



CURRENT SOLUTIONS IN SHOULDER ELBOW SURGERY
TAMPA, FL
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GAME CHANGERS IN ELBOW SURGERY 2018:
WHAT DO I DO DIFFERENTLY IN THE
THROWERS ELBOW?

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Sports Medicine and Shoulder Service

HOSPITAL FOR SPECIAL SURGERY   HOSPITAL FOR SPECIAL SURGERY WHERE THE WORLD COMES TO GET BACK IN THE GAME

Disclosures


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- Royalties: Conmed Linvatec
- Editorial Board: JSES, AJO

• SPECIAL THANKS TO JEFF DUGAS for Internal Brace Data

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Background

- Rate of Tommy John Surgery increasing
- Generally high rates of return to throwing (80-90%) but many don't get back or re-tear
- Even in successful cases, rehab is lengthy



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What Am I Doing in 2018 To Counter These Issues?

- 1. Avoiding Reconstruction (and its long recovery process)**
- 2. Monitoring the rehab/throwing program more scientifically**

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Can we avoid reconstruction?



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Stem-cell therapy is poised to disrupt the Tommy John epidemic in baseball

ARMED INJECTION RACE
Ethan Wolfson April 05, 2017



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Platelet Rich Plasma Can Successfully Treat Elbow Ulnar Collateral Ligament Insufficiency in High-Level Throwers
Joshua S. Dines MD, et al American J Orthop 2016



- 44 throwers 6 pro, 14 college, 24HS
- 15 excellent, 17 good, 2 fair, 10 poor
- 67% of Pro's RTP
- Best in acute damage to isolated part of the ligament in young throwers

PRP has much better results than conservative Tx in these partial UCL injuries

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An Original Study

Platelet-Rich Plasma Can Be Used to Successfully Treat Elbow Ulnar Collateral Ligament Insufficiency in High-Level Throwers



Potential utility in:
Partial Tears
Lower-level throwers
Patients unwilling/unable to go through year recovery

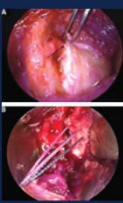
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Can it be repaired?

- Historically Poor Results

Savoie et al AJSM 2008



- 60 Athletes
- 93% Excellent Results
- Quicker Recovery



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Adolescent and Young Adults


- These athletes typically have end-avulsions of the UCL or partial tears of the ligament.
- Rarely is the UCL tissue deficient or deteriorated from chronic repetitive injury

IS UCL RECONSTRUCTION NECESSARY in THIS POPULATION?

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UCL Repair with Augmentation



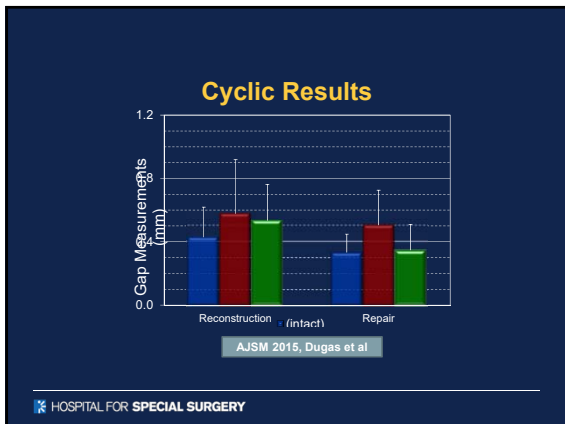
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Biomechanical Comparison of Ulnar Collateral Ligament Repair With Internal Bracing Versus Modified Jobe Reconstruction.

Cadaveric Study: Augmented Repair vs Reconstruction


		Age (yrs)	Intact Gap (mm)	Torn Gap (mm)	Proc. Gap (mm)
Reconstruction	Mean ± SD	63 ± 5	0.43 ± 0.19	0.58 ± 0.34	0.53 ± 0.23
Repair	Mean ± SD		0.33 ± 0.12	0.51 ± 0.22	0.35 ± 0.16
p-value (one-tailed paired t-test)			0.09	0.3	0.03

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Demographics – 40 patients with min 1 year follow up (J. Dugas personal results)

- Ages 13.5-33.2 (Avg 17.7 yr)
- Baseball – 30 (23/30 pitchers)
- Softball – 3 (2/3 pitchers)
- Tennis – 1
- Football – 1
- Javelin – 3
- Cheer – 1
- Rock Climbing - 1



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Demographics

- 19 proximal (6 complete, 13 partial)
- 17 Distal (11 complete, 6 partial)
 - 4 mid-substance in non-throwers
- Avg time from Injury to Repair 7.3 months
 - (6.7 months in throwers, 4.9 months in HS pitchers)

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Results at 12 months

- 85% F/U (34/40)
- KJOC score avg 93
 - Range (50-100)
- Baseball Pitchers avg KJOC = 94
 - Range (80-100)
- Throwing athletes rated their elbows as 95.6% normal at 12 months post-op

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Results – Post-op Course

- Patients achieved full ROM by 6-8 weeks post surgery in all cases
- Plyometric exercises initiated after wk 6 when ROM is FULL.
- Throwing program initiated after 4 weeks of plyometrics (avg beginning of week 11)
- RTP average WEEK 21 after surgery in baseball
 - Just under 6 months.

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Results to date

- 39/40 have returned to at least their pre-surgical level of sports participation, given the opportunity
- No statistically significant difference in KJOC score between proximal vs distal OR partial vs complete avulsion.

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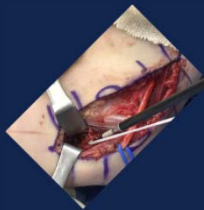
Results – Level of Play

- 13/14 HS pitchers with at least one year of HS baseball remaining returned to pitching
 - 1/14 playing SS and says he does not want to pitch
 - 4 went on to make a collegiate team and pitch at least one season
- 5/5 Collegiate pitchers returned to their pre-surgical level of collegiate pitching

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My Experience

- 12 patients
- 5 athletes with minimum 6 month follow up
- Sports:
 - MMA/Wrestling 2
 - Gymnastics 1
 - Lacrosse 1
 - Volleyball 1
- Failed trial of conservative treatment
 - PT, rest, +/- PRP
- All returned to sports by 6 months



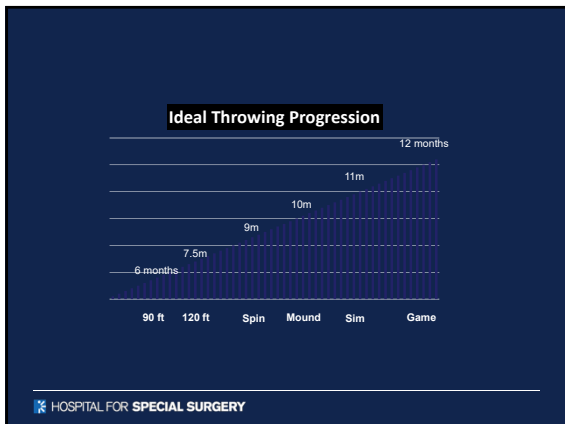
SMALL NUMBERS...

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Do we need to change our rehab?



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Motus Sleeve

- mThrow by Motus is IMU sensor with tri-axial accelerometer and tri-axial gyroscope that records data at 1000 Hz.
- collects 3-Dimensional motion data relating to your every throw to calculate workloads for arm
- throw count, arm speed, maximal shoulder external rotation (ER), arm slot, and elbow varus torque

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The Relationship of Throwing Arm Mechanics and Elbow Varus Torque

Within-Subject Variation for Professional Baseball Pitchers Across 82,000 Throws

Christopher L. Camp,* MD, Travis G. Rubin,† MS, Glenn S. Fleisig,†† PhD, Joshua S. Dines,‡ MD, David M. Dines,‡ MD, David W. Altobelli,‡ MD, and Barbara Dierker,‡ MD
Investigation performed at Motus Global, Rockville Centre, New York, USA

- Analyze on-field activity of pro baseball pitchers
 - Impact of various mechanical factors on torque
 - ROM / arm speed / arm slot
 - Impact of various situational factors on torque
 - Long toss / bullpen / live game


All with goal of better informing/designing rehab and injury prevention programs

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The Relationship of Throwing Arm Mechanics and Elbow Varus Torque

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Christopher L. Camp,¹ MD, Travis G. Tubbs,¹ MS, Glenn S. Fjelle,^{1,2} PhD, Joshua S. Dines,¹ MD, David M. Dines,¹ MD, David W. Altschek,¹ MD, and Brittany Dowling,^{1,2} MS
Investigation performed at Motus Global, Rockville Centre, New York, USA



• 80,000 throws in professional baseball players

• Within individual athletes, a 1-Nm increase in elbow varus torque was associated with a:

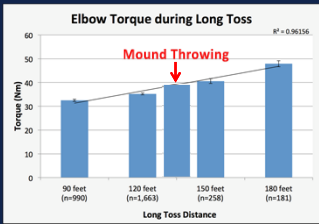
- 13° decrease in arm slot
- 116/s increase in arm speed
- 8° increase in shoulder rotation



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Elbow Torque during Long Toss

$R^2 = 0.96156$




Long Toss Distance	n	Approximate Torque (Nm)
90 feet	990	32
120 feet	1,463	38
150 feet	258	42
180 feet	181	48

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Conclusions

- Mound work actually had **less torque** than long distance (150') throwing
- Increased speed at the same distance increased torque **less** than increasing distance at the same speed.
- Should we change our progression?



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Conclusion

- **New ways to avoid Tommy John Surgery**
 - Need more long term follow and better designed studies but initial data is promising
- **Improving our postoperative rehab program will likely decrease the re-tear rate**
 - Metrics provided by Motus sleeve can help guide rehab

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THANK YOU

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