Reviewer’s report

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

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Reviewer: Trevor D Prior

Reviewer's report:

This is an interesting paper which introduces an analysis of the torsion within the first metatarsal in patients with hallux valgus. It is worthy of publication subject to the following comments.

Introduction, line 78.

The author's quote a paper from 1928 stating the first ray bears a large magnitude of ground reaction force due to the presence of the medial longitudinal arch. I understand the author's wish to indicate how first ray pathology can affect the foot, but I feel a clearer description/more up to date reference would be appropriate.

Line 84.

The author's quote a number of references relating to the shape of the metatarsal head and hallux valgus. However, the Kilmartin reference regarding juvenile hallux valgus concludes that assessing shape has little place in the scientific assessment of the deformity. The author's may be better reviewing the evidence and indicating that there is still some controversy and this would help to justify their investigation.

The reference below also referred to metatarsal shape but indicates that conclusions regarding the causality cannot be made from cross-sectional studies and may be worth including.


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Methods, line 100

Were the presence of hallux valgus on x-ray and the absence of features on CT scan the only inclusion/exclusion criteria?

Lines 106-111.

The author's report that the control group were taken from patient's who had CT scans for rearfoot pathology but no evidence of hallux valgus deformity or sesamoid subluxation on CT. The authors should at least consider that these are non-weightbearing assessments and could potentially underestimate the presence of hallux valgus. Can they confirm that the sesamoid position was completely congruent?

The author's could report the average hallux valgus angle and sesamoid deviation observed on the CT scan of the hallux valgus group. If all of these patients showed an angulation consistent with hallux valgus and sesamoid deviation greater than the control group, this would provide some support for their process.

Results, line 144.

The author's report that the torsion seem to occur in the diaphyseal region. As this is not a definitive result, how can make this conclusion?

I feel the author's should publish demographic details of the subjects (i.e. age range) and the hallux valgus angle on x-ray (mean and standard deviation). It may also be of interest to compare the degree of deformity on x-ray compared to CT (this relates to the comments above) and whether or not the degree of torsion relates to the degree of deformity.

Discussion, lines 159-160.

The author's have not discussed how the relative position of the metatarsal may change with weight-bearing. They have measured a rotation within the metatarsal in the subject group but the relative position of the first metatarsal in relation to the lesser metatarsals in weight-bearing or the ground might alter. It is possible that the rotation they see is adaptive which is something they go on to discuss but they should at least consider the effect of weight-bearing on the overall position.
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