Ultrasound Guided Percutaneous Tenotomy for the Treatment of Chronic Tennis Elbow

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Tennis Elbow

- Disorder affecting the common extensor tendon at the lateral epicondyle
- One of the most common tendon problems seen in musculoskeletal practice
Tennis Elbow: Symptoms can be quite debilitating

- Pain at the lateral elbow with -.
  - picking up a cup of coffee.
  - brushing teeth.
  - golf, tennis, etc.
  - keeping elbow in one position (sleeping, telephone).
Tennis Elbow: Why does it happen?

- Repetitive stress to the tendon leads to collagen breakdown
- "Inefficient" healing leads to fibrosis and even calcification
- Loss of elasticity leads to interstitial tearing
- Tears become "walled-off" from blood vessels
Terminology - “Epicondylitis”

- *-itis* implies inflammation
  - *Tendinitis* implies inflammation of a tendon

- Surgical specimens of affected tendons show **NO** signs of inflammation
  - No WBC’s, no chemical mediators of inflammation, etc.
Inflammation

- A *fundamental* pathologic process consisting of ... cytologic & histologic reactions that occur in response to an injury, including ... the responses that lead to repair and healing.
- A **NECESSARY** component of healing
- Efforts to inhibit inflammation also inhibit healing
Tennis Elbow is NOT Tendinitis:

*IS Tendinosis*

Degeneration of the tendon
Histology of Healthy Tendon

- Dense fibers
- Clearly-defined
- Parallel
- Slightly wavy bundles
HEALTHY TENDON

- Densely packed
- Few nucleii
- Sparse amount of blood vessels
Normal Tendon

- Has wavy pattern of regularity
- Termed “Crimp”
- Crimp provides “elasticity”
Tendon Crimp

• “Elasticity” is actually the opening up of the wave pattern to straighten the collagen.
Tendinosis
Tendinosis

- Disorganized array of Collagen fibers
- Loss of crimp
- Loss of elasticity
- Diffuse tendon degeneration
Tendinosis

- Dense, thick mass of scar tissue
- Inelastic
- Collagen microtears
- Attempted proliferation of vessels
- Tenocyte hypertrophy and hyperplasia
- **NO inflammation!**
Tendinosis

A Chronic, Degenerative Process
So, What About Treatment?

- If no inflammation, do anti-inflammatory modalities, NSAIDS or steroid injections make sense?
- If the tendon is damaged, can the tendon remodel?
NSAIDs

- May help reduce pain, but...

- ...No evidence that they improve long term outcome.

- In fact, they may impede healing
Corticosteroid injections

• Rationale for use is unclear if there is no inflammation
• Treatment has lost favor in tendinopathy.
• *Possibly* beneficial in early phase
Corticosteroid injection

2-6 Weeks

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<th>2 - 6 weeks</th>
<th>Favours treatment</th>
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<td>Price et al. (1991)</td>
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Corticosteroid injection

> 6 weeks

Corticosteroid Injections

- Anecdotally, there is short-term, rapid symptom relief after injections.
- Why they help is unclear, but benefit is clearly short lived.
- NO EVIDENCE of long term benefit!
“I’ve tried every brace on the market, every medication available, I’ve had 3 cortisone shots and 6 months of physical therapy. I’m still in pain! What now?!?”

-Frustrated Patient
Surgery?

• Variable outcomes reported.
  – 46-85% success rate
  – Cochrane Review: “At this time there are no published controlled trials of surgery for lateral elbow pain. Without a control group, it is not possible to draw any conclusions about the value of this modality of treatment.
  – Most patients required 6-9 months after surgery to return to full activity.
If Surgery, When?

• Reserved for failure of a non-operative treatment.

• Many surgeons will wait up to one year of symptoms.
Technique

- Variety of techniques described
- Open debridement, release of ECRB most common
Any Other Option?
Stages of Healing

- Break down scar
- Open up channels for blood flow
- Stimulate body’s healing response
- Guide tissue remodeling
- Restore strength and endurance
Novel Procedure

- Diagnostic sonography
- Percutaneous needle tenotomy
Tendinosis of Common Extensor Tendon is easily seen with US

- Hypoechoic regions
- Calcifications
- Bony irregularities
- Fissures and peritendinous fluid
- Thickening of tendinous insertion
Sonographic Diagnosis

- Normal Common Extensor tendon
  - Homogeneous
  - Smooth bone
  - Not thickened
Tendinopathy

- Irregular bone surface
- Heterogeneous
- Thickened
- Tearing
Novel Procedure

- Based on the actual pathology involved
- Attempt to break up scar
- Stimulate a healing response
- Guide that response with physical therapy
Ultrasound Guided Tenotomy

- Local Anesthetic
- 20g Needle
Percutaneous Needling

- Tendinotic tissue is repeatedly fenestrated
- Calcification is broken up
- Not just random “poking”
- Systematic needling of the entire abnormal tendon
Ultrasound Guided Tenotomy

- Post-Procedure
- Aggressive rehab begun immediately!
Post-Procedure

• Elbow is NEVER immobilized!
• MUST begin active stretching, isometrics immediately
• Elbow will be sore for several days, but will improve quickly with aggressive rehab
Rehab

• Lasts @ 12 weeks
• AGGRESSIVE!
  – DFM
  – Stretching
  – Isometrics
  – Eccentrics
  – Push the envelope!
  – Activity as tolerated
OUTCOMES

• Sonographically Guided Needle Tenotomy for Treatment of Common Extensor Tendinosis In The Elbow.

Patients

• 52 patients
  – Chronic “tennis elbow”
  – Average symptom length: 9 months

• Failed corticosteroid injection, NSAIDs, counterforce bracing, PT, wrist splints, and/or previous surgery
Procedure

• All patients underwent percutaneous needling of origin of Common Extensor Tendon under US guidance
• 12 week rehab protocol immediately following the procedure
Study Design

• Phone Interviews
• Pt’s at least 6 months out from procedure
• Asked patients to rate:
  – Current limitations
  – Current pain
  – Perceived success of procedure
  – Would they recommend it?
Results

• 92% of patients contacted reported EXCELLENT or GOOD results and would recommend the procedure to a friend or relative.

• NO ADVERSE EVENTS REPORTED.
Since Study Ended

• Have treated several hundred additional patients
• Outcomes consistent
• Physical therapy protocol has made the biggest difference
Summary

• Must understand the true pathology of “Tennis Elbow”
  – Tendinosis-- not tendinitis.
• Treatments must be aimed at treating the actual pathology
• Physical therapy should be aimed at tendon remodeling
  – Stretch, Isometrics, Eccentrics.
• Ultrasound guided percutaneous tenotomy provides a valuable option for recalcitrant cases.