Reduction Tricks and Tips

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Intracortical Screws and Miniplates

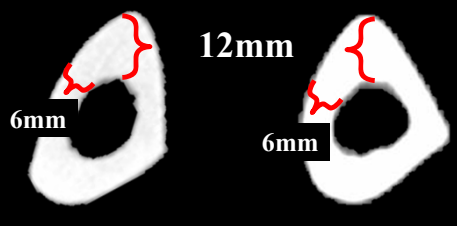
Disclosures!

- **Publications:**
  - Rockwood and Green, Tornetta and Ricci TIFS, Tornetta and Einhorn; Subspecialty series, Court-Brown, Tornetta; Trauma, AAOS; OKU Trauma, ICL Trauma, Tornetta; Op Techn in Ortho Surg, OTA Slide project
  - Journals:; JOT; Deputy editor, CORR, JAAOS, JBJS; Reviewer
- **Research:**
  - OTA, FOT, AIOD, Smith Nephew
- **Designer**
  - Smith and Nephew, Kinespring

Intracortical Screws

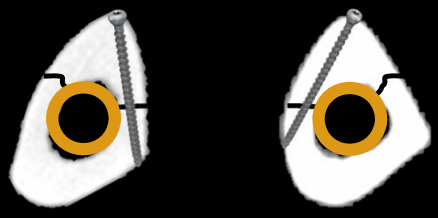
- Lag screws
- Tibia
- Humerus
- Femur

Tibial CT's



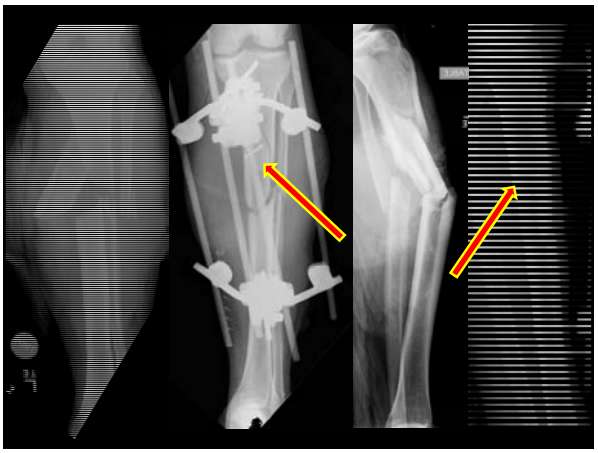
47 Male 42 Female

2.0mm – 2.7mm

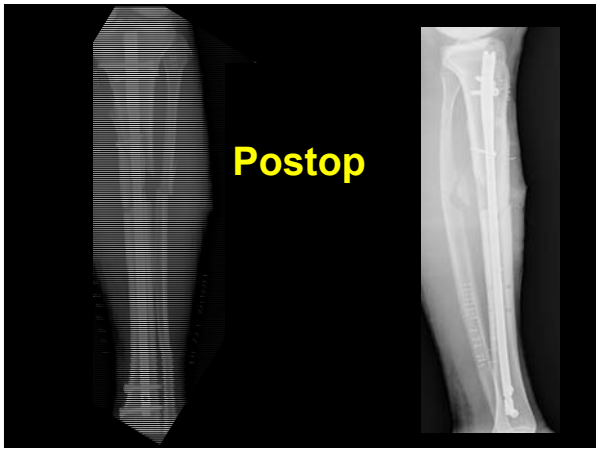


Injury

- *24M*
- *Grade IIIC*
- *Arterial repair*

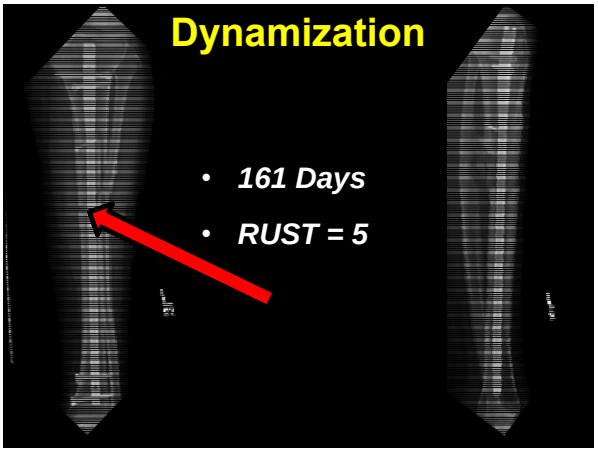


Postop



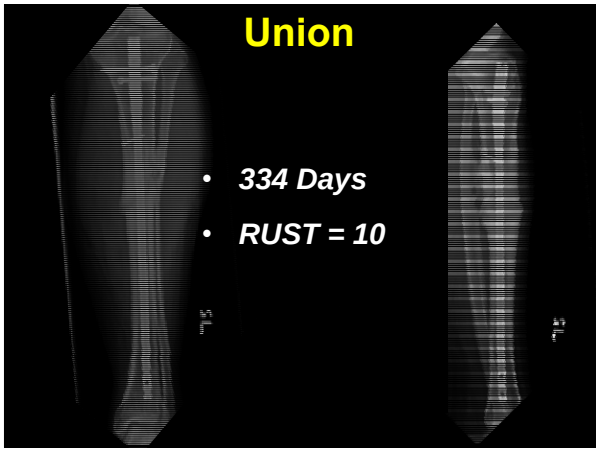
Dynamization

- *161 Days*
- *RUST = 5*



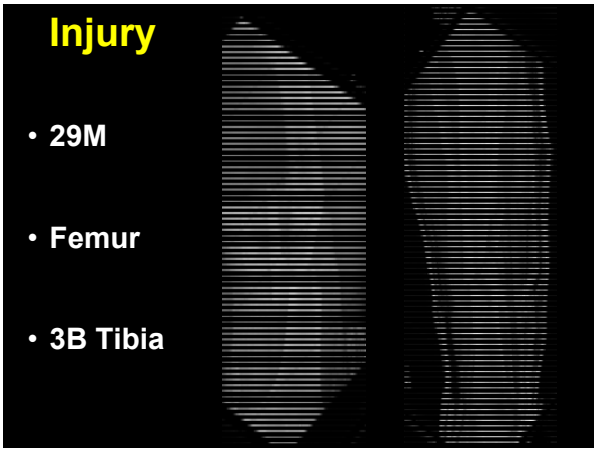
Union

- *334 Days*
- *RUST = 10*



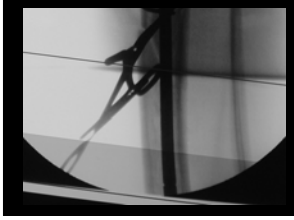
Injury

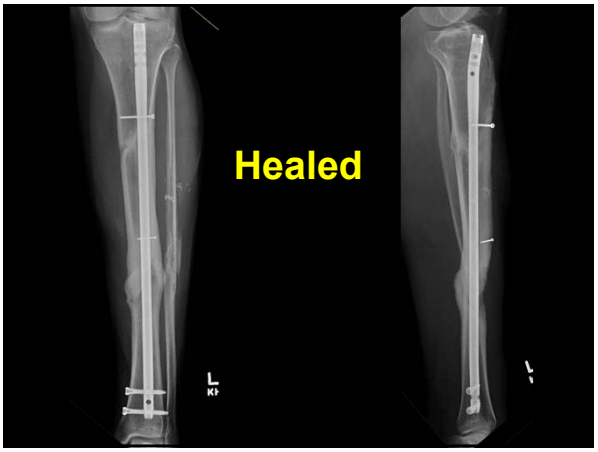
- 29M
- Femur
- 3B Tibia



Clamp to Nail

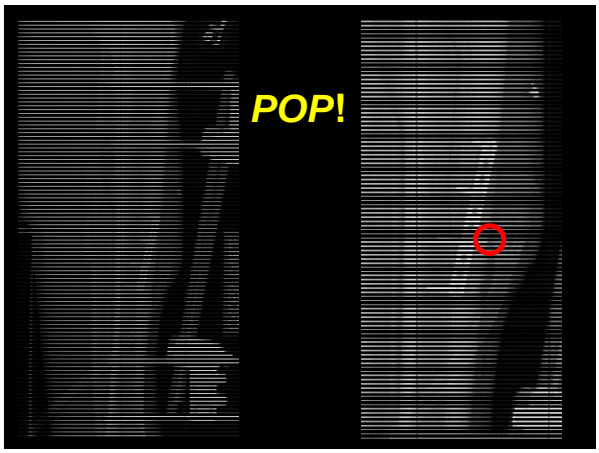
Three Loose Fragments

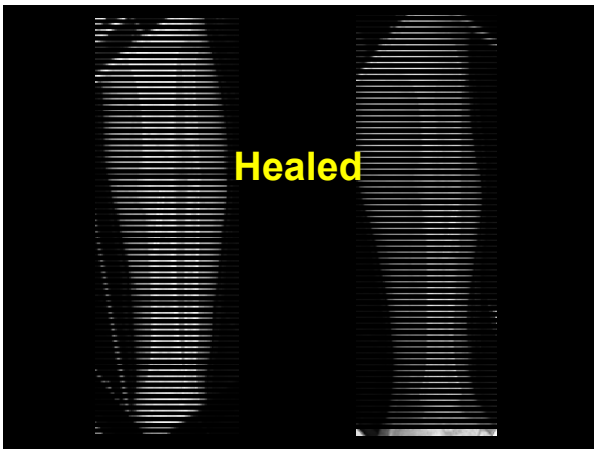




Beware! *Hard Bone!*

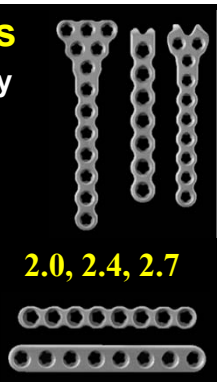
GSW: Ex Fix + Minifixation



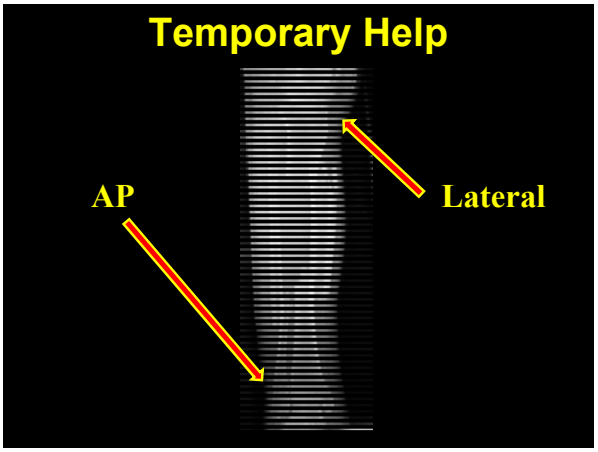


Miniplates

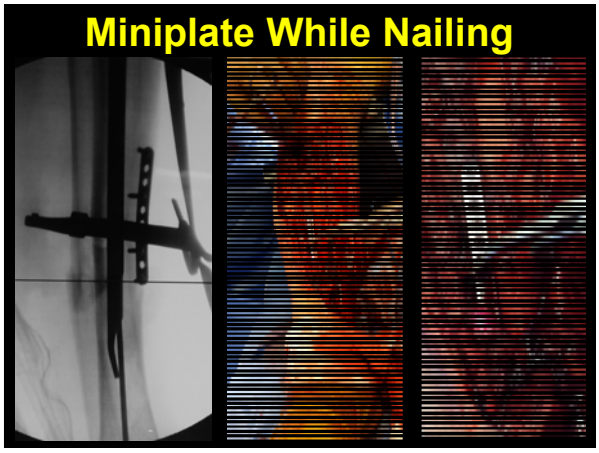
- Can be used temporarily
- *Support reductions*
- *Plate over or around them*
- *Unicortical screws*
- Accessory fixation
- *Add to stability*
- *Hold a fragment reduced*

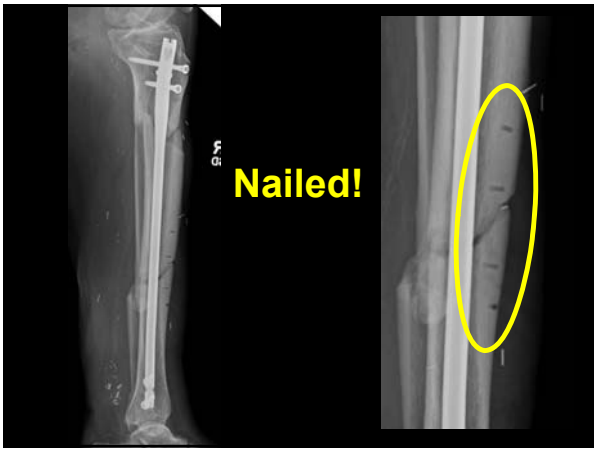


Temporary Help

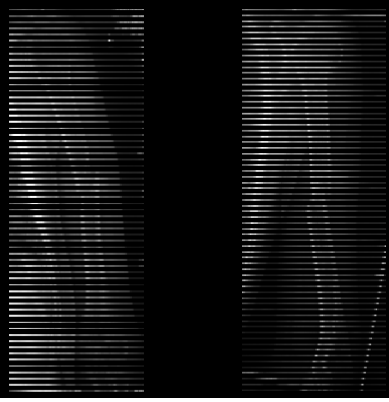


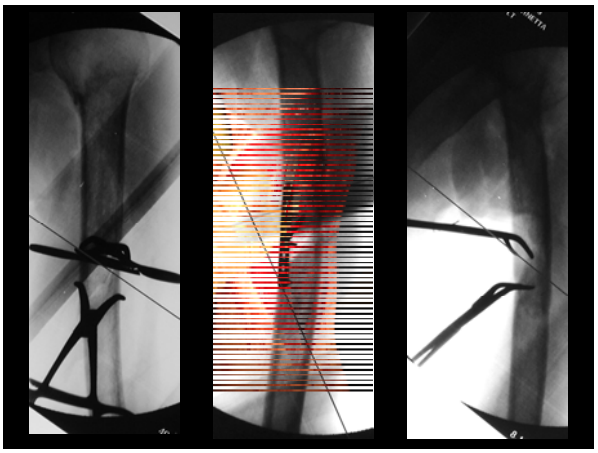
Miniplate While Nailing





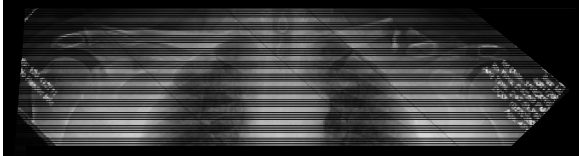
48 YO Alcoholic



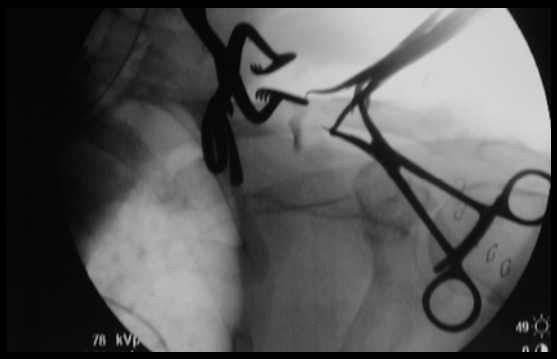


Leave it in!

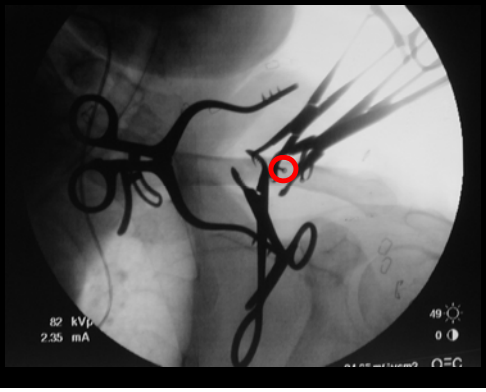
Multiple Implants



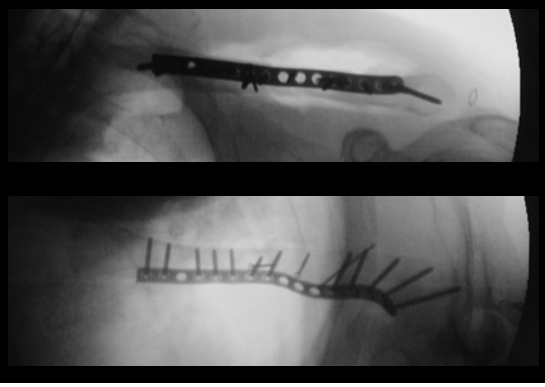
Reduction



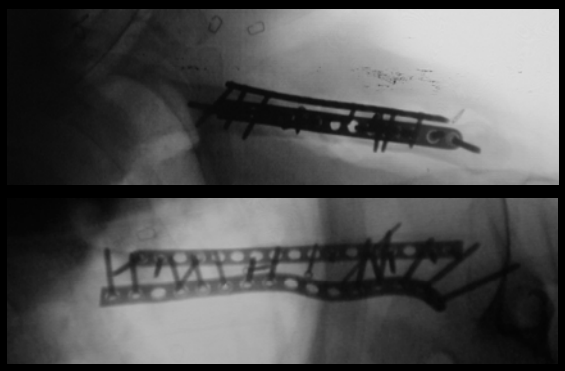
Initial Fixation



2.7 Plate

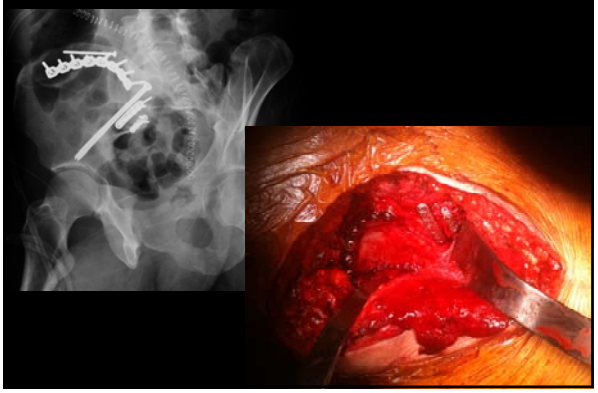


2.4 Plate

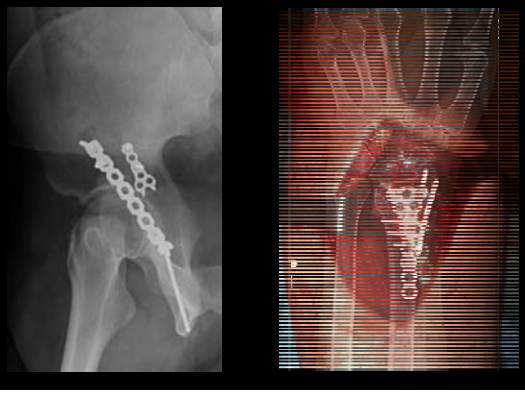


Final Healed

Accessory Antiglide Plates

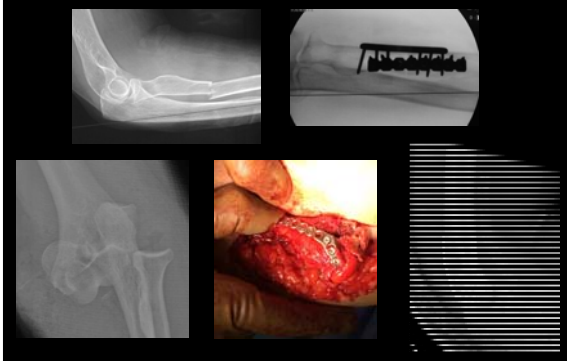


Accessory Antiglide Plates



Strong Miniplates

Definitive Fixation



Summary

- Intracortical screws
- Miniplates
  - Strength
  - Flexible
- Reduction tools
- Temporary fixation
- Leave it in?

Thank You

OTA

Boston Medical Center

Blocking screws

Gregory J. Della Rocca, MD, PhD, FACS

Disclaimer: please note that use of nail interlocking screws as blocking screws is an off-label application of the devices in question

I. Blocking screws – what are they?
   a. Devices used to "narrow" a medullary canal when the canal of a nailed, fractured bone is much larger than the medullary nail itself
   b. May be used to improve fracture reduction and to minimize loss of reduction after nailing of a long bone fracture
   c. Multiple devices may be used for this function (wires, screws, drill bits), not all of which are necessarily left in situ
II. "Normal" locations for use of blocking screws
   a. Proximal tibial metaphysis
   b. Distal tibial metaphysis
   c. Distal femoral metaphysis
   d. Proximal femoral metaphysis
III. Where do they go?
   a. Generally, consider placing screws into the fracture segment containing the articular surface (e.g. if there is a proximal tibial metaphyseal fracture, place the screw(s) in the proximal fragment)
   b. Place the screws on the CONCAVE side of the anticipated nail path
      i. Consider deforming forces and the resultant fracture deformity
      ii. Place the screws on the CONCAVE side of that fracture deformity
   c. Remember to consider sagittal-plane deformities as well as coronal plane deformities; blocking screws may go anterior or posterior to the nail (in addition to medial or lateral)
   d. In patients with poor bone quality (osteoporotic), consider placing blocking screws on both sides of nail in a given plane (medial AND lateral, and/or anterior AND posterior)
IV. How are they used?
   a. First, reduce the fracture, and maintain it reduced during reaming and nailing and interlocking
   b. Consider placing blocking screws after nail placement, before removing any adjuncts holding reduction
      i. If the reduction is very difficult, the blocking screw(s) can be placed first, before reaming or nailing
      ii. Use care reaming past a blocking screw to avoid damage to reamers or iatrogenic fractures
   c. Make sure that the blocking screw is placed into bone that is continuous with the closest articular surface (i.e. do not place blocking screws into an area of comminution)
   d. Screws are often left in place; wires are not
      i. In patients with poor bone quality, consider leaving the screws in place at the completion of the procedure
      ii. In patients with very good bone quality, careful consideration to blocking screw removal may be reasonable (trabecular bone will "hold" nail and maintain reduction)

Proximal Humerus Fractures: *Avoiding Varus*

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Chief, Orthopaedic Trauma
Stanford University School of Medicine
Palo Alto, CA

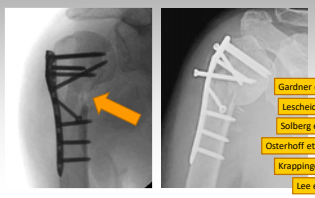
Predictors of failure

Varus Malreduction

Schnetzke, JBJS 2016
Solberg et al, JOT 2009
Krappinger, Injury 2011
Agudelo et al, JOT 2007

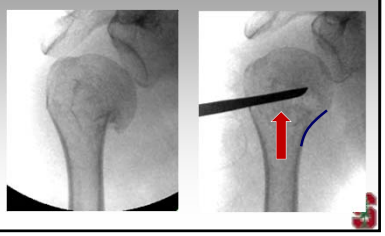
Predictors of failure

Unsupported calcar comminution

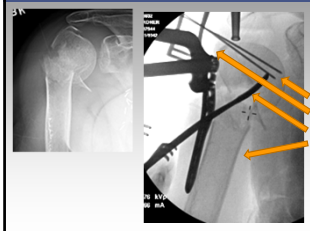


Gardner et al, JOT 2007
Lescheid et al, JT 2010
Solberg et al, JOT 2009
Osterhoff et al, Injury 2012
Krappinger, Injury 2011
Lee et al, JSES 2009

Head/Neck - reduction



Head/Neck – reduction

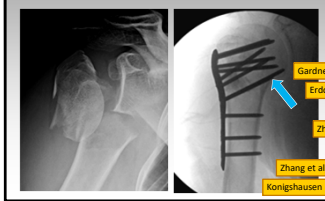


Devarusize

1. K-wire joysticks
2. Cuff sutures
3. Elevator
4. Arm abduction

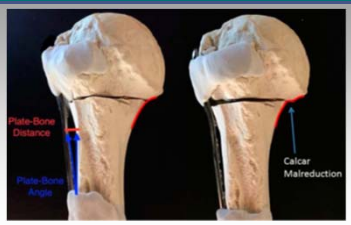
Fixation

Inferomedial ("calcar") screws help



Gardner et al, JOT 2007
Erdogan, EJOST 2014
Bai, JOT 2014
Zhang, PLOS1 2014
Burke, JOS 2014
Zhang et al, Int Orthop 2011
Konigshausen et al, Injury 2012

Plate Mismatch



Ravindra JOT 2017

Fixation

Fibular strut allograft helps

Gardner et al, JOT 2008
Matassi, Injury 2012
Chow, JSES 2012
Panchal, IO 2016
Hinds, JSES 2015
Bae et al, JBJS-B, 2011
Neviaser et al, CORR, 2011
Osterhoff et al, JSES 2012

Fibular strut allograft