

Dual Plate Fixation for Distal Femur Fractures: A Multicenter Case Series

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Purpose: The optimal mode of fixation for treatment of distal femur fracture remains controversial. Biomechanical studies have demonstrated that dual-plate fixation (DPF) provides increased stiffness compared to other constructs; however, large clinical studies of DPF outcomes are lacking. The purpose of this study was to report on outcomes of patients with distal femur fractures treated with DPF in a large multicenter retrospective case series.

Methods: All adult patients with distal femur fractures who underwent DPF between 2012 and 2020 at 1 of 8 Level I trauma centers were identified. Patient demographics, injury characteristics, fracture classification, surgical details, implant, radiographic, and clinical outcomes were collected.

Results: Patient demographics, injury characteristics, and surgical details are summarized in Table 1. The cohort included 54 patients, with a mean follow-up of 18 months. The radiologic and clinical outcomes of DPF are summarized in Table 2. Of the 8 nonunion patients, 7 had suffered open injuries and had a bone void. Four (50%) of the 8 treated with titanium lateral plates each went on to nonunion. No demographic, injury, or surgical characteristics were significantly associated with risk of nonunion requiring reoperation. There was no association between the number of total proximal screws, cortical screws, locking screws, or far cortical locking screws with the risk of nonunion.

Conclusion: This multicenter case series of 54 patients is the largest series to date reporting on DPF for distal femur fractures. Despite a high proportion of open and comminuted fractures, we found a low rate of reoperation, radiologic deformity, or significant functionally limiting pain, suggesting that DPF provides a reliable treatment option across a variety of fracture morphologies.

Table 1: Dual Plate Fixation Cohort Patient, Injury, and Surgical Characteristics

Total Patients (N)	54
Age (mean, range)	53.3 years (16-85)
Female Sex	29 (54%)
Tobacco Use	18 (33%)
Diabetes	10 (18%)
BMI (mean, range)	29.1 (18-64)
Mechanism of injury**	
High energy	39 (72%)
Low energy	15 (28%)
Periprosthetic	10 (18%)
Intra-articular	38 (70%)
OTA classification	
A1	0 (0%)
A2	6 (11%)
A3	8 (15%)
C1	13 (24%)
C2	12 (22%)
C3	15 (28%)
Gustilo-Anderson	
Closed	29 (54%)
Type I	3 (6%)
Type II	5 (9%)
Type IIIA	16 (30%)
Type IIIB	0 (0%)
Type IIIC	1 (2%)
Comminution	
Medial	32 (59%)
Lateral	26 (48%)
Lateral Plate Material	
Stainless Steel	47 (83%)
Titanium	7 (13%)
Reduction	
Closed or Percutaneous	6 (11%)
Open	46 (89%)
Bone Void after Fixation	17 (31%)

Table 2: Dual Plate Fixation Cohort: Clinical and Radiographic Outcomes*

Total Patients (N)	54
Radiologic Outcomes	
Varus Collapse	6 (11%)
Hypermension deformity	4 (7%)
RUST score at 3 months	8.77 +/- 3.5 (1-14)
RUST above 12	27 (50%)
Reoperation	
Nonunion	15 (28%)
Arthrofibrosis	4 (7%)
Infection	3 (6%)
Pain	
Absent	13 (24%)
Mild, not functionally limiting	25 (46%)
Severe, functionally limiting	6 (11%)
Not reported	10 (19%)
Ambulatory	
No	6 (11%)
Yes	46 (74%)
Not reported	8 (15%)

* Categorical variables reported as N (%), continuous variables reported as mean +/- standard deviation (range)

** High energy injuries include automobile or motorcycle collisions, vehicle versus pedestrian, bicycle, or scooter, falls from height, gun shot wounds, and explosive injuries. Low energy injuries include ground level falls.

See the meeting website for complete listing of authors’ disclosure information. Schedule and presenters subject to change.