Reviewer’s report

Title: Etiological Factors in Hallux Valgus, a Three-dimensional Analysis of the First Metatarsal

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Reviewer: Edward Roddy

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This is a potentially interesting study which used three-dimensional CT to assess morphological changes associated with hallux valgus. Most existing studies have undertaken two-dimensional assessment using radiographs. There are some important issues with the manuscript however. As discussed below, some key methodological detail is missing, the statistical analysis needs to be revisited, and the volume of data presented is small.

Major comments:

1) Methods, patient selection (pg 6): no detail is provided of how hallux valgus cases were recruited from and how they were identified.

2) Methods, radiographic evaluation: who and how many observers read the CT scans? What was their professional background and experience/training? What is known about the reliability of the CT assessments undertaken in the study? Were inter- or intra-observer reliability assessed in this study, or are data available from previous studies?

3) Results: no descriptive characteristics are provided about cases and controls, apart from the mean age which is provided in the methods. This would be better placed in the results. The hallux valgus angle is provided for cases but not for controls - again this would be better placed in the results section. Are any other descriptive characteristics available such as musculoskeletal or other comorbidities? Did any participants have inflammatory arthritis, gout or osteoarthritis (OA)? The discussion (pg 11) states that care was taken that controls had no first metatarsophalangeal joint osteoarthritis - yet this is not mentioned in the patient selection section of the methods.

4) The data presented were obtained for 31 feet from 30 cases and 32 feet from 16 controls. This is problematical because the statistical analysis employed treats these as independent observations and does not take into account the fact that the cases mostly provided data on one foot each whereas the control feet consisted of 16 paired observations. The analysis needs to be revisited using statistical methods which take account of this.
Minor comments:

1) The first sentence of the introduction (pg 5) states that hallux valgus is one of the most common and significant forefoot problems in women. Whilst this is true and hallux valgus is more common in women than men, it is also a common and significant problem in men also so I feel it would be more accurate rather to refer to older people, not specifically women.

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