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

Updated August 2013
Expected date of revision August 2015

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CRICOS Provider Number 001218
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Chapter 1: Introduction – Planning an Episode of Care

Traditionally, the term “episode of care” applied only to the inpatient length of stay, which began on admission and was completed upon separation from the hospital. More recently, this notion was extended to include outpatient care, so that episodes of allied health outpatient care were defined as containing all those occasions of service between the date of first service and the date of final (discharge) service (Grimmer et al 2000). Hornbrook et al (1985) described episode of care as a series of temporally contiguous health care services related to treatment of a condition or provided in response to a specific request by the patient or other relevant entity. In instances where cure is not possible, particularly in individuals with chronic conditions, treatment of a condition is directed only on maintenance of function and improving quality of life. The start of the care episode commences with the client’s first contact with the health care provider. After the initial encounter, the clinician performs an initial assessment that will assist in formulating a treatment program. During the course of treatment, the clinician regularly monitors and evaluates the condition of the client. The end of an episode of care for acute conditions is typically indicated by the cure of the disease as determined by the cessation of signs and/or symptoms and return to normal or pre-episode function. For chronic diseases that are life-long, the termination of episode typically occurs when the client shows no further improvement (maintenance) or decline in his/her condition. A typical journey of a client through an entire episode of care is illustrated in Figure 1.1.

Figure 1.1: Client’s journey through a health service
Each episode of care should have an outcome. Outcomes are the measurable result of health care practices on clients or patients. They are used in various ways to describe the impact of care on patients’ lives, establish a basis for clinical decision making, evaluate the effectiveness of care and identify areas for improvement of care (Davies et al 1994). With this in mind, exploring and monitoring outcomes within the clinical practice is central to high quality patient care. However, there is often confusion between assessment and outcome measurement. Assessment provides one-off screening or risk-related information, profiling and or demographic information which can be used to direct patients/clients to appropriate management programs. This is distinct from measuring an outcome. Outcome measurement is focused on change in state. It requires at least two consecutive administrations of one instrument to measure change as a result of treatment intervention, natural healing, time (acute to chronic progression) or change in living or working environments. Outcome measures provide perspective on the impact of a condition and are used to inform practice and policy decisions. Many of the assessment instruments, however, are appropriate as outcome measures if they are used more than once and the difference in scores is obtained.

Each of the outcome instruments has a scoring system and in many instances the number response for each item is summed to obtain a total score. In some instruments, however, response categories have corresponding weighted scores which are subsequently tallied to obtain a domain score. To determine if there is change over time, the initial score or baseline measurement is compared to the subsequent score. Slowing of the rate of change, or the amount of difference between subsequent treatments could indicate decreasing effectiveness of the treatment.

Many outcome measurement tools have been developed but not all of them have excellent clinical usability and psychometric properties. Determining the properties of an outcome measure is essential in order to select the most important tool for use in clinical practice. Clinical utility of the outcome instrument depends on several factors like ease of administration, ease of scoring and interpretation as well as the cost of the instrument. The key clinical and psychometric properties of an instrument include: validity, reliability and sensitivity to detect change.

Validity refers to the extent to which a measure estimates the true nature of what it is purporting to measure. There are several types of validity:

Concurrent validity is established by comparing a 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 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).

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 implies ‘whether on the face of it, the instrument appears to be assessing the desired qualities’ (Streiner and Norman 1995).
Reliability is the extent of agreement between administrations of the one valid measure taken from the same subject on different occasions of testing, by the same or different assessors. There are four general classes of reliability estimates:

Inter-rater reliability measures the degree to which different assessors/raters give a consistent estimate of the same phenomenon.

Test-retest reliability measures the consistency of a test/instrument across time.

Parallel forms reliability measures the degree of consistency of results of two tests/instruments constructed in the same way from the same content domain.

Internal consistency reliability measures the consistency of results across items within a test or instrument.

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). It is the ability of the outcome measures to demonstrate the same propensity to change over its full range.

The selection of the most appropriate outcome measures should be based on a clear sense of what is to be measured and why. The domain of health in which the clinician is particularly interested with is a major consideration. Most of the time, the clinical signs and symptoms, severity of illness and complications are the main issues. From a psychosocial point of view however, the functional status and the psychological response of clients to the condition are most significant. Therefore it is essential to make sure that the domains covered by the instrument relate to the expected health outcomes of the treatment or management strategies. A condition specific measure (e.g. Hip Disability and Osteoarthritis Outcome Score) will narrow the focus of measurement and will contain considerable detail in the specific area of interest (e.g. hip osteoarthritis) but may measure several health domains (pain, disability). If a practitioner is dealing with one-disease condition, and the assessment is mainly on symptoms and function, then a condition specific measure may be appropriate. If a specific domain is the point of interest (e.g. balance, incontinence), then a dimension-specific instrument may be more suitable (e.g. Berg Balance Scale, Bladder Diary). Dimension-specific measures focus on particular aspects of health, such as the ones mentioned above and usually produce a single score. If, however, the general health or the interaction of different health conditions are the main concern, use of generic instruments are more appropriate. Generic measures can be used across different patient populations and usually measure several health domains. Figure 2 demonstrates an example of outcome measure options for an older patient diagnosed with hip osteoarthritis.

Allied health practitioners should keep in mind that the value of the collected information from the outcome measures is related to the source. Therefore, it is important to remember that with the choice of outcome measures, clients should be able to identify with the contents and response categories of the instrument.

No one instrument may prove satisfactory for all purposes. For this reason, practitioners may use a combination of outcome instruments to obtain a more comprehensive picture of the clinical scenario. Every instrument has its own peculiarities; therefore, the clinician’s insight and expertise are critical when deciding on which instrument to use.
*iCAHE Basic Outcomes Calculator: User Manual*

**Figure 1.2: Example of outcome measure selection**

When should be the initial measurement of outcome and how often should outcome be measured? The initial evaluation of outcomes provides baseline information. Frequency of measurement thereafter depends mostly on the nature of the condition and the client’s potential response to treatment. In identifying points (time) of measurement, it is important to think about when the client is expected to show an initial change in condition as well as the subsequent improvement or decline in health status. In general, acute conditions are more likely to show early signs of improvement after being treated compared to chronic conditions which may require more treatment, or a longer time frame to achieve results.

<table>
<thead>
<tr>
<th>Domain Specific</th>
<th>Condition Specific</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>Hip Disability and Osteoarthritis Outcome Score</td>
</tr>
<tr>
<td>Balance</td>
<td></td>
</tr>
<tr>
<td>ADL's</td>
<td></td>
</tr>
<tr>
<td>Affective</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td></td>
</tr>
</tbody>
</table>

- Visual Pain Scale
- Timed Up and Go Test
- Barthel Index
- Kessler Distress Scale

**COMBINATION??**
References


Chapter 2: The Outcomes Calculator

Background

The Outcomes Calculator has been under development 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 Australian health clinicians regarding the barriers and facilitators to regular use of health outcomes in clinical practice (Research Committee APA 1999, Grimmer et al 2000)

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 Outcomes 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 CNAHS Outcomes Calculator have been selected on the basis of their clinical utility and psychometric properties (validity, reliability, sensitivity to detect change over time and clinical utility for old patient populations). 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 2.1 provides a schematic overview of the International Classification of Functioning, whilst Figure 2.1 provides definitions regarding the components associated with functioning / disability.

The outcome measures contained in the CNAHS Outcomes Calculator are presented in Table 2.2. 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 (Table 2.3).

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 2.1: 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>
</tr>
</thead>
<tbody>
<tr>
<td>Domains</td>
<td>Body functions</td>
<td>Life areas</td>
</tr>
<tr>
<td></td>
<td>Body structures</td>
<td>(tasks, actions)</td>
</tr>
<tr>
<td>Constructs</td>
<td>Change in body functions</td>
<td>Capacity executing tasks in</td>
</tr>
<tr>
<td></td>
<td>(physiological)</td>
<td>a standard environment</td>
</tr>
<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 integrity</td>
<td>Activities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Participation</td>
</tr>
<tr>
<td>Negative aspect</td>
<td>Impairment</td>
<td>Activity limitation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Participation restriction</td>
</tr>
</tbody>
</table>

Functioning

Disability
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.

*Figure 2.1: Definitions of the components associated with functioning / disability (World Health Organization 2001)*

### Table 2.2: Summary of outcome measures contained in the Outcomes Calculator

<table>
<thead>
<tr>
<th>Measurement construct</th>
<th>Outcome measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impairment (Pain)</td>
<td>Short Form McGill Pain Questionnaire</td>
</tr>
<tr>
<td></td>
<td>Visual Analogue Scales</td>
</tr>
<tr>
<td>Activity Limitation</td>
<td>Upper Extremity Functional Index</td>
</tr>
<tr>
<td>Activity Limitation/Participation Restriction</td>
<td>Patient-Specific Functional Scale</td>
</tr>
<tr>
<td></td>
<td>Roland-Morris Questionnaire</td>
</tr>
<tr>
<td></td>
<td>Oswestry Disability Index</td>
</tr>
<tr>
<td></td>
<td>Whiplash Disability Questionnaire</td>
</tr>
<tr>
<td></td>
<td>Neck Disability Index</td>
</tr>
<tr>
<td></td>
<td>Lower Extremity Functional Scale</td>
</tr>
<tr>
<td>Impairment/Activity Limitation</td>
<td>Glasgow Pain Scale</td>
</tr>
<tr>
<td></td>
<td>Shoulder Pain and Disability Index</td>
</tr>
<tr>
<td></td>
<td>Patient Rated Tennis Elbow Evaluation</td>
</tr>
<tr>
<td></td>
<td>Disabilities of the Arm, Shoulder and Hand</td>
</tr>
<tr>
<td>Impairment/Activity Limitation/Participation Restriction/Quality of Life</td>
<td>Knee Injury and Osteoarthritis Outcome Score</td>
</tr>
<tr>
<td></td>
<td>Hip Disability and Osteoarthritis Outcome Score</td>
</tr>
<tr>
<td></td>
<td>Foot Function Index</td>
</tr>
<tr>
<td>Psychological Response to Impairment/Activity Limitation/Participation Restriction</td>
<td>Fear Avoidance Belief Questionnaire</td>
</tr>
<tr>
<td></td>
<td>Kessler Psychological Distress Scale</td>
</tr>
<tr>
<td>Yellow Flag</td>
<td>Orebro Musculoskeletal Pain Questionnaire</td>
</tr>
</tbody>
</table>

### Table 2.3: Contact details of developers of selected outcome measures

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

<table>
<thead>
<tr>
<th>Outcome Measure</th>
<th>Developer</th>
</tr>
</thead>
</table>
| Short-Form McGill Pain Questionnaire                  | Dr Ronald Melzack [melzack@psych.mcgill.ca]  
Professor Emeritus  
Department of Psychology  
McGill University  
1205 Dr. Penfield Avenue  
Montreal, PQ, H3A 1B1  
Tel: (514) 398-6127, FAX: (514) 398-4896 |
| Upper Extremity Functional Index (UEFI)               | Prof. Paul Stratford, et. al. [stratfor@mcmaster.ca]  
McMaster University, Faculty of Health Sciences  
Institute for Applied Health Sciences  
Rm 430 1400 Main Street West, Hamilton, |
<table>
<thead>
<tr>
<th>Test Name</th>
<th>Contact Information</th>
</tr>
</thead>
</table>
| Patient Specific Functional Scale              | Paul Stratford [stratfor@mcmaster.ca]  
McMaster University, School of Rehabilitation Science  
Institute of Applied Health Sciences, 4th Floor, Rm 403  
1400 Main St. West, Hamilton ON L8S 1C7 |
| Roland-Morris Questionnaire                    | Professor Martin Roland [martin.roland@man.ac.uk]  
Director, National Primary Care Research and Development Centre  
University of Manchester  
Williamson Building, Oxford Road, Manchester M13 9PL  
Phone 0161 275 7659 (secretary, Jane), Fax 0161 275 7600 |
| Oswestry Disability Index                      | Jeremy Fairbank [jeremy.fairbank@ndos.ox.ac.uk]  
Consultant Orthopaedic Surgeon  
Nuffield Orthopaedic Centre  
Oxford OX3 7LD, UK |
| Whiplash Disability Questionnaire              | Ken Niere [k.niere@latrobe.edu.au]  
Coordinator  
Postgraduate Studies in Musculoskeletal Physiotherapy  
School of Physiotherapy  
La Trobe University  
VIC 3086  
PH: 03 94795857, Fax:03 94795768 |
| Neck Disability Index                          | Dr. Howard Vernon [hvernon@cmcc.ca]  
Canadian Memorial Chiropractic College, 1900 Bayview Ave.  
Toronto, ON, CAN, M4G 3E6 |
| Lower Extremity Functional Scale (LEFS)        | Ms. Jill M. Binkley, PT, MSc [binkleyj@bellsouth.net]  
Assistant Professor (Physical Therapy), School of  
Rehabilitation Science, McMaster University, Hamilton,  
Ontario, Canada |
| Glasgow Pain Questionnaire                     | Dr A. J. Asbury [aja1p@clinmed.gla.ac.uk]  
Reader in Anaesthesia, and Hon Consultant Anaesthetist.  
University Dept of Anaesthesia,  
Gartnavel General Hospital, (30/6 Shelley Court),  
Gt Western Road, Glasgow, G12 OYN.  
Tel 0141-531-3716, Fax 0141-531-3771 |
| Shoulder Pain & Disability Index (SPADI)       | Kathryn E. Roach, PhD, PT [keroach@miami.edu]  
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 |
| Patient Rated Tennis Elbow Evaluation (PRTE)   | Dr. Joy C. MacDermid [macderj@mcmaster.ca]  
Hand and Upper Limb Centre Clinical Research Laboratory,  
Monsignor Roney Ambulatory Care Centre, 930 Richmond  
Street, London, Ontario N6A 3J4, Canada. |
<table>
<thead>
<tr>
<th>Measure</th>
<th>Contact Information</th>
</tr>
</thead>
</table>
| Disabilities of the Arm, Shoulder and Hand                             | Kristina Buccat [kbuccat@iwh.on.ca and dash@iwh.on.ca]  
Institute for Work and Health  
481 University Avenue, Suite 800  
Toronto, Canada                                                             |
| Kessler Psychological Distress Scale                                   | Ronald C. Kessler, PhD [kessler@hcp.med.harvard.edu]  
Harvard Medical School  
Department of Health Care Policy  
180 Longwood Avenue  
Boston, MA 02115-5899  
Phone: 1 617-432-3587  
Fax: 1 617-432-3588                                                     |
| Knee Injury and Osteoarthritis Outcome Score                           | Professor Ewa Roos [eroos@health.sdu.dk]  
Institute of Sports Science and Clinical Biomechanics  
Faculty of Health Sciences, University of Southern Denmark,  
Campusvej 55, DK-5230 Odense, Denmark                                   |
| Hip Disability and Osteoarthritis Outcome Score                        | Professor Ewa Roos [eroos@health.sdu.dk]  
Institute of Sports Science and Clinical Biomechanics  
Faculty of Health Sciences, University of Southern Denmark,  
Campusvej 55, DK-5230 Odense, Denmark                                   |
| Foot Function Index                                                    | Kathryn E. Roach, PhD, PT [keroach@miami.edu]  
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                   |
| Fear Avoidance Belief Questionnaire                                    | Professor Gordon Waddell [gordon.waddell@virgin.net]  
6 Heatherbrae Bishopbriggs  
Glasgow G64 2TA, UK  
Tel/fax: +44 141 762 2724                                              |
| Kessler Psychological Distress Scale                                   | Ronald C. Kessler, PhD [kessler@hcp.med.harvard.edu]  
Harvard Medical School  
Department of Health Care Policy  
180 Longwood Avenue  
Boston, MA 02115-5899  
Phone: 1 617-432-3587  
Fax: 1 617-432-3588                                                     |
| Orebro Musculoskeletal Pain Screening Questionnaire                    | Steven Linton, PhD [steven.linton@bsr.oru.se]  
[steven.linton@orebroll.se]  
Department of Occupational and Environmental Medicine,  
Orebro University Hospital, Orebro, Sweden                              |

References


Chapter 3: Outcomes Instruments

3.1. Pain

3.1.1 Short Form McGill Pain Questionnaire (SF-MPQ) Melzack 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.

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</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Throbbing
Shooting
Stabbing

Sharp
Cramping
Gnawing
Hot-burning
Aching
Heavy
Tender
Splitting
Tiring-exhausting
Sickening
Fearful
Punishing-cruel

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 internal consistency

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.

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>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
</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
3 □ Mild
2 □ Discomforting
3 □ Distressing
4 □ Horrible
5 □ Excruciating

3.1.2 Visual Analogue 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 patient’s 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>
<thead>
<tr>
<th>Pain Intensity</th>
<th>Pain Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. NIRS</td>
<td>1. Time count</td>
</tr>
<tr>
<td>2. VGIRS</td>
<td>Multiply</td>
</tr>
<tr>
<td>3. AVAIS</td>
<td>Multiply</td>
</tr>
<tr>
<td>2. VGFRS</td>
<td>Graph</td>
</tr>
<tr>
<td>3. AVAFS</td>
<td>Multiply</td>
</tr>
</tbody>
</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**

**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.
1. **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’.

2. **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.

### 3.2. Activity Limitation
3.2.1 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.

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

Interpretation

Lower score means greater disability.

Validity, reliability and internal consistency

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
3.3. Activity Limitation/Participation Restriction

3.3.1 Patient-Specific Functional Scale

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
   \[
   \frac{\text{(initial activity 1 score} - \text{subsequent activity 1 score})}{\text{initial activity 1 score}} \times 100
   \]
6. Percentage change, between the previous and subsequent assessments, for each activity, can be calculated by:
   \[
   \frac{\text{(previous activity 1 score} - \text{subsequent activity 1 score})}{\text{previous activity 1 score}} \times 100
   \]
7. Percentage change in total score, between the initial and subsequent assessments for all the activities nominated, can be calculated by:
   \[
   \frac{\text{(initial total score} - \text{subsequent total score})}{\text{initial total score}} \times 100
   \]
8. Percentage change in total score, between the previous and subsequent assessments for all of the activities nominated can be calculated by:
   \[
   \frac{\text{(previous total score} - \text{subsequent total score})}{\text{previous total score}} \times 100
   \]

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**

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 Generic 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**


**Patient-Specific Functional 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)*

<table>
<thead>
<tr>
<th>Level</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>Do it with no problems</td>
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<td></td>
<td></td>
<td></td>
<td>Can’t do it at all</td>
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### Dates

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<tr>
<th>ACTIVITY</th>
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For recording other difficulties which the patient may identify at later dates

<table>
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<th>ACTIVITY</th>
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</table>

**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)*

3.3.2 Roland Morris 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:
   \[
   \left(\frac{\text{initial total score} - \text{subsequent total score}}{\text{initial total score}}\right) \times 100
   \]

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

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 (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).

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: __________ %
Background

The Oswestry Disability Index was 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 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:

\[
\text{score} = \left( \frac{\text{total raw score}}{5 \times \text{number of sections answered}} \right) \times 100
\]

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:

\[
\text{score} = (\text{initial total score} - \text{subsequent total score})
\]
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**

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 travelling (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).
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.

**Section 1- Pain Intensity**
- ☐ I have not 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 is very painful.
- ☐ It is painful to look 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, wash with difficulty and stay in bed.

**Section 3- Lifting**
- ☐ I can lift heavy weights without 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, e.g., 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 only very light weights.
- ☐ I cannot lift or carry anything at all.

**Section 4- Walking**
- ☐ Pain does not prevent me walking any distance.
- ☐ Pain prevents me walking more than 1 mile.
- ☐ Pain prevents me walking more than ¾ mile.
- ☐ Pain prevents me walking more than 100 yards.
- ☐ I can only walk using a stick or crutches.
- ☐ I am in bed most of the time and have to crawl to the toilet.

**Section 5- Sitting**
- ☐ I can sit in any chair as long as I like.
- ☐ I can only sit in my favourite chair as long as I like.
- ☐ Pain prevents me from sitting more than 1 hour.
- ☐ Pain prevents me from sitting more than half an hour.
- ☐ Pain prevents me from sitting more than 10 mins.
- ☐ Pain prevents me from sitting at all.

**Section 6- Standing**
- ☐ I can stand as long as I want without extra pain.
- ☐ I can stand as long as I want but it gives me extra pain.
- ☐ Pain prevents me from standing for more than 1 hour.
- ☐ Pain prevents me from standing for more than half an hour.
- ☐ Pain prevents me from standing for more than 10 minutes.
- ☐ Pain prevents me from standing at all.
### 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.

---

3.3.4 Whiplash Disability Questionnaire (WDQ) (Pinfold et al 2004)
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?
8. How much do your whiplash symptoms interfere with **sporting activity**?

0 1 2 3 4 5 6 7 8 9 10
Not at all Unable to socialise

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

0 1 2 3 4 5 6 7 8 9 10
Not at all Unable to participate

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

0 1 2 3 4 5 6 7 8 9 10
Not at all Always

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

0 1 2 3 4 5 6 7 8 9 10
Not at all Always

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

0 1 2 3 4 5 6 7 8 9 10
Not at all Always

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

0 1 2 3 4 5 6 7 8 9 10
No difficulty Unable to Concentrate

**3.3.5 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:

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

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:
   \[
   \text{initial total score – subsequent total score}
   \]

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

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

4. Percentage change in total score, between the previous and subsequent assessments calculated:
((previous total score – subsequent total score) / previous total score) * 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).
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.

<table>
<thead>
<tr>
<th>Section 1 - Pain Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ I have no pain at the moment.</td>
</tr>
<tr>
<td>☐ The pain is very mild at the moment.</td>
</tr>
<tr>
<td>☐ The pain is moderate at the moment.</td>
</tr>
<tr>
<td>☐ The pain is fairly severe at the moment.</td>
</tr>
<tr>
<td>☐ The pain is very severe at the moment.</td>
</tr>
<tr>
<td>☐ The pain is the worst imaginable at the moment.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Section 3 - Lifting</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ I can lift heavy weights without causing extra pain.</td>
</tr>
<tr>
<td>☐ I can lift heavy weights but it gives 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, for example on a table.</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>
</tr>
<tr>
<td>☐ I can lift very light weights.</td>
</tr>
<tr>
<td>☐ I cannot lift or carry anything at all.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section 4 - Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ I can read as much as I want to with no pain in my neck.</td>
</tr>
<tr>
<td>☐ I can read as much as I want to with a slight pain in my neck.</td>
</tr>
<tr>
<td>☐ I can read as much as I want with moderate pain in my neck.</td>
</tr>
<tr>
<td>☐ I can’t read as much as I want because of moderate pain in my neck.</td>
</tr>
<tr>
<td>☐ I can hardly read at all because of severe pain in my neck.</td>
</tr>
<tr>
<td>☐ I can not read at all.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section 5 - Headaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ I have no headaches at all.</td>
</tr>
<tr>
<td>☐ I have slight headaches which come infrequently.</td>
</tr>
<tr>
<td>☐ I have moderate headaches which come infrequently.</td>
</tr>
<tr>
<td>☐ I have moderate headaches which come frequently.</td>
</tr>
<tr>
<td>☐ I have severe headaches which come frequently.</td>
</tr>
<tr>
<td>☐ I have headaches most of the time.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section 6 - Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ I can concentrate fully when I want to with no difficulty.</td>
</tr>
<tr>
<td>☐ I can concentrate fully when I want to with slight difficulty.</td>
</tr>
<tr>
<td>☐ I have a fair degree of difficulty in concentrating when I want to.</td>
</tr>
<tr>
<td>☐ I have a lot of difficulty in concentrating when I want to.</td>
</tr>
<tr>
<td>☐ I have a great deal of difficulty in concentrating when I want to.</td>
</tr>
<tr>
<td>☐ I cannot concentrate at all.</td>
</tr>
</tbody>
</table>
### 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.

### 3.3.6 Lower Extremity Functional Scale
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 ($r=0.94$ [95% lower limit confidence interval (CI) 5.89]). Correlations between the LEFS and the SF-36 physical function subscale and physical component score were $r=0.80$ (95% lower limit CI 5.73) and $r=0.64$ (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.

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

3.4. Impairment/Activity Limitation
3.4.1  Glasgow Pain Scale

Background

The Glasgow Pain Questionnaire (GPQ) 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 GPQ 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 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 3.9.

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 GPQ 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 GPQ. Clinicians need to decide whether to compare the subsequent domain score with the initial or previous domain score.

Scoring options include:

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

The GPQ 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 3.1: 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 upset my normal routine</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>
3.4.2 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.
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? No pain_____________Worst Pain Imaginable
2. When lying on the involved side? No pain_____________Worst Pain Imaginable
3. When reaching for something on a high shelf? No pain_____________Worst Pain Imaginable
4. When touching the back of your neck? No pain_____________Worst Pain Imaginable
5. When pushing with the involved arm? No pain_____________Worst Pain Imaginable

Total _____/ Possible______ = ________ %

The line next to each item represents how much difficulty you had doing that activity. 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.

Disability Scale

B. How much difficulty do you have?

1. Washing your hair? No difficulty_____________So difficult required help
2. Washing your back? No difficulty_____________So difficult required help
3. Putting on an undershirt or pullover shirt? No difficulty_____________So difficult required help
4. Putting on a shirt that buttons down the front? No difficulty_____________So difficult required help
5. Putting on your pants? No difficulty_____________So difficult required help
6. Placing an object on a high shelf? No difficulty_____________So difficult required help
7. Carrying a heavy object of 10 pounds or more? No difficulty_____________So difficult required help
8. Removing something from your back pocket? No difficulty_____________So difficult required help

Total _____/ Possible______ = ________ %
3.4.3 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 (ICC=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 ($r = -0.30$).

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.

1. PAIN in your affected arm

   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.

<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>

2. FUNCTIONAL DISABILITY

   A. SPECIFIC ACTIVITIES

   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.

<table>
<thead>
<tr>
<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>
</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>
</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>
</tr>
<tr>
<td>Open a jar</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>Pull up pants</td>
<td>0 1 2 3 4 5 6 7 8 9 10</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>
</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.

   | 1. Personal activities (dressing, washing) | 0 1 2 3 4 5 6 7 8 9 10 |
   | 2. Household work (cleaning, maintenance) | 0 1 2 3 4 5 6 7 8 9 10 |
   | 3. Work (your job or everyday work) | 0 1 2 3 4 5 6 7 8 9 10 |
   | 4. Recreational or sporting activities | 0 1 2 3 4 5 6 7 8 9 10 |
3.4.4 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 disability/symptom score = [(sum of n responses) - 1] x 25, where n 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.

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**

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Open a tight or new jar</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>Write</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3.</td>
<td>Turn a key</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4.</td>
<td>Prepare a meal</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5.</td>
<td>Push open a heavy door</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6.</td>
<td>Place an object on a shelf above the head</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7.</td>
<td>Do heavy household chores (e.g. wash walls, wash floors)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8.</td>
<td>Garden or doing yard work</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9.</td>
<td>Make a bed</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10.</td>
<td>Carry a shopping bag or briefcase</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11.</td>
<td>Carry a heavy object (over 5 kilograms)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12.</td>
<td>Change a light bulb overhead</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13.</td>
<td>Wash or blow-dry your hair</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14.</td>
<td>Wash your back</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>15.</td>
<td>Put on a pullover sweater</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>16.</td>
<td>Use a knife to cut food</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>17.</td>
<td>Recreational activities that require little effort (e.g., card playing, knitting, etc.).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>18.</td>
<td>Recreational activities that require taking some force or impact through the arm shoulder or hand (e.g., golf, hammering, tennis, etc.).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>19.</td>
<td>Recreational activities that require moving the arm freely (e.g., playing frisbee, badminton, etc.).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>20.</td>
<td>Manage transportation needs (getting from one place to another)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>21.</td>
<td>Sexual activities</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
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 Practising or playing your instrument or sport 1 2 3 4 5

3.5. Impairment/Activity Limitation/Participation Restriction/Quality of Life Arthritis Self-efficacy Scale
3.5.1 Knee Injury and Osteoarthritis Outcome Score

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. anterior cruciate ligament (ACL) injury, meniscus injury, chondral injury. 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). Standardised 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>
<th>Minimally Detectable Change (90)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>/36</td>
<td>100 – Actual Raw Score x 100</td>
<td>12 points</td>
</tr>
<tr>
<td>Symptoms</td>
<td>/28</td>
<td>Possible Raw Score range</td>
<td>8 points</td>
</tr>
<tr>
<td>ADL</td>
<td>/68</td>
<td>Example: a pain raw score of 16 would be transformed as follows:</td>
<td>10 points</td>
</tr>
<tr>
<td>Sport/Rec</td>
<td>/20</td>
<td>100 – (16 x 100) = 56</td>
<td>19 points</td>
</tr>
<tr>
<td>QoL</td>
<td>/16</td>
<td></td>
<td>13 points</td>
</tr>
</tbody>
</table>

Missing data: If a mark is placed outside a box, the closest box is chosen. If two boxes are marked, that which indicated the more severe problems is 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

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, ADL, and Knee-related QOL 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 the KOOS measured expected constructs. The most responsive subscale was Knee-related QOL. The effect sizes of the five KOOS subscales at 12 months ranged from 1.08 to 3.54 and for the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) from 1.65 to 2.56. (Roos and Toksvig-Larsen 2003).

References

Knee Injury and Osteoarthritis Outcome Score

Pain
P1 How often is your knee painful?
- Never
- Monthly
- Weekly
- Daily
- Constantly

What degree of pain have you experienced the last week when...?

P2 Twisting/pivoting on your knee
- None
- Mild
- Moderate
- Severe
- Extreme

P3 Straightening knee fully
- None
- Mild
- Moderate
- Severe
- Extreme

P4 Bending knee 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

Symptoms

Sy1 How severe is your knee stiffness after first wakening in the morning?
- None
- Mild
- Moderate
- Severe
- Extreme
### iCAHE Basic Outcomes Calculator: User Manual

**Sy2** How severe is your knee stiffness after sitting, lying, or resting later in the day?

<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>None</td>
<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></th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Rarely</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<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></th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Rarely</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

**Sy5** Does your knee catch or hang up when moving?

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Rarely</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

**Sy6** Can you straighten your knee fully?

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Often</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

**Sy7** Can you bend your knee fully?

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Often</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

### Activities of daily living

**What difficulty have you experienced the last week...?**

**A1** Descending 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>None</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

**A2** Ascending 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>None</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

**A3** Rising from sitting

<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>None</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

**A4** Standing

<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>None</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

**A5** Bending to floor/pick up an object

<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>None</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Task</td>
<td>None</td>
<td>Mild</td>
<td>Moderate</td>
<td>Severe</td>
<td>Extreme</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>------</td>
<td>------</td>
<td>----------</td>
<td>--------</td>
<td>---------</td>
</tr>
<tr>
<td>A6 Walking on flat surface</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A7 Getting in/out of car</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A8 Going shopping</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A9 Putting on socks/stockings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A10 Rising from bed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A11 Taking off socks/stockings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A12 Lying in bed (turning over, maintaining knee position)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A13 Getting in/out of bath</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A14 Sitting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A15 Getting on/off toilet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A16 Heavy domestic duties (shovelling, scrubbing floors, etc)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A17 Light domestic duties (cooking, dusting, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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Sport and recreation function

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 □ □ □ □ □
3.5.2 Hip Disability and Osteoarthritis Outcome Score

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). Standardised answer options are given (5 Likert boxes) and each question gets a score from 0 to 4.

Scoring

A normalised 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 – Total score P1-P10 x 100 = 100 - ____ = ____

40

Symptoms: 100 – Total score S1-S5 x 100 = 100 - ____ = ____

20

ADL: 100 – Total score A1-A17 x 100 = 100 - ____ = ____

68

Sport and Rec: 100 – Total score SP1-SP4 x 100 = 100 - ____ = ____

16

QoL: 100 – Total score Q1-Q4 x 100 = 100 - ____ = ____

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

The HOOS met set criteria of validity and responsiveness. The responsiveness (SRM) for the two added subscales sport/rec and QOL 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, ADL SRM 2.51 vs. 1.52, sport/rec function SRM 1.53 vs. 1.21 and hip related QOL SRM 1.95 vs. 1.57).

Reference

Hip Disability and Osteoarthritis Outcome Score

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
# iCAHE Basic Outcomes Calculator: User Manual

<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>
<tr>
<td>☒</td>
<td>☐</td>
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<tr>
<td>☒</td>
<td>☐</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**

<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>

**A6. Walking on a flat surface**

<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>

**A7. Getting in/out of car**

<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>

**A8. Going shopping**

<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>

**A9. Putting on socks/stockings**

<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>

**A10. Rising from bed**

<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>

**A11. Taking off socks/stockings**

<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>

**A12. Lying in bed (turning over, maintaining hip position)**

<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>

**A13. Getting in/out of bath**

<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>

**A14. Sitting**

<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>
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?
None  Mild  Moderate  Severe  Extreme
☐   ☐   ☐   ☐   ☐
3.5.3 Foot Function Index

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 measures the level of foot pain in a variety of situations and contains 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 describes the difficulty in performing various activities due to foot problems. This sub-scale also consists 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 addresses activity limitations due to foot problems. It consists 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 consists of horizontal lines to which no numbers or divisions are attached. Verbal anchors, representing opposite extremes of the dimension being measured, are 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 is 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.

Reference

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:

1. At its worst?
   No pain ___________ Worst pain imaginable

2. In the morning?
   No pain ___________ Worst pain imaginable

3. When walking barefoot?
   No pain ___________ Worst pain imaginable

4. When standing barefoot?
   No pain ___________ Worst pain imaginable

5. When walking with shoes?
   No pain ___________ Worst pain imaginable

6. When standing with shoes?
   No pain ___________ Worst pain imaginable

7. When walking with orthotics
   No pain ___________ Worst pain imaginable

8. When standing with orthotics?
   No pain ___________ Worst pain imaginable

9. At the end of the day?
   No pain ___________ Worst pain imaginable

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 ______ = ______%**
3.6. Psychological Response to Impairment/Activity Limitation/Participation Restriction

3.6.1 Fear Avoidance Belief 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 a 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 testing 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 intra-tester reliability and test-retest, high $Kappa$ statistics of > 0.7 and Cronbach’s alpha statistics of >0.8 for internal consistency and sound comparison testing for criterion and construct validity. Wadell et al (1993) 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 (Pearson $r$-value of 0.4) and highly correlated with the Tampa scale (TSK11).

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 activities such as bending, lifting, walking or driving affect or would affect your back pain.

<table>
<thead>
<tr>
<th></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 1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Physical activity makes my pain worse.</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Physical activity might harm my back.</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I should not do physical activities which (might) make my pain worse.</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. I cannot do physical activities which (might) make my pain worse.</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The following statements are about how your normal work affects or would affect your back pain.

<table>
<thead>
<tr>
<th></th>
<th>Completely disagree</th>
<th>Unsure</th>
<th>Completely agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. My pain was caused by my work or by an accident at work.</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. My work aggravated my pain.</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. I have a claim for compensation for my pain.</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. My work is too heavy for me.</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. My work makes or would make my pain worse.</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. My work might harm my back.</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. I should not do my normal work with my present pain.</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. I cannot do my normal work with my present pain.</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. I cannot do my normal work till my pain is treated.</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. I do not think that I will be back to my normal work within 3 months.</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. I do not think that I will ever be able to go back to that work.</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.6.2  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).
References

### Kessler Psychological Distress Scale

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 hopeless?</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>

#### 3.7. Yellow Flag
3.7.1 Orebro Musculoskeletal Pain Questionnaire

Background

The Orebro 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.

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

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

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<tbody>
<tr>
<td>Completely disagree</td>
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<td></td>
<td>Completely agree</td>
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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>Can't do it because of pain problem</td>
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<td>Can do it without pain being a problem</td>
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22. I can walk for an hour.

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<td>Can do it without pain being a problem</td>
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23. I can do ordinary household chores.

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<td>Can't do it because of pain problem</td>
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<td>Can do it without pain being a problem</td>
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24. I can do the weekly shopping.

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<td>Can't do it because of pain problem</td>
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<td>Can do it without pain being a problem</td>
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25. I can sleep at night.

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<tr>
<td>Can't do it because of pain problem</td>
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<td>Can do it without pain being a problem</td>
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Chapter 4: Troubleshooting: using calculator data to assist in treatment decisions, quality improvement and casenote review

The data provided by the iCAHE Outcomes Calculator allows practitioners 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 4.1).

*Figure 4.1: Example of one patient’s progress throughout an episode of care using the iCAHE 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 they 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 (hypothesized) 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 an iCAHE Outcomes Calculator episode graph in Figure 4.2.

**Figure 4.2: Example of a second patient’s progress throughout an episode of care using the iCAHE 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 they 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 the 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 hypothesized 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 iCAHE Outcomes Calculator**

The advantages of the iCAHE 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 iCAHE 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 practitioners 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.