Ankle taping and bracing for proprioception

**AIM**
To determine whether ankle taping or bracing compared to no taping or bracing improves proprioception in people with a history of ankle sprain or functional ankle instability.

**SEARCHES AND INCLUSION CRITERIA**
Eight biomedical databases including MEDLINE, CINAHL and SPORTDiscus were searched from their inception up to March 2012 and the reference lists of all included articles were screened by hand. Study eligibility checks, data extraction and methodological quality assessment were all completed independently by two authors. Studies were eligible for inclusion if they included subjects who had a previous ankle sprain, compared a taped or braced condition with an untaped/braced condition in the same subjects (case-crossover design) and measured proprioceptive acuity. Methodological quality of included studies was assessed using relevant items from the scale of Downs and Black.

**INTerventions**
The review provides a simple description of interventions for inclusion: ‘a condition where tape or a brace was used on the sprained ankle and there was a control condition where no tape or brace was used on the same ankle’. Therefore, different types of tape application and brace types were included. These two interventions are the most used measures for preventing ankle sprain recurrences in sports medicine practise, besides ‘balance’ or neuromuscular training.

**RESULTS**
One low-quality and seven medium-quality or high-quality studies, with small sample sizes (n ranging from 16 to 31 participants) were included. Participants mainly consisted of young (20–35 years) recreational athletes from various sports. Definition of ‘history of ankle sprain’ varied considerably among included studies, ranging from self-reported sprain history (1–3 recurrences) to functional instability with or without explicit definition.

The mean differences in 19 of 32 comparisons reported were not significant, of the 13 comparisons that reported significant mean differences, 10 were positive, indicating better proprioceptive acuity in the taped/braced condition and 3 were negative, indicating poorer proprioceptive acuity. When considering both aspects of proprioception together there was no significant effect of ankle tape/brace. The pooled mean difference was 0.08°, 95% CI −0.39 to 0.55, there was significant heterogeneity among the studies (I²=87%). Negative values indicate poorer proprioceptive acuity on the taped/braced condition.

All the studies that reported positive effects were from those that measured joint position sense, and all those that reported negative effects were from studies that measured movement detection. Despite this, pooled effect sizes for both measure types were non-significant showing no effect of taping or bracing. For joint position sense, the mean difference was 0.20°, 95% CI −0.49 to 0.88 (I²=86%), for movement detection, the mean difference was −0.24°, 95% CI −0.71 to 0.23 (I²=64%).

**LIMITATIONS/CONSIDERATIONS**
The decision to narrow the definition of proprioception to joint position sense or sense of movement resulted in the exclusion of studies that used tests of balance, sway or peroneal reaction time. This limited the number of eligible studies considerably, but improved the comparability of those included and hence interpretability of the results. This decision is also congruent with the research question which sought to examine the effect of taping on proprioception directly, as opposed to the hypothesised functional consequences of reduced proprioception, for example, single leg stance time. However, inclusion of studies that exclusively use very specific, laboratory-based measures is not without a downside. It is unknown to the extent that these...
findings generalise to the simple tests of proprioception more commonly used in clinical settings.

Pooling of mean differences from the studies of the two measure types raises some issues of interpretation. Joint position sense estimates represent the accuracy in degrees with which a person can reposition their ankle to a predetermined spot after a movement, whereas estimates of movement detection represent the amount of movement in degrees that a person requires before they detect movement. Pooling these two types of estimates does not provide a readily interpretable figure, the apparent statistical heterogeneity may indicate that the comparisons should be considered separately.

Inclusion of different methods of tape application of different types of ankle brace potentially adds to the generalisability of the findings but adds clinical heterogeneity. Further heterogeneity is generated by the fact that there exists no universally accepted definition for chronic ankle problems, resulting in different inclusion criteria in the source studies. In both these cases though the decisions the authors have made appear reasonable from a clinical point of view.

CLINICAL IMPLICATIONS
This review is well conducted and thorough and uses accepted methods for study identification, data abstraction and analysis. The authors conclude that the available evidence suggests that joint position sense and sense of movement at the ankle is not increased with the use of ankle tape or ankle braces in people who suffer repeated ankle sprains. In other words, it remains unclear as to how taping and bracing actually work. It may be that currently used measures of joint position sense and sense of movement do not provide valid assessment of proprioceptive deficits and are therefore unsuitable for testing preventive measures. Nevertheless, in recognition of evidence that supports taping and bracing for preventing injury, the authors conclude that application of taping and bracing should not be discouraged.

Kasper W Janssen,1,2 Steven J Kamper1,3
1Department of Public & Occupational Health, EMGO Institute for Health and Care Research, VU University Medical Center, Amsterdam, Noord-Holland, The Netherlands
2Department of Sports and Exercise Medicine, Sports Medical Centre Jeroen Bosch Hospital, ’s-Hertogenbosch, Noord-Brabant, the Netherlands
3Musculoskeletal Division, The George Institute for Global Health, Sydney, New South Wales, Australia

Correspondence to Kasper W Janssen, Department of Public & Occupational Health, EMGO Institute for Health and Care Research, VU University Medical Center, Amsterdam, Van der Boechorststraat 7, Amsterdam 1081 BT, Noord-Holland, The Netherlands; kasperjanssen@thesportsphysician.nl, kw.janssen@vumc.nl

Contributors KWJ selected the review. KWJ and SJK wrote the article and read and approved the final manuscript.

Competing interests None.

Provenance and peer review Not commissioned; internally peer reviewed.


Received 2 October 2012
Accepted 2 October 2012
Published Online First 26 October 2012


REFERENCES
Ankle taping and bracing for proprioception

Kasper W Janssen and Steven J Kamper

Br J Sports Med 2013 47: 527-528 originally published online October 26, 2012
doi: 10.1136/bjsports-2012-091836

Updated information and services can be found at:
http://bjsm.bmj.com/content/47/8/527.full.html

These include:

References
This article cites 5 articles, 1 of which can be accessed free at:
http://bjsm.bmj.com/content/47/8/527.full.html#ref-list-1

Email alerting service
Receive free email alerts when new articles cite this article. Sign up in
the box at the top right corner of the online article.

Topic Collections
Articles on similar topics can be found in the following collections

- Injury (722 articles)
- Trauma (649 articles)
- Ankle instability (18 articles)
- Ankle sprains (4 articles)
- Health education (341 articles)

Notes

To request permissions go to:
http://group.bmj.com/group/rights-licensing/permissions

To order reprints go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to BMJ go to:
http://group.bmj.com/subscribe/