Common Elbow Problems in Young Athletes

Stephen M. Swirsky, DO
Pediatric and Adolescent Sports Medicine
Miami Children’s Hospital
VALGUS EXTENSION OVERLOAD

Medial Stress

Lateral Compression

Forced Extension
Repetitive Microtraumatic Process

Mechanical abutment of bone and soft tissue in the posterior elbow compartment
POSTERIOR & MEDIAL
Quick Anatomy Review
Anterior Bundle 1° restraint

30° - 130°
OLECRANON/FOSSA

Provides Stability:

<20° and >120° flexion
VALGUS EXTENSION

- Post-Medial Trochlea
- Olecranon tip
VALGUS & EXTENSION

Posterior impingement
Repetitive Microtrauma
↓
Subtle UCL Instability/Insufficiency
↓
↑Valgus subluxation while throwing
↓
↑compressive forces radiocapitellar joint
Chondromalacia
Bony Hypertrophy
Osteophytes
Valgus Deformity
Joint Contracture
UCL Ossification
Loose bodies
Chondromalacia
Tip stress fracture
Tip osteophyte
CHONDROMALACIA

Medial Trochlea

Olecranon
TIP STRESS FRACTURE
TIP OSTEOPHYTE
OSTEOPHYTE FRAGMENTATION
BONY HYPERTROPHY

Dominant

Non-dominant
LIGAMENT OSSIFICATION
LOOSE BODIES
Lateral Margin Stress Fracture of the Capitellum
VALGUS DEFORMITY
Pain
  • Extremes of motion
  • Posterior medial

Crepitation

Locking

Extension Loss

Performance Loss
EXAMINATION

Effusion
Extension loss
Crepitus/mechanical Sx
Tender posteromedial olecranon tip
Extension painful
More pain with valgus
R/O ASSOCIATED CONDITIONS

UCL Injury
Ulnar Neuropathy

*LAXITY DOES NOT = UCL INSUFFICIENCY!!*
VEO SYNDROME IN BASEBALL:
Most Common Surgical Diagnosis in Baseball Players

Throwing Athlete

- 64N Valgus Force – Late Cocking/Early Accel
- 500N Lateral Compressive Force: 20° - 110°

Andrews JR, Timmerman LA. 
91 Acute Elbow Injuries in NFL:
- 77%: Elbow Sprains
- 56%: Hyperextension
- 20%: MCL injury
  - Blocking at the Line (50%)
  - Valgus Force to planted hand (29%

Kenter K, Behr CT, Warren RF, et al.
SAME MECHANISM – LESS FORCE

Repetitive hyperextension/Valgus Load
While blocking at line of scrimmage
  - Hand fixed against opponent
  - Opponent delivers valgus blow to break free

Direct blow to extended elbow while hand planted on playing surface
Different Throwing Mechanism than BB

- Less rotational/medial/compressive Forces
- Less cocking/slower acceleration
- Different hand positions
- Not as prone to Valgus Extension Overload
DIAGNOSTIC STUDIES

Routine Radiographs
Stress Radiographs
Bone Scan
CT Scan
MR Scan
RADIOGRAPHS

- AP
- Lateral
- Oblique
- Stress Views

If Extension Loss:
- AP of distal humerus
- AP of prox forearm

- Loose bodies
- Osteophytes:
  - Semilunar notch
  - Coronoid
  - Olecranon
- Olecranon/Coronoid bony hypertrophy
- Radiocapitellar Degen
WHAT IS LAXITY??

- 1-2 mm: Anterior bundle insufficiency
- >4 mm: Complete UCL insufficiency

Field LD, Altchek DW, AJSM, 1996.
CT/MRI

- Useful for loose bodies
- Chondral damage
- Soft tissue impingement
- UCL injury
TROCHLEA
CHONDROMALACIA
TIP FRAGMENTATION
UCL DEFICIENCY

Acute

Chronic
<table>
<thead>
<tr>
<th>Procedure</th>
<th>Sen</th>
<th>Spec</th>
</tr>
</thead>
<tbody>
<tr>
<td>ArthroCT</td>
<td>86%</td>
<td>91%</td>
</tr>
<tr>
<td>MRI</td>
<td>57%</td>
<td>100%</td>
</tr>
<tr>
<td>MRI / Saline</td>
<td>92%</td>
<td>100%</td>
</tr>
</tbody>
</table>
| MRI / Gad          |     |      | Better?
3-D CT SCAN
BONE SCAN

RT POSTERIOR  LT
Individualize for athlete
  - Sx length
  - Sx relation to activities
  - Position played

Time in Season
Level of competition
NONOPERATIVE

- Acute: NSAIDS/Ice/Cryotherapy
- Relative Rest
- ROM: Keep Flexible
- Strength: (if muscle imbalance exists/instability)
- Brace: limit terminal extension in linemen
- Steroid injection: Temporize
ARHTHOSEOOPY

- Evaluate all compartments
- Treat pathology in all compartments
- Minimal soft tissue dissection
- Assess UCL insufficiency
  - Before/after debridement
ARTHROSCOPY
SOFT TISSUE LESIONS
LOOSE BODIES
LOOSE BODIES
OSTEOPHYTE
EXCISION
S/P EXCISION
OLECRANON TIP EXCISION
OSTEOPHYTE & CHONDROMALACIA
CHONDROMALACIA
CHONDROMALACIA
UCL Injury and Reconstruction
Treatment Options
Medial Antebrachial cutaneous nerve
Flexor Carpi Ulnaris split
Anterior portion of UCL split. Gap>2mm
Convergent 3.5 mm drill holes in ulna 2 cm apart A/P to sublimis tubercle 3-4 mm distal to jt. Watch ulnar n.
Guide wire thru ulna tunnel to pass suture
15x4.5 mm tunnel up epicondylar axis of humerus
Dental burr makes ant and post holes connecting humeral cortex with tunnel, 1cm bridge
Hewson suture passer delivered anterograde from posterior fissure hole and into humeral tunnel.
Graft threaded thru ulnar tunnel
Posterior arm of graft docked into humeral tunnel
Whip stitch placed in ant. arm that will be pulled out thru humeral tunnel and ant. drill hole. Sutures tied over bone bridge between ant/post drill holes
Graft fixed with elbow flexed 30°, wrist pronated (closes lat side), varus stress (closes med side)
Excess graft oversewn to reinforce graft midsubstance
Postop:

Splinted at 90° flexion, neutral rotation

Placed in brace postop day 10, allows motion 30 to 100 degrees flexion

Motion progresses to full ROM next 5 wks

6-12 weeks-strengthening program

4 months- short toss 30-40 feet, grad. ↑ distance

Pitching by 7th month at 50% velocity

Competition at 1 year if strength, ROM back, no pain
THANK YOU