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Sports Health

VEO and Olecranon Injuries in Overhead Athletes



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Disclosures

- Arthrex: Consultant
- DJO: Education
- Smith Nephew: Education
- American Journal of Sports Medicine
- Journal of Bone and Joint Surgery
- Journal of Shoulder and Elbow Surgery
- Orthopaedic Journal of Sports Medicine
- The Physician and Sports Medicine
- American Orthopaedic Society for Sports Medicine (AOSSM):
Education and Industry Relations Committee

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Back in the Day.....

- Bennett described a condition he termed "so-called osteochondritis of the professional pitchers' elbow":
 - "semi-detached bodies" by the medial epicondyle
 - Loose bodies in the olecranon fossa
 - Stated that "removal does away with all symptoms" (Bennett, JAMA, 1941)

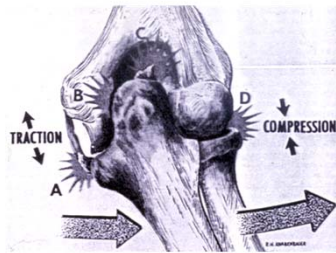


Eddie Collins
INFIELDER-CLEVELAND, AM. L.

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- In 1969, King described the "Medial Stress Syndrome" of the elbow in 50 pro baseball players.
- Proposed that valgus/tension causes medial problems and compression leads to lateral pathology

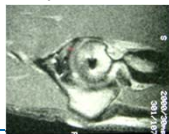


(King, et al, CORR, 1969)

Valgus Extension Overload



- Posterior medial pain at follow through
- Reproduced on exam by forced extension and valgus
- May be related to UCL insufficiency
- Synovitis, chondromalacia, loose bodies and osteophytes



[Am J Sports Med.](#) 2010 Dec;38(12):2535-41. doi: 10.1177/0363546510376231. Epub 2010 Sep 9.

Ulnohumeral chondral and ligamentous overload: biomechanical correlation for posteromedial chondromalacia of the elbow in throwing athletes.

[Osbaahr DC¹](#), [Dines JS](#), [Breazeale NM](#), [Deng XH](#), [Altchek DW](#)

Increased contact pressure (shifted medially) and decreased contact area in UCL insufficient specimens

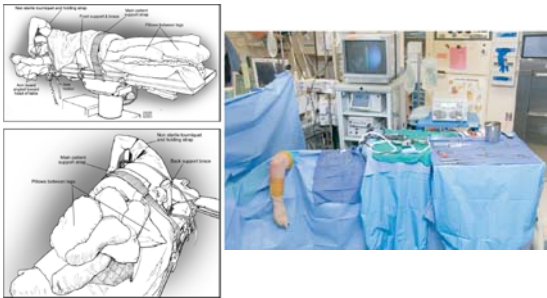
Abnormal contact may occur as a result of valgus laxity through increased contact pressures across the posteromedial elbow

Concluded that valgus laxity throughout the throwing motion may lead to chondromalacia

VEO Treatment

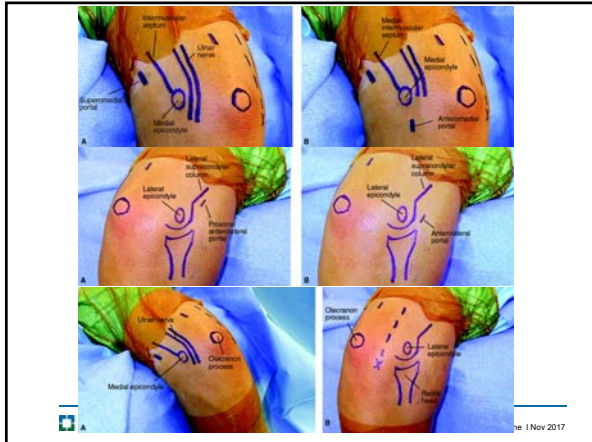
- Initial treatment includes short period of rest, NSAIDS, possibly injection
- Arthroscopic debridement with osteophyte and loose body removal may be needed
- Loose bodies, osteophytes often return after 2-3 seasons
- Many veteran athletes have had several "clean-outs" during their career

Elbow Arthroscopy Set-up



Basic Elbow Arthroscopy Principles

- Outline bony landmarks and ulnar nerve
- Distend the joint with saline
- Keep elbow flexed 90 degrees
- Incise skin only
- Spread with hemostat
- Only use blunt trocars
- Be careful with pumps; low pressure and flow are best





VEO Surgery

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MEDIAL COLLATERAL LIGAMENT STRAIN WITH PARTIAL POSTEROMEDIAL OLECRANON RESECTION

A BIOMECHANICAL STUDY

BY JOSHUA KRAMER, MD, FRC(S) TRICHINOLI, NINA S. ELATRAKCHI, MD, ROBERT W. O'NEILL, MD, PHD, CARLOS J. SOTO, M. YAMADA, MD, HIROYUKI HIRAKAWA, MD, PATRICK G. SINGH, MD, KAI-SHAI AN, PHD, AND DEBRAJ F. MOHANTY, MD

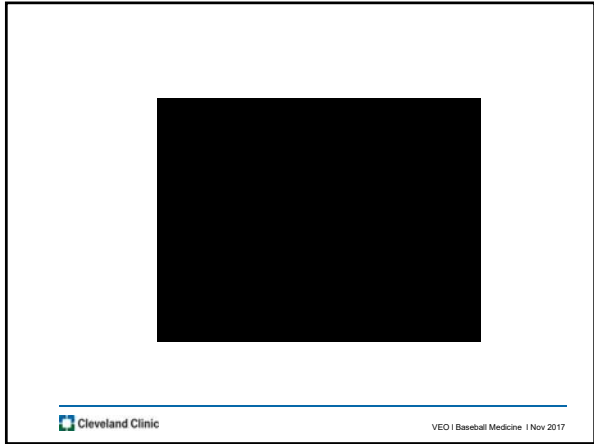
Investigation performed at the Department of Orthopaedic Biomechanics, Mayo Clinic, Rochester, Minnesota

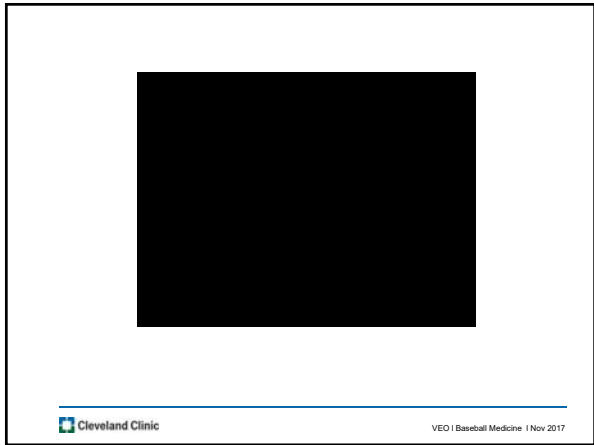
JBJS

JBJS 2004

- Measured MUCL strain with increasing amounts of bone resection
- Determined that resection should not include native bone (remove spur only)

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0003-5465/90/2004-0407\$02.00/0
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Outcome of Elbow Surgery in Professional Baseball Players*

James R. Andrews,[†] MD, and Laura A. Timmerman, MD

From the American Sports Medicine Institute, Birmingham, Alabama

14% reoperation rate for arthroscopic debridement group (VEO)

Better results with UCL reconstruction

TABLE 1
 Initial surgical procedures

Procedure	N	Study group		Return to play		Reoperation N (%)
		N (%)	N (%)	N (%)	N (%)	
Debridement of posterior olecranon osteophyte	41	34 (83)	23 (68)	14 (41)		
UCL reconstruction	12	9 (75)	7 (78)	0		
UCL repair	2	2 (100)	0	1 (50)		
Ulnar nerve transfer and olecranon osteophyte	9	7 (78)	6 (86)	3 (43)		
Ulnar nerve transfer	2	1 (50)	1 (100)	0		
Debridement of capitulum	1	1 (100)	1 (100)	0		
Diagnostic arthroscopy [†]	5	5 (100)	5 (100)	1		

* 4 UCL injuries and 1 posterior olecranon osteophyte.

[J Shoulder Elbow Surg.](#) 2016 Dec;25(12):2048-2056. doi: 10.1016/j.jse.2016.09.007. Epub 2016 Oct 17.

Valgus extension overload syndrome in adolescent baseball players: clinical characteristics and surgical outcomes.

Park JY¹, Yoo HY², Chung SW³, Lee SJ³, Kim NR³, Ki SY³, Oh KS⁴

13 male adolescent baseball players (mean age, 15.4 years)

The overall rate of return to play was 85% (11 of 13). concomitant ulnar collateral ligament insufficiency had less optimal outcomes



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Stress Injury of the Proximal Ulna in Professional Baseball Players

Mark S. Schickendantz,[†] MD, Charles P. Ho,[‡] MD, PhD, and Jason Koh,[§] MD

AJSM 2002



Figure 1. MRI shows normal appearance of the proximal ulna. Coronal fat-suppressed T2-weighted image shows well-defined bony structure of the proximal ulna along the posteromedial aspect of the olecranon in a left-handed pitcher. The surrounding bone is normal signal intensity.



Figure 2. Proximal stress fracture injury of the olecranon. Coronal fat-suppressed T2-weighted image shows extensive hyperintense signal from edema (arrow) throughout the proximal ulna in a right-handed pitcher.



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Olecranon Stress Injury

- Relatively uncommon
- Posteromedial pain during acceleration and follow through
- Gradual onset
- Results from tensile failure of proximal medial ulna trabecular bone
- XR wnl



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Olecranon Stress Injury

- Differentiate from MCL sprain by:
 - Pain, tenderness of olecranon proximal and dorsal to MUCL (posteromedial corner)
 - May have pain with percussion of olecranon
- MRI very helpful; ligament intact
- My opinion:
 - UCL laxity allows for shear across posterior medial joint leading to VEO; intact ligament results in constant stress on the ulna leading to **trabecular failure**

Olecranon Stress Injury

- Non-operative treatment effective if no fracture line
- True bi-cortical fracture requires rigid fixation
- Rest (orthotic?); avoid hyperextension and valgus stress while healing
- Consider bone growth stimulator
- Return to throwing based upon clinical response; majority return to play by 3 months
- Repeat MRI not absolutely indicated but may be helpful in some cases

Olecranon Apophysis Fracture

- Immediate severe posterior pain during follow through of throw



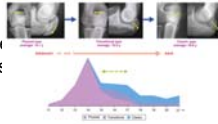
Classification of Olecranon Stress Fractures in Baseball Players

Kozo Furushima,¹ MD, PhD, Yoshiyasu Itoh,¹ MD, PhD, Shohei Iwabuchi,¹ MD, PhD, Yuzuru Yamamoto,¹ MD, PhD, Ryuji Koga,¹ MD, and Masaki Shimizu,¹ MD, PhD
Investigation performed at the Sports Medical Center, Keio Orthopaedic Hospital, Gunma, Japan



AJSM 2014

- 200 baseball players age 13-27
- 71-90% associated MUCL sprain or medial epicondyle avulsion
- New classification system based on location and pattern; correlate:



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Fixation Options

- Cannulated screw(s) +/- washer
- Single "home run" screw
- Tension band
 - Wire
 - Suture
- Plate and screws



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Cannulated Screw Fixation of Refractory Olecranon Stress Fractures With and Without Associated Injuries Allows a Return to Baseball

James M. Paci,¹ MD, Jeffrey R. Dupas,¹ MD, Jeffrey A. Guy,¹ MD, E. Lyle Cain Jr.,¹ MD, Glenn S. Fleisig,¹ PhD, Candice Hurst,¹ MPH, Kevin E. Wik,¹ PT, DPT, and James R. Andrews,¹ MD
Investigation performed at the American Sports Medicine Institute, Birmingham, Alabama



AJSM 2013

- 25 ORIF; 18 min 2 yr f/u; phone
- 17 RTP same or higher level; mean 29 w postop
- 10 athletes (56%) underwent 13 more surgeries; 7 not related to index procedure
- 6 (33%) hardware removal; 2 for infection
- **This is not a benign injury or "slam dunk" fix!**

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Final Thoughts

- Posterior medial pain in the thrower's elbow often arises from the joint/osseous structures
- Non-mechanical symptoms are safe to manage through a season
- Limit bone resection to osteophyte removal
- UCL insufficiency may play a role; always consider it
- Aggressively treat fractures with solid fixation/AO principles



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Thank You!

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