Femoral Neck Fractures: When is open reduction necessary?

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Objectives

Review:

- Identify Epidemiology of young femoral neck fractures
- Review current treatment algorithms
- Discuss current literature on open versus closed treatment of young femoral neck fractures

Epidemiology

- 250,000 cases annually
- 3% occur in patients <50
- 45% will have major complication, 18-32% reoperation

Epidemiology

- AVN and Non-union are common complications
- Quality Quality Quality!
  - Young Femoral Neck Group: Poor quality red increases poor outcome OR 5.3
- AVN: no association with timing
- Nonunion: delay >24 hours

Predictors of Poor Outcomes

- Fracture Characteristics
  - High Pauwel's angle (Angle >50 deg)
  - Location, Displacement, Comminution (OR 2.6)
  - Associated Femoral shaft protective (OR 0.19)
- Patient Factors:
  - Age >50 (OR 3.64)
  - Metabolic bone disease (OR 1.8), Alcohol (OR 3.1), Smoking (3.64)

What is a good reduction?

- Ideal: <2mm displacement, <5 deg angulation
- Tolerances: <5mm displacement, <10 deg angulation

Clinical Trial > J Orthop Trauma. 2009 Jul;23(6):408-12. doi: 10.1097/BOT.0b013e31815ea017.

Interobserver reliability of classification systems to rate the quality of femoral neck fracture reduction

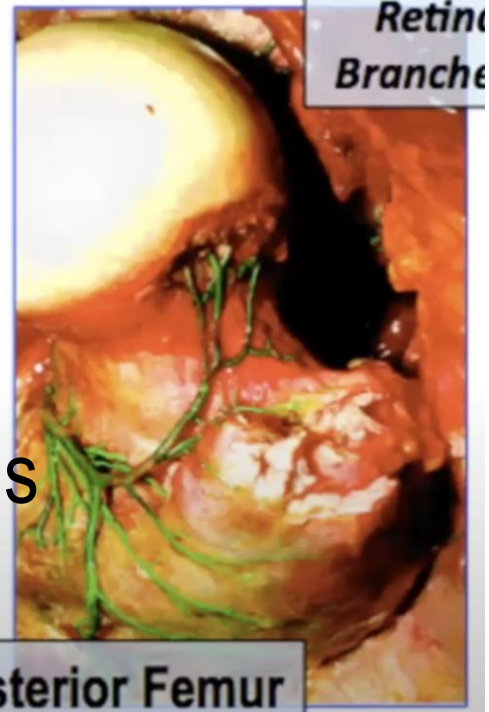
Paul J Karanicolas [1], Mohit Bhandari, Stephen D Walter, Diane Heels-Ansdell, David Sanders, Emil Schemitsch, Gordon H Guyatt

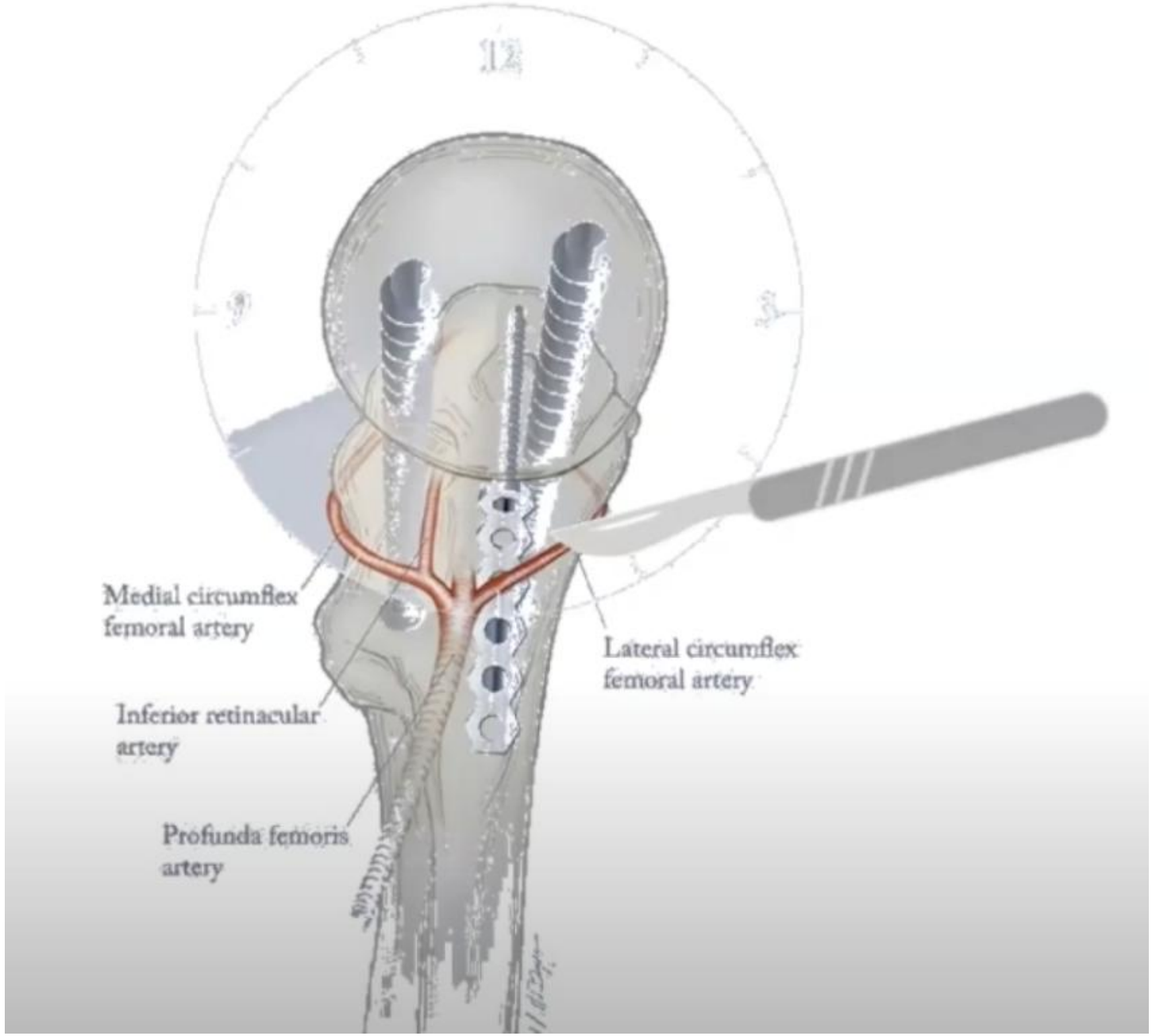
Affiliations + expand

PMID: 19550226 DOI: 10.1097/BOT.0b013e31815ea017

Open vs Closed Reduction

- Pros:
  - Open reduction may relieve intracapsular tamponade→ less damage to femoral head circulation
  - Direct visualization of reduction quality
- Cons
  - Opening capsule may damage anterior vessels (IRA, LFCA supply >50% blood supply to the femoral neck, MFCA to femoral head)




Medial circumflex femoral artery
Lateral circumflex femoral artery
Inferior retinacular artery
Profunda femoris artery

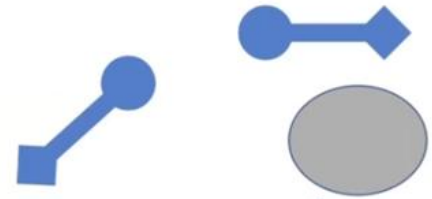
Treatment Options

- Fixed angle implants have lower treatment failures but higher AVN
  - FAITH (age 50+): AVN 9% SHS vs 5% Cannulated screws (p=0.03)
  - YFNWG & Meta Analysis: Treatment failure almost double with Cannulated screws vs Fixed Angle
- Add Medial Neck support (buttress plate, screw)
- Lowest tx failure with medial neck support and anti-rotation screw

When to open?

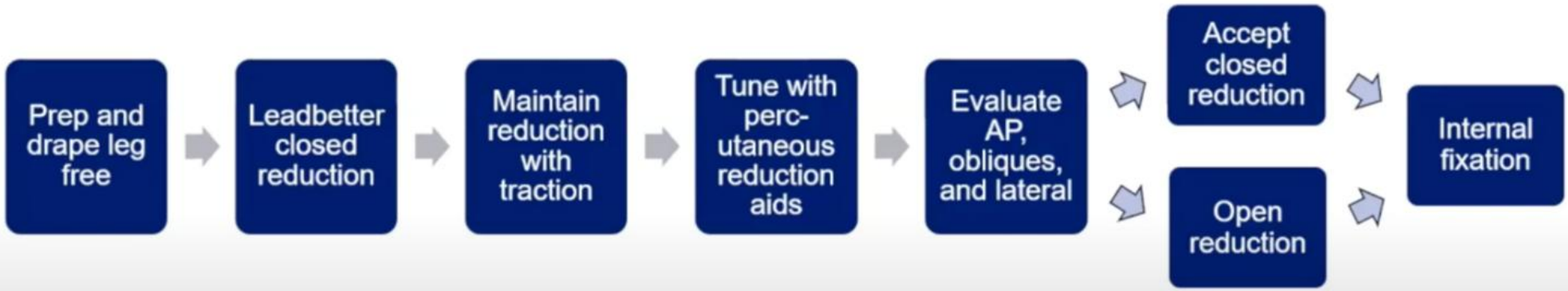
- When closed reduction/percutaneous reduction maneuvers do not work
- When Medial Neck support (buttress plate, screw) is needed
- High quality read that can be addressed with direct visualization
- Extension into the intertrochanteric region or femoral head
- Capsule entrapment

Prepare the leg ***free***



Bump

Radiolucent table


Prep and drape leg free
Leadbetter closed reduction
Maintain reduction with traction
Tune with perc-utaneous reduction aids
Evaluate AP, obliques, and lateral
Accept closed reduction
Open reduction
Internal fixation

Contents lists available at ScienceDirect

Injury

journal homepage: www.elsevier.com/locate/injury

Evidence based update: Open versus closed reduction

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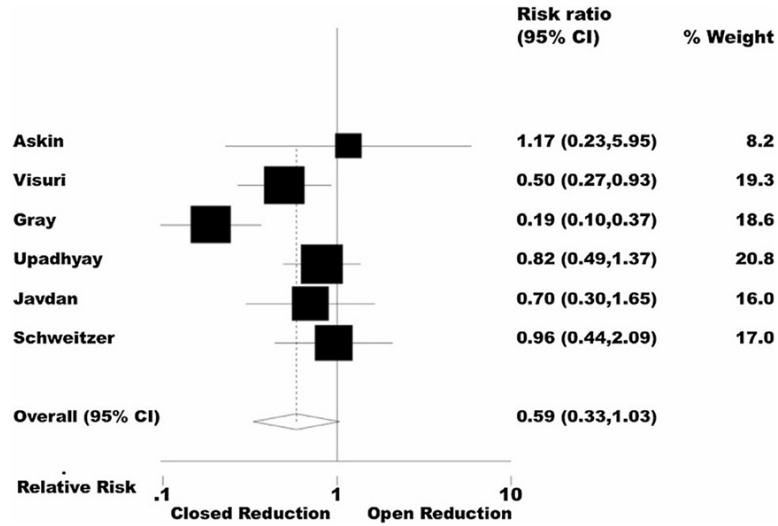

Fig. 4. Forest plot comparing relative risks of total complications in studies with both cases of open and closed reductions. The squares show the RR of total complications in fractures treated with closed reduction to those treated with open reduction. Error bars represent the 95% confidence intervals. The pooled RR of total complications in these studies was 0.59 (95% CI: 0.33–1.03). Heterogeneity chi-squared = 17.31 (df = 5) $P = 0.004$.

We did not find any significant difference in the incidence of nonunion, avascular necrosis or all complications combined between the open reduced and closed reduced groups, however we were able to show a higher rate of deep wound infection with open reduction

> J Orthop Trauma. 2020 Jun;34(6):294-301. doi: 10.1097/BOT.0000000000001711.

Open Reduction Is Associated With Greater Hazard of Early Reoperation After Internal Fixation of Displaced Femoral Neck Fractures in Adults 18-65 Years

Joseph T Patterson [1], Keisuke Ishii [1], Paul Tornetta 3rd [2], Ross K Leighton [3], Darin M Friess [4], Clifford B Jones [5], Ari Levine [6], Jeffrey J Maclean [1], Theodore Miclau 3rd [1], Brian H Mullis [7], William T Obremskey [8], Robert F Ostrum [9], J Spence Reid [10], John A Ruder [11], Anas Saleh [6], Andrew H Schmidt [12], David C Teague [13], Antonios Tsismenakis [2], Jerald R Westberg [12], Saam Morshed [1]

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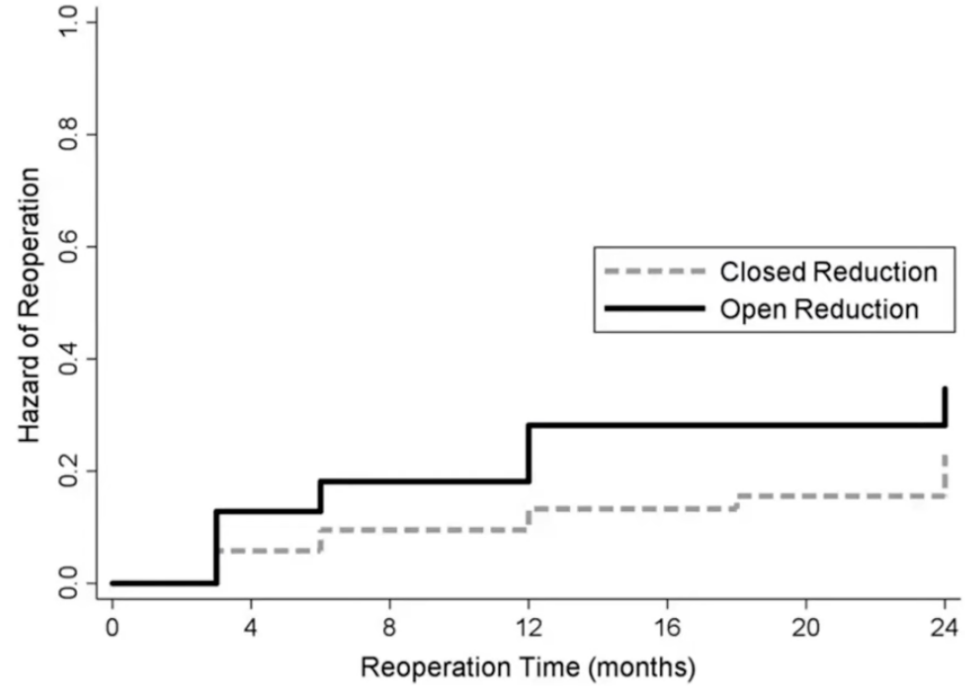
PMID: 32079891 DOI: 10.1097/BOT.0000000000001711

HR= 2.4 for reoperation



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AO Trauma Fellows NA Webinar —Femoral Neck Open vs Closed Reduction
(https://www.youtube.com/watch?v=mnoCznCSjrg**)**

Treatment of Femoral Neck Fractures in the Young - Dr. Morshed
(https://www.youtube.com/watch?v=hNSN5Gtq_MA**)**

Thank You

Acknowledgments: