



University of California
San Francisco

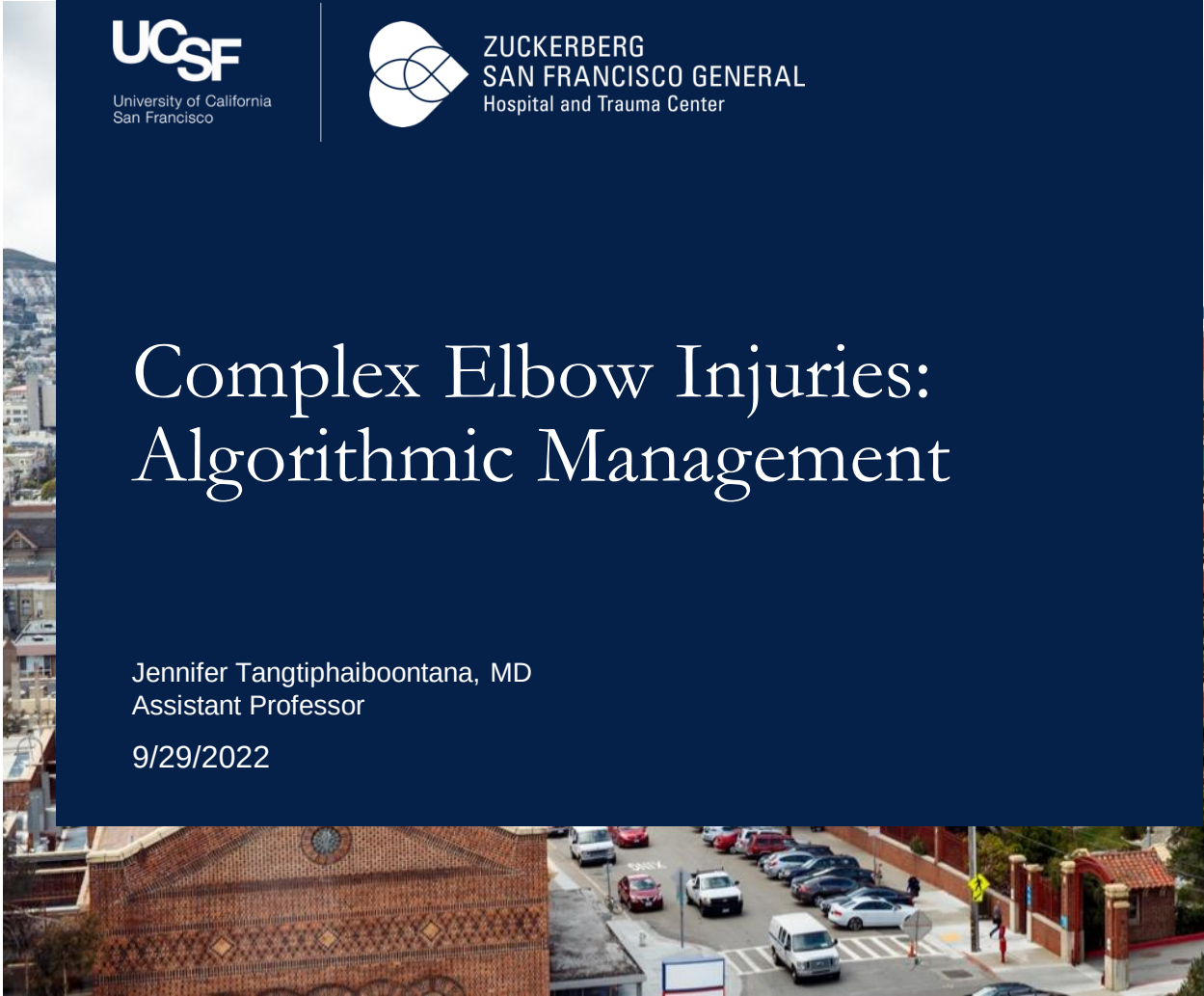


ZUCKERBERG
SAN FRANCISCO GENERAL
Hospital and Trauma Center

Complex Elbow Injuries: Algorithmic Management

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Variety of complex elbow injuries

Terrible Triads



Coronoid



Capitellum



Trans-olecranon



Monteggia variants



Variety of complex elbow injuries

Terrible Triads



Coronoid



Capitulum

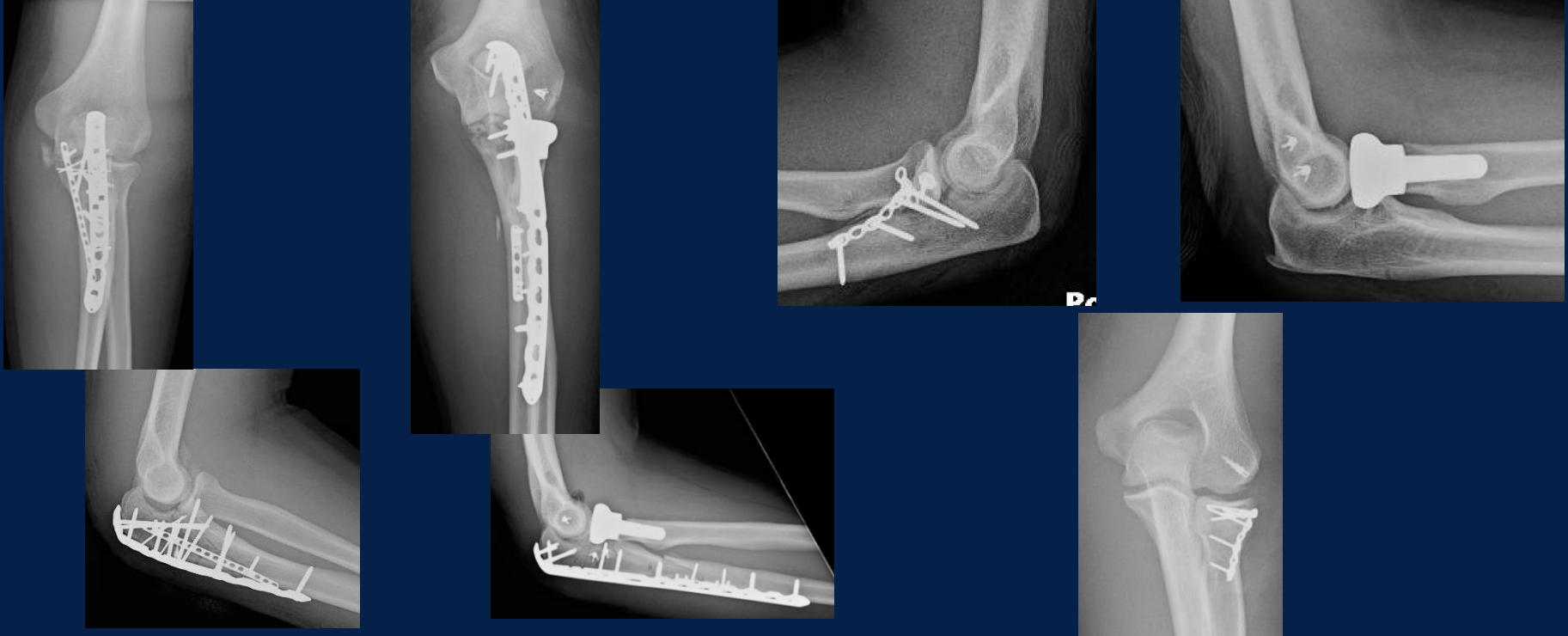


Proximal Ulna fracture-dislocations



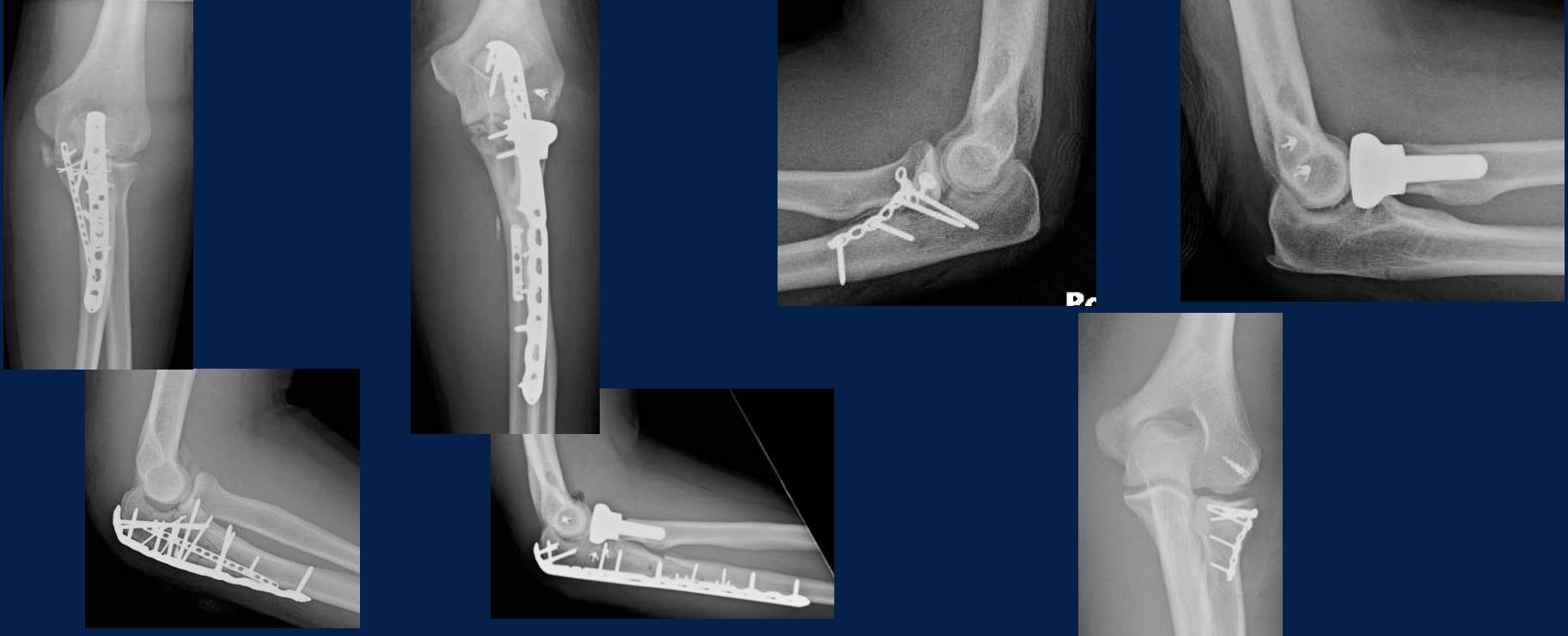
Goals of surgery

Anatomic reduction, stable fixation, and stable joint to allow for early ROM



Goals of surgery

Anatomic reduction, stable fixation, and stable joint to allow for early ROM



Objectives

- Review key structures that contribute to elbow stability
- Review a systematic treatment algorithm
 - Terrible triad
- Review how to stress the elbow intraoperatively

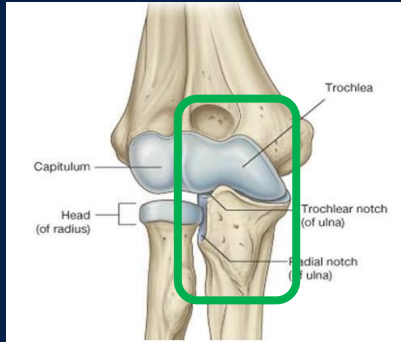
Be prepared!



Stabilizers of the Elbow

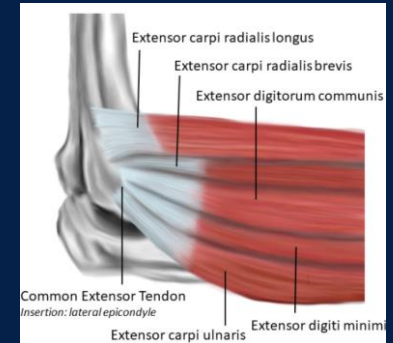
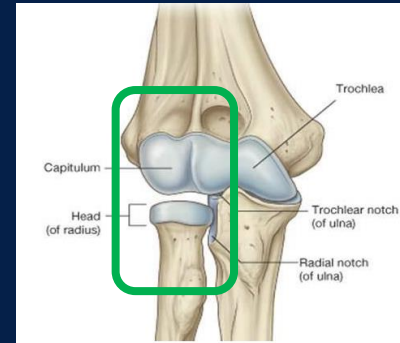
Primary:

- Ulnohumeral joint (coronoid)
- MUCL
- LUCL complex



Secondary:

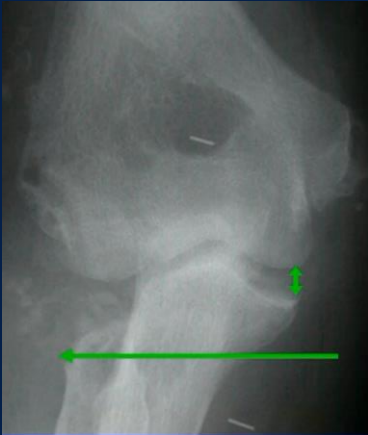
- Radiocapitellar joint
- Capsule
- Flexor and extensor tendons



Stabilizers of the Elbow

Valgus Stability

- MCL
- Radial head



Varus Stability

- LCL
- Coronoid



Posterior Stability

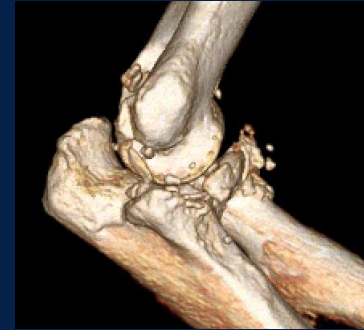
- Coronoid
- Radial head



Overall Approach

- Single vs dual incision
- Address the fractures first
 - Proximal ulna fractures – work from distal to proximal
 - Get the coronoid right!
- Stress elbow under fluoroscopy
- Repair soft tissue injuries

Beware of small or seemingly insignificant fractures!



Algorithmic Approach – Terrible Triads

1. Radial Head
2. Coronoid*
3. LUCL/extensors
4. MUCL
5. Ex-fix vs IJS

*coronoid first if requires a medial approach



Algorithmic Approach – Terrible Triads

1. Radial Head – ORIF vs arthroplasty
2. Coronoid
3. LUCL/extensors
4. MUCL
5. Ex-fix vs IJS

Do NOT excise!

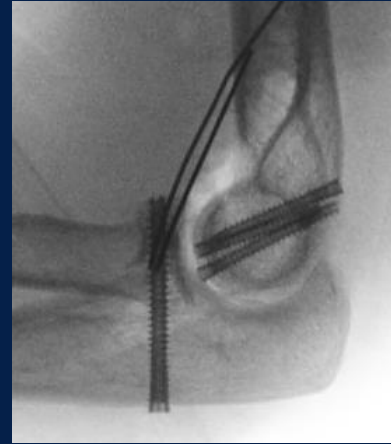


Algorithmic Approach – Terrible Triads

1. Radial Head
2. Coronoid – suture vs ORIF
3. LUCL/extensors
4. MUCL
5. Ex-fix vs IJS



#2 fiberwire passed
through 2mm drill holes



Algorithmic Approach – Terrible Triads

1. Radial Head
2. Coronoid
3. LUCL/extensor repair
4. MUCL
5. Ex-fix vs IJS



Algorithmic Approach – Terrible Triads

1. Radial Head
2. Coronoid
3. LUCL/extensor
4. MUCL repair
5. Ex-fix vs IJS

When do you need to repair the MUCL?



33M s/p fall while running



Stress Fluoros



No stress



Valgus stress in
full extension



Valgus stress at
30 degrees

Stress Fluoros



Neutral



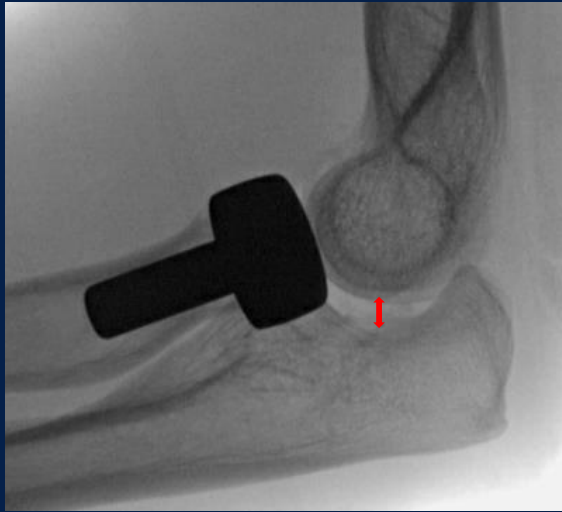
Supination



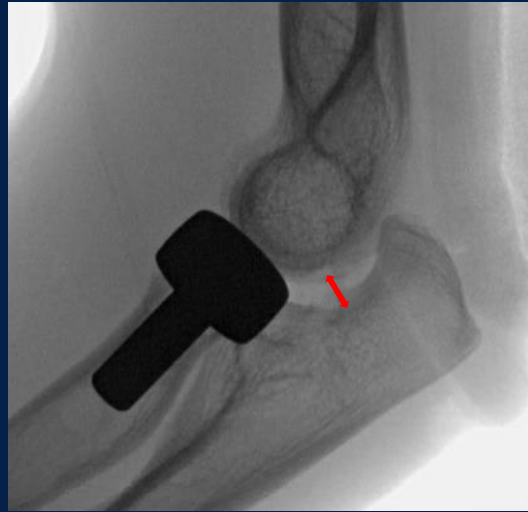
Pronation

Stress Fluoros

Forearm in pronation



90° flexion



60° flexion



Full Extension

Stress Fluoros after MUCL fixation

MUCL fixed with a suture anchor

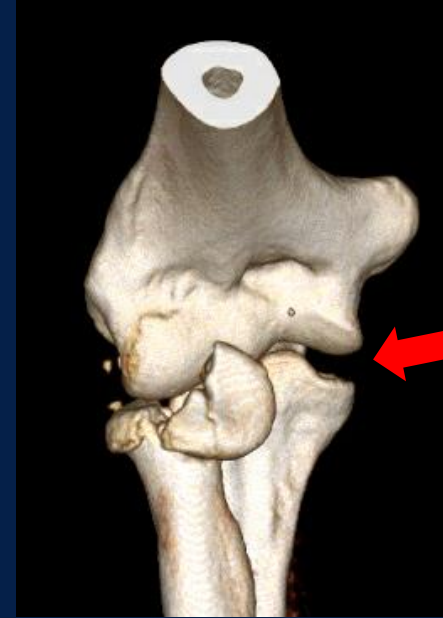




MUCL fixation



29M s/p fall while mountain biking



Stress Fluoros



Stress Fluoros after MUCL augment with internal brace



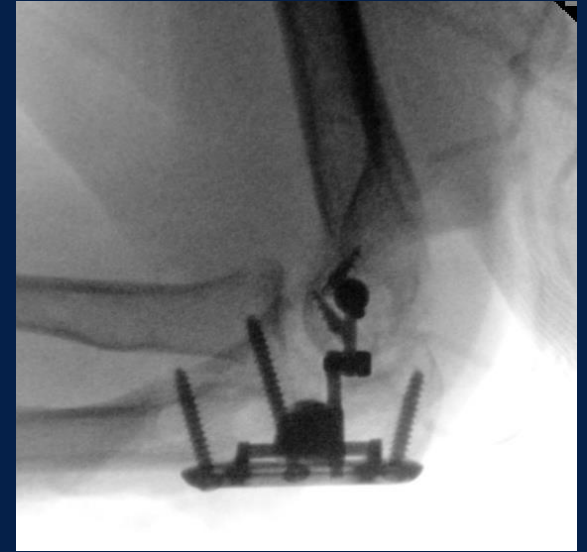
Algorithmic Approach – Terrible Triads

1. Radial Head
2. Coronoid
3. LUCL/extensor
4. **MUCL repair**
5. Ex-fix vs IJS



Algorithmic Approach – Terrible Triads

1. Radial Head
2. Coronoid
3. LUCL/extensor
4. MUCL
5. Ex-fix vs IJS



Is the radial head fixable?

Yes

Repair Coronoid

ORIF radial head



No

Cut radial neck then
repair coronoid

Radial head arthroplasty



Repair LUC

Elbow stable?



Yes

Congratulations!

No

MUCL repair +/- Ex-fix

Summary

- Remember the key stabilizers of the elbow
- Address the fractures first
 - Anatomic reduction of the coronoid
 - Restoration of normal anatomy
- Stress elbow under fluoroscopy
 - Coronal and rotational forces
- Repair soft tissue injuries base on finding of stress exam

Thank you



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