MEDIAL ELBOW INSTABILITY

Felix H. Savoie III, MD
Ray J. Haddad Professor & Chairman
Department of Orthopaedic Surgery
Tulane University
New Orleans, LA

COI

• Royalties: none
• Stock: none
• Stock option: Cayenne Medical
• Consultant: DePuy Mitek, Smith & Nephew, Exactech

MEDIAL INSTABILITY

• Medial instability: primarily a problem in overhead athletes
• There are no long-term consequences of not repairing or reconstructing a medial ligament injury
• It does not make you throw harder
MUCL INJURIES

- USA: rapid increase over past 10 years in younger and younger patients
- Non-throwing patients usually respond to non-operative management: brace and rehabilitation

THE THROWING ELBOW

- Epidemic increase in injury rates in past 10 years
- MUCL receives most attention, but other injuries increasing as well

FLEISIG / ANDREWS

ASSOCIATIONS
- Same sport > 8 months / year = 800% increase in injury & 500% increase in surgery
- Innings > 100 / yr = 3.5 fold increase in serious injury
- Showcase / multiple leagues = 86% increase in elbow injuries
- Curveball not associated with elbow injury (slider and cut fastball are)

REFERENCES
- AJSM (GF), 1994
- Sports Health (GF), 2012
- AJSM (Lyman), 2002
- La Med Soc. (Kerut), 2008
- AJSM (GF), 2011
- AJSM (Olsen), 2006
- JAAOS (Bruce), 2014
INJURY PREVENTION
1. Correct scapular dyskinesia
2. Improve core strength
3. Check the hip: HIRD, not GIRD!
4. Realistic throwing program
5. Avoid multiple leagues / showcases
6. Summer ball for collegiate athletes?

AGE-RELATED INJURIES
- Age < 9: apophysitis
- Age 9-13: medial apophyseal injury vs OCD
- 13-18: isolated tears, med > lat
- > 16: multiple tears

AGE < 9
- "Little leaguer’s elbow"
- Medial apophysitis
  - Can occur age 7 - 13
  - ? No clear evidence related to “curve balls” too young
AGE < 9: PREVENTION

- Pitch count: 50 per game, 75 / wk, includes practice
- Teach balance on the mound
- Limit to FB / change-up
- Fatigue = biggest risk factor: limit weekend tournaments and showcases; pick your spots

AGE 9 – 13: MEDIAL PAIN

- Medial apophyseal avulsion
  - Medial pain, tender to palpation along posterior apophysis
  - May open to valgus stress
  - Often acute on chronic
- Prevention: same as < 9 but 75 pitches / game, 100 per week

MEDIAL APOPHYSEAL AVULSION: EARLY Rx

- Try to get them before there is significant separation
- Cast for 1 week, then wrist & elbow bracing, start PT
- Wrist brace off when:
  1. No pain to palpation along posterior margin, and:
  2. No pain to resisted wrist flexion with elbow straight
MEDIAL APOPHYSEAL AVULSION: SURGERY

- 1cm rule does not apply to throwers
- 3mm displacement is "career ending"
- ORIF with cubital tunnel release
- Watch out for separate avulsion fragment with MUCL attached

MEDIAL APOPHYSEAL AVULSION

- Post-op course:
  - Splint for 1 week
  - Dual bracing program for 3-6 weeks
  - PT starts at 1 week for shoulder, hip, and core ex, ROM elbow
  - At 4 weeks start adding in pain-free wrist and elbow exercise
  - At 6-8 weeks can start return to throw and hit program

MUCL EXAMINATION

- Valgus stress test
- Moving valgus stress test
- Milk test
MUCL EXAMINATION

- Valgus stress test
- Moving valgus stress test
- Milk test

WHAT ARE THE CONSEQUENCES OF LEAVING AN INJURY TO THE MEDIAL ULNAR COLLATERAL LIGAMENT ALONE?

MEDIAL INSTABILITY REPAIR / RECONSTRUCTION

- MUCL injury is at epidemic proportions
- Everyone wants "Tommy John" surgery
- Only surgery you have to talk patients and family out of having
HISTORICAL TREATMENT
• Jobe Reconstruction: MUCL injuries in PROFESSIONAL baseball players; changed a career-ending injury to one with RTP
• Numerous papers on technique of reconstruction in professional athletes with excellent results and RTP
• Other treatments were either not as effective or ineffective in RTP

TULANE ORTHOPAEDIC SURGERY

HISTORICAL TREATMENT
• Who was the first player to have the surgery?
• Did he have any complications?
• Where did Jobe get the idea?

TULANE ORTHOPAEDIC SURGERY

TREATMENT OPTIONS
• Stop playing
• Play with pain / limitations
• Brace and rehabilitation (Rettig 2001)
• PRP injections (Yocum)
• Ligament repair (Rusch, Savoie, Dugas)
• Reconstruction (Jobe, Andrews, Altchek, Conway, many others)
INJURY TREATMENT OPTIONS

• Non-operative Rx (Rettig) with bracing and rehabilitation (Savoie)
  – Add to non-op with PRP? (Podesta)
• Arthroscopy with mini-open repair (Savoie, Rusch)
• Dugas: repair with internal brace
• Standard reconstruction: modified Jobe, Andrews, Altchek docking, Conway’s Dane, etc.

NON-OPERATIVE TREATMENT

1. Protect the elbow: brace with hinges
2. Biologic supplementation?
3. Core, scapular, and shoulder rehab
4. Tulane PRP study: 35 throwers Rx with PRP; 85% RTP (Banks Deal & Ed Smith:, OJSM 2017)

16 YEAR OLD TREATED WITH REHAB, BRACING, & PRP

• 1st MRI showed partial MUCL tear at humerus; came in for surgery
• Non-op protocol, continued to play with brace x 6 weeks
• 2nd MRI at 6 weeks: “normal” MUCL
INDICATIONS FOR SURGERY

• Failure of non-operative treatment
• Desire to continue to play
• Ability and means to properly rehabilitate after the surgical procedure
• Understand that it doesn’t work in everyone and the return to play time can be extensive

SURGICAL OPTIONS

• Direct repair with or without “augmentation”
• Repair with internal brace augmentation
• Standard Jobe or modified Jobe reconstruction (Altchek Docking, Conway DANE, etc.)

SURGICAL OPTIONS

• What is the current standard of care to manage an athlete with damage to the medial ulnar collateral ligament?
• What is expected time to RTP?
• Is there a way to speed this up?
ADVANTAGES OF REPAIR

• The MUCL is an extra-articular ligament and should heal like one (not an ACL), meaning 6 - 8 weeks to heal
• Altchek's muscle splitting approach (Smith, et al.) minimizes surgical damage and allows rapid rehab
• Protective bracing allows immediate hip, scapular, and core rehabilitation

SURGICAL TECHNIQUE

• Prone position for diagnostic arthroscopy
• Internally rotate the shoulder and place hand on a standard arm board for the open part
• Smith approach, split the muscle, evaluate ligament under direct visualization for area of damage

DIAGNOSTIC ARTHROSCOPY

• Medial opening of > 3mm should be seen
• Often radial side impact lesions
• Chondromalacia in olecranon fossa on medial wall of fossa and medial tip of olecranon
SURGICAL TECHNIQUE

- Incise ligament along its anterior margin to look at its underside
- Place an osteo-inductive or osteo-conductive (not a biocomposite) anchor into humerus at the base of the medial epicondyle or middle of sublime tubercle for ulnar avulsion
- Double-mattress suture repair
SURGICAL TECHNIQUE

• Repair the capsule back over the repaired ligament in pants-over-vest suture
  – Watch out for ulnar nerve along the back of the ligament
  – Don't pull capsule too far—must maintain full extension
  – Should we add PRP?
POST-OP REHAB

- Splint for 1st week then hinged elbow brace for next 8 - 12 weeks.
- Start scapula, core, hip, and wrist rehab immediately
- Elbow rehabilitation in brace added at week 4
- Return to throw starts weeks 6 to 8 in brace and week 12 out of brace

RESULTS

- 2 studies both have >90% return to same or higher level of play
  - Savoie et al.: 58 / 60 RTP same or higher level; AJSM 2008
  - Richard (Rusch) et al.: JBJS 2008

FAILURES OF REPAIR

- 2 / 60 repairs failed, one at 5 years and 1 at 3.5 years, while playing professionally
  - Both tears were mid-substance
- Both underwent DANE-type reconstruction and returned to play at higher level
- Revision surgery was similar to a non-operative elbow
Jeff Dugas’ idea
Advanced the concept of repair and expanded the indications
Biologic tape to both support the ligament repair and advance healing
Allows more rapid rehab

Post-op rehabilitation
Rest 1 week then start leg, hip, core, scapula, and shoulder rehab in elbow brace: fix their poor posture
3 weeks’ work on elbow ROM
6 - 8 weeks US assessment of ligament and start RTP protocol; IF rest of body well – SCAPULA!!

Dugas
– Series published OJSM
– Excellent results
Savoie
– Current series
– 42 UCL repair with internal brace
– RTP 40/42 to same level within 4 months
RECONSTRUCTION

- 2 main technical options:
  - Modified Jobe with ulnar nerve transposition (Andrews)
    - Elevates the FP mass anteriorly
    - Drill holes around sublime tubercle and "Y" tunnel in medial epicondyle
    - Tunnels exit posteriorly in cubital tunnel
  - Altchek muscle-splitting approach without ulnar nerve transposition
    - Ulnar same; single tunnel proximally decreased risk of fracture

GRAFT CHOICE

- Ipsilateral palmaris (most cases)
- Contra-lateral palmaris longus (Paletta)
- Hamstring if not available
- Gracilis allograft (Savoie & Morgan, JBJS 2013)

ALTERNATIVES (FROM WILK, ET AL.)

Docking Technique (Altchek)  Modification (El Attreche)
• Same muscle-splitting approach
• DANE-TJ: screw distal and either Docking or Jobe proximal (Conway)
POST-OP REHAB

• Splint for 1st week then hinged elbow brace for next 12-20 weeks.
• Start scapula, core, hip, and wrist rehab immediately (unless fp tear)
• Elbow rehabilitation in brace added at week 4
• Return to throw starts weeks 12-16 in brace and week 20 out of brace
• Basically twice as slow as repair
RESULTS

- Cain (Andrews): 1,294 athletes had 84% return to play (RTP), AJSM
  - Variable age / level related
- Altchek (docking): 93% RTP, AJSM
- Savoie (Morgan): 94% RTP with allograft, JBJS 2013

RECONSTRUCTION DURABILITY

- Average post-reconstruction career is 3.5 years but innings often diminished
- Potential for re-injury is undetermined but has gone up due to early surgery
- Results of revision reconstruction are 30-40% return to play at best (Yocum et al.)
  - Recent report by El Attrache actually had 70% return

DISCUSSION

- Conservative treatments (brace / rehab, repair) do work in young athletes: whole body rehab is the key
- Reconstruction of a failed repair has the same chance of success as a primary reconstruction
- Return to same level of play is much more rapid with a repair
DISCUSSION

• Prevention: talk to parents & coaches
• Design programs to protect these young arms by total body conditioning
• Young athletes are not pro’s and don’t always need TJ: tailor the surgery to fit the patient
• Early rehab while protecting the elbow is a key component of recovery: THINK CORE AND SCAPULA

CONCLUSION: MUCL

• MUCL injuries are occurring in a younger (non-professional) population
• Fatigue, dyskinesia a key factor in the injuries
• Prevention involves both education and conditioning
• There are many treatment options available, with more rapid recovery pace than the classic TJ surgery

THANK YOU