Lateral Epicondylitis

The Therapist Approach to Conquering the Pain

What is tennis elbow?
- It is inflammation or degeneration of the tendon that attaches to the bony area (lateral epicondyle) on the outside of the arm or elbow.

Symptoms of Lateral Epicondylitis
- Localized tenderness at the ECRB (Extensor Carpi Radialis Brevis)

What is tennis elbow?
- The muscles that lift the wrist and hand are the primary muscles involved (ECRB)
- Pain may be felt where the fibers attach to the bone on the lateral epicondyle of elbow or along the muscles in the forearm.

Pathogenesis

Soft Tissue
- Over load leads to inflammatory process
- Inflammatory process signaled by:
  - Pain
  - Swelling
  - Redness
  - Heat
  - Temperature

- Pain is usually more noticeable during or after stressful use of the arm.
- In severe cases, lifting and grasping even light things (coffee cup) may be painful.
Soft Tissue Pathogenesis

- Collagen cross linking
- Muscle fibers strained increasing aching/edema
- Tearing of muscle fibers causing symptoms
- Chronic Inflammation

“normal”
- Collagen strands are lined up
- Enabling tendon to withstand high force
- When muscles work they pull on one end of the tendon and the other end pulls on the bone
  - When damaged the pain occurs due to the strain on the tendon pulling on bone

Tendinosis vs. Tendonitis

- However, tennis elbow often does not involve inflammation.
- Rather, the problem is within the cells of the tendon.
  - Tendinosis.
- In tendinosis
  - Wear and tear is thought to lead to tissue degeneration. A degenerated tendon usually has an abnormal arrangement of collagen fibers.

Tendons

- Micro Tears
  - Tendonitis
    - Lateral Epicondylitis

Theories of pathology

- No one really knows exactly what causes tendinosis. Some researchers think that the forearm tendon develops small tears with too much activity.
- The tears try to heal, but constant strain and overuse keep re-injuring the tendon. After a while, the tendons stop trying to heal. The scar tissue never has a chance to fully heal, leaving the injured areas weakened and painful.
3 STAGES OF RSI (Quilter 1998)

Stage One
- Pain/fatigue end of day or week
- Sx resolve overnight/weekends
- NO reduction in work performance
- Duration weeks to months
- REVERSIBLE

Stage Two
- Recurrent pain/fatigue earlier in day or week
- Nocturnal disturbances
- Reduced work capacity
- Physical Symptoms
  - Edema, Tinel’s....
- Duration Months
- REVERSIBLE LIKELY

Stage Three
- Pain/fatigue rest
- Nocturnal pain (multiple times)
- Reduced work capacity
- Duration months to years
- REVERSIBILITY UNLIKELY or very difficult

Who gets tennis elbow?

- Less than 10% are from racquet sports
  - Interchangeably called lateral epicondylitis
- The majority of people getting tennis elbow are between 38 and 50 yrs

Who, what when and why?

- Routine use of the arm or an injury to this area may stress or damage the muscle attachment and cause tennis elbow symptoms.
- Generally, people who develop this problem may be involved in activities with motion of the wrist and arm or lifting with (PRONATION) the palm side of the hand facing down.
- The condition is quite common in our late 30s to early 50s.

SX

- Difficulty holding onto, pinching, or gripping objects
- Pain, stiffness, or insufficient elbow and hand movement
- Forearm muscle tightness
- Insufficient forearm functional strength
- Point tenderness at or near the insertion sites of the muscles of the lateral elbow

Why did this happen?

- The load, or period of loading, of flexion/extension (wrist) and pronation/supination becomes too great causing a breakdown
- Long period of cumulative load, combined with age-related change
- Local trauma to the common extensor tendons - primarily the wrist creating an inflammatory response.
Symptoms

- Pain in the evening
- Stiffness in the morning
- Limited AROM secondary to pain with wrist extension

Symptoms

- Increased pain with wrist extension
- Increased pain with activities
- Increased pain with grasping

Symptoms

- Pain just distal to the lateral epicondyle
  - Tendon
  - Muscle

Provocative activities

- Combination
  - Extended elbow
  - Forearm pronated
  - Wrist extended

Racquet Sports

- Unorthodox backhand
- Duration of session
  - Limit in elderly

Evaluation

- Palpation
  - ECRB (ECRB) ***
  - ECRL (ECRL)
  - Brachioradialis (BR)
  - Mobile Wad of Three

Find on yourself
Evaluation

- Pain with Resisted wrist extension

Evaluation

- Pain with Resisted Middle Finger

Evaluation

- Radial deviation
  - Increases pain at the elbow
  - ECRL

Evaluation

- Pain with Gripping (increased with elbow extended)

Hand Shaking test

- Nirschel, et al determined how patients may respond to conservative treatment based on the hand shaking test
  - Test: Examiner shakes patient’s hand with extended elbow and applies resisted supination
  - Then shake hands with elbow flexed to 90 degrees and resist supination

Shaking hands test results

- If pain in less when the elbow is flexed at 90 degrees vs. extended elbow, Nirschel believes conservative treatment will be more successful vs. the opposite
Educate

- Avoid strain on the arm
  - 6 weeks minimum
  - 3 months
  - Work modifications
    - Goal
      - Avoid disability

What can I do?

- The first and foremost goal is to decrease the pain and decrease the inflammation
- The key to conservative (nonsurgical) treatment is to keep the collagen from breaking down further. The goal is to help the tendon heal.

What The MD may do?

- If the problem is caused by acute inflammation, anti-inflammatory medications such as ibuprofen may give you some relief.
- If inflammation doesn't go away, M.D. may inject the elbow with cortisone. Cortisone is a powerful anti-inflammatory medication.
- Its benefits may temporary, but they can last for a period of weeks to several months.

RICE

- R is for Rest - This slows down any bleeding and reduces the risk of further damage.
- I is for Ice - This can ease the pain, reduce swelling, reduce bleeding (initially) and encourage blood flow (later).
- C is for compression - This reduces bleeding and reduces swelling.
- E is for Elevation - Uses gravity to reduce bleeding and reduces swelling by allowing fluids to flow away from the site of injury.

How to apply rice

- It should never be applied directly to the skin but in a wet tea towel to prevent ice burns.
- Apply the ice for about 15 minutes every 2 hours. This will vary depending on the size of the area and depth of the tissue. This can be reduced gradually over the next 24 hours.
- If you have a bad circulation condition in a specific area then you should not apply ice to that area, or if you have a cold allergy.

REST

- Rest is a very important component in the healing of this injury. It may heal quickly within two weeks but you could suffer with this problem for years.
- When the symptoms have settled down it is essential you fully rehabilitate and strengthen the elbow and stress how the patient must follow your guidelines that will help you avoid the injury in the future.
Treatment

- Cross Friction Massage
  - Controversial
  - 15 minutes deep
  - Create hyperemia
  - Counter pressure

Reference: Ciriax

Soft tissue mobilization

- Biofreeze or Prossage Heat
  - Biofreeze cold
  - Prossage is heat
    - Work analgesic lotion into the area
      - demonstration

Trigger point

- Hyperirritable spot
- Hypersensitive
- Palpable nodule in a taut band
- Compression increases pain
- Referred pain
- Referred tenderness
- Referred motor dysfunction

Technique

- Progressive pressure technique
  - Thumbs or four fingers
  - May start with a few ounces and go up to a couple of pounds
  - Tissue resistance is achieved (stop and wait) then resistance will dissipate
  - Melting away (slow release)
  - Continue with steady pressure
    - Moving inward towards center

Technique

- Continue cycle of progressive pressure, resistance, relax or melting, and applied pressure
- Results usually is relaxation of tissue
  - Occasionally no new gains achieved

Trigger points- don’t do unless you feel a trigger point (nodule)

- Decrease muscle flexibility
- Produce muscle weakness
- Distort proprioception
- Muscle contraction may slow down
  - Decreasing neuromuscular coordination
  - Exposes to danger or re-injury
Trigger point therapy followed by:

- Myofascial stretching exercises
  - Lengthens muscle fibers
  - Restore musculotendinous resting length
- Post treatment modalities
  - Cold decreases sensitivity
- Progressive resistive exercises
- Proprioceptive retraining
  - Increase strength and coordination

Home program

- Stretching
- Biofreeze 4X day
- Any exercises
- Self massage

Pain relieving lotion

- Some physicians prescribe lotion

Case Study

- A 27 year old male with tennis elbow reports initial pain after carrying his heavy briefcase on a business trip. Which muscle is most likely the referring pain to the lateral epicondyle?
  - Supinator (an active trigger point) refers pain to the lat. Epic. In this situation the supinator is most likely activated because the this muscle stabilizes the straight elbow while extended, as when carrying a swinging brief case

Demonstrate Supinator Trigger Point

- Origin of supinator (lateral epicondyle)
- Insertion (upper 1/3 of radial shaft)
- RPP (lateral epicondyle, forearm, web space)
- TP Radial to the most distal part of the insertion of the biceps
  - USE FLAT Palpation aiming toward the head of the radius
Demonstrate TP supinator

- MFS: Elbow extension and pronated, extreme wrist flexion w/UD
- IF PSS is present decrease UD
- PSS (Pain at ulnar wrist area)
- HEP As above but patient uses other hand to facilitate stretch

Clinical Notes for TP supinator

- Entrapment of the deep branch of the radial nerve at the arcade of Frohse may occur
- Check for weakness of the extensors
- Usually the supinator is spared
- Supinator usually involved with lateral epicondylitis

Treatment

- Modalities
  - HVPC
  - Interferential
  - Iontophoresis
  - Ultrasound
    - 2 or 3 MHz
    - 1.0cm²
  - Ice pack
  - Ice massage
  - Heat

Laser (cold)

- ML830
  - 3 J at 33 seconds per area
  - 7 to 10 minutes elbow

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  727-804-7754

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- Cold laser
  - FDA approved for CTS
    - Need order from physician indicating medical necessary with lateral epicondylitis
  - Increase metabolism of tissue
  - Increase blood flow
  - Decrease pain
    - INCREASE B-ENDORPHINS
    - INCREASE SEROTONINS

Cold Laser

- Decrease spasms
- Increase oxygen to tissue
- Increase Healing
  - Promotes
    - Healing
    - Cell regeneration
    - Tissue Recover
    - INCREASE BONE REPAIR
Cold LASER BEWARE

☐ 5 cm depth and 3cm lateral
  ■ ML830

■ Some less effective models on the market are 632 (grocery scanner/laser light)
■ Beware of LED (photolight) it is not Laser
☐ Know what you are using

Iontophoresis

☐ Physician’s order
  ■ Lidacaine FDA approved – medically necessary
☐ Apply over the lateral epicondyle at the origin of the ECRB
☐ 40 mA/min to 80mA/min
☐ You should notice a difference about 6 treatment – continue until 9 to 12 treatments or case by case situation

IOMED Electrodes

☐ TransQFlex is an excellent choice when treating the hands and fingers - the unique clover shape enables the clinician to surround the treatment site on three sides such as a finger joint.

☐ IOGEL electrodes are a good choice when treating the carpal tunnel

IOMED Phoresor

☐ Phoresor® II Auto Model PM850
  ■ Reliable and efficient operation
  ■ Dosage is fully programmable up to 80 mA-minutes
  ■ Current is adjustable from 0 to 4.0 mAmp
  ■ Automatically calculates the required treatment time and automatically shuts off
  ■ Includes: twin lead connector, two 9-volt batteries, durable carrying case and instruction guide

IOMED contact information

IOMED, Inc.
P: 800-621-3347 Ext. 240 (Toll Free)
P: 801-975-1191 Ext. 240
F: 801-975-7366

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IOMED Phoresor

☐ Phoresor® Model PM900
  ■ One-touch push button operation
  ■ Dosage is preset for 40 mA-minutes
  ■ Current is adjustable at 2.0, 3.0 and 4.0 mAmps
  ■ Automatically calculates the required treatment time and automatically shuts off
  ■ Includes: twin lead connector, one 9-volt battery, durable carrying case and instruction guide
Companion 80
- 24 hour delivery of 80mA/min
- hypersensitive skin to direct current
- Nice slow delivery
- Time constraints
- If patient private pay it would be cheaper

Taping
- Kinesotaping

Counter-force Brace (demo)
- The counter-force brace --However, adhere to the following caution:
  - do not become dependent on the counter-force brace and gradually wean yourself off its use during strengthening
  - Counter-force bracing is a supplement to, not a replacement for your rehabilitation program.
  - Be careful about compressing the forearm nerves causing additional problems (radial tunnel)

Treatment (Acute)
- Splinting
  - Neoprene
  - Wrist immobilization
    - Wear intermittent
  - Air Cast
    - Wear when using arm

Braces and splints (demo)
- Wrist immobilization splints to help rest the injured tendon
- Again, you don’t want to become dependent but our first goals are to decrease the pain and inflammation and this is a good way to accomplish those goals.
Stretching

- Gentle stretching exercises including wrist flexion, extension and rotation.
- The elbow should be extended and not flexed to increase the amount of stretch as required.
- These stretches should be held for 20-30 seconds and repeated 3 to 6 times, at least twice a day.
- Vigorous stretching should be avoided - do not stretch to the point of pain that reproduces your symptoms.

Treatment

- Stretching
  - Normal muscle length
  - Places tension on the pathological section of the tendon/muscle
  - Helps realign tissue
  - (stretch in neutral with elbow extended)

Stretching

- Perform at least 3X a day
- Hold for 60 seconds
- Relax
- If numbness in the fingers occur modify stretch or d/c

Once pain has decreased

- Begin strengthening
  - Isometric
  - Isotonic

Strengthening

- Goal: Put demand on your arm WITHOUT increasing symptoms
Treatment Progressing

- As pain allows you want to slowly introduce exercises.

- Goal
  - Increase demand on tendon without increasing pain/tear
  - Demonstration

Isometric strengthening

- First I would recommend trying active wrist movement. If this is painful:
  - Continue to rest
  - Begin isometric strengthening
  - Demo

Strengthening

- demostrate

Exercise Program

- Performed 1X day
- May use Counterforce Brace
- Want to focus on
  - Wrist extension
  - Wrist Flexion
  - Forearm rotation

Stage one: Elbow bent: begin with no weights; work up to 3 sets of 10 reps. Then add a one pound weight. After accomplishing 3 sets of 10 advance to 2 pound weight continue until you reach 3 pound weight.

Stage one with a one pound weight performing supinated wrist flexion Work up to 3 sets of 10 repetitions.
Supination and Pronation exercises: Rotate forearm. Again begin with elbow flexed (stage one) progress to extended elbow with elbow supported (stage two) and finally end with elbow extended and locked (not supported) stage three: 

Each stage: begin slow and work up to 3 sets of 10 each.

Stage one with a 2 # weight

You can use Theraband vs. weights: caution is in order because the actual tension is not known… progression is based on pain and tolerance.

Stage two: Elbow Extended – supported– do not lock elbow: work through one, two, and three # weights

Work up to 3 sets of 10 before advancing to higher weight.

If PAIN Occurs

Adjust don’t stop

- Decrease arc of motion
- Decrease number of repetition
- Decrease amount of weight

Stage Three: elbow locked: work through one, two, and three # weights

3 sets of 10
If related to racquet sports

- A common cause in tennis elbow is poor backhand technique or a grip that is too small. A small grip will mean the muscles in the elbow must work harder and become inflamed.
- Hitting tennis backhands with a 'wristy' action will put far too much strain on the elbow.

Recommendations for racquet sports

- Correct technique - play the backhand with the arm not the wrist!
- Use a forearm brace or heat retainer if you have a weak wrist or elbow.
- Do not play with wet, heavy balls.
- Use a light racket if you do not play very often.

Correct Grip Size

- A grip too large or too small lessens control and promotes excessive wrist movement.

Recommendations for Racquet Sports

- Racquet material - Graphite composites are currently considered the best in terms of torsion and vibration control.
- Head size - A midsize racquet (95-110 square inches) is preferred. The popular oversized racquets cause problems because they make the arm susceptible to injury due to the increased torque effect of shots hit off-center.

Recommendations for Racquet Sports

- String tension - stay at the lower end of the manufacturer’s recommendation. While higher string tensions provide improved ball control, it also increases the torque and vibration experienced by the arm.
- Stringing material - synthetic nylon (re-string every 6 months)
When ready to return to racquet sports

- **Start easy- advance if no pain**
  - 15 minutes forehand only
  - 30 minutes forehand only
  - 30 minutes forehand and two handed
  - 45 minutes forehand and backhand
  - 45 minutes all stokes
  - Serve
  - Full play
  - Competitive play

If related to computer use

- Ergonomics is a big factor or should I say poor ergonomics
- Computer set up;
  - Avoid reaching
  - Keep keyboard and mouse on the same level
  - Have enough room on your desk for writing comfortably

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- Good website with great products
- Goldtouch keyboard
  - Adjust to order
  - Easy to use
  - Goldtouch mouse
  - ErgoPro
  - 1800-ergopro (374-6776)

Stretches

- 20*20*20 Rule
  - 20 minutes of work
  - 20 feet to look away
  - For 20 seconds

Posture

- Most economical form of correction
  - BUT the MOST DIFFICULT to correct
- Rounded shoulders
- Protruding head
  - Demonstrate exercises

Radial Tunnel co-exists 20%
Radial Tunnel
- May be caused from the counter-force brace
- Treatment
  - Massage
    - Prossage Heat & @ home Biofreeze 4X/day
  - Modalities
    - Laser, U/S
  - Stretches
    - 2X day 3 repetitions each session
  - Rest
  - Wrist splint
  - Activity modifications
    - Avoid causative factors

Pain management
- Topical analgesic products
- Analgesic patches
- Ice
- Rest
- Activity modification
- Exercises
- Proximal strengthening
- Soft tissue mobilization
- Cold laser
- Electrical modality

Don’t Forget

Proximal muscles

Flexibility Exercises
- Demonstrate

Exercise

Proximal Muscle strengthening
- Encourage general conditioning program
- Flexibility and stretching exercises to increase the tendon/muscle resting length potential
Posture and body mechanics
- Extremely important if at a desk, table (hand therapist), lifting, pushing, pulling
- Perform postural checks
- Keep arms close to body
- Avoid extended reach especially with pronated forearm and lifting

Causative Postures
- Forward head
- Rounded shoulder
- Extended elbow

RESEARCH
- 80% RESPOND TO CONSERVATIVE
  - 40% CONTINUE TO NOTICE MILD TO MODERATE DISCOMFORT/PAIN WITH CERTAIN MOTIONS But feel the pain does not interfere with the quality of life warranting surgery

Surgery Intervention
- Bosworth Procedure (modified)
  - Common tendonous origin of extensor musculature released and the proximal 1/3 annular ligament is resected with excision of bursa or synovium
  - 86% success
  - Complication
    - Elbow instability (annular ligament)
Surgical Intervention

- Garden Procedure
  - Release tension of ECRB musculotendinous unity by Z-lengthening of its DISTAL tendon
  - Fairly new procedure

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Detachment/reattachment
Surgical Intervention

- Repair of the Proximal ECRB
- Percutaneous tenotomy of the ECRB Tendon
- Subcutaneous division of the tendinous origin of the ECRB
  - 70% success

Surgical Intervention

- Alternative procedure
  - Excision of granulation tissue
  - Manipulation under general anesthetic
    - Chronic cases
    - Forearm fully pronated and wrist palmer flexion
  - Arm above elbow
  - Arm forcefully straightened followed by
    - Arm forcefully flexed
  - Results in an audible "snap"

Post Op Treatment

- Surgical Technique dictates rehab
- In general
  - Reduction of pain
    - modalities
  - Protection
    - splinting
  - Gentle AROM
  - Reduction of edema

Decompression

- Usually patient sent for therapy within the first week
- Begin gentle AROM of the elbow and wrist to tolerance
- Wound care/suture care

Detachment/reattachment

- 10 to 14 days sent to rehab post casting
- Splint wrist for protection
- Begin gentle AROM elbow
- Rotation to tolerance
  - Do not strain

Post Op Care

- 14 to 17 days
- Begin Wrist AROM
- Increase ROM supination/pronation
Post OP Care

- 21 days
  - 80% to 100% of Elbow AROM
  - Begin Protocol (as discussed previously)
    - Do not cause increased pain
    - Stress repair slowly

Post OP Exercises

- 17 to 21 days post op detachment then reattachment
- 7 to 10 days decompression
- Begin with NO weights work up to weights

Progressing Post OP Protocol

- Goals: Improve muscular strength and endurance, maintain and improve flexibility, and gradually return to prior level of sport or high level activity.
- Begin with ½ to 1 pound hand held weights

Considerations

- Bosworth procedure
  - Lateral Elbow instability
  - Watch out for Valgus stretch
    - Stabilize medial elbow when performing Active Assistive ROM exercises
    - Have patient hold medial elbow during AROM

Considerations

- When the common extensors were decompressed detached and reattached protect repaired by limiting wrist AROM.
- NO PROM of wrist
  - PROM of wrist should not be needed post surgery
  - PROM of elbow is permitted

Manipulation Consideration

- Educate on procedure
- NO strain to symptomatic extremity for Three (3) months
- Economical
- Literature reports good results with chronic conditions
- Usually pain relief is immediate
Soft Tissue Debridement
- TOPAZ technique
  - Minimally invasive approach
  - VIDEO

ExtraCorporeal Shockwave Treatment (ESWT)(OssaTron)
- Non-invasive
- High energy sound waves (acoustical energy) to trigger bodies natural repair
- Safe and effective treatment option
- Recovery is shorten than traditional invasive approaches

What to expect with ESWT
- General effects of anesthesia
- Discomfort in treated area
- Some bruising, swelling, temporary numbness is expected
  - Treat with RICE
  - Sx: 2 weeks
    - Avoid stressful activities for four to 6 weeks
    - Healing generally complete at 12 weeks

Thank You
- Continue to visit www.exploringhandtherapy.com for up to date courses.
- EHT adds courses and/or updates courses frequently