- Severe  
- Extreme

**S5.** How severe is your hip stiffness after sitting, lying or resting **later in the day**?

- None  
- Mild  
- Moderate  
- Severe  
- Extreme
### Pain

**P1. How often is your hip painful?**
- Never
- Monthly
- Weekly
- Daily
- Always

What amount of hip pain have you experienced the **last week** during the following activities?

**P2. Straightening your hip fully**
- None
- Mild
- Moderate
- Severe
- Extreme

What amount of hip pain have you experienced the **last week** during the following activities?

**P3. Bending your hip fully**
- None
- Mild
- Moderate
- Severe
- Extreme

**P4. Walking on a flat surface**
- None
- Mild
- Moderate
- Severe
- Extreme

**P5. Going up or down stairs**
- None
- Mild
- Moderate
- Severe
- Extreme

**P6. At night while in bed**
- None
- Mild
- Moderate
- Severe
- Extreme

**P7. Sitting or lying**
- None
- Mild
- Moderate
- Severe
- Extreme

**P8. Standing upright**
- None
- Mild
- Moderate
- Severe
- Extreme

**P9. Walking on a hard surface (asphalt, concrete, etc.)**
- None
- Mild
- Moderate
- Severe
- Extreme

**P10. Walking on an uneven surface**
- None
- Mild
- Moderate
- Severe
- Extreme

**Function, daily living**
The following questions concern your physical function. By this we mean your ability to move around and to look after yourself. For each of the following activities please indicate the degree of difficulty you have experienced in the **last week** due to your hip.

A1. Descending stairs
   - None
   - Mild
   - Moderate
   - Severe
   - Extreme

A2. Ascending stairs
   - None
   - Mild
   - Moderate
   - Severe
   - Extreme

A3. Rising from sitting
   - None
   - Mild
   - Moderate
   - Severe
   - Extreme

A4. Standing
   - None
   - Mild
   - Moderate
   - Severe
   - Extreme

For each of the following activities please indicate the degree of difficulty you have experienced in the **last week** due to your hip.

A5. Bending to the floor/pick up an object
   - None
   - Mild
   - Moderate
   - Severe
   - Extreme

A6. Walking on a flat surface
   - None
   - Mild
   - Moderate
   - Severe
   - Extreme

A7. Getting in/out of car
   - None
   - Mild
   - Moderate
   - Severe
   - Extreme

A8. Going shopping
   - None
   - Mild
   - Moderate
   - Severe
   - Extreme

A9. Putting on socks/stockings
   - None
   - Mild
   - Moderate
   - Severe
   - Extreme

A10. Rising from bed
    - None
    - Mild
    - Moderate
    - Severe
    - Extreme

A11. Taking off socks/stockings
    - None
    - Mild
    - Moderate
    - Severe
    - Extreme

A12. Lying in bed (turning over, maintaining hip position)
    - None
    - Mild
    - Moderate
    - Severe
    - Extreme
A13. Getting in/out of bath

None  Mild  Moderate  Severe  Extreme

A14. Sitting

None  Mild  Moderate  Severe  Extreme

A15. Getting on/off toilet

None  Mild  Moderate  Severe  Extreme

A16. Heavy domestic duties (moving heavy boxes, scrubbing floors, etc)

None  Mild  Moderate  Severe  Extreme

A17. Light domestic duties (cooking, dusting, etc)

None  Mild  Moderate  Severe  Extreme

Function, sports and recreational activities

The following questions concern your physical function when being active on a higher level. The questions should be answered thinking of what degree of difficulty you have experienced during the last week due to your hip.

SP1. Squatting

None  Mild  Moderate  Severe  Extreme

SP2. Running

None  Mild  Moderate  Severe  Extreme

SP3. Twisting/pivoting on loaded leg

None  Mild  Moderate  Severe  Extreme

SP4. Walking on uneven surface

None  Mild  Moderate  Severe  Extreme

Quality of Life

Q1. How often are you aware of your hip problem?

Never  Monthly  Weekly  Daily  Constantly

Q2. Have you modified your life style to avoid activities potentially damaging to your hip?

Not at all  Mildly  Moderately  Severely  Totally

Q3. How much are you troubled with lack of confidence in your hip?

Not at all  Mildly  Moderately  Severely  Extremely
Q4. In general, how much difficulty do you have with your hip?

<table>
<thead>
<tr>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☐</td>
<td>☑</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>


Non-arthritic Hip Score

Background

The Non-arthritic Hip Score was created to measure preoperative and postoperative hip pain and function in a younger more athletic population. The score is symptom-related only, requiring no physical examination parameters that could introduce bias to the score. This scoring system includes 20 multiple choice questions each having five responses. Similar to the Western Ontario and McMaster Universities Osteoarthritis Index, each of the answers corresponds to a particular numerical value and the values are added at the end of the test and multiplied by 1.25 to arrive at a final score. This score is divided into four domains: pain, mechanical symptoms, physical function, and level of activity. All 10 questions measuring pain and physical function come directly from the Western Ontario and McMaster Universities Osteoarthritis Index. Four additional questions deal exclusively with mechanical symptoms involving the hip because it has been reported that painful clicks and locking episodes of the hip are associated with labral injuries and loose bodies. The fourth set of questions measures activity level. In this section, the levels of activity that the patient participates in before and after intervention are identified.

The Non-arthritic Hip Score is designed to be extremely sensitive to discriminate between high levels of activity. This scoring scheme is aimed at 20-to 40-year-old patients with hip pain without obvious radiographic diagnosis.

Scoring

The numbers associated with each of the answers are added to arrive at the raw score. To obtain the Hip Score, raw score should be multiplied by 1.25.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

The maximum score is 100 indicating normal hip function.

Validity, reliability and internal consistency

Validity and internal consistency was studied with 48 consecutive patients with a mean age of 33 years with intractable hip pain and normal plain radiographs. Reproducibility was assessed from data on an additional random sample of 17 patients with hip pain. The Pearson correlation coefficients were 0.82 and 0.59 between the non-arthritic hip score and the Harris hip score and Short Form-12, respectively showing validity. Cronbach’s coefficient alpha measuring the internal consistency within each of the score’s four domains ranged from 0.69 to 0.92. The test and retest reproducibility ranged from 0.87 to 0.95 for the four subsets and was 0.96 overall.

References

Non-arthritic Hip Score

**INSTRUCTIONS:** The following 5 questions concern the amount of pain you are currently experiencing in the hip that you are having evaluated today. For each situation, please circle the response that most accurately reflects the amount of pain experienced in the past 48 hours. Please circle one answer that best describes your situation.

**QUESTION:** How much pain do you have-

1. Walking on a flat surface?
   - 4 = none
   - 3 = mild
   - 2 = moderate
   - 1 = severe
   - 0 = extreme

2. Going up or down stairs?
   - 4 = none
   - 3 = mild
   - 2 = moderate
   - 1 = severe
   - 0 = extreme

3. At night while in bed?
   - 4 = none
   - 3 = mild
   - 2 = moderate
   - 1 = severe
   - 0 = extreme

4. Sitting or lying?
   - 4 = none
   - 3 = mild
   - 2 = moderate
   - 1 = severe
   - 0 = extreme

5. Standing upright?
   - 4 = none
   - 3 = mild
   - 2 = moderate
   - 1 = severe
   - 0 = extreme
INSTRUCTIONS: The following 4 questions concern the symptoms that you are currently experiencing in the hip that you are having evaluated today. For each situation, please circle the response that most accurately reflects the symptoms experienced in the past 48 hours. Please circle one answer that best describes your situation.

QUESTION: How much trouble do you have with-

1. Catching or locking of your hip?
   - 4 = none
   - 3 = mild
   - 2 = moderate
   - 1 = severe
   - 0 = extreme

2. Your hip giving out on you?
   - 4 = none
   - 3 = mild
   - 2 = moderate
   - 1 = severe
   - 0 = extreme

3. Stiffness in your hip?
   - 4 = none
   - 3 = mild
   - 2 = moderate
   - 1 = severe
   - 0 = extreme

4. Decreased motion in your hip?
   - 4 = none
   - 3 = mild
   - 2 = moderate
   - 1 = severe
   - 0 = extreme

INSTRUCTIONS: The following 5 questions concern your physical function. For each of the following activities, please circle the response that most accurately reflects the difficulty that you have experienced in the past 48 hours because of your hip pain. Please circle one answer that best describes your situation.

QUESTION: What degree of difficulty do you have with-

1. Descending stairs?
   - 4 = none
   - 3 = mild
   - 2 = moderate
   - 1 = severe
   - 0 = extreme
2. Ascending stairs?
   4 = none
   3 = mild
   2 = moderate
   1 = severe
   0 = extreme

3. Rising from sitting?
   4 = none
   3 = mild
   2 = moderate
   1 = severe
   0 = extreme

4. Putting on socks/stockings?
   4 = none
   3 = mild
   2 = moderate
   1 = severe
   0 = extreme

5. Rising from bed?
   4 = none
   3 = mild
   2 = moderate
   1 = severe
   0 = extreme

INSTRUCTIONS: The following 6 questions concern your ability to participate in certain types of activities. For each of the following activities, please circle the response that most accurately reflects the difficulty that you have experienced in the past month because of your hip pain. If you do not participate in a certain type of activity, please estimate how much trouble your hip would cause you if you had to perform that type of activity. Please circle one answer that best describes your situation.

QUESTION: How much trouble does your hip cause you when you participate in-

1. High demand sports involving sprinting or cutting (for example, football, basketball, tennis, and exercise aerobics)
   4 = none
   3 = mild
   2 = moderate
   1 = severe
   0 = extreme

2. Low demand sports (for example, golfing and bowling)
   4 = none
   3 = mild
   2 = moderate
   1 = severe
   0 = extreme
3. Jogging for exercise?
   4 = none
   3 = mild
   2 = moderate
   1 = severe
   0 = extreme

4. Walking for exercise?
   4 = none
   3 = mild
   2 = moderate
   1 = severe
   0 = extreme

5. Heavy household duties (for example, lifting firewood and moving furniture)?
   4 = none
   3 = mild
   2 = moderate
   1 = severe
   0 = extreme

6. Light household duties (for example, cooking, dusting, vacuuming, and doing laundry)?
   4 = none
   3 = mild
   2 = moderate
   1 = severe
   0 = extreme

**INSTRUCTIONS:** Please add the numbers associated with each of your 20 answers to arrive at the raw score, multiply the raw score by 1.25 to obtain your hip score.
Oxford Hip Score

Background

The Oxford Hip Score is a patient-centred questionnaire that is designed to assess functional ability and pain from the patient’s perspective. It is a short, twelve-item questionnaire developed for completion by patients undergoing Total Hip Replacement.

Scoring

Each of the 12 questions on the Oxford hip score is scored in the same way with the score decreasing as the reported symptoms increase (i.e. become worse). All questions are laid out similarly with response categories denoting least (or no) symptoms being to the left of the page (scoring 4) and those representing greatest severity lying on the right hand side (scoring 0). eg. question 1:

<table>
<thead>
<tr>
<th>During the past 4 weeks........</th>
</tr>
</thead>
<tbody>
<tr>
<td>How would you describe the pain you <strong>usually</strong> had from your hip?</td>
</tr>
<tr>
<td>None</td>
</tr>
<tr>
<td>☐</td>
</tr>
<tr>
<td>4</td>
</tr>
</tbody>
</table>

The overall score is reached by simply summing the scores received for individual questions. This results in a continuous score ranging from 0 (most severe symptoms) to 48 (least symptoms). The numbers associated with each of the answers are added to arrive at the raw score.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

Lower score indicates greater pain and disability.

Validity, reliability, internal consistency and sensitivity to detect change over time

The OHS has been demonstrated to be highly sensitive to change in patients undergoing primary THR and revision THR. It correlates well with patient satisfaction and other patient-centred instruments, such as the Euroqol 5D. Responsiveness of the OHS to change has been found to be greater than generic measures such as the SF-36 and disease specific measures such as the WOMAC. The OHS has been utilized in a broad range of contexts, including studies comparing different prostheses, surgeon and patient expectations, and the outcomes of NHS and private patients.

The OHS has been shown to have internal consistency and produce data of high reliability and validity. (Dawson et al, 1996)
The Italian OHS questionnaire is valid, reliable (α =0.85-0.89; ICC=0.89), and responsive for use in Italian patients with symptomatic hip OA receiving hyaluronate injections (Martinelli et al. 2011). The Oxford hip scale has shown acceptable to excellent psychometric properties and has been reported to be a useful predictor of early revision after total hip replacement (THR) (Nilsdotter & Bremander 2011). Internal consistency was measured in patients pre- and postsurgery; Cronbach’s α varied between 0.84–0.93. High correlation (r= 0.7, P < 0.001) was found between OHS and the HHS in THR patients.

References

**Oxford Hip Score**

1. **During the past 4 weeks**, how would you describe the pain you usually had from your hip?

<table>
<thead>
<tr>
<th>None</th>
<th>Very mild</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

2. **During the past 4 weeks**, have you had any trouble with washing and drying yourself (all over) **because of your hip**?

<table>
<thead>
<tr>
<th>No trouble at all</th>
<th>Very little trouble</th>
<th>Moderate trouble</th>
<th>Extreme difficulty</th>
<th>Impossible to do</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

3. **During the past 4 weeks**, have you had any trouble getting in and out of a car or using public transport **because of your hip**?

<table>
<thead>
<tr>
<th>No trouble at all</th>
<th>Very little trouble</th>
<th>Moderate trouble</th>
<th>Extreme difficulty</th>
<th>Impossible to do</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

4. **During the past 4 weeks**, have you been able to put on a pair of socks, stocking or tights?

<table>
<thead>
<tr>
<th>Yes, easily</th>
<th>With little difficulty</th>
<th>With moderate difficulty</th>
<th>With extreme difficulty</th>
<th>No, impossible</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

5. **During the past 4 weeks**, could you do the household shopping **on your own**?

<table>
<thead>
<tr>
<th>Yes, easily</th>
<th>With little difficulty</th>
<th>With moderate difficulty</th>
<th>With extreme difficulty</th>
<th>No, impossible</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

6. **During the past 4 weeks**, for how long have you been able to walk before **pain from your hip** becomes severe (with or without a stick)?

<table>
<thead>
<tr>
<th>No pain/&gt;30minutes</th>
<th>16-30 minutes</th>
<th>5-15 minutes</th>
<th>Around the house only</th>
<th>Not at all-severe pain on walking</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

7. **During the past 4 weeks**, have you been able to climb a flight of stairs?

<table>
<thead>
<tr>
<th>Yes, easily</th>
<th>With little difficulty</th>
<th>With moderate difficulty</th>
<th>With extreme difficulty</th>
<th>No, impossible</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

8. **During the past 4 weeks**, after a meal (sat at a table), how painful has it been for you to stand up from a chair **because of your hip**?

<table>
<thead>
<tr>
<th>Not at all painful</th>
<th>Slightly painful</th>
<th>Moderately painful</th>
<th>Very painful</th>
<th>Unbearable</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
9. **During the past 4 weeks**, have you been limping when walking **because of your hip**?

<table>
<thead>
<tr>
<th>Rarely/Never</th>
<th>Sometimes, or just at first</th>
<th>Often, not just at first</th>
<th>Most of the time</th>
<th>All of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

10. **During the past 4 weeks**, have you had any sudden or severe pain – ‘shooting’, ‘stabbing’, or ‘spasms’ – **from the affected hip**?

<table>
<thead>
<tr>
<th>No days</th>
<th>Only 1 or 2 days</th>
<th>Some days</th>
<th>Most days</th>
<th>Everyday</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

11. **During the past 4 weeks**, how much has **pain from your hip** interfered with your usual work (including housework)?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>A little bit</th>
<th>Moderately</th>
<th>Greatly</th>
<th>Totally</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

12. **During the past 4 weeks**, have you been troubled by **pain from your hip** in bed at night?

<table>
<thead>
<tr>
<th>No nights</th>
<th>Only 1 or 2 nights</th>
<th>Some nights</th>
<th>Most nights</th>
<th>Every night</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
Knee Scales

Knee Injury and Osteoarthritis Outcome Score (KOOS)

Background

The Knee Injury and Osteoarthritis Outcome Score (KOOS) was developed as an instrument to assess the patient's opinion about their knee and associated problems. It is intended to be used for knee injury that can result in post traumatic osteoarthritis i.e. ACL (anterior cruciate ligament) injury, meniscus injury, chondral injury, etc. KOOS consists of 5 subscales; Pain, other Symptoms, Function in daily living (ADL), Function in sport and recreation (Sport/Rec) and knee related Quality of life (QoL). Standardized answer options are given (5 Likert boxes) and each question gets a score from 0 to 4.

Scoring

Each item is scored 0 to 4 and the raw score for each section is the sum of item scores. Scores are then transformed to a 0 to 100 scale. A higher score indicates fewer problems.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Raw Score</th>
<th>Transformed score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>/36</td>
<td>100 – Actual Raw Score x 100</td>
</tr>
<tr>
<td>Symptoms</td>
<td>/28</td>
<td>Possible Raw Score range</td>
</tr>
<tr>
<td>ADL</td>
<td>/68</td>
<td>Example: a pain raw score of 16 would be transformed as follows:</td>
</tr>
<tr>
<td>Sport/Rec</td>
<td>/20</td>
<td>100 – (16 x 100) = 56</td>
</tr>
<tr>
<td>QoL</td>
<td>/16</td>
<td>36</td>
</tr>
</tbody>
</table>

Minimally Detectable Change (90)

- Pain: 12 points
- Symptoms: 8 points
- ADL: 10 points
- Sport/Rec: 19 points
- QoL: 13 points

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

A higher score indicates fewer problems.

Validity, reliability and internal consistency

The intra-class correlation coefficients were over 0.75 for all subscales indicating sufficient test-retest reliability. Over 90% of the patients regarded improvement in the subscales Pain, Symptoms, Activities of Daily Living, and knee-related Quality of Life to be extremely or very important when deciding to have their knee operated on, indicating good content validity.

The correlations found in comparison to the SF-36 indicated that KOOS measured expected constructs. The most responsive subscale was knee-related Quality of Life. The effect sizes of the five KOOS subscales at 12 months ranged from 1.08 to 3.54 and for the WOMAC from 1.65 to 2.56.

A study evaluated the psychometric properties of the Portuguese version of the KOOS and found that it had acceptable reliability (ICC= 0.85; α= 0.89) and validity (Goncalvesyz et al. 2010). The KOOS outcome measure has also been successfully translated into Italian, and is proven to have good psychometric properties that replicated the results of existing versions. It has good internal consistency (0.782-0.977), and a high level of test-retest reliability (0.850-0.949) (Monticone et al. 2012). Its use is recommended for clinical and research purposes in patients with knee injuries. A study conducted to validate the Knee injury and Osteoarthritis Outcome Score (KOOS) for the assessment of competitive athletes with higher level
sports activities after anterior cruciate ligament (ACL) reconstruction found the scale to be valid and reliable for use in this population (Salavati et al. 2011). The study reported the ICCs of the KOOS subscales were: Pain 0.93, Symptoms 0.85, Activities of Daily Living 0.91, Function in Sport and Recreation 0.75 and Knee-related Quality of Life 0.89. And the Cronbach’s alphas of the KOOS subscales were: Pain 0.91, Symptoms 0.75, Activities of Daily Living 0.96, Function in Sport and Recreation 0.86 and Knee-related Quality of Life 0.74.

References


Knee Injury and Osteoarthritis Outcome Score (KOOS)

**Pain**
P1 How often is your knee painful?

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Monthly</th>
<th>Weekly</th>
<th>Daily</th>
<th>Constantly</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

What degree of pain have you experienced the last week when...?

P2 Twisting/pivoting on your knee

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td></td>
<td>☐</td>
</tr>
</tbody>
</table>

P3 Straightening knee fully

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
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<td>☐</td>
<td>☐</td>
<td>☐</td>
<td></td>
<td>☐</td>
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</tbody>
</table>

P4 Bending knee fully

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
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<td>☐</td>
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</tbody>
</table>

P5 Walking on flat surface

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td></td>
<td>☐</td>
</tr>
</tbody>
</table>

P6 Going up or down stairs

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td></td>
<td>☐</td>
</tr>
</tbody>
</table>

P7 At night while in bed

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td></td>
<td>☐</td>
</tr>
</tbody>
</table>

P8 Sitting or lying

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
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<td>☐</td>
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</tbody>
</table>

P9 Standing upright

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td></td>
<td>☐</td>
</tr>
</tbody>
</table>

**Symptoms**

Sy1 How severe is your knee stiffness after first wakening in the morning?

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td></td>
<td>☐</td>
</tr>
</tbody>
</table>
Sy2 How severe is your knee stiffness after sitting, lying, or resting later in the day?

<table>
<thead>
<tr>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sy3 Do you have swelling in your knee?

<table>
<thead>
<tr>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Sy4 Do you feel grinding, hear clicking or any other type of noise when your knee moves?

<table>
<thead>
<tr>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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</tbody>
</table>

Sy5 Does your knee catch or hang up when moving?

<table>
<thead>
<tr>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Sy6 Can you straighten your knee fully?

<table>
<thead>
<tr>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Sy7 Can you bend your knee fully?

<table>
<thead>
<tr>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

Activities of daily living

What difficulty have you experienced the last week...?

A1 Descending stairs

<table>
<thead>
<tr>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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A2 Ascending stairs

<table>
<thead>
<tr>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

A3 Rising from sitting

<table>
<thead>
<tr>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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</table>

A4 Standing

<table>
<thead>
<tr>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
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<tbody>
<tr>
<td></td>
<td></td>
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</table>

A5 Bending to floor/pick up an object

<table>
<thead>
<tr>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
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<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>
### iCAHE Musculoskeletal Outcomes Calculator: User Manual

#### A6 Walking on flat surface

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
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<tr>
<td></td>
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</table>

#### A7 Getting in/out of car

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
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<td></td>
<td></td>
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</table>

#### A8 Going shopping

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
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<td></td>
<td></td>
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#### A9 Putting on socks/stockings

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
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<tbody>
<tr>
<td></td>
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#### A10 Rising from bed

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
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#### A11 Taking off socks/stockings

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
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#### A12 Lying in bed (turning over, maintaining knee position)

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
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#### A13 Getting in/out of bath

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
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<td></td>
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#### A14 Sitting

<table>
<thead>
<tr>
<th></th>
<th>None</th>
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<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
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<td></td>
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</table>

#### A15 Getting on/off toilet

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

#### A16 Heavy domestic duties (shovelling, scrubbing floors, etc)

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

#### A17 Light domestic duties (cooking, dusting, etc.)

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Sport and recreation function**
**iCAHE Musculoskeletal Outcomes Calculator: User Manual**

What difficulty have you experienced the last week...?

**Sp1 Squatting**

None | Mild | Moderate | Severe | Extreme
-----|-----|---------|-------|-------
☐    | ☐   | ☐       | ☐     | ☐     

**Sp2 Running**

None | Mild | Moderate | Severe | Extreme
-----|-----|---------|-------|-------
☐    | ☐   | ☐       | ☐     | ☐     

**Sp3 Jumping**

None | Mild | Moderate | Severe | Extreme
-----|-----|---------|-------|-------
☐    | ☐   | ☐       | ☐     | ☐     

**Sp4 Turning/twisting on your injured knee**

None | Mild | Moderate | Severe | Extreme
-----|-----|---------|-------|-------
☐    | ☐   | ☐       | ☐     | ☐     

**Sp5 Kneeling**

None | Mild | Moderate | Severe | Extreme
-----|-----|---------|-------|-------
☐    | ☐   | ☐       | ☐     | ☐     

**Knee-related quality of life**

What difficulty have you experienced the last week...?

**Q1 How often are you aware of your knee problems?**

Never | Monthly | Weekly | Daily | Always
-----|--------|--------|------|-------
☐     | ☐      | ☐      | ☐    | ☐     

**Q2 Have you modified your lifestyle to avoid potentially damaging activities to your knee?**

Not at all | Mildly | Moderately | Severely | Totally
-----------|-------|------------|---------|--------
☐          | ☐     | ☐          | ☐       | ☐      

**Q3 How troubled are you with lack of confidence in your knee?**

Not at all | Mildly | Moderately | Severely | Totally
-----------|-------|------------|---------|--------
☐          | ☐     | ☐          | ☐       | ☐      

**Q4 In general, how much difficulty do you have with your knee?**

None | Mild | Moderate | Severe | Extreme
-----|-----|---------|-------|-------
☐    | ☐   | ☐       | ☐     | ☐     

233
Knee Outcome Survey (KOS): Activities of Daily Living Scale/Sports Activities Scale

Background

The Knee Outcome Survey (KOS) is a patient-reported instrument for the measurement of functional limitations commonly experienced by individuals who have various pathological disorders of the knee, including ligamentous and meniscal injuries, patellofemoral pain, and osteoarthrosis. It was also designed to address the limitations inherent in patient-reported measures of function. The Knee Outcome Survey consists of two separate scales: the Activities of Daily Living Scale (ADLS) and the Sports Activity Scale (SAS). The Activities of Daily Living Scale includes items related to symptoms and functional limitations experienced during activities of daily living, while the Sports Activity Scale consists of items related to symptoms and functional limitations experienced during sports activities.

The ADLS consists of 14 items. Items 1 through 6 measure symptoms commonly experienced during activities of daily living by an individual with pathology and impairment of the knee. The responses to items 1 to 6 are graduated in terms of the degree of limitation that the symptom imposes on activities of daily living. There are 6 responses for each item that range from absence of the symptom (score 5) to the symptom is so severe that it prevents the individual from performing all daily activities (score 0). Symptoms included in the ADLS include pain, stiffness, swelling, giving way/buckling, weakness and limping. Items 7 through 16 are related to function during activities of daily living including the ability to walk on level surfaces, ascend and descend stairs, stand, kneel of the front of the knee, squat, sit with the knee bent and rise from a chair. Responses for each item are graduated in terms of the degree of limitation that the individual experiences during each activity. There are 6 responses for each item that range from no limitation in performing the activity (score 5) to the inability to perform the activity (score 0).

The SAS consists of 11 items. Items 1 through 7 are related to symptoms commonly experienced during sports activities by an individual with pathology or impairment of the knee. The symptoms included on the SAS are pain, crepitus, stiffness, swelling, partial and complete giving way and weakness. Each item is graduated in terms of the degree of limitation that the symptom imposes during sports activities. There are 6 responses for each item that range from absence of the symptom (score 5) to the inability to participate in sports due to the symptom (score 0). Items 7 to 11 are related to functional limitations during sports activities commonly experienced by an individual with pathology and impairment of the knee. Functional activities on the SAS include the ability to run, jump and land on the involved knee, stop and start quickly and cut and pivot on the involved knee. Responses for each item are graduated in terms of the degree of limitation that an individual experiences when performing each activity. For each item there are 6 responses that range from no limitation in performing the activity (score 5) to the inability to perform the activity (score 0).

Scoring

Activities of Daily Living Scale

The ADLS raw score is calculated by summing the points associated with the individual’s responses. The ADLS raw score is then transformed to the ADLS score, that ranges from 0 to 100, by dividing the ADLS raw score by 70 than multiplying by 100.
The ADLS raw score can still be calculated if there is missing data as long as there are responses for at least 90% of the items (i.e. responses have been provided for at least 13 items). To calculate the ADLS raw score in the presence of missing data, the average score of the responses to the items answered by the individual may be substituted for the score for the missing item(s). Once the ADLS raw score has been calculated, the ADLS score is calculated as described above.

The ADLS also includes 3 items that are not included in the ADLS score. The responses to these items are reported separately to provide a global description of the individual’s level of function. One item is designed to elicit a global rating of function of the knee during an individual’s usual daily activities on a scale from 0 to 100 with 100 being the level of function prior to injury and 0 being the inability to perform any of his/her usual daily activities. In the remaining two items, individuals are asked to describe their overall level of function of the knee during usual daily activities and rate their current level of daily activity as normal, nearly normal, abnormal or severely abnormal.

Sports Activities Scale
The SAS raw score is calculated by summing the points associated with the individual’s responses. The total possible raw score for the SAS is 55. The SAS raw score is then transformed to the SAS score, which ranges from 0 to 100, by dividing the SAS raw score by 55 than multiplying by 100.

The SAS raw score can be calculated in the presence of missing data when the individual responds to at least 90% of the items (i.e. responses are provided for at least 10 items). To calculate the SAS raw score in the presence of missing data, the average score of the responses to the items answered by the individual may be substituted for the score for the missing item. Once the SAS raw score has been calculated, the SAS score is calculated as described above.

The SAS also includes 9 items that are not included in the calculation of the SAS score. The responses to these items are reported separately to provide a global description of the individual. One item is designed to elicit a global rating of knee function during sports activities on a scale from 0 to 100 with 100 being the level of function prior to injury and 0 being the inability to perform any sports activities. Two items are designed for the individual to describe the function of his/her knee during sports activities and level of sports activity as normal, nearly normal, abnormal or severely abnormal. The remaining 6 items are designed to determine an individual’s level and frequency of sports participation prior to injury, prior to treatment and his/her current status. The level of sports activity is described as strenuous, moderate, light or none and the frequency of sports activity is described as 4 to 7 times per week, 1 to 3 times per week, 1 to 3 times per month or none.

Recording
A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation
Higher percentage score indicates less symptoms or functional limitations related to the knee.
Validity, reliability and internal consistency

The internal consistency of the Activities of Daily Living Scale was substantially higher than that of the Lysholm Knee Scale (coefficient alpha, 0.92 to 0.93 compared with 0.60 to 0.73), resulting in a smaller standard error of measurement for the former scale. Validity was demonstrated by moderately strong correlations with concurrent measures of function, including the Lysholm Knee Scale (r =0.78 to 0.86) and the global assessment of function as measured on a scale ranging from 0 to 100 points (r =0.66 to 0.75). Analysis of variance with repeated measures revealed significant improvements in the score on the Activities of Daily Living Scale during the eight weeks of physical therapy ($F_{2,236} = 108.13; p < 0.0001$); post hoc testing indicated that the change in the score at eight weeks was significantly greater than the change at four weeks and that the change at four weeks was significantly greater than that at one week (p < 0.0001 for both). As had been hypothesized, the patients in whom the knee had somewhat improved had a significantly smaller change in the score, both at four weeks ($F_{1,189} = 33.50; p < 0.001$) and at eight weeks ($F_{1,156} = 22.48; p < 0.001$), compared with those in whom the knee had greatly improved. The test-retest reliability coefficient (intraclass correlation coefficient[2,1]) was 0.97.

The KOS-ADL scale is a reliable (across many languages) and valid instrument that is responsive to change in patients with a variety of knee conditions who are undergoing physical therapy or orthopedic procedures (Collins et al. 2011). However the lack of direct patient input into item selection means that content validity cannot be assumed.

References

# Knee Outcome Survey – Activities of Daily Living Scale

## Instructions:

The following questionnaire is designed to determine the symptoms and limitations that you experience because of your knee while you perform your usual daily activities. Please answer each question by checking the one statement that best describes you over the last 1 to 2 days. For a given question, more than one of the statements may describe you, but please mark only the statement which best describes you during your usual daily activities.

## Symptoms

To what degree does each of the following symptoms affect your level of daily activity? (Check one answer on each line)

<table>
<thead>
<tr>
<th></th>
<th>I Do Not Have the Symptom</th>
<th>I Have the Symptom But It Does Not Affect My Activity</th>
<th>The Symptom Affects My Activity Slightly</th>
<th>The Symptom Affects My Activity Moderately</th>
<th>The Symptom Affects My Activity Severely</th>
<th>The Symptom Prevents Me From All Daily Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stiffness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swelling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Giving Way, Buckling or Shifting of Knee</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weakness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limping</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Functional Limitations with Activities of Daily Living

How does your knee affect your ability to... (Check one answer on each line)

<table>
<thead>
<tr>
<th>Activity Is Not Difficult</th>
<th>Activity is Minimally Difficult</th>
<th>Activity is Somewhat Difficult</th>
<th>Activity is Fairly Difficult</th>
<th>Activity is Very Difficult</th>
<th>I am Unable to Do the Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walk?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Go up stairs?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Go down stairs?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stand?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kneel on the front of your knee?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Squat?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sit with your knee bent?</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rise from a chair?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
How would you rate the current function of your knee during your usual daily activities on a scale from 0 to 100 with 100 being your level of knee function prior to your injury and 0 being the inability to perform any of your usual daily activities?

__________

How would you rate the overall function of your knee during your usual daily activities? (Please check the one response that best describes you)

☐ normal
☐ nearly normal
☐ abnormal
☐ severely abnormal

As a result of your knee injury, how would you rate your current level of daily activity? (Please check the one response that best describes you)

☐ normal
☐ nearly normal
☐ abnormal
☐ severely abnormal
Knee Outcome Survey – Sports Activities Scale

Instructions:

The following questionnaire is designed to determine the symptoms and limitations that you experience because of your knee while you perform sports activities. Please answer each question by checking the one statement that best describes you over the last 1 to 2 days. For a given question, more than one of the statements may describe you, but please mark only the statement which best describes you when you participate in sports activities.

Symptoms

To what degree does each of the following symptoms affect your level of sports activity? (check one answer on each line)

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Never Have</th>
<th>Have, But Does Not Affect Sports Activity</th>
<th>Affects Sports Activity Slightly</th>
<th>Affects Sports Activity Moderately</th>
<th>Affects Sports Activity Severely</th>
<th>Prevents Me From All Sports Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grinding or Grating</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stiffness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swelling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slipping or Partial Giving Way of Knee</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buckling or Full Giving Way of Knee</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weakness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Functional Limitations with Sports Activities

How does your knee affect your ability to... (Check one answer on each line)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Not Difficult at All</th>
<th>Minimally Difficult</th>
<th>Somewhat Difficult</th>
<th>Fairly Difficult</th>
<th>Very Difficult</th>
<th>Unable to Do</th>
</tr>
</thead>
<tbody>
<tr>
<td>Run straight ahead?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jump and land on your involved leg?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stop and start quickly?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cut and pivot on your involved leg?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How would you rate the current function of your knee during sports activities on a scale from 0 to 100 with
100 being your level of knee function prior to your injury and 0 being the inability to perform any sports activities?

__________

How would you rate the overall function of your knee during sports activities? (Please check the one response that best describes you)

* normal
* nearly normal
* abnormal
* severely abnormal

As a result of your knee problem, how would you rate your current level of activity during sports? (Please check the one response that best describes you)

* normal
* nearly normal
* abnormal
* severely abnormal

**Changes in Sports Activity**
Describe your highest level of sports activity at each of the following points in time. (check one answer on each line)

<table>
<thead>
<tr>
<th></th>
<th>Strenuous Sports (ex. football, soccer, basketball)</th>
<th>Moderate Sports (ex. tennis, skiing)</th>
<th>Light Sports (ex. cycling, swimming, golf)</th>
<th>No Sports Activities Possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior to your knee injury</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Prior to treatment of your knee injury</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Currently</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

Describe the frequency that you participated in sports activity at each of the following points in time. (check one answer on each line)

<table>
<thead>
<tr>
<th></th>
<th>4 to 7 Times per Week</th>
<th>1 to 3 Times per Week</th>
<th>1 to 3 Times per Month</th>
<th>Less Than 1 Time per Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior to your knee injury</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Prior to treatment of your knee injury</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Currently</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>
Oxford Knee Score

Background

The Oxford Knee Score is a 12-item questionnaire developed to assess the outcome of knee replacement.

Scoring

Each of the 12 questions on the Oxford knee score is scored in the same way with the score decreasing as the reported symptoms increase (ie. become worse). All questions are laid out similarly with response categories denoting least (or no) symptoms being to the left of the page (scoring 4) and those representing greatest severity lying on the right hand side (scoring 0). eg. question 1:

<table>
<thead>
<tr>
<th>None</th>
<th>Very mild</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

The overall score is reached by simply summing the scores received for individual questions. This results in a continuous score ranging from 0 (most severe symptoms) to 48 (least symptoms).

Missing values/notes for analysis.

If after repeated attempts to obtain complete data from an individual, only one or two questions have been left unanswered, it is reasonable to enter the mean value representing all of their other responses, to fill the gaps. An alternative computerised method of imputing values has been reported by Jenkinson et al (2006). If more than two questions are unanswered it is recommended that an overall score should not be calculated. If patients indicate two answers for one question it is recommended that the convention of using the worst (most severe) response is adopted.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

Lower score means greater symptoms and disability.

Validity, reliability and internal consistency

The single score derived from the Oxford Knee questionnaire had high internal consistency, and its reproducibility, examined by test-retest reliability, was found to be satisfactory. Its validity was established by obtaining significant correlations in the expected direction with the AKS scores and the relevant parts of the SF36 and HAQ. Sensitivity to change was assessed by analysing the differences between the preoperative scores and those at follow-up. The same study also compared change in scores with the patients’ retrospective judgement of change in their condition. The effect size for the new questionnaire compared favourably with those for the relevant parts of the SF36. The change scores for the new knee questionnaire were significantly greater (p < 0.0001) for patients who reported the most improvement in their condition.
The OKS has demonstrated good psychometric properties and can be considered a reliable and valid measurement for outpatients with OA (Xie et al 2011). The OKS has been found to have adequate test-retest reliability, internal consistency, construct validity and content validity (Collins et al. 2011). In addition it demonstrates good sensitivity and responsiveness to change.

References

PROBLEMS WITH YOUR KNEE

<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
<th>Ticks</th>
</tr>
</thead>
<tbody>
<tr>
<td>During the past 4 weeks... How would you describe the pain you usually have from your knee?</td>
<td>None, Very mild, Mild, Moderate, Severe</td>
<td>☐ ☐ ☐ ☐ ☐</td>
</tr>
<tr>
<td>During the past 4 weeks... Have you had any trouble with washing and drying yourself (all over) because of your knee?</td>
<td>No trouble at all, Very little trouble, Moderate trouble, Extreme difficulty, Impossible to do</td>
<td>☐ ☐ ☐ ☐ ☐</td>
</tr>
<tr>
<td>During the past 4 weeks... Have you had any trouble getting in and out of a car or using public transport because of your knee? (whichever you would tend to use)</td>
<td>No trouble at all, Very little trouble, Moderate trouble, Extreme difficulty, Impossible to do</td>
<td>☐ ☐ ☐ ☐ ☐</td>
</tr>
<tr>
<td>For how long have you been able to walk before pain from your knee becomes severe? (with or without a stick)</td>
<td>No pain/Not at all, More than 30 minutes, 16 to 30 minutes, 5 to 15 minutes, Around the house only, - pain severe when walking</td>
<td>☐ ☐ ☐ ☐ ☐</td>
</tr>
<tr>
<td>After a meal (sat at a table), how painful has it been for you to stand up from a chair because of your knee?</td>
<td>Not at all, Slightly painful, Moderately painful, Very painful, Unbearable</td>
<td>☐ ☐ ☐ ☐ ☐</td>
</tr>
</tbody>
</table>
| Have you been limping when walking, because of your knee? | Rarely/never, Sometimes, or just at first, Often, not just at first, Most of the time, All of the time | ☐ ☐ ☐ ☐ ☐
During the past 4 weeks...

7. **Could** you kneel down and get up again afterwards?
   - Yes, Easily
   - With little difficulty
   - With moderate difficulty
   - With extreme difficulty
   - No, Impossible

8. **During the past 4 weeks**
   Have you been troubled by **pain from your knee** in bed at night?
   - No nights
   - Only 1 or 2 nights
   - Some nights
   - Most nights
   - Every night

9. **During the past 4 weeks**
   How much has **pain from your knee** interfered with your usual work (including housework)?
   - Not at all
   - A little bit
   - Moderately
   - Greatly
   - Totally

10. **During the past 4 weeks**
    Have you felt that your knee might suddenly 'give way' or let you down?
    - Rarely/never
    - Sometimes, or just at first
    - Often, not just at first
    - Most of the time
    - All of the time

11. **During the past 4 weeks**
    **Could** you do the household shopping **on your own**?
    - Yes, Easily
    - With little difficulty
    - With moderate difficulty
    - With extreme difficulty
    - No, Impossible

12. **During the past 4 weeks**
    **Could** you walk down one flight of stairs?
    - Yes, Easily
    - With little difficulty
    - With moderate difficulty
    - With extreme difficulty
    - No, Impossible
**Knee Pain Scale (KPS)**

**Background**

The Knee Pain Scale (KPS) is a uni-dimensional scale that specifically measures ADLs that are troublesome for people with knee OA. The Knee Pain Scale has 4 3-item subscales that assess frequency and intensity of knee pain experienced during activities that require either ambulation or transfer.

**Scoring**

The KPS yields subscale scores for frequency and intensity of pain during both ambulation/climbing and transfer.

**Transfer**
- Frequency of pain subscale = \((1a + 1c + 1e)/3\)
- Intensity of pain subscale = \((2a + 2c + 2e)/3\)

**Ambulation/Climbing**
- Frequency of pain subscale = \((1b + 1d + 1f)/3\)
- Intensity of pain subscale = \((2b + 2d + 2f)/3\)

**Recording**

A separate recording sheet is provided to facilitate repeated measures over time.

**Interpretation**

Higher score means greater pain and disability.

**Validity, reliability and internal consistency**

Confirmatory factor analyses support the factor structure of the Knee Pain Scale, and alpha reliability for all subscales is in excess of 0.80. Rejeski et al also showed that the Knee Pain Scale had good convergent validity. In another psychometric study, KPS has shown validity and reliability in elderly patients with knee OA.

**References**

Knee Pain Scale (KPS)

1. Please indicate HOW OFTEN in the past week have you experience pain in your knee(s) when you:

   a. Got in and out of bed?
      
      Always | Almost Always | Sometimes | Almost Never | Never
      ------|-------------|-----------|--------------|--------
      | | | | |

      5 4 3 2 1

   b. Walked a short block (1 block) distance?
      
      Always | Almost Always | Sometimes | Almost Never | Never
      ------|-------------|-----------|--------------|--------
      | | | | |

      5 4 3 2 1

   c. Got in and out of chair?
      
      Always | Almost Always | Sometimes | Almost Never | Never
      ------|-------------|-----------|--------------|--------
      | | | | |

      5 4 3 2 1

   d. Walked up a flight of stairs?
      
      Always | Almost Always | Sometimes | Almost Never | Never
      ------|-------------|-----------|--------------|--------
      | | | | |

      5 4 3 2 1

   e. Got in and out of a car?
      
      Always | Almost Always | Sometimes | Almost Never | Never
      ------|-------------|-----------|--------------|--------
      | | | | |

      5 4 3 2 1

   f. Walked down a flight of stairs?
      
      Always | Almost Always | Sometimes | Almost Never | Never
      ------|-------------|-----------|--------------|--------
      | | | | |

      5 4 3 2 1
2. Please indicate **HOW SEVERE** the average pain in your knee(s) has been in the past week when you:

   a. Got in and out of bed?

<table>
<thead>
<tr>
<th>No pain</th>
<th>Mild Pain</th>
<th>Discomforting Pain</th>
<th>Distressing Pain</th>
<th>Excruciating Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

   b. Walked a short (1 block) distance?

<table>
<thead>
<tr>
<th>No pain</th>
<th>Mild Pain</th>
<th>Discomforting Pain</th>
<th>Distressing Pain</th>
<th>Excruciating Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

   c. Got in and out of car?

<table>
<thead>
<tr>
<th>No pain</th>
<th>Mild Pain</th>
<th>Discomforting Pain</th>
<th>Distressing Pain</th>
<th>Excruciating Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

   d. Walked up a flight of stairs?

<table>
<thead>
<tr>
<th>No pain</th>
<th>Mild Pain</th>
<th>Discomforting Pain</th>
<th>Distressing Pain</th>
<th>Excruciating Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

   e. Got in and out of car?

<table>
<thead>
<tr>
<th>No pain</th>
<th>Mild Pain</th>
<th>Discomforting Pain</th>
<th>Distressing Pain</th>
<th>Excruciating Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

   f. Walked down a flight of stairs?

<table>
<thead>
<tr>
<th>No pain</th>
<th>Mild Pain</th>
<th>Discomforting Pain</th>
<th>Distressing Pain</th>
<th>Excruciating Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Ankle and Foot Scales

Foot Function Index (FFI)

Background

The Foot Function Index (FFI) was developed to measure the impact of foot pathology on function in terms of pain, difficulty and activity restriction. The FFI is designed to measure both current state, defined as the past week, and change in status. It consists of 23 items grouped into three sub-scales. The sub-scales were formed to provide information on three unique aspects of function-foot pain, disability and activity limitation-as they related to foot pathology.

The Pain sub-scale measured the level of foot pain in a variety of situations. It contained 9 items. The measurement dimension employed by this sub-scale is severity of pain. The visual analogue scale anchors are “no pain” and “worst pain imaginable”. The Disability subscale described the difficulty in performing various activities due to foot problems. This sub-scale also consisted of 9 items. The measurement dimension used for this sub-scale is degree of difficulty. The anchors for the visual analogue scale are “no difficulty” and “so difficult unable”. The Activity Limitation subscale addressed activity limitations due to foot problems. It consisted of 5 items and the dimension of measurement for this scale is frequency. The anchors for the scale are “none of the time” and “all of the time”.

Scoring

All items are rated using a visual analogue scale. The visual analogue scales used in this instrument consisted of horizontal lines to which were attached no numbers or divisions. Verbal anchors, representing opposite extremes of the dimension being measured, were placed at either end of the line. Patients are instructed to place a mark on the line in a position which best represent their experience in the past week.

A score is derived for each item by dividing the attached horizontal line into 10 equal segments and assigning a number ranging from 0 to 9 to each segment. To obtain a sub-scale score, the item scores for a sub-scale are totalled and then divided by the maximum total possible for all of the sub-scale items which the patient indicated were applicable. If a subject indicated that he did not perform an activity such as walking barefoot or wearing an orthotic, that item was marked as not applicable. Any item marked as not applicable is excluded from the total possible. To eliminate the decimal point, the score is multiplied by 100. A total foot function score is derived by calculating the average of the three sub-scale scores.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

A higher score indicates greater impairment.

Validity, reliability and internal consistency

In its development, validity and reliability was tested among patients with rheumatoid arthritis. Test-retest reliability of the FFI total and sub-scale scores ranged from 0.87 to 0.69. Internal consistency ranged from 0.96 to 0.73. With the exception of two items, factor analysis supported the construct validity of the total index and the sub-scales. Strong correlation between the FFI total and sub-scale scores and clinical measures of foot pathology supported the criterion validity of the index.

References
**Foot Function Index**

INVOLVED FOOT (FEET) 1.RIGHT 2.LEFT 3.BOTH

The line next to each item represents the amount of pain you have in each situation. The far left of the line represents "No pain" and the far right of the line represents "Worst pain imaginable". Place a mark on the line to indicate how much pain you had during the past week in each of the following situations. Mark the NA if you did not experience this situation during the past week.

### Pain Scale

A. How severe is your foot pain:

<table>
<thead>
<tr>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. At its worst?</td>
</tr>
<tr>
<td>No pain.absolutely no pain.Worst pain imaginable</td>
</tr>
<tr>
<td>2. In the morning?</td>
</tr>
<tr>
<td>No pain.absolutely no pain.Worst pain imaginable</td>
</tr>
<tr>
<td>3. When walking barefoot?</td>
</tr>
<tr>
<td>No pain.absolutely no pain.Worst pain imaginable</td>
</tr>
<tr>
<td>4. When standing barefoot</td>
</tr>
<tr>
<td>No pain.absolutely no pain.Worst pain imaginable</td>
</tr>
<tr>
<td>5. When walking with shoes?</td>
</tr>
<tr>
<td>No pain.absolutely no pain.Worst pain imaginable</td>
</tr>
<tr>
<td>6. When standing with shoes?</td>
</tr>
<tr>
<td>No pain.absolutely no pain.Worst pain imaginable</td>
</tr>
<tr>
<td>7. When walking with orthotics</td>
</tr>
<tr>
<td>No pain.absolutely no pain.Worst pain imaginable</td>
</tr>
<tr>
<td>8. When standing with orthotics</td>
</tr>
<tr>
<td>No pain.absolutely no pain.Worst pain imaginable</td>
</tr>
<tr>
<td>9. At the end of the day?</td>
</tr>
<tr>
<td>No pain.absolutely no pain.Worst pain imaginable</td>
</tr>
</tbody>
</table>

Total _____/possible _______ = _____%
**Disability Scale**

The line next to each item represents how much difficulty you had doing that activity because of problems with your feet. The far left of the line represents "No difficulty" and the far right of the line represents "So much difficulty you required help". Place a mark on the line to indicate the amount of difficulty you had doing each activity during the past week. Mark the item NA if you did not do that activity during the past week.

A. How much difficulty did you have:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Walking in the house?</td>
<td>No difficulty ___________________________ So difficult required help</td>
</tr>
<tr>
<td>2. Walking outside?</td>
<td>No difficulty ___________________________ So difficult required help</td>
</tr>
<tr>
<td>3. Walking 4 blocks?</td>
<td>No difficulty ___________________________ So difficult required help</td>
</tr>
<tr>
<td>4. Climbing stairs?</td>
<td>No difficulty ___________________________ So difficult required help</td>
</tr>
<tr>
<td>5. Descending stairs?</td>
<td>No difficulty ___________________________ So difficult required help</td>
</tr>
<tr>
<td>6. Standing on tip toe?</td>
<td>No difficulty ___________________________ So difficult required help</td>
</tr>
<tr>
<td>7. Getting up from a chair?</td>
<td>No difficulty ___________________________ So difficult required help</td>
</tr>
<tr>
<td>8. Climbing curbs?</td>
<td>No difficulty ___________________________ So difficult required help</td>
</tr>
<tr>
<td>9. Walking fast?</td>
<td>No difficulty ___________________________ So difficult required help</td>
</tr>
</tbody>
</table>

**Total _____/possible _____ =_______%**
Activity Limitation Scale

The line next to each item represents how much of the time you do the following activities because of problems with your feet. The far left of the line represents “None of the time” and far right of the hand represents “All of the time.”

A. How much of the time did you:

1. Use device indoors because of foot problems?
   None of the time __________________________ All of the time

2. Use device outdoors because of foot problems?
   None of the time __________________________ All of the time

3. Stay indoors most of the day because of foot problems?
   None of the time __________________________ All of the time

4. Stay in bed most of the day because of foot problems?
   None of the time __________________________ All of the time

5. Limit activities because of foot problems?
   None of the time __________________________ All of the time

   Total _____/possible _____ = ______%
American Academy of Orthopaedic Surgeons (AAOS): Foot and Ankle Questionnaire

Background

The Foot and Ankle Questionnaire is designed to be administered to patients 18 years of age or older, and can be used to assess foot and ankle conditions and treatment improvements. Disability indices for lower limb core, global foot and ankle functionality, and shoe comfort are included.

Scoring

The individual's Standardized score is based on the mean of items that make up the scale. Before computing this, all items must be recalibrated so that they are all in the same metric. The most straightforward way to understand the scoring is that each response is rescaled so that every item has a value in the range 0 through 5 (i.e., lowest score possible = 0 and maximum score possible = 5) for each item.

Rescaling algorithm for the Foot/Ankle Score

<table>
<thead>
<tr>
<th>Question Number</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Q1 -1)* 5/4</td>
<td>Value ranging from 0-5</td>
</tr>
<tr>
<td>2 (Q2 -1)*5/4</td>
<td>Value ranging from 0-5</td>
</tr>
<tr>
<td>3 (Q3 -1) note: a value of &quot;7&quot; is considered missing and not counted.</td>
<td>Value ranging from 0-5</td>
</tr>
<tr>
<td>4 (Q4 -1) note: a value of &quot;7&quot; is considered missing and not counted.</td>
<td>Value ranging from 0-5</td>
</tr>
<tr>
<td>5 (Q5 -1) note: a value of &quot;7&quot; is considered missing and not counted.</td>
<td>Value ranging from 0-5</td>
</tr>
<tr>
<td>6 (Q6 -1) note: a value of &quot;7&quot; is considered missing and not counted.</td>
<td>Value ranging from 0-5</td>
</tr>
<tr>
<td>7 (Q7 -1) *5/3</td>
<td>Value ranging from 0-5</td>
</tr>
<tr>
<td>8 (Q8 -1) *5/3 counted.</td>
<td>Value ranging from 0-5</td>
</tr>
<tr>
<td>9 (Q9 -1) *5/3 counted.</td>
<td>Value ranging from 0-5</td>
</tr>
<tr>
<td>10 (Q10 -1) *5/6</td>
<td>Value ranging from 0-5</td>
</tr>
<tr>
<td>11 (Q11 -1)</td>
<td>Value ranging from 0-5</td>
</tr>
<tr>
<td>12 (Q12 -1)</td>
<td>Value ranging from 0-5</td>
</tr>
<tr>
<td>13 (Q13 -1) counted. note: a value of &quot;7&quot; is considered missing and not counted.</td>
<td>Value ranging from 0-5</td>
</tr>
<tr>
<td>14 (Q14 -1) counted. note: a value of &quot;7&quot; is considered missing and not counted.</td>
<td>Value ranging from 0-5</td>
</tr>
<tr>
<td>15 (Q15 -1) counted. note: a value of &quot;7&quot; is considered missing and not counted.</td>
<td>Value ranging from 0-5</td>
</tr>
<tr>
<td>16 (Q16 -1) counted. note: a value of &quot;7&quot; is considered missing and not counted.</td>
<td>Value ranging from 0-5</td>
</tr>
<tr>
<td>17 (Q17 -1) counted. note: a value of &quot;7&quot; is considered missing and not counted.</td>
<td>Value ranging from 0-5</td>
</tr>
<tr>
<td>18 (Q18 -1) counted. note: a value of &quot;7&quot; is considered missing and not counted.</td>
<td>Value ranging from 0-5</td>
</tr>
<tr>
<td>24 (Q24 -1)</td>
<td>Value ranging from 0-5</td>
</tr>
<tr>
<td>25 (Q25 -1)</td>
<td>Value ranging from 0-5</td>
</tr>
</tbody>
</table>

Algorithm for the Shoe Comfort Scale
Next, all of the items comprising a given scale are averaged over the number of items answered.

This average of the rescaled values is multiplied by a constant so that each scale’s resulting value falls between 0 and 100. If these values are scored in a way such that high scores represent the least disability (i.e., reversed), this number must be subtracted from 100 to reverse score the scale.

**Recording**

A separate recording sheet is provided to facilitate repeated measures over time.

**Interpretation**

Lower score indicates greater symptoms and disability.

**Validity, reliability and sensitivity to detect change over time**

Initial testing for reliability and validity of all AAOS outcomes instruments was conducted in collaboration with the Council of Musculoskeletal Specialty Societies (COMSS) and the Council of Spine Societies (COSS). On the basis of these findings, the instruments were further tested using a general population in the Normative Data Study. Analysis of the normative data using a Multitrait/Multi-item Analysis Program, showed all sub-scales within each of the core instruments exhibited high internal reliability, as well as discriminant and convergent validity. Items within each of the sub-scales contributed roughly equal proportions of information to the total scale scores.

The Lower Limb Core Scale and the Hip and Knee Core Scale, each consisting of seven items addressing pain, stiffness and swelling, and function, performed at an acceptable level when tested for validity, reliability and sensitivity to change. Additional Sports/Knee and Foot and Ankle Modules proved to have internal and retest reliability of 0.80 or better, comparable with the values for well-established measures such as the Short Form-36 (SF-36). All of the new scales were moderately to strongly correlated with other measures of pain and function, such as physician ratings, the SF-36, and the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). Seventy-one patients provided follow-up information for the analysis of sensitivity to change. The Lower Limb Core was found to contribute independently to the prediction of the transition score based on the patient and physician assessments of change.

AAOS-FAM is one of the few foot patient reported outcome measures that have internal and external reliability measures. Internal Cronbach’s alpha of 0.91, 0.83, 0.61, and 0.88 was reported for the pain, function, stiffness, and giving way subscales, respectively, and 0.93 for the entire foot and ankle module Riskowski, Hagedorn & Hannan (2011). This questionnaire does not evaluate the impact of foot health with regard to its impact on the participant’s psychological state, social activities, or self-esteem, all of which may influence quality of life and patient satisfaction.
American Academy of Orthopaedic Surgeons (AAOS): Foot and Ankle Questionnaire

Instructions

Please answer the following questions for the foot/ankle being treated or followed up. If it is BOTH feet/ankles, please answer the questions for your worse side. All questions are about how you have felt, on average, during the past week. If you are being treated for an injury that happened less than one week ago, please answer for the period since your injury.

1. During the past week, how stiff was your foot/ankle? (Circle one response.)
   - 1 Not at all
   - 2 Mildly
   - 3 Moderately
   - 4 Very
   - 5 Extremely

2. During the past week, how swollen was your foot/ankle? (Circle one response.)
   - 1 Not at all
   - 2 Mildly
   - 3 Moderately
   - 4 Very
   - 5 Extremely

During the past week, please tell us about how painful your foot/ankle was during the following activities. (Circle ONE response on each line that best describes your average ability.)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Not painful</th>
<th>Mildly Painful</th>
<th>Moderately painful</th>
<th>Very painful</th>
<th>Extremely painful</th>
<th>Could not do because of foot/ankle pain</th>
<th>Could not do for other reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Walking on uneven surfaces?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>4. Walking on flat surfaces?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>5. Going up or down stairs</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>6. Lying bed at night</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

During the past week, did your foot/ankle give way during the following activities. (Circle ONE response on each line that best describes you for each activity level.)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Did not give way at all</th>
<th>Partially gave way, but I did not fall</th>
<th>Completely gave way, so that I fell</th>
<th>Could not do the activity because of foot/ankle pain</th>
<th>Could not do for other reasons</th>
</tr>
</thead>
</table>
7. **Strenuous activity**, such as heavy physical work, skiing, tennis?
   - 1 I did not need support or assistance at all.
   - 2 I mostly walked without support or assistance.
   - 3 I mostly used one cane or crutch to help me get around
   - 4 I mostly used two canes, two crutches or a walker to help me get around.
   - 5 I used a wheelchair.
   - 6 I mostly used other supports or someone else had to help me get around.
   - 7 I was unable to get around at all.

8. **Moderate activity**, such as moderate physical work, jogging, running?
   - 1 No trouble at all
   - 2 A little bit of trouble
   - 3 A moderate amount of trouble
   - 4 Quite a bit of trouble
   - 5 A great amount of trouble
   - 6 I cannot balance on my feet at all

9. **Light activity**, such as walking, house work, yard work?
   - 1 Not at all difficult
   - 2 A little bit difficult
   - 3 Moderately difficult
   - 4 Very difficult
   - 5 Extremely difficult
   - 6 Cannot do it at all

10. Which of the following statements best describes your ability to get around most of the time during the **past week**? (Circle one response.)
    - 1 I did not need support or assistance at all.
    - 2 I mostly walked without support or assistance.
    - 3 I mostly used one cane or crutch to help me get around
    - 4 I mostly used two canes, two crutches or a walker to help me get around.
    - 5 I used a wheelchair.
    - 6 I mostly used other supports or someone else had to help me get around.
    - 7 I was unable to get around at all.

11. How much trouble did you have with balance during the **past week**? (Circle one response.)
    - 1 No trouble at all
    - 2 A little bit of trouble
    - 3 A moderate amount of trouble
    - 4 Quite a bit of trouble
    - 5 A great amount of trouble
    - 6 I cannot balance on my feet at all

12. How difficult was it for you to put on or take off socks/stockings during the **past week**? (Circle one response.)
    - 1 Not at all difficult
    - 2 A little bit difficult
    - 3 Moderately difficult
    - 4 Very difficult
    - 5 Extremely difficult
    - 6 Cannot do it at all

All questions are about how you have felt on average **during the past week**. During the **past week**, please tell us about how **painful** your foot or ankle was when you were performing the following activities. (Circle ONE response on each line that best describes your average ability.)
15. **Light activity**, such as walking, house work, yard work

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>16. Standing for an hour</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Standing for a few minutes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

18. How much difficulty do you have walking on uneven surfaces (eg., small stones, rocks, sloping ground)? (Circle one response.)
   1. No difficulty
   2. Mild difficulty
   3. Moderate difficulty
   4. Severe difficulty
   5. Extreme difficulty
   6. Cannot do because of foot/ankle
   7. Cannot do for other reasons

What types of shoes can you wear comfortably? (Circle one response on each line.)

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>19. Any women's shoe (including high heels) OR any men's shoe (including fancy dress shoes)</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>20. Most women's dress shoes (except high heels) OR most men's dress shoes</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>21. Sneakers, walking, or casual shoes</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>22. Orthopaedic or prescription shoes</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>23. All shoes</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

24. How much did your foot or ankle problem interfere with your normal work, including work both outside the home and house work? (Circle one response.)
   1. Not at all
   2. A little bit
   3. Moderately
   4. Quite a bit
   5. Extremely
   6. Unable to work due to foot and ankle problems

25. How much did your foot or ankle problem interfere with your life and your ability to do what you want? (Circle one response.)
   1. Not at all
   2. A little bit
3 Moderately
4 Quite a bit
5 Extremely
6 It ruins everything
Foot and Ankle Outcome Score (FAOS)

Background

The Foot and Ankle Outcome Score (FAOS) was developed to assess the patient’s opinion about a variety of foot and ankle-related problems. FAOS has so far been used in patients with lateral ankle instability, Achilles tendinosis, and plantar fasciitis. FAOS is a 42-item questionnaire divided into 5 subscales; Pain, other Symptoms, Function in daily living (ADL), Function in sport and recreation (Sport&Rec), and foot and ankle-related Quality of Life (QOL). The last week is taken into consideration when answering the questionnaire. Standardized answer options are given (% Likert boxes) and each question gets a score from 0 to 4.

Scoring

Scores are assigned to the ratings where None = 0, Mild = 1, Moderate = 2, Severe = 3, Extreme = 4. Sum of the scores for each subscale is computed and divided by the possible maximum score for the scale. Traditionally in orthopaedics, a score of 100 indicates no problems and 0 indicates extreme problems. The normalized score is transformed to meet this standard. The formula provided for each subscale should be used.

\[
\text{Pain: } \frac{100 - \text{Total score P1-P9} \times 100}{36} = 100 - \_\_\_ = _\_\_
\]

\[
\text{Symptoms: } \frac{100 - \text{Total score S1-S7} \times 100}{28} = 100 - \_\_\_ = _\_\_
\]

\[
\text{ADL: } \frac{100 - \text{Total score A1-A17} \times 100}{68} = 100 - \_\_\_ = _\_\_
\]

\[
\text{Sport and Rec: } \frac{100 - \text{Total score SP1-SP5} \times 100}{20} = 100 - \_\_\_ = _\_\_
\]

\[
\text{QoL: } \frac{100 - \text{Total score Q1-Q4} \times 100}{16} = 100 - \_\_\_ = _\_\_
\]

For Missing Data: If a mark is placed outside a box, the closest box is used. If two boxes are marked, the box which indicates the most severe problems has to be chosen. Missing data are treated as such; one or two missing values are substituted with the average value for that subscale. If more than two items are omitted, the response is considered invalid and no subscale score is calculated.

Recording: A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation: A higher score indicates fewer problems.

Validity, reliability and internal consistency

In 2001, Roos et al studied the validity and reliability of FAOS when used to evaluate the outcome of 213 patients who underwent anatomical reconstruction of the lateral ankle ligaments. The FAOS met set criteria of validity and reliability and appeared to be useful for the evaluation of patient-relevant outcomes related to ankle reconstruction.

A study has shown that the FAOS has acceptable construct validity, reliability, and responsiveness in hallux valgus patients and is a useful patient based tool in assessing these patients (Chen et al. 2012).

References
Chen L, Lyman S, Do H, Karlsson J, Adam SP, Young E, Deland JT, Ellis SJ (2012): Validation of Foot and Ankle Outcome Score for Hallux Valgus Foot Ankle Int 33: 1145-1155.

**Foot and Ankle Outcome Score (FAOS)**

**INSTRUCTIONS:** This survey asks for your view about your foot/ankle. This information will help us keep track of how you feel about your foot/ankle and how well you are able to do your usual activities. Answer every question by ticking the appropriate box, only one box for each question. If you are unsure about how to answer a question, please give the best answer you can.

**Symptoms**

S1 Do you have swelling in your foot/ankle?
- Never
- Rarely
- Sometimes
- Often
- Always

S2 Do you feel grinding, hear clicking or any other type of noise when your foot/ankle moves?
- Never
- Rarely
- Sometimes
- Often
- Always

S3 Does your foot/ankle catch or hang up when moving?
- Never
- Rarely
- Sometimes
- Often
- Always

S4 Can you straighten your foot/ankle fully?
- Always
- Often
- Sometimes
- Rarely
- Never

S5 Can you bend your foot/ankle fully?
- Always
- Often
- Sometimes
- Rarely
- Never

**Stiffness**

S6. How severe is your foot/ankle stiffness after first wakening in the morning?
- None
- Mild
- Moderate
- Severe
- Extreme

S7. How severe is your foot/ankle stiffness after sitting, lying or resting *later in the day*?
- None
- Mild
- Moderate
- Severe
- Extreme

**Pain**

P1 How often do you experience foot/ankle pain?
- Never
- Monthly
- Weekly
- Daily
- Always
What amount of foot/ankle pain have you experienced the last week during the following activities?

P2 Twisting/pivoting on your foot/ankle

- None
- Mild
- Moderate
- Severe
- Extreme

P3 Straightening foot/ankle fully

- None
- Mild
- Moderate
- Severe
- Extreme

P4 Bending foot/ankle fully

- None
- Mild
- Moderate
- Severe
- Extreme

P5 Walking on flat surface

- None
- Mild
- Moderate
- Severe
- Extreme

P6 Going up or down stairs

- None
- Mild
- Moderate
- Severe
- Extreme

P7 At night while in bed

- None
- Mild
- Moderate
- Severe
- Extreme

P8 Sitting or lying

- None
- Mild
- Moderate
- Severe
- Extreme

P9 Standing upright

- None
- Mild
- Moderate
- Severe
- Extreme

Function, Daily Living

The following questions concern your physical function. By this we mean your ability to move around and to look after yourself. For each of the following activities please indicate the degree of difficulty you have experienced in the last week due to your foot/ankle.

A1 Descending stairs

- None
- Mild
- Moderate
- Severe
- Extreme

A2 Ascending stairs

- None
- Mild
- Moderate
- Severe
- Extreme

For each of the following activities please indicate the degree of difficulty you have experienced in the last week due to your foot/ankle.

A3 Rising from sitting

- None
- Mild
- Moderate
- Severe
- Extreme
### iCAHE Musculoskeletal Outcomes Calculator: User Manual

#### A4 Standing
- None
- Mild
- Moderate
- Severe
- Extreme

#### A5 Bending to floor/pick up an object
- None
- Mild
- Moderate
- Severe
- Extreme

#### A6 Walking on flat surface
- None
- Mild
- Moderate
- Severe
- Extreme

#### A7 Getting in/out of car
- None
- Mild
- Moderate
- Severe
- Extreme

#### A8 Going shopping
- None
- Mild
- Moderate
- Severe
- Extreme

#### A9 Putting on socks/stockings
- None
- Mild
- Moderate
- Severe
- Extreme

#### A10 Rising from bed
- None
- Mild
- Moderate
- Severe
- Extreme

#### A11 Taking off socks/stockings
- None
- Mild
- Moderate
- Severe
- Extreme

#### A12 Lying in bed (turning over, maintaining knee position)
- None
- Mild
- Moderate
- Severe
- Extreme

#### A13 Getting in/out of bath
- None
- Mild
- Moderate
- Severe
- Extreme

#### A14 Sitting
- None
- Mild
- Moderate
- Severe
- Extreme

#### A15 Getting on/off toilet
- None
- Mild
- Moderate
- Severe
- Extreme
For each of the following activities please indicate the degree of difficulty you have experienced in the last week due to your foot/ankle.

A16 Heavy domestic duties (moving heavy boxes, scrubbing floors, etc)

<table>
<thead>
<tr>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

A17 Light domestic duties (cooking, dusting, etc.)

<table>
<thead>
<tr>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

**Function, sports and recreational function**

The following questions concern your physical function when being active on a higher level. The questions should be answered thinking of what degree of difficulty you have experienced during the last week due to your foot/ankle.

Sp1 Squatting

<table>
<thead>
<tr>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Sp2 Running

<table>
<thead>
<tr>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Sp3 Jumping

<table>
<thead>
<tr>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Sp4 Turning/twisting on your injured knee

<table>
<thead>
<tr>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Sp5 Kneeling

<table>
<thead>
<tr>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
Quality of life

What difficulty have you experienced the last week...?

Q1 How often are you aware of your foot/ankle problems?

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Monthly</th>
<th>Weekly</th>
<th>Daily</th>
<th>Constantly</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

Q2 Have you modified your lifestyle to avoid potentially damaging activities to your foot/ankle?

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>Mildly</th>
<th>Moderately</th>
<th>Severely</th>
<th>Totally</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

Q3 How troubled are you with lack of confidence in your foot/ankle?

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>Mildly</th>
<th>Moderately</th>
<th>Severely</th>
<th>Totally</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

Q4 In general, how much difficulty do you have with your foot/ankle?

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>
Functional Ankle Ability Measure (FAAM)

Background

The Functional Ankle Ability Measure (FAAM) is a reliable and valid measure of physical function for individuals with a broad range of musculoskeletal disorders of the lower leg, foot and ankle. The FAAM is identical to the Foot and Ankle Disability Index (FADI), which is a 34-item questionnaire divided into Foot and Ankle Disability Index and Foot and Ankle Disability Index Sport. The Foot and Ankle Disability Index contains 4 pain related items and 22 activity related items. The Foot and Ankle Disability Index Sport contains 8 activity related items. Each question can be scored on a 5-point Likert scale (from zero to four). In the FAAM, the “sleeping” item and the 4 "pain related" items of the Foot and Ankle Disability Index are deleted. The Activities of Daily Living subscale of the FAAM (previously called the Foot and Ankle Disability Index) now contains 21 activity related items; the Sports subscale of the FAAM remains exactly the same as the Foot and Ankle Disability Index Sport subscale (8 activity related items). The rating system of the FAAM is identical to the FADI.

Scoring

The ADL and Sports subscales are scored separately.

The response to each item on the ADL subscale is scored from 4 to 0, with 4 being “no difficulty” and 0 being “unable to do”. N/A responses are not counted. The score on each of the items are added together to get the item score total. The total number of items with a response is multiplied by 4 to get the highest potential score. If the subject answers all 21 items, the highest potential score is 84. If one item is not answered the highest score is 80, if two are not answered the total highest score is 76, etc. The item score total is divided by the highest potential score. This value is then multiplied by 100 to get a percentage.

The Sports subscale is scored the same as above, 4 being “no difficulty at all” to 0 being “unable to do”. The score on each item are added together to get the item score total. The number of items with a response is multiplied by 4 to get the highest potential score. If the subject answers all 8 items the highest potential score is 32. If one item is not answered the highest potential score is 28, if two are not answered the highest potential score is 24, etc. The item score total is divided by the highest potential score. This value is then multiplied by 100 to get a percentage.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Interpretation

A higher score represents a higher level of physical function for both scales.
Validity, reliability and responsiveness to detect change over time

Validity evidence was provided for test content, internal structure, score stability, and responsiveness. Test retest reliability was 0.89 and 0.87 for the ADL and Sports subscales, respectively. The minimal detectable change based on a 95% confidence interval was ±5.7 and ±12.3 points for the ADL and Sports subscales, respectively. Two-way repeated measures ANOVA and ROC analysis found both the ADL and Sports subscales were responsive to changes in status (p < 0.05). Guyatt responsive index and ROC analysis found the ADL subscale was more responsive than general measures of physical function while the Sports subscale was not. The ADL and Sport subscales demonstrated strong relationships with the SF-36 physical function subscale (r = 0.84, 0.78) and physical component summary score (r = 0.78, 0.80) and weak relationships with the SF-36 mental function subscale (r = 0.18, 0.11) and mental component summary score (r = 0.05, −0.02).

Relates to scores out of 100 percentage points

<table>
<thead>
<tr>
<th>Error associated with a one time measurement 95% confidence</th>
<th>ADL Subscale</th>
<th>Sport Subscale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimal detectable difference over a four week period 95% confidence</td>
<td>6 points</td>
<td>12 points</td>
</tr>
<tr>
<td>*Minimal Clinically Important Difference</td>
<td>8 points</td>
<td>9 points</td>
</tr>
</tbody>
</table>

*The Minimal Clinically Important Difference is the score distinguished patients who felt they improved with physical therapy from those who felt they did not improve over a four week period.

The Persian version of FAAM is found to be a reliable and valid measure to quantify physical functioning in patients with foot and ankle disorders (Mazaheri et al. 2010). The original FAAM questionnaire was also successfully translated and cross-culturally adapted from English to German and is a reliable and valid questionnaire for self-reported assessment of pain and disability in German-speaking patients suffering from chronic ankle instability (Nauck & Lohrer 2011).

References


### Functional Ankle Ability Measure (FAAM)

Please answer **every question** with one response that most closely describes to your condition within the past week. If the activity in question is limited by something other than your foot or ankle mark not applicable (N/A).

<table>
<thead>
<tr>
<th>Activity</th>
<th>No Difficulty</th>
<th>Slight Difficulty</th>
<th>Moderate Difficulty</th>
<th>Extreme Difficulty</th>
<th>Unable to do</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking on even ground</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking on even ground without shoes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking up hills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking down hills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Going up stairs</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Going down stairs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking on uneven ground</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stepping up and down curbs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Squatting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coming up on your toes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking initially</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking 5 minutes or less</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking approximately 10 minutes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking 15 minutes or greater</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Because of your foot and ankle how much difficulty do you have with:

<table>
<thead>
<tr>
<th>Activity</th>
<th>No Difficulty At all</th>
<th>Slight Difficulty</th>
<th>Moderate Difficulty</th>
<th>Extreme Difficulty</th>
<th>Unable to do</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home Responsibilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activities of daily living</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal care</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light to moderate work</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(standing, walking)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy work (push/pulling, climbing, carrying)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreational activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How would you rate your current level of function during your usual activities of daily living from 0 to 100 with 100 being your level of function prior to your foot or ankle problem and 0 being the inability to perform any of our usual daily activities?

☐ ☐ ☐ 0%

**FAAM Sports Scale**

Because of your foot and ankle how much difficulty do you have with:

<table>
<thead>
<tr>
<th>Activity</th>
<th>No Difficulty At all</th>
<th>Slight Difficulty</th>
<th>Moderate Difficulty</th>
<th>Extreme Difficulty</th>
<th>Unable to do</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jumping</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Landing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Starting and stopping quickly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cutting/lateral movements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low impact activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to perform activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with your normal technique</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Ability to participate in your desired sport as long as you would like

How would you rate your current level of function during your sports related activities from 0 to 100 with 100 being your level of function prior to your foot or ankle problem and 0 being the inability to perform any of your usual daily activities?

☐ ☐ ☐ • 0%

Overall, how would you rate your current level of function?

☐ Normal ☐ Nearly Normal ☐ Abnormal ☐ Severely abnormal
Kaikkonen Functional Scale

Background

The Kaikkonen Functional Scale is a test protocol and scoring scale for evaluation of ankle injuries. The test protocol consisted of 3 simple questions describing the subjective assessment of the injured ankle, 2 clinical measurements (range of motion in dorsiflexion, laxity of the ankle joint), 1 ankle test measuring functional stability (walking down a staircase), 2 tests measuring muscle strength (rising on heels and toes), and 1 test measuring balance (balancing on a square beam).

Performance instructions for the following activities are given:

Walking down the stairs: Two levels of a staircase (length 12 m) with 44 steps (height 18 cm, depth 22 cm) are walked down once, 1 step at a time with full contact of the sole to the stair. The walking time is recorded manually with a stopwatch.

Rising on heels and toes. The patient is asked to rise on the heel with 1 leg as many times as possible at the pace of 60 times per minute to measure the fatigue of the ankle dorsiflexor muscles. The pace is given with a metronome. The knee of the opposite side is flexed 90°, and the arms are kept behind the back. In case of lost balance, the patient is allowed to touch the wall to regain balance and then continue the performance. The number of risings is measured, demanding from the toes a minimum of 1 cm of free movement to be registered as a rise. The rising-on-toes test is performed analogically to measure the fatigue of the plantar flexors.

Balance Test: The balance test is performed in a one-legged stance. A square beam (height 10 cm, width 10 cm, length 30 cm) is used with standing on the forefoot with the knee of the opposite side flexed 90° and the arms kept behind the back. The time (seconds) of the standing is measured manually with a stopwatch.

Scoring

Maximum score is adjusted to 100 points, which corresponds to a fully normal ankle. The total score of 85 to 100 was graded as excellent, 70 to 80 as good, 55 to 65 as fair, and ≤50 as poor.

**Scoring Scale for subjective and functional follow-up evaluation**

<table>
<thead>
<tr>
<th>I. Subjective assessment of the injured ankle</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>No symptoms of any kind</td>
<td>15</td>
</tr>
<tr>
<td>Mild symptoms</td>
<td>10</td>
</tr>
<tr>
<td>Moderate symptoms</td>
<td>5</td>
</tr>
<tr>
<td>Severe symptoms</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>II. Can you walk normally</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>15</td>
</tr>
<tr>
<td>No</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>III. Can you run normally</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>15</td>
</tr>
<tr>
<td>No</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IV. Climbing downstairs</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 18 seconds</td>
<td>10</td>
</tr>
<tr>
<td>18 to 20 seconds</td>
<td>5</td>
</tr>
<tr>
<td>Over 20 seconds</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>V. Rising on heels with injured leg</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over 40 times</td>
<td>10</td>
</tr>
<tr>
<td>30 to 39 times</td>
<td>5</td>
</tr>
<tr>
<td>Under 30 times</td>
<td>0</td>
</tr>
</tbody>
</table>
### VI. Rising on toes with injured leg

| Over 40 times | 10 |
| Under 30 times | 0 |
| 30 to 39 times | 5 |

### VII. Single-limb stance with injured leg

| Over 55 seconds | 10 |
| Under 50 seconds | 0 |
| 50-55 seconds | 5 |

### VIII. Laxity of the ankle joint

| Stable (≤5mm) | 10 |
| Moderately instability (6-10mm) | 5 |
| Severe instability (>10mm) | 0 |

### IX. Dorsiflexion range of motion, injured leg

| ≥10º | 10 |
| ≤5º-9º | 5 |
| <5º | 0 |

#### Recording

A separate recording sheet is provided to facilitate repeated measures over time.

#### Interpretation

A higher score indicates fewer problems.

#### Validity and reliability

The final total test score during the developmental stage correlated significantly with the isokinetic strength results of the ankle, subjective opinion about the recovery, and subjective-functional assessment.

In a systematic review conducted in 2003 on the different outcome measures for lateral ligament injury, the KFS offers the most promising approach to a combined clinician- and patient-assessment of ankle function, and the Karlsson’s Ankle Function Score (KAFS) or Olerud Molander Ankle Score (OMAS) if a patient-assessed evaluation of function is required.

#### References


# Kaikkonen Functional Scale

| A. | Subjective assessment of the injured ankle  
|    | No symptoms of any kind  
|    | Mild symptoms  
|    | Moderate symptoms  
|    | Severe symptoms  
| B. | Can you walk normally  
|    | Yes  
|    | No  
| C. | Can you run normally  
|    | Yes  
|    | No  
| D. | Climbing downstairs  
|    | Under 18 seconds  
|    | 18 to 20 seconds  
|    | Over 20 seconds  
| E. | Rising on heels with injured leg  
|    | Over 40 times  
|    | 30 to 39 times  
|    | Under 30 times  
| F. | Rising on toes with injured leg  
|    | Over 40 times  
|    | 30 to 39 times  
|    | Under 30 times  
| G. | Single-limb stance with injured leg  
|    | Over 55 seconds  
|    | 50-55 seconds  
|    | Under 50 seconds  
| H. | Laxity of the ankle joint  
|    | Stable (≤5mm)  
|    | Moderately instability (6-10mm)  
|    | Severe instability (>10mm)  
| I. | Dorsiflexion range of motion, injured leg  
|    | ≥10°  
|    | 5°-9°  
|    | <5° |
7. Psychological Response to Pain/Disability Scales

Tampa Scale of Kinesiophobia

Background

The Tampa Scale Kinesiophobia-11 (TSK-11) uses 11 out of the 17 items from the original version of the Tampa Scale of Kinesiophobia. TSK checklist was developed as a measure of fear of movement/re-injury in persistent pain. The scale is based on the model of fear avoidance, fear of work-related activities, fear of movement/re-injury. This instrument requires an average literacy level.

Measurement and Scoring

Patient rates each item on a 4-point Likert scale, with scoring options ranging from 1= strongly disagree to 4= strongly agree. The score can be calculated as the sum of the responses to the 11 items. The TSK-11 produces a total score ranging from 0 to 44.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Comparison

The TSK-11 should be completed on repeated occasions of testing, and the scores should be compared between testings in order to obtain an understanding of any change in the experience.

Interpretation

A high value in the TSK-11 signifies a high degree of kinesiophobia, indicating greater fear for physical movement and activity.

To determine change in status over time, the clinician may compare the subsequent assessment score with the initial or previous score (initial total score – subsequent total score). Initial research by the instrument developers suggests that a reduction of at least 4 points in the total score represents a clinically significant reduction in the patient’s fear of movement/re-injury. This has been shown to have 66% sensitivity and 67% specificity, when using the instrument as an outcome measure.

Validity, reliability and internal consistency

The TSK-11 version may be used with confidence of validity, as intra-instrument Pearson r correlations were >0.7. The scale has good internal consistency (Cronbach’s α=0.79), test-retest reliability (ICC=0.81), and responsiveness (SRM=−1.11). The TSK_11 has been translated into a number of languages and the psychometric properties have been tested in translation.

A study compared commonly used fear avoidance questionnaires in patients with chronic low back pain and found that the Tampa scale for Kinesiophobia had similar test retest reliability and validity to the Fear-Avoidance Beliefs Questionnaire (FABQ), Fear of Pain Questionnaire (FPQ), and the Pain Catastrophizing Scale. The test-retest ICC coefficients for these questionnaires ranged from 0.90 to 0.96 (George, Valencia & Beneciuk 2010). TSK-11 was found to be appropriate for use in patients with shoulder pain (Mintken et al. 2010). Test-retest reliability intraclass correlation coefficient (ICC) was substantial for the TSK-11 however it correlated significantly only with SPADI (Shoulder Pain and Disability Index) pain scores not disability scores.
The TSK-11 scales were found to demonstrate acceptable levels of internal consistency, as well as evidence of discriminant, concurrent criterion-related, and incremental validity. Somatic focus uniquely predicted perceived disability while activity avoidance uniquely predicted actual physical performance, controlling for pain severity (Tkachuk & Harris 2012). The 2-factor structure of the TSK-11 was found to be a brief, reliable, and valid measure of fear of movement/ (re)injury for chronic pain patients. It is recommended for use in future research and in clinical settings. A study found the Dutch version of the TSK to have good reliability and validity and the results provide a basis for use of the 12-item version for routine assessment of fear of movement in Temporomandibular joint disorder (TMD) patients, and for future clinical studies, for example, to the role of fear of movement in TMD-treatment success (Visscher et al. 2010).

References
### Tampa Scale of Kinesiophobia

This is a list of phrases that other patients have used to express how they view their condition. Please circle the number that best describes how you feel about each statement.

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I'm afraid that I might injure myself if I exercise.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>If I were to try to overcome it, my pain would increase.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>My body is telling me I have something dangerously wrong.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>People aren't taking my medical condition seriously enough.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5.</td>
<td>My accident has put my body at risk for the rest of my life.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6.</td>
<td>Pain always means I have injured my body.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>7.</td>
<td>Simply being careful that I do not make any unnecessary movements is the safest thing I can do to prevent my pain from worsening.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>8.</td>
<td>I wouldn't have this much pain if there weren't something potentially dangerous going on in my body.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>9.</td>
<td>Pain lets me know when to stop exercising so that I don't injure myself.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>10.</td>
<td>I can't do all the things normal people do because it's too easy for me to get injured.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>11.</td>
<td>No one should have to exercise when he/she is in pain.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
Pain Self-Efficacy Questionnaire

Background

The Pain Self-Efficacy Questionnaire (PESQ) is a 10-item Likert-type questionnaire, designed specifically for chronic pain, where patients are asked to rate their confidence in performing activities despite the presence of pain.

Measurement and Scoring

Patient rates the 10-item scale with scoring options from 0 (Not at all) to 6 (Extremely/could not have been worse. Score is calculated by summing the scores for each of the 10 items. PESQ produces a total score ranging from 0-60.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Comparison

The PESQ should be completed on repeated occasions of testing, and the scores should be compared between testings in order to obtain an understanding of any change in the pain experience.

Interpretation

There is directional scoring, where higher scores indicate stronger self-efficacy beliefs. There is limited data reporting research project norms.

Validity, reliability and internal consistency

The PSEQ has high Pearson r values (0.8) for intrarater reliability, strong Cronbach’s α (0.9) and stability over retest (p>0.05).

In a study by Sarda et al, reliability of the PSEQ among chronic pain patients in Brazil has been found to be adequate (split-half correlation was 0.76 and internal consistency was 0.90). Factor analysis indicated the existence of only one factor. Discriminant and concurrent validity were also adequate.

The Portuguese version of the PESQ has been confirmed to have strong validity and reliability with a Cronbach’s alpha = 0.88 and Composite reliability = 0.92 (Ferreira-Valente, Pais-Ribeiro & Jensen 2011).

References


**Pain Self-Efficacy Questionnaire**

NAME: ___________________________ DATE: ______________________

Please rate how confident you are that you can do the following things at present, despite the pain. To indicate your answer circle one of the numbers on the scale under each item, where 0 = not at all confident and 6 = completely confident.

For example:

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not at all confident</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Completely confident</td>
</tr>
</tbody>
</table>

Remember, this questionnaire is not asking whether or not you have been doing these things, but rather how confident are you that you can do them at present, despite the pain.

<table>
<thead>
<tr>
<th></th>
<th>Not at all confident</th>
<th>Completely confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I can enjoy things, despite the pain.</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>2. I can do most of the household chores (e.g. tidying-up, washing dishes) despite the pain.</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>3. I can socialise with my friends or family members as often as I used to do, despite the pain.</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>4. I can cope with my pain in most situations.</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>5. I can do some form of work, despite the pain. (&quot;Work&quot; includes housework, paid and unpaid work.)</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>6. I can still do many of the things I enjoy doing, such as hobbies or leisure activities, despite the pain.</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>7. I can cope with my pain without medication.</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>8. I can still accomplish most of my goals in life, despite the pain.</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>9. I can live a normal lifestyle, despite the pain.</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>10. I can gradually become more active, despite the pain.</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
</tr>
</tbody>
</table>
Centre for Epidemiologic Studies-Depression Scale

Background

The CES-D is a 20-item measure of anxiety, depression and depressed mood symptoms. It has been translated into a number of other languages and validated in many of them. There are shorter forms of this instrument, all of which have been developed to measure current depressive symptoms in the general population (CESD-10 (10 item), Revised Form (8 item), Iowa Form (11 item) and Boston Form (10 item). The long form of the instrument is the best researched and the one reported in this compendium.

Measurement and Scoring

Scoring of all questions, except items 4, 8, 12 and 16 are as follows:

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 point</td>
<td>rarely or none of the time (&lt;1day)</td>
</tr>
<tr>
<td>1 point</td>
<td>some or little of the time (1-2days)</td>
</tr>
<tr>
<td>2 points</td>
<td>occasionally or moderate amount of the time (3-4 days)</td>
</tr>
<tr>
<td>3 points</td>
<td>most or all of the time (5-7days)</td>
</tr>
</tbody>
</table>

For questions 4, 8, 12 and 16 the scoring is reversed, with “most or all of the time” as 0, “rarely or none of the time as 3, etc. The score can be calculated as the sum of the responses to the 20 items. Higher scores indicate greater depressive symptoms.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Comparison

The CES-D should be completed on repeated occasions of testing, and the scores should be compared between testings in order to obtain an understanding of any change in the mood.

Interpretation

In the general population a cut-off score of 16 is used for diagnosing depression. This cut-point may lead to overdiagnosis in persistent pain patients, because typical neurovegetative symptoms of depression (e.g. sleep disorder) are often associated with patients’ pain problems. For persistent pain patients, cut-off scores of 19 (Turk & Okifuji 1994) and 27 (Geisser, Roth & Robinson 1997) have been suggested. A higher cut-off is less likely to lead to overdiagnosis (that is, has greater specificity) but is less sensitive.

Validity, reliability and internal consistency

The CES-D has demonstrated significant responsiveness to change and differentiated between different groups of pain sufferers with p values < 0.05 from ANOVA modelling. This instrument has been compared well with Beck Depression Inventory (BDI) psychologists’ assessment and the Multidimensional Personality Questionnaire (MPQ) for convergent and divergent validity.
Among cancer patients (Hann et al. 1999), the CES-D was found to have good internal consistency, with alpha coefficients > 0.85 for both groups of women with and without cancer, as well as adequate test-retest reliability in both groups. Construct validity was demonstrated in two ways, via comparisons between the groups and by comparing the CES-D with measures of fatigue, anxiety, and global mental health functioning. The CES-D was established as a valid and reliable measure of depressive symptomatology in this sample of breast cancer patients.

The CESD was found to have good factorial validity and internal consistency to measure depression in adolescents (Bradley, Bagnell & Brannen 2010). An interesting study was conducted on World trade Centre (WTC) rescue/recovery workers to assess the performance of a one-month version of the CES-D (Chiu et al. 2010). The CES-D performed well in identifying those at elevated risk and since diagnostic follow-up is time consuming and costly, it is important to correctly distinguish those at elevated risk using a screening tool that has been validated in the population under study. The CES-D is also reliable (α = 0.90) and valid for use as a measure of depressive symptom severity in patients with Systemic Sclerosis (Milette et al. 2010).

In order to reflect modern diagnostic criteria and improve upon psychometric limitations of its predecessor, the Center for Epidemiologic Studies Depression Scale Revised (CESD-R) was created (Van Dam & Earleywine 2011). A study assessing its psychometric properties found it demonstrated high internal consistency, strong factor loadings, and theoretically consistent convergent and divergent validity with anxiety, schizotypy, and positive and negative affect. Results suggest the CESD-R is an accurate and valid measure of depression in the general population with advantages such as free distribution and an a theoretical basis.

References


Below is a list of the ways you might have felt or behaved. Please tell me how often you have felt this way during the past week.

<table>
<thead>
<tr>
<th></th>
<th>During the Past Week</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rarely or none of the time (less than 1 day)</td>
</tr>
<tr>
<td>1. I was bothered by things that usually don’t bother me.</td>
<td>☐</td>
</tr>
<tr>
<td>2. I did not feel like eating; my appetite was poor.</td>
<td>☐</td>
</tr>
<tr>
<td>3. I felt that I could not shake off the blues even with help from my family or friends.</td>
<td>☐</td>
</tr>
<tr>
<td>4. I felt I was just as good as other people.</td>
<td>☐</td>
</tr>
<tr>
<td>5. I had trouble keeping my mind on what I was doing.</td>
<td>☐</td>
</tr>
<tr>
<td>6. I felt depressed.</td>
<td>☐</td>
</tr>
<tr>
<td>7. I felt that everything I did was an effort.</td>
<td>☐</td>
</tr>
<tr>
<td>8. I felt hopeful about the future.</td>
<td>☐</td>
</tr>
<tr>
<td>9. I thought my life had been a failure.</td>
<td>☐</td>
</tr>
<tr>
<td>10. I felt fearful.</td>
<td>☐</td>
</tr>
<tr>
<td>11. My sleep was restless.</td>
<td>☐</td>
</tr>
<tr>
<td>12. I was happy.</td>
<td>☐</td>
</tr>
<tr>
<td>13. I talked less than usual.</td>
<td>☐</td>
</tr>
<tr>
<td>15. People were unfriendly.</td>
<td>☐</td>
</tr>
<tr>
<td>16. I enjoyed life.</td>
<td>☐</td>
</tr>
<tr>
<td>17. I had crying spells.</td>
<td>☐</td>
</tr>
<tr>
<td>18. I felt sad.</td>
<td>☐</td>
</tr>
<tr>
<td>19. I felt that people dislike me.</td>
<td>☐</td>
</tr>
<tr>
<td>20. I could not get “going.”</td>
<td>☐</td>
</tr>
</tbody>
</table>
Modified Somatic Perceptions Questionnaire

Background

The Modified Somatic Perceptions Questionnaire (MSPQ) is a measure of heightened somatic and autonomic awareness related to anxiety and depression. The MSPQ was developed as a tool to identify clinically significant psychological distress in patients with persistent back pain.

Measurement and Scoring

The 13-item self-report scale is scored from 0 (Not at all) to 3 (Extremely/could not have been worse). The score can be calculated as the sum of the responses to the 13 items. The MSPQ produces a total score ranging from 0-39. The higher the score, the more marked the general somatic symptoms.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Comparison

The MSPQ should be completed on repeated occasions of testing, and the scores should be compared between testings in order to obtain an understanding of any change in the experience.

Interpretation

Directional interpretation is made of the scores (the higher the score the more psychological distress). High scores may indicate the need for psychological assessment. In the author’s original study a sample of healthy adults scored on average 1.8 points, compared with a mean of 4.9 for patients with back conditions. Limited normative data is reported from research studies on different conditions.

Validity, reliability and internal consistency

The Modified Somatic Perception Questionnaire (MSPQ) demonstrates strong psychometric properties – with Kappa scores > 0.8 for internal consistency, convergent and divergent validity tested with a range of instruments which measured anxiety and depression (eg MMPI, Zung Depression Rating Scale, MPQ) and discriminative validity within different groups of pain sufferers (p<0.05).

References

Modified Somatic Perception Questionnaire

Please describe how you have felt during the PAST WEEK by marking a check mark (✓) in the appropriate box. Please answer all questions. Do not think too long before answering.

<table>
<thead>
<tr>
<th>Feeling</th>
<th>Not at all</th>
<th>A little/slightly</th>
<th>A great deal/quite a bit</th>
<th>Extremely/could not have been worse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeling hot all over</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweating all over</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dizziness</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blurring of vision</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeling faint</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nausea</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain or ache in stomach</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stomach churning</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mouth becoming dry</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muscles in neck aching</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legs feeling weak</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muscles twitching or jumping</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tense feeling across forehead</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Kessler Psychological Distress Scale

Background

The Kessler Psychological Distress Scale (K10) is a widely reported two-domain, 10-item measure of non-specific psychological distress, primarily intended as a measure of mood, anxiety and depression. The wording is appropriate for use with moderately literate individuals.

Measurement and Scoring

The 10-item scale has 5 response categories, from 1 (None of the time) to 5 (All of the time). The score can be calculated as the sum of the responses to the 10 items.

Recording

A separate recording sheet is provided to facilitate repeated measures over time.

Comparison

The K10 should be completed on repeated occasions of testing, and the scores should be compared between testings in order to obtain an understanding of any change in the mood.

Interpretation

The following cut-off scores have been used to estimate the prevalence of levels of psychological distress in an Australian population health survey.

<table>
<thead>
<tr>
<th>K10 score</th>
<th>Likelihood of having a mental disorder</th>
</tr>
</thead>
<tbody>
<tr>
<td>10–19</td>
<td>Likely to be well</td>
</tr>
<tr>
<td>20–24</td>
<td>Likely to have a mild mental disorder</td>
</tr>
<tr>
<td>25–29</td>
<td>Likely to have a moderate mental disorder</td>
</tr>
<tr>
<td>30–50</td>
<td>Likely to have a severe mental disorder</td>
</tr>
</tbody>
</table>

Scores usually decline with effective treatment. Patients whose scores remain above 24 after treatment should be reviewed and specialist referral considered.

Validity, reliability and internal consistency

The developmental literature reports a significant area under the ROC curve (0.89) related to its sensitivity and specificity, high Cronbach’s alpha in all tests (>0.9) and high intra-rater reliability (Pearson r >0.75).

A study confirms the good psychometric characteristics of Kessler’s psychological distress scale when administered to patients admitted to French emergency department for alcohol consumption–related
disorders (Arnaud et al. 2010). Another study set out to validate the Dutch version of the K10 as well as an extended version (EK10) in screening for depressive and anxiety disorders in primary care. It reported that the Dutch version of the K10 is appropriate for screening depressive disorders in primary care, while the EK10 is preferred in screening for both depressive and anxiety disorders (Donker et al. 2010).

References


The following questions ask about how you have been feeling over the past 30 days. For each question, mark the circle under the option that best describes the amount of time you felt that way.

<table>
<thead>
<tr>
<th>Question</th>
<th>None of the time</th>
<th>A little of the time</th>
<th>Some of the time</th>
<th>Most of the time</th>
<th>All of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. During the last 30 days, about how often did you feel tired out for no good reason?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>2. During the last 30 days, about how often did you feel nervous?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>3. During the last 30 days, about how often did you feel so nervous that nothing could calm you down?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>4. During the last 30 days, about how often did you feel hopeful?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>5. During the last 30 days, about how often did you feel restless or fidgety?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>6. During the last 30 days, about how often did you feel so restless you could not sit still?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>7. During the last 30 days, about how often did you feel depressed?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>8. During the last 30 days, about how often did you feel that everything was an effort?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>9. During the last 30 days, about how often did you feel so sad that nothing could cheer you up?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>10. During the last 30 days, about how often did you feel worthless?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>
8. Quality of Life Scales

RAND-36

Background

The RAND-36 is a widely used health-related quality of life survey instrument which contains eight dimensions of health, namely, physical functioning, social functioning, role limitations (physical problem), role limitations (emotional problem), mental health, vitality, pain and general health perception.

RAND is comprised of 36 items selected from a larger pool of items used in the RAND Medical outcomes study. It assesses eight health concepts with multi-item scales (35 items): physical functioning (10 items), role limitations caused by physical health problems (4 items), role limitations caused by emotional problems (3 items), social functioning (2 items), emotional wellbeing (5 items), energy/fatigue (4 items), pain (2 items), and general health perceptions (5 items). An additional single item assesses change in perceived health during the last 12 months.

Scoring

Scoring of RAND involves transforming every item linearly to a 0-100 possible range (per cent of total possible score) and then averaging all items in the same scale together. Below is a scale that can be used to convert scores.

<table>
<thead>
<tr>
<th>Item Numbers</th>
<th>Original Response</th>
<th>Recorded Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, 20, 22, 34, 36</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item Numbers</th>
<th>Original Response</th>
<th>Recorded Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>3, 4, 5, 6, 7, 8, 9, 10, 11, 12</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item Numbers</th>
<th>Original Response</th>
<th>Recorded Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>13, 14, 15, 16, 17, 18, 19</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item Numbers</th>
<th>Original Response</th>
<th>Recorded Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>21, 23, 26, 27, 30</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
### Averaging Items to Form 8 Scales

<table>
<thead>
<tr>
<th>Scale</th>
<th>Number of Items</th>
<th>After recording scores from the above table, average the following items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical functioning</td>
<td>10</td>
<td>3, 4, 5, 6, 7, 8, 9, 10, 11, 12</td>
</tr>
<tr>
<td>Role limitations due to physical health</td>
<td>4</td>
<td>13, 14, 15, 16</td>
</tr>
<tr>
<td>Role limitations due to emotional problems</td>
<td>3</td>
<td>17, 18, 19</td>
</tr>
<tr>
<td>Energy/ fatige</td>
<td>4</td>
<td>23, 27, 29, 31</td>
</tr>
<tr>
<td>Emotional well being</td>
<td>5</td>
<td>24, 25, 26, 28, 30</td>
</tr>
<tr>
<td>Social functioning</td>
<td>2</td>
<td>20, 32</td>
</tr>
<tr>
<td>Pain</td>
<td>2</td>
<td>21, 22</td>
</tr>
<tr>
<td>General health</td>
<td>5</td>
<td>1, 33, 34, 35, 36</td>
</tr>
</tbody>
</table>

For example, to measure the patient's energy/fatigue level, scores from questions 23, 27, 29, and 31 are added. If a patient circled 4 on 23, 3 on 27, 3 on 29 and left 31 blank, scores are converted using the first table above. An answer of 4 to Q23 is scored as 40, 3 to Q27 is scored as 60, and 3 to Q29 is scored as 40. Q31 is omitted. The score for this block is 40+60+40 =140 which is then divided by 3 (3 answered questions) to get a total of 46.7. Since a score of 100 represents high energy with no fatigue, the lower score of 46.7% suggests the patient is experiencing a loss of energy and is experiencing some fatigue. All 8 categories are scored in the same way.

**Note:** One item was added measuring health change during the last 12 months. This item was not included in one of the dimensions.

**Interpretation**

Higher score indicates higher level of functioning.
Validity, Reliability and Sensitivity

VanderZee et al (1996) examined the psychometric properties of RAND 36 and found the internal consistency of the questionnaire to be high. Alpha values ranged from 0.71-0.93. The convergent and discriminant validity of the RAND-36 was largely supported by data. All the correlations between the corresponding scales of the RAND 36-Item Health Survey and corresponding scales from different instruments are significantly positive. Furthermore, on the whole, correlations between corresponding scales are higher than correlations between non-corresponding scales.

In a more recent study by Moore et al (2001), psychometric properties both of the total RAND-36 and of its subscales, such as uni-dimensionality, differential item functioning, homogeneity and reliabilities were examined. Data were collected from Dutch population with different chronic illnesses such as multiple sclerosis, rheumatism or COPD. All subscales of the RAND-36 appeared to be uni-dimensional. For the subscales ‘mental health’ and ‘general health perceptions’ some minor indications of DIF for the different chronic illnesses were found. Reliabilities of almost all subscales in all subpopulations were higher than 0.80, while the homogeneities of almost all subscales in all subpopulations were higher than 0.50, indicating ‘strong uni-dimensional, hierarchical scales’.

References

9. Patient Satisfaction Scale

Patient satisfaction with treatment (Cherkin et al 1996)

Recording

This information would be recorded by the person/organization administering the questionnaire. The questionnaires would most likely be distributed after completion of an episode of care, and returned anonymously by the recipients, probably in reply paid envelopes.

Measurement

Injured workers would complete this questionnaire after an episode of care, or after a number of occasions of service with a therapist, by assigning a score from 1-5 (as indicated above) to each of these statements, allowing a graded measure of satisfaction. These numbers can be expressed as total scores, or domain scores.

Validity and reliability

The literature suggests that this scale is reliable on repeated administration and valid, in that it explores different elements of patient satisfaction with therapy. This questionnaire would be completed by the injured worker without prompting by the therapist, and ideally would be completed anonymously.

Comparison

Comparison of scores would thus be unlikely within the one patient (over time) although comparison of scores from a number of patients who attend the one therapist could be used as a measure of that therapist’s performance. This may be useful in situations where the therapist is reviewing his/her own performance (for accreditation or quality assurance purposes), or where the therapist’s performance is being reviewed by an employer, or an insurer.

Interpretation

Using the published version of the scoring system of this questionnaire can be problematic in interpretation. For instance, if patients agreed with all of the positive statements and disagreed with all of the negative statements, the ‘best case’ score is 53. If patients disagreed with all of the positive statements and agreed with all of the negative statements, the ‘best case’ score is 49. Therefore for the purposes of this calculator, alternative wording to the negative questions is used, so that all questions have a positive focus. Thus, a low total score indicates a satisfied patient and a high score, a dissatisfied one.

References


Patient Satisfaction Subscales

There are five category responses for each question (1= strongly agree- 5= strongly disagree). While this version of the instrument originally focused on ‘back pain’ it can be applied to any condition about which a patient consults a therapist. Therapists wishing to use the scale for other conditions should substitute the appropriate wording instead of (problem).

Information

- The therapist gave me enough information about the cause of my problem
- The therapist did not give me a clear explanation of the cause of my pain
  - The therapist gave me a clear explanation of the cause of my pain (A+)
- The therapist told me what to do to prevent further problems

Caring

- The therapist seemed to believe that my pain was real
- The therapist did not understand the concerns I had about my problem
  - The therapist understood the concerns I had about my problem (A+)
- The therapist did not seem comfortable dealing with my problem
  - The therapist seemed comfortable dealing with my problem
- The therapist was not concerned about what happened with my pain after I left the office
  - The therapist was concerned about what happened with my pain after I left the office

Effectiveness

- The treatment the therapist prescribed for my problem was effective
- The therapist seemed confident that the treatment he/ she recommended would work
- The therapist gave me a clear idea of how long it might take for my problem to get better

General Questions

- After seeing the therapist I did not know what I needed to do for my problem
  - After seeing the therapist I knew what I needed to do for my problem
- The therapist did not listen carefully to my description of my problem
  - The therapist listened carefully to my description of my back problem
- The therapist made me feel less worried about my problem
- The therapist performed a thorough examination of me
- The therapist did not understand what was wrong with me
  - The therapist understood what was wrong with my back
- The therapist should have ordered more tests
  - The therapist ordered as many tests as necessary
- The therapist should have referred me to a specialist
  - The therapist referred me to a specialist
## Identifying positive and negative questions in the published version of the questionnaire

<table>
<thead>
<tr>
<th>Information</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The therapist gave me enough information about the cause of my problem</td>
<td>+</td>
</tr>
<tr>
<td>The therapist did not give me a clear explanation of the cause of my pain</td>
<td>-</td>
</tr>
<tr>
<td>The therapist told me what to do to prevent further problems</td>
<td>+</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Caring</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The therapist seemed to believe that my pain was real</td>
<td>+</td>
</tr>
<tr>
<td>The therapist did not understand the concerns I had about my problem</td>
<td>-</td>
</tr>
<tr>
<td>The therapist did not seem comfortable dealing with my problem</td>
<td>-</td>
</tr>
<tr>
<td>The therapist was not concerned about what happened with my pain after I left the office</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Effectiveness</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The treatment the therapist prescribed for my problem was effective</td>
<td>+</td>
</tr>
<tr>
<td>The therapist seemed confident that the treatment he/she recommended would work</td>
<td>+</td>
</tr>
<tr>
<td>The therapist gave me a clear idea of how long it might take for my problem to get better</td>
<td>+</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>General Questions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>After seeing the therapist I did not know what I needed to do for my problem</td>
<td>-</td>
</tr>
<tr>
<td>The therapist did not listen carefully to my description of my problem</td>
<td>+</td>
</tr>
<tr>
<td>The therapist made me feel less worried about my problem</td>
<td>+</td>
</tr>
<tr>
<td>The therapist performed a thorough examination of me</td>
<td>-</td>
</tr>
<tr>
<td>The therapist did not understand what was wrong with me</td>
<td>-</td>
</tr>
<tr>
<td>The therapist should have ordered more tests</td>
<td>-</td>
</tr>
<tr>
<td>The therapist should have referred me to a specialist</td>
<td>-</td>
</tr>
</tbody>
</table>
10. Troubleshooting: using calculator data to assist in treatment decisions, quality improvement and casenote review

The data provided by the CAHE Outcomes Calculator allows clinicians to review patient progress throughout, and after completion of, an episode of care. It allows practitioners to consider actual response to treatment, compared with expected response. Expected response may come from an in-house review of clinical outcomes for specific conditions over a cohort of patients treated in the practice, or it could come from peer-developed benchmarks (what do other practices do?), or from the research literature (algorithms of outcome from clinical guidelines for instance).

Take as an example of reflection on outcomes throughout an episode of care, the findings from repeated administration of the Oswestry Disability Index, used to measure outcome for a patient with low back pain.

Figure 10.1: Example of one patient’s progress throughout an episode of care using the CAHE outcomes calculator

This patient received five treatments for low back pain in an episode of care. The patient’s initial Oswestry score was high, indicating that he/she rated problems in most domains of the instrument. Improvement was noted throughout the first three treatments in the episode of care, by decreasing scores in repeated administrations of the Oswestry outcomes instrument.

On the fourth treatment however, an increased score was found, indicating that the patient’s condition had worsened.

What could have happened to increase the outcomes score on the fourth visit? Perhaps as a result of good response to treatment in treatments 1-3, the therapist suggested returning to work, increasing exercises or increasing activities. These strategies may have resulted in a short-term worsened score. The much improved Oswestry Disability Index outcomes score on treatment 5 however may have resulted from changed treatment approaches following treatment 4 response, such as strategies to assist with remaining at work and reduce physical load, modifying exercises or activities and/or providing additional treatment or a referral to another practitioner.

Reflection on this episode of care outcome for quality improvement purposes should provide the practitioner with assurance that the patient benefited overall, and that a ‘glitch’ observed at treatment 4 was dealt with appropriately.
Comparing this patient’s outcome from treatment with an expected (hypothesised) benchmark of care, in which every treatment produced an incremental decrease in Oswestry score, this patient’s progress mapped relatively well to the expected care path outcome. Thus treatment in this instance produced a response in the expected range and should provide the practitioner with indications that treatment decisions were appropriate.

Now consider another case scenario, outlined as a CAHE Outcomes Calculator episode graph in Figure 6.2.

**Figure 10.2: Example of a second patient’s progress throughout an episode of care using the CAHE outcomes calculator**

This patient also received five treatments for low back pain in an episode of care. The patient’s initial Oswestry score was high, indicating that he/she rated problems in most domains of the instrument.

Worsening was noted at the second treatment in the episode of care, by an increased score in second administration of the Oswestry outcomes instrument. On the third and fourth treatments the score plateaued, indicating that the patient’s condition had stabilised, but on the fifth treatment the score increased again.
Considering the hypothesised progress of outcome scores throughout the episode of care, this patient’s progress did not map well. Improvement was only noted after one treatment, whilst worsening with treatment was noted on two occasions of treatment, and plateauing was noted on two treatments.

In this patient’s case, perhaps this practitioner’s treatment may be inappropriate for the presentation and alternative methods of management should be considered. Certainly this treatment should not continue without a thorough review of the patient’s risk factors for a good outcome, and the therapist’s clinical decision-making.

Quality improvement and the CAHE Outcomes Calculator

The advantages of the CAHE Outcomes Calculator are that it allows therapists and patients to quantify patient response to treatment using choices of standard outcome measures throughout the episode of care. The response to treatment can be measured at each contact, or at whatever treatment contact intervals are deemed to be appropriate for the condition and the likelihood of response. The response to treatment throughout the episode of care can be compared with expected progress, such as that reported in clinical guidelines, or outlined in clinical indicators (i.e. 60% patients will demonstrate at least 50% improvement in one outcome of care score after five treatments). Use of the quantitative measures of outcome in the CAHE Outcomes Calculator allow quantification of the influence of risk factors on patient outcome, for instance in the example of the second patient, a review of the patient’s clinical signs, therapists’ notes and yellow flags may indicate the reasons as to why this patient’s outcomes were poorer than expected. Use of the episode of care graphs also allow therapists to quantify the influence of different funding models on patient outcome, for instance to compare patients’ responses to treatments, when they are funded by a compensable funding system (such as WorkCover or Motor Accident Insurance) or when they are privately responsible for funding treatment. This data allows clinicians to reflect on why specific individuals did not comply with expected treatment outcomes, and may highlight poor practice, inappropriate benchmarks for specific patients or opportunities for improvement in diagnosis, risk factor identification or care processes.