Smith-Peterson vs. Trochanteric Flip Osteotomy: Which Technique Provides Better Intrumentability for Femoral Head Fractures?

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INTRODUCTION: The best surgical approach for fixation of femoral head fractures is often debated. Proponents for either approach cite similar exposure with each technique. However, the ability of each approach to instrument and fix a fracture based on location is unknown. The goal of this study was to quantitatively compare the instrumentable surface area of femoral heads exposed through two surgical approaches—modified Smith-Peterson (anterior) and trochanteric flip osteotomy (TFO). We hypothesized that the TFO approach would be able to instrument a larger area of the femoral head than the modified Smith Peterson Approach.

METHODS: Cadaveric specimens (n=4, 8 hips) underwent dissection via anterior and TFO approaches on opposite hips. Choice of left/right for each approach was alternated between each specimen. A drill hole was placed at 90 degrees from the surface of the femoral head to assess the instrumentable surface. A 2-dimensional surface map was created by wrapping the femoral head, marking anterior versus posterior cranial/caudle and digitally captured. The percentage area that accessible by drill was analyzed using ImageJ software. Exposed surface area percentages were compared using independent t-tests, with significance set at $p<0.05$.

RESULTS: The TFO approach allowed instrumentation of a significantly larger portion of the femoral head (81%) compared to the anterior approach (58%, $p=0.0154$). For the anterior half of the femoral head, TFO provided greater access (70% vs 49%, $p=0.0138$). Although TFO also allowed access to more of the posterior half (87% vs. 61%) and cranial half (81% vs. 32%), these differences did not achieve statistical significance. Similar exposure was observed for the caudal half (75% TFO vs. 76% anterior).

DISCUSSION AND CONCLUSION: Although visualization of the femoral head may be similar between the two approaches, the TFO approach provides greater overall access to instrument the femoral head compared to the anterior approach.