Orthopaedic Journal of Sports Medicine | SAGE

Orthop J Sports Med. 2019 Apr; 7(4): 2325967119839785. PMCID: PMC6487771

Published online 2019 Apr 26. doi: 10.1177/2325967119839785 PMID: 31065552

Clinical Utility of an MRI-Based Classification System for Operative Versus Nonoperative Management of Ulnar Collateral Ligament Tears: A 2-Year Follow-up Study

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Sports Medicine

Disclosures

Arthrex

DJO
Smith & Nephew

Journal of Shoulder and Elbow Surgery
Journal of Bone and Joint Surgery
American Journal of Sports Medicine
Orthopaedic Journal of Sports Medicine
The Physician and Sports Medicine

Management of ulnar collateral ligament injury in throwing athletes: a survey of the American Shoulder and Elbow Surgeons

Daniel J. Hurwit, MD, Grant H. Garcia, MD, Joseph Liu, MD, David W. Altchek, MD, Anthony Romeo, MD, Joshua Dines, MD

- Polled 159 ASES surgeons who treat UCL Injuries
  - Operate on all professional athletes with complete tears
  - Unclear on partial tears or nonprofessionals

Which Patients Should be managed non operatively ?

Can MRI findings help us define operative and non-operative management?

- Case series of 43 MLB players
  - ***First study to utilize MRI to demonstrate efficacy of non operative management of low grade partial UCL tears***
  - low grade UCL tears treated non-operatively = 94% RTSP
  - complete/high grade UCL tears were treated operatively and had 71% RTSP

The American Journal of Sports Medicine

Magnetic Resonance Imaging Predictors of Failure in the Nonoperative Management of Ulnar Collateral Ligament Injuries in Professional Baseball Pitchers

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- 32 MLB pitchers retrospective case control of partial UCL tears
  - All completed a trial of non-operative management
  - 11/32 failed nonop (recurrent pain/weakness)
    - 9 of 11 were distal tears, 2/11 were proximal
  - 21/32 succeeded non operative management
    - 17/21 were proximal, 4/21 were distal

12.4x failure rate risk with distal injury!

LOCATION and GRADE are important to determine management of partial UCL tears: is this reliable/reproducible?

Biomechanical analysis of elbow medial ulnar collateral ligament tear location and its effect on rotational stability

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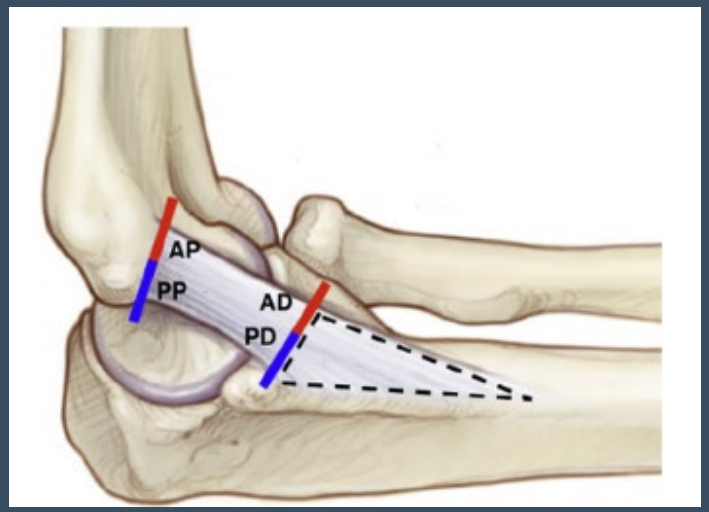
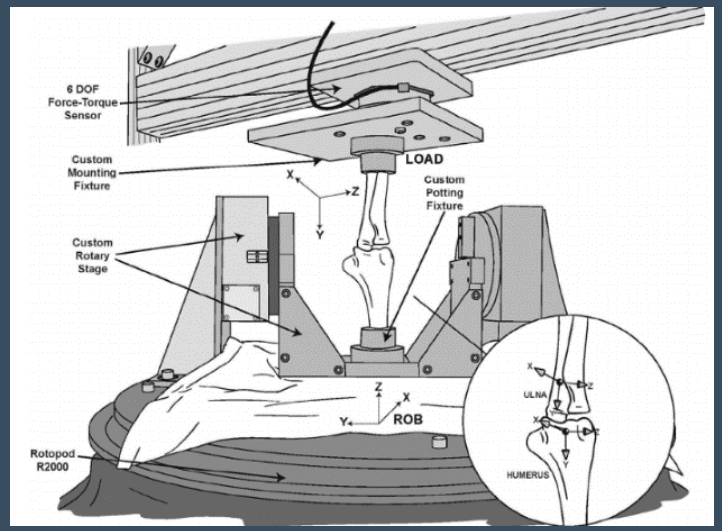
J Shoulder Elbow Surg (2018) 27, 2068–2076





Overall, the ***posterior distal insertion of the UCL contributed most to rotational stability and stiffness*** of the medial elbow when subjected to valgus stress at 90° and 120° of elbow flexion

Interobserver and Intraobserver Reliability of an MRI-Based Classification System for Injuries to the Ulnar Collateral Ligament

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University of Iowa Health Care

The Steadman Clinic and Steadman Philippon Research Institute

Henry Ford Health System

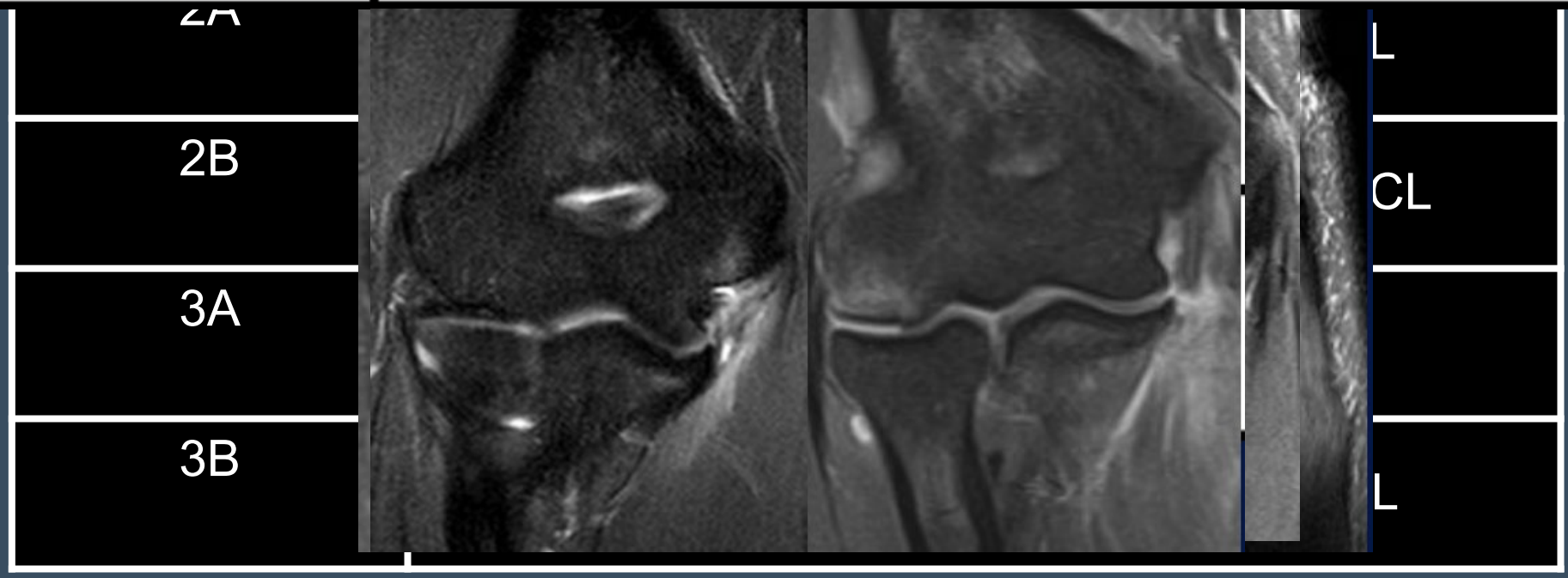
Baylor College of Medicine

Columbia Doctors Orthopedics

Saint Louis University

Allegheny Health Network
Allegheny General Hospital

3A	Partial tear of the distal/ulnar UCL
3B	Complete tear of the distal/ulnar UCL



High inter/intra-observer reliability

- Intraobserver reliability
  - Near perfect agreement x 2 (0.800, 0.804)
- Interobserver
  - Substantial agreement x 2 (0.716, 0.706)
- Additional axial view not valuable: coronal alone
- Intraoperative findings
  - ***High accuracy for partial (89%), complete (91%), proximal (100%), distal (100%)***
  - Low accuracy for midsubstance (40%)

The classification is reproducible and reliable for most tears, but is it clinically applicable?

Methods

- Retrospective review of 58 consecutive patients with MUCL injuries INITIALLY TREATED non operatively.
  - Excluded those who were managed with acute surgical intervention or prior elbow surgery.

    - Operative, n=35 (60%), Mean age = 20
    - Non-Operative, n=23 (40%), Mean age = 30

- Baseball Subcohort (n=40, 34 pitchers)
    - Operative, n=32 (27 pitchers, 5 position), Mean age = 20
    - Non-Operative, n=8 (7 pitchers, 1 position), Mean age = 23

- MRI based classification applied by two independent reviewers
    - Coronal T2 views, 3T MRI.
- RTP and prior performance were evaluated with at least two years follow up

Results

- ***Patients with distal tears (48x (p=.0004) and complete tears (5.4x (p= 0.004) were more likely to undergo surgery.***
- Baseball players, regardless of position, were confounding determinants of operative management
- No difference in RTP and RP level of play between treatment arms at two years

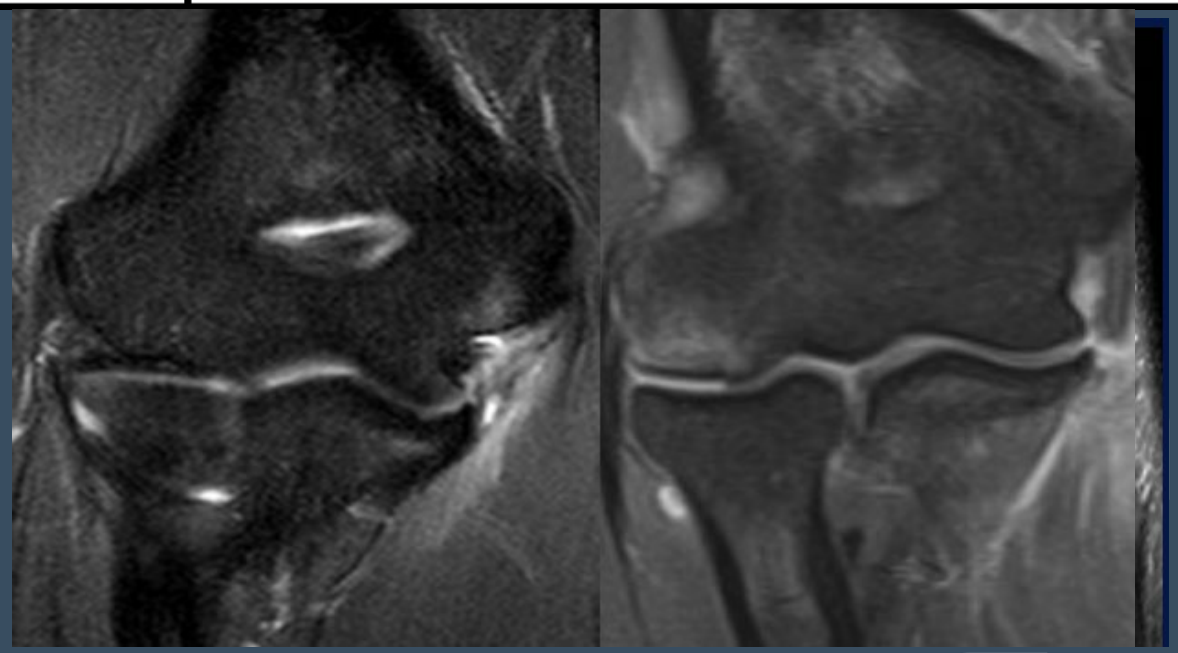
Subgroup of Baseball Players With UCL Tears (n = 40) Stratified by MRI-Based Classification[a]

Stage	Nonoperative	Operative	Total
1A	6	0	6
1B	0	4	4
2A	0	1	1
2B	2	5	7
3A	0	9	9
3B	0	13	13
Partial	6	10	16
Complete	2	22	24
Proximal	6	4	10
Midsubstance	2	6	8
Distal	0	22	22

Results: *Proximal and Distal Tear*

- 18/23 (6/10 baseball players) (1A,1B) with proximal tears were successfully managed with non-operative management
- 24/25 players with distal tears (3A/3B) (22/22 baseball players) failed non operative management and went on to surgery.

3A	Partial tear of the distal/ulnar UCL
3B	Complete tear of the distal/ulnar UCL



***Risk of 3B proceeding to surgery 10x higher than 1A (OR 10.5 P= .001)*

Take home points

- An MRI based classification which focuses on humeral versus ulnar based injuries is reliable and reproducible, and can assist in deciding between surgical versus non surgical management of partial UCL injuries.
  - 1A tears are more likely to do well without surgery
  - 3B tears are more likely to fail nonoperative management

Thank you for your Attention

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