Ultrasound-guided Tenotomy

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Outline: questions
• What is it?
• How do I do it?
• Does it work?
• How does it compare with other tendon treatments?

Introduction:
Treatments:
– Rest, NSAIDS
– Physical therapy, braces, orthoses
– Surgery
– Steroid injection?
– Hyperosmolar dextrose
– Ultrasound-guided fenestration
– Platelet-rich plasma or whole blood

Patellar Tendon: tendinosis

color Doppler
power Doppler

Peritendon Steroid Injections
• Shoulder: minimal transient pain relief1
• Elbow: common extensor tendon
  – Pain returns worse than before injection2
• Gluteal:
  – 72% showed improvement at 1 month3
• Hamstring:
  – 24% had symptom relief beyond 6 months4

2Coombes BK et al. JAMA 2013; 309:461
3Labrosse JM et al. AJR 2010; 194:202
4Zissen MH et al. AJR 2010; 195:993
Steroid Injection: plantar fascia

- Into fascia:
  - 2% risk of plantar fascia rupture
  - Temporary pain relief: 4 weeks
  - No difference at 8, 12 weeks compared to saline
- Deep to fascia: 1st branch of the lateral planter nerve (Baxter’s nerve)
- Superficial to fascia:
  - Risk of fat atrophy theoretical using US guidance

1Kim C et al. Foot Ank Spec 2010; 3:335
2McMillan AM et al. BMJ 2012; 344:e3260

Tendon Fenestration

- Also called “dry-needling” or tenotomy
- Needle repeatedly passed through areas of tendinosis
- Disrupts area of tendinosis
- Bleeding causes release of growth factors
- Stimulates tendon healing

Fenestration: technique

- No NSAIDS x 10 days prior
- Ultrasound guidance: in plane
  - Long axis to tendon
- 20 or 22 gauge needle
- 20 – 30 passes until area soft
- Minimal Lidocaine: over tendon

Percutaneous Fenestration

- 20 or 22-gauge needle
- 20 to 30 needle passes
- Continued until area covered and tendon softens

Fenestration: technique

- Cover entire tendon abnormality
- Contact bone if at tendon abnormality
- Pull needle out of tendon to redirect
- Also redirect medial to lateral
  - Pivoting at needle entrance
  - Cone-shaped area

Fenestration: technique

- Contraindications:
  - Not delineated in literature
  - Prior steroid injection < 3 months ago
  - Bleeding disorders
  - Infection
  - Tendon tear > 50% thickness?
Post-procedure:

- No ice
- Rest for 2 weeks
  - Daily activities okay
  - Gradual return to activities
- Follow-up:
  - Referring physician, physical therapy
- No NSAIDS: 2 weeks

Phases of Tissue Healing

Post-procedure:

- Patellar tendon:
  - Knee brace (locked) x 2 weeks
  - First week non-weight bearing with crutches
  - Nothing?
- Achilles tendon:
  - Walking boot x 2 weeks

Billing:

- Ultrasound-guidance + tendon injection
- Percutaneous tenotomy codes:
  - 24357: medial and lateral epicondylitis
- Other tenotomy codes:
  - Describe incision
  - Check with your own billing department

Tendons

- Common extensor tendon: elbow
- Patellar tendon
- Gluteal tendons: great trochanter
- Achilles
- Other

Tendon Fenestration

- 14 tendons
- VAS score improved: 4, 12 weeks
- Patellar (5), Achilles (4)
- 1 each: gluteus medius, iliotibial tract, rectus femoris, hamstring, common extensor tendon

Common Extensor Tendon: elbow

- Randomized controlled: 230 patients
- PRP + fenestration versus fenestration alone
- No difference in outcomes at 12 weeks
- Significant difference in pain scores at 24 weeks: PRP group had less pain


Patellar Tendon

- Randomized controlled: 23 patients
- PRP + fenestration versus fenestration alone
- PRP outcomes better at 12 weeks
- No significant difference in outcomes when greater than 26 weeks

**Patellar Tendon**
- 45 tendons
- 76% improved at 4 weeks, 24% no change
- Improved outcome at 4 weeks if:
  - Less pain prior to procedure
  - Well-defined area of tendinosis at US
  - No correlation with other ultrasound findings (color, size, location, etc.)


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**Fenestration: pelvis**
- 22 tendons in 21 patients
- Gluteus medius (11), hamstring (8),
  gluteus minimus (2), tensor fascia lata (1)
- Marked or some improvement: 82%

Gluteus Maximus and Minimus

- Randomized controlled: 30 patients
- PRP versus fenestration alone
- Significant improvement at weeks 1 and 2
- Approximately 80% had long term improvement: up to 1 year follow-up
- No difference between treatment groups


Achilles Tendon

- Randomized controlled: 54 patients
- PRP versus saline injection
- No significant difference in outcomes
  - At 24 weeks¹
  - At 1 year²
  - *Both groups: eccentric physical therapy

¹de Vos RJ et al. JAMA 2010; 303:145

Discussion: tendon fenestration

- Studies are relatively limited to date
- Most common site:
  - Common extensor tendon (elbow)
  - Other sites have been attempted
- All studies show improvement
- Procedure well-tolerated
  - Potential risk of tendon tear

Discussion: other treatments

- Fenestration is often combined with other treatments:
  - Platelet-rich plasma or whole blood injection
  - Hyperosmolar dextrose or prolotherapy
- Common extensor tendon (elbow):
  - There is no benefit of injecting steroids during tenotomy¹
  - Risk of tendon rupture

¹McShane JM et al. J Ultrasound Med 2008; 27:1137
Ultrasonic Tenotomy (Tenex)

- Ultrasound phacoemulsification
  - Debride and aspirate necrotic tendon
- Irrigation
- Safe and effective
- No comparison studies
  - Outcomes, cost-effectiveness

Williams RC et al. PM R 2018; 2015; 10:313

Discussion: questions

- Do some tendons respond better?
- Young versus old patients?
- What timing (acute versus chronic)?
- Tendinosis versus partial tear?
- Timing of physical therapy?

Conclusion:

- Ultrasound-guided percutaneous fenestration
- Effective treatment of various sites of tendinosis
- No complications
- Further studies are needed

Syllabus on line and other educational material:

www.jacobsonmskus.com

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