Nonsurgical Treatment of UCL Injuries

Thomas J. Noonan, MD
Steadman Hawkins Clinic Denver
University of Colorado

- No financial disclosures

Return To Play After Nonsurgical Treatment Of Elbow UCL Injuries In Professional Baseball Players

Thomas Noonan, Gregory Ford,
James Genuario, Jason Kinkartz, Thomas Githens, Scott Murayama

Steadman Hawkins Clinic Denver

- Me: “I think we should treat this guy with rehab”
- GM: “Why would you do that? He needs surgery!”

Background

- Return to play rates after UCL reconstruction well described
- Limited studies after non-operative treatment
  - Rettig et al.[11]
    - 29 baseball players & 2 javelin throwers
    - 42% → RTP with non-operative treatment
    - No factors identified predicting success
- No published studies for non-operative treatment of UCL injury among professional baseball players

Background

- Question:
  - Is non-operative treatment for UCL injuries successful?
- Purpose
  - Identify professional baseball players' ability to return to the same level of play after UCL injuries
  - Evaluate the relationship between RTP and:
    - non-operative vs. operative treatment
    - MRI grade
    - Player position

Methods

- Retrospective review
- Single professional baseball organization
  - 6 minor league & 1 MLB
- 2006 - 2011
- 72 medial elbow injuries
- MRI performed on all players
- 45 UCL injuries
  - Dx: PE and MRI

Methods

- Treatment: rehabilitation, surgery or both
- Success:
  - RTP (return to play at least 1 season)
  - RTSP (return to same level of play or higher)
- Factors
  - MRI grade
    - I - intact ligament with edema
    - II - partial tearing
    - III - complete tear
    - IV - chronic healed injury
  - Location of injury
  - Player position

Results: Treatment Breakdown

- 45 UCL injuries
  - 15 UCL recon surgery
    - 6 w/o attempted rehab
      - 5 grade III (complete) injuries
      - 1 grade IV (chronic healed)
    - 9 failed rehab first
      - Average days of rehab prior to surgery: was 46 d (19-88)
      - 4 grade IV (chronic healed)
      - 3 grade III (complete)
      - 2 grade II (partial)
  - 30 non-operative treatment
    - All incomplete injuries
      - 4 grade I
      - 7 grade II
      - 19 grade IV

Results: Treatment Breakdown by Grade

Injuries	Operative Treatment	Non-operative Treatment
Grade I	0%	13%
Grade II	13%	23%
Grade III	53%	0%
Grade IV	33%	63%

Results: RTSP by MRI grade

- RTSP (regardless of treatment)
  - 100% Grade I
  - 86% Grade II
  - 63% Grade III
  - 96% Grade IV

Results: Surgical Treatment

- Among 15 players treated surgically
  - 13 (87%) RTP
  - 11 (73%) RTSP

RTSP comparisons: Surgery

- Operative- 73%
- Non-operative- 93%
- p<.07
- Likely influenced by the fact that all grade 3 injuries underwent surgery

RTSP comparisons: degree of tear

- Complete- 63%
- Incomplete- 92%
- p<.05

RTSP comparisons: acuity

- Acute- 81%
- Chronic- 92%
- p<.20

RTSP comparisons: tear location

- Proximal- 79%
- Diffuse/distal- 95%
- p<.12

Results: Pitchers

- 33 pitchers
  - Surgical treatment (14)- 71% RTSP
  - Non-operative treatment (19)- 95% RTSP
  - p<0.08
  - 24% had grade 3 injuries

Results: Position Players

- 12 position players
  - Surgical treatment (1)- 100% RTSP
  - Non-operative treatment (11)- 91% RTSP
  - p<0.92
  - No grade 3 tears

Conclusion

- Incomplete UCL injuries in professional baseball players
  - Can be successfully treated non-operatively most of the time
    - 93% RTP and RTSP
  - When surgery is performed
    - 100% RTP, 86% RTSP

Conclusions

- Complete UCL tears in professional baseball players
  - Require surgical reconstruction in most cases
    - Lower return to play rates (75% RTP, 63% RTSP)
- Pitchers
  - more likely to develop UCL injuries
  - more likely to have complete tears leading to surgery

Conclusions

- Non-pitchers
  - Higher rates of return to play
- MRI Grading of UCL injuries
  - Can help predict potential for
    - Return to play
    - Need for surgery

Limitations

- Retrospective study
- Relatively small numbers
- Selection bias
- No long term follow up

Non-operative treatment: how did we do it?

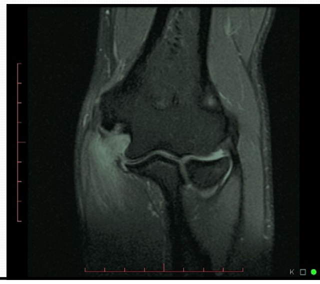
- 4-8 weeks no throwing depending on severity of injury
- Early PT for ROM, shoulder strengthening
- Re-evaluation after no throw period- if asymptomatic then begin throwing program
- Gradual return to play (6-8 weeks for pitcher)

Take home point

- Partial UCL tears can effectively be treated with nonsurgical treatment

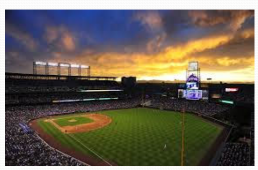
What we are not saying

- All UCL tears can and should be treated non-surgically



What we are not saying

- Successful nonsurgical treatment of a UCL tear is a long term solution
- Then again, neither is surgery…



Points to consider: degree of tear

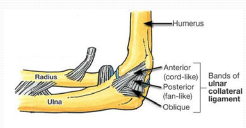
- Why were outcomes with complete tears worse?
  - I don't know
  - Do those players generate more valgus stress when they throw?
  - Is something different anatomically with those players?
  - Does surgery simply not work as well when the tear is complete?

Points to consider: location

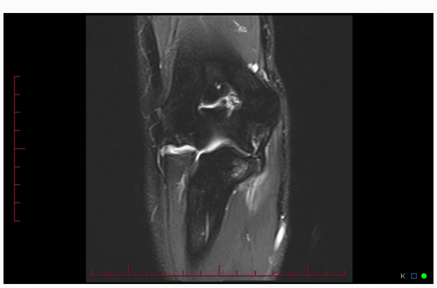
- We did not identify a difference in non-operative success rate based on location of injury
- Frangiamore et al, AJSM 2017
  - 32 professional pitchers with non-op treatment
  - 82% who failed non-op treatment had distal tears
    - Distal location was only significant factor in multivariate analysis
  - 88% (7/8) with high grade distal tears failed non-op treatment
  - Distal, **non high grade** tears were successfully treated non-op 60% of the time (3/5)

Points to consider: location

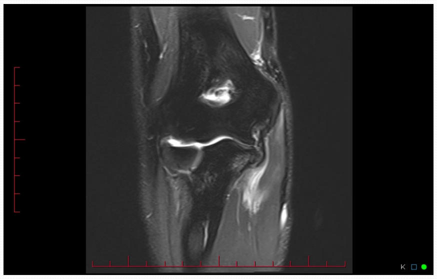
- Not all distal tears are the same
- Stripping of the ligament with preservation of ligament thickness→ non-surgical treatment
- Disruption of ligament at the sublime tubercle→ surgical treatment



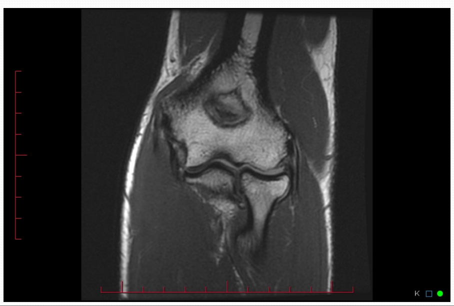
Non-surgical treatment? YES



Non-surgical treatment? YES



Non-surgical treatment



Non-surgical treatment? NO

Non-surgical treatment? NO

Points to consider: biologics

- None of the athletes in our study received any injections of PRP, stem cells, or anything else
- Podesta et al, AJSM 2013
  - 34 athletes with partial UCL tear who had failed 2 months of non-op treatment (2 professional athletes)
  - Single injection of LR-PRP
  - 88% returned to same level of play

Points to consider: biologics

- Dines et al, 2016, Am J Orthop
  - 44 baseball players (6 professional)
  - ACP injections for partial tears
  - 73% RTP (34% RTSP)
  - 67% of professionals RTSP
  - Worse outcomes than Podesta study or ours, why??
- Currently consider PRP injection for partial UCL tears but unsure it significantly improves success rate

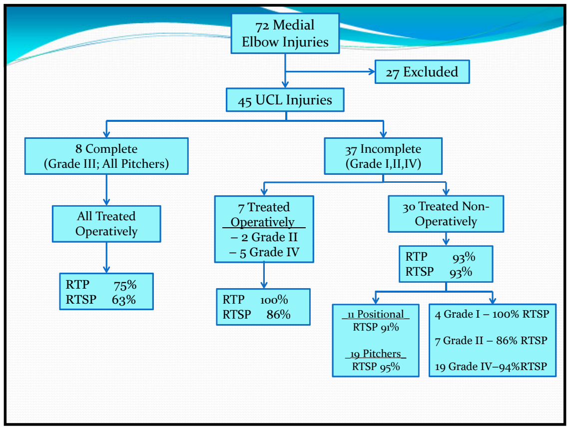
SUMMARY: UCL TEAR TREATMENT

- Nonsurgical treatment
  - Partial tears, especially proximal
  - Consider PRP or other biologics
- Surgical treatment
  - Complete tear
  - History of previous non-surgical treatment of partial tear
  - High-grade distal partial tear

THANK YOU

References

- 1. Andrews JR, Timmerman LA. Outcome of elbow surgery in professional baseball players. *Am J Sports Med*. 1995;23:407-413.
- 2. Azar FM, Andrews JR, Wilk KE, Groh D. Operative treatment of ulnar collateral ligament injuries of the elbow in athletes. *Am J Sports Med*. 2000;28:16-23.
- 3. Bushnell BD, Bitting SS, Crain JM, Boublik M, Schlegel TF. Treatment of magnetic resonance imaging-documented isolated grade III lateral collateral ligament injuries in National Football League Athletes. *Am J Sports Med.* 2010;38:86-91.
- 4. Cain EL, Andrews JR, Dugas JR, Wilk KE, McMichael CS, Walter JC 2nd, Riley RS, Arthur ST. Outcome of ulnar collateral ligament reconstruction of the elbow in 1281 athletes: results in 743 athletes with minimum 2-year follow up. *Am J Sports Med.* 2010;38:2426-2434.
- 5. Chen FS, Rokito AS, Jobe FW. Medial elbow problems in the overhead-throwing athlete. *J Am Acad Orthop Surg*. 2001;9:99-113.
- 6. Dodson CC, Slenker N, Cohen SB, Ciccotti MG, DeLuca P. Ulnar collateral ligament injuries of the elbow in professional football quarterbacks. *J Shoulder Elbow Surg.* 2000;19:1276-1280.
- 7. Jones KJ, OsbahrDC, Schrumpf MA, Dines JS, Altchek DW. Ulnar collateral ligament reconstruction in throwing athletes: a review of current concepts. *J Bone Joint Surg Am.* 2012;94:1-12.
- 8. Kenter K, Behr CT, Warren RF, O'Brien SJ, Barnes R. Acute elbow injuries in the National Football League. *J Shoulder Elbow Surg.* 2000;9:1-5.
- 9. Langer P, Fadale P, Hulstyn M. Evolution of the treatment options of ulnar collateral ligament injuries of the elbow. *Br J Sports Med*. 2006;40:499-506.
- 10. Nakanishi K, Masatomi T, Ochi T, Ishida T, Hori S, Ikezoe J, Nakamura H. MR arthrography of elbow: evaluation of the ulnar collateral ligament of elbow. *Skeletal Radiol*. 1996;25:629-634.
- 11. Rettig AC, Sherrill C, Snead DS, Mendler C, Mieling P. non-operative treatment of ulnar collateral ligament injuries in throwing athletes. *Am J Sports Med.* 2001;29:15-17.
- 12. Waris W. Elbow injuries of javelin-throwers. *Acta Chir Scand*. 1946;93:563-575.
- 13. Kim NR, Moon SG, Ko SM, Moon WJ, Choi JW, Park JY. MR imaging of ulnar collateral ligament injury in baseball players: Value for predicting rehabilitation outcom. *European journal of radiology*. 2011;80:422-426.


72 Medial Elbow Injuries
27 Excluded
45 UCL Injuries
8 Complete (Grade III; All Pitchers)
37 Incomplete (Grade I,II,IV)
All Treated Operatively
RTP 75%
RTSP 63%
7 Treated Operatively
– 2 Grade II
– 5 Grade IV
RTP 100%
RTSP 86%
30 Treated Non-Operatively
RTP 93%
RTSP 93%
11 Positional
RTSP 91%
19 Pitchers
RTSP 95%
4 Grade I – 100% RTSP
7 Grade II – 86% RTSP
19 Grade IV–94%RTSP