Triaging the Injured Worker

Elbow Tendinopathies, Epicondylitis and the Distal Biceps

Joseph P. Cullen, M.D.

1

Elbow Tendinopathies

- Epicondylitis:
  - Lateral (Tennis Elbow)
  - Medial (Golfer's Elbow)
- Biceps Tendinitis or Rupture

2

Elbow Tendinopathies in the Workplace

- Many workers are "athletes" who have special training and skills
- Their bodies are trained for specialized tasks
- Changing job duties, hours, and other factors may upset that delicate "balance"

3

Epicondylitis - Etiology

- Direct trauma
- Isolated Event: Eccentric Contraction – lengthening a muscle while it is contracting
- Insidious Onset: Overuse Syndrome
  - Repetition: wrist flexion/extension as well as forearm rotation
  - Force: Lifting, Gripping, Twisting, and Pulling

4

Epicondylitis - Etiology

Center for Disease Control (CDC): Causation

- Force (grip, wrist flex/extend, forearm rotation-pronation/supination, finger motion)
- Repetition
- Posture
- Combination of factors increases risk
- Highest incidence in occupations requiring high force repetitive use with dynamic posture (especially elbow extended)

5

Epicondylitis - Etiology

- Examples:
  - Mechanic
  - Carpenter
  - Roofer
  - Plumber
  - Machinist
  - Factory Worker

6

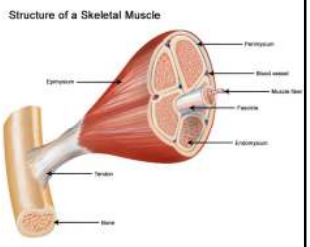
Epicondylitis - Etiology

- Non-occupational Factors:
  - Obesity
  - Smoking
  - Stress
  - **Deconditioning**
  - "Enthesopathies of middle age":
    - When young, we have excess capacity
    - Muscle mass decreases as we age
    - The first thing we lose is endurance

7

Concept of muscle contraction…

- Muscle contracts and relaxes to move a joint
  - Motion
  - Strength
  - Endurance
- Muscle works as a "shock absorber" dampening the stress of activity
- As the muscle fatigues the "shock absorber" fails leading to stress on the tendinous origin and/or insertion



8

Lateral Epicondylitis

- Affects 1-3% of the population/year
- Classically seen in the 4th and 5th decades
- More common in dominant extremity
- Male: Female ratio is equal 1:1
- Only a small number (4-11%) require surgical treatment
- Over 80% are asymptomatic at one year without treatment

9

Lateral Epicondylitis: History

- Lateral arm pain beginning at the epicondyle and radiating into the forearm
- Difficulty lifting or gripping especially with the palm down
- Pain with elbow extension especially after periods of rest (morning)

10

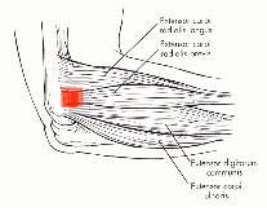
Lateral Epicondylitis: Exam

- Tenderness beginning at the lateral epicondyle and just distal and anterior to the epicondyle
- Pain with resisted wrist extension
  - Usually worse with elbow extension
- Decreased grip strength
- No mechanical symptoms: clicking, popping, locking

11

Lateral Epicondylitis: Anatomy

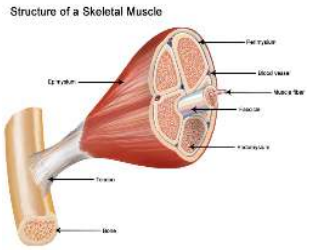
- Micro-tearing of the common extensor origin with incomplete healing
- Primarily the Extensor Carpi Radialis Brevis (ECRB) tendon origin
- Extensor Digitorum Communis (EDC) is also involved one third of the time



12

Lateral Epicondylitis: Anatomy

- Tendinopathy not a tendinitis – **poor blood supply where tendon inserts on to bone**
  - No inflammatory cells
  - Micro-tearing with subsequent incomplete repair process



13

Lateral Epicondylitis: Treatment Non-operative: Mainstream

- Activity Modification
- Non-steroidal anti-inflammatory drugs (NSAID)
- Counterforce Brace
- Wrist Brace
- Therapy

If these measures are not working, refer them to a specialist

14

Lateral Epicondylitis: Imaging

- X-rays of the elbow are usually normal
  - Used to rule out other conditions
  - 16% show reactive bone around lateral epicondyle
- MRI is the "gold standard" imaging study
  - Edema (23/23)
  - Thickening (19/23)
  - Tearing (13/23)

15

Lateral Epicondylitis: MRI

16

Lateral Epicondylitis: Differential Diagnosis

- Intra-articular Joint Pathology
  - Arthritis
  - Fracture
  - Loose body
  - plica
- Radial Tunnel Syndrome
- Ligamentous Instability

17

Lateral Epicondylitis: Treatment Non-operative: Mainstream

- Observation
- Activity Modification
- Anti-inflammatories (NSAID)
- Counterforce Brace
- Wrist Brace
- Injections
- **Therapy**

18

Lateral Epicondylitis: Treatment Non-operative: Mainstream

- Steroid Injection:
  - No longer recommended as a first line of treatment
  - Appears to provide early pain relief but does not alter the natural course of the condition
  - It masks the problem but does not heal the underlying pathology
  - It may be better for patients to "feel pain" so that they have feedback as to the activities they need to avoid or adapt
  - If an injection is done, it needs to be combined with a stretching and strengthening program to provide long term benefit

19

Lateral Epicondylitis: Therapy

- Therapy: The Mainstay of Successful Non-operative Treatment
  - Stretching
  - Strengthening (isometric, concentric, eccentric)
    - Build strength and endurance
  - Deep pressure massage
  - Modalities (Ultrasound, Iontophoresis, Electrical stimulation, Kinesio tape, dry needling)
  - Work hardening

20

Lateral Epicondylitis: Treatment Less Common

- Platelet Rich Plasma (PRP)
- Extracorporeal Shock Wave Therapy (ESWT)
- Radiofrequency Microtenotomy (RF) - Tenex
- Botox
- Denervation

21

Lateral Epicondylitis: Treatment Operative

- Only considered after a failure of prolonged non-operative treatment (6-12 months)
- Debridement of the pathologic tissue of the common extensor origin (ECRB +/- EDC) –"Gold Standard"
- Tenotomy of the common extensor origin
  - Arthroscopic, Open, or Percutaneous
- No statistical difference in results for any of these procedures – Approximately 85% (69-100%) good and excellent results

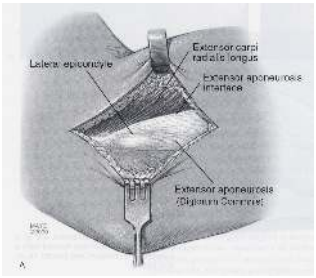
22

Lateral Epicondylitis: Operative

- Open Debridement of Pathologic Common Extensor Origin (ECRB): Nirschl Procedure
- Nirschl and Pettrone: 97.7% improved and 85.2% complete relief of all symptoms
- Later studies: 83-94% pain relief

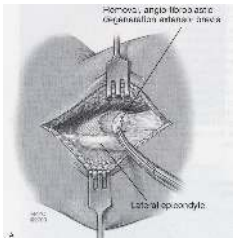
23

Lateral Epicondylitis: Operative Open Debridement



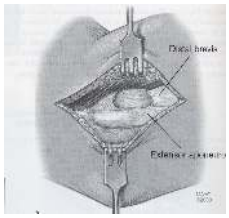
24

Lateral Epicondylitis: Operative Open Debridement



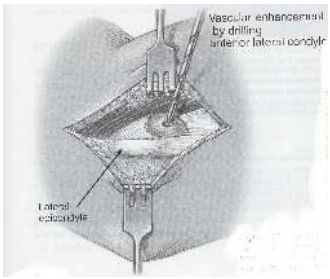
25

Lateral Epicondylitis: Operative Open Debridement



26

Lateral Epicondylitis: Operative Open Debridement



27

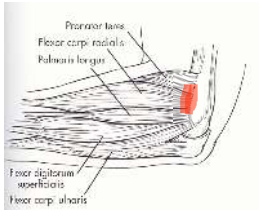
Lateral Epicondylitis: Treatment Operative

- Post op protocol – variable
  - Immobilization for 3-14 days
  - Strengthening at 4-8 weeks
  - Return to full activity at 3-6 months
- Return to work
  - 7-14 days (after first therapy or post-operative visit) one hand duty only
  - Light use of the operative hand at 6-8 weeks depending on their occupation and symptoms
  - Full use 3-6 months

28

Medial Epicondylitis

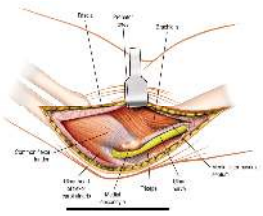
- Similar to Lateral Epicondylitis but involves the medial aspect of the elbow
- Much less common 4-7:1
- Medial elbow pain at and just distal/anterior to the medial epicondyle
- Pain with grip or wrist flexion (Flexor Carpi Radialis)
- Pain with pronation (Pronator Teres)



29

Medial Epicondylitis

- 23-50% have ulnar nerve symptoms
  - Ulnar nerve runs just behind the medial epicondyle
  - Numbness and tingling in the ring and small digits
  - Possible weakness in the intrinsic muscles



30

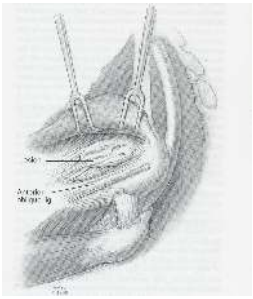
Medial Epicondylitis: Treatment Non-operative

- Activity Modification
- Non-steroidal anti-inflammatory drugs (NSAID)
- Counterforce Brace
- Wrist Brace – Does not prevent rotation
- Injections - Controversial
- **Therapy**

31

Medial Epicondylitis: Treatment Operative

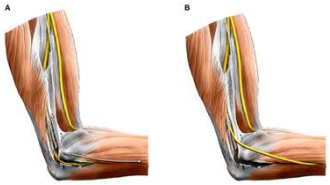
- Release or lengthening of the flexor/pronator origin with debridement of pathologic tissue.



32

Medial Epicondylitis: TreatmentOperative

- 23-50% have ulnar nerve symptoms along with their medial epicondylitis
- May require treatment of ulnar nerve at the same time (decompression or transposition)



33

Medial Epicondylitis: Operative Treatment

- Similar post-operative protocol
- Frequently a more prolonged recovery following surgery when compared to lateral epicondylitis
- Approximately 70-75% complete pain relief
- Results are worse in patients with ulnar nerve symptoms along with their medial epicondylitis

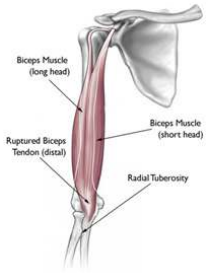
34

Trivia answer removed

35

Biceps Tendinitis and Rupture

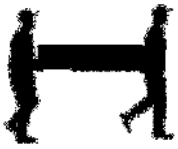
- Spectrum of injury
  - Muscle strain
  - Tendinitis
  - Partial distal biceps rupture
  - Complete distal biceps rupture
- All present with:
  - Anterior elbow pain
  - Weakness of elbow flexion and supination



36

Biceps Tendinitis and Rupture Epidemiology

- Primarily Male
- Dominant arm
- Age 40-60
- History of an Eccentric Load – lifting (flexing the elbow against resistance) while the elbow gets forced into extension



37

Biceps Tendinitis and Rupture Causation

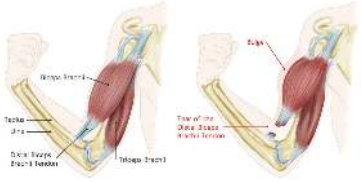
- Direct trauma (rare)
- Isolated Event: Eccentric Contraction – lengthening a muscle while it is contracting
- Insidious Onset: Overuse Syndrome
  - Repetition: Elbow flexion forearm supination
  - Force: Lifting and twisting (supination) against resistance

38

Biceps Tendinitis and Rupture

Do not want to miss a complete Distal Biceps Rupture

- Ideal to repair in the first three weeks
- Can be repaired later, but it is more difficult with both slower recovery and potentially worse results



39

Biceps Tendinitis and Rupture

- Signs and symptoms of a complete or partial rupture:
  - Pain following an eccentric load
  - **Feeling a "pop"**
  - **Ecchymosis**
  - **Visible retraction of the biceps**
  - Significant Weakness
  - Pain with active supination or passive pronation

40

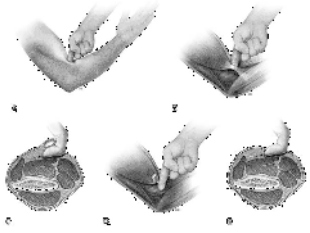
Biceps Tendinitis and Rupture

- Signs of a complete or partial rupture
  - Pain following an eccentric load
  - **Feeling a "pop"**
  - **Ecchymosis**
  - **Visible retraction of the biceps**
  - Significant Weakness
  - Pain with active supination or passive pronation

41

Biceps Tendinitis and Rupture: Rupture Diagnosis

- No palpable biceps tendon
- Hook Test
  - Elbow at 90 degrees
  - Index finger feels biceps at lateral edge
  - 100% sensitive and specific



42

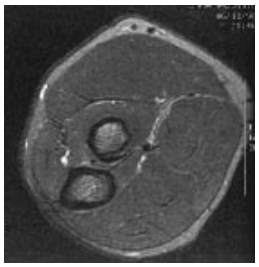
Biceps Tendinitis and Rupture: Rupture Diagnosis

- MRI:
  - 92% sensitive and 85% specific at diagnosing a Biceps tendon rupture

43

Biceps Tendinitis and Rupture: Rupture Diagnosis

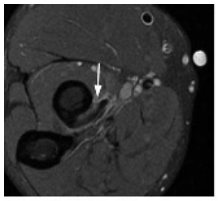
- MRI of the normal insertion of the distal biceps into the radial tuberosity



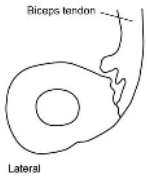
44

Biceps Tendinitis and Rupture:

MRI and diagram of partial biceps rupture



A

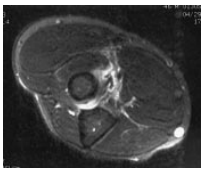


B

45

Biceps Tendinitis and Rupture: Rupture Diagnosis

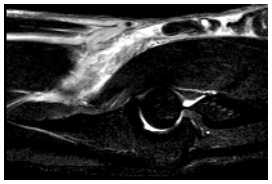
- MRI: near complete rupture of the biceps tendon – no normal appearing tendon at radial tuberosity



46

Biceps Tendinitis and Rupture: Rupture Diagnosis

- MRI: complete rupture of the biceps tendon with retraction



47

Biceps Tendinitis and Rupture: Treatment

- Tendinitis:
  - Activity modification
  - NSAIDs
  - Therapy
- Partial Tendon Rupture:
  - Conservative management until 6 months then consider repair
- Complete Tendon Rupture:

48

Biceps Tendinitis and Rupture: Treatment

- Complete biceps tendon rupture: Treatment
- Non-operative:
  - Low demand individual
  - 74% supination strength, 88% flexion strength
  - Loss of endurance

49

Biceps Tendinitis and Rupture: Operative Repair – Cortical Button

- Improved techniques with faster recovery
- Not with out risk (primarily nerve related)
- Significantly improved supination and flexion strength as well as endurance
- Eliminates muscle cramping with use

50

Biceps Tendon Repair: One Incision Technique

- Risk of nerve injury
- Most commonly the lateral antebrachial cutaneous nerve (13%) seen on the right which must be identified and retracted
- Less common are injuries to the radial sensory nerve and posterior interosseous nerve

51

Biceps Tendon Repair: One Incision Technique

52

Biceps Tendon Repair: One Incision Technique

53

Biceps Tendon Repair: One Incision Technique

54

Biceps Tendon Repair

- Post Operative Protocol: highly variable depending on technique and surgeon
- Button technique is the strongest repair
  - May initiate active and active assist motion within 2 weeks of surgery
  - Splinting variable 0-6 weeks
  - Strengthening at 6-12 weeks
  - Return to normal activity 3-6 months

55

Thank You!

56