

**Ankle Fracture Complexity Does Not Predict Functional Outcome:
A New Validated Scoring System Contradicts Established Belief**

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Purpose: The present study applies the validated Foot and Ankle Ability Measure (FAAM) to trimalleolar, bimalleolar, and isolated malleolar ankle fractures. We hypothesize that trimalleolar ankle fractures and fracture dislocations will result in significantly lower FAAM scores. Additionally, we hypothesize that the presence of a malreduced ankle or posterior malleolar fracture will result in lower functional outcome scores.

Methods: Patients treated for ankle fractures between January 2005 and January 2010 were identified through our institutional billing registry by CPT codes for operatively and nonoperatively treated ankle fractures, ankle fracture-dislocations, and syndesmotic injuries. All patients age 18 and older were included in the database query. Exclusion criteria included pilon fractures, concomitant ipsilateral extremity trauma, prior ankle injury, and subsequent ankle injury occurring prior to last follow-up. Patients were then recruited by phone and mailed the FAAM questionnaire. Patient charts were reviewed for demographic data and radiographs were reviewed to determine adequacy of reduction. Fractures were classified as isolated malleolar, bimalleolar, or trimalleolar. A subgroup with fracture-dislocations was also included. The presence of a syndesmotic injury, open fractures, and posterior malleolar fixation was noted for each patient. The mean outcome score was calculated for each group and data were analyzed using analysis of variance (ANOVA) or a Student *t*-test. The data str presented as a mean \pm standard deviation.

Results: Our query of the billing database identified 395 patients who sustained a first-time isolated ankle fracture, ankle fracture-dislocation, or syndesmotic injury. Of these, 97 who met inclusion criteria completed the outcome questionnaires and were included in the final analysis. There were 52 isolated malleolar fractures, 19 bimalleolar, and 26 trimalleolar. Of these, there were 26 ankle fracture-dislocations. There were 63 females and 34 males with an overall average age of 55 ± 15.5 years. The FAAM questionnaire was administered at an average 3.4 years postinjury. One-way ANOVA found no significant difference between any of the four groups for FAAM-ADL (Activities of Daily Living) ($F_{3,119} = 1.25$), $P = 0.3$) or for FAAM-Sport ($F_{3,119} = 1.4$, $P = 0.24$). When asked to rate their current level of function, 82% in the isolated malleolar and 84% in the bimalleolar group reported normal to near-normal level of function as compared to 65% of trimalleolar and 73% of the fracture-dislocation groups. The presence or absence of a posterior malleolar fracture had no significant impact on the FAAM-ADL (83.3 ± 19 vs. 87.6 ± 14.5 , $P = 0.35$) or FAAM-Sport subscales (67.5 ± 29.3 vs. 71.7 ± 27.1 , $P = 0.6$). Additionally, there were no significant differences in FAAM score when controlled for malreduced fractures (ADL, 84.4 ± 17.5 vs. 88.7 ± 16.1 , $P = 0.26$; Sport, 68.5 ± 31.1 vs. 77.1 ± 28.4 , $P = 0.14$).

Conclusion: We were unable to demonstrate a difference in outcome score between different fracture types at mean 3.4-year follow-up. This observation remained constant even when controlling for fracture malreduction. Patients in the isolated malleolar and bimalleolar groups

reported higher rates of normalcy than the more complex patterns. When basic treatment principles of fracture care are applied to ankle fractures, the outcomes are similarly positive between fracture types at medium-term (3.4-year) follow-up.

- The FDA has not cleared this drug and/or medical device for the use described in this presentation (i.e., the drug or medical device is being discussed for an “off label” use). For full information, refer to page 600.