Centre for Allied Health Evidence

CAHE JC Critically Appraised Article Summary

Journal Club Details

Date of submission June 2009

Journal Club location Flinders Medical Centre

JC Discipline/s Physiotherapy

JC Facilitator Carolyn Berry

Clinical Scenario

Pre-operative rehabilitation is commonly prescribed for patients with chronic anterior cruciate ligament instability, but minimal research evidence currently exists to support this prescription. This prospective non randomised controlled study was designed to assess the effectiveness of a 6 week pre-operative program for patients with chronic anterior cruciate ligament instability.

Review Question/PICO/PACO

P Males and females with chronic anterior cruciate ligament deficiency

I Home based exercise program

C Males and females with no anterior cruciate ligament deficiency

O Muscle strength (Hamstrings and quadriceps), knee joint stability (anterior translation), standing balance (postural sway), (shuttle run, side step and carioca) and episodes of giving way.

Article/Paper

Keays, S, L, Bullock-Saxon, J, E, Newcombe, P & Bullock, M, I 2006, 'The effectiveness of a pre-operative home-based physiotherapy programme for chronic anterior cruciate ligament deficiency', *Physiotherapy Research International*, vol. 11, no. 4, pp. 204-218.

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Article Methodology: Prospective clinical trial

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By CAHE staff member: Luke Perraton

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Centre for Allied Health Evidence

CONTACTS
www.unisa.edu.au/cahe
karen.grimmer-somers
@unisa.edu.au
Telephone (08) 8302 2769
Facsimile (08) 8302 2766

University of South Australia
GPO Box 2471
Adelaide SA 5001
Australia

CRICOS Provider Number
001218

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Ques No.	Yes	Can't Tell	No	Comments
1	✓			**Did the study ask a clearly focused question?** Yes. This study clearly asked whether a pre operative physiotherapy rehabilitation program was effective over a range of outcomes.
2			✓	**Was this a randomised controlled trial (RCT) and was it appropriately so?** No. This study was not randomised. Non injured participants were matched for age, gender and activity level with participants who were awaiting ACL reconstruction surgery, who acted as controls. As this trial was the first trial to investigate the effectiveness of a pre-operative physiotherapy program prior to knee reconstruction (as reported by the authors at the time), the study design is hence appropriate. Future studies could build on the findings of this study by using a more rigorous, randomised study design, to eliminate any effects of bias.
3			✓	**Were participants appropriately allocated to intervention and control groups?** Subjects sampled by convenience from a group that had been referred for pre-operative physiotherapy (the intervention group), a standard surgical waiting list (the non intervention group) and hospital staff, friends and family (control group). The sampling of participants from different groups introduces the potential for bias, as it is possible that the intervention group had received a different stream of care than the non intervention group, or given that they were previously selected for pre-operative rehabilitation, that they had a greater potential for improvement than the non intervention group. Even though this was an appropriate study design to answer the research question (see comments above), future randomised controlled trials will need to ensure that blind and randomised allocation of participants to intervention and control groups occurs. This will reduce these potential sources of bias.
4			✓	**Were participants, staff and study personnel 'blind' to the participants' study group?** No. The assessors who measured each outcome were blind to the treatment allocation. This may serve to reduce measurement bias. However, due to the method of allocation of participants, the study personnel were not blinded to each participant's study group. Therefore it is possible that bias was introduced in the interpretation of data. It is not possible to blind participants to whether they are receiving an exercise intervention or not, and therefore this criterion may be less relevant.
5	✓			**Were all of the participants who entered the trial accounted for at its conclusion?** No drop outs are noted in the tables of the results section.
6	✓			**Were the participants in all groups followed up and data collected in the same way?** Yes. The same time intervals between appointments, duration of intervention and a standardised program were used. Data was collected in a standardised manner.

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Ques No.	Yes	Can't Tell	No	Comments
7	✓			**Did the study have enough participants to minimise the play of chance?** A power calculation is included in the method section. The sample size was sufficient to minimise the effects of chance, although it is noted that two participants dropped out of the non intervention group and one dropped out of the intervention group before the initial assessment. This slight reduction in sample size could possibly increase the chance of error, and was not addressed by the study authors.
8	-	-	-	**How are the results presented and what was the main result?** Results were presented in terms of size of effect, and statistical significance (between group and within group measures). Statistically significant differences are noted between the intervention group and the non intervention groups for quadriceps strength at 60 and 120 degrees, single leg balance (5 seconds, no foam, eyes closed. Balancing on foam and 30 second balance were not significantly different. Agility measures were all significantly different between intervention and non intervention groups (shuttle run, side step and carioca $p< 0.01$). Subjective measures also were statistically significant (Noyes and trust score $p<0.001$). In summary, the study demonstrated significant differences between an exercise intervention and no intervention for those awaiting a knee reconstruction, over a range of subjective and clinical outcomes. These results were validated against uninjured controls.
9	-	-	-	**How precise are these results?** Standard deviations (SD) were supplied along with mean scores for each outcome. This allows insight into the range of scores around the mean score. The standard deviations reported for some of the significant outcome at follow up appear reasonable. For example, quadriceps strength ratio at 60 degrees at follow up is reported with a mean of 1.02, SD 0.1 A calculation of a 95% confidence interval using the data supplied in the study shows that 95% of scores fell between 0.92 and 1.12. This compares to mean scores of 0.75 (SD 0.1) for the non intervention group and 0.99 (SD 0.07) for the control group. These calculations help to improve the readers' trust that the changes in these outcomes were not due to chance alone.
10	✓			**Were all important outcomes considered so the results can be applied?** This study looked at a range of clinical and questionnaire- based subjective measures from the perspective of a clinician. The research question did not warrant the inclusion of economic outcome measures and did not focus on measuring outcomes from the patient's perspective. This may be an area for future research. The authors answered their research question, by measuring outcomes before and after a pre-operative physiotherapy exercise program. Post surgical outcomes were not addressed. This should be addressed by future studies.