

#445 - Experimental Study / Posters

## **Biomechanical Effect Of Additional Medial Plate Fixation In Lateral Locked Plating For Complex Distal Femur Fracture**

Trauma / Hip & Femur Trauma / Surgical Treatment

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### **Background**

Lateral locked plating is an excellent treatment option for distal femur fractures. However, distal locking screw may not be sufficient if arthroplasty components blocks screw path or far distal femur fracture limits number of distal screw.

### **Objectives**

The objective of this study is to establish the relative strength of fixation of an additional medial locked plate compared with the single lateral locked plate for distal femur fracture models.

### **Study Design & Methods**

Distal femur locked plates were applied to bridge a metadiaphyseal fracture in femur surrogate. A lateral locked construct with six distal locking screws served as the conventional control group (LP6S). Two different methods of fixation were evaluated: lateral locked plating with four distal locking screws (LP4S); and LP4S with additional medial plating (LP4S-MP). A vertical load (10 mm/min) was applied until femur failure. Load to failure, ultimate displacement, and mode of failure were documented.

### **Results**

Fixation strength (load to failure) of LP4S-MP (5522 N; range, 5199–5924 N) was 17.2% greater compared with LP6S (4713.3 N; range, 4587–4955 N;  $p < 0.05$ ) and 26.5% greater than LP4S (4273.2 N; range, 4143–4329 N;  $p < 0.05$ ). Ultimate displacement in axial loading was similar for LP6S (8.8 mm; standard deviation [SD], 1.9), and LP4S (9.1 mm; SD, 2.0), and most small in LP4S-MP (5.6 mm; SD, 0.7;  $p < 0.05$ ).

### **Conclusions**

The LP4S-MP construct proved stronger than the LP6S in terms of ultimate strength by Biomechanical testing of a simulated distal femur fracture. The lateral locked plate fixation with an additional medial plating is expected to secure biomechanical superior fixation and sufficient stability until bony union.