The reliability and validity of assessing medio-lateral patellar position: a systematic review

Smith TO, Davies L, Donell ST

CRD summary
This well-conducted review concluded that, based on limited evidence, intra-tester reliability of assessing mediolateral patellar position was good and inter-tester reliability was variable. The criterion validity of this test was at worst moderate. These conclusions are likely to be reliable.

Authors' objectives
To determine the reliability and validity of evaluating mediolateral patellar position.

Searching
PubMed, EMBASE, AMED, British Nursing Index, The Cochrane Library, PEDro and Zetoc were searched from inception to July 2008. Search terms were reported. Unpublished and grey literature were sought through searches of SIGLE, NRR, NTIS, Bristol Library's Integrated Catalogue and Current Controlled Trials. Relevant journals and conference proceedings were handsearched. Reference lists of retrieved studies were screened. The review was restricted to full-text studies. No language restrictions were applied.

Study selection
Primary studies that evaluated assessment of the mediolateral patellar position by two or more examiners at one or more time points or that compared clinical assessment with a radiological assessment using magnetic resonance imaging (MRI), computed tomography (CT) or plain radiograph were eligible for inclusion. Papers that presented insufficient data on their method of assessing mediolateral patella position and case-studies were excluded.

Included studies assessed patients with patellofemoral pain syndrome (PFPS) and asymptomatic controls. Age of patients with PFPS ranged from 18 to 41 years (mean 30.6 years), age of asymptomatic controls ranged from 18 to 28 years (mean 24.2 years) and 38% of participants were men. Most studies assessed patellar position using McConnell's (1986) method; one study assessed patellar orientation using visual estimation or pluri-cal callipers. Some studies assessed the knee at 20° flexion; others assessed the knee in full extension.

Two reviewers independently assessed studies for inclusion; disagreements were resolved through discussion.

Assessment of study quality
Two reviewers independently assessed studies using criteria based on the CASP appraisal tool for diagnostic studies. Items assessed included reporting of research question, appropriate design, appropriate reference test, whether all patients received the index test and reference standard, whether reference standard findings could influence the index test result, clear definition of population characteristics, index test clearly defined, appropriate results analysis, precise statistical results presented, appropriate interpretation, ability to generalise results and applicability of results to clinical practice. Disagreements were resolved through discussion.

Data extraction
One reviewer extracted data and these were checked by a second reviewer. Data were extracted as intraclass correlation coefficients (ICC) or kappa statistics together with standard errors and p-values (where reported).

Methods of synthesis
A narrative synthesis was presented.

Results of the review
Nine observational studies were included (237 patients, 306 knees). The quality assessment suggested that studies suffered from a number of methodological limitations. Only one study provided a clear definition of the medio-patellar position evaluation. Five studies provided a clear definition of the population characteristics. Only three studies
included a reference standard; all patients received both the index test and reference standard in these studies.

Seven studies assessed intra-rater reliability. Six studies reported substantial or near perfect agreement for the same rater tested at different times (ICC ranged from 0.70 to 0.99). One study reported poor to fair agreement (Kappa ranged from 0.11 to 0.35). Four studies assessed inter-rater reliability. One study reported near perfect results (ICC values of 0.91 for medial measure and 0.94 for lateral measure). The other studies reported poorer agreement (ICCs ranged from 0.02 to 0.14).

Three studies assessed agreement between clinical assessment and MRI evaluation. One study reported near perfect agreement (ICC of 0.9), one reported substantial agreement (ICC of 0.61) and one reported moderate agreement (ICC of 0.44).

**Authors' conclusions**

Based on a limited evidence base, intra-tester reliability of assessing mediolateral patellar position was good and inter-tester reliability was variable. The criterion validity of this test was at worst moderate.

**CRD commentary**

The review addressed a focused question supported by clearly defined inclusion criteria. The literature search was extensive and included attempts to minimise risks of language and publication bias. Appropriate steps were taken to minimise reviewer error and bias at all stages of the review. Study quality was assessed using some relevant criteria, but the criteria used were more appropriate for assessing the findings of a primary diagnostic accuracy study rather than for use in a systematic review and were not specifically tailored to assessing studies of inter- and intra-rater reliability. Relevant study details were clearly presented in tables and discussed in the text. A narrative synthesis of results was appropriate given the small number of studies identified and differences in studies in terms of results. It would have been more informative to present data on the sensitivity and specificity of clinical assessment of the mediolateral patellar position in comparison to the reference standard of MRI, if such data were available, rather than to simply report the ICC.

This was generally a well-conducted review and the authors' conclusions are likely to be reliable, but (as acknowledged by the authors) they were based on a small number of studies with some methodological limitations.

**Implications of the review for practice and research**

**Practice:** The authors stated that as intra-test reliability appears satisfactory, clinicians can have some confidence that they have consistency in their measures between treatment sessions.

**Research:** The authors stated that further studies were required to directly compare the different clinical criteria (in particular the McConnell and Herrington methods) for the assessment of mediolateral patellar position in patients with well-defined patellofemoral disorders. Further research was required to determine the physiotherapist's abilities to translate their mediolateral displacement findings to specific taping placement to address abnormal patellar translation.

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