Scared to Move:
Kinesiophobia Following a Knee Injury

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Physiotherapy Alberta Connect + Learn
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#fear
OVERVIEW

1. Knee injuries
2. Kinesiophobia
3. Assessment tools
4. Rehab strategies
Knee Injuries
Epidemiology

This is on the rise!

- Sport injuries: 36%
- Knee injuries: 50%

Emery et al. (2006); Emery et al. (2009); Finch et al. (2015)
Knee Injuries
Consequences

**PHYSICAL**
- Pain and symptoms
- Muscle weakness
- Physical inactivity
- Increased adiposity
- Elevated risk of early-onset osteoarthritis

**PSYCHOLOGICAL**
- Fear of movement or re-injury
- Reduced knee confidence
- Difficulty coping

**SOCIAL**
- Isolation from sports
- Frustration and anxiety

Kvist et al. (2005); Podlog et al. (2013); Ajuied et al. (2014); Ardern et al. (2016); Toomey et al. (2017); Whittaker et al. (2017)
Knee Injuries

Psychological consequences
n=77

- Fear/anxiety
- Other emotions
- Coping
- Recovery expectations
- Identity
- Self-efficacy
- Motivation
- Perceptions
- Psychological readiness
- Confidence
- Beliefs
- Autonomy
- Catastrophizing pain
- Resilience

n=29
OVERVIEW

1. Knee injuries

2. Kinesiophobia

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Fear-Avoidance Model

Fig. 1. Cognitive-behavioral model of fear of movement/(re)injury.

Avoidance

Confrontation

Chronic low back pain

Lethem et al. (1983); Vlaeyen et al. (1995)
Fear-Avoidance Model

Catastrophizing

“Process in which anxious patients dwell on the most extreme negative consequences conceivable.”

Ellis (1962)

Fig. 1. Cognitive-behavioral model of fear of movement/(re)injury.

Lethem et al. (1983); Vlaeyen et al. (1995)
Fear-Avoidance Model

Kinesiophobia

“Excessive and irrational fear of movement and activity due to feeling vulnerable to pain or re-injury.”

Kori et al. (1990)

Lethem et al. (1983); Vlaeyen et al. (1995)
Fear-Avoidance Model

Avoidance Behaviour

“Performing a behavior which postpones or averts the presentation of an adverse event.”

Kazdin (1980)

Lethem et al. (1983); Vlaeyen et al. (1995)
Fear-Avoidance Model
Disability, Disuse, Depression

Various physical (e.g., decreased strength), psychological (e.g., depression), and social (e.g., isolation) consequences

Lethem et al. (1983); Vlaeyen et al. (1995)
Fear-Avoidance Model

Other Versions

Fig. 1. Revised fear-avoidance model incorporating the mediational role of functional self-efficacy.

Fig. 1. The fear-avoidance model of chronic pain. Based on the fear-avoidance model of Vlaeyen and Linton (2000), and the fear-anxiety-avoidance model of Assmundsen et al. (2004).

Leeuw et al. (2007); Woby et al. (2017)
Have you met Christina?

- Suffered an anterior cruciate ligament (ACL) tear from a classic non-contact plant and cut
- And now is hesitant of certain movements...
Fear-Avoidance Model
Knee Injuries

How do we apply this model to knee injuries?

ACL Injury
Instability

Fig. 1. Cognitive-behavioral model of fear of movement/(re)injury.

Lethem et al. (1983); Vlaeyen et al. (1995)
Kinesiophobia
Knee injuries

1. Greater fear immediately after injury
2. Reduces during rehabilitation
3. Increases with closer return to sport
Kinesiophobia
Knee injuries

1. Most common barrier for return to sports

2. Associated with less strength and lower self-efficacy

3. Present in individuals with knee osteoarthritis

Kvist et al. (2005); Gunn et al. (2017); Hart et al. (2015); Özmen et al. (2017); Cai et al. (2018); DiSanti et al. (2018)
OVERVIEW

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Does Christina have kinesiophobia?

• Filled out the Tampa Scale for Kinesiophobia (TSK)
Tampa Scale for Kinesiophobia

- Developed for individuals with **chronic low back pain**
- 17 items
- 4-point Likert scale
- Scores range from 17-68
  - Higher scores = higher fear of movement

Q1. “I’m afraid I might injure myself if I exercise”

1 = Strongly disagree
2 = Disagree
3 = Agree
4 = Strongly agree
Tampa Scale for Kinesiophobia

Knee Injuries

Pain intensity + Fear-avoidance beliefs

Self-reported function

Pain catastrophizing

Not validated in knee injury populations!

George et al. (2012); Hartigan et al. (2013); Gunn et al. (2017); Cai et al. (2019); Odele et al. (2019)
Little is known about kinesiophobia in the acute injury stage, especially in young athletes.

To assess the relationship between self-reported kinesiophobia and bilateral knee strength or knee balance between youth within 3 months of a sport-related knee injury and uninjured controls.
Convenience sample of 88 young individuals (10-20 years old)

44 injured individuals:
Suffered a sport-related knee injury within the last 3 months

- Clinical diagnosis of an intra-articular tibiofemoral or patellofemoral injury
- Required medical attention
- Disrupted sport participation

44 uninjured controls:
Matched on age-, sex-, and sport

- No previous knee injury
Edmonton PrEOA Study

Methods

Exposure:
• Sport-related knee injury

Outcome:
• **Kinesiophobia**: Tampa Scale for Kinesiophobia (TSK)

Covariates:
• **Strength**: Isokinetic dynamometer
• **Balance**: Y-balance test (YBT)
Edmonton PrEOA Study

Methods

1. Summarize descriptive statistics for participant characteristics and outcomes
   ✓ Median (range), proportion (95%CI), or matched-pair difference (95%CI)

2. Assess the relationship between TSK and bilateral knee strength or YBT in injured youth and uninjured controls
   ✓ Logistic regression → odds of having high kinesiophobia (TSK score >37) by study group (odds ratio; 95%CI)
   ✓ Multivariable regression → association between TSK score and strength or YBT (95%CI)

Vlaeyen et al. (1995)
Edmonton PrEOA Study

Results

Participant Characteristics:

- Median age was 17 years (range 10-20)
- 65% were girls
- 36% played soccer as their main sport

Injured Group:

- Median time since injury was 1.5 months (range 0.3-4.2)
- 50% suffered an ACL injury
## Edmonton PrEOA Study

### Results

<table>
<thead>
<tr>
<th></th>
<th>Injured Group</th>
<th>Uninjured Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n=44)</td>
<td>(n=44)</td>
</tr>
<tr>
<td><strong>TSK score</strong></td>
<td>41 (28-56)</td>
<td>35 (25-47)</td>
</tr>
<tr>
<td><strong>Index quadriceps strength</strong></td>
<td>4.61 Nm/kg (0.99-7.19)</td>
<td>6.14 Nm/kg (3.68-8.35)</td>
</tr>
<tr>
<td><strong>Index hamstrings strength</strong></td>
<td>3.49 Nm/kg (0.92-6.33)</td>
<td>4.41 Nm/kg (2.44-7.25)</td>
</tr>
<tr>
<td><strong>Index balance</strong></td>
<td>76 cm (64-86)</td>
<td>78 cm (67-94)</td>
</tr>
</tbody>
</table>
Edmonton PrEOA Study

Results

<table>
<thead>
<tr>
<th>Study Group</th>
<th>Low Kinesiophobia (TSK ≤37)</th>
<th>High Kinesiophobia (TSK &gt;37)</th>
<th>OR (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uninjured</td>
<td>29</td>
<td>15</td>
<td>4.8 (1.6, 14.0)</td>
</tr>
<tr>
<td>Injured</td>
<td>14</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

The odds of having high kinesiophobia was **4.8 times** greater in the injured than uninjured group.

No associations between kinesiophobia and strength or balance were found.
May be present **early** after injury!

Addressing physical outcomes may not be sufficient to reduce kinesiophobia

Stay tuned for more research!

Le et al. (2019, in press)
What does Christina’s TSK score mean?

- Scored 45 out of 68
- Above the ‘high kinesiophobia’ cut-off
OVERVIEW

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Rehab Strategies

Graded activity

- Use **activity quotas** to progress exercise (vs pain)
- Focus on **functional** activities (e.g., work or sport demands)

Graded exposure

- Use **hierarchy of activities** to progress exercise
- Focus on **feared** activities
- Includes addressing irrational beliefs

**Disclaimer**
Rehab Strategies

Graded Activity and Graded Exposure for Persistent Nonspecific Low Back Pain: A Systematic Review

Luciana G. Macedo, Rob J.E.M. Smeets, Christopher G. Maher, Jane Latimer, James H. McAuley

Some evidence for graded activity compared to minimal intervention (0-12 months):
✓ Reduced pain
✓ Reduced disability
Treating Christina...

- Was a pain in the butt
- Fear with plant and cut
- How can we help tackle her fear?
Rehab Strategies

45° plant and cut

Graded activity

Graded exposure
# Rehab Strategies

## Graded Activity

<table>
<thead>
<tr>
<th>Baseline</th>
<th>25%</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>3x1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal speed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3x3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal speed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3x5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal speed</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>3x8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal speed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3x10</td>
<td></td>
<td></td>
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<tr>
<td>Normal speed</td>
<td></td>
<td></td>
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</tbody>
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Progress using Activity Quotas!

- Fordyce et al. (1982); Kernan & Rainville (2007); George et al. (2010); Macedo et al. (2010)
Rehab Strategies
Graded Exposure

• Reframe and reconceptualize feared experiences
• Explain fear-avoidance model using your patient’s experiences
• Discuss expectations

Educate, educate, educate!

Vlaeyen et al. (2002); George et al. (2010); Macedo et al. (2010)
Rehab Strategies

Graded Exposure

“What activities would you be doing if you didn’t have fear?”

Set SMART Activity Goals!
Rehab Strategies
Graded Exposure

Create Hierarchy of Feared Activities

Patient-led!!

Vlaeyen et al. (2002); George et al. (2010); Macedo et al. (2010)
Rehab Strategies
Graded Exposure

1. Start with least feared activity
2. Physiotherapist demonstrates the activity
3. Patient replicates the activity
4. With repetition, the patient realizes they can complete the activity without harm
5. Move to the next feared activity

Vlaeyen et al. (2002); George et al. (2010); Macedo et al. (2010)
Rehab Strategies
Christina’s Graded Exposure

Deceleration
Rehab Strategies
Christina’s Graded Exposure

1-foot jumps
Deceleration
Rehab Strategies

Christina’s Graded Exposure

- 45° plant and cut with pause
- 1-foot jumps
- Deceleration
Rehab Strategies
Christina’s Graded Exposure

- 45° plant and cut at run/sprint
- 45° plant and cut with pause
- 1-foot jumps
- Deceleration
Rehab Strategies

Key Messages

✓ Educate!!
✓ Have honest conversations
✓ Individualize treatment plans
✓ Provide coping strategies: goal setting, relaxation, mental imagery, positive self-talk
The Bigger Picture

Optimize health-related quality of life

Promote a happy, healthy, and active life!

Fig. 1. Cognitive-behavioral model of fear of movement/(re)injury.
Assess for kinesiophobia **early** after a knee injury and **throughout** rehab

Manage kinesiophobia with **education** and **graded exposure**

Reduce kinesiophobia during rehab because it may **promote long-term health**
PrEOA Study!

- Looking for healthy young athletes
- No previous knee injuries
- Age 11-19
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