

# Psychosocial and Environmental Barriers to Recovery after Knee

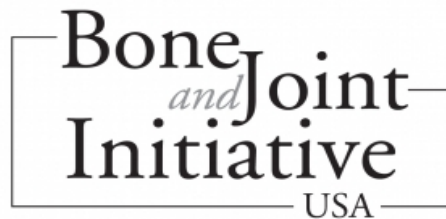
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# Conflict of Interest Disclosure

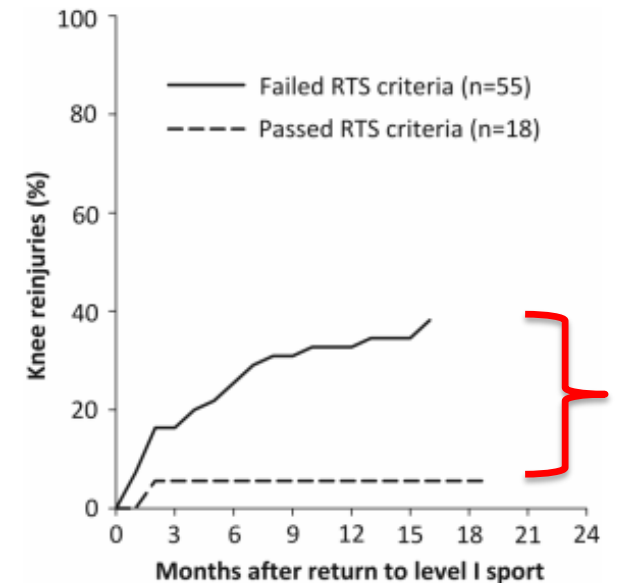
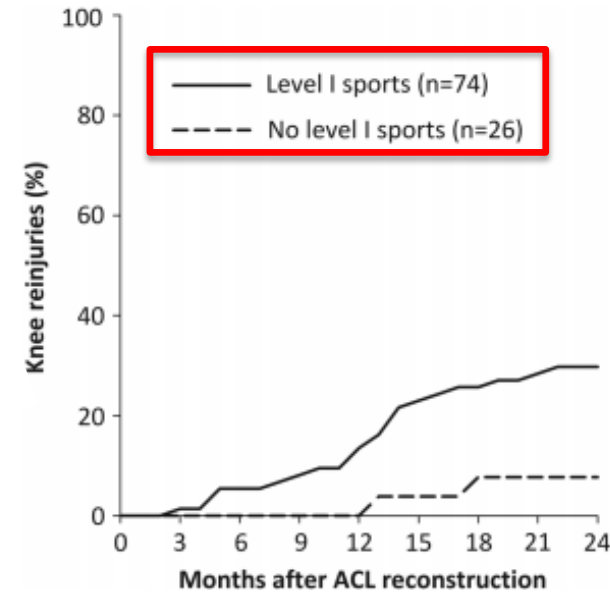
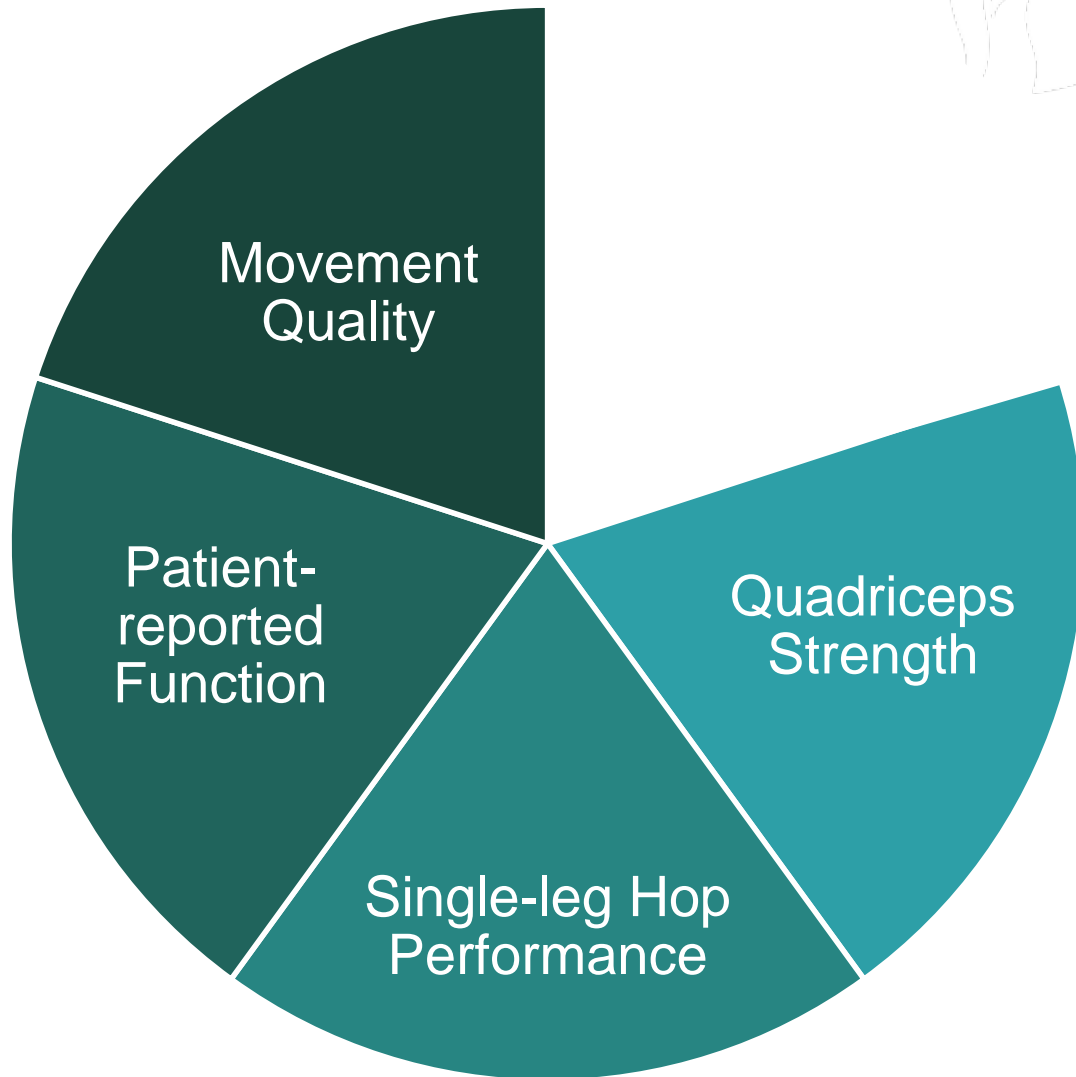
- The presenter has no conflicts of interest to disclose
- Research support has been provided by:



# Objectives

1. Discuss psychological barriers of return to sport
2. Identify evidence-based psychological assessments
3. Explore evidence-based psychological interventions
4. Classify sex differences in psychological outcomes

# Hallmarks of Effective Secondary Prevention



# What Is A Successful Outcome?

1. Return to Function and Psychological Readiness



2. Return to Sport or Desired Physical Activity



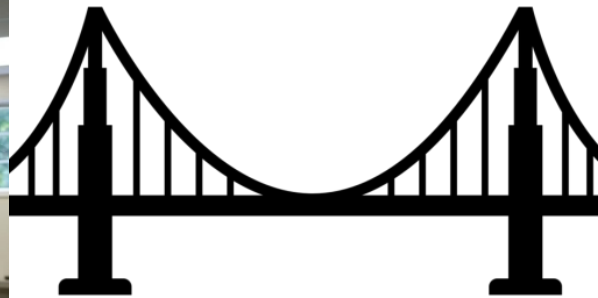
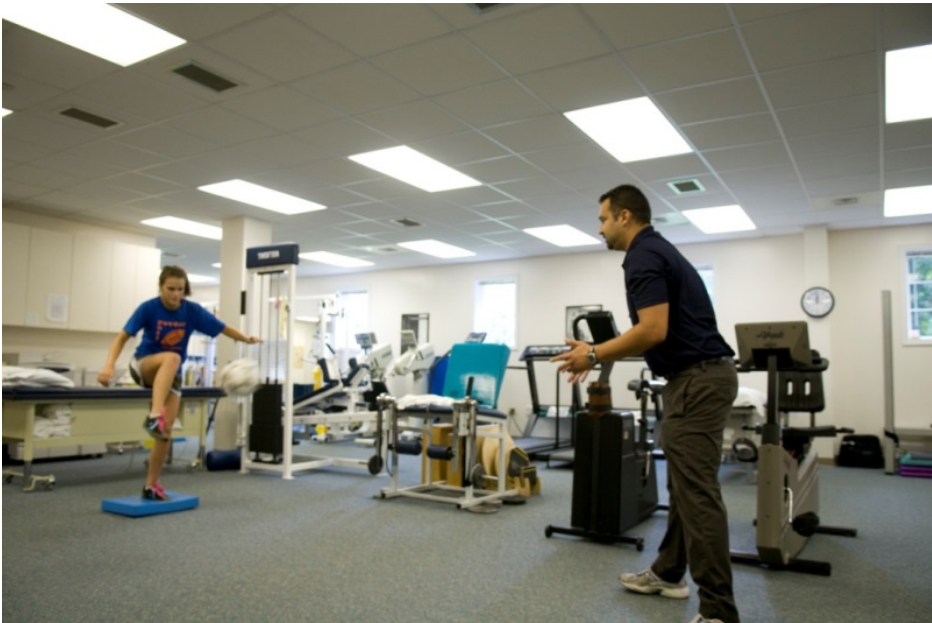
3. No Subsequent Re-Injury or Contralateral Injury



4. Minimal Risk of Long Term Complication

# The Big Idea

- We talked to 10 patients who had not yet been cleared:
  - Perceived barriers to recovery and return to activity after ACLR
  - Positive rehabilitation factors that facilitate return to activity
  - Negative perceptions of rehabilitation and return to activity.



# Barriers for Return to PA

## Barriers for Returning to PA

### Physical

- Limited strength/mobility
- Pain/discomfort

### Psychological

- Uncertainty of progress
- Lack of motivation for PT
- Typical activities become atypical
- Fear of reinjury
- Uncertainty of recovery

### Social

- Direct social comparison
- Role adjustment

# Positive and Negative Rehabilitation Factors



## Positive Recovery Factors

- Knowledge of injury/recovery
- Trusting relationship w/ clinicians
- Positive peer role models

## Negative Recovery Factors

- Negative reactions by family/peers
- Lack of attention from PT/surgeon
  - No mention of goals
  - Attention divided
- Generalized approach to treatment



# We Weren't the Only People with this Idea

Psychological

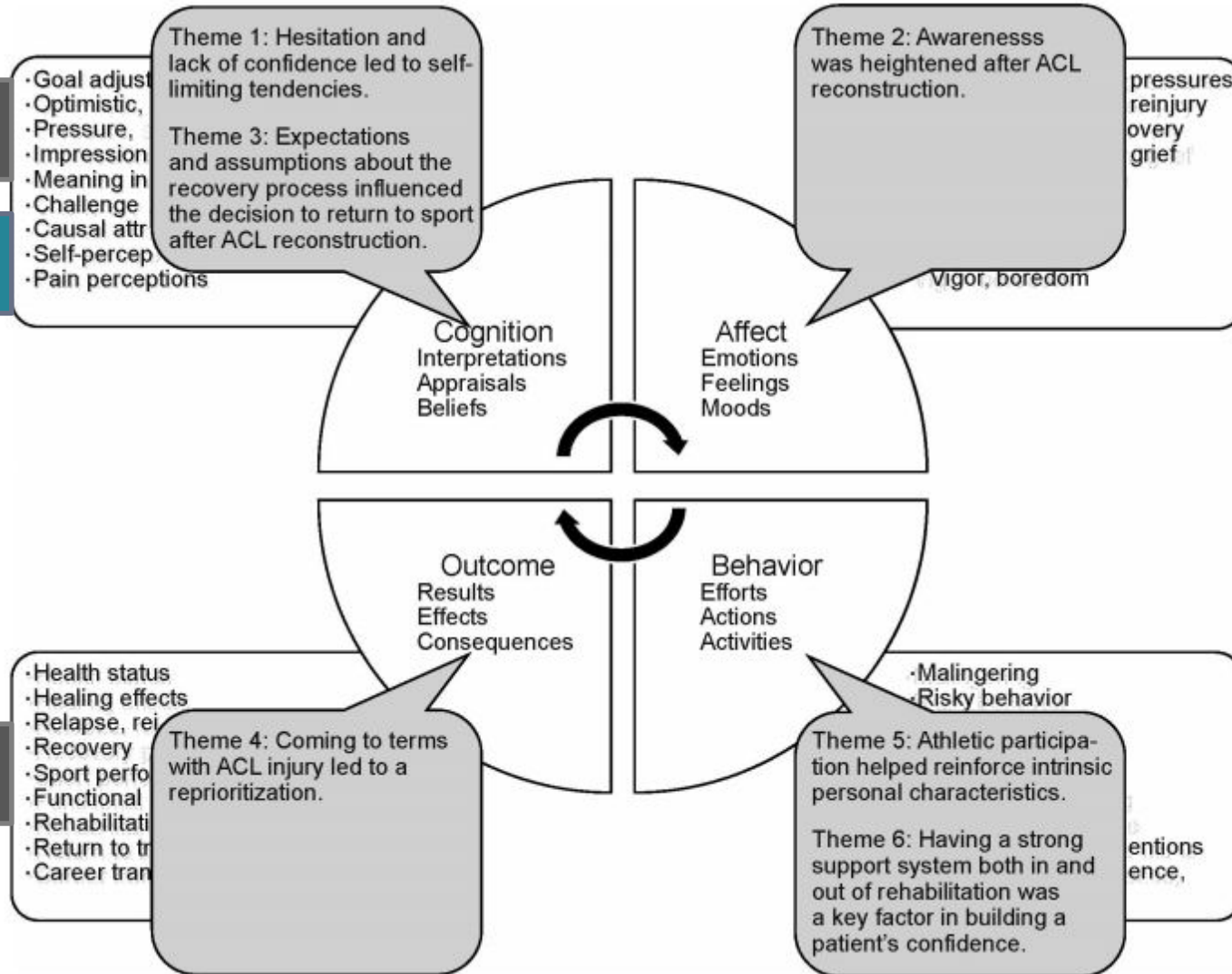
Physical

Psychological

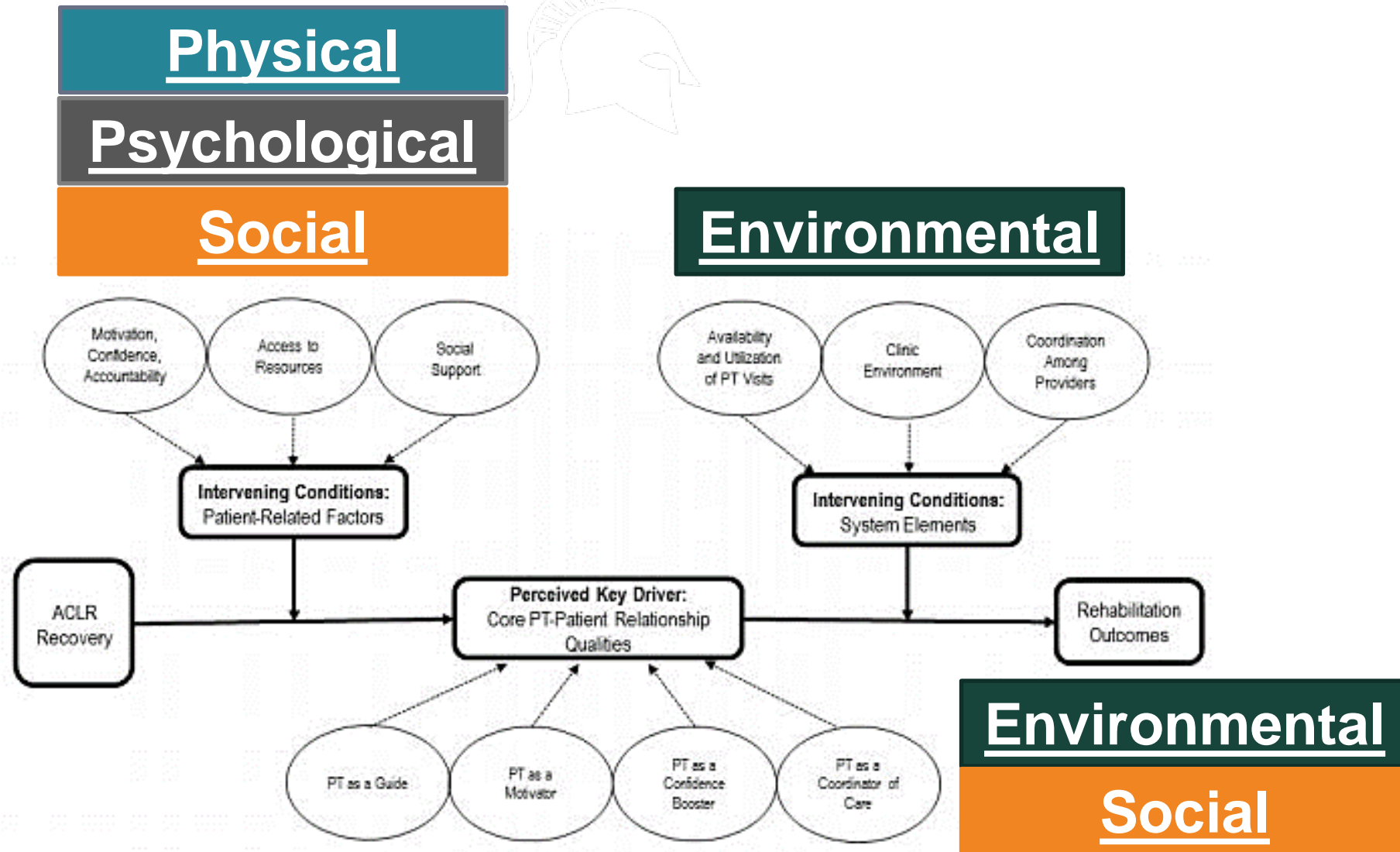
Psychological

Psychological

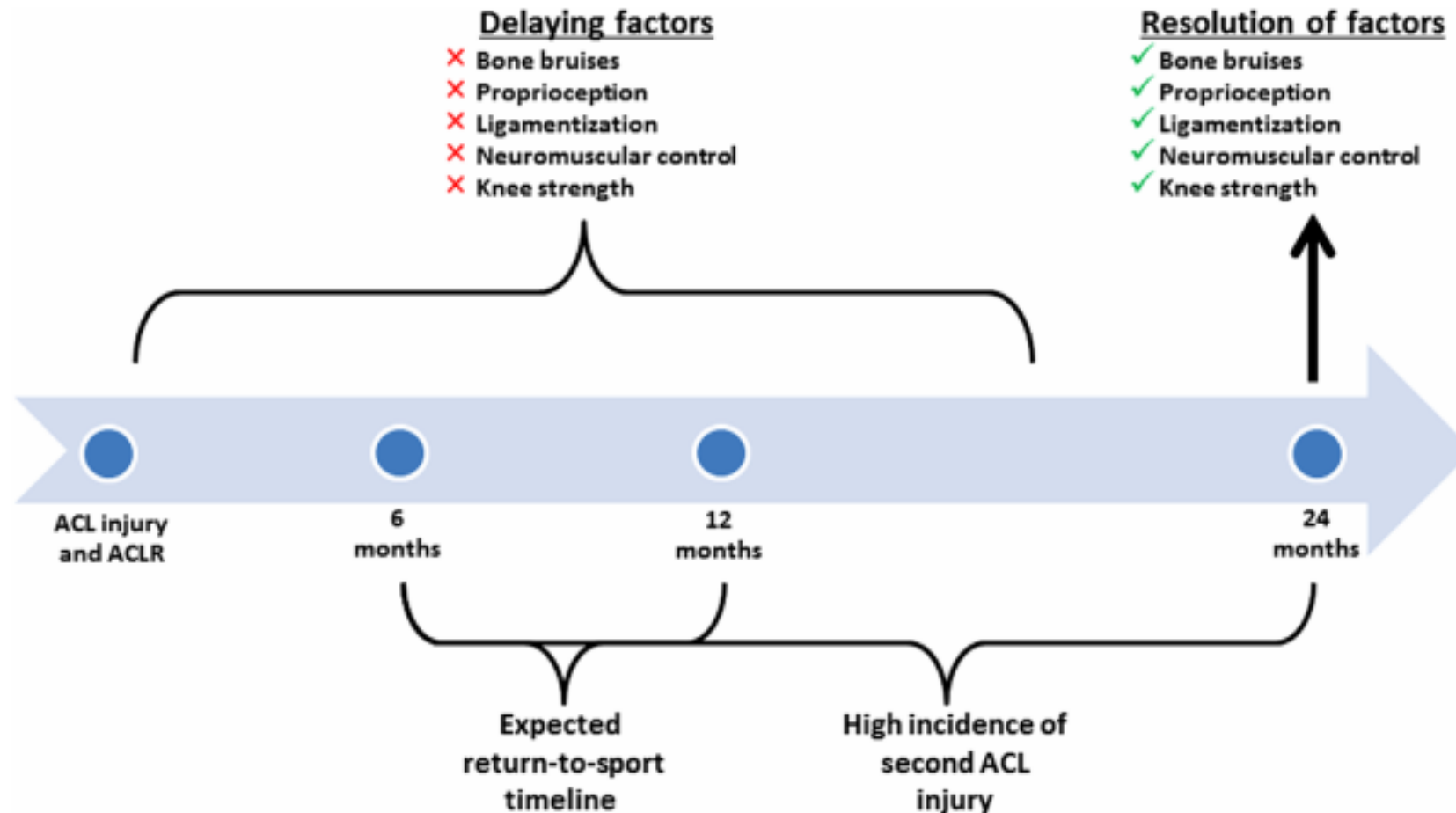
Social



# We Weren't the Only People with this Idea (Take 2)

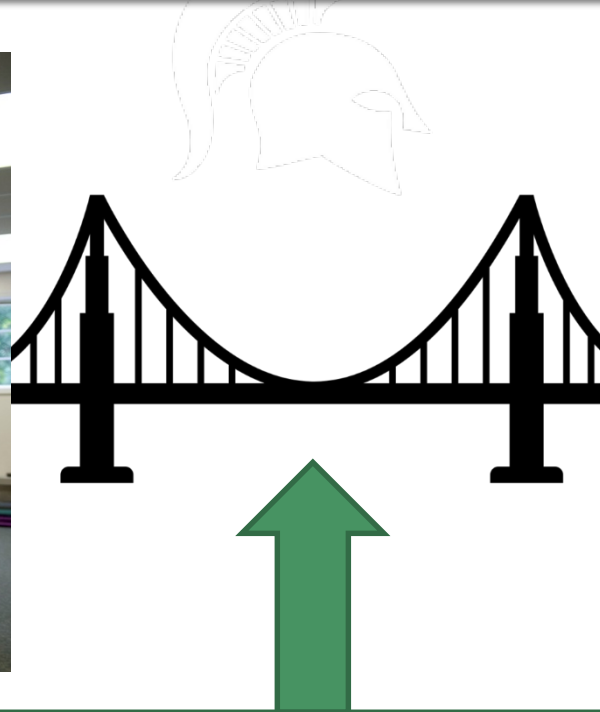


# What Is A Successful Outcome?



Psychological Readiness for Return to Activity

# Take Home Message



Actively addressing fear of re-injury and providing adequate social support may aid young patients in overcoming common barriers to rehabilitation progress after ACLR.

**Table 2****Psychological Variables and Associations in Anterior Cruciate Ligament Recovery**

Study	Psychological Variable	Effects
Tripp et al <sup>23</sup> Mainwaring et al <sup>24</sup> Smith et al <sup>26</sup> Morrey et al <sup>27</sup> Udry et al <sup>33</sup>	↑ Psychological distress	↑: Emotional disturbance, anxiety, depression, mood disturbance, pain intolerance, catastrophizing ↓: Self-esteem
Thoméé et al <sup>34</sup> Thoméé et al <sup>36</sup> Thoméé et al <sup>37</sup> Mendonza et al <sup>39</sup>	↑ Self-efficacy	↑: Activity level, KOOS scores, return to sport, knee-related QOL, single-leg hop test, internal LOC, adherence to rehabilitation ↓: Symptoms
Ardern et al <sup>7</sup> Nyland et al <sup>35</sup> Thoméé et al <sup>37</sup>	↑ Locus of control	↑: KOOS scores, IKDC scores, satisfaction, mental health, physical function, social function, knee function, self-efficacy, return to sport at 1 year
Brewer et al <sup>25</sup> Stephan and Brewer <sup>38</sup> Brewer et al <sup>40</sup>	↑ Athletic identity with injury	↑: Adherence ↓: Self-concept, self-esteem

↑ = increased

↓ = decreased

IKDC = International Knee Documentation Committee, KOOS = Knee Injury and Osteoarthritis Outcome Score, LOC = locus of control, QOL = quality of life

**Table 1****Psychological Terms and Definitions**

Term	Definition
Self-concept	Multidimensional construct that refers to the general way one perceives oneself
Self-efficacy	Belief in one's ability to succeed in a particular situation or execute actions
Self-esteem	Overall sense of self-worth and personal value
Locus of control	Belief in the relationship between action and outcome; feeling like one has control
Athletic identity	The degree to which one identifies with the athlete role
Psychological or emotional distress	Upsetting or intrusive feelings that prevent a person from optimal performance
Catastrophizing	Assuming the worst case scenario; interpreting any negative stimuli as disaster



# BARRIERS TIMELINE

Psychological  
Distress/  
Emotions



Fear of  
Movement



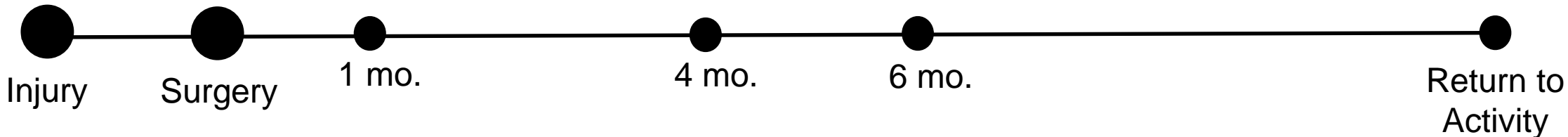
Self Efficacy



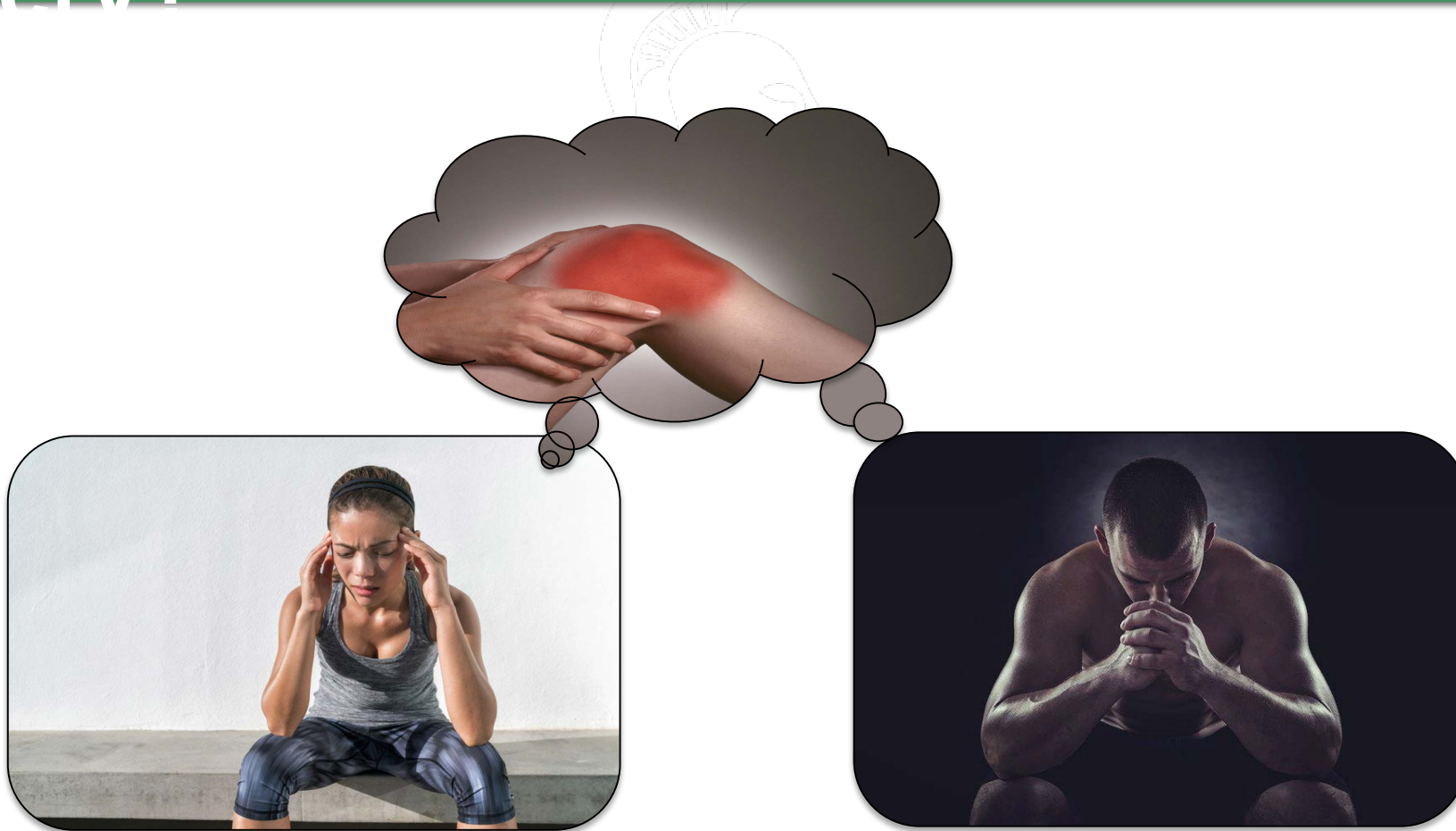
Fear of  
reinjury



Altered  
Athletic  
Identity



# ... But How Do We Assess Psychological Recovery?





# Patient Reported Outcomes

1. Knee Self Efficacy Scale

(K-SES)

2. Tampa Scale of Kinesiophobia-11 (TSK-11)

3. Anterior Cruciate Ligament Return to Sport after Injury Scale (ACL-RSI)

Fear

Psychological Distress/  
Emotions

Self Efficacy



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# Patient Reported Outcomes

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Fear

Psychological Distress/  
Emotions

Self Efficacy



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# K-SES – Self Efficacy



Validated in ACL injured populations

- (age =  $30.1 \pm 9.1$  years)



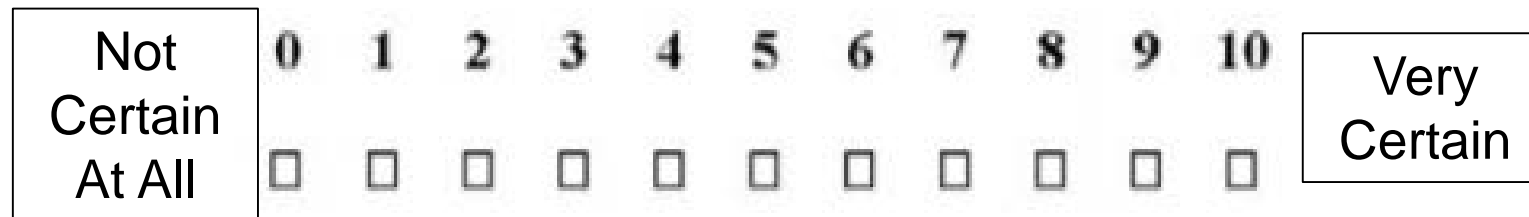
Acceptable Test-Retest Reliability

- ( $ICC = 0.75$ )

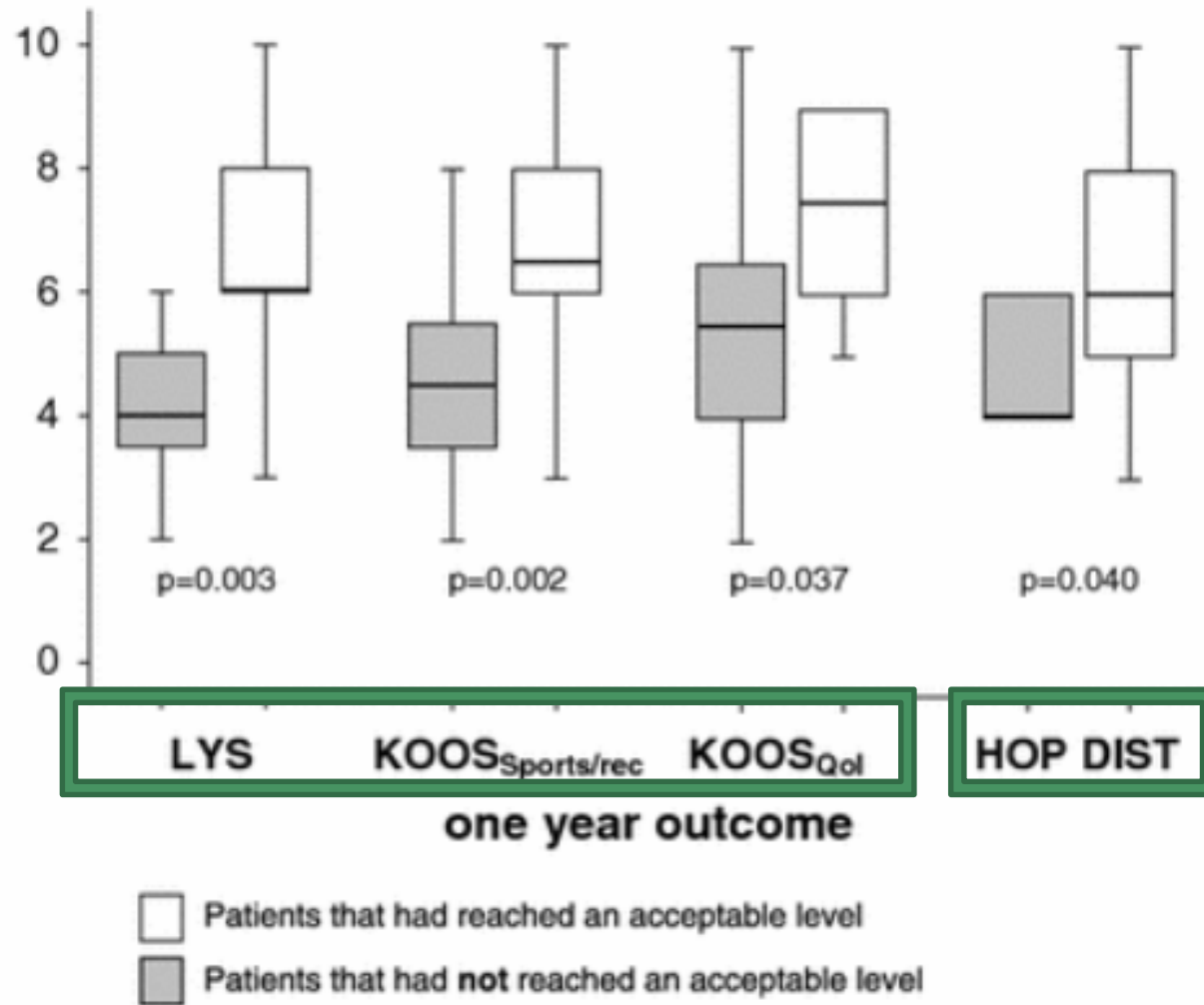


No Accepted Cut-off Scores

ADLs, Exercise Activities, Sport Activities, Future Knee Function



# Why Improve Self-Efficacy?



- ↑ rehabilitation compliance
- Improved rates of return to activity

# Patient Reported Outcomes

1. Knee Self Efficacy Scale (K-SES)

Fear

Psychological Distress/  
Emotions

2. Tampa Scale of Kinesiophobia-11 (TSK-11)

Self Efficacy

3. Anterior Cruciate Ligament Return to Sport after Injury Scale (ACL-RSI)



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# TSK-11 – Kinesiophobia



Not validated in ACL populations

- Traditionally for LBP or chronic pain



Acceptable Test-Retest Reliability

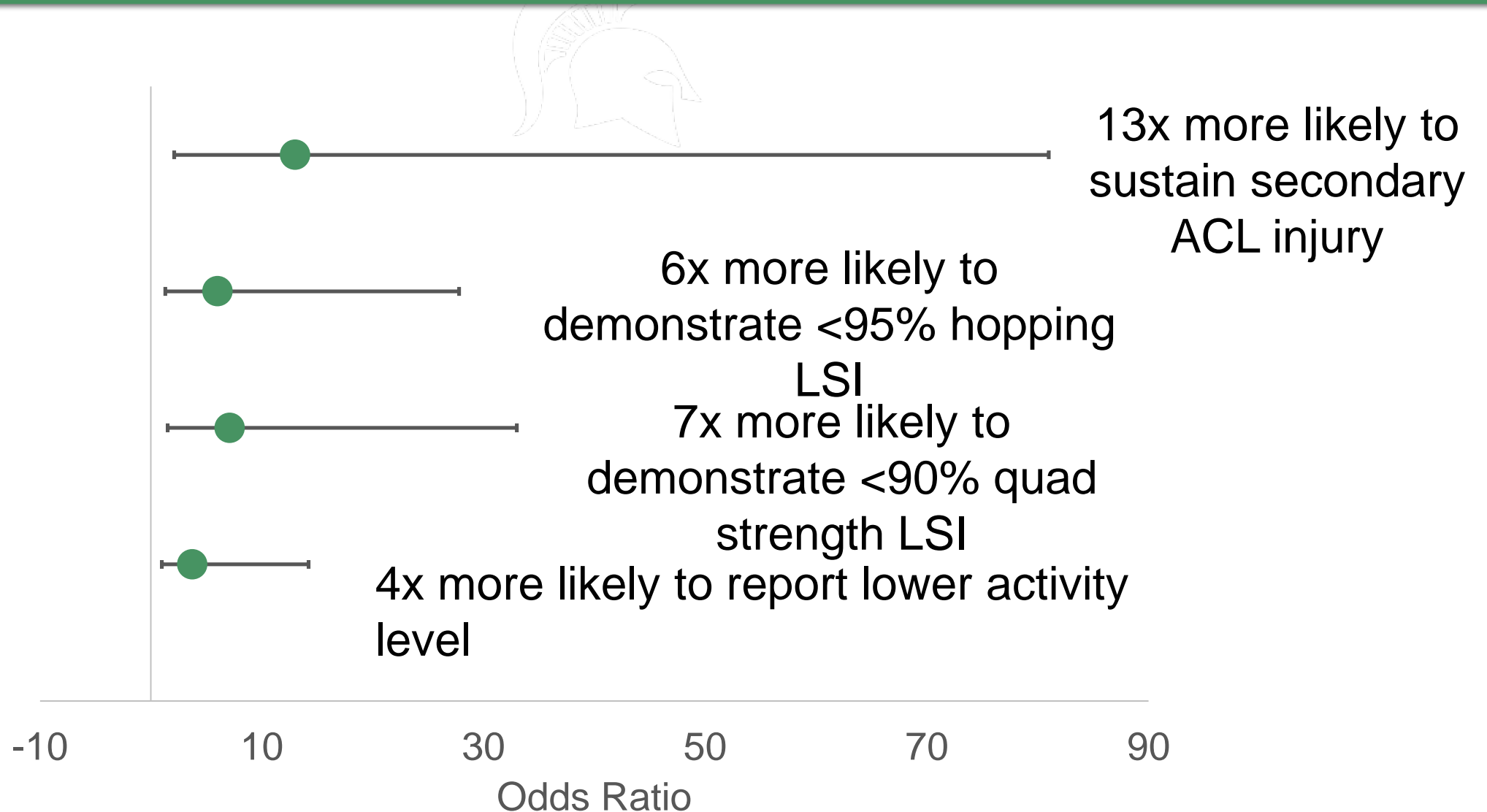
- ( $ICC = 0.81$ )



Score  $<17$  at 4 months post ACLR



# Why is Fear of Movement a Problem?



# Patient Reported Outcomes

1. Knee Self Efficacy Scale (K-SES)

2. Tampa Scale of Kinesiophobia-11 (TSK-11)

3. Anterior Cruciate Ligament Return to Sport after Injury Scale (ACL-RSI)

Fear

Psychological Distress/  
Emotions

Self Efficacy



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# ACL-RSI – Psychological Readiness

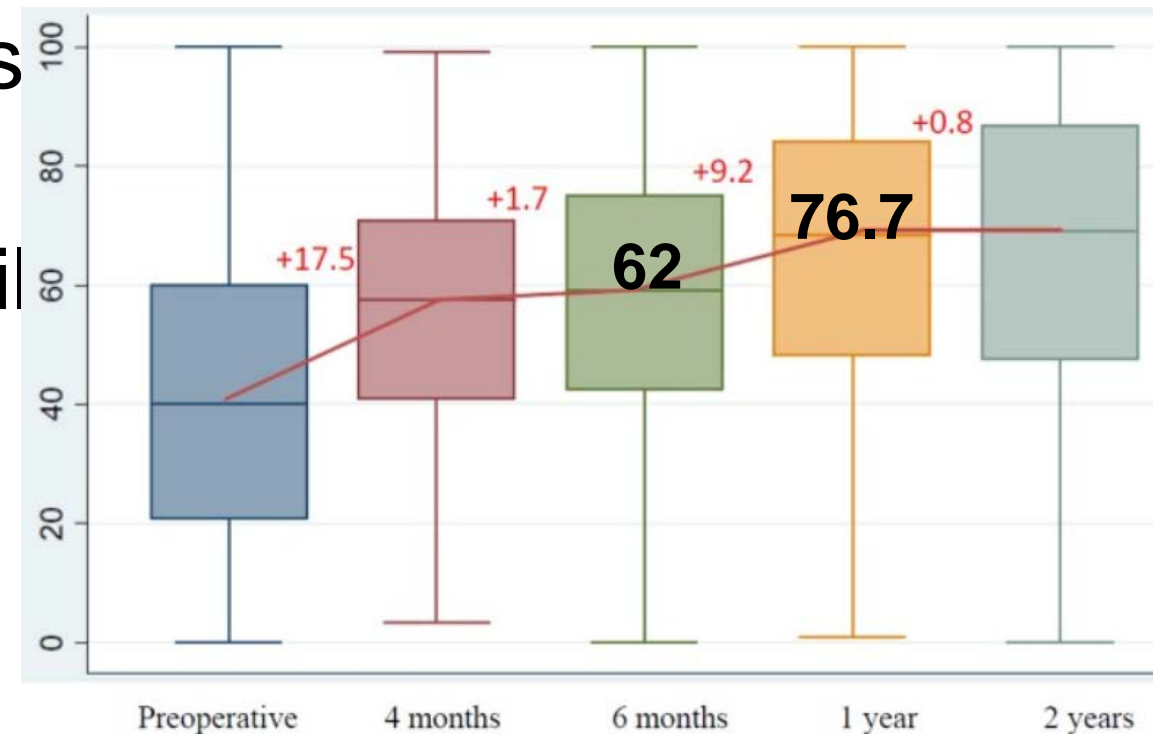


✓ Validated in ACLR populations

✓ Excellent Test-Retest Reliability  
▪ ( $ICC > 0.90$ )

✓ Prospective and evidence based cut points

- ACL-RSI Score = **62** @ 6 months (RTP)
- ACL-RSI Score = **76.7** @ 12 months (reinjury)



(Mcpherson et al. 2019, Webster et al. 2018, Sadeqi et al. 2018)

# Why Should Patients be Psychologically Ready?



TABLE 2  
Univariate Regression to Identify Factors Associated With Psychological Readiness  
(ACL-RSI Scores) Among All 635 Patients<sup>a</sup>

Independent Variable	$\beta$ Coefficient (95% CI)	<i>P</i> Value
Age	-0.2 (-0.4 to -0.01)	.04
Sex	5.8 (2 to 10)	.002
Time between ACL injury and surgery	-0.1 (-0.1 to -0.02)	.006
Preinjury sport frequency	5.4 (2 to 9)	.003
Limb symmetry index	0.5 (0.3 to 0.6)	.001
Anterior-posterior laxity	-0.6 (-1.4 to 0.2)	.2
IKDC subjective form (symptoms/function)	1.3 (1.1 to 1.4)	.001

<sup>a</sup>For categorical outcomes, a positive  $\beta$  coefficient is associated with male sex and the "high" category of preinjury sports frequency (4-7 days/week). ACL, anterior cruciate ligament; ACL-RSI, Anterior Cruciate Ligament–Return to Sport After Injury; IKDC, International Knee Documentation Committee.

\*\*\*Greater Risk of Secondary ACL Injury and Worse Return to Play

# Patient Reported Outcomes

## Timeline

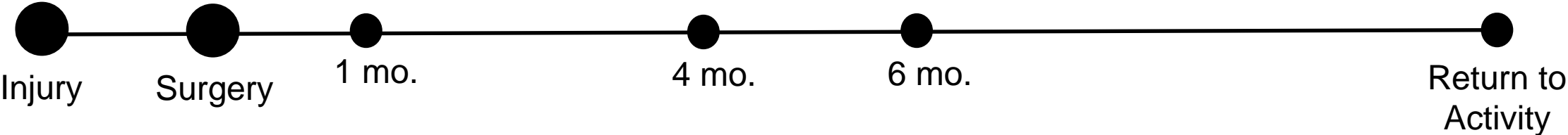
K-SES



TSK-11



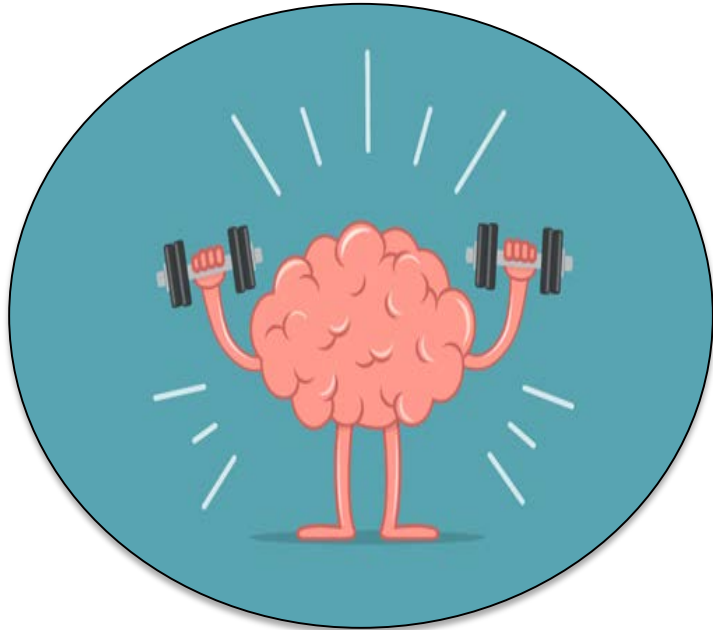
ACL-  
RSI



# ... But How Do We Address Psychological Recovery?



# Guided Imagery Continued



Cognitive/Kinesthetic Imagery =  
Imagine Exercises  
i.e. “quadriceps strength increasing”



Motivational imagery =  
set goals, increase  
confidence  
i.e. “performing at peak in 3 months  
time”

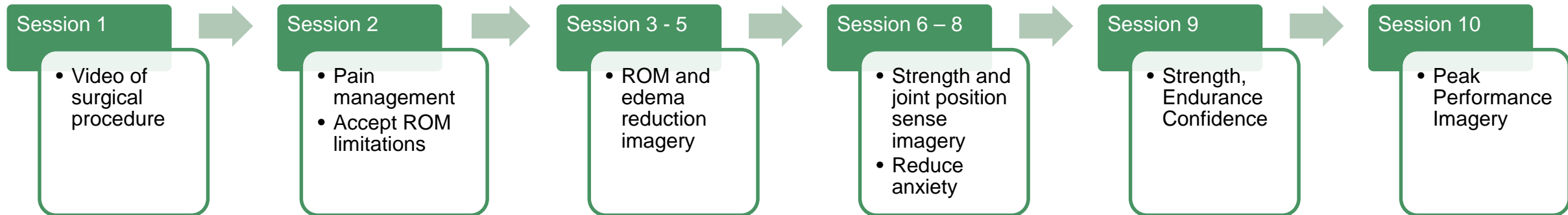


Healing Imagery =  
Imagine Physiological  
Processes  
i.e. “interior of joint returning to normal”

# Progressive Relaxation and Guided Imagery

## Intervention:

- Twice a month throughout rehab
- Breath-assisted relaxation and guided imagery



↑ Knee Extension Strength

↓ Reinjury Anxiety

↓ Pain

(Treatment Compared to Placebo and Healthy Controls)

# Other Intervention Considerations

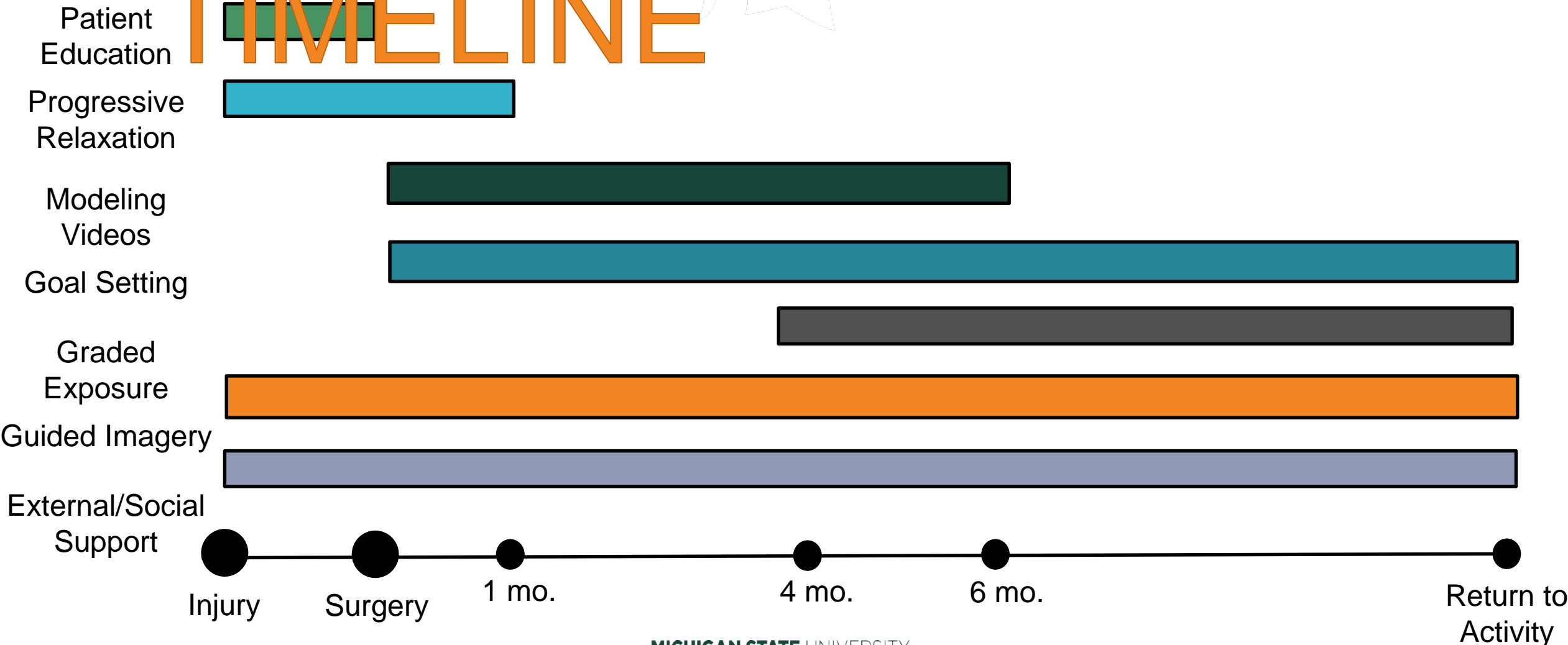
Intervention	Barrier
Cognitive Behavioral Therapy	↓ fear of reinjury, ↑ self-efficacy
Graded Exposure/Activity	↓ fear of reinjury
Goal Setting	↑ self-efficacy
<b>Modeling Exercise Videos</b>	<b>↑ self-efficacy</b>

- Models
  - age and sex specific
- Crutch Usage

- Activities of Daily Living
  - stairs climbing, walking
- Knee ROM exercises

# INTERVENTIONS

## TIMELINE





# Sex Differences

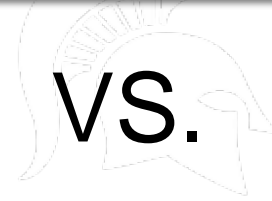


Women  
Demonstrate...

- Lower Self-Efficacy
- Greater Anxiety
- Self-Worth
  - **Physical Self-Concept** vs. Athletic Identity

# High-Risk Movement Patterns in Female Patients

Low Fear



High Fear

Optimal Landing



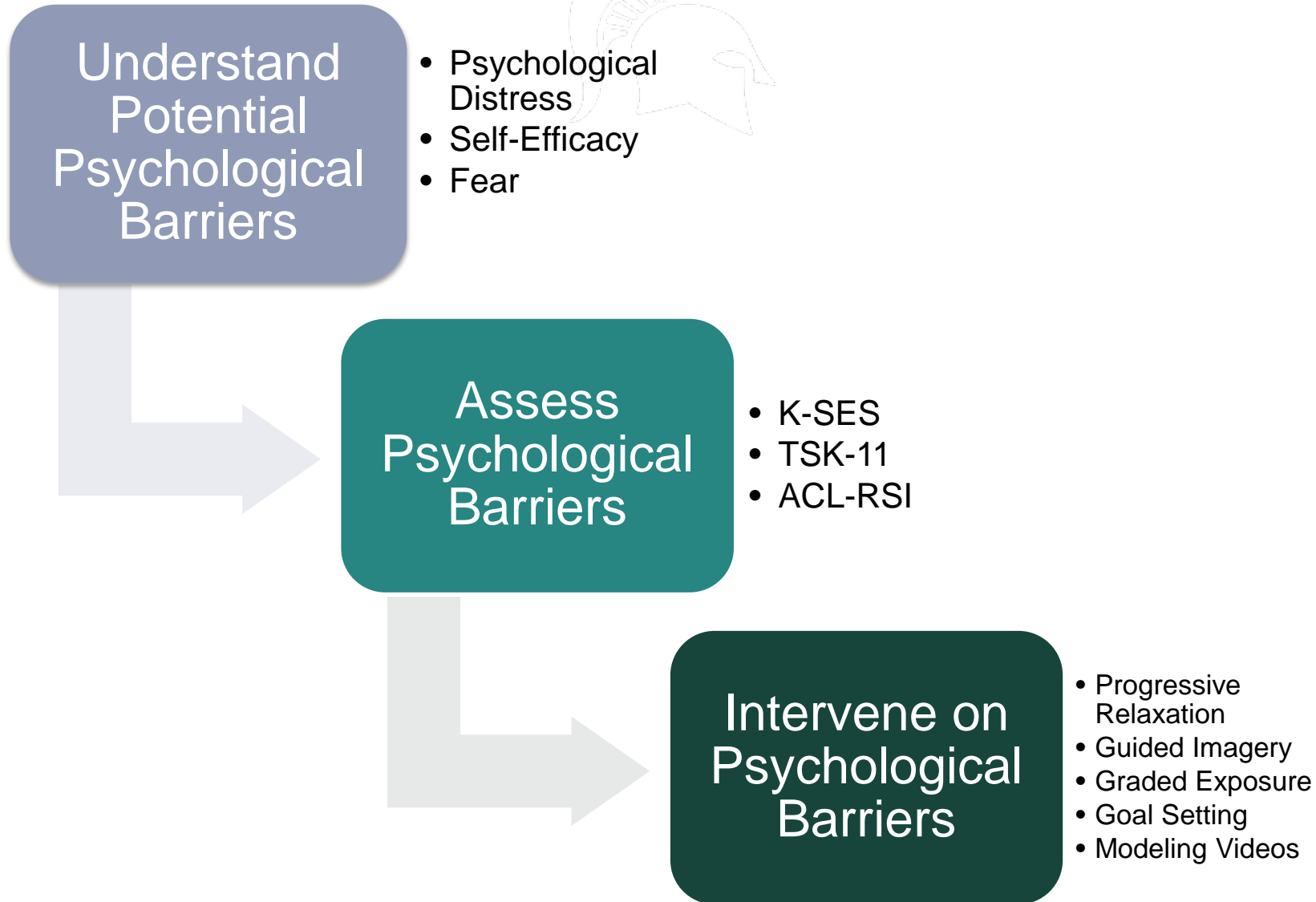
Large knee, hip  
and trunk

Stiff Landing



Small knee, hip  
and trunk

# Conclusions



# Thank you!



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