The effects of proprioceptive exercise and taping on proprioception in subjects with functional ankle instability: a review of the literature
Hughes T, Rochester P

CRD summary
This review concluded that there was a lack of high quality evidence assessing the effects of proprioceptive exercise and taping on measures of proprioception in patients with chronic functional ankle instability. This conclusion accurately reflects an evidence base of small, highly variable studies with high or unclear risks of bias. The recommendation that further research is required appears accurate for 2007.

Authors' objectives
To investigate the effect of proprioceptive exercise rehabilitation and taping techniques on measures of proprioception in patients with chronic functional ankle instability.

Searching
Five databases including MEDLINE, AMED and SPORTDiscus were searched from January 1985 up to February 2007. Search terms were reported. References of identified studies were checked. Only studies reported in English and published in peer-reviewed journals were eligible for inclusion.

Study selection
Randomised controlled trials (RCTs) and quasi-RCTs that assessed proprioceptive exercise therapy and therapeutic taping in people classified as having functional ankle instability or chronic recurrent lateral ankle sprains with a subjective feeling of instability/giving way were eligible for inclusion. Trials had to report a primary outcome that was directly related to proprioceptive outcome measures; these could include joint reposition tests, kinaesthesia (detection of active/passive movement), muscle response time, and postural control (stability/sway tests).

The included studies varied widely in the type of control group used (alternative treatment/no treatment for an injured group or uninjured individuals); the nature of the training or taping employed, and the outcome measures assessed. Durations of interventions also varied from two to ten weeks where reported.

Two reviewers assessed the studies for inclusion at title and abstract stage, with disagreements resolved through discussion. It was unclear whether this type of assessment was applied at full-text screening.

Assessment of study quality
Two reviewers independently assessed the studies for quality using the Scottish Intercollegiate Guidelines Network critical appraisal tool. Disagreements were resolved through consensus. Limited evidence meant that the authors did not restrict the synthesis to higher quality studies.

Data extraction
It appeared that data on key aspects of studies were extracted using a pre-specified form by two reviewers.

Methods of synthesis
The studies were combined in separate narrative synthesis (supported by evidence tables) for exercise rehabilitation and taping.

Results of the review
Thirteen studies were included in the review. Nine studies (including four RCTs) assessed exercises. Four studies (including one RCT) assessed taping. Sample sizes were very small, ranging from 10 to 48 individuals (total 238) for exercise and 17 to 43 individuals (total 84) for taping. In some cases, studies included uninjured people as controls plus people with ankle instability. The evidence was assessed as being of poor methodological quality, with RCTs not reporting details of randomisation or allocation concealment and most not having blinded outcome assessment. Quasi-RCTs often did not report selection methods. Across the studies there was poor reporting of dropouts before study...
Exercise: Four studies supported a role for proprioceptive exercise in improving postural sway, with two using a six-week composite exercise programme involving ankle discs, tilt boards and single-leg standing. Evidence for the impact of these programmes on joint reposition tests was inconclusive. Two studies indicated that proprioceptive retraining may improve peroneus longus muscle reaction time. Two studies suggested that ankle disc training improves the reaction time of the tibialis anterior. Studies differed sufficiently that it was not possible to identify the intervention characteristics required to make the training effective. There was some evidence (one study for each component) that agility ladder, theraband kicks, theraband strengthening and combinations of these may not be effective for improving postural sway. Single studies indicated some value in single-leg stand ankle disc training and Biodex stability system programmes for improving postural sway.

Taping: Three out of four studies suggested that taping may affect some measures of proprioception. Evidence for an impact on muscle reaction time and kinaesthesia was found from only one study in each case. Taping alone and taping combined with ankle disc training both showed impact on postural sway in single studies.

Authors’ conclusions
There was a lack of high quality evidence assessing the effects of proprioceptive exercise and taping.

CRD commentary
This review had a clear research question supported by specific inclusion criteria. The search used a large number of databases but the latest search year was 2007. The restriction to published studies in English means that some relevant studies may have been missed. The authors appeared to have used methods designed to reduce reviewer error and bias in each stage of the review process.

A quality assessment of included studies used appropriate criteria and was extensively reported. The narrative synthesis was appropriate in view of the differences between the included studies; the primary focus of the synthesis was the limited quality, high risk of bias and variability of the included studies. Brief summaries of the evidence of efficacy were provided, which were supported by the evidence tables. Reporting of statistical tests was limited to summary p-values.

The authors’ conclusion, that there was a lack of high quality evidence, accurately reflects the nature of the included studies which were all small and mostly subject to high levels of bias. The recommendation for further research appears justified, although it may have been superseded since the review was completed.

Implications of the review for practice and research
Practice: Although the authors did not state any implications for practice, they did state that differences between the interventions assessed made it difficult to recommend specific approaches.

Research: The authors stated that further high-quality clinical trials were required to enhance the evidence base and to guide physiotherapists in selecting appropriate and effective strategies for the management of functional ankle instability.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.