Early Versus Standard Weight-Bearing following Surgical Treatment of Tibial Plateau Fractures: Do We Really Have to Wait 10-12 Weeks?

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INTRODUCTION:

In the United States, postoperative management of tibial plateau fractures classically involves a prolonged period between 10-12 weeks of non-weight-bearing. Anecdotally, early weight-bearing has been reported, but not reported in the literature. The goal of this study was to compare the difference in clinical and radiographic outcomes between early weight-bearing and traditional weight-bearing protocols.

METHODS:

This was a single center retrospective review of 92 patients treated with open reduction and internal fixation of tibial plateau fractures from August 2018 to September 2020. Patients were grouped into early weight-bearing (EWB), defined as <10 weeks, and traditional non-weight-bearing (TWB) groups, defined as ≥10 weeks. The primary outcome measures were complication rates, postoperative range-of-motion (ROM), and time to radiographic union. Secondary outcomes included injury classification, mechanism of injury, surgical fixation method, bone grafting, time to full weight-bearing, and subsidence at an average follow-up time of one-year.

RESULTS:

Ninety-two patients met inclusion criteria including 35 patients in the EWB group and 57 patients in the TWB group. The EWB group had an earlier average time to weight-bearing versus the TWB group (6.5 ± 1.4 weeks vs. 11.8 ± 2.3 weeks, p<0.0001). There was no difference in classification of fractures treated between the two groups, with Arbeitsgemeinschaft für Osteosynthesefragen (AO)/Orthopaedic Trauma Association (OTA) B3 fractures the most common in the EWB group (38%), and C3 fractures the most common in the TWB group (38%) (p=0.29). Radiographic time to union was similar between groups (EWB: 93.5 ± 53.7 days, TWB: 103.7 ± 77.6 days, p=0.49). There was no significant difference between the cohorts in regard to radiographic signs of subsidence or early arthritis at 6 months or 1 year follow up (**Table 1**). At final follow up (EWB: 19.6 ± 12.3 months, TWB: 21.5 ± 14.6months), 1(3%) patient in the EWB group developed arthrofibrosis compared to 4(7%) patients in the TWB (p=0.65) (**Table 2**). Overall, there were no significant difference in all-cause complication rates (EWB:23% vs. TWB:34%, p=0.349), postoperative ROM (EWB:106.5 ± 22.1, TWB: 106.6 ± 21.6, p=0.99), or time to radiographic union (EWB: 93.5 ± 53.7days, TWB: 103.7 ± 77.6days, p=0.49).

DISCUSSION AND CONCLUSION:

Following surgical treatment of tibial plateau fractures, weight-bearing at 6 weeks is safe and allows patients to return to activity and work faster than traditional protocols. Of note, 'actual' weight-bearing was not able to be tracked for this study, and for future randomized trials, ability to truly track weight-bearing will be an important parameter to study. Furthermore, for future trials, an ideal radiostereometric analysis would be ideal to track quantitative subsidence, something we were unable to do in this analysis.

Table 1. Comparison of post-operative data between early weight bearing (EWB) and traditional weight bearing (TWB) groups.

Study Variables	EWB (n=35)	TWB (n=57)	P-value
Time to Weight Bear (weeks)	6.5 ± 1.4	11.8 ± 2.3	**<0.001**
Time to Union (days)	93.5 ± 53.7	103.7 ± 77.6	0.49
Post-operative arthrosis	1 (2.9%)	4 (7%)	0.646
Reoperation for subsidence	0 (0%)	0 (0%)	--
Post-operative range-of-motion	106.5 ± 22.1	106.6 ± 21.6	0.99
Complication at final follow-up	8 (23%)	19 (34%)	0.349
0-6 months	5 (14%)	8 (14%)	1.000
6 months - 1 year	5 (14%)	11 (19%)	0.586
1-2 year	5 (14%)	16 (28%)	0.2
Radiographic follow-up, months	13.1 ± 10.4	10.4 ± 7.3	0.088
>6 months	n=27 (79%) subsidence = 0 (0%)	n=42 (74%) subsidence = 0 (0%)	0.537
>1 year	n=22 (63%) subsidence = 0 (0%)	n=23 (40%) subsidence = 0 (0%)	**0.025**
Final clinical follow-up, months	19.6 ± 12.3	21.5 ± 14.6	0.511
>6 months	n=32 (91%) arthrofibrosis = 1(3%)*	n=51 (89%) arthrofibrosis = 3(5%)†	0.888
>1 year	n=29 (83%)	n=43 (75%) arthrofibrosis = 1(3%)‡	0.475
>2 year	n=22 (63%)	n=33 (58%)	0.687

*Treated with physical therapy, continuous passive motion machine, and dynasplint; †2 patients treated with physical therapy, continuous passive motion machine, and dynasplint and 1 patient underwent manipulation under anesthesia; ‡treated with manipulation under anesthesia.

Table 2. Comparison of complications data between EWB and TWB groups.

Complications	EWB (n=35)	TWB (n=57)	p-value
Infection	3 (8.6%)	4 (7.0%)	0.78
Arthrofibrosis	1 (2.9%)	4 (7.0%)	0.65
Conversion to UKA	1 (2.9%)	2 (3.5%)	0.86
ROH	1 (2.9%)	7 (12.3%)	0.15
Wound Dehiscence	1 (2.9%)	1 (1.8%)	0.73
DVT	0 (0%)	1 (1.8%)	0.62
Death	1 (2.9%)*	0 (0%)	0.38

Note: UKA = unicompartmental knee arthroplasty; ROH = removal of hardware; DVT = deep venous thrombosis; ACL, anterior cruciate ligament; *Due to traumatic brain injury secondary to motor vehicle collision