Treatment of common geriatric fractures: Wrist

Nikki Schroeder, MD

UCSF Osher Mini Medical School for the Public

Associate Clinical Professor, UCSF Department of Orthopaedic Surgery

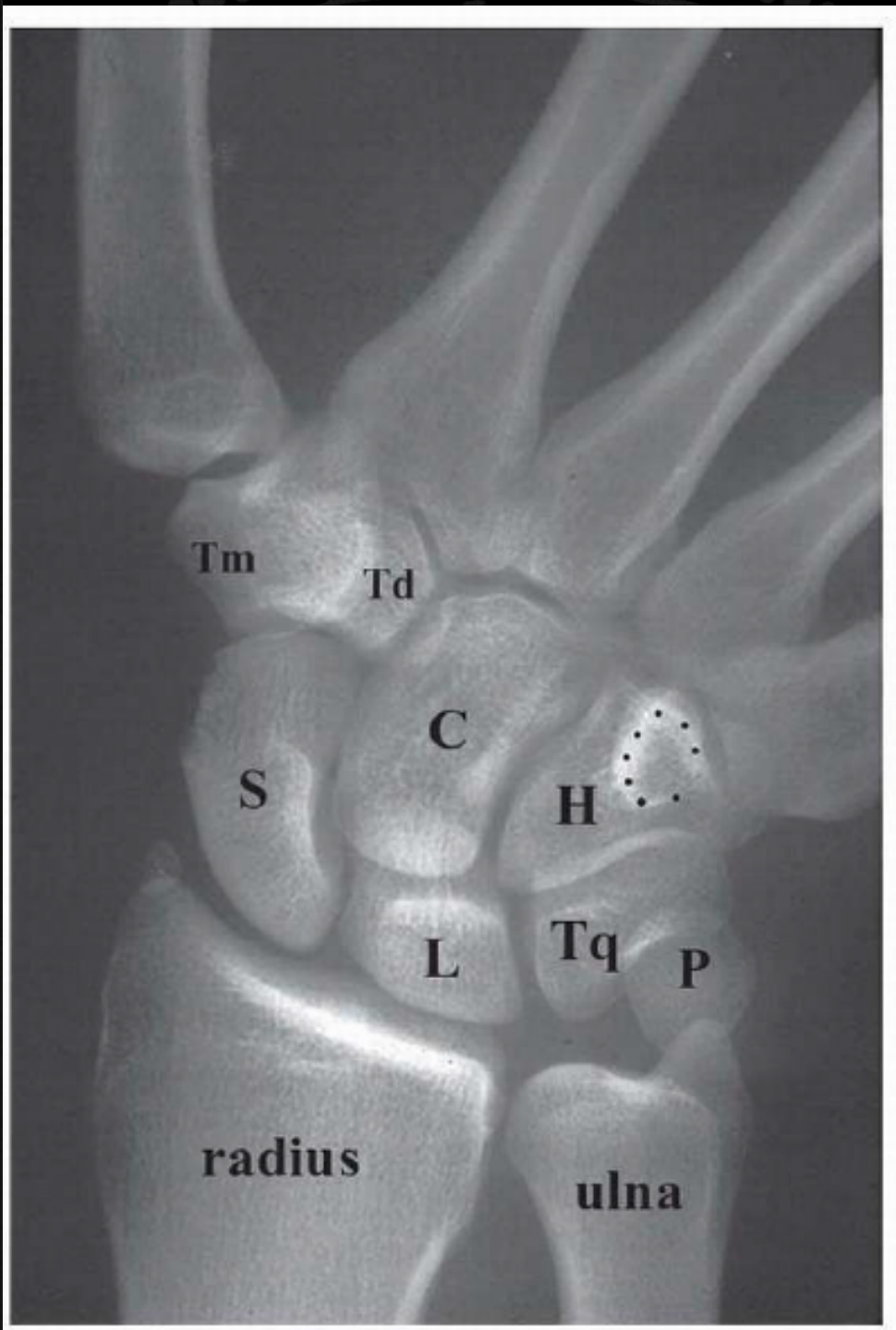
6.5.2018

Orthopaedic Trauma Institute

UCSF + SAN FRANCISCO GENERAL HOSPITAL

Disclosures

- **I have nothing to disclose.**


Tm
Td
C
S
H
L
Tq
P
radius
ulna

Distal radius fracture (DRF)

DRF: Epidemiology

- ~ 20% of all fractures treated in ED
- Adolescents/Young Adults
  - High energy injuries (MVC, fall from height)
- Elderly
  - Low energy injuries (fall from standing)
  - Incidence correlates with osteopenia

Distal Radius Fractures in Elderly

- 2nd most common fracture occurring in the elderly, after hip fractures
  - DRF are the most common upper extremity fracture in patients over the age of 65 years.
- 50% increase in relative risk of sustaining a hip fracture
- As the population ages, the incidence of osteoporotic DRF increases
  - Over 80% of all fractures in people 50+ are caused by osteoporosis
- As many as 372,000 people over 65 sustain a DRF in US yearly
- Decreased survival among DRF patients
  - 57% vs 71%

Johansson, 1996
Rozental, 2002

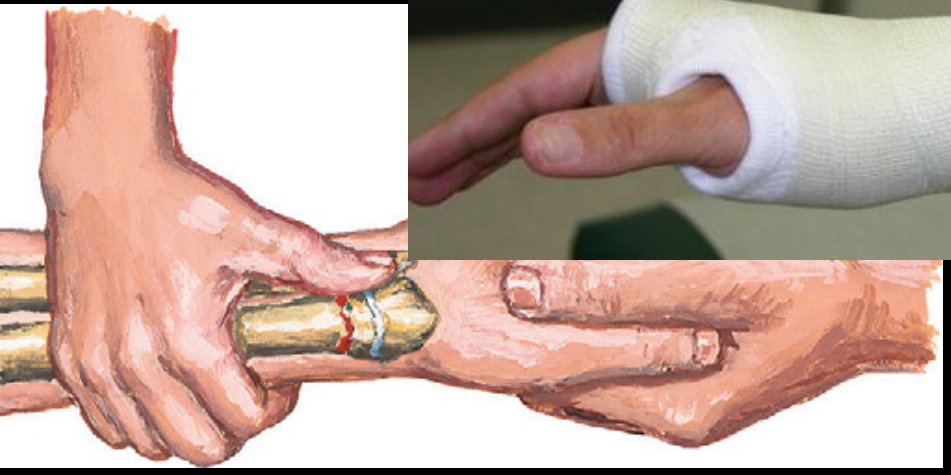
DRF: Mechanism

- Mechanism – fall on hyper-extended, radially deviated wrist with forearm in pronation

DRF: Colles'Fracture

- **>90% of distal radius fractures**
- **Originally used to describe extraarticular fractures**
- **Dorsal tilt, dorsal displacement, radial shift, radial shortening**
- **Mechanism – fall on hyper-extended, radially deviated wrist with forearm in pronation**

supination
2.



DRF in elderly

- Poor bone quality, low bone mineral density (BMD)
- Comminution
- Direct correlation between BMD and the severity of DRF

Clayton, 2009

Osteoporosis

- Characterized by loss of bone mineral density (BMD)
- Increases the risk of fracture after low-energy trauma
- Increased risk of DRF in patients with low BMD
- As the BMD decreases, the severity of distal radius fracture increases
- Treatment for osteoporosis after DRF can decrease the risk of a subsequent fragility fracture.
  - women treated with osteoporosis with bisphosphonates can reduce the relative risk of fracture of the hip and distal radius

Treatment Options

- Closed reduction and casting
- External fixation
- Percutaneous pin fixation
- Open reduction, internal fixation

- Determined by fracture pattern, degree of displacement, stability, patient age and physical demands

Treatment Options

- Importance of Anatomical Reduction
  - Articular incongruity
    - Pain, stiffness, degeneration
  - Dorsal tilt
    - Decreased contact area of radiocarpal articulation
    - Incongruent DRUJ
    - Tightening of interosseous membrane

  → pain, midcarpal instability, post-traumatic OA

DRF Elderly: What we know

1. Fractures displace in the elderly
2. Radiographic appearance does not affect functional outcome
3. Marked deformity/ severe fracture displacement has been shown to adversely affect functional outcome

Nonoperative Treatment

- **Mainstay of treatment for stable, nondisplaced fractures**
- **Padded splint with wrist in neutral, MCP joints free**
- **3-point molding**

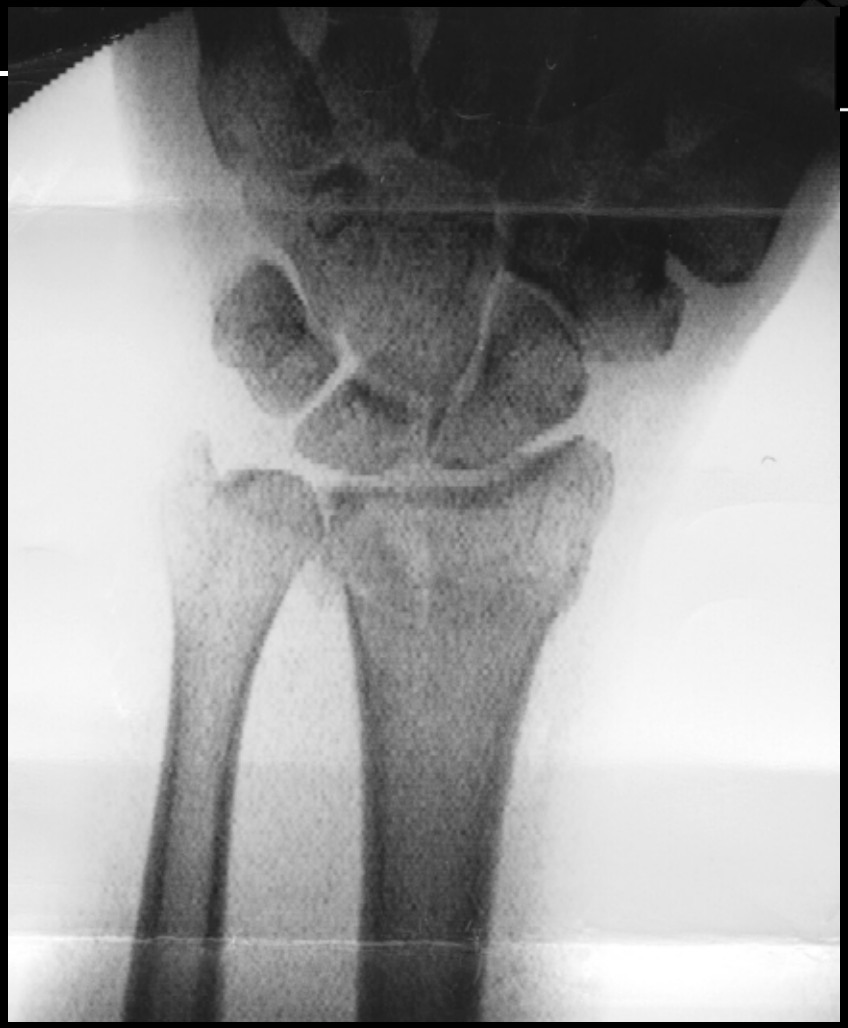
1. Fracture displacement

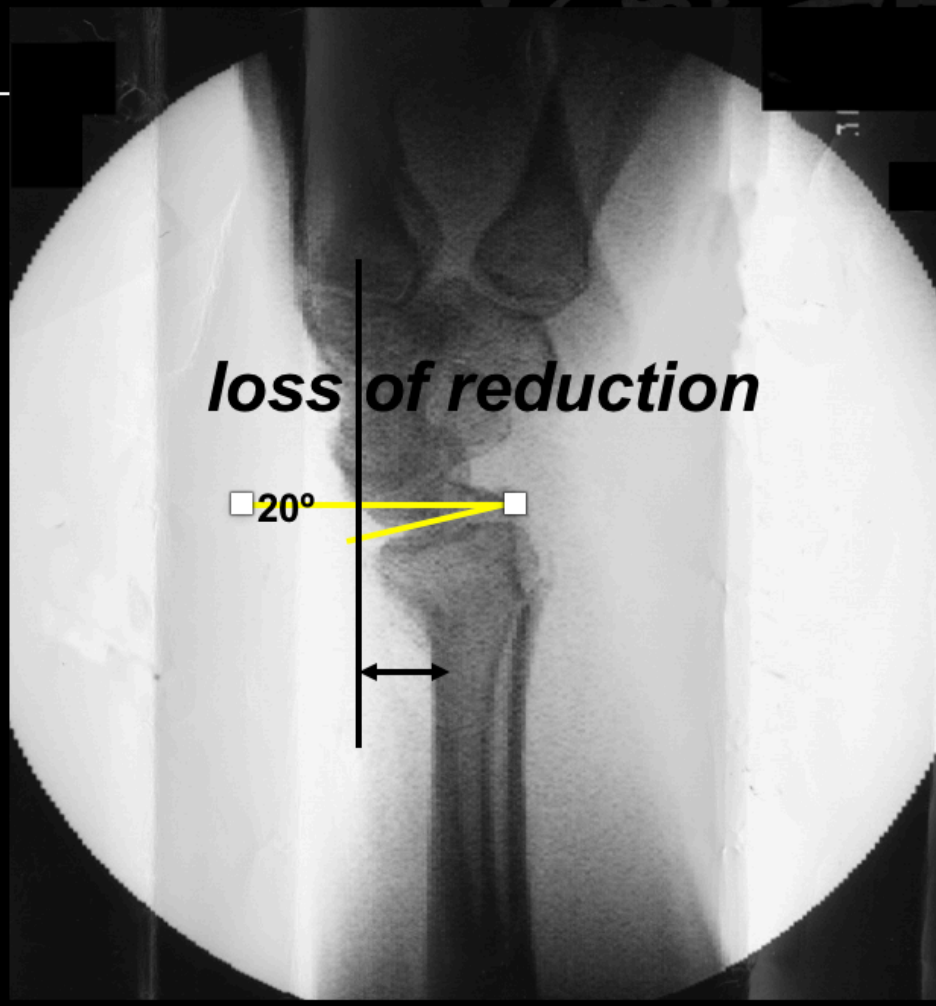
- **Risk for displacement increases after closed reduction as age increases**
  - **If >58 years, 50% risk of displacement**

Table 2. Percent Risk for Displacement Based on Age and Time From Reduction

Age (y)	After Reduction	1 Week After Reduction
30	17%	6%
40	27%	10%
58	50%	25%
70	66%	42%
80	77%	57%

Nesbitt, 2004

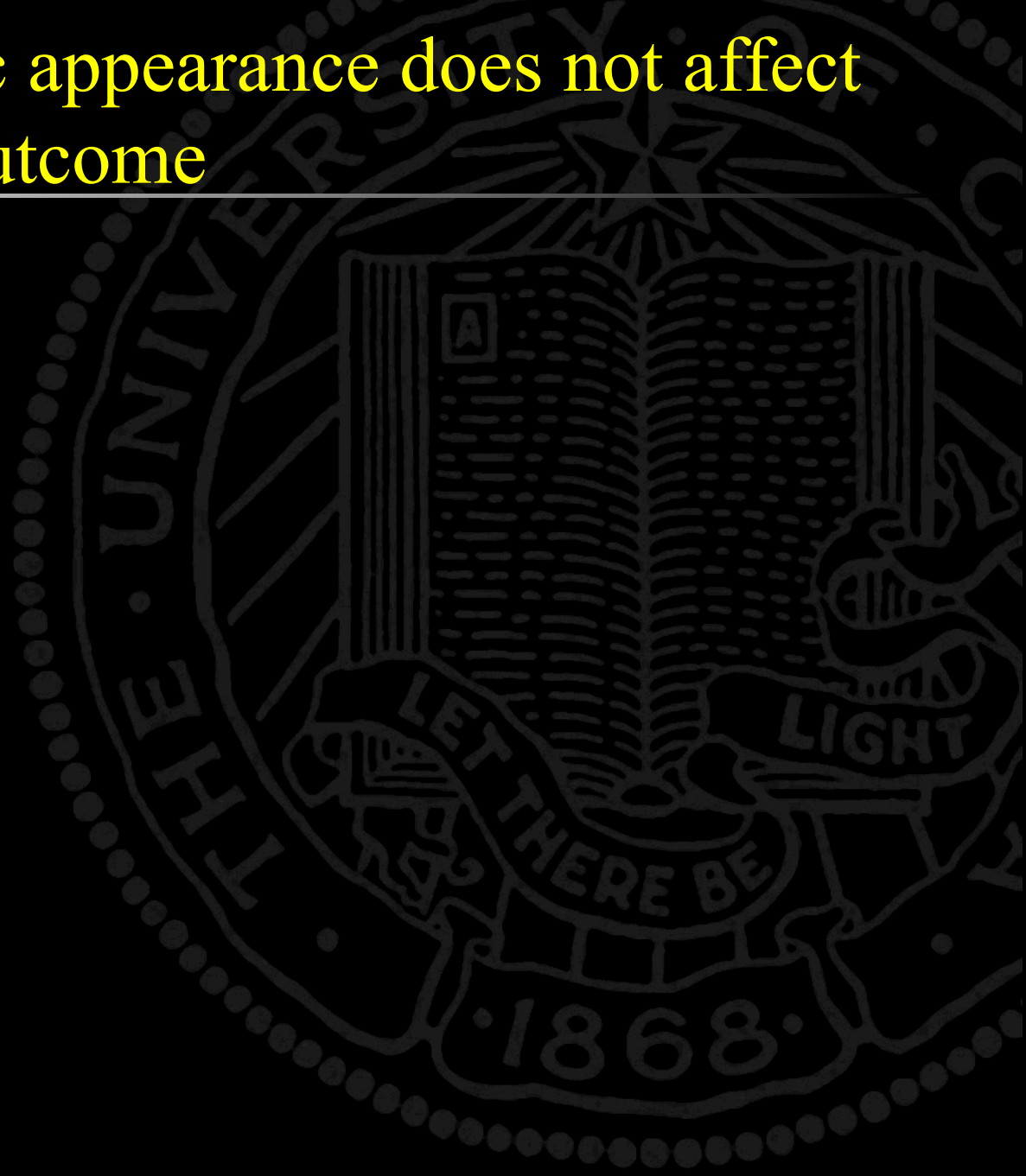




3.5 weeks

4 weeks postoperative

2. Radiographic appearance does not affect functional outcome



Radiographs and Functional Outcomes

- Sedentary, low-demand >60 (RR, 25 patients)
- Overall satisfaction, ability to return to previous activity level or occupation, concern over wrist appearance, functional task questionnaire
  - 68% good- excellent results, 8% fair, 24% poor
- Radiographic outcomes did not correlate with functional outcome

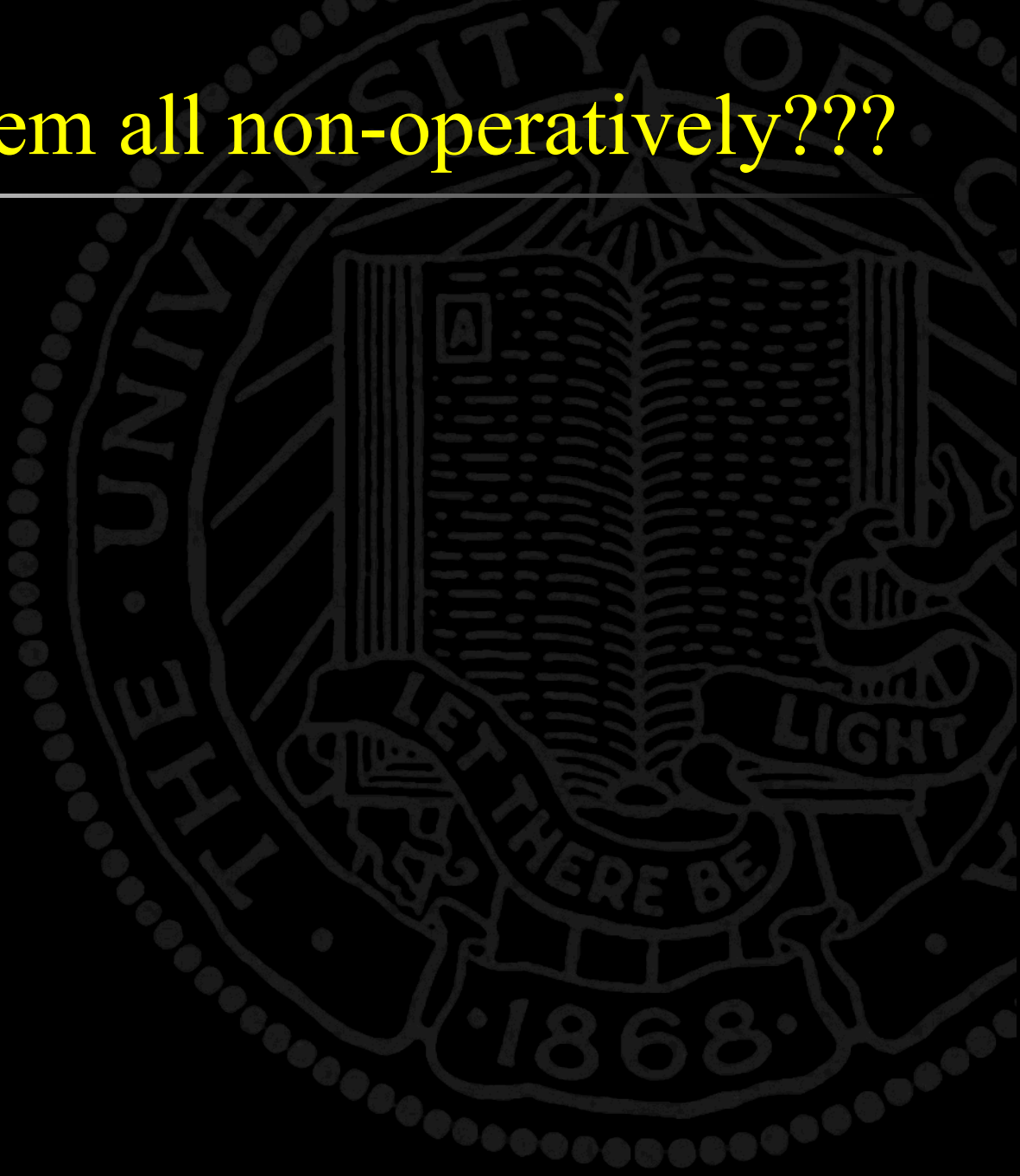
Young and Rayan, 2000

Radiographs and Functional Outcomes

- Prospective study, >50 yr with cast-treated DRF
- Only measured dorsal/volar tilt
- DASH, SF-12, patient satisfaction survey
- Radiographic outcomes did not correlate with functional outcome OR satisfaction

Anzarut, 2004

So, treat them all non-operatively???



3. Marked deformity has been shown to adversely affect functional outcome

- **Radial shortening > 6mm**
- **>10° dorsal angulation with 2mm shortening→ weak, stiff, painful wrist (>69 y/o)**

McQueen, 1988
Fujiii, 2002

A Systematic Review of Outcomes and Complications of Treating Unstable Distal Radius Fractures in the Elderly

- Management of DRFs in patients aged 60 and over with 5 common techniques
- Outcomes: ROM, grip strength, functional outcome measurements, radiographic parameters, and complications
- 2,039 papers and selected 21 papers
- Conclusion: Despite worse radiographic outcomes of cast immobilization, functional outcomes were no different from those of surgically treated groups for patients age 60 and over

Chung et al, JHS

ORIF

- **Advantages:**
  - **Makes XR look better**
  - **Earlier ROM**
- **Equivalent outcomes at 1 year**

What about rate of recovery?

- The rate of recovery and limitations of ADLs during treatment affect QOL.
- Jeudy et al: >65, better clinical outcomes up to 6 months with ORIF (vs exfix)
- Compared with younger patients, the elderly already experience a delay of approximately 6 months in gaining functional improvement.
- Is the rate of recovery rather than the final functional outcome more important when deciding treatment strategy?

Chung, JHS
Wei
Rozental

My thought process

- **Assess patient**
  - **Age, comorbidities, function**
    - **Sedentary, vs active**
    - **Cosmesis**
- **Assess fracture**
  - **Is the carpus lying over the radius?**
- **Fracture management**
  - **Non-operative: Qweek xr x 3 week, →6 wk cast**
  - **Operative: ORIF vs Bridge Plate**

- Prevalence of osteoporosis in patients with DRF is high
- Osteoporosis is a risk factor for DRF in both men and women
- Patients of both sexes with an age $\geq$ 50 who have a DRF should be evaluated with bone densitometry for the possible treatment of osteoporosis.

References

- Chung KC, Squitiere L, Kim HM. A comparative outcomes study of using the volar locking plating system for distal radius fractures in both young and elderly adults. J Hand Surg 2008;33A:809–819.
- McQueen M, Caspers J. Colles fracture: does the anatomical result affect the final function? J Bone Joint Surg 1988;70B: 649–651.
- Kopylov P, Johnell O, Redlund-Johnell I, Bengner U. Fractures of the distal end of the radius in young adults: a 30-year follow-up. J Hand Surg 1993;18B:45– 49.
- Taleisnik J, Watson HK. Midcarpal instability caused by malunited fractures of the distal radius. J Hand Surg 1984;9A:350–357.
- Bickerstaff DR, Bell MJ. Carpal malalignment in Colles' fractures. J Hand Surg 1989;14B:155–160.
- Knirk JL, Jupiter JB. Intra-articular fractures of the distal end of the radius in young adults. J Bone Joint Surg 1986; 68A:647–659.
- Medoff, RJ. Essential Radiographic Evaluation for Distal Radius Fractures Hand Clin 21 (2005) 279-288
- Fujii K, Henmi T, Kanematsu Y, Mishiro T, Sakai T, Terai T. Fractures of the distal end of radius in elderly patients: a comparative study of anatomical and functional results. J Orthop Surg (Hong Kong) 2002;10:9 –15.
- Nesbitt KS, Failla JM, Les C. Assessment of instability factors in adult distal radius fractures. J Hand Surg 2004;29A:1128– 1138.
- Jeudy J, Steiger V, Boyer P, Cronier P, Bizot P, Massin P. Treatment of complex fractures of the distal radius: a prospective randomised comparison of external fixation 'versus' locked volar plating. Injury. 2012;43(2):174-179.

- Mackenney PJ, McQueen MM, Elton R. Prediction of instability in distal radial fractures. J Bone Joint Surg 2006;88A:1944–1951.
- Arora R, Gabl M, Gschwentner M, Deml C, Krappinger D, Lutz M. A comparative study of clinical and radiologic outcomes of unstable Colles type distal radius fractures in patients older than 70 years: nonoperative treatment versus volar locking plating. J Orthop Trauma 2009;23:237–242.
- Synn AJ, Makhni EC, Makhni MC, Rozental TD, Day CS. Distal radius fractures in older patients: is anatomic reduction necessary? Clin Orthop Relat Res 2009;467:1612–1620.
- Young BT, Rayan GM. Outcome following nonoperative treatment of displaced distal radius fractures in low-demand patients older than 60 years. J Hand Surg 2000;25A:19 –28.
- Anzarut A, Johnson JA, Rowe BH, Lambert RGW, Blitz S, Majumdar SR. Radiologic and patient-reported functional outcomes in an elderly cohort with conservatively treated fractures. J Hand Surg 2004;29A:1121–1127.
- Clayton RA, Gaston MS, Ralston SH, Court-Brown CM, McQueenMM. Association between decreased bone mineral density and severity of distal radius fractures. J Bone Joint Surg 2009;91A:613– 619.
- Fu YC, Chien SH, Huang PJ. Use of an external fixation combined with the buttress-maintain pinning method in treating comminuted distal radius fractures in osteoporotic patients. J Trauma 2006;60: 330–333
- Hutchinson DT, Strenz GO, Cautilli RA. Pins and plaster vs external fixation in the treatment of unstable distal radial fractures. A randomized prospective study. J Hand Surg 1995;20B:365–372.