

The Captain's View: A Novel Radiographic View to Assess Axial Alignment of the Calcaneus

Brian Velasco, BA, Bruno Moura, MD, John Kwon, MD

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Introduction/Purpose: The axial alignment of the calcaneus has paramount importance in the management of these fractures. The Harris view has long stood as the recommended radiograph to assess axial alignment. However, given the obliquity at which the radiograph is obtained, it doesn't represent a true axial view and is subject to inaccuracies secondary to rotational malpositioning of the foot and mismeasurement of angulation. Multiple reports have described the axial alignment as a surgical outcome, but usually this assessment of the residual deformity have no described method.

The objectives of this study are to evaluate the capacity of Harris view to assess axial alignment in a cadaveric model and to describe the use of a true AP view of the calcaneus that we have named Captain's view.

Methods: Five below knee amputated fresh-frozen cadaveric specimens were used in the study. For each specimen, the soft tissues over the lateral side were removed to access to the lateral wall. A small wedge of the cuboid was removed to visualize the center of the calcaneocuboid articular surface. LCA-guide and a cannulated drill were used to create a tunnel in the axis of the calcaneus. An oblique osteotomy was performed in order to simulate a non-comminuted fracture. Varus deformity was created by inserting solid radiolucent wedges into the osteotomy to create models of 10, 20, and 30 degrees of varus angulation. Harris and Captain views were obtained for each specimen with 0 (control), 10, 20, and 30 degrees of varus malalignment. Measurements of the deformity were made digitally on each fluoroscopic image.

Results: The average degrees of varus in Harris views were 10,9 (5,5-16); 11,5 (8,2-13,6); and 18,3 (13,3-23,6) for 10,20 and 30 degrees of deformity respectively.

The average degrees of varus in Captain's view were 13,0 (7,3-20,9); 18,4 (11,7-23,5); and 28,2 (24,4-31,1) for 10,20 and 30 degrees of deformity respectively.

The average degrees of error for varus deformity in Harris views were 4,1 (41%); 8,4 (42%) and 11,6 (39%) for 10,20 and 30 degrees of deformity respectively.

The average degrees of error for varus deformity in Captain's views were 4,8 (48%); 3,6 (18%) and 2,8 (8%) for 10,20 and 30 degrees of deformity respectively.

Conclusion: The results of this study show a high rate of mismeasurement for both radiographic views. Despite the average angles have a clear correlation with the severity of varus, the wide range of error observed between specimens make this assessment unreliable and inaccurate. We observed an improvement of accuracy of captain's view for more severe deformities, but not with Harris views which maintain a 40% mismeasurement in all the settings. Therefore, intraoperative Harris views should not be used in isolation to evaluate axial alignment and Captain's view provides an additional perspective that can be useful to rule out severe deformities.