

Femoral Head Fractures: Can We Change Outcomes?

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Purpose: Femoral head fractures are rare, and usually complex. High complication rates and poor outcomes make it difficult for surgeons to agree on the best course of treatment. The goal of this study is to compare treatment methods on the rates of complications and outcomes.

Methods: A multi-center retrospective cohort study was performed that included 32 ACS Level 1 Academic Trauma Centers utilizing patient data from 2005 to 2023. This timeframe was chosen to include the increased use of surgical hip dislocation (SHD) in the management of femoral head fractures. Patients were excluded if follow-up was less than 6 months. Data points evaluated include age, BMI, race, sex, mechanism of injury, history of dislocation, direction of dislocation, side of injury, Pipkin classification type, associated injuries and related procedures, medical comorbidities, treatment method, surgical approach (if surgery was done), complications, final follow-up time, and patient reported outcomes.

Results: **1678** patients were included. Mean age of 36.19 years (sd=11.84) from 470 (28.01%) females, 1206 (71.87%) males and 2 (0.12%) other sex groups. Motor vehicle crash was the most common mechanism of injury (79.7%). Most fractures were **Pipkin IV (1100, 65.6%)**, Pipkin I (219, 13.0%), Pipkin II (270, 16.1%) and Pipkin III (60, 3.6%). Associated dislocation occurred in 84.4% of patients and 92.2% were posterior. Posterior wall fractures were reported in 52.7%. However, an acetabular labral tear was only documented in 5%. 79% of fractures were treated operatively. **Posterior approach without surgical hip dislocation** was the most common surgical approach 38.9%. Major complications occurred in 522 patients (**31.3%**) and included **post-traumatic osteoarthritis 176 (10.5%), HO 98 (6.2%), and AVN 243 (14.5%)**. Operatively treated fractures were significantly more likely to develop complications and particularly HO. SHD was the most likely approach to develop HO (**7.1%**) but surprisingly the posterior approach (without surgical hip dislocation) was **0.46 times less likely to develop HO** when compared to the anterior-based approach. Conversion to total hip arthroplasty occurred in 24.9% of the 678 patients for whom this data was available.

Conclusion: This is the **highest-powered study** to date evaluating the treatment of femoral head fractures. Previous meta-analyses show complication rates approximately 37%. Our complication rate was approximately 31%. Previous reviews showed Heterotopic Ossification to be the most common complication, however Avascular Necrosis was our most common complication. 24.9% underwent conversion to arthroplasty secondary to all complications. Prospective data would be best, but the low incidence of this fracture makes a prospective trial difficult. This large data set can help educate patients on potential outcomes for these life-altering injuries.