Importance of Loading In Management of Tendinopathies

Why Patients Fail To Progress

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Learning Objectives

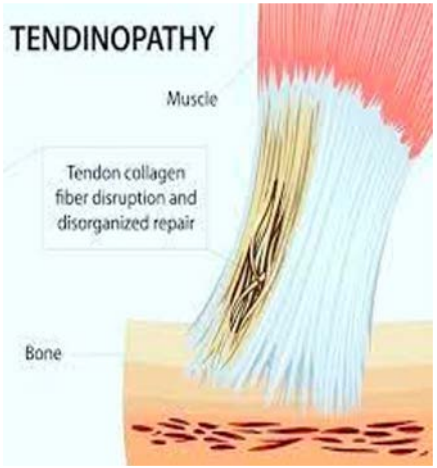
- Understand Basic Pathophysiology and Diagnostic Criteria For Tendinopathies

- Understand The Requirements For Tendon Adaptation

- Be Familiar With The Current Evidence in Treatment of Tendinopathies

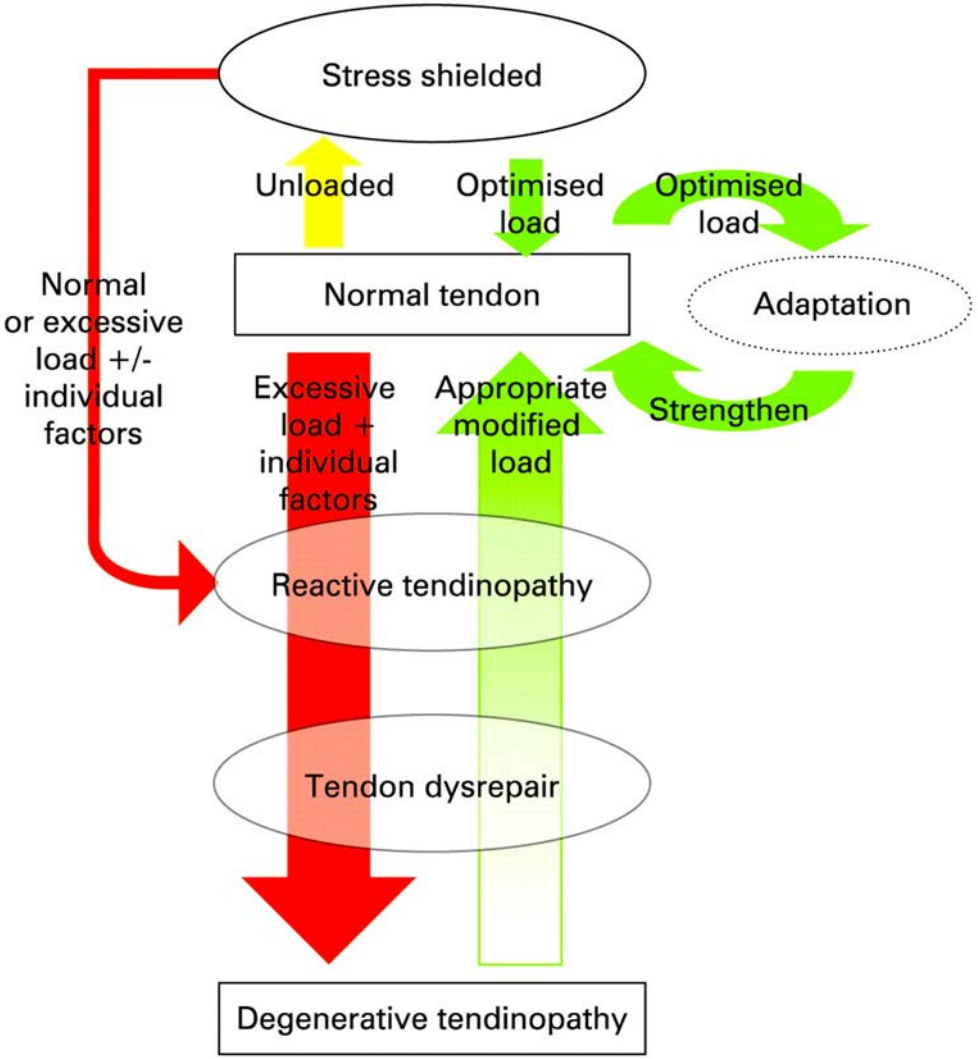
Tendinopathy

- Describes the painful condition that occurs in response to activity overuse
  - Complex
  - Multi-Factorial
- Degenerative vs Reactive
- Occurs most commonly in sports/activities that require repetitive loading of a particular tendon or group of tendons
- Accounts for approximately 30% of all diagnosed injuries (Macedo et al.



Pathophysiology

- Multiple Theories Exist
- Continuum Model
  - Cook et al 2016



Diagnosis

- Largely Clinical
  - Activity provoked localized tendon stiffness

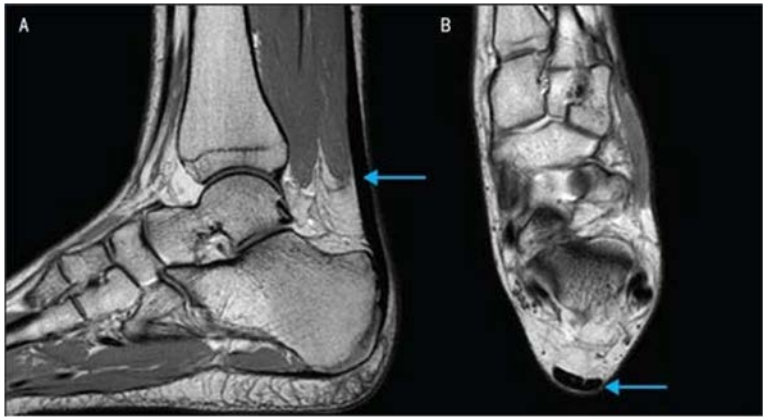
- Pain typically doesn't prevent activity participation initially, but progresses to inability to participate in later stages

- Palpation can be used diagnostically for superficial tendons
  - Thickness of tendons may occur (such as achilles)

Imaging

- MRI/Ultrasound
  - Tissues changes don't necessarily correlate with severity

- Imaging should be used in context with presence of clinical symptoms



MRI Normal, Healthy Achilles

MRI Abnormal Achilles

Treatment Of Tendinopathies

Why Your Patients Failed To Progress

Management

- Exercise Based Treatment
  - Tendon-Loading
- Corticosteroids
- Topical glyceryl trinitrate (GTN)
- Plasma Rich Platelet (PRP)
- Low Level Laser & Extracorporeal shock wave therapy (ESWT)

Corticosteroids

- Corticosteroids
  - Potential For Short-Term Relief
    - Especially In Lateral Epicondylalgia
  - Intermediate(6 months)/Long-Term
    - No significant difference or inferior results
  - Role is debated

- Chronic effect on tissue quality?

Topical Glyceryl Trinitrate (GTN)

- Topical glyceryl trinitrate (GTN)
  - Limited Evidence
  - May enhances new tissue synthesis through its involvement in a number of processes, including local blood flow, host defence and collagen synthesis
  - May be used up to 6 months

Other Treatments

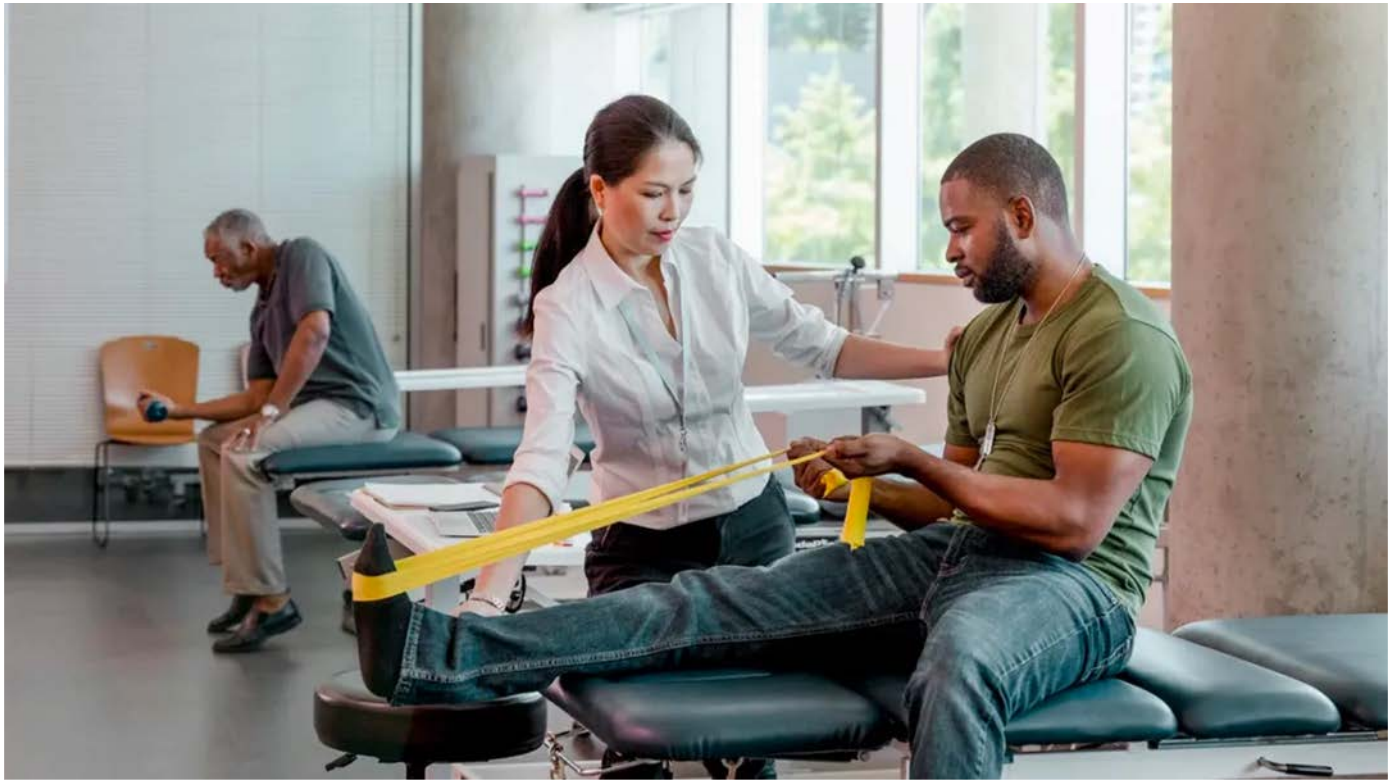
- Plasma Rich Platelet (PRP)
- Low Level Laser & Extracorporeal shock wave therapy (ESWT)

Instrument Assisted Soft Tissue Mobilization (IASTM)

- Often referred to as “Scapring”
- Theory:
  - Using IASTM will cause localized inflammation, which then facilitates synthesis and ralightment of new tissues (hopefully in a more organized manner)
- Research
  - Reduce pain and increase ROM (Howitt et al., 2009)
  - Mechanism
    - Animal Studies
  - Mostly Case Reports
  - No human studies that confirm IASTM can breakdown scar tissue

Management

- Exercise Based Treatment
  - Loading is the major factor associated with successful treatment of tendinopathies
  - Tendon Stiffness Increases after exercise training to maintain new ranges of strain
- Approximately 30-50% of patients may fail initially with conservative care(Challoumas et al.)
- Why is this?




20"
24"
REP
FITNESS

Tendinopathy Loading

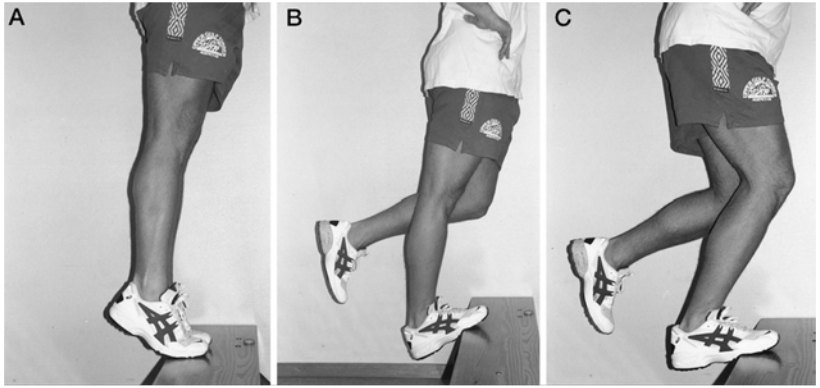
- Isometrics:
  - Analgesic effect
  - Early Treatment
  - 5 x 45” Hold with 70% MVIC with 2 minutes of rest
  - Reduced Pain by 87% for 45 min

- Incredibly successful at treating pain
  - DON’T STOP HERE

Tendinopathy Loading

- Eccentrics:
  - Tried and True
  - Builds tendon stress capacity and strength
  - Validated in multiple research studies
  - 3-5 sets of 5-8 reps close to fatigue

- Why many get it wrong...
  - Especially Physical therapist



Tendinopathy Loading

- Heavy Slow Resistance Training:
  - Newer
  - Equally effective as eccentrics (Beyer Et al., 2015)
    - Better satisfaction and compliance
  - Go Slow
    - Speed is important
      - Start higher rep, Slow tempo (3-0-3)
      - Intensity high ›70%

Is Pain Ok?

- Pain up to a 3-4/10, okay as long as symptoms reduce to baseline in 24 hrs
  - Not Sharp and tolerable

AT force (BW)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
4.2
4.4
4.6
4.8
5
5.2
5.4
5.6
5.8
6
6.2
6.4
6.6
6.8
7
7.2
7.4
7.6
7.8
8
Walking
(1 - 2 m.s-1)¶
Running
(2.9 - 5.63 m.s-1)¶
Seated heel raises 2-legs †
Seated heel raises 1-leg † ‡
Seated heel raises 1-leg, 108-115% BW ‡
Squat † §
Seated heel raises 1-leg, 125% BW ‡
Low step-up (leading leg) †
Standing heel raises 2-legs † §
High step-up (leading leg) †
Lunge (leading leg) † §
Low step-down (leading leg) †
Seated heel raises 1-leg, 150% BW ‡
Lunge (trailing leg) †
Rebounding heel raises 2-legs †
High step-down (trailing leg) †
Group 1 : Lower load than walking
Seated heel raises + squat
Standing heel raises 2-legs / Introduction of asymmetric exercises

Group 2 : Load equivalent to walking
Increase phase 1 intensity / Start the standing heel raises
1-leg / Introduction of plyometrics
AT force
Walking
(1 - 2 m.s-1)¶
Running
(2.9 - 5.63 m.s-1)¶
Low step-up (trailing leg) †
Low step-down (trailing leg) †
Standing heel raises 1-leg † ‡ §
High step-down (leading leg) †
Forward jump 2-legs †
CMJ 2-legs †
Drop jump 2-legs †
High step-up (trailing leg) †
Eccentric standing heel raises knee straight (1-leg), 108-115% BW ‡
Standing heel raises 1-leg, 108-115% BW ‡
Jump landing 2-legs §

0 0.2 0.4 0.6 0.8 1 1.2 1.4 1.6 1.8 2 2.2 2.4 2.6 2.8 3 3.2 3.4 3.6 3.8 4 4.2 4.4 4.6 4.8 5 5.2 5.4 5.6 5.8 6 6.2 6.4 6.6 6.8 7 7.2 7.4 7.6 7.8 8
AT force
Walking (1 - 2 m.s-1)¶
Running (2.9 - 5.63 m.s-1)¶
Seated heel raises 2-legs †
Rebounding heel raises 1-leg †
Standing heel raises 1-leg, 125% BW ‡
Eccentric standing heel raises knee bent (1-leg), 108-115% BW ‡
Hopping 2-legs †
CMJ 1-leg †
Standing heel raises 1-leg, 150% BW ‡
Forward hopping 2-legs †
Forward jump 1-leg †
Drop jump 1-leg †
Jump landing 1-leg §
Hopping 1-leg †
Lateral hopping 1-leg †
Forward hopping 1-leg †
Group 3 : Load equivalent to running
Increase the standing heel raises additional load / Progression in plyometrics
Extreme loading

Summary

- A Tendinopathy is the result of chronic tissue overloading
- Pathological findings on imaging DO NOT correlate with severity of symptoms
- Multiple treatment methods exist, but therapeutic exercise results in best outcomes
- Tissue Loading is a critical factor in build tendon resilience

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