Superior Tuber Displacement in Intra-articular Calcaneus Fractures

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Disclosure

No Conflict to Disclose
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Our Disclosures are in the final mobile app.
We have no potential conflicts with this presentation.
Superior Tuber Displacement in Intra-articular Calcaneus Fractures

- Intra-articular calcaneus fractures result in heel shortening, widening, varus malalignment and loss of height.

- Little has been written regarding superior displacement of the calcaneal tuber which warrants consideration as previous literature has demonstrated issues arising from a shortened triceps surae.

- We sought to determine the amount of tuber elevation seen in calcaneus fractures as compared to normal calcanei and propose two new measurements.
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- Two novel measurements were utilized to establish normative data for calcaneal tuber positioning.

- Two lines were drawn from the superior most portion of the talar head, one tangential to the talar dome and the other to the superior most portion of the calcaneal tuberosity.

- The angle subtended by these lines was termed the **Talo-Tuber Angle**

- The distance between these two lines at the level of superior most portion of calcaneal tuberosity measured as a perpendicular was termed the **Talo-Tuber Distance**
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Talo-Tuber Angle : Yellow Arrow
Talo-Tuber Distance: White Arrow
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- Lateral radiographs of 220 normal calcanei were examined.
- Two novel measurements, the talo-tuber angle and talo-tuber distance, were utilized to establish normative data for calcaneal tuber positioning.
- Lateral radiographs of 50 calcaneus fractures treated operatively were examined and the same measurements were obtained before and after surgery to determine the amount of superior tuber elevation.
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- Normative data demonstrated mean:
  - 38.6 degrees (range: 26.2 to 58.44, SD=4.28) utilizing talo-tuber angle and
  - 54.46 millimeters (range: 36.15 to 72.57, SD=7.30) utilizing talo-tuber distance

- Patients sustaining calcaneus fractures demonstrated mean:
  - 29.54 degrees (range: 20 to 46.4, SD=5.86) for talo-tuber angle
  - 39.01 millimeters (range: 24.02 to 62.9, SD=9.41) for talo-tuber distance.

- These values changed after surgery to mean:
  - 37 degrees (range: 26.4 to 50, SD=5.18) for talo-tuber angle
  - 51.76 millimeters (range: 33.18 to 75.65, SD=8.62) for talo-tuber distance.
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- There was a statistically significant difference (P value <.00001) for both talo-tuber angle and distance between normal and fractured calcanei.
- After surgery the values returned to normal.

- Inter- and intra-observer agreement analysis resulted in an intra-class correlation coefficient of >0.97 demonstrating excellent inter- and intra-observer reliability.

- There was no statistical difference between male and females in terms of talo-tuber angle (P-Value = 0.8526), However, the difference between mean talo-tuber distance between male and females (7.75 mm) was statistically significant (P value <.00001) explained by the gender differences in calcaneal size.
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- An intraarticular calcaneus fracture.
- Talo-Tuber height and Talo-Tuber angle show decrease compared to a normal calcaneus.
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- Surgical technique used for addressing the shortening of calcaneus tuberous.
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- Superior displacement of the calcaneal tuber is a deformity seen in intra-articular calcaneus fractures that has been poorly described that warrants increased awareness and correction at the time of surgery.

- We propose two novel measurements with associated normative data that may aid surgeons in quantifying this deformity and assessing anatomic reduction.
References:


