Reviewer's report

Title: Effect of foot orthoses on lower extremity kinetics during running: a systematic literature review.

Version: 2 Date: 12 October 2008

Reviewer: Sharon Dixon

Reviewer's report:

Major Compulsory Revisions

General Comments
This paper aims to explore literature regarding the influence of foot orthoses on kinetics. Following a systematic search of relevant databases, a small number of papers are identified which satisfy the inclusion criteria of the authors. The process followed to identify relevant papers appears comprehensive and logical.

There needs to be some justification for presenting a review that is based on just 10 papers, particularly when for some variables considered only one or two of these papers are considered.

The introduction section should present a clear argument for the focus on kinetic variables. Currently this is not the case. The argument seems to be that there appears to be no systematic change in kinematic variables and thus the authors propose to look at kinetics instead. This is not a strong argument.

It is not clear from the detail provided on the review methodology exactly what process was performed to exclude some papers from the original 1801. In particular, did just one person assess the appropriateness, or was this process repeated by more than one person to improve confidence in the screening process? Similarly, was the reduction from 31 articles to 10 just performed by one person? If so, can this be justified?

Introduction/Background
For much of this background section it is not clear why the detail is directly relevant to the purpose of the manuscript. The first paragraph commences with relevant detail concerning the frequency of running injuries, but then provides detail on the possible links between foot morphology and injury. This detail is not clearly linked to the subsequent focus on orthotics and kinetic variables, and thus does not support or justify the focus of the paper. Similarly, the detail presented regarding links between kinematic variables and orthotic devices does not help to justify the resulting focus on kinetics.

A more appropriate introduction would present a rationale for focus on the influence of orthotic devices on force/pressure/moments and thus make it clear why the authors want to evaluate evidence in this area.
Review - Loading Rate

Para 3 – according to table 4, papers 53 and 56 did not measure loading rate, but the results of these papers are included in this evaluation.

Para 4 – it would be useful to identify the specific papers that have conflicting findings.

Para 5 – I suggest an alternative word to ‘significant’, as this suggests some statistical analysis has been performed.

Para 6 – given the wide range in orthotic prescription and fabrication methods, are you confident that the orthoses used in different studies are equivalent?

Review – Rearfoot Inversion Moment

Para 2 – Can it be assumed that all three papers have reported the same finding when one of the three papers and one condition from a second paper did not reach significance?

Para 3 – please confirm whether you are referring to within or between subject consistency in running style of the participants.

Review – Plantar Pressure

I believe Van Gheluwe and Dannanberg (JAPMA, 2004) considered the influence of orthotic devices on in-shoe pressure. Is there a justification for omitting this paper from the review? I guess the question may be – how was ‘orthotic’ defined?

Para 3 – Paper 60 utilised a pressure plate (not a force plate).

In contrast to the suggestions of the authors, I believe that the different results for the papers 60 and 61 may be explained by the use of a pressure plate in one study and a pressure insole in the other. The pressure insole will detect load at the plantar surface of the foot. Thus, the presence of a device that is higher in the medial area of the foot will likely produce a higher load on the medial aspect owing to the device applying pressure in this area. In contrast, measurement beneath the shoe will provide detail on the balance of pressure on the medial-lateral shoe, and thus will not necessarily detect a higher load on specific areas of the plantar surface of the foot. This measurement procedure is more likely to detect a shift in movement to a less everted position, despite higher pressure on the medial aspect of the foot.

Review - Timing of Peak Force and Pressure

It is not clear why timing of peak force is considered separately to loading rate?

Para 1 – please provide further explanation on the demonstration of a relationship between peak impact force and loading rate by the presented data.
Para 2 – paper 60 appears to present data on the peak lateral and medial pressure timings. It is not clear that data are provided on the peak forefoot pressure. Which specific variable from the paper is being referred to here? Is this variable claimed to represent the start of the propulsion phase?

Para 3 – since there is only one study presented with each methodology, I am not convinced that there is ‘consistency’ in the findings.

Review – Force/Time Integral

Please explain in more detail the variable impulse and how a reduction and delay in impact peak may be used to infer this variable.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

'I declare that I have no competing interests'