Proximal Humerus Fractures: Where Are We?

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Disclosure

- Studies supported by:
- OTA, COA, ASES, CIHR
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- I am a consultant for Stryker, Acumed, Zimmer, ITS
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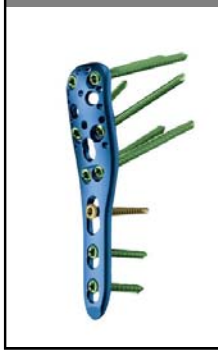
Proximal Humeral Fractures 2017

- Most elderly patients can and should be treated non-operatively
- Locking plates have a high complication rate, and fare poorly in RCT's
- The ideal proximal humeral fixation device remains elusive
- Reverse TSA is a game-changer for the treatment of complications
- Reverse TSA may be better than hemi-arthroplasty for primary treatment

PHILOS...

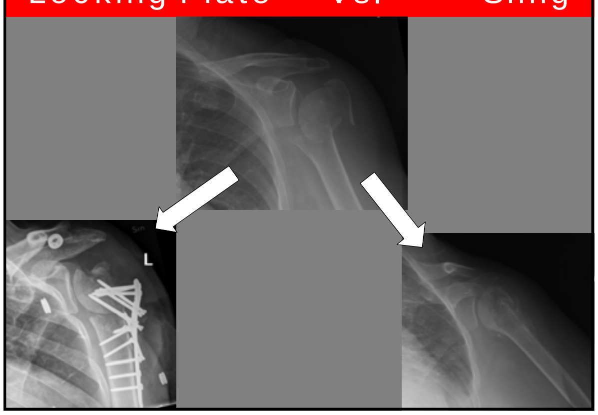


- Angular stable
- Locking screws
- Anatomic

......and cousins



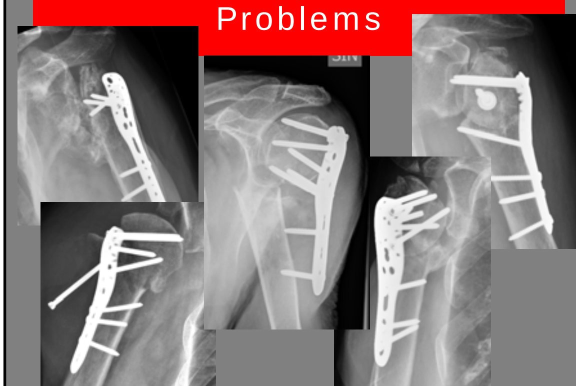

Locking Plate Vs. Sling



RCT's of Proximal Humeral Fractures Operative versus Non-operative

- **Olerud 2011 – 60 pts, mean age 74, 2 yrs f/u**
  - Constant score   Non-op 59, OR 61
- **Fjalestad 2012 – 50 pts, mean age 73, 1 yr fu**
  - Constant score Non-op 33, OR 35
- **PROFHER study, JAMA, 2015, 231 patients**
  - Oxford scores 39 surgical, 38 non-op

Problems



Ontario 2007-2012

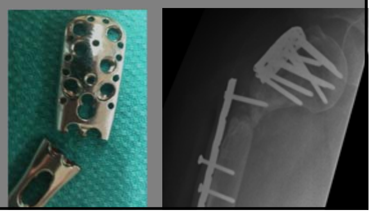
Table 1: Two and Five Year Outcomes Following Initial Treatment of Proximal Humerus Fractures

Outcome / Group	Replacement	Fixation	Rotator cuff repair	Hardware removal	Repair	Irrigation & debridement	Total
Two-Year Outcomes							
Non-operative (n= 25,104)	0 ([illegible])	111 ([illegible])	[illegible]	[illegible]	[illegible]	21 (0.1%)	[illegible]
Reduction (n = 3,258)	[illegible]	274 ([illegible])	147 ([illegible])	[illegible]	[illegible]	0 ([illegible])	[illegible]
Fixation (n = 2,979)	[illegible]	[illegible]	67 (2.3%)	412 ([illegible])	[illegible]	[illegible]	[illegible]
Replacement (n = 1,419)	[illegible]	14 ([illegible])	14 ([illegible])	[illegible] (1.4%)	7 ([illegible])	0 ([illegible])	123 ([illegible])
Total (n = 32,760)	[illegible]	[illegible] (1.7%)	[illegible]	473 (1.4%)	74 ([illegible])	[illegible] (0.1%)	1767 ([illegible])
Five-Year Outcomes							
Non operative (n= 25,104)	0 ([illegible])	123 ([illegible])	[illegible] (0.4)	[illegible]	0 ([illegible])	25 (0.1%)	[illegible] (1.4%)
Reduction (n = 3,258)	[illegible]	[illegible]	[illegible]	34 (1.0%)	24 (0.7%)	0 ([illegible])	[illegible] (21.1%)
Fixation (n = 2,979)	[illegible]	[illegible]	[illegible]	447 ([illegible])	[illegible]	[illegible]	[illegible]
Replacement (n = 1,419)	[illegible]	[illegible] (1.7%)	[illegible]	33 (2.3%)	11 ([illegible])	0 ([illegible])	[illegible]
Total (n = 32,760)	[illegible] (1.1%)	[illegible]	[illegible] (1.2%)	[illegible]	[illegible]	[illegible]	[illegible]

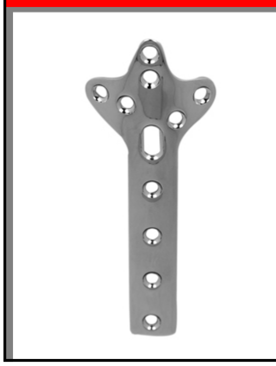
Trends and Variation in Incidence, Surgical Treatment, and Repeat Surgery of Proximal Humeral Fractures in the Elderly

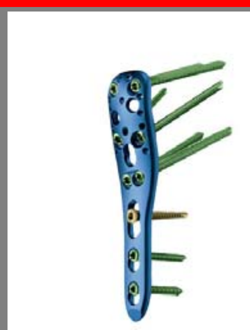
By John-Erik Bell, MD, MS, Brian C. Leung, MD, Kevin F. Spratt, PhD, Ken J. Koval, MD, James D. Weinstein, DO, MS, David C. Goodman, MD, MS, and Anna N.A. Tosteson, ScD

- Operative intervention increased 25% from 1999 to 2004
- Reoperation 1.5 times higher in 2004-2005 vs 1999-2000



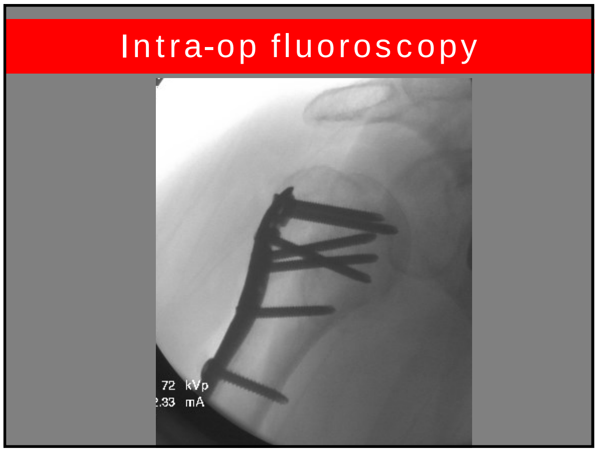
1999-2000 | 2004-2005



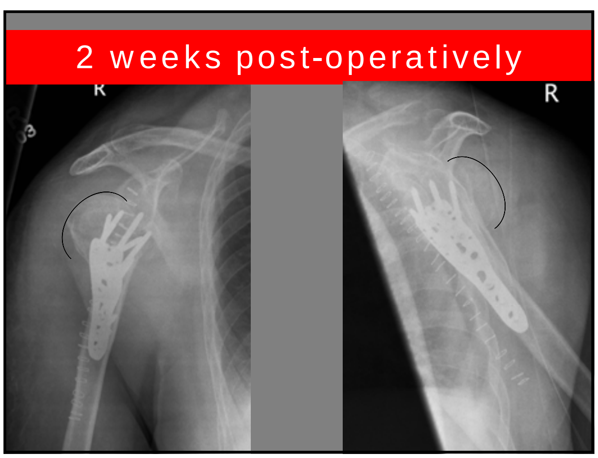


50% higher reoperation rate

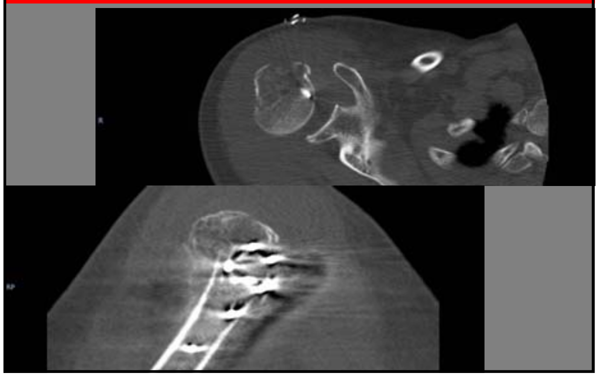
66 yr old female isolated


Intra-op fluoroscopy
72 kVp


2 weeks post-operatively
R

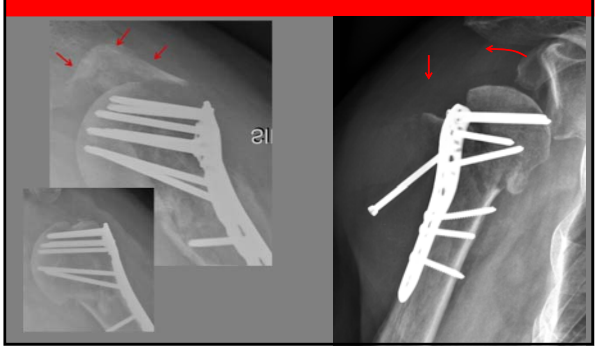

2 weeks post-operatively
R

CT scan

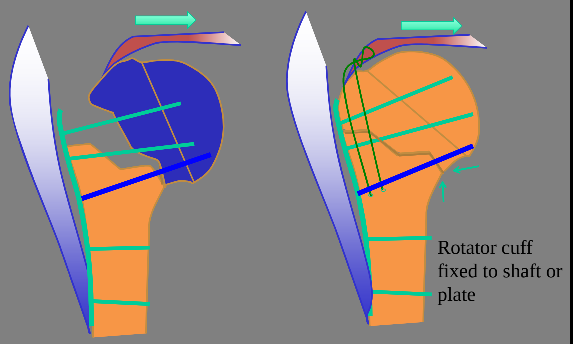


Revision fixation

Tuberosity escape



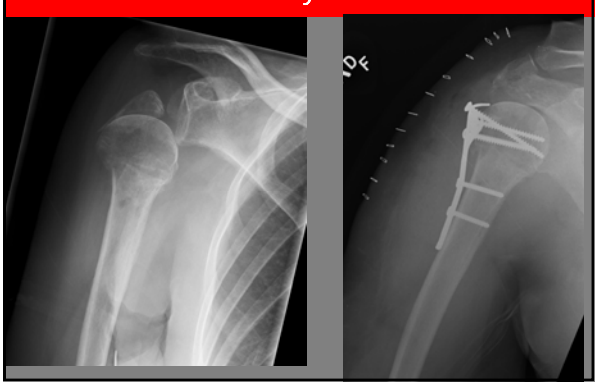
Varus



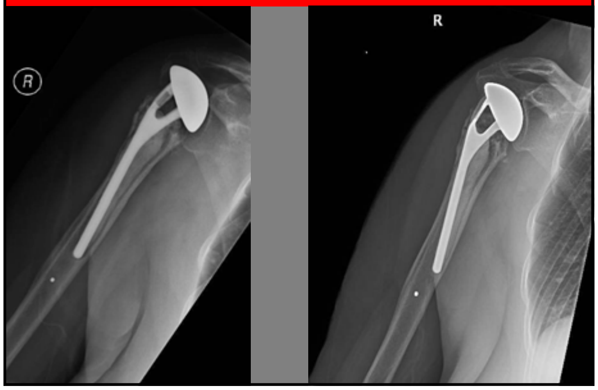
Suture Greater Tuberosity

- **Arvesen JE et. al. Biomechanical Contribution of Tension-Reducing Rotator Cuff Sutures in 3-Part Proximal Humerus Fractures. JOT 2016 Aug;30(8).**
- **Tension-relieving rotator cuff sutures do not add stability to the repair of 3-part proximal humerus fractures. No mechanical data exist to demonstrate benefit of adding suture to a plate and screw construct for limiting fracture displacement.**

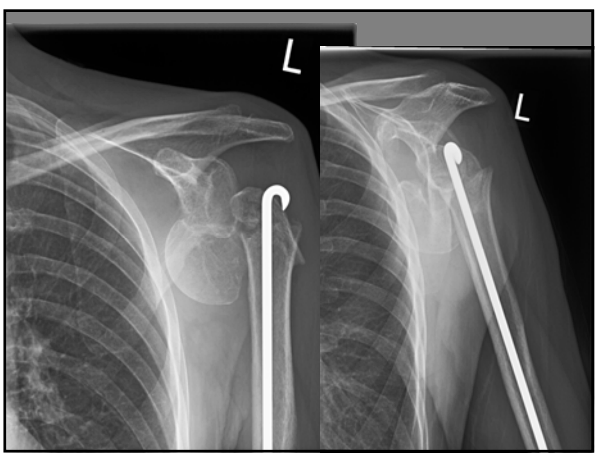
Tuberosity fixation

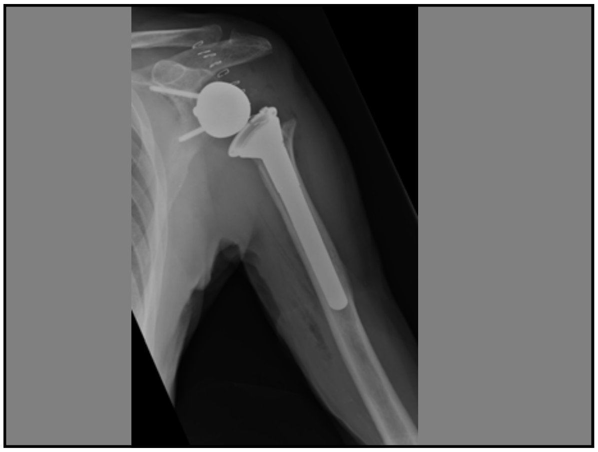


Painful hemiarthroplasty

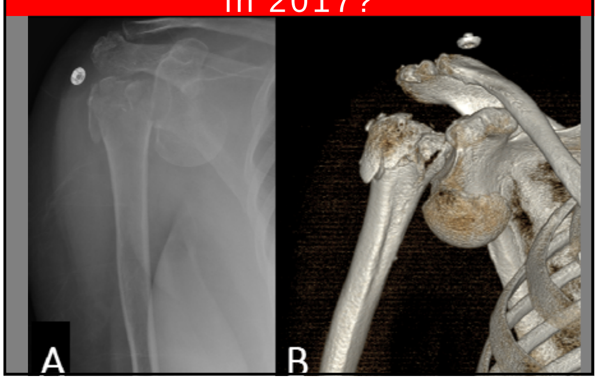


Revision to Reverse

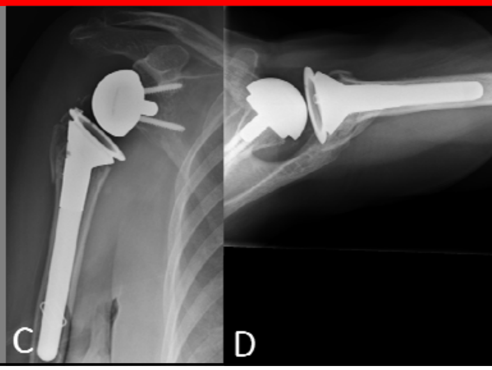




What is the role of Reverse TSA in 2017?



Reverse TSA



RCT: Reverse versus Hemi

- Sebastiá-Forcada E. et. al.
  Reverse shoulder arthroplasty versus hemiarthroplasty for acute proximal humeral fractures. A blinded, randomized, controlled, prospective study. J Shoulder Elbow Surg. 2014 Oct;23(10):1419-26
- 62 patients over 70 years of age with 3, 4 part fractures
- RSA better Constant (56 versus 40)
- RSA better flexion 122˚ versus 79˚
- RSA better DASH 17 versus 29
- 6 HA's converted to RSA

Conclusions

- Most patients (especially the elderly) can and should be treated non-operatively
- Current proximal humeral locking plate designs are sub-optimal, and have a high complication rate
- Reverse TSA is a game-changer for complications of proximal humeral fractures
- Reverse TSA may be beneficial in primary treatment of severe proximal humeral fractures