

Number and Type of Fractures on CT Scan Is not a Predictor for Stability in Lisfranc Injuries

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Background/Purpose: Lisfranc injury is frequently accompanied by fractures of the metatarsal and/or tarsal bones. These fractures may vary from clearly visible on conventional radiographs to subtle small avulsion fractures on detailed CT imaging. It is unknown whether this CT imaging can be used to predict stability of the Lisfranc complex and subsequent determine the treatment plan. The gold standard for testing instability is the intraoperative stress testing. The aim of this study is to determine whether the number and type of fractures, as well as congruency of the Lisfranc complex, on CT imaging can be correlated with the stability.

Methods: In total 36 consecutive patients between 2007 and 2014 with a Lisfranc injury were analyzed using CT scan (coupes 0.7-1 mm), including 18 women and 17 men, median age 42 years (range, 13-84 years). After standard radiographs and CT scanning, a weight-bearing radiograph or intraoperative stress testing evaluated stability. One-way ANOVA (analysis of variance and X^2 test was used. CT-based parameters were assessed blinded from the presence of (in)stability.

Results: After stress testing, 10 injuries were classified stable and 26 injuries unstable. There was a significant difference in incongruency on CT scan for stable injuries 3/10, and unstable injuries 17/24 ($P = 0.035$). However, in 30% of patients false positive and false negative results for congruency in predicting instability was present. The number of fractures was on average 3.4 (34/10) in the stable group and 4.5 in the unstable group (117/26) (not significant). Regarding the localization of the fractures over the tarsal and metatarsal bones, only a significant difference in the involvement of the cuboid was present, 1/10 in the stable group versus 12/26 in the unstable group ($P = 0.046$).

Conclusion: Incongruency on CT scan of the Lisfranc injury is correlated with instability, whereas the number of fractures does not correlate. Regarding the type of fractures the existence of tarsal fractures seems to matter but is not a good predictor for stability in Lisfranc injuries.