MCL RECONSTRUCTION: INDICATIONS, TECHNIQUE, RESULTS

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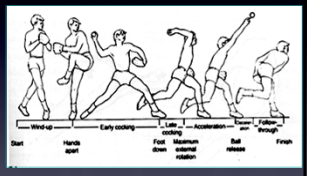
Disclosures

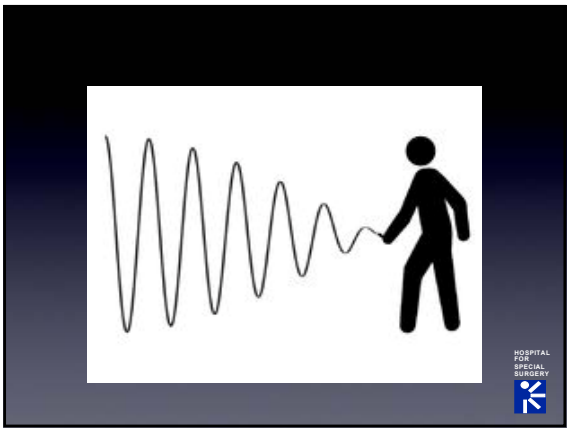
- Consultant: Arthrex, Conmed Linvatec, Ossur
- IP/Royalties: Conmed Linvatec
- Editorial Board: AJO, JSES

NONE DIRECTLY RELEVANT TO THIS TALK

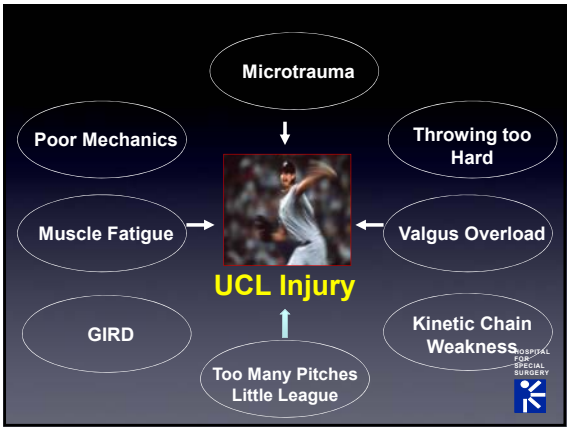
Throwing is *NOT* Normal



- **Excessive Joint Forces**
- **High angular velocities**
  - Angular velocities up to 7200°/sec (Fleisig *AJSM* 95)




"LAG"
• Creates Potential Energy

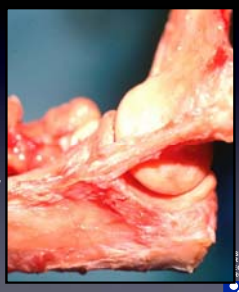

Microtrauma
Poor Mechanics
Throwing too Hard
Muscle Fatigue
Valgus Overload
UCL Injury
GIRD
Kinetic Chain Weakness
Too Many Pitches Little League

What are we talking about?

Valgus Laxity is a physical finding.

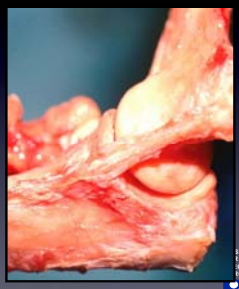
Valgus Instability is a clinical diagnosis based on documented disability from valgus laxity.

UCL Insufficiency is …



UCL Insufficiency

… a clinical diagnosis based on documented disability from a symptomatic MUCL injury either with or without valgus laxity.



Differential Diagnosis

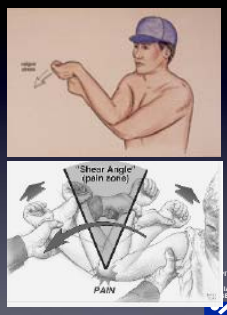
- **Ulnar collateral Ligament Injury**
- **Flexor-pronator tendonosis**
- **Posterior Osteophytes**
- **Stress fractures (olecranon, ulna)**
- **Ulnar Nerve**

History

- **Medial elbow pain**
- **Pain during acceleration phase of throwing (85%)**
- **more commonly**
  - Decreased accuracy/velocity/control/stamina
- **Sometimes Acute**
  - Possible "POP" if acute
- **Ulnar nerve complaints**
  - 40%; usually sensory

Physical Exam

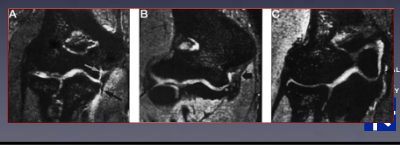
- ROM
- Tenderness over MCL
- Valgus Instability (Jobe)
- Milking Test (O'Brien)
- Moving Valgus Stress Test*
  - 100% sensitive; 75% specific
- Resisted pronation
- Ulnar nerve symptoms



*=O'Driscoll et al. *AJSM* 2005

MRI

- MRI useful in identifying presence and severity of UCL injury (Timmerman AJSM 1994)
  - Sensitivity 57%
  - Specificity 100%



MRI of Asymptomatic Pitchers

14 high school: 100% UCL normal

Jazrawi AOSSM 2004

31 college: 90% UCL abnormal

Meister et al, AOSSM 2004

20 professional (low A):

85% UCL abnormal

Waslewski et al,

UCL Treatment Options

Nonoperative

Repair

Reconstruction

Nonoperative Treatment Protocol

- Active rest:
  - Mild severity 6-8 weeks
  - Moderate severity 3-4 months
- Rehab exercise
  - Progressive elbow & shoulder program
- Interval throwing program
- 40% success rate Retting AJSM 2001

Glenohumeral Internal Rotation Deficits in Baseball Players With Ulnar Collateral Ligament Insufficiency

Joshua S. Dines,*† MD, Joshua B. Frank,† MD, Meredith Akerman,† MS, and Lewis A. Yocum,† MD
From the †Sports Medicine and Shoulder Service, The Hospital for Special Surgery, New York.

- 29 baseball players with UCL insufficiency matched to 29 controls
- Significant difference in GIRD between UCL pathology and controls (28° vs 13°)
  - *GIRD > 25 ° pathologic*
- Pathologic GIRD associated with UCL insufficiency

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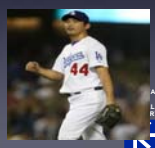
Platelet Rich Plasma

Dines, ElAttrache, Bradley AJO 3/2016

- 27 cases
  - 5 Professional
  - 8 College
  - 14 High School
- Indicated for UCL reconstruction
- 67% G/E results
  - 4/5 Professionals RTP
- Return to throwing ~ 5 weeks
- Return to competition ~ 14 weeks



Who should have surgery?

- Throwing athletes, others
- Persistent medial elbow pain while throwing
- Exam consistent with diagnosis of UCL Injury
- Documented failure to improve
- Desire and ability to return to competitive overhead throwing.

When to do surgery?

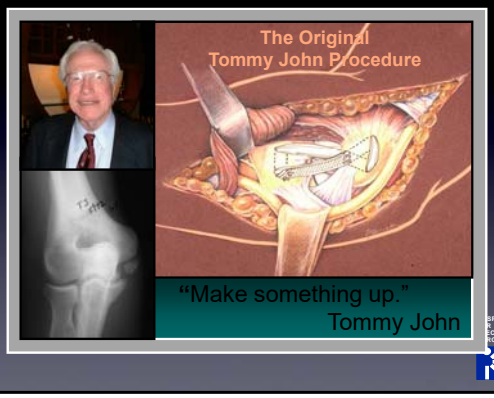
Consider

- Long term goals
- Most important season
- Time to start of season
- Time to recover

Age, Duration of symptoms, Laxity, X-ray findings, MRI findings

Goals of Surgical Treatment

- Reconstruct UCL
  More effective than repair
- Treat associated joint pathology arthroscopically or open
- Ulnar nerve transposition for motor symptoms, persistent paresthesia, or extensive posteromedial debridement



Original Tommy John Method

Dr Jobe's First 13 year experience

56 Reconstructions

20 MLB, 14 MnLB

68% Excellent

21% Ulnar nerve complications

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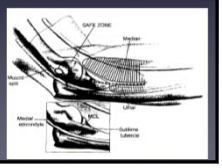
Muscle Splitting Approach to UCL

Smith, Altchek et al. *AJSM*, 1996

Determined safe zone b/w branches of median nerve and ulnar nerve

Fascial Split between FCU and common flexor mass

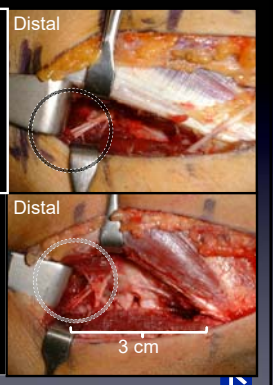


- 22 pts underwent repair/reconstruction using muscle splitting approach
  - No neuropathy

Muscle Split: Safe Interval?

Martin Gruber anastomosis

Neural structures reported crossing within the "safe zone"



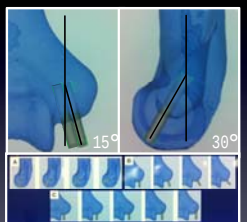
Tunnel Position – Humerus

Humeral Tunnels

Drill Angulated:

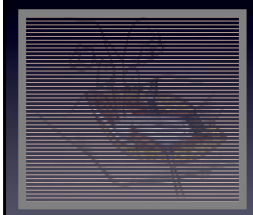
15° to the long axis of the humerus in the coronal plane

30° to the long axis of the humerus in the sagittal plane



Byram and Ahmad AJSM 2013

Final Configuration



Post-op Management

- Splint in supination at 30º for 1 week
- Brace permitting motion 0 - 45º week 2 - 4
- Motion 0 - 90º week 4 – 6
- Full ROM after week 6
- May begin light grip immediately
- Avoid all valgus stress for 4 months
- Progressive throwing program at 6 months

MUCL Outcomes

Jobe	1986	16	TJ, SM UNT	62%
Conway	1992	56	TJ, SM UNT	65%
Azar	1997	91	TJ, SQ UNT	82%
Thompson	1998	33	TJ	82%
Altchek	2000	40	Docking	97%
Koh	2006	19	Docking	89%
Dodson	2006	100	Docking	90%
Dines	2011	21	Docking	90%
Dines	2007	22	DANE TJ	86%
Cain	2010	1281	TJ, ASQUNT	83%

Operative Management of UCL Injury in Adolescent Athletes

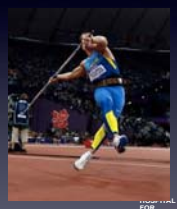
Jones, Dines, et al. *AJSM 2014*

- 55 patients
- 87.5% EXCELLENT OUTCOMES

Elbow UCL in Javelin Throwers at a minimum 2-year follow-up

Dines JS, et al. *AJSM 40(1):2012*

- 10 Javelin Throwers
- Docking technique
- 90% *Excellent* outcomes



Increased Average time to RTP vs. Baseball (15 months)

Concomitant Flexor-Pronator/UCL Tear

Osbahr, Dines, Altchek *AJSM 2010*

- 8 players
- ONLY 1 EXCELLENT OUTCOME
- 25% Fair/ 62.5% Poor

Typically occur in older baseball players (>30 yo)

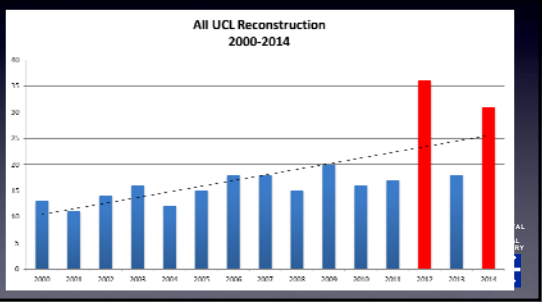
Revision Surgery For Failed Elbow MCL Reconstruction

Dines, et al. *AJSM 36(6)*,2008

- 15 Baseball Players
- Revision reconstruction
- 5/15 (33%) with *Excellent* outcomes
- Postoperative complications in 40%

Worse outcomes and increased complications can be expected

All UCL Reconstructions 2000-2014



Outcomes in revision Tommy John surgery in Major League Baseball pitchers
Liu J, Dines J. January 2016

- Revisions- 2000-2014
- 39 players
- 13% revision rate

Years	Revisions
2000-02	3
2003-05	5
2006-08	6
2009-11	6
2012-14	19

Time from 1st Surgery to Revision

- 39 players, 38 pitchers
- Average years: 5.1 years

41% occurred within 3 years of 1st surgery

Conclusions

- UCL insufficiency is potentially career ending injury
- Prevalence is Increasing
- Treat Associated conditions
- Return to play expected in ~85% of throwers
- All techniques work fairly well
- We need to improve our outcomes and probably starts with rehab

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THANK YOU

1925 - 2014

1947 - 2013

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Evolutionary Pressure

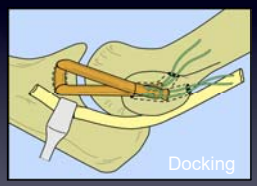
Complexity of the Surgery

Extensive Dissection

Flexor Mass Mobilization

Research: Anatomical and biomechanical studies

Isometry, Fixation strength



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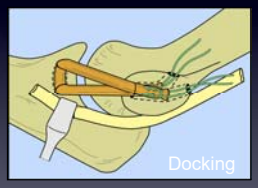

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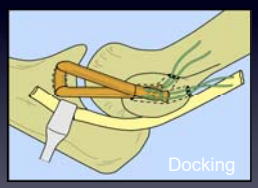

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New Methods - Surgical Goals

Restore the anatomy: functional, strong, valgus torque restraint with anatomic length and isometry

Minimize surgical complications

Increase initial fixation strength

Accelerate rehabilitation and recovery

Improve outcomes

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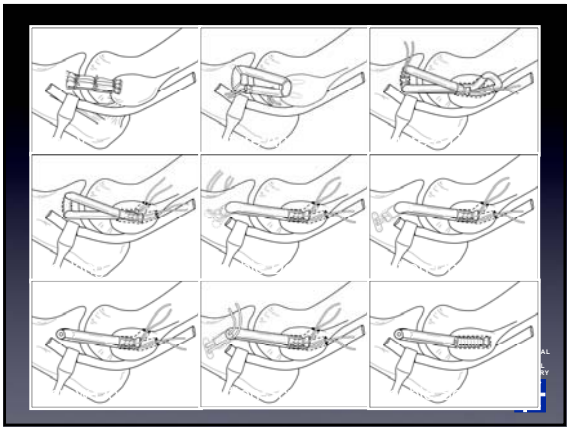

Functional Outcomes Following Revision UCL in Major League Baseball

Jones, JS Dines. *JSES 22(5),*2013

- 14 of 18 returned to professional baseball
- Neither Relief Pitchers nor Starting Pitchers typically able to get back to previous workload

Worse outcomes and increased complications can be expected

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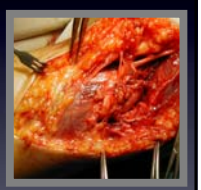
ASMI *Modified TJ Procedure: Largest Series Published*

Cain, Andrews et al *AJSM* 2011

- **1266** UCL reconstructions
- 743 with minimum 2-yr f/u
- 617 (83%) returned to previous level
- Complications 20%
  - Ulnar n. neuropraxia (16%)



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