

Any Cortical Bridging Predicts Healing of Supracondylar Femur Fractures

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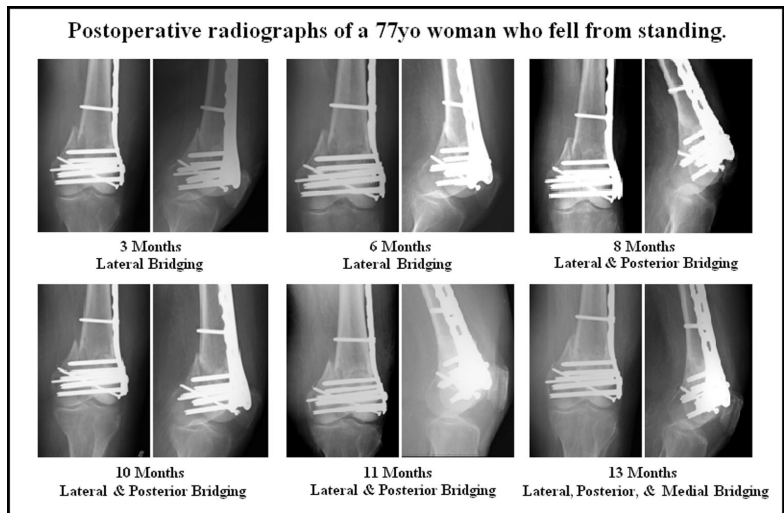
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Purpose: Locking plates are frequently used for fixation of supracondylar femur fractures, particularly in the setting of osteoporosis. This treatment has been increasingly associated with reports of deficient callus, nonunion, and need for secondary procedures with bone grafting. Outside of implant failure, there is no consensus regarding the radiographic and clinical criteria used to assess fracture healing. Ideally, a discriminating tool could accurately identify fractures bound for union versus nonunion based on information available in the first few months after injury. The aim of this study is to determine the accuracy and reliability of radiographic cortical bridging criteria in predicting the final healing of supracondylar femur fractures.

Methods: We retrospectively reviewed the records at two Level I trauma centers for patients who presented with supracondylar femur fractures (AO/OTA33A, C) and were treated with locking plate fixation between 1/1/2004 and 1/1/2011. The final study population included 82 fractures after excluding patients with open physes (n = 4), nondisplaced fractures (n = 4), early revision for technical failure (n = 4), or inadequate follow-up (n = 42). Postoperative radiographs until final follow-up were assessed for cortical bridging at each cortex on AP and lateral views. Analysis by three orthopaedic traumatologists allowed assessment of reliability. Final determination of union required both radiographic and clinical confirmation. Receiver operator characteristic (ROC) curve and X2 analyses were performed to determine the predictive accuracy of each criterion throughout the postoperative period.

Results: Assessment for any cortical bridging was the earliest accurate predictor of final union (95.1% accuracy at 4 months postoperatively), relative to criteria requiring bicortical bridging (93.9% accuracy at 6 months) and tricortical bridging (78% accuracy at 21 months). Any cortical bridging demonstrated a higher interobserver reliability (K = 0.73) relative to bicortical (K=0.27) or tricortical bridging (K = 0.5).



Conclusion: Our results for plate fixation of supracondylar femur fractures mirror those previously described for tibia shaft fractures following intramedullary nailing. Any radiographic cortical bridging by 4 months postoperatively is an accurate and reliable predictor of final healing outcome following locking plate fixation of supracondylar femur fractures. Assessment for bicortical or tricortical bridging is less reliable and inaccurate during the first postoperative year.

The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or medical device he or she wishes to use in clinical practice.