Early Weight-bearing and Mobilization vs Non-Weight-bearing and Immobilization After Surgical Fixation of Unstable Ankle Fractures: A Multi Centre Randomized Controlled Trial

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Background:

The optimal post-operative protocol with respect to weight-bearing and ankle range of motion following surgical fixation of acute ankle fractures remains elusive. Convention dictates non-weight-bearing and immobilization for six weeks post-operatively, but a more contemporary approach utilizes early weight-bearing. Early weight-bearing has the potential to expedite return to work and function, thus reducing cost to health care; however, there is a concern regarding the potential risk of loss of fixation or wound complications. Our goal was to conduct a randomized controlled trial comparing early weight-bearing and mobilization to non-weight-bearing and immobilization after surgical fixation of unstable ankle fractures.

The primary outcome for this study was rate of return to work; secondary outcomes included ankle range of motion, SF-36 health outcome scores, Olerud/Molander ankle function score, and rates of complications (wound complication, loss of reduction, hardware failure, re-operation). Our null hypothesis was that there would be no difference with regards to time to return to work, functional outcomes, or rate of complications between the two groups.

Methods:

We conducted a multi-centre randomized controlled trial at two level one trauma centres. Power analysis using previous studies demonstrated a sample size of 110 based on our primary outcome. Patients who underwent acute surgical fixation of an unstable ankle fracture were approached for recruited from September 2010 to June 2013, and informed consent was obtained in all cases. Patients with work related injury or posterior malleolar fixation or syndesmosis injuries were excluded. All patients underwent a standard surgical protocol, and were kept non-weight-bearing for the first two weeks post-operatively. At the first post operative visit at two weeks, patients were randomized to one of two rehabilitation protocols: 1) Early weight-bearing or 2) Delayed weight-bearing.

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The early weight-bearing group was allowed to start weight-bearing as tolerated with use of a boot orthosis at two weeks post-op, they were also instructed to perform ankle range of motion exercises a few times a day. The delayed weight-bearing group was kept non-weight-bearing and immobilized in a cast for 6 weeks; then allowed to start weight-bearing at 6 weeks post-op by use of boot immobilizer, and perform ankle range of motion exercises.

Patients were seen in followup at 2 weeks, 6 weeks, 3 months, 6 months, and 12 months post-operatively. At each visit patients underwent assessment of their wound, ankle range of motion, and radiographs of the fracture; they also completed the SF-36 health outcome survey, as well as the Olerud/Molander ankle functional outcome survey.

Results:

In total 110 patients were recruited: 56 were randomized to early weight-bearing and 54 were randomized to the delayed weight-bearing groups. Patients were 47% female, 53% male, with a mean age of 42 years (range 19-76 years). There were no differences between the two groups with regards to demographics, pre-injury type of occupation (labour, active, sedentary), side of injury, type of fracture, or time to surgery.

There was no difference between the two groups with regards to rate of to return to work at any time point. However, at 6 weeks post-op, patients in the early weight-bearing group had significantly improved ankle range of motion (42° vs 28°, p=0.001); significantly improved Olerud/Molander ankle function scores (44 vs 31, p=0.002), as well as significantly improved SF-36 health outcome scores on both the physical (50 vs 42, p=0.008) and mental (62 vs 54, p=0.005) components. There were no cases of fixation failure, loss of reduction, or repeat operation in either group at any time point. There were also no differences with regards to wound complications or infections.

Conclusion:

This randomized study of early versus delayed weight-bearing demonstrated no significant difference with regards to rate of return to work with surgically treated ankle fractures. However, patients treated with the early weight-bearing protocol had significantly improved ankle range of motion, ankle function, and higher mental and physical health outcome scores early in the post-operative period. There were no failures of fixation or differences in wound complications between the two groups. Given the convenience for the patient, the early improved functional outcome, and the lack of an increased complication rate with early weight-bearing, we recommend early post operative mobilization and weight-bearing in patients with surgically treated ankle fractures.