

Is the Posterior and Cranial Screw of the Inverted Triangle Configuration for Femoral Neck Fracture Fixation Safe?

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Purpose: In femoral neck fractures, a biomechanically advantageous construct is achieved with 3 screws placed in the inverted triangle fashion parallel to the peripheral cortex. Iatrogenic perforation of the posterior-cranial cortex may have devastating consequences with the potential for disruption of the vascular supply to the femoral head. The purpose of this study was to determine if the posterior-cranial screw that appeared contained on fluoroscopy did not violate the cortex.

Methods: Ten hemipelvises with the proximal femur were obtained from embalmed cadavers. Under fluoroscopy, only the posterior-cranial screw of the inverted triangle configuration was placed using standard technique. AP and lateral images of the final screw placement were blinded to 2 orthopaedic traumatologists and 1 musculoskeletal radiologist who were asked to determine if the screw radiographically breached the posterior-cranial cortex. Cadavers were stripped of soft tissues and inspected for screw perforation. Screws were grouped as contained, thread extrusion, or core extrusion.

Results: Reviewers classified all 10 screws as radiographically contained within the femoral neck. Cadavers were inspected and found to show: 4 of 10 with core extrusion (Fig. 1), 3 of 10 with thread extrusion, and 3 of 10 screws contained within the femoral neck.

Conclusion: 70% of screws that were judged to be radiographically contained had cortical breach near the area where the lateral epiphyseal vessels enter the femoral neck. We urge caution against placement of posterior-cranial implants even if they appear radiographically contained.

