High Variability of Observed Weight Bearing During Standing Foot and Ankle Radiographs
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Introduction/Purpose: Weight bearing radiographs are a critical component of evaluating foot and ankle pathology. An underlying assumption is that patients are placing 50% of their body weight on the affected foot during image acquisition. The accuracy of weight bearing during radiographs is unknown and, presumably, variable, which may result in uncertain ability of the resultant radiographs to accurately portray the pathology of interest.

Methods: 50 subjects were tested. The percent body weight through the foot of interest was measured at the moment of radiographic image acquisition. The subject was then instructed to “bear ½ body weight” prior to the next radiograph. The percent body weight was calculated and compared to ideal 50% weight bearing.

Results: The mean percent body weight in trial 1 and 2 was 45.7% ± 3.2% (p=0.012 compared to 50% mark) and 49.2% ± 2.4%, respectively (p=0.428 compared to 50%). The mean absolute difference in percent weight bearing compared to 50% in trials 1 and 2 was 9.3% ± 2.25% and 5.75% ± 1.8%, respectively (p=0.005). For trial 1, 18/50 subjects were within the “ideal” (45-55%) range for weight bearing compared to 32/50 on trial 2 (p=0.005). In trial 1 24/50 subjects had “appropriate” (>45%) weight bearing compared to 39/50 on trial 2 (p=0.002).

Conclusion: There is substantial variability in the weight applied during radiograph acquisition. This study raises significant questions about assumptions we, as orthopaedic surgeons, have made regarding weight bearing radiographs, their reliability and how we should proceed when evaluating them.

Accuracy of Weight Bearing

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