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Subtrochanteric

Fractures

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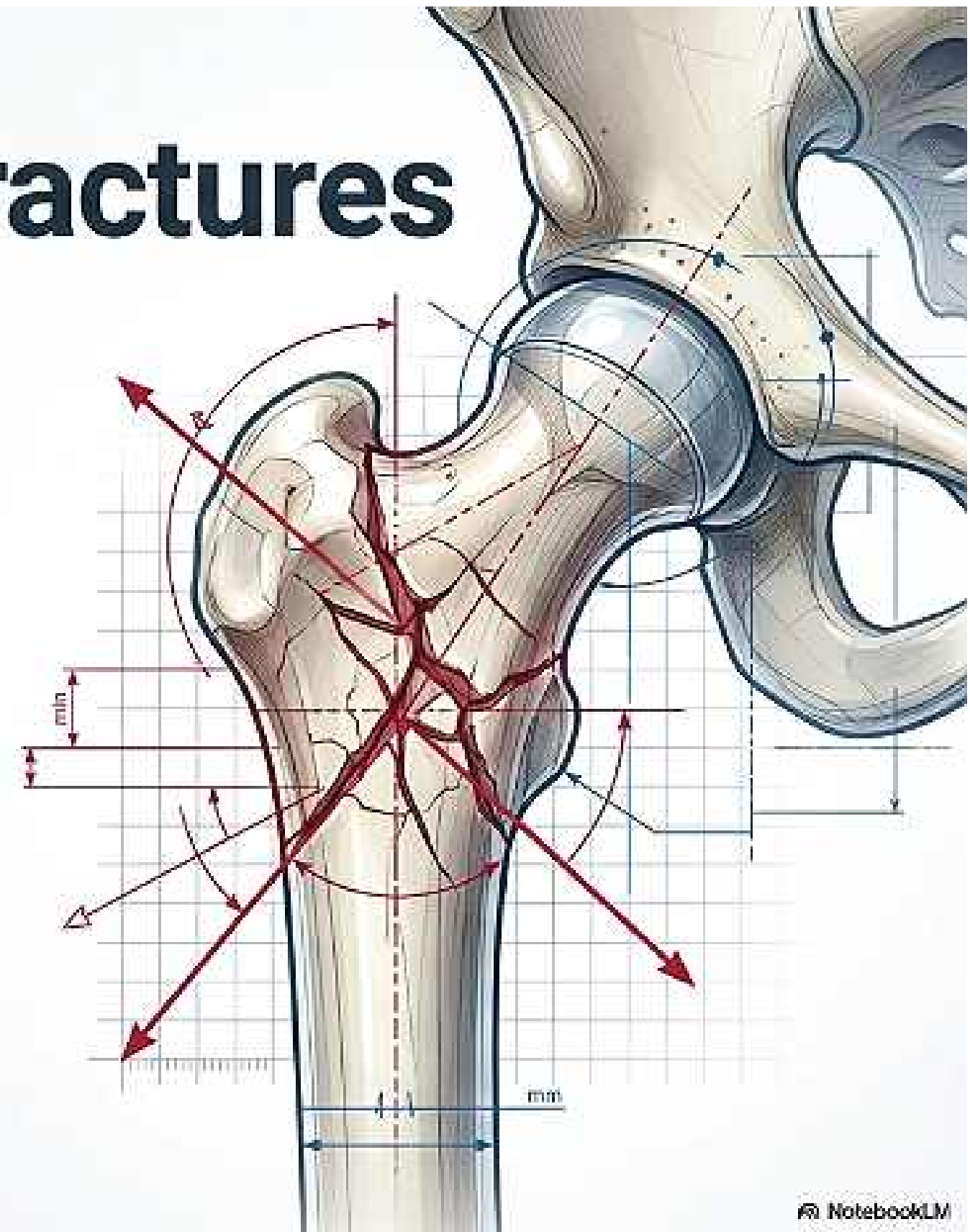


Subtrochanteric Fractures

A Rapid-Revision Masterclass

- Focused PG Residency rapid-revision
- Strict adherence to core textbook principles
- Emphasis on definitions, deforming forces, and surgical strategies

Exam Pearl: The subtrochanteric region is a high-stress transition zone where biomechanical understanding is more critical than isolated anatomical knowledge.



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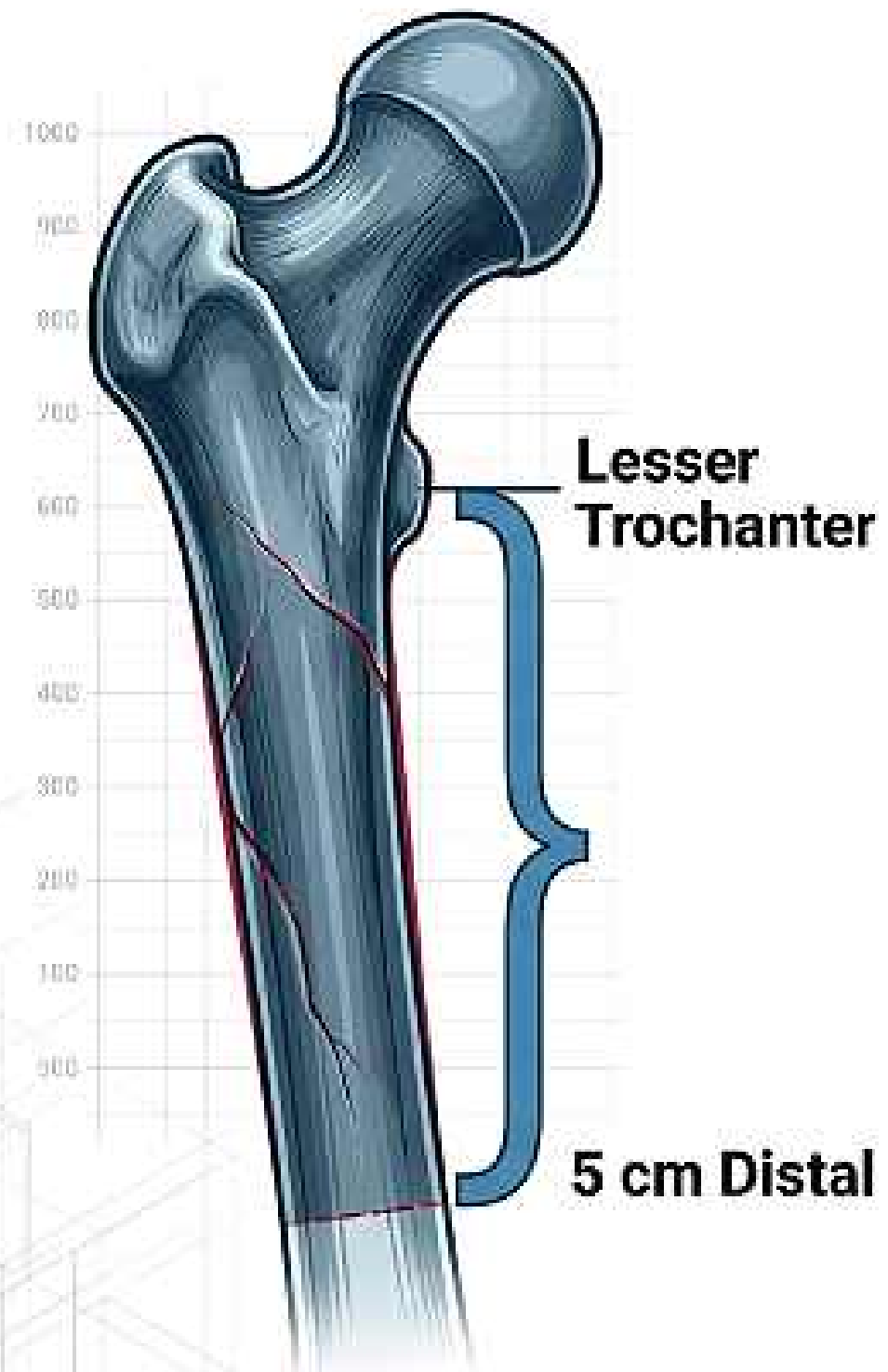
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Definition & Anatomical Transition Zone

- Fracture located entirely below the trochanters
- Proximal boundary: Lesser trochanter
- Distal boundary: 5 cm distal to the lesser trochanter
- Acts as the transition zone to the femoral shaft
- Preferred implant: Intramedullary (IM) nail

Exam Pearl: Strictly define the zone: from the lesser trochanter to exactly 5 cm distal. Any extension beyond changes the primary classification.

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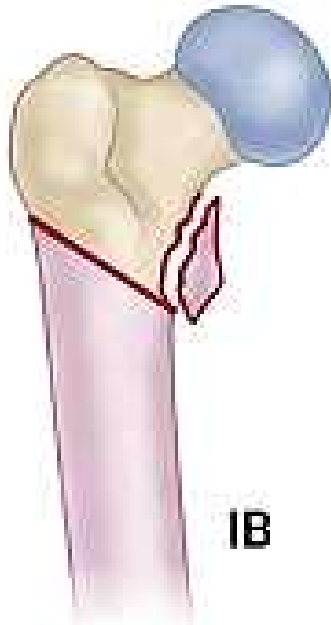
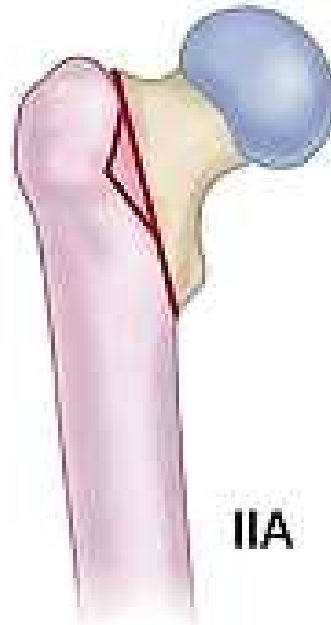
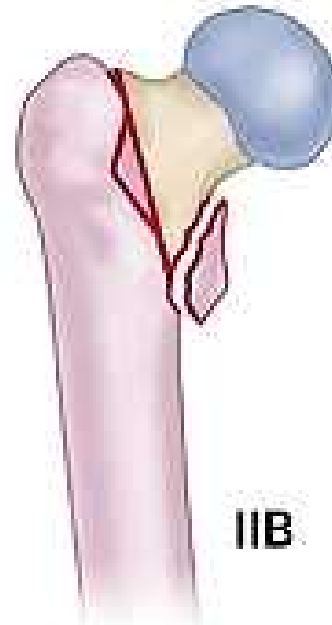
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Russell-Taylor Classification

Primary basis: Extension into the piriformis fossa

Type I: Piriformis Fossa INTACT		Type II: Piriformis Fossa INVOLVED	
			
IA	IB	IIA	IIB
Type IA: Lesser trochanter intact	Type IB: Lesser trochanter fractured (includes reverse oblique/oblique)	Type IIA: Lesser trochanter intact	Type IIB: Lesser trochanter fractured

Exam Pearl: Always look at the piriformis fossa first: if it is fractured, it is automatically a Type II.

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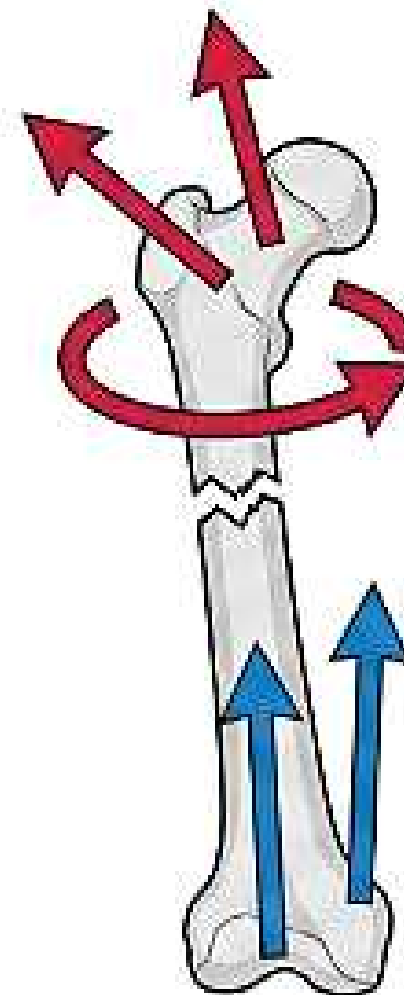
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Biomechanics: Deforming Forces

Proximal Fragment

- Flexed (Iliopsoas)
- Abducted (Abductors)
- Externally rotated (External rotators)

Result: Flexed, Abducted, Externally Rotated



Distal Fragment

- Adducted (Adductors)
- Shortened (Quadriceps, Hamstrings)

Result: Adducted, Shortened

Exam Pearl: The classic deformity is driven by the intact iliopsoas and abductors acting on the proximal fragment.

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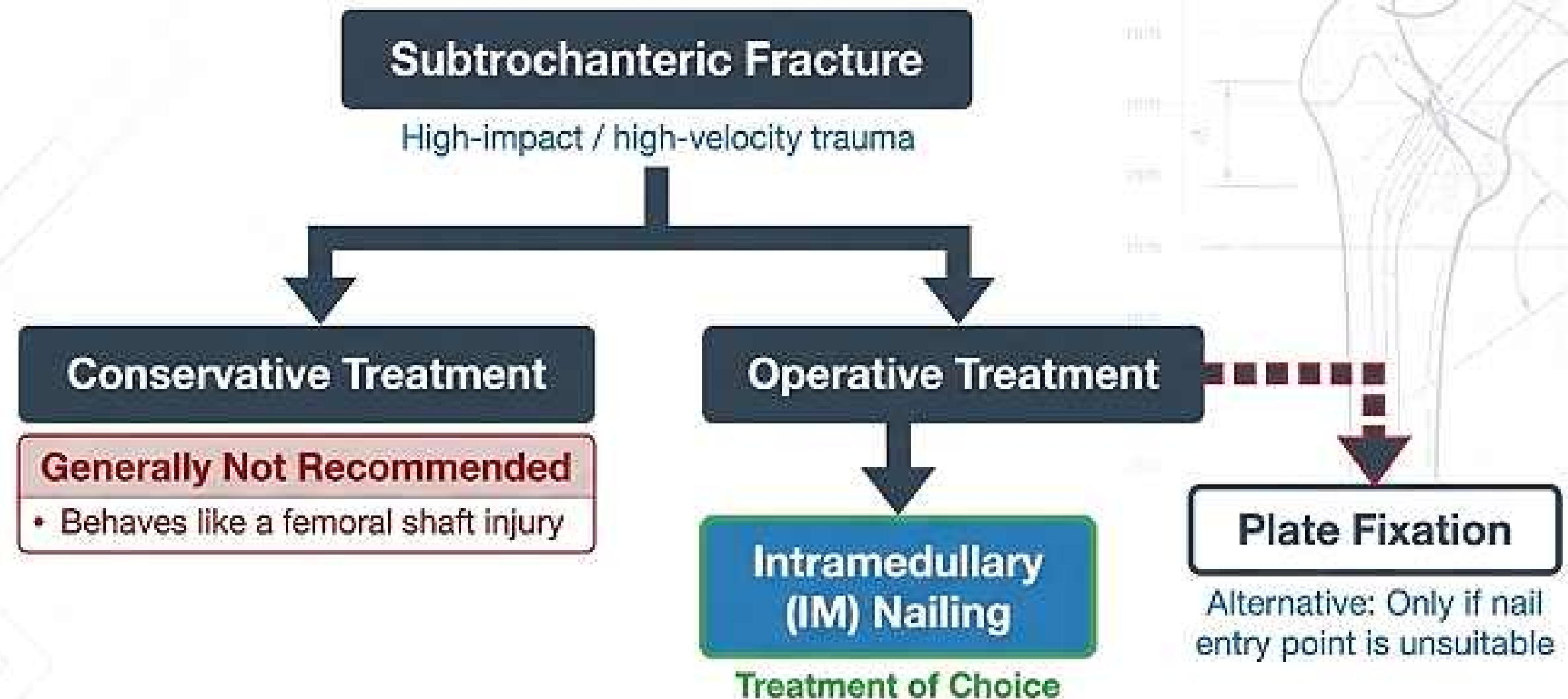
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Treatment Principles & Implant Choice



Exam Pearl:

Treat subtrochanteric fractures with the same mechanical respect as femoral shaft injuries—nailing is the gold standard.

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Nail Entry Points: The Critical Decision

Piriformis Fossa

- Traditional entry point
- Technically demanding



Greater Trochanter (GT) Tip

- Commonly preferred approach
- Preferred portal: Modified medial trochanter portal
- Benefits of medial start: Easier technique, better alignment, improved reduction

Patient Position: Supine most commonly used (Lateral is alternative)

Exam Pearl:

A medial starting point is mechanically protective; it ensures better alignment and easier technique.

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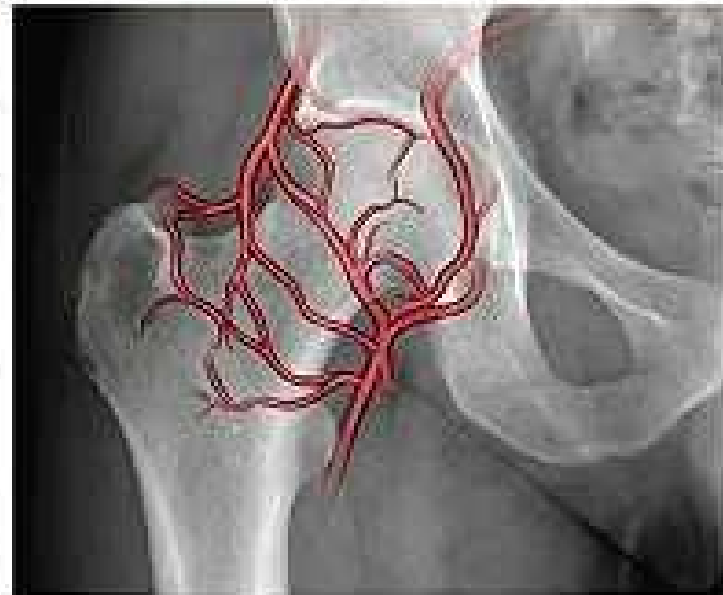
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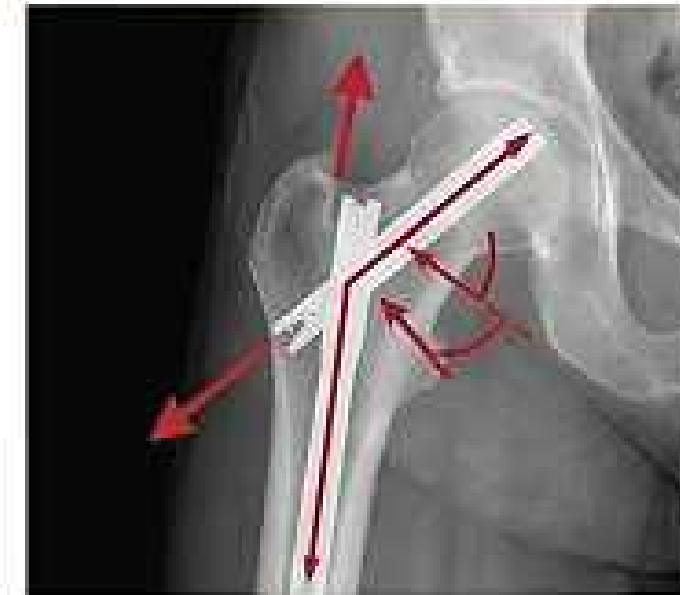
Entry Point Risks & Complications

Piriformis Risk



- Near blood supply to the femoral head
- Increased risk of Avascular Necrosis (AVN)
- Risk of iatrogenic femoral neck fracture

Lateral Entry Risk



- Causes severe varus malalignment
- Disrupts optimal biomechanics
- Frequently leads to nonunion or delayed union

Exam Pearl:

The GT tip portal avoids the AVN risk of the piriformis fossa while avoiding the varus malalignment risk of a lateral entry.

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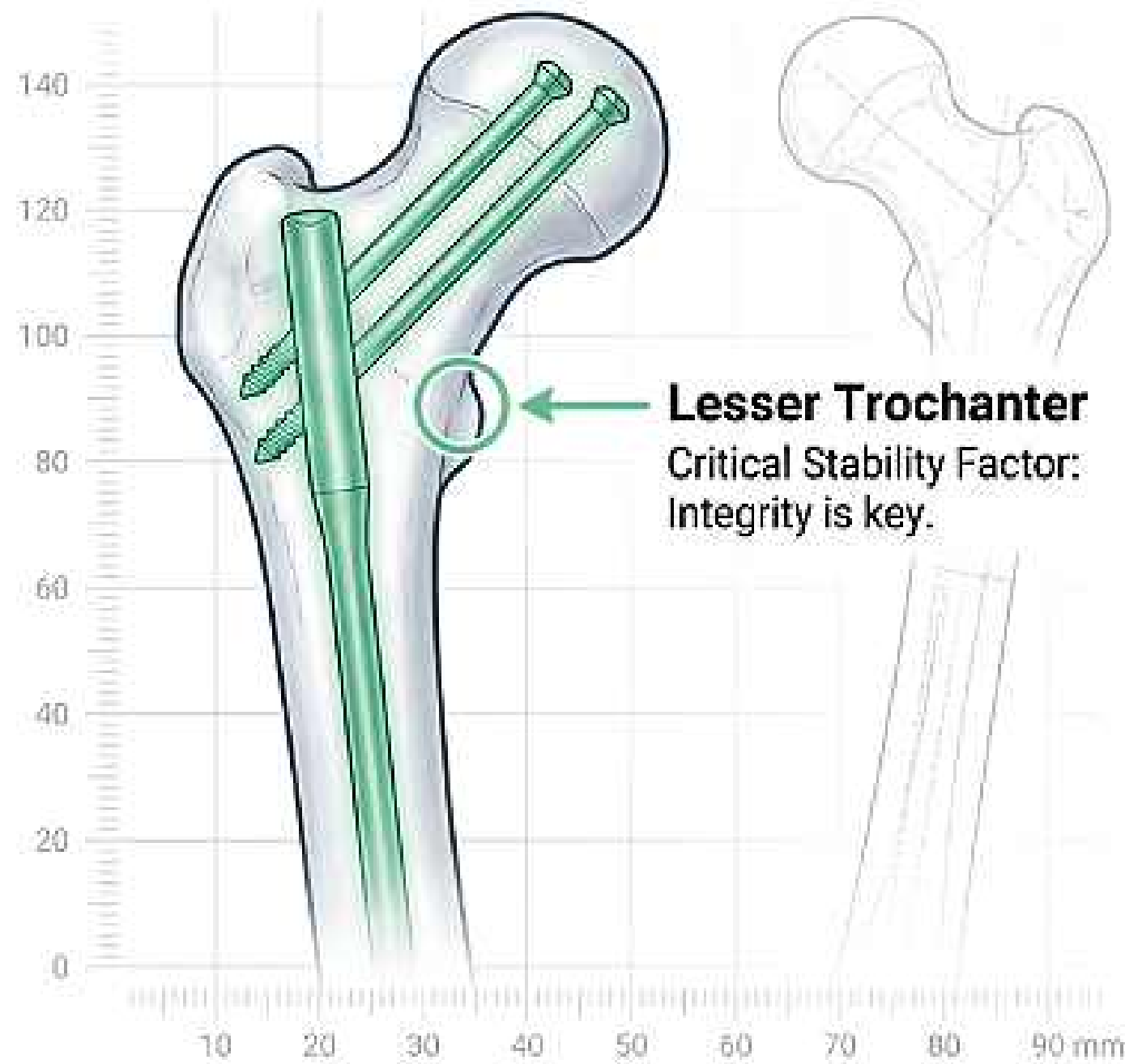


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Intramedullary Nails: Fixation & Stability



Preferred Implant Options:

- Femoral medullary nail (Most common: PFN / PFNA)
- **Alternatives:** Gamma, InterTAN

Proximal Locking Strategy:

- **Configuration:** Reconstruction mode (Recon mode)
- **Hardware:** 2 or 3 proximal screws into the femoral head
- **Benefit:** Superior fixation and control of the proximal fragment
- **Indications:** Unstable fractures (R-T Type 1B, 2A, 2B)

Crucial Stability Factor:

- **Integrity** of the Lesser Trochanter is critical to maintaining fracture stability.

Exam Pearl: The integrity of the lesser trochanter is the absolute key to maintaining stability in subtrochanteric fractures.

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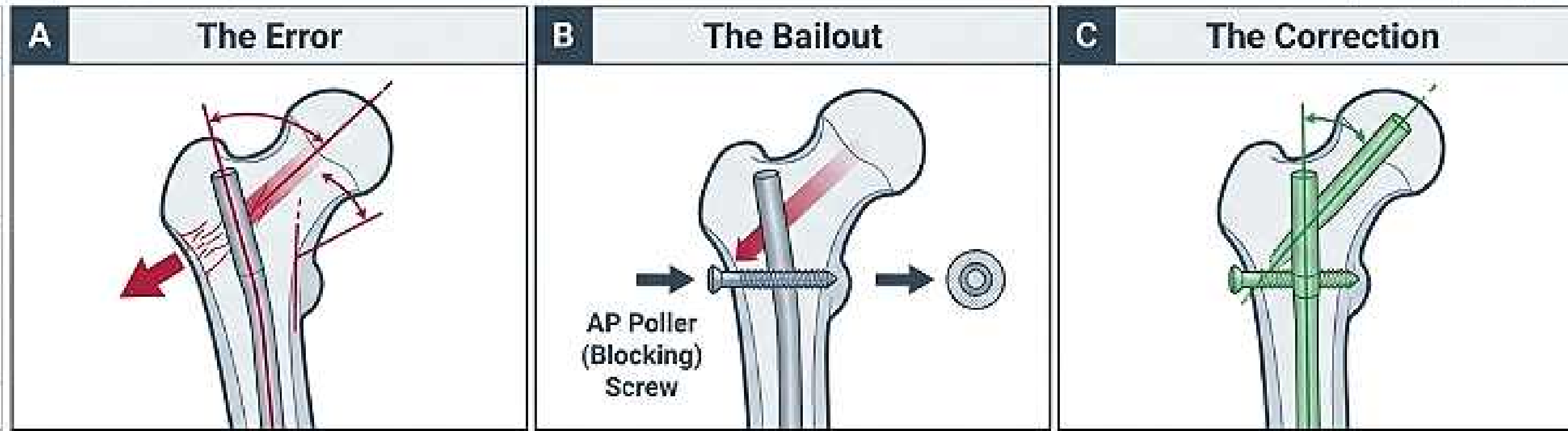
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Surgical Errors & Bailout: The Poller Screw

Most common surgical error: Excessively lateral entry point causing varus malalignment and delayed union.



Correction Method 1: Place small plate in lateral tract and create a completely new medial entry portal.

Exam Pearl: If the nail gets stuck or drifts lateral, use an anterior-to-posterior Poller screw to force the nail medial.

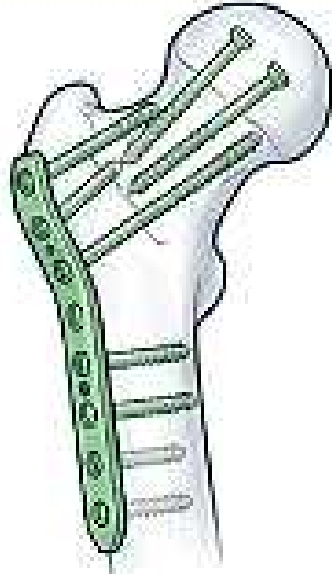
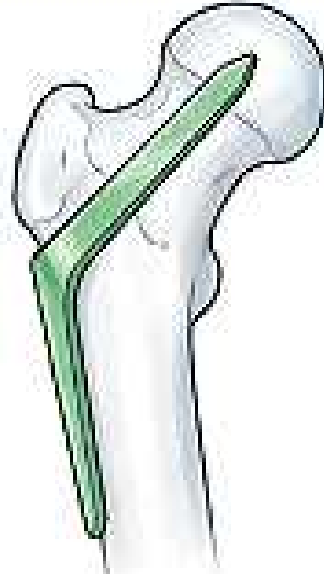
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Plate Fixation Options

Indication: Compromised nail entry portal or fracture extending into the entry point.

Difficult for Plating: Severe comminution and complex fracture patterns.

Proximal Femoral Locking Plate (PFLP)	Angled Blade Plate
	
• Fixation Mechanism: Multiple angle-stable locking screws • Surgical Approach: Percutaneous OR Open technique • Biomechanics: Acts as an internal fixator	• Fixation Mechanism: Solid geometric blade • Surgical Approach: Open fixation only • Requirement: Demands exact direct anatomical reduction (percutaneous not possible)

Exam Pearl: Blade plates demand exact direct reduction and open techniques; they cannot be applied percutaneously.

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Postoperative Care & Rehabilitation

Core Principle: Avoid excessive force prematurely. The subtrochanteric region is subjected to massive bending moments.



Exam Pearl: Never advance weight bearing before 6 weeks, and strictly rely on radiological evidence of callus formation before progressing.

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Rapid Revision Summary Dashboard



Definition:

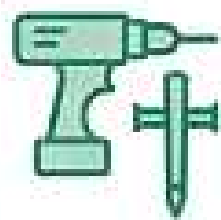
Lesser Trochanter to 5 cm distal



Deformity:

Proximal: Flexed, Abducted, Externally Rotated

Distal: Adducted, Shortened



Standard of Care:

Intramedullary Nailing (PFN/PFNA)



Preferred Entry:

Greater Trochanter tip (Patient Supine)



Most Common Error:

Excessively lateral entry leading to varus malunion. **Bailout:** AP Poller Screw.

Exam Pearl: Subtrochanteric fractures demand medial entry trajectories and aggressive mechanical stabilization of the flexed/abducted proximal fragment

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Must-Remember Classifications & Values

5 cm

Distal boundary from the Lesser Trochanter defining the subtrochanteric zone.

Type I vs II

Russell-Taylor Classification split: strictly differentiated by Piriformis Fossa involvement.

2 or 3

Number of proximal locking screws required for Reconstruction (Recon) mode.

6 Weeks

Absolute minimum time before any progression in weight-bearing is permitted.

Exam Pearl: In the Russell-Taylor classification, the lesser trochanter dictates the sub-type (A vs B), but the piriformis fossa dictates the main type (I vs II).

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Common Exam Traps



Trap: Assuming Piriformis Fossa is the safest entry.



Reality: Carries high AVN risk; Greater Trochanter tip is preferred.



Trap: Treating with conservative management.



Reality: Never recommended; behaves identically to a highly unstable femoral shaft fracture.



Trap: Confusing varus/valgus errors.



Reality: Lateral entry causes VARUS malalignment, not valgus.



Trap: Poller screw orientation.



Reality: Must be placed in an Anterior-to-Posterior direction, NOT medial-to-lateral.

Exam Pearl: Examiners will consistently test the complication of lateral entry points.
Remember: **Lateral entry = Varus deformity = Poller screw bailout**

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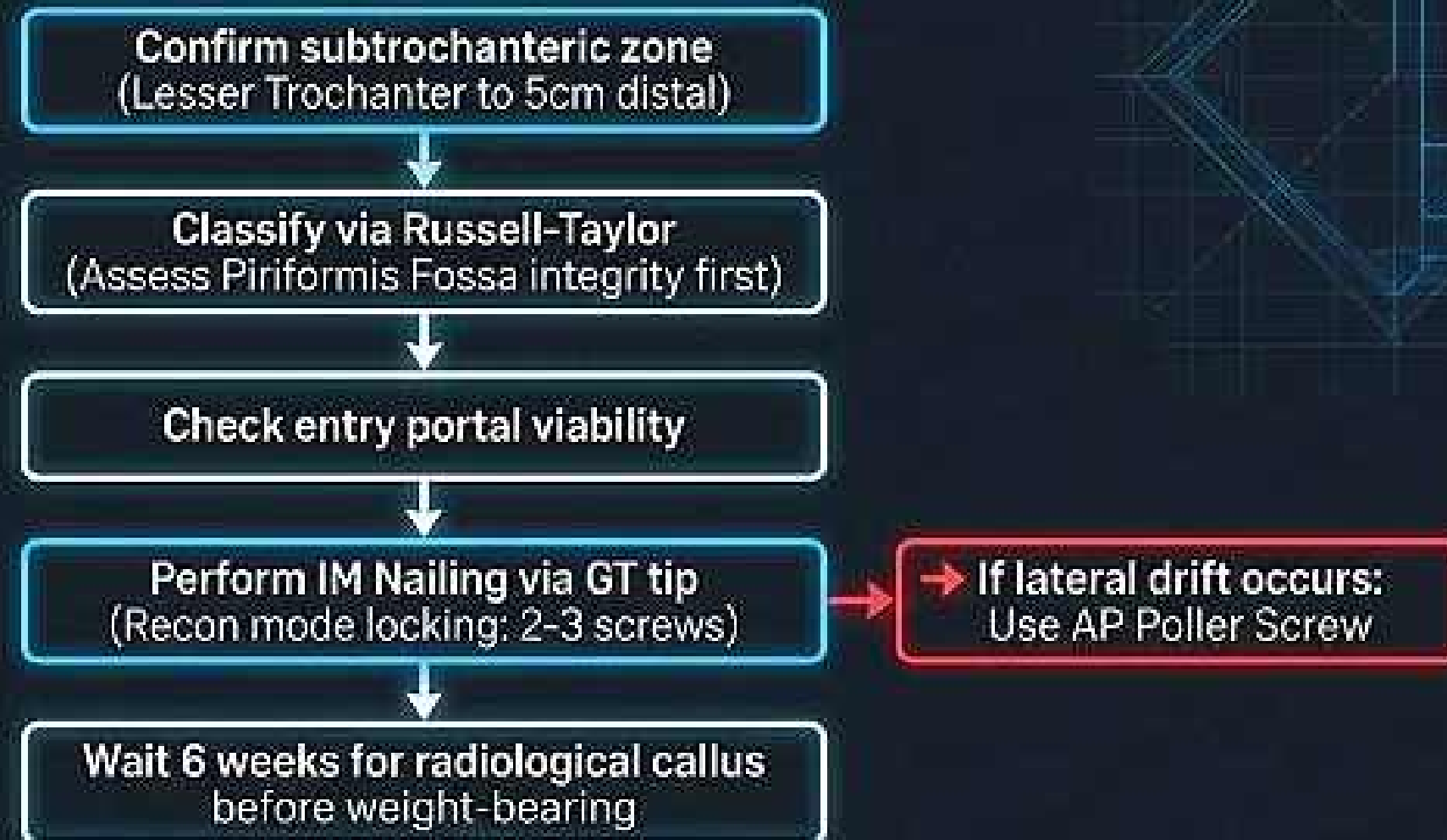
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Management Algorithm & Final Take-Home



Final Take-Home: Perfect alignment requires respecting the proximal deforming forces and aggressively correcting lateral trajectories before securing proximal locking screws.

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