**IM Nail Fixation of Proximal Humerus Fractures**

**Why IM nail?**

**Intramedullary Rods**
Intramedullary Rods

Can we do better?
YES!

Next Generation Nails

Pascal Boileau, MD

Problems with Locked Plates

517 Cases

Sproul et al, Injury 2011
Why Complications?

Add more metal?  Fibular strut?

Why IM Fixation?

• Shares compressive, bending, and torsional loads with the bone
• Internal splint
• Internal scaffold
Robust Healing

Issues with Distal Fixation

Locked Plate Hardware Failure
Fracture Deforming Forces

Cannot Neutralize with Plating

Need Screws Perpendicular to the Fracture lines
Screws Point Away from Joint

Unhappy Triad
1. GT migration
2. Humeral Head Necrosis
3. Glenoid Erosion

Importance of Tuberosity Fixation
Headless Fixation
### Intramedullary Fixation

- TUBEROSITY Fixation
- Cannulated for Guidewire Insertion
- Minimally Invasive

### IM Nail Animation

### Contralateral Template
Preoperative Radiographs

- Inferior displacement of humeral head
- Greater tuberosity "locked" above humeral head

IM Nail Surgical Technique

Preop AP

- Inferior displacement of humeral head
- Greater tuberosity "locked" above humeral head

Preop Axillary View

Lesser and Greater tuberosity fractured, but held together by cuff

Shaft comminution
Calcar reduces, indicating intact medial periosteal hinge.

Reduction Tricks

Preliminary Reduction
Near Anatomic Reduction
Preliminary Reduction
Greater Tuberosity Humeral Head Reduction Held with 2.5mm terminally threaded Steinmann Pin

IM Nailing
Placing Guide Pin (For Nail) Insertion

IM Nail Insertion
Nail Insertion Over Guide Pin
**IM Nail Insertion**

Outlet View

**First Greater Tuberosity Screw**

- Nail rotated into slight retroversion to capture largest greater tuberosity fragment, under direct visualization

**Greater Tuberosity Fixation**

First Greater Tuberosity Screw Placed
Fixes tuberosity and supports anteromedial humeral head
Placing Distal Screw Dynamic Slot

Completed IM Nailing

Final Construct

Final Fluoroscopic Image
Note near anatomic lesser tuberosity placement secondary to intact cuff and fixation of greater tuberosity.

Postoperative Radiographs

Preoperative Radiographs

One Week Postop Radiographs

Greater tuberosity

Lesser tuberosity

Shaft comminution
Note early controlled impaction at distal screw, humeral head and greater tuberosity fracture sites.

Greater tuberosity
Lesser tuberosity
Shaft comminution

Note early controlled impaction at distal screw, humeral head and greater tuberosity fracture sites.