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The resistance to failure of spring ligament reconstruction

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Highlights

- We examined 6 pairs of fresh frozen cadaveric specimens in a standardised and reproducible manner.
- Mean lateral translation measured as surrogate for assessing integrity of repair or reconstruction
- Traditional repair models fail to provide sufficient resistance to planovalgus.
- Using an augmented device such as the internalbrace provides optimal resistance to planovalgus.

ABSTRACT

Introduction:

The spring ligament (SL) is increasingly recognised as the major structure that fails in acquired adult flatfoot deformity (AAFD). This is the first study that demonstrates integrity of repair of the SL.

Patients and Methods:

Six pairs of fresh frozen cadavers were setup in a standardised fashion with ankle in plantargrade (mean age 59 years, BMI 25).

A 25N lateral force was applied to the medial metatarsal head using an algometer. Lateral displacement of the foot was measured with SL intact, sectioned, following FibreWire® repair, then Arthrex InternalBrace (IB) reconstruction, then with selective sectioning of each limb of the IB reconstruction.

Results:

In 12 specimens, overall lateral translation with SL intact was 21mm±4.9. This increased to 39.2mm±10.9 ($p<0.05$) with SL sectioning, no significant improvement to 34.2mm±9.5 with repair ($p=0.159$), before significantly returning to baseline 16.55mm±5.1 ($p<0.001$) with the IB. Augmenting with FDL did not influence lateral translation ($p = 0.586$).

Conclusion:

Restoration of SL integrity is fundamental to prevent flat foot. Our study shows traditional repair models fail to provide sufficient resistance to planovalgus. Using an augmented device

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