Reviewer’s report

Title: Cross-sectional associations between variations in ankle shape by statistical shape modeling, injury history, and race: the Johnston County Osteoarthritis Project

Version: 0 Date: 10 Apr 2017

Reviewer: Todd Bredbenner

Reviewer’s report:

This study presents a reasonably novel approach to evaluating the relationships between 2D ankle shape and injury/race. However, I suggest that it is difficult to draw conclusions from the results given the uncertainty in causation of joint shape variation and the period of time between injury and capture of joint shape.

Specific comments

Page 3, lines 12-14

The intended meaning of the phrase "changing the ability of joint tissues to control forces" is not clear. Please clarify.

Page 3, lines 48-51

Are the authors referring to changes in the shape of the bones within the joint or in the relative alignment and orientation of the bones within the joint? It seems more likely that injury would lead to compensatory reactions, which would lead to variation in biomechanics, than change in joint shape. Please clarify.

Page 4, lines 4

It is not clear that Dr. Gregory pioneered statistical shape modeling, as Davies, Cootes, Twinning, Taylor, and others have published earlier studies. Please clarify.

Page 4, lines 42

It seems likely that sprains and fracture would have very different effects on joint mechanics and a different relationship to mechanics and loading conditions. Please discuss.

Page 5, line 20

Were landmarks positions corresponding or adjusted to be corresponding, in the sense of being located at the same anatomical points over the set of ankles? Please clarify.
What was the basis for selecting modes describing (only) 80% of the variability in the set of ankles? Please clarify.

How would the reported levels of inter- and intra-reader variability affect the result? Please provide context.

This phrase is not clear. A google search reveals a number of quantitative measures of variation between surface shape and surface orientation or relative surface orientation. Please clarify.

Please describe the "global shift."

Is the work presented in the abstract based on a different cohort than that of the current paper? It is not clear that this sentence adds value to the paper. Please clarify or remove.

The meaning of "easier … models" is not clear. Please clarify.

Also, it is not clear how predicted stresses obtained from 2D or 3D models would affect clinical practice. Please clarify.

This sentence is not useful as a conclusion. Please remove or clarify.

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Please indicate how interesting you found the manuscript:

An article whose findings are important to those with closely related research interests

Quality of written English
Please indicate the quality of language in the manuscript:

Not suitable for publication unless extensively edited

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