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Disclosures

- *Institutional Support-Smith & Nephew, AONA, COTA*
- *Consultant-Smith & Nephew, Biomet, Stryker*
- *Royalties-Smith & Nephew, Wright (MicroPort)*
- *Board -OTA*
- *Editor-Rockwood & Green*
- *Reviewer-JBJS-A, JBJS-Br, JOT, CORR*

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IT Fractures
No Role for Plate

William M. Ricci, MD
Professor of Orthopaedic Surgery
Washington University School of Medicine
St. Louis, MO

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Stable **Un-Stable**

DHS **Nail**

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Stable | **Un-Stable**

DHS | **Nail**

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Spectrum of Stability

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Stable?

- **Stable with non-operative treatment? NO**
- **Stable with operative treatment?**
  - **with plate???**
  - **with nail???**

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"STABILITY"

- **The ability of the reduced fracture to support physiologic loading**

Fracture Stability relates not only to the # of fragments but the fracture *plane* as well

and the fixation device

Ricci, 2016

Michael R. Baumgaertner, MD

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2006 Fracture Classification

AO / OTA **31**

Stable

Unstable

A3

.1 .2 .3

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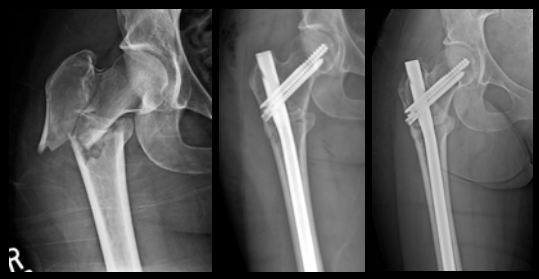
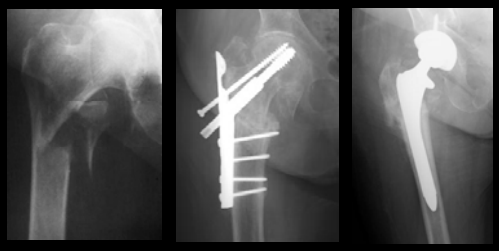
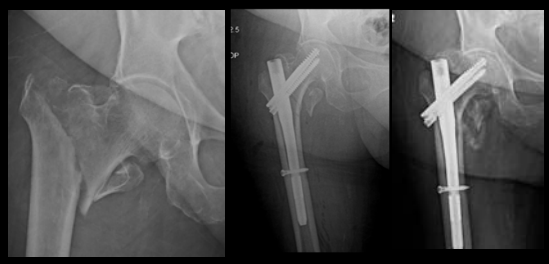
Stable or Unstable?







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Stable or Unstable?

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Stable or Unstable?

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Stable or Unstable?


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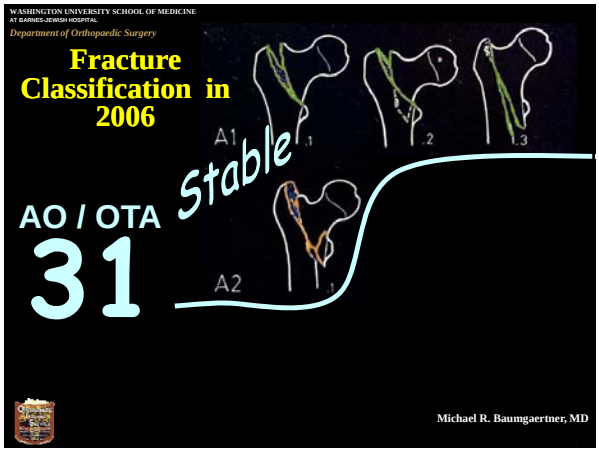
2006
Fracture
Classification
IM Nail
AO / OTA
31
Unstable
A3
.1
.2
.3
Michael R. Baumgaertner, MD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Fracture
Classification in
2006
AO / OTA
31
A1
Stable
A2
.1
.2
.3
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Stable or Unstable?

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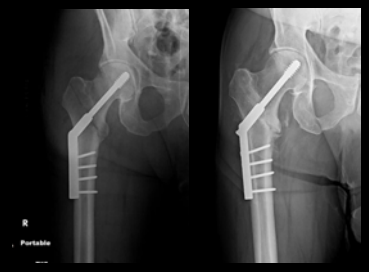
Stable or Unstable?



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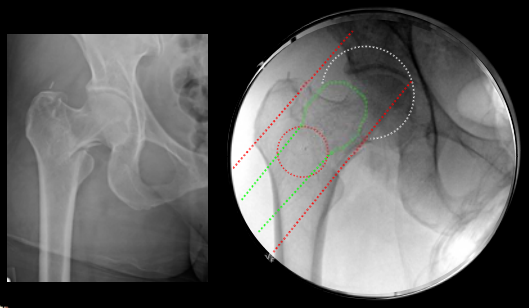

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Stable with Nail
Stable with DHS?

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Stability of IT Fx's Nail vs Plate

Ganesh V. Kamath, MD
Joseph Borelli, Jr, MD
William M. Ricci, MD

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Retrospective Cohort with Control

- 56 Patients
  - 26 2-Part Fractures
  - 30 3-Part Fractures
- Treated with either Nail or DHS

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Retrospective Cohort with Control

- Intramedullary Nail (Short TAN)
  - N = 38
  - Average age 73
  - Follow-up 10 mo
- Extremedullary plate (DHS)
  - N = 35
  - Average age 79
  - Follow-up 9 mo

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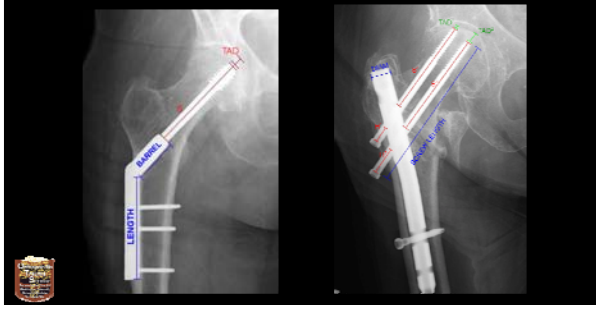
Radiographic Measurements

Normalized
Magnification
Rotation



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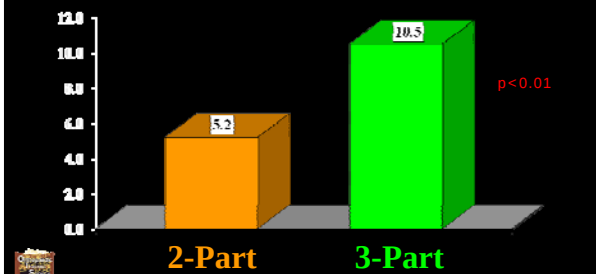
Pattern & Collapse



Ricci et al

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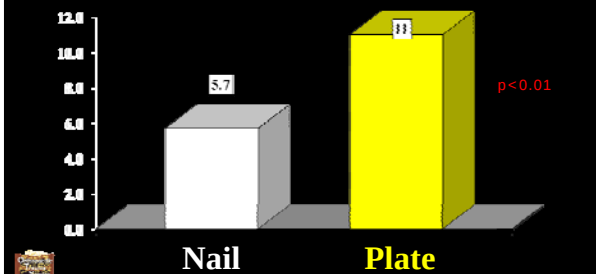
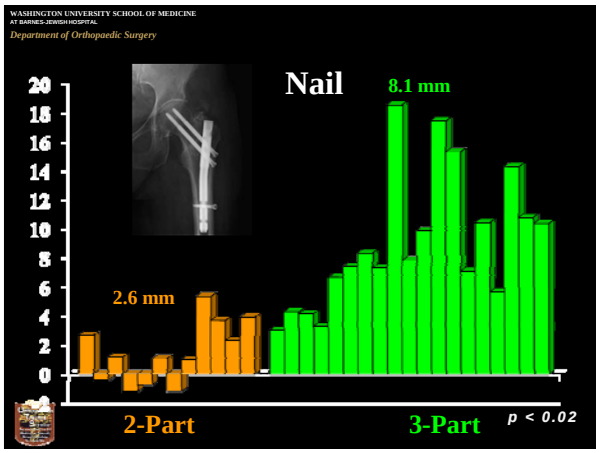
Implant & Collapse



Ricci et al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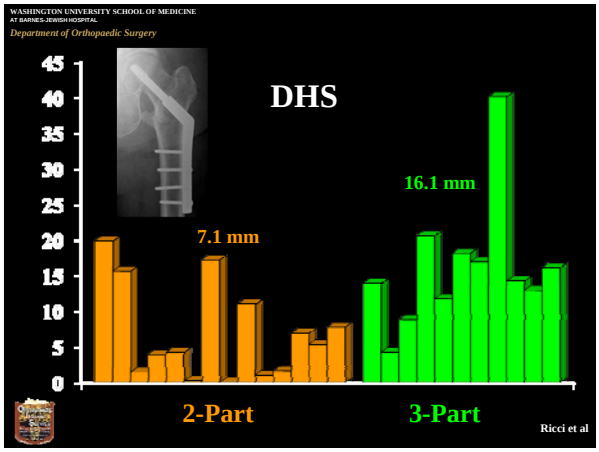
Nail
8.1 mm
2.6 mm
2-Part
3-Part
p < 0.02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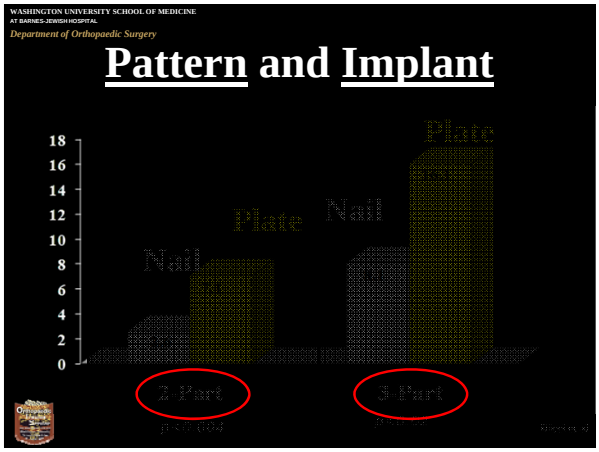
DHS
16.1 mm
7.1 mm
2-Part
3-Part
Ricci et al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Pattern and Implant
Plate
Nail
Plate
Nail
2 Part
3 Part

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Study Summary

- **Fracture stability**
  - **2 and 3 part fx's less stable with plate fixation**
- **Controlled collapse**
  - **Nails associated with less collapse for both fracture types**
- **Consequences of severe collapse?**
  - **Limb shortening**
  - **Abductor dysfunction**

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Outcomes

- **Matre et al JBJS 2013**
  - **341 Nail vs 343 Plate**
  - **No difference in outcomes**
  - **40% required living support**

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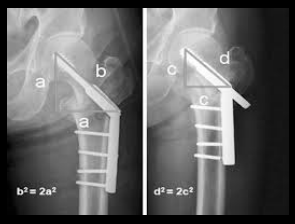
Does Collapse Matter?



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Consequence of Collapse

- Sanders et al OTA 2015
  - Prospective, randomized, multicenter study
    - 123 InterTAN Nail
    - 126 SHS
  - Limb shortening > 2.5 cm
    - Nail – 17.2%
    - Plate – 42.9%
  - Entire cohort - No difference in outcomes
  - Active subgroup (n=70)
    - Shortening > 2.5 cm poorer outcomes

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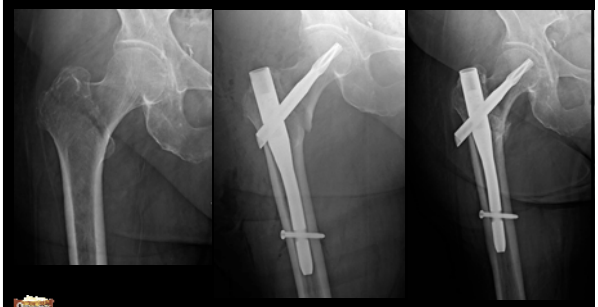
All Nails Created Equal?



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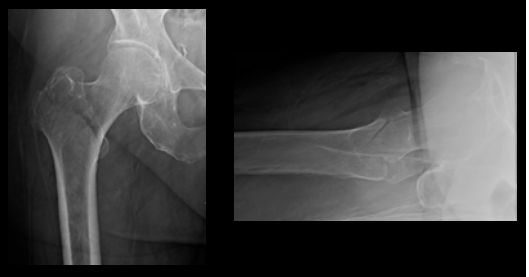

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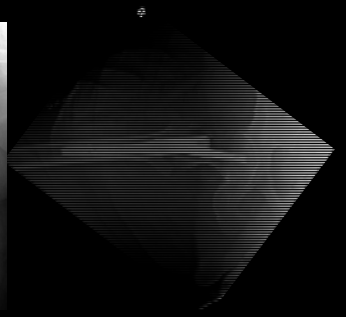

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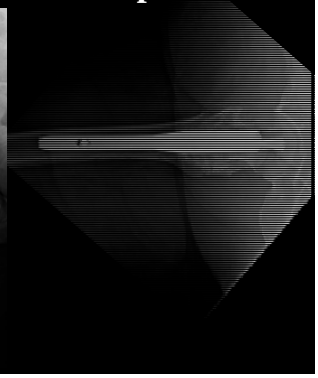
Why so Much Collapse?



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Prevention???

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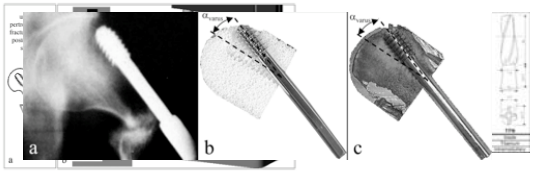
Rotational Instability

A Laboratory Model to Evaluate Cutout Resistance of Implants for Pertrochanteric Fracture Fixation

Mark B. Sommers, MS, Christoph Roth, MS,† H. Hall, MS,† Benjamin C. C. Kam, MD,‡ Larry W. Ehmke, MS,* James C. Krieg, MD,* Steven M. Madey, MD,* and Michael Bottlang, PhD**



JOT 18:36:361-368, 2004

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Neck Rotation

- **Problem with ALL single screw designs**

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Collapse with Dual Screw Device

- **Ruecker et al JOT 2009**
  - **100 patients InterTAN**
  - **73% zero collapse**
  - **27% < 5mm collapse**

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Nail vs Plate

- No clinical differences
  - OR time
  - EBL
  - Mortality
- Nails more expensive

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Peri-Implant Fracture

- Matre et al JBJS 2013
  - PRT 341 Nail vs 343 Plate
  - 1.5% vs 0.3% (p>.05)
- Adams et al JOT 2001
  - 203 Nail vs 197 Plate
  - 2% vs 0% (p=.13)
- Saudan et al JOT 2002
  - 100 nail vs 106 plate
  - No difference
- Bhandari et al JOT 2005
  - Meta-Analysis
  - No difference (studies 2000-2005)

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Summary

- **Stability of IT fx's depends on:**
  - **Fracture pattern**
  - **Implant**
    - **Nails**
    - **Dual screw devices**

  } More Stable
- **Nails associated with less collapse**
  - **Functionally Important in active patients**
- **What would want your family member to have??**

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Thank You

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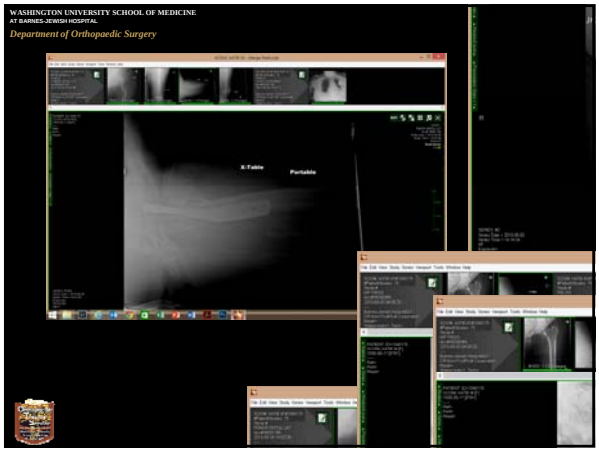
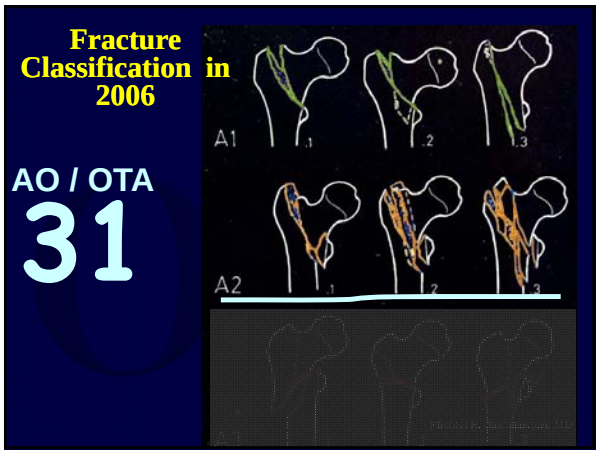
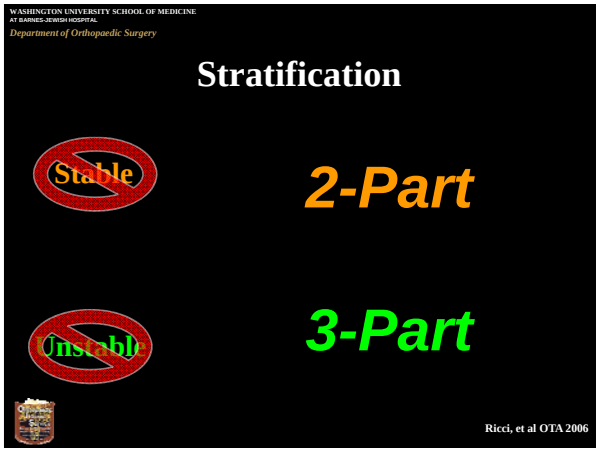



Fracture Classification in 2006
AO / OTA
31
A1
A2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AT BARNES-JEWISH HOSPITAL
Department of Orthopaedic Surgery
Stratification
Stable
2-Part
Unstable
3-Part
Ricci, et al OTA 2006


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Stable with Locked Plate

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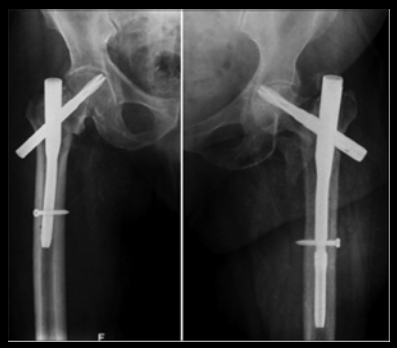

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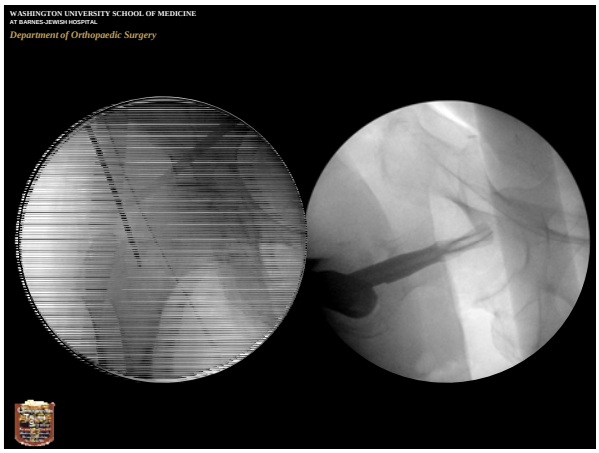
Why So Much Collapse?



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Spectrum of Stability