

## Clamp-Assisted Reduction Via Lag Screw Window in Cephalomedullary Nailing for Subtrochanteric Femur Fractures: A Technical Trick

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**Purpose:** Subtrochanteric (ST) femur fractures are complex fracture patterns with high complication rates and often require difficult reduction maneuvers to restore anatomic alignment due to strong deforming forces. Once it is decided to do open reduction and internal fixation, incisions should be strategically placed to allow control of the proximal fragment and facilitate clamp placement, while also minimizing the number of incisions to prevent creation of avascular skin bridges due to incision proximity. We exhibit a novel method to minimize skin incisions by predicting where cephalomedullary nail (CMN) fixation will be placed so a single incision can be used for both clamp-assisted reduction and for head-neck fixation.

**Methods:** We have utilized this technique on 22 patients since 2018. Excluding patients with less than 1-year follow-up and patients with pathologic fractures, 11 patients comprised this series. Closed reduction is attempted before proceeding to open reduction and internal fixation. Placement of a single lateral incision is determined by the following technique. The insertion jig with aiming arm for the CMN fixation is assembled on the back table. The jig is then placed on the anterior aspect of the prepped limb and positioned such that the jig is superimposed with the nail entry point at the tip of the greater trochanter using fluoroscopy. The sleeve for ultimate CM screw fixation is slid through the aiming arm and advanced down to the skin of the lateral thigh to mark the approximate location of the future incision needed for lag screw fixation. A roughly 5-cm incision is made at this location just posterior to the mid-lateral axis of the femur. This incision can be extended as necessary for proximal fragment control. Reduction clamps are left in place for the entire duration of intramedullary nailing, and not moved until both proximal and distal locking screws are secured.

**Results:** Mean age of included patients was 66 years (range, 17-93). There were 3 males and 8 females. Mean follow-up duration was  $1.95 \pm 0.8$  years. All surgeries were performed by one of two fellowship-trained orthopaedic traumatologists. Mean duration of surgery was  $96.9 \pm 15.9$  minutes. Long IMN implants were used in all but 2 patients. One patient had a short intramedullary nail (IMN) placed due to the presence of a stemmed total knee arthroplasty prosthesis distally. The second short IMN implant was in a patient with significant bowing deformity to her femur due to osteogenesis imperfecta and multiple healed femoral shaft fractures. There were 2 complications in our series. One patient underwent removal of hardware of a lateral spanning femur plate. A second patient had a postoperative deep vein thrombosis. There were no nonunions or malunions observed.

**Conclusion:** This is a surgical technique trick that can be utilized to aid in reduction of ST femur fractures. Planning incision placement for open reduction in complex fractures minimizes complications while facilitating adequate reduction.