Reviewer's report

Title: Deviations in Gait Metrics in Patients with Chronic Ankle Instability. A Case Control Study

Version: 1  Date: 25 August 2014

Reviewer: Cameron Powden

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Review of:
Deviations in Gait Metrics in Patients with Chronic Ankle Instability. A Case Control

The submitted paper presented here provides an interesting look at individuals with a history of ankle sprains. It investigates gait parameters during walking to describe CAI. As far as this review knows this would be one of the few or only articles using these specific outcome variables. Additionally, it seemed as though the authors aimed to look at the relationship between these gait measures and self-reported pain and function.

Even with these positives there are significant concerns with this manuscript. The most troublesome issue is with the reporting and classification of CAI. Within the discussion section of the paper discussed the difficulties of diagnosing CAI and that there were no accepted cut off scores for many of the commonly used inclusion criteria. I would like to direct the authors attention to the International Ankle Consortium position statement on the selection criteria for patients with CAI in research (Selection Criteria for Patients With Chronic Ankle Instability in Controlled Research: A Position Statement of the International Ankle Consortium, J Orthop Sports Phys Ther 2013;43(8):585-591. doi:10.2519/jospt.2013.0303) that came out in 2013. I understand that this may have come out after the initiation of your study but an effort should be made to adhere to its guidelines for reporting on CAI patients. Information is needed concerning number of previous ankles sprains, number of episodes of giving way and time since last ankle sprain at a minimum for the CAI group so that readers can determine CAI status on their own.

As the current manuscript is written there is insufficient reporting on the characteristics of the patients in general. It seems as though data was obtained via retrospective evaluation of physical therapy charts. The manuscript does not state why these subjects were at physical therapy at the time of their evaluations. It is important as it can allow readers to interpret if subjects had conditions that could influence the results. Additionally, with the information reported subjects with CAI could have been suffering from an acute sprain as no time frame from last sprain was provided. Because these subjects were therapy patients there needs to be more reporting on why they were at therapy.
Another major/minor concern had to do with the reporting of outcome variables and inconsistency of terminology. More information is need on the outcome variables to allow readers to get an appreciation of what they are measuring, as many clinicians do not use these computerized gait parameters often. Without a description of the outcomes readers will not be able to synthesize opinions of the findings on their own. The outcome measures reported are also classified spatiotemporal measures. From the data reported each outcome measure seems to be either spatial or temporal and not a mixture of both as a spatiotemporal measure is. An example of my point is the idea that velocity is strictly a measure of speed and does not deal with location, thus it would be a temporal measure. Reference to the CAI group is made in multiple ways (CAI, study group and patients). Please be consistent with terminology to make the manuscript easier to read.

Lastly, the discussion poses a section of major concern. The discussion seems to do little to add and expand on the findings in the report. Often findings from previous studies are stated but not tied into what they may mean in relation to the study. Thus further explanation on topics is needed to inform the reader. Additionally, some statements are a bit to bold for the results of the study. The idea that gait parameters could be utilized to qualitatively evaluate pain and function is one such statement. I feel it is more important to state that these may be areas to target to improve these scores of pain and function not that they could be a substitute. Another note is that with the retrospective nature of this study it does not allow use to determine if thee alterations in gait are preexisting or due to ankle sprain. I believe that gait differences in individuals with CAI are most likely due to proprioception, sensation and mechanoreceptor deficits due to ankle injury and force individuals to walk in the more cautious pattern that was found in this study. Perhaps, gait could be used as a measure to identify CAI but I don’t feel that targeting gait during rehab will improve self-reported function and you cannot claim this either from your study.

In conclusion I feel that this study is interesting and could be provide another vantage point on individuals with a history of ankle sprain. I have significant concern with the patient population although and determining, as the reader, if they are a true CAI population. I’m concerned that there may be other underlying pathologies in all subjects that have not been reported as all subjects were Therapy patients. This needs to be addressed before the article can move forward. Additionally, as the manuscript is currently written there are many holes and difficulties for the reader. Attention needs to be placed on consistency of terminology, using the correct terminology and explained the discussion to provide more explanation. I think that it would be best to focus the static proprioception deficits found in the literature and how they may relate to gait and how the found gait alterations by be indicative of such deficits.

**Level of interest:** An article whose findings are important to those with closely related research interests
Quality of written English: Needs some language corrections before being published

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.