Reviewer's report

Title: Joint space width of the tibiotalar joint in the normal foot

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Reviewer: Bernhard Zipfel

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General comments to authors:

This paper by Imai et al. presents an analysis of the joint space width of the tibiotalar joint in the healthy foot using CT to carry out the measurements. The study was carried out on a small sample of subjects (n=10) placing the ankle in "neutral", dorsiflexed and plantarflexed positions for measurement of the joint space. Even though similar studies have been carried out in the past, this study uses CT imaging which gives a better resolution and more precise measurement. The results suggest that there are significant change in joint space in particular areas of the ankle depending on the position of the foot. Even though the results are well set out, the manuscript would do well by summarising the results in a more succinct manner in the conclusions. This study will be a useful addition to the literature and of significance to a number of fields including orthopaedic surgery, functional morphology and biomechanics. It does however require some minor revision as set out below.

Minor essential revisions:

This study is well executed and the results are conclusive. There are however, a number of largely editorial issues and a few questions that need to be addressed before this manuscript can be considered for publication. The definition of the "normal" foot is somewhat ambiguous. You refer to the "healthy foot" in the text and I think this is a more appropriate term to use. Please consider using this in the title of your study and throughout the text.

The sample is small; do you have any idea if a larger sample may produce a different result and reflect a greater range of variation? I don’t see the ranges of joint space measurements. By including these, this may allay any fears of the sample being too small and a larger sample producing greater or lesser variation. The figures and tables are good and relevant; however, the captions for all could be greatly improved by giving more detail and being more specific. Please also check that the table format is appropriate for the Journal of Foot and Ankle Research. It may look better without so many visible lines both horizontally and vertically. I compliment the authors on an interesting study. Please take note of the specific comments below.

Specific comments and revisions:
Page 4, Line 49: Abstract; “to clarify the pathology...” seems a little awkward. Perhaps instead of “clarify”, use a words “better understand”.

Page 4, Line 54: Write out “CT” in the abstract i.e. Computerised Tomography (CT).

Page 4, Line 55: Consider using “plantarflexed” and “dorsiflexed”.

Page 4, Line 56: instead of “made”, consider using “fabricated”.

Page 6, Line 75: Should “…moving back and forth in association” not be “…moving back and forth during…”?

Page 6, Line 79: The term “valgus” is often used quite loosely in the orthopaedic and podiatric literature. It is however more specifically used to describe a fixed bony position. This is not necessarily the case in a “flatfoot”. Perhaps the use of “everted hindfoot” might be more appropriate.

Page 6, Line 81: “…osteoarthritis of the ankle of the lateral type” is a bit vague. Do you mean that the osteoarthritis occurs more laterally? Please clarify.

Page 6, Line 84: Consider deleting “authors measured”.

Page 6, Line 85: I suggest rephrasing this sentence to read “…the ankle joint was measured using healthy subjects [6-9]”.

Page 7, Line 92: The citation “Kido” should be Kido et al.? Please include citation number. Also check this throughout the text.

Page 7, Line 95: Everyone more or less understands the term “flatfoot”. However, it is a rather vague term, and perhaps another term could be used here. Would “hyperpronated” or “pes planus” be more appropriate? I have no objection to “flatfoot”, but wonder if you could not use more scientific terminology.

Page 9, Line 109: Be specific about the Medical Ethics Committee. You refer to your university, but authors are affiliated with a number of universities. Specify from which institution ethical approval was granted.

Page 9, Line 111: You refer to “healthy” volunteers; this is probably correct and better than using “normal”.

Page 9, Line 113: Is there a reason why males and females are not distributed equally, seeing that healthy volunteers were used?

Page 9, Line 117: Should be “plantarflexion and dorsiflexion”.

Page 9, Line 122: Reference to “neutral in all axes...” is rather vague. Does this refer to all the axes in the foot? Surely not? Also, neutral is a vague term and needs to be clarified. Is it neither plantarflexed, nor dorsiflexed? If so, is this with the subtalar joint in “neutral”? The tables reflect some of this, but don’t make it clear. This should be an important point as the degree of plantarflexion and dorsiflexion is influenced by the inverted or everted position of the calcaneus. My understanding of your study is that when you refer to maximally dorsiflexed or plantarflexed foot, it doesn’t matter what position the calcaneus moves, and this doesn’t influence the joint space narrowing or widening. The “neutral” position however, is important as this defines the point at which dorsiflexion and
plantarflexion begins. I understand what you mean, but please define these parameters.

Page 10, Line 129: Instead of using sole, I would suggest plantar surface.

Page 10, Line 142: Were the nine regions equally divided, or how was this division made? The table is good, but would be strengthened by more detail in the text and caption. Please specify. Also, should ‘anterior-posterior’ be ‘posterior-lateral’?

Page 12, Line 154: At the beginning of the sentence, should it be “The mean joint space….”, “malleolus” instead of “malleus”? Please check this throughout and correct where appropriate.

Page 12: Where you refer to no significant changes and significant changes, please include the p-value where relevant with reference to Table 3. It does not seem to be clear here.

Page 13, Line 170: Use “complex” instead of “complicated”.

Page 13, Line 173: You refer to the joint space width. I presume that this is the mean joint space width. If so, please say so.

Page 13, Line 178: Instead of saying “in the previous study”, rather refer to the study by Goker et al (if this is the one you are referring to). It is not clear which previous study you are citing.

Page 13, Line 179: Perhaps rather refer to population group rather than race.

Page 13, Line 180: Should the sentence start with “Jonsson et al.”? Also include the reference number [8]. In the following sentence, which authors are you referring to?

Page 14, Line 188: Consider using “precisely” instead of “exactly”

Page 14, Line 194: Use “anterior” rather than “front”, as you use “posterior” later on.

Page 14, Last sentence: Should start with Kido et al. and be numbered [12], if this is the reference you are citing (there are three Kido et als’.

Page 15, Line 214: A “couple” refers to two, strictly speaking. If you are referencing to more than two, rather say “several”.

Page 15, Line 217: “We therefore compared….”.

Page 16, Lines 224-226: You make a good point regarding the reproducibility regarding placing a load in dorsiflexion and plantarflexion. You may want to reflect this in the materials and methods section justifying why you did it this way.

Page 16, Lines 227-229: The last sentence is unclear and I’m not sure what you mean. Please rephrase accordingly.

Level of interest: An article of importance in its field

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:**

There is no conflict of interest.