Management of Lower Extremity Tendinopathy

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Disclosure Information
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Disclosure of Relevant Financial Relationships
I have the following financial relationships to disclose:
Employees of: Park Nicollet, University of Minnesota, Evidence in Motion, 3 Fellows, Tracker

Disclosure of Off-Label and/or Investigative Uses
I will not discuss off label use and/or investigational use in my presentation.

Course Objectives
• Understand causes of tendon pathology
• Evaluate and recognize tendinopathy
• Understand the value of load
• Be able to progress a patient with tendinopathy in an exercise prescription.
• Use manual therapy as an analgesic for those struggling with painful tendinopathy

Tendinopathy - Defined
• Tendon injuries represent 50% of all sports injuries.¹
• Vast majority of tendon injuries are degenerative lacking the presence of inflammatory cells.¹
• Tendonitis vs. tendonosis = tendinopathy
• Tendinopathy is a failed healing response²
  • Tendonitis - acute tendon irritation with swelling and redness¹
  • Tendonosis - chronic degenerative problems as a result of overload.¹

Tendinopathy - Defined
• Tendinopathy presents in clinic with a wide ranging presentation and functional deficits.⁷
  • Load based exercises for this group have been proven to be effective however intensity, frequency and duration remain unknown.⁷
  • Concentric-eccentric heavy slow loading x 3 per week vs. x2 per day for 7 days/wk have shown similar results.⁷
Tendon response to load

Healthy tendon have normal collagen fibers tightly bundled in a parallel fashion. Tendinopathy demonstrates unequal and irregular crimping of collagen fibers. Overloading causes minor ruptures triggering a healing response. Tendinopathy is the response in the tendon of a tendon that never fully heals. This is a failed healing response initially. Mechanical loading and more specifically alterations in regular loading drive tendon change.

Fatigue to mechanical loading is a major driver of tendon related pain. More common over the age of 30. Tendinopathy appears to correlate with aging. Random and inconsistent activity that is beyond the tendons capacity will then drive a failed healing response.

What is the tendon response to overload?

Phases of healing
Mechanotherapy & Mechanotransduction:

Turning tissue loading into tissue repair

Mechanotransduction refers to the process by which the body converts mechanical loading into a cellular response. Mechanotherapy is the clinical application of mechanotransduction. Research shows that tendon loading is a dynamic response to tissue load. Key is controlling the load after injury for optimal healing. Progressive and consistent.

Mechanical forces direct cellular forces to induce tissue adaption. Cells can modify their micromechanical environment via cytoskeletal arrangement, which feeds back to alter cellular sensitivity to incoming forces. Constant push pull with healthy tendons. Think Cook and Purdham

Clinically what does this look like?

Gluteal Tendinopathy Objective

- Hallmark for GT is sensitivity to touch on the lateral aspect of the hip. For young - snapping hip syndrome is more common manifestation of GT.
- Loud audible snapping and sometimes painful
- 2nd to anterior fibers of the glute max and ITB band migrate posterior to anterior over the greater trochanter as hip moves from extension to flexion.

Gluteal Tendinopathy

- 10-25% occur between the 4-6th decade of life
- 2x’s more common in females
- Abductor tendon degeneration is the most common reason for this pain.
Gluteal Tendinopathy:

Objective

- Clinical Cluster for gluteal tendinopathy (Mulligan 2015) - Not tested
- Pain at end range of motion of hip abd/add
- Pos. Faber
- Pain with resisted hip abduction
- Pain with palpation over greater trochanter
- No radicular pain patterning

- Single leg stance 30 seconds neutral pelvis
- 97% specificity
- 100% sensitivity

Gluteal Tendinopathy:

Treatment

- Exercises that maximize gluteal medius and minimizes iliotibial band.
- Patient needs to feel an increase in their symptoms when performing the exercise.
- Think mechanotherapy and mechanotransduction
- Start in non. wt. bearing and progress to wt. bearing

Patellar Tendinopathy

- Most commonly found as insertional tendinopathy
- Data shows that >1/3 of athletes are not able to return to sport after 6 mos.
- 53% of athletes with patellar tendinopathy were forced to retire.
Patellar Tendinopathy:

Objective

- Hallmark features of patellar tendinopathy\textsuperscript{15}
- Pain localized to the inferior pole of patella
- Load-related pain that increases demand on knee extensors
- Patellofemoral and patellar tendinopathy can both occur with squatting, stairs and prolonged sitting.\textsuperscript{15}
- Pain is often increased the day after increased loading.\textsuperscript{15}

- Tendon pain occurs instantly with loading and usually ceases when load is removed.\textsuperscript{15}
- Tendon pain rarely occurs with rest\textsuperscript{15}
- Irritability is critical in recognizing in clinical decision making\textsuperscript{15}
  - Pain greater than 24 hours of loading - irritable
  - Pain less than 24 hours after loading - stable

Patellar Tendinopathy:

Treatment

- Eccentric exercise is the most investigated exercise for patellar tendinopathy.\textsuperscript{15}
  - Example decline squat program 3 sets of 15 reps x2 per day.
  - However this could be too aggressive for highly irritable tendons
  - Also does not address other weakness in the LE chain

- Rio et al. demonstrated the immediate analgesic effects of isometrics in the short term in a 4 week study.\textsuperscript{18}
  - Eccentric exercise can be poorly tolerated but in combination with isometrics the tolerance to load could increase.\textsuperscript{15}
  - 5 x 45 second holds - 80% MVC
    - 1 min between sets
    - 60° of flexion

- Malliaras et al. proposed a 4 stage program that address pain reduction, eccentric strengthening and lower quarter weakness.
  - Isometric exercise for pain control
  - Isotonic exercise to address load tolerance
  - Energy-storage exercises to address neuro re-education
  - Progressive return to sport
Patellar Tendinopathy: Treatment

- Smith et al. (2018) examined the psychological effects of Achilles tendinopathy.

> "I had to go to the hospital once to have x-rays... I don’t know if he [doctor] was trying to scare me into doing some exercise or something, but he basically said the only thing they could do is break both of my thighs and twist them a bit and then heal them back together. And it would take me years to get back to walking properly."

Achilles Tendinopathy

- Elite long distance runners have a 52% risk of developing.
- Reoccurrence rates as high as 27% with soccer players.
- However 30% are sedentary.
- Extrinsic risk factors include training errors, environmental factors and faulty equipment.

Achilles Tendinopathy: Objective

- Evidence has shown both increased and decreased dorsiflexion is a risk factor.
- Abnormal subtalar ROM
- Decreased plantar flexion strength
- NSAIDS have shown no benefit with this problem.
- Altered hip biomechanics in runners commonly seen secondary to weak hip abductors.

Achilles Tendinopathy: Treatment

- Alfredson et al. study most famous study looking at the effects of tendon loading with eccentric training.
- 3 sets of 15 reps of heel drops x 2 per day for 180 reps.
  - Both gastroc and soleus emphasized
  - Were instructed to progress with more aggressive loading if they did not feel it in their Achilles tendon.

Alfredson et al. Program
Achilles Tendonopathy: Treatment

- Beyer et al. compared eccentrics and high load slow resistance and that both offered equally good results.  
- High load slow resistance had higher patient satisfaction at 12 weeks but not 52 weeks  
- Eccentric group performed 3 sets of 15 reps x 2 per day for 12 weeks both with knee straight and flexed.  
- HSR was done x 3 per week goal of progressing to 1 RM.  
- Prognosis is 2-8 years out 71-100% resolution.

Achilles Tendonopathy: Treatment

- McAuliffe et al. (2018) examined the psychological effects of Achilles tendonopathy.

  “I’ve gone to a lot of physios and they tell me its an overuse injury but I don’t think it is ‘cause I’ve stopped. People say stop and don’t do anything for 6 or 8 weeks but if I did stop and went back even for a jog a couple of miles after not doing anything for a period of time id still be in pain like it never stopped.”

Take Home Message

Exercise / Rehab

The Goldilocks Principle
If during 24-48 hours after...
- No soreness = too cold
- Sore but eased = just right
- Still sore = too hot
- do more next time

Thank You!

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