

Which Surgical Approach Provides the Greatest Exposure of the Femoral Head? A Comparison of the Smith-Petersen and Trochanteric Flip Osteotomy Approaches

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Purpose: Femoral head fractures are relatively rare injuries that occur because of high-energy trauma. Although rare, these injuries necessitate prompt and skillful orthopaedic treatment to avoid long-term functional sequelae for the patient. Choosing an appropriate surgical approach is therefore an essential part of preoperative planning, with multiple viable options. The purpose of our study was to calculate and compare the surface area exposed by two different surgical approaches to the femoral head (the Smith-Petersen and the trochanteric flip osteotomy). A qualitative comparison of the location of exposure between the two approaches was also conducted.

Methods: Dissections were conducted on eight cadaver pelvises, with a Smith-Petersen approach performed on one side and a trochanteric flip osteotomy performed on the other (16 approaches total with one of each approach performed on each pelvis). Each approach included a surgical hip dislocation. The amount of femoral head surface area exposed via each approach was calculated using digital image-capture software (ImageJ, Bethesda, MD). The calculations of area exposed were then compared using a paired sample t-test.

Results: The Smith-Petersen approach provided a significantly greater amount of exposure compared to the trochanteric flip osteotomy ($1328 \text{ mm}^2 \pm 379 \text{ mm}^2$ vs $1086 \text{ mm}^2 \pm 270 \text{ mm}^2$; $p = 0.017$). Qualitative comparisons of the location exposure demonstrated that the Smith-Petersen approach provided improved exposure of the anteroinferior head while the trochanteric flip osteotomy provided improved exposure of the posterosuperior head.

Conclusion: Both the Smith-Petersen with surgical hip dislocation and trochanteric flip osteotomy approaches are viable options for approach to the femoral head. Although the Smith-Petersen approach did provide a statistically greater area of exposure, both approaches provided a significant amount of exposure. This study also suggests that the region of exposure may vary between the two approaches with the Smith-Petersen providing improved exposure of the anteroinferior head while the trochanteric flip osteotomy provided a greater amount of exposure in the posterosuperior head.