Elbow Tendinopathies

Tennis Elbow
Biceps Ruptures
Triceps Ruptures

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My Background

- Manchester Orthopedic Surgery and Sports Medicine since 1991
- Board Certified
- Hartford Hospital
- Manchester Memorial Hospital
- Shoulder and Elbow Surgery
- Sports Medicine
- Occupational Orthopedics
A Physician’s Role

• A significant part of our role as physicians is to educate our patients about why they hurt and how we can help them get better.

• I hope this presentation helps someone get the relief they need from a painful shoulder problem.

• More information can be obtained on the internet from my website www.OrthoOnTheWeb.com or www.orthodoc.aaos.org/jtmazzara
Elbow Tendinopathies

• This presentation reviews many of the common elbow tendon problems that I frequently treat in my practice.

• The topics reviewed include:
  – Biceps tendon ruptures at the elbow
  – Tennis elbow and Golfer’s elbow
  – Triceps tendon ruptures
Distal Biceps Tendon Ruptures

- Predominantly male
  - 3% of all biceps ruptures
- Average age 40-50 years (21-70 years)
- Usually involved in heavy labor or activity
- Fails by complete rupture from radial tuberosity
Distal Biceps Tendon Ruptures

- Preexisting degenerative changes in tendon
- Seen in younger weight-lifters in association with anabolic steroid use
- Requires early repair
  - Tendon often retracts making repair difficulty or impossible
Distal Biceps Tendon Ruptures

- Sudden overload in midflexion
- Ecchymosis in antecubital fossa several days after injury
- Exam
  - Pain, weak supination, maybe flexion
  - Tendon is not palpable
- MRI can be diagnostic
History

• Sudden unanticipated overload to the elbow in midflexion
• Sudden forceful hyperextension of the elbow
• Painful pop, snap or tearing sensation in the elbow or upper forearm
• Acute pain may subside in hours
History

• Continued activity may be difficult but possible
• Symptoms may be minimal after the initial rupture
• Ache may persist for weeks
  – Anterior elbow or upper or mid forearm aching, pain or weakness with resisted flexion, supination or use of the forearm
• As swelling diminishes, asymmetric biceps contour becomes apparent
Physical Examination

- Strength testing for bilateral elbow flexion and supination strength
  - Elbow flexion weakness in notable in early ruptures
  - Forearm supination weakness is always present
Physical Examination

- Pain and weakness on resisted supination
  - Average 40% loss
- Mild weakness on resisted flexion
- Loss of grip strength is common
- Ecchymosis may or may not be present
- Pain and tenderness on direct palpation of the biceps tendon in the antecubital fossa
Physical Examination

• With elbow flexion the tendon retracts proximally and may be visible
• Tendon may not be palpable
• Tendon may not be retracted if the bicipital aponeurosis is intact
• Range of motion is normal with
  – May have pain at the extremes of motion
Diagnostic Studies

- **X-rays**
  - Subtle hypertrophic changes is the bicipital tuberosity

- **MRI**
  - Helpful in diagnosing partial ruptures when soft tissue attachments prevent tendon retraction
Biceps Imaging

- MRI using FABS Tech:
- Flexed, Abducted, Supinated, Prone
- Differentiate from bicipitoradial bursitis

AJR 2004; 182:944-946
MRI with FABS Protocol

Normal
AJR 2004; 182:944-946

Partial Tear biceps
MRI with FABS Protocol

Partial tear biceps
AJR 2004; 182:944-946

Complete tear biceps
Distal Biceps Tendon Ruptures

- Nonoperative treatment may be accepted in sedentary patients
- 30-36% Loss of flexion strength
- 40-55% Loss of supination strength
- No loss of motion
- Persistent weakness and fatigue with repetitive activities
- Active patients
  - Early surgical repair yields excellent results
Single Incision Repair

This is a larger incision than normal and is not the approach that I use for biceps tendon repair.
I always use the 2 incision approach. These incisions heal well and are usually inconspicuous. These incisions are larger than average in this particular patient.
Acute Biceps Tendon Repair

- 2 incision technique is preferred
- More rapid recovery of flexion strength
- Fewer complications
- Repair becomes more difficult after 2-3 weeks

(J Hand Surg, 29(3), 2003)
Acute Biceps Tendon Repair
Acute Biceps Tendon Repair

Second Incision

Humerus  Ulna  Radius

MUSCLE SPLITTING — RECOMMENDED APPROACH

ECU  EDC  Su
Acute Biceps Tendon Repair

The bone tunnel in the radius.

The distal biceps repaired into that tunnel.
Acute Biceps Repair

- Single incision with endobutton
Acute Biceps Repair

• Pull out strength
• Single incision with anchors
  – Good clinical results
  – Associated with musculocutaneous and radial nerve injuries (J Hand Surg, 29(3), 2003)
    • 44% in 1-incision group
    • 10% in 2 incision group
    • “Mostly” minor and transient paresthesias
Acute Biceps Tendon Repair

- **Postoperatively**
  - Splint @ 90 degrees for 1 week
  - Passive elbow flexion and extension to -30 degrees 5 times per day
  - 3 weeks: Allow gentle full extension
  - 4 weeks: Allow flexion / extension against gravity
  - 6 weeks: Flexion-strengthening 1 kg wts.
  - 3 months: Activity as tolerated
  - 6 months: Full activity without restrictions
Results of Acute Repairs

- 100% restoration in flexion and supination strength
- Loss of flexion / extension is uncommon
- Slight loss of supination is common
- Rerupture is uncommon
Delayed Biceps Tendon Reconstruction

• Retracted tendon may not be of adequate length
• Tendon tract to radial tuberosity may be obliterated
Delayed Biceps Tendon Reconstruction

- Delay of more than 4 weeks
  - More extensive dissection required
  - Achilles tendon allograft may be required
Delayed Biceps Tendon Reconstruction

Achilles tendon allograft may be used to extend a contracted chronic biceps rupture.
Delayed Biceps Tendon Reconstruction

Fig. 4-A
Distal traction is applied to the biceps remnant with use of an Allis clamp. The elbow is placed in 40° to 60° of flexion with the forearm in complete supination, and modest traction is applied to the graft and the host biceps in opposite directions. (By permission of the Mayo Foundation.)
Delayed Biceps Tendon Reconstruction
Delayed Biceps Reconstruction

• Tendon extenders may be required
  – Achilles allograft (Morrey, Mayo Clinic)
  – Autologous semitendinosus, Fascia Lata

• Consider reinsertion to brachialis muscle for patients not requiring normal supination strength

• Patients requiring normal supination strength should undergo a full reconstruction
Delayed Biceps Reconstruction

• Postoperatively
  – Protected for 3 weeks
  – 3-6 weeks: Passive assisted motion (-30-150)
  – 6 weeks: Full extension is allowed
  – 6-12 weeks: Active motion for ADLs
  – 3-6 months: Activity as tolerated progresses
Results of Delayed Repairs

- 13% Loss of strength
- 15% Loss of endurance
Partial Distal Biceps Tendon Ruptures

More commonly recognized
– Females as well as males

Pain and aching in anterior elbow with stressful tasks
Locally tender
Confirmed on MRI
Differential Diagnosis

- Bicipitoradial bursitis
Partial Distal Biceps Tendon Ruptures

- Repair or reimplantation of the torn tendon alone does not reliably relieve pain.
- Complete removal of the remaining fibers and reattachment is the treatment of choice.
Complications

• Complication rate **doubles if more than 21 days occurs before surgery**
• Radial nerve injury
Complications

• Ectopic bone
  – Results from exposing the lateral periosteum of the ulna
  – Minimized with the 2-incision muscle splitting approach
  – May require resection 8-9 months after initial surgery

• After ectopic bone resection
  – Irradiation (700cGy) reduces recurrences
Lateral / Medial Epicondylitis

- Usually 30-40’s (Range 12-80 years)
- Males = Females
- 75% dominant arm
Etiology

• Overuse and overexertion
  – Intensity and duration of arm use
  – Inadequate or compromised physical condition

• Sudden trauma, extreme effort or activity
Etiology

- Constitutional Factors
  - Mesenchymal syndrome
  - Bilateral rotator cuff tendinopathies
  - Medial and lateral elbow tendinosis
  - Carpal tunnel syndrome
  - Triggering tenosynovitis
  - De Quervain’s tenosynovitis
Pathophysiology

- Starts as a microtear in the ECRB
- Repetitive microtearing results in mucoid degeneration and reactive granulation in the origins of the ECRB and/or EDC
- Large numbers of nerve endings contained within
Pathophysiology

- Tendon appears grayish, friable, edematous
- Fibers appear fibrillated
- 35% reveal gross tendon rupture and entry into the joint
- Significant vascular and fibrous proliferation
- Lack of acute or chronic inflammatory components
History

- Pain at the lateral or medial epicondyle
- Radiates into the forearm
- Sense of finger weakness with grasping
- History of overuse of repetitive activity
Examination

- Tenderness at the conjoined tendon origin at the ECRB
- Max tenderness is 2-5mm distal and anterior to the midpoint of the lateral epicondyle
Examination

- Pain with grasping or pinching with wrist in extension
- Resisted wrist and finger extension with elbow in full extension
- Resisted long finger extension
- Wrist extensor weakness may be due to pain
- Elbow ROM and hand sensation are unaffected
Studies

- X-rays usually normal
  - 25% may have calcification in the soft tissue around the lateral epicondyle
Associated Problems

• Ulnar Nerve Neuropraxia – Associated with *medial* epicondylitis
• Carpal Tunnel Syndrome – 10%
• Radial Tunnel Syndrome – 5%
Differential Diagnosis

• Cervical radiculopathy
• Intra-articular elbow disease (arthritis)
• Joint laxity (ligament tears and instability)
Nonsurgical Treatment

- Avoidance of aggravating activities
- Ice (Local analgesia and vasoconstriction)
- NSAIDs for 2-3 weeks
- Wrist immobilizer places ECRB in resting position
Nonsurgical Treatment

• Corticosteroid injection
  – Marcaine (0.5%) 2 cc and 40mg Depo-medrol
  – Injected into ECRB tendon with “peppering” technique
  – One injection preferred
  – 2nd and 3rd injections just buy time
  – Ease of flow of the injection indicates significant loose tendinosis tissue
Nonsurgical Treatment

• Physical therapy with iontophoresis
  – 4-6 sessions in the initial 2-3 weeks of treatment
Nonsurgical Treatment

• Resumption of sport or work with altered technique or equipment
• Counter force bracing
  – Inhibits full muscular expansion and decreases force on the injured tissue
Surgical Treatment

- Persistent debilitating pain despite proper treatment for 6 months
- 3-8% may require surgery
- 35% may reveal a discrete tear in the extensor mechanism
Surgical Treatment

- Damaged tissue is easily noted in the extensor brevis origin.
- Sharply debrided, epicondyle is decorticated and the tendon is closed.
Lateral epicondylar debridement

The damaged region of the tendon is exposed over the lateral elbow.

Here that damaged region has been excised.
Post op Rehabilitation

- Start activity as tolerated after 48 hours
- Early strength training for first 3 weeks
- Gradual strengthening started @ 3 weeks with counterforce brace
- Counter force bracing for ADL’s for 2-3 months then for sports and occupational activity thereafter
- Full unrestricted activity @ ~ 6 months
Medial Epicondylitis

- \(\frac{1}{4}\) as common as lateral epicondylitis
- Due to acute or chronic loads applied to the medial flexor pronator mass
- 30-50% also have ulnar neuropathy
Medial Epicondylitis

- Pain along medial elbow
- Worsened with resisted forearm pronation or wrist flexion
- May report ulnar nerve symptoms
Nonsurgical Treatment

- Rest, avoidance of offending activity
- NSAIDs, Iontophoresis, corticosteroid injection
- Guided rehab, technique and equipment modification
Surgical treatment

- Indicated when pain persists despite proper treatment for 6 months
- Requires debridement of pathologic tissue from the undersurface of the flexor pronator mass
Triceps Tendinopathy

- Tears are rare
  - Male : female 3:2
  - Mean age 33 years
  - Spontaneous or traumatic

- Predisposing factors
  - Olecranon bursitis
  - Diabetes
  - Steroids
  - Renal disorders
  - Others
Diagnosis

- Fall on outstretched hand
- Pain, *sometimes* a palpable defect
- Pain and weakness on resistance testing
- May still be able to extend elbow
- Unable to extend elbow overhead against gravity
MRI

- Used to differentiate partial from complete tears

Partial tear distal posterior triceps

Complete tear
Treatment

• Partial tears
  – May be treated nonoperatively

• Complete tears
  – Should be treated surgically to avoid significant functional impairment
Degenerative Tear
Degenerative Tear
Degenerative Tear
Degenerative Tear
Degenerative Tear
Gout
Thank You