

## Dorsal Plating of the Patella: A Biomechanical and Clinical Series

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**Purpose:** Multiple methods of patellar fixation are utilized with rates of failure up to 30% and hardware irritation up to 60%. Additionally, comminuted fractures and distal smaller fragments are difficult to hold using cannulated screws and cables, leaving very few options providing good stability. Our purpose was to evaluate the use of dorsal minifragment fixation of patella fractures both biomechanically and clinically.

**Methods:** Biomechanical: We compared dorsal plating with both cerclage wiring and modified tension band cable fixation in a comminuted patella fracture model in 36 cadaveric patellae. After preloading to 50 N a graduated static load was applied followed by a polycyclic load to failure to evaluate stiffness of the construct. Constructs were tested in 0° and 45° of flexion. Clinical: We reviewed a consecutive series of patella fractures in 2 centers for reduction, union, complications, and range of motion (ROM).

**Results:** Biomechanical: Stiffness was greatest in dorsal plating in both 0° and 45°. Dorsal plating (976 and 1643) was greater than modified tension band cable (317 and 297), which was greater than cerclage (89.8 and 150.3). Clinical: We evaluated 51 consecutive patients (28 M, 23F; average age 48 years [range, 16-84]; ISS average 10.1; body mass index [BMI] 18-39) with 30 uncomminuted and 21 comminuted patella fractures fixed with dorsal 2.7-mm minifragment plates including a distal to proximal lag screw through the plate from the nose of the patella. 9 cases were small distal fragments not easily managed with screws and cables. A small split in the patella tendon origin was utilized to tuck the contoured plate around the nose allowing this screw position. 39 had additional screws or smaller miniplates in addition to the primary plate. All patients were followed through union and all reductions were felt to be anatomic or near anatomic. ROM in those followed >4 months averaged 1°-117°. There were 2 infections (1 superficial, 1 deep that also went on to nonunion) and 7 had hardware irritation and hardware removal (13.7%). Proximal extension of the plate to the superior surface atop the patella was associated with a higher rate of removal (24% vs 4%,  $P = .049$ ) than plates that ended on the dorsal surface of the patella.

**Conclusion:** Dorsal plating is biomechanically superior to modified tension band cable and cerclage techniques in comminuted patella fractures. Clinically, this strategy demonstrated results superior to those reported for tension band cable and screw techniques. In particular, this method allows for fixation of small distal pole fractures by hooking the nose of the patella.