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Outline

30 min: Updates in hip tendinopathy research
15 min: Differential diagnosis
10 min: Clinical assessment of tendinopathy
5 min: Questions

15 min: Explanation of postural strategies and patient education
15 min: Intervention Strategies – Manual Therapy
15 min: Intervention Strategies – Therapeutic Exercise
5 min: Conclusion
10 min: Questions
Learning Objectives

By the end of this presentation, audience members will be able to:

1. Understand the most current research related to common hip tendinopathies
2. Describe examination components in the evaluation of tendinopathy
3. Utilize exercise and manual therapy strategies for pain management and treatment of the entire kinetic chain
4. Develop a rehabilitation program that incorporates guidelines for tissue loading progression and return to activity

Hip tendinopathies warrant postural modification, patient education, and loading progression

Understanding of Tendinopathy Continues to Change
Hip tendinopathies warrant postural modification, patient education, and loading progression.

Understanding of Tendinopathy Continues to Change

1. Exercise and manual therapy are effective management approaches

1. Psychosocial factors may play a role in the severity of hip tendinopathies

What is Tendinopathy?

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

Scott et al. 2015
Relevant Factors

Extrinsic
- Sport – Training Errors
- Work – Improper equipment or repetitive tasks
- Overload or Underload

Intrinsic
- Metabolic
- Age
- Genetics

Hallmark Signs of Tendinopathy

Tendon pathology

Hallmark Signs of Tendinopathy
The Problem

Tendinopathy: 30% of all general practice musculoskeletal consultations

Gluteal tendinopathy is most common of all lower limb tendinopathies

Prevalence:
- Gluteal tendinopathy: 10 – 25%
- Psoas/hamstrings tendinopathy: unclear

Low Diagnostic accuracy of orthopaedic tests

Grimaldi et al. 2015
Anderson 2015
Mello 2016
Gluteal Tendinopathy

- Commonly present over age 40
- Affects more women than men (2.4 – 4:1) - up to 23.5 % women & 8.5 % men between ages 50 and 79
- Low incidence of bursal change
- Prevalence in people with low back pain: 35%

Psoas & Proximal Hamstrings

Tendinopathy

- Psoas disorders account for 12 – 36% of chronic groin pain in athletes
- Hamstrings: considerable variation in location of tendon pathology
  - common hamstring tendon 23%
  - biceps femoris 41%
  - semimembranosus 29%
  - semitendinosus 6%

Muscle Function

<table>
<thead>
<tr>
<th>Gluteal</th>
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Grimaldi & Fearon 2015
Grimaldi et al. 2015
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Grimaldi et al. 2015
Psoas & Proximal Hamstrings Tendinopathy

Andersen 2015
Goom et al. 2016
Grimaldi et al. 2015
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Gluteal Tendinopathy & Motor Control

• Differences in walking gait:
  • Greater hip adduction moment
  • Modified activation levels of hip abductor muscles
    o More sustained burst activity of posterior gluteus minimus & middle gluteus maximus
    o Muscle activation patterns were less variable within & between GT participants

Allison et al. 2018
**Inflammation**

<table>
<thead>
<tr>
<th>Classic inflammatory response</th>
<th>Rupture or laceration</th>
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*Cook et al. 2016*
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Collagen Dysrepair

Initially thought of as “kinking” of collagen fibers

Currently thought of as under-stimulation of tendon

Used as rationale for use of cross friction mobilization

Cook et al. 2016

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<th>Tendon Cell Response</th>
<th>Tenocytes maintain cellular environment</th>
<th>Cell activation</th>
<th>Proteoglycan expression</th>
<th>Changes in collagen types</th>
<th>Used to explain development of fibrocartilage</th>
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Cook et al. 2016
Tendon Pain Explained

Inflammation "Tendinitis"

Collagen Dysrepair "Tendinosis"

Tendon Cell Response

Neovascularization

Healthy tendons are relatively avascular
Neurovascular ingrowth
Conflicting evidence on neovessels
Used for diagnosis purposes and use of medical procedures

Cook et al. 2016

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Tendon Pain Explained

- Collagen Dysrepair: "Tendinosis"
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- Tendon Cell Response
- Neovascularization

Central Sensitization

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Plinsinga et al. 2015
Tompra et al. 2016
## Central Sensitization

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Plinsinga et al. 2015
Tompra et al. 2016
Clinical Relevance of Central Sensitization

Higher severity = lower quality of life (Coombes 2015)

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

Mediates treatment outcomes (Kim 2015)

Can be present with gluteal tendinopathy (French et al. 2019)

Current Concept: Psychological Considerations in Gluteal Tendinopathy

• Patients with more severe pain & disability demonstrated:
  o greater psychological distress
  o poorer quality of life
  o greater waist girth and BMI
  o no significant difference in hip abductor strength

Plinsinga et al. 2018

De-conditioned tendon

Fear avoidance

Episode of relative overuse

CNS scrutiny

Positive perception

Negative perception

Cycle of Chronicity

Pathway to Recovery

Positive outcome/output

Littlewood et al. 2013

Littlewood et al. 2013
Advantages of Pathophysiology Models

- Directs choice of medical interventions
- Patients often ask about the cause of their pain
- More commonly used among various medical providers
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

Current Concept: Continuum Model

Normal Tendon

Reactive Tendinopathy

Current Concept: Continuum Model

Reactive Tendinopathy
Current Concept: Continuum Model

Current Concept: Continuum Model

Current Concept: Continuum Model
Current Concept: **Continuum Model**

- Normal Function
- Reactive Tendinopathy

**Advantages of Continuum Model**

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

Cook 2015
Pitfalls of Continuum Model

- Clinical presentation can change
- More complex for patients to understand
- Still not used by wide range of medical professionals

Current Concept: **Tendon Compression**

<table>
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<tr>
<th>Type of Tendon Load</th>
<th>Biological Response</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Less than normal</td>
<td>1. Catabolic</td>
<td>↓ tensile strength</td>
</tr>
<tr>
<td>2. Normal</td>
<td>2. Catabolic + Anabolic</td>
<td>Homeostasis</td>
</tr>
<tr>
<td>3. Slightly greater than normal</td>
<td>3. Net Anabolic</td>
<td>↑ tensile strength</td>
</tr>
<tr>
<td>4. Much greater than normal</td>
<td>4. Net Catabolic</td>
<td>Failure to adapt</td>
</tr>
<tr>
<td>Compressive</td>
<td>Catabolic</td>
<td>↓ tensile strength</td>
</tr>
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- Grimaldi et al. 2015
### Differential Diagnosis

| Medical Conditions | Spine Conditions | Hip Conditions |

### Examination

**Screening**
- Medical conditions
- Lumbar spine contributions
- Central nervous system sensitization

**Orthopedic examination**
- AROM → PROM → Joint Assessment → Palpation → Special Tests

Assessing the effects of different lumbopelvic postures

### Recognizing Central Sensitization

Ask about changes in senses

Have patient self rate their quality of
- Stress
- Sleep
- Nutrition
- Physical activity

Patient Reported Outcome Measures
- TendonQ, FABQ, Central Sensitization Inventory
Special Tests

- Glute Tendon
  - Single leg stance
  - Lateral derotation test
  - Flexion-Abduction-External Rotation (FABER)
  - Hip adduction + resisted abduction

- Hamstrings
  - Chair bridge
  - Arabesque

- Psoas
  - No defined clinical test

Grimaldi et al. 2015
Guen et al. 2016

Clinical Assessment of Hip Pain

Video

Intervention
Current Concept: **Continuum Model**

Current Concept: **Reactivity: “24 hour rule”**

- **Reactive pain:** symptom aggravation following energy storage activities
- **Irritable:** provocation lasting greater than 24 hours
- **Stable:** settles within 24 hours

Current Concept: **Physical Therapy vs Surgery**

Surgery: not superior to sham surgery in midterm & long term

Tendon loading exercises: as effective as surgery in midterm & long term for pain, function & quality of life.

Surgery should be reserved for selected cases & only after a sufficiently long course (12 months) of evidence-based loading exercise has failed.

Chaloupkova et al. 2019
Current Concept: Gluteal Tendinopathy

Evidence for Exercise & Education

Education & Exercise (Mellor et al. 2018)

Comprehensive Education (Ganderton et al. 2018)

Current Concept: Psoas & Hamstrings

Not Well Studied

Interventions: Hip Exercise

Video
Interventions: Hip Manual Therapy

Video

Interventions: Education

Educational Interventions

Minimize compressive positions until irritability reduces

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<tr>
<td>Raising seat height when sitting</td>
<td>Avoid excessive stretching into hip extension</td>
<td>Avoid sitting too upright</td>
</tr>
<tr>
<td>Avoiding crossing legs</td>
<td>Avoid deep ranges of hip flexion</td>
<td>Use cushion to sit</td>
</tr>
<tr>
<td>Sleeping on back (knees supported)</td>
<td>Alter gait speed to comfortable pace</td>
<td>Avoid deep ranges of hip flexion</td>
</tr>
<tr>
<td>Avoid lying on painful side</td>
<td></td>
<td>Avoid excessive hamstrings stretching</td>
</tr>
<tr>
<td>Sleep with pillow between knees</td>
<td></td>
<td>Avoid excessive forward bending</td>
</tr>
<tr>
<td>Walk with wider gait mechanics</td>
<td></td>
<td>Alter gait speed to comfortable pace</td>
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# Educational Interventions

## Recommendations for exercise

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<th>Gluteal</th>
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<td>Midrange hip adduction isometrics</td>
<td>Midrange hip flexion isometrics</td>
<td>Midrange knee flexion isometrics</td>
</tr>
<tr>
<td>Reduced energy storage loading</td>
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<tr>
<td>Gradual hip abduction loading</td>
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<tr>
<td>Modify squat range (0-45 degrees) until irritability has reduced</td>
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Hip tendinopathies warrant postural modification, patient education, and loading progression

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