

# Clinical Outcomes in Early Weight Bearing of Posterior Malleolus Fractures Associated with Tibia Shaft Fractures

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**Disclosures:** None

**INTRODUCTION:** Posterior malleolus fractures can often occur concomitantly with tibia shaft fractures. The incidence of these associated injuries has reported to be between 0.6%-25% in the literature. A greater number of tibia shaft fractures with an associated posterior malleolus fracture have been reported in the recent years likely due to improved imaging technology and greater awareness of the associated fractures. Intramedullary nailing with open reduction or percutaneous screw fixation of the posterior malleolus is the primary treatment in these injuries. However, appropriate weight bearing status following these injuries is unclear. The purpose of this study was to compare early (<6 weeks postoperative) versus delayed (≥ 6 weeks postoperative) weight bearing for tibia shaft fractures with an associated posterior malleolus fracture at a single institution. Additionally, pre-operative comorbidities and postoperative PROMIS (Physical Function, Depression, and Pain Interference) scores, ankle range of motion (ROM), and complications were assessed to further evaluate any differences in time to weight bearing following surgery. We hypothesize that early weight bearing would result in greater improvements in PROMIS scores and ankle ROM without increasing the risk for postoperative complications.

**METHODS:** A retrospective cohort study was performed at a single level 1 trauma center between 2014-2023. Thirty-four patients with OTA/AO 43 fractures underwent intramedullary nailing with closed reduction percutaneous pinning to treat tibia shaft fractures with an associated posterior malleolus fracture. Patients with either bimalleolar or trimalleolar ankle fractures were excluded. The early or delayed weight bearing status postoperatively was based on the surgeon's preference. The primary outcomes of this study were to assess the PROMIS scores subsets and ankle ROM of the patients at their follow-up visits. PROMIS score subsets included physical function, depression, and pain interference. Secondary outcomes included hospital length of stay, surgical site infections, maintenance of anatomic reduction, hardware removal for pain or infection, failure of fixation, postoperative sensory or motor deficits, associated syndesmotic injuries, and American Society of Anesthesiology (ASA) scores. Statistical analysis was performed using T-tests for continuous variables and chi-square tests for categorical variables. The significance level for each variable was set at P < 0.05.

**RESULTS SECTION:** This study included 18 patients in the early weight bearing protocol and 16 patients in the delayed weight bearing protocol. The mean length of follow up was 7.9 ± 11.3 and 7.7 ± 8.5 months for the early weight bearing and delayed weight bearing groups, respectively (P = 0.934). Demographics and comorbidities were similar between the two cohorts (P > 0.05). However, the operative time for patients in the delayed weight bearing protocol was significantly longer (214.31 ± 131.27 minutes vs. 132.67 ± 40.67 minutes, P < 0.028). There were no statistically significant differences in ankle ROM, PROMIS sub-scores, and postoperative complications between the two groups (see table). Both cohorts also had similar rates of surgical site infections, post-operative nerve deficits, and hardware removal for pain (see table).

**DISCUSSION:** Our study indicates that both early and delayed weight bearing after percutaneous fixation of posterior malleolar fractures associated with tibial shaft fractures can have good return to function and range of motion with no difference in complication rates. Limitations of this study include a small sample size for both cohorts, use of retrospective data, and a lack of consistent methodology for evaluating ankle ROM.

**SIGNIFICANCE/CLINICAL RELEVANCE: (1-2 sentences):** Despite the traditional standard of care of delayed weight bearing for proper fracture healing and prevention of hardware failure in malleolar fractures, we did not find that early weight bearing in percutaneously fixed posterior malleolus fractures associated with tibial shaft fractures compromised recovery. This study indicates similar surgical and clinical outcomes between the early weight bearing and delayed weight bearing cohorts, which can potentially help guide postoperative treatment plans for these patients, as the incidence of these injuries continue to grow.

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	Early (<6 weeks)	Delayed (≥6 weeks)	P-Value
<b>Full dorsiflexion</b>	9 (50%)	11 (68.8%)	0.268
<b>Full plantarflexion</b>	8 (44.4%)	7 (43.8%)	0.968
<b>PROMIS: Physical Function</b>	33.4 ± 8.4	32.3 ± 9.1	0.645
<b>PROMIS: Depression</b>	49.9 ± 8.3	51.2 ± 10.9	0.614
<b>PROMIS: Pain</b>	60.9 ± 7.4	62.0 ± 12.5	0.699
<b>Superficial infection</b>	1 (5.6%)	1 (6.3%)	0.932
<b>Deep infection</b>	0	1 (6.3%)	0.282
<b>Post-operative sensory/motor deficits</b>	3 (16.7%)	3 (18.8%)	0.874
<b>Hardware removal for pain</b>	3 (16.7%)	2 (12.5%)	0.732