

*Pain Science Within Tendinopathy
Management: Square Peg, Round Hole?*

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Disclosures

We have nothing to disclose



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



TENDINOPATHY =



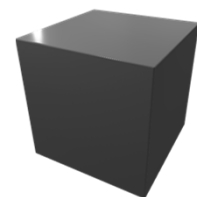
"...nonrupture injury in the tendon or paratendon that
is exacerbated by mechanical loading"

Scott et al. 2015



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



Moseley 2007





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

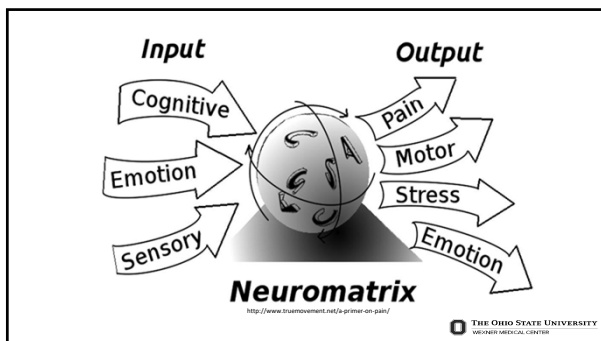
Why do people have different responses to exercise?

Lack of Clear Mechanism for Tendon Pain

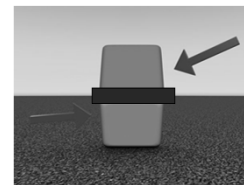
What is pain?

Pain

What shapes our pain experience?



Pain as a Perception



Understanding Pain

Pain is our most sophisticated protective device

Tissue damage is neither sufficient or 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

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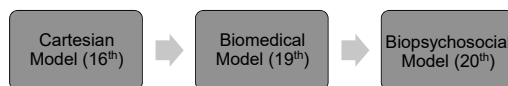
Lack of Clear Mechanism for Tendon Pain

Evolution of pain science

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Pain

The evolution of pain science



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Cartesian Model (16th Century)

- Injury = Pain
- Damage = harm

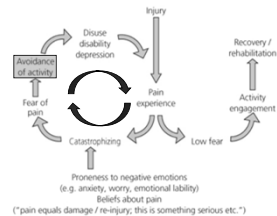


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3 Options for Treating Pain

- Take Foot out of fire
- Douse fire
- Cut wire



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3 Options for Treating Pain

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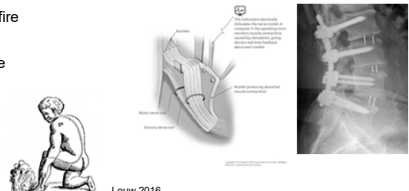


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3 Options for Treating Pain

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What is the Biomedical Model?

Biomedical model of health

It is a scientific measure that doctors take to find out the reasons behind a particular disease. They solely focus on the biological reasons to learn about the illness with this method. Instead of using any other reasons such as sociological psychological.

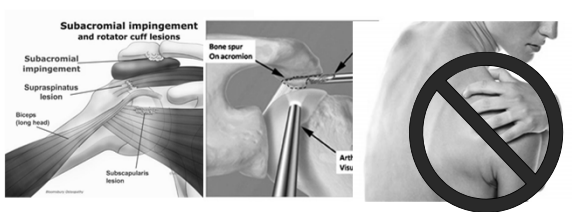
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What is the Biomedical Model?

- 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

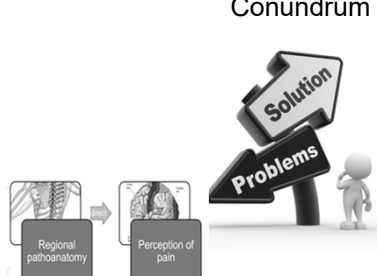
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What is the Biomedical Model?



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Conundrum



Regional pathoanatomy → Perception of pain

Biological
Genetic predisposition
Neuroanatomy
Effect of medications
Sensory response
HPA axis
Fight-flight response
Psychological responses

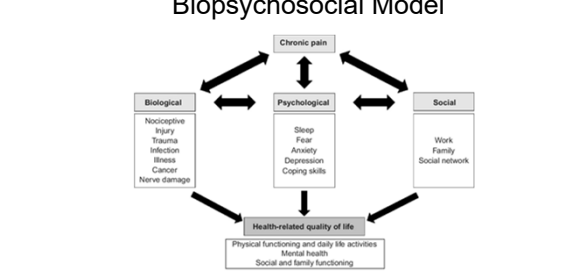
Psychological
Learning
Emotions
Thinking
Attitudes
Memory
Perceptual beliefs
Stress management strategies

Social
Social support
Family background
Interpersonal relationships
Cultural traditions
Medical care
Socio-economic status
Poverty
Physical exercise
Biofeedback

Buller 2000

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Biopsychosocial Model



Biological
Nociceptive
Injury
Trauma
Infection
Illness
Cancer
Nerve damage

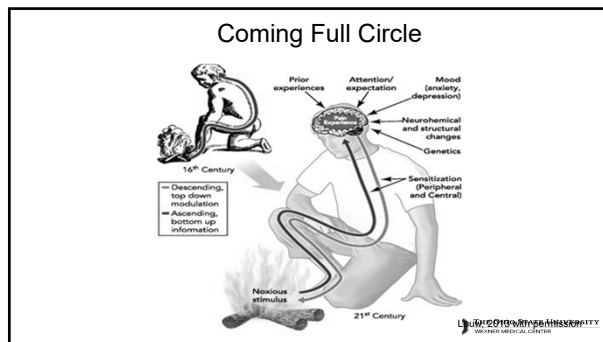
Psychological
Sleep
Fear
Anxiety
Depression
Coping skills

Social
Work
Family
Social network

Chronic pain

Health-related quality of life
Physical functioning and daily life activities
Mental health
Social and family functioning

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Role of Central Sensitization in Tendinopathy

How does it occur?

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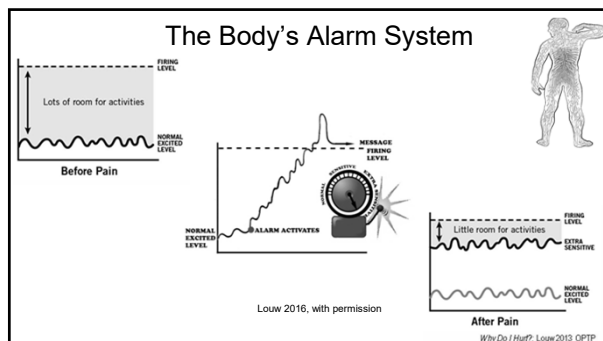
Central Sensitization

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

Nijis 2016

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Role of Central Sensitization in Tendinopathy

How do we assess?

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Evidence of Clinical Importance

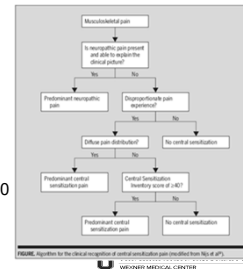
Higher severity = lower quality of life (Coombes 2012, Smart 2012)

Predictor of poor outcomes in those with chronic musculoskeletal pain (Coombes 2015, Kim 2015, Sterling 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

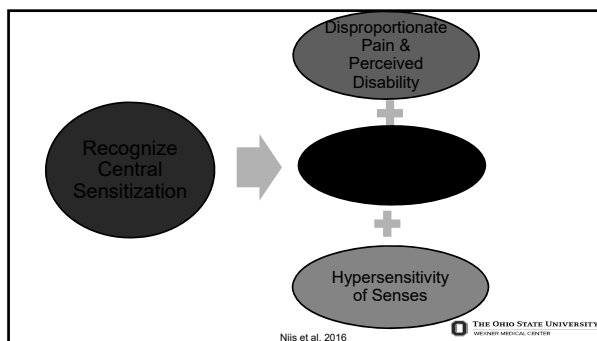
Elbow - lateral elbow (10/16 studies)

Shoulder - rotator cuff (4/16 studies)

Knee - patellar tendon (2/16 studies)

Ankle - Achilles tendon (Tompra 2016)

Plasinga 2015



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

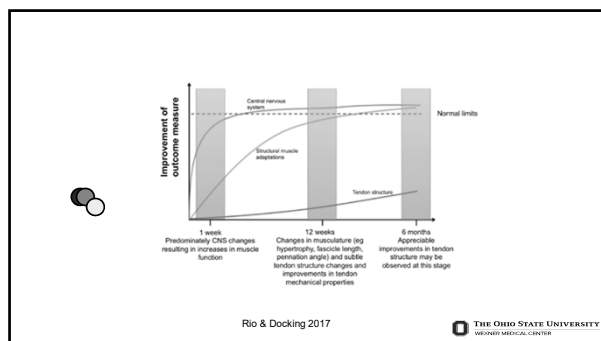
Emanuel Brunner, Wim Dankaerts, André Meichtry, Kieran O'Sullivan, Michel Probst

- 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

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

Medications



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Metabolic Health

Medications



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

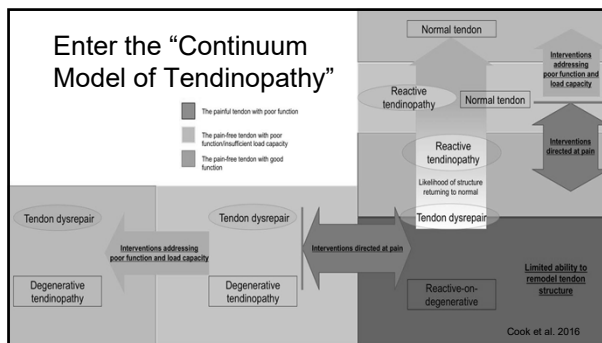
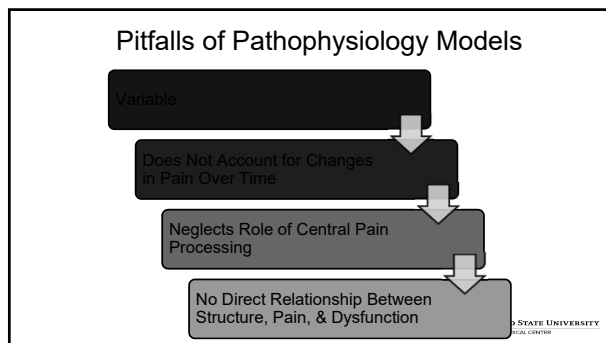
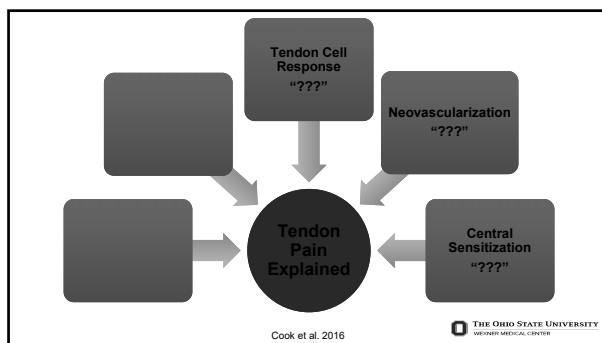
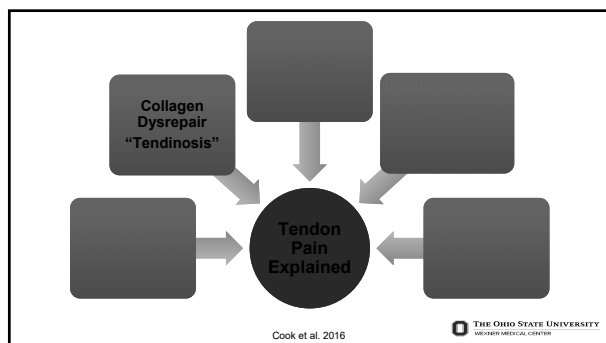
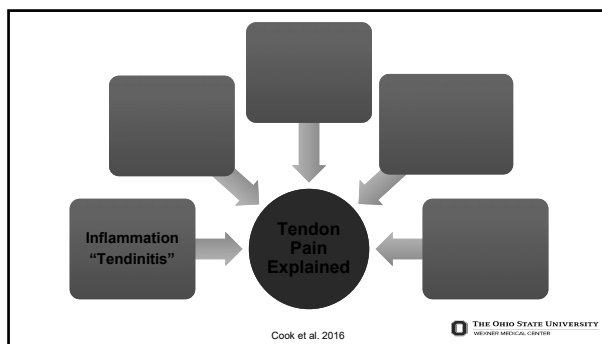
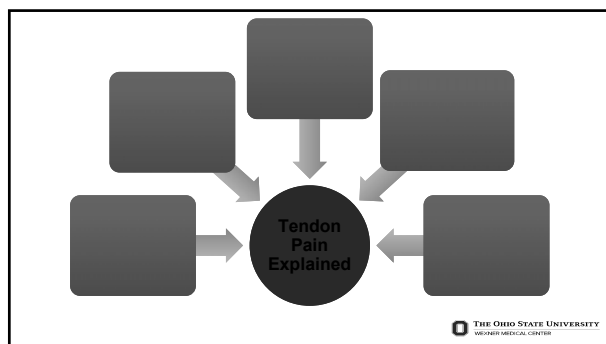
Psychosocial components to consider in tendinopathy

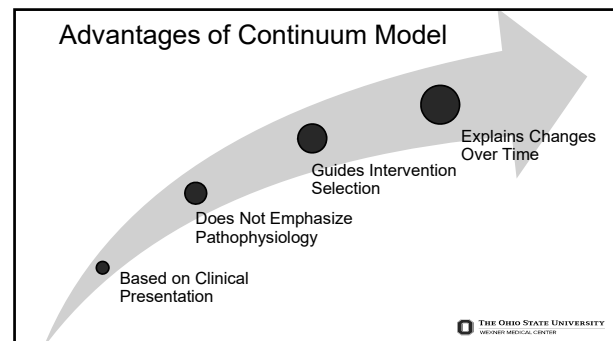
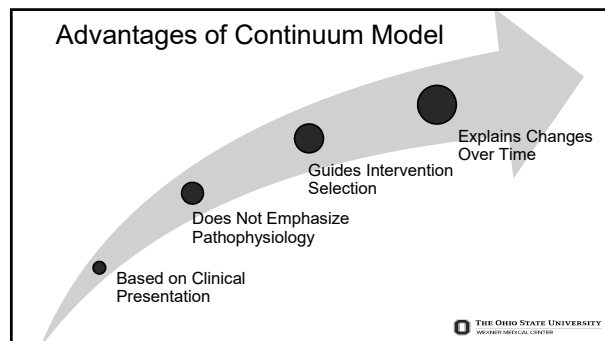
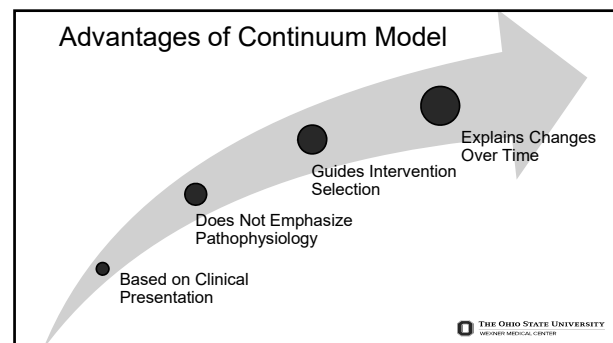
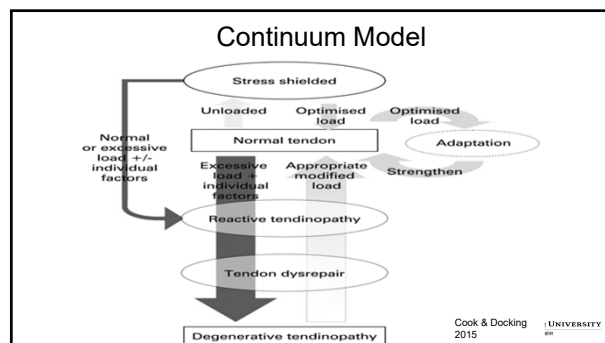
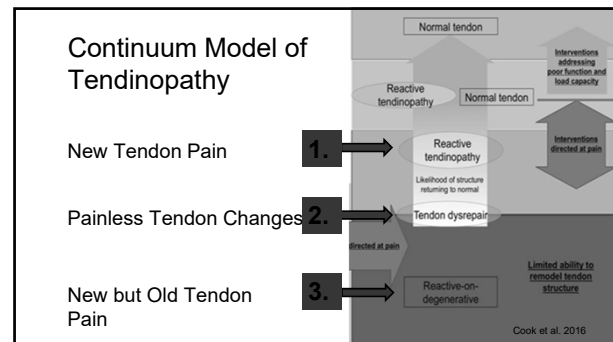
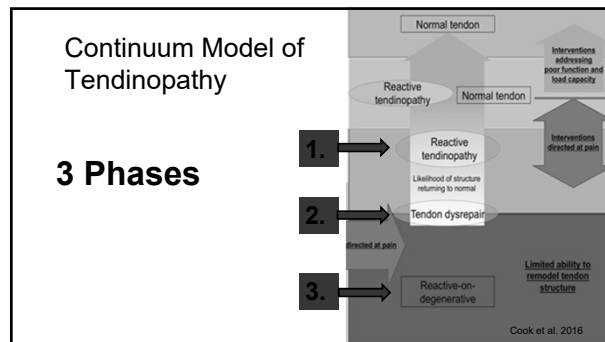
Loading Interventions Produce Variable Results

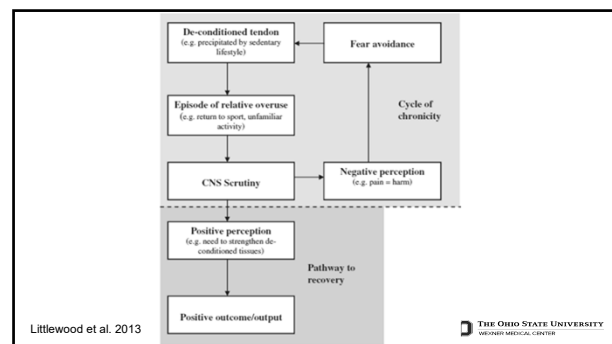
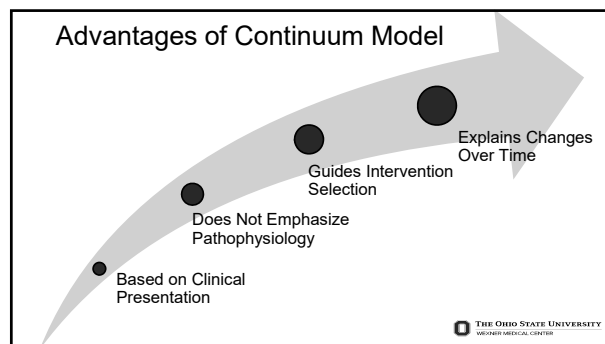
Between body regions

Between types of loading







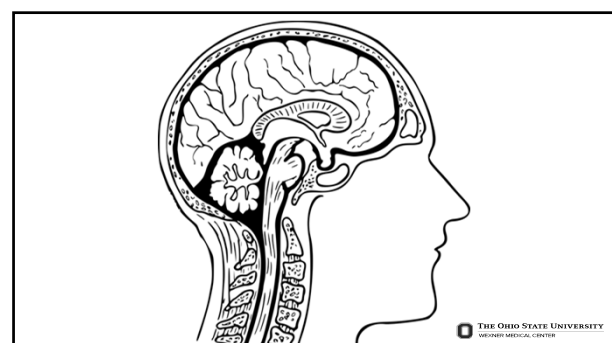


Upper vs Lower Extremity Literature

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

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

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Psychological Health

Tennis elbow and psychological characteristics

Trust is an important component

Higher anxiety and depression compared to controls

Work satisfaction did not differ

(Aben 2018)

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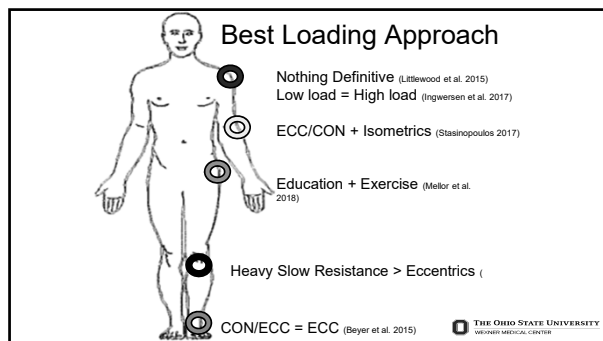
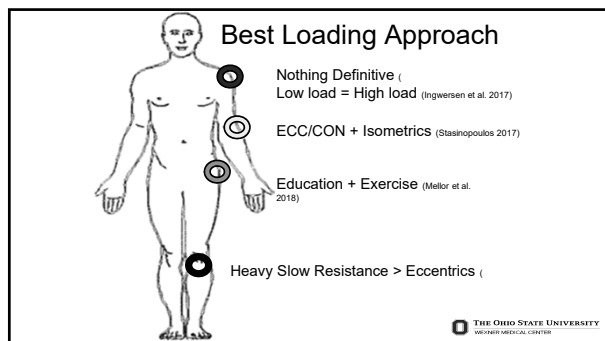
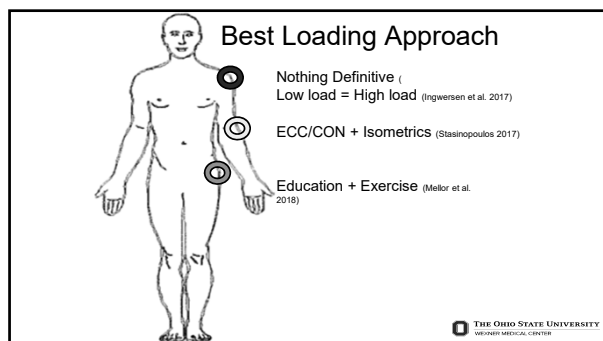
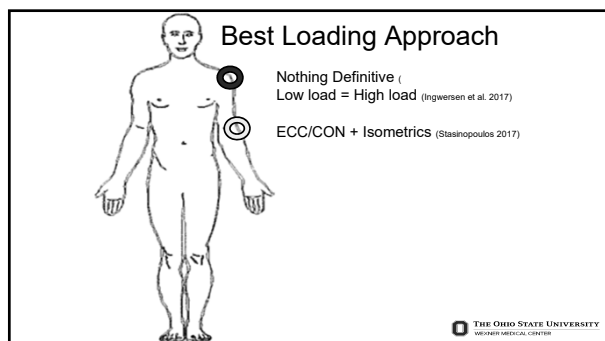
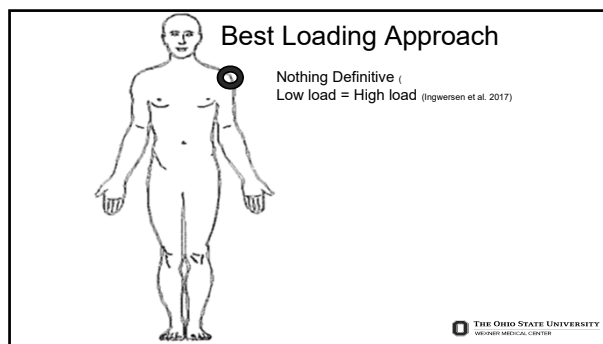
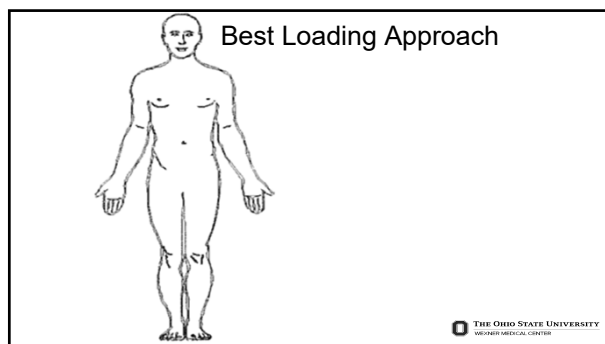
Psychological Health

Severe gluteal tendinopathy

- > psychological distress
- > waist girth & BMI
- < poorer quality of life

(Plinsinga 2018)

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The Rise and Stall of Isometrics

Rio et al (2015)

Patellar

Long vs short (Pearson et al. 2018)

Achilles (O'Neil et al. 2018)

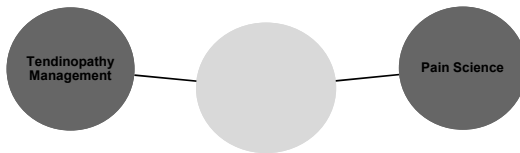
Plantar fascia (Riel et al. 2018)

Similarities and Pitfalls

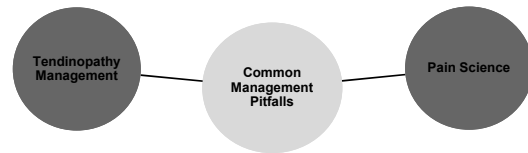
Both includes aspects of pain reduction and desensitization
Both are grounded in graded exposure

Pain science does not address poor tissue health

Tendon loading does not address poor pain beliefs



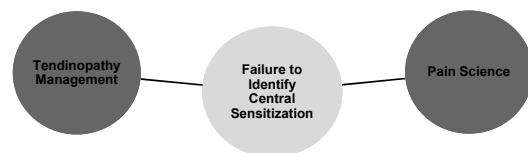
Malliaris et al. 2015



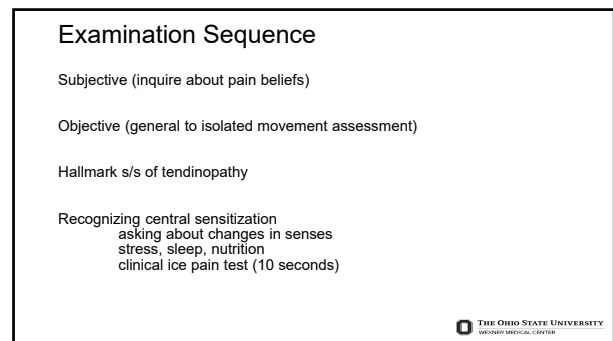
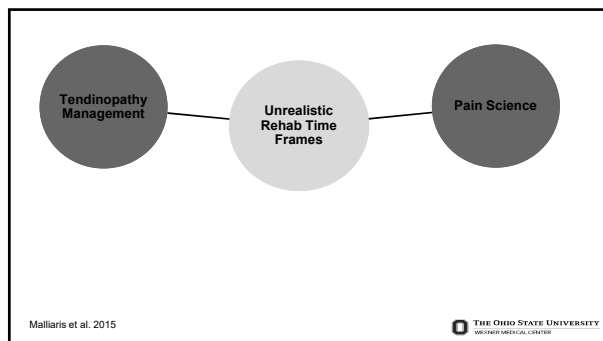
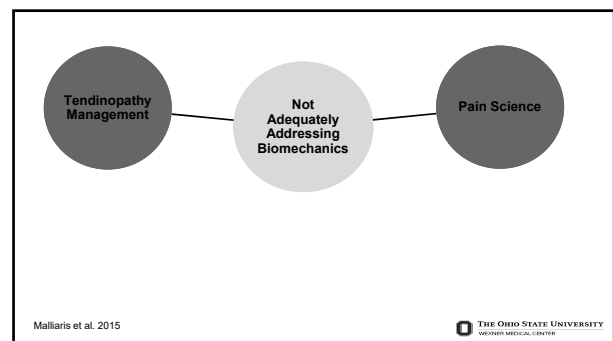
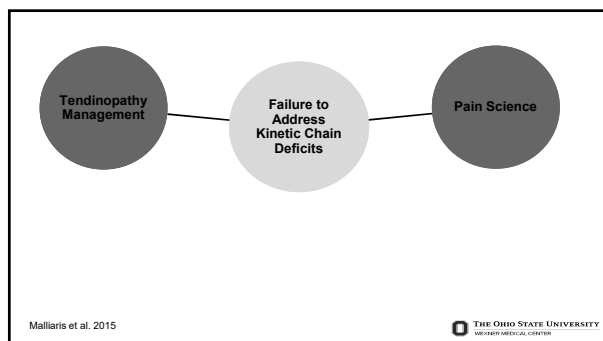
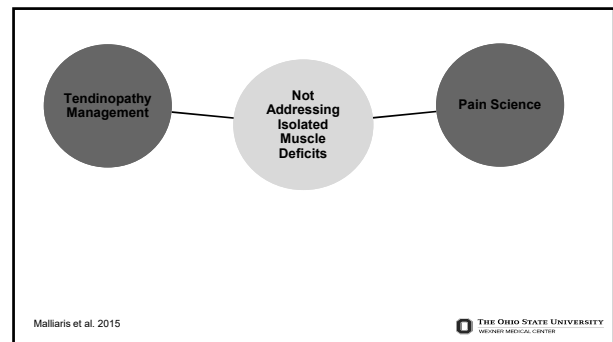
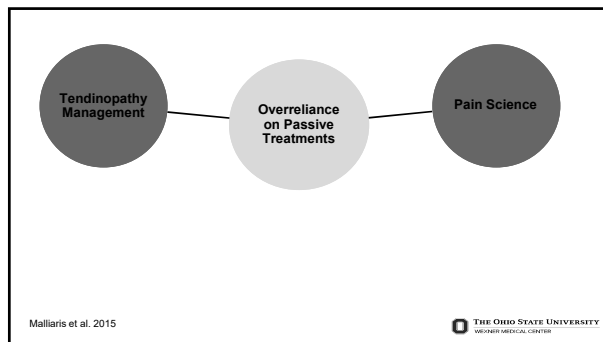
Malliaris et al. 2015



Malliaris et al. 2015



Malliaris et al. 2015



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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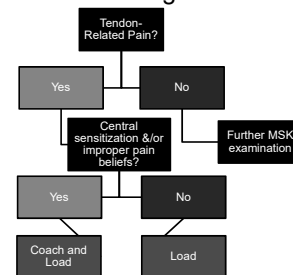
Outcome Measures

- TendonQ
- FABQ
- Pain Catastrophizing Scale
- Central Sensitization Inventory

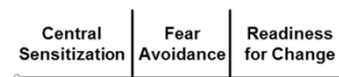
Comprehensive Rehab Program



Clinical Decision-Making



Coach and Load



Setting Expectations

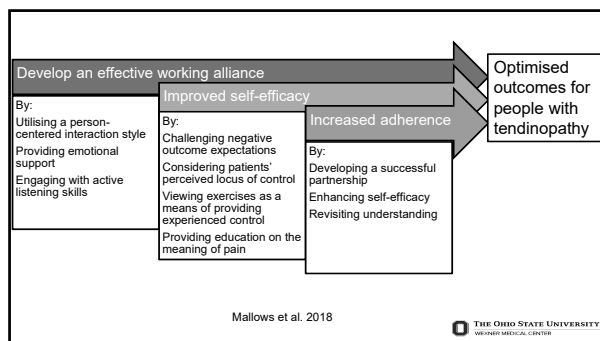
What may be considered best for tissue may not be optimal in terms of efficacy expectations

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)

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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

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Reactivity: "24 hour rule"

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Malliaris et al. 2015

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Load

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Reactivity: "24 hour rule"

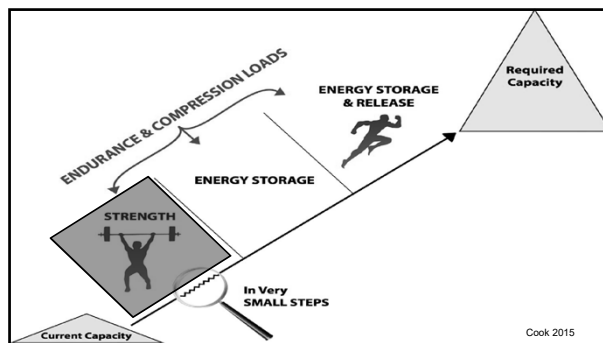
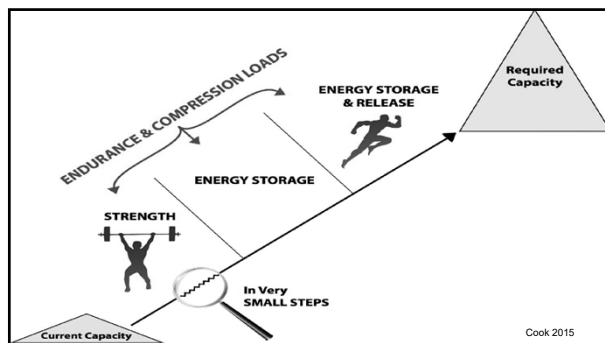
Reactive pain:
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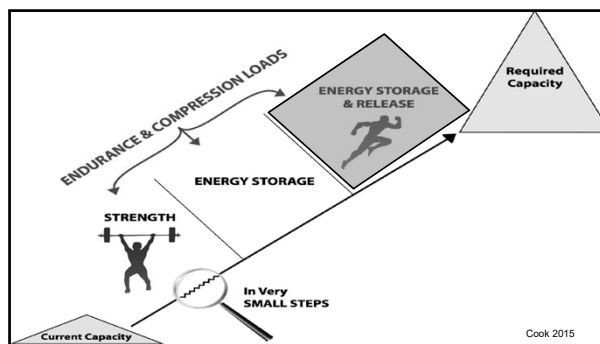
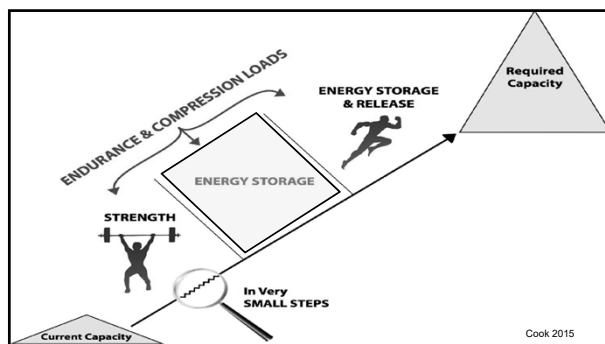
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Malliaris et al. 2015




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Thank You


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