Matching patients with persistent tendinopathy to the right intervention at the right time

How Does Pain Science Fit In?
Lack of Clear Mechanism for Tendon Pain
Growth in Research on Role of Central Sensitization in Tendinopathy
Loading Interventions Produce Variable Results

Pain Science =
- Pain does not provide a measure of the state of the tissues
- Pain is modulated by many factors
- The relationship between pain and tissue becomes less predictable as pain persists
- Pain can be conceptualized as the perception that tissue is in danger

TENDINOPATHY =
“...nonrupture injury in the tendon or paratendon that is exacerbated by mechanical loading”

Scott et al. 2015

Disclosures
We have nothing to disclose
Lack of Clear Mechanism for Tendon Pain

What is pain?

Pain

What shapes our pain experience?

Pain Science

Lack of Clear Mechanism for Tendon Pain
Explanation of Pain Science (what is pain?)
How has pain science evolved?
Growth in Research on Role of Central Sensitization in Tendinopathy
How does central sensitization occur?
How can it be clinically assessed?
Loading Interventions Produce Variable Results
Why do people have different responses to exercise?
Understanding Pain

Pain is our most sophisticated protective device

Tissue damage is neither sufficient nor necessary for pain

Pain depends on how much danger your brain THINKS you are in, not how much danger you are really in

The longer you have pain, the better your system gets at producing it

Louw 2016

Lack of Clear Mechanism for Tendon Pain

Evolution of pain science

The evolution of pain science

Cartesian Model (16th Century)
- Injury = Pain
- Damage = harm

Pain

3 Options for Treating Pain
- Take Foot out of fire
- Douse fire
- Cut wire

Biomedical Model (19th)

Biopsychosocial Model (20th)

3 Options for Treating Pain
- Take Foot out of fire
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3 Options for Treating Pain

- Take Foot out of fire
- Douse fire
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What is the Biomedical Model?

- Illness vs. Health
- Looks for the cause of illness vs. contributory factors
- Explains illness by simplest possible process
- People not responsible for illness
- Considers the absence of disease as physical wellness

Biopsychosocial Model

Conundrum
Central Sensitization

How does it occur?

- Altered responsiveness to a variety of stimuli
- Altered sensory processing in the brain
  - Poor functioning of descending antinociception
  - Increased activity of brain-orchestrated nociception

The Body's Alarm System

Role of Central Sensitization in Tendinopathy

How does it occur?

How do we assess?
Evidence of Clinical Importance

Higher severity = lower quality of life (Coombes 2012, Smart 2012)

Predictor of poor outcomes in those with chronic musculoskeletal pain (Coombes 2015, Kim 2015, Bartling 2006)

Mediates treatment outcomes (Kim 2015, Jull 2007)

Recognition of Central Sensitization

- Predominate neuropathic pain?
- Disproportionate pain experience?
- Diffuse pain distribution?
- Central Sensitization Inventory score ≥40

Central sensitization in tendinopathy

Elbow - lateral elbow (10/16 studies)
Shoulder - rotator cuff (4/16 studies)
Knee - patellar tendon (2/16 studies)
Ankle - Achilles tendon (Tompra 2016)

Role of Central Sensitization in Tendinopathy

How good do we assess?

Physical Therapists’ Ability to Identify Psychological Factors and Their Self-Reported Competence to Manage Chronic Low Back Pain

- Moderate correlation between perception of distress and patient reported distress
- Clinical intuition and other psychological domains was fair or worse
- Patient reported distress was a negative predictor for therapists confidence

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Loading Interventions Produce Variable Results

Why do we have variable response to loading / exercise?

Tendons Adapt Differently Depending On...

Age
- Younger tendons can adapt structurally
- Older tendons can adapt mechanically

Gender
- Tendons in women can have
  - < new connective tissue formation, respond less to mechanical loading, lower mechanical strength (Magnusson et al. 2007)

Metabolic Health

Tendinopathy

Lack of Clear Mechanism for Tendon Pain
Why the continuum model works well
Growth in Research on Role of Central Sensitization in Tendinopathy
Variable literature between UE and LE
Psychosocial components to consider in tendinopathy

Loading Interventions Produce Variable Results
Between body regions
Between types of loading
Tendon Pain Explained
Inflammation "Tendinitis"

Collagen Dysrepair "Tendinosis"
Tendon Cell Response "???"
Neovascularization "???"
Central Sensitization "???"

Pitfalls of Pathophysiology Models
- Variable
- Does Not Account for Changes in Pain Over Time
- Neglects Role of Central Pain Processing
- No Direct Relationship Between Structure, Pain, & Dysfunction

Enter the "Continuum Model of Tendinopathy"

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Continuum Model of Tendinopathy

3 Phases

1. New Tendon Pain
2. Painless Tendon Changes
3. New but Old Tendon Pain

Advantages of Continuum Model

- Based on Clinical Presentation
- Does Not Emphasize Pathophysiology
- Guides Intervention Selection
- Explains Changes Over Time
Advantages of Continuum Model

- Guides Intervention Selection
- Expects Changes Over Time
- Does Not Emphasize Pathophysiology
- Based on Clinical Presentation

Upper vs Lower Extremity Literature

Currently, more evidence of central sensitization in UE tendinopathies (Plinsinga et al. 2015)

Psychological health is an important factor to consider (Plinsinga et al. 2015; Aben et al. 2018)

Psychological Health

- Tennis elbow and psychological characteristics
- Trust is an important component
- Higher anxiety and depression compared to controls
- Work satisfaction did not differ

(Presings 2018)

Psychological Health

- Severe gluteal tendinopathy
  - Psychological distress
  - Waist girth & BMI
  - Poorer quality of life

(Presings 2018)
Best Loading Approach

Nothing Definitive ; Low load = High load (Ingwersen et al. 2017)

ECC/CON + Isometrics (Kazimerov et al. 2017)

Education + Exercise (Mellor et al. 2018)

Heavy Slow Resistance > Eccentrics ;

CON/ECC = ECC (Moss et al. 2011)
The Rise and Stall of Isometrics
Patellar
Long vs short (Pearson et al. 2018)
Achilles (O’Neil et al. 2018)
Plantar fascia (Riel et al. 2018)

Similarities and Pitfalls
Both includes aspects of pain reduction and desensitization
Both are grounded in graded exposure
Pain science does not address poor tissue health
Tendon loading does not address poor pain beliefs
Overreliance on Passive Treatments

Not Addressing Isolated Muscle Deficits

Failure to Address Kinetic Chain Deficits

Not Adequately Addressing Biomechanics

Unrealistic Rehab Time Frames

Examination Sequence

Subjective (inquire about pain beliefs)

Objective (general to isolated movement assessment)

Hallmark s/s of tendinopathy

Recognizing central sensitization
asking about changes in senses stress, sleep, nutrition
clinical ice pain test (10 seconds)
Assess Beliefs About Pain

Sample Questions for Subjective
- "What's your understanding of what's going on?"
- "What's an appropriate response to exercise for you?"

Outcome Measures
- TendonQ
- FABQ
- Pain Catastrophizing Scale

Assess Beliefs About Pain

Sample Questions for Subjective
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Outcome Measures
- TendonQ
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- Pain Catastrophizing Scale
- Central Sensitization Inventory

Comprehensive Rehab Program

Clinical Decision-Making

Coach and Load

Central Sensitization | Fear Avoidance | Readiness for Change

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Setting Expectations

What may be considered best for tissue may not be optimal in terms of efficacy expectations. Exercise prescription should promote self-monitoring, and appropriate interpretation of physiological signs is essential. Explain pain in terms of sensitivity, ensuring the person in pain understands why hurt does not necessarily equal harm and why pain during rehabilitation should be acceptable.

(Mallows et al. 2018)

Develop an effective working alliance

- By: Utilising a person-centered interaction style
- By: Providing emotional support
- By: Engaging with active listening skills

Improved self-efficacy

- By: Challenging negative outcome expectations
- By: Considering patients' perceived locus of control
- By: Viewing exercises as a means of providing experienced control
- By: Providing education on the meaning of pain

Optimised outcomes for people with tendinopathy

Increased adherence

- By: Developing a successful partnership
- By: Enhancing self-efficacy
- By: Revisiting understanding

Discussing Tendon Pain with a Patient

Understand that emotional context of pain affects severity/chronicity

Emphasize loading tolerance rather than structural changes

Encourage active management techniques

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Reactivity: “24 hour rule”

Symptom aggravation following energy storage activities

Irritable: provocation lasting greater than 24 hours

Stable: settles within 24 hours

Malliaris et al. 2015

Property of: Kenneth Kirby & JJ Kuczynski, not to be copied without permission
Reactivity: “24 hour rule”

Reactive pain:
symptom aggravation following energy storage activities

Irritable:
provocation lasting greater than 24 hours

Stable:
settles within 24 hours

Malliaris et al. 2015

Load

Reactivity: “24 hour rule”

Reactive pain:
symptom aggravation following energy storage activities

Irritable:
provocation lasting greater than 24 hours

Stable:
settles within 24 hours

Malliaris et al. 2015

Cook 2015
Assess Beliefs About Pain

Respect Variable Responses to Loading

Treat the Person, Not the Tendon

Thank You

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References

References