

Do Concomitant Posterior Malleolar Fractures in the Setting of Tibial Shaft Fractures Affect Clinical Outcomes?

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INTRODUCTION:

The purpose of this study was to determine if the presence and/or fixation of posterior malleolar fractures (PMFs) in the setting of tibial shaft fractures (TSFs) affects postoperative outcomes.

METHODS:

All TSFs presenting to one of three hospitals within a single institution were retrospectively reviewed for demographic, injury, operative, and postoperative parameters (time to healing, return to work, ankle range of motion, knee range of motion, wound complications, fracture-related infection, and tibial shaft nonunions). Patients with and without PMFs were statistically compared, and a subanalysis of PMF-only patients with and without prophylactic fixation was also performed.

RESULTS:

There were 397 TSF patients identified, with 46 lost to follow up, leaving 351 (88.4%) TSF with a mean of 14 months follow up to be included in the analysis. This cohort was composed of 65% (228) males, with an average age of 43.5 years. Eighty-eight (25.1%) had an associated PMF. There was no difference in time to final follow up. There was no difference in the average amount of time to weightbearing postoperatively (5.82±2.4 versus 6.00±5.1 weeks, p=0.734). Additionally, there was no difference in time of healing, rate of return to work, wound complications, fracture-related infection, or tibial shaft nonunion (Table 1). Patients with PMFs had more ankle plantarflexion (36.22±10.1 versus 32.80±9.6 degrees, p = 0.040), knee extension (0.0±0.0 versus 1.13±5.0, p = 0.006), and knee flexion (127.23±9.8 versus 122.22±17.6, p = 0.014), however there was no difference in ankle dorsiflexion (16.33±8.1 versus 15.68±10.7, p = 0.670) at final follow up. Within all patients with PMFs, there was no difference in ankle dorsiflexion/plantarflexion and knee extension/flexion between those who did and did not undergo prophylactic fixation (Table 2).

DISCUSSION AND CONCLUSION:

Patients who sustain TSFs with concomitant PMFs have similar ankle and knee range of motion at one-year postoperatively compared to patients without PMFs. Other clinical outcomes do not appear to be affected by the presence and/or fixation of PMFs in the setting of tibial shaft fractures.

Table 1. Comparison of Tibial Shaft Fractures with and without Posterior Malleolar Fractures

Fractures	Total (n = 351)	No Posterior Malleolar Fracture (n = 263)	Posterior Malleolar Fracture (n = 88)	Sig.
Age (years)	43.50±16.0	44.05±16.5	41.86±14.3	0.233
Male Sex	65.0% (228)	66.2% (174)	61.4% (54)	0.245
BMI (kg/m ²)	27.47±5.0	27.57±5.4	27.17±5.5	0.592
Diabetic	11.4% (40)	12.5% (33)	8.0% (7)	0.164
Active Smoker	30.2% (106)	30.4% (80)	29.5% (26)	0.495
High Energy	54.3% (195)	62.0% (168)	7.5% (7)	<0.001
Open Fracture	28.7% (103)	34.3% (93)	11.4% (10)	<0.001
Fibula Fracture	83.0% (298)	80.1% (217)	92.0% (81)	0.005
Additional Injuries	22.0% (79)	23.6% (64)	17.0% (15)	0.125
NWB Post-Operatively	52.9% (190)	45.0% (122)	77.3% (68)	<0.001
Time NWB Post-Operatively (weeks)	5.94±4.4	6.00±5.1	5.82±2.4	0.734
Time to Healing (months)	3.97±2.7	4.02±2.9	3.83±2.1	0.623
Return to Work (months)	5.17±5.3	5.35±5.5	4.70±4.8	0.601
Final Follow-Up (months)	14.87±16.2	15.27±16.5	13.61±15.2	0.384
Ankle Dorsiflexion at Final Follow-Up (degrees)	15.87±10.0	15.68±10.7	16.33±8.1	0.670
Ankle Plantarflexion at Final Follow-Up (degrees)	33.80±9.8	32.80±9.6	36.22±10.1	0.040
Knee Extension at Final Follow-Up (degrees)	0.86±4.4	1.13±5.0	0.0±0.0	0.006
Knee Flexion at Final Follow-Up (degrees)	123.41±16.2	122.22±17.6	127.23±9.8	0.014
Wound Complication	15.1% (52)	16.8% (44)	9.6% (8)	0.075
Fracture-Related Infection	11.7% (40)	7.5% (6)	13.0% (34)	0.126
Tibial Shaft Fracture Nonunion	7.5% (24)	8.3% (20)	5.1% (4)	0.260

Table 2. Posterior Malleolar Fractures with and without Prophylactic Fixation

	No Prophylactic Fixation (n = 46)	Prophylactic Fixation (n = 42)	Sig.
Age	43.63±16.4	39.93±11.4	0.219
Male Sex	60.9% (28)	61.9% (26)	0.548
BMI	27.46±4.2	26.97±4.7	0.691
Diabetic	10.9% (5)	4.8% (2)	0.256
Active Smoker	21.7% (10)	38.1% (16)	0.074
High Energy	23.9% (11)	38.1% (16)	0.113
Open Fracture	13.0% (6)	9.5% (4)	0.429
Time NWB (weeks)	5.47±2.1	6.13±2.6	0.248
Fibula Fracture	87.0% (40)	97.6% (41)	0.070
Haraguchi Classification	1: 64.3% (27) 2: 14.3% (6) 3: 21.4% (9)	1: 76.5% (26) 2: 20.6% (7) 3: 2.9% (1)	0.057
Intra-Operative Displacement	2.2% (1)	0% (0)	0.523
NWB Post-Operatively	67.4% (31)	88.1% (37)	0.059
Time to Healing (months)	3.61±2.38	4.03±1.87	0.422
Return to Work (months)	6.45±6.5	3.3±2.05	0.105
Final Follow-Up (months)	10.72±9.5	16.77±19.28	0.071
Ankle Dorsiflexion at Final Follow-Up (degrees)	17.95±9.2	15.00±6.9	0.207
Ankle Plantarflexion at Final Follow-Up (degrees)	37.27±12.0	35.37±8.4	0.519
Knee Extension at Final Follow-Up (degrees)	0.0±0.0	0.0±0.0	0.519
Knee Flexion at Final Follow-Up (degrees)	125.00±11.1	129.20±8.1	0.143
Wound Complication	11.4% (5)	7.7% (3)	0.427
Fracture-Related Infection	9.8% (4)	5.1% (2)	0.362
Tibial Shaft Fracture Nonunion	7.7% (3)	2.6% (1)	