Call to Action: Driven Rehabilitation Progressions

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No Disclosures

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Objectives

1. Review current evidence related to tissue healing timelines in common orthopaedic surgical procedures
2. Discuss common post-operative rehabilitation protocols and how tissue healing timelines are incorporated into return to activity / sport decision making
3. Outline current best practice updates and the use of objective data and metrics to guide progression through these identified tissue healing timelines, to promote intentional return to sport decision-making

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Why Does it Matter?

Post-operative *rehabilitation* and *return to activity / sport* decisions & progressions are heavily influenced by surgeon-developed post-operative protocols

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Current Inconsistency in Data Driven Return to Activity / Sport

Most post-operative progression decisions are dictated by **tissue healing** timepoints alone

Increased evidence to support the use of **objective data**, alongside tissue healing timelines, to justify and safely progress post-operative patients back to activity and sport

Inconsistency in the use of objective progression criteria likely contributes to current *post-operative re-injury rates*

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What is Data Driven Return to Activity / Sport?

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Readiness vs Clearance

(Taberner et al, 2019)

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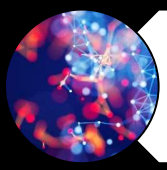
What Needs to be Ready?



Healing Tissue

Body Function

Brain

Post-operative Protocols

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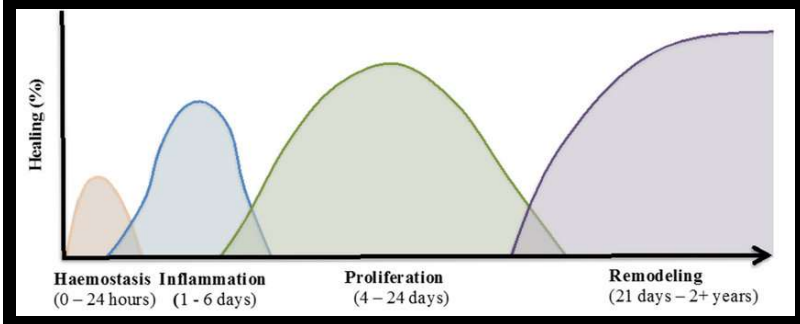
Tissue Healing Timelines



Tissue	Duration of elevated re-injury risk
Bone, ligament, tendon	10 - 12 weeks
Full ligamentization	*6-24 mos*
Nerve	3 - 13 months
Muscle	4 - 6 weeks
Systemic recovery after anesthesia	3 - 4 weeks

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Test

Return to Participation

- The athlete is physically active but not ready to tolerate the demands of sport at the level of competition.

Test

Return to Sport

- The athlete has returned to sport but may not be performing at their desired level. This may be considered end stage for some athletes.

Test

Return to Performance

- This stage extends the RTS period and is characterized by the athlete performing at levels similar or above pre-injury.

(Doege et al, 2021)

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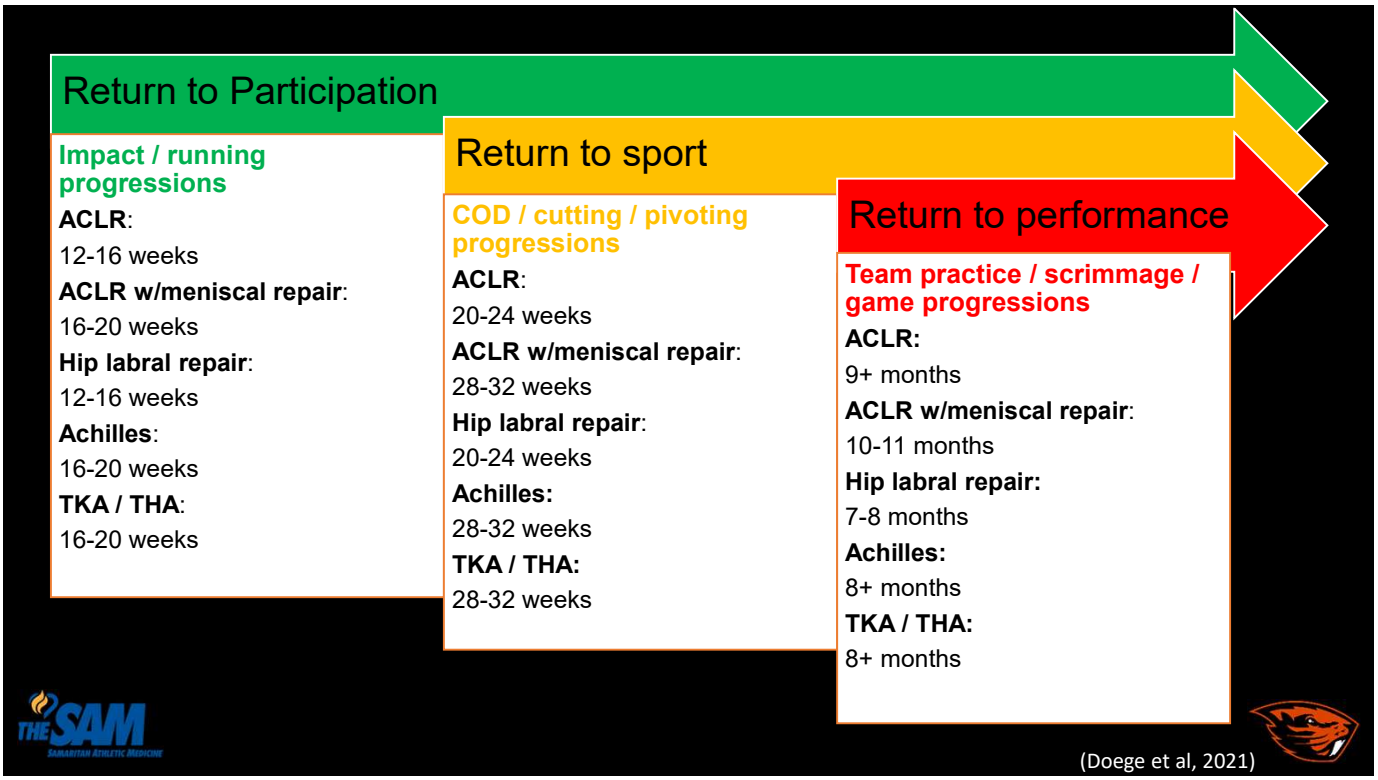
Return to Participation
Impact / running progressions
ACLR:
12-16 weeks
ACLR w/meniscal repair:
16-20 weeks
Hip labral repair:
12-16 weeks
Achilles:
16-20 weeks
TKA / THA:
16-20 weeks
Return to sport
COD / cutting / pivoting progressions
ACLR:
20-24 weeks
ACLR w/meniscal repair:
28-32 weeks
Hip labral repair:
20-24 weeks
Achilles:
28-32 weeks
TKA / THA:
28-32 weeks
Return to performance
Team practice / scrimmage / game progressions
ACLR:
9+ months
ACLR w/meniscal repair:
10-11 months
Hip labral repair:
7-8 months
Achilles:
8+ months
TKA / THA:
8+ months
(Doege et al, 2021)

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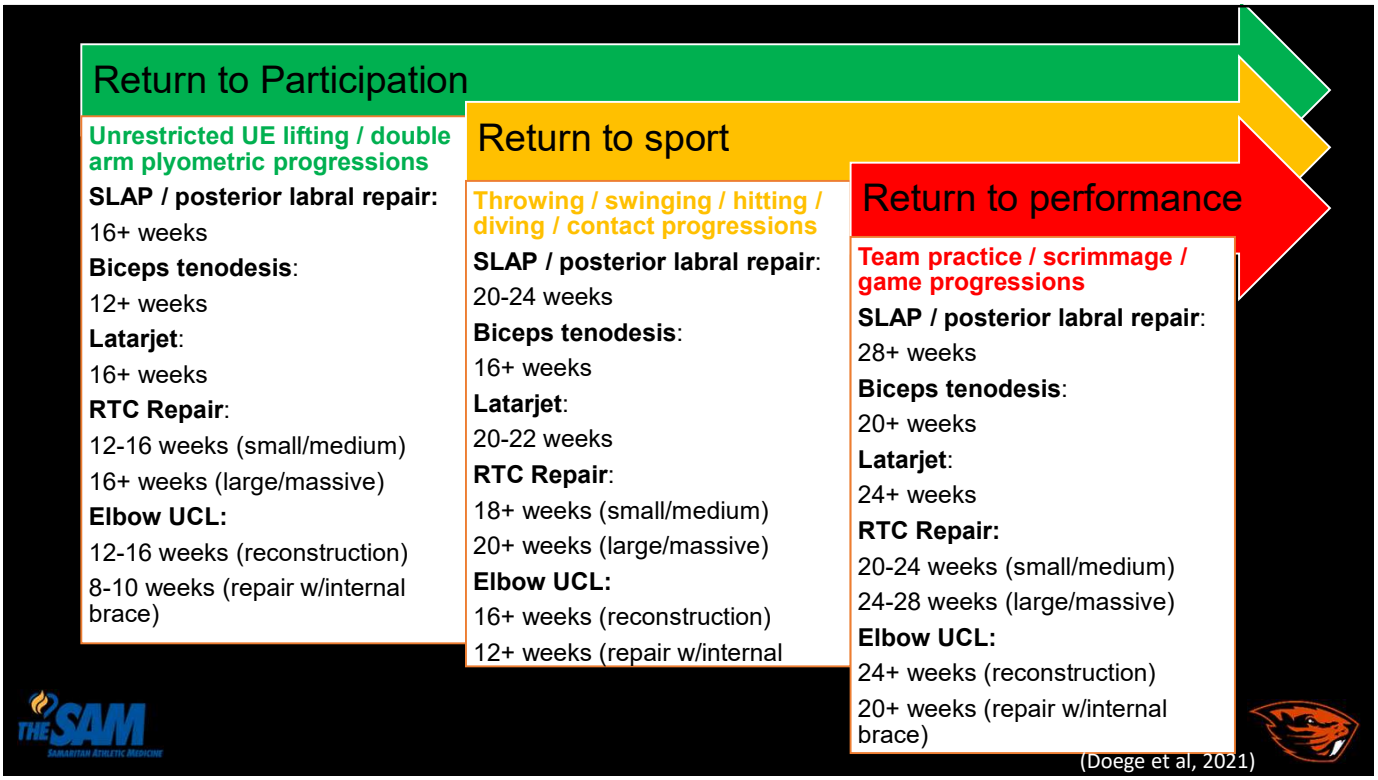
Return to Participation
Unrestricted UE lifting / double arm plyometric progressions
SLAP / posterior labral repair:
16+ weeks
Biceps tenodesis:
12+ weeks
Latarjet:
16+ weeks
RTC Repair:
12-16 weeks (small/medium)
16+ weeks (large/massive)
Elbow UCL:
12-16 weeks (reconstruction)
8-10 weeks (repair w/internal brace)
Return to sport
Throwing / swinging / hitting / diving / contact progressions
SLAP / posterior labral repair:
20-24 weeks
Biceps tenodesis:
16+ weeks
Latarjet:
20-22 weeks
RTC Repair:
18+ weeks (small/medium)
20+ weeks (large/massive)
Elbow UCL:
16+ weeks (reconstruction)
12+ weeks (repair w/internal
Return to performance
Team practice / scrimmage / game progressions
SLAP / posterior labral repair:
28+ weeks
Biceps tenodesis:
20+ weeks
Latarjet:
24+ weeks
RTC Repair:
20-24 weeks (small/medium)
24-28 weeks (large/massive)
Elbow UCL:
24+ weeks (reconstruction)
20+ weeks (repair w/internal brace)
(Doege et al, 2021)

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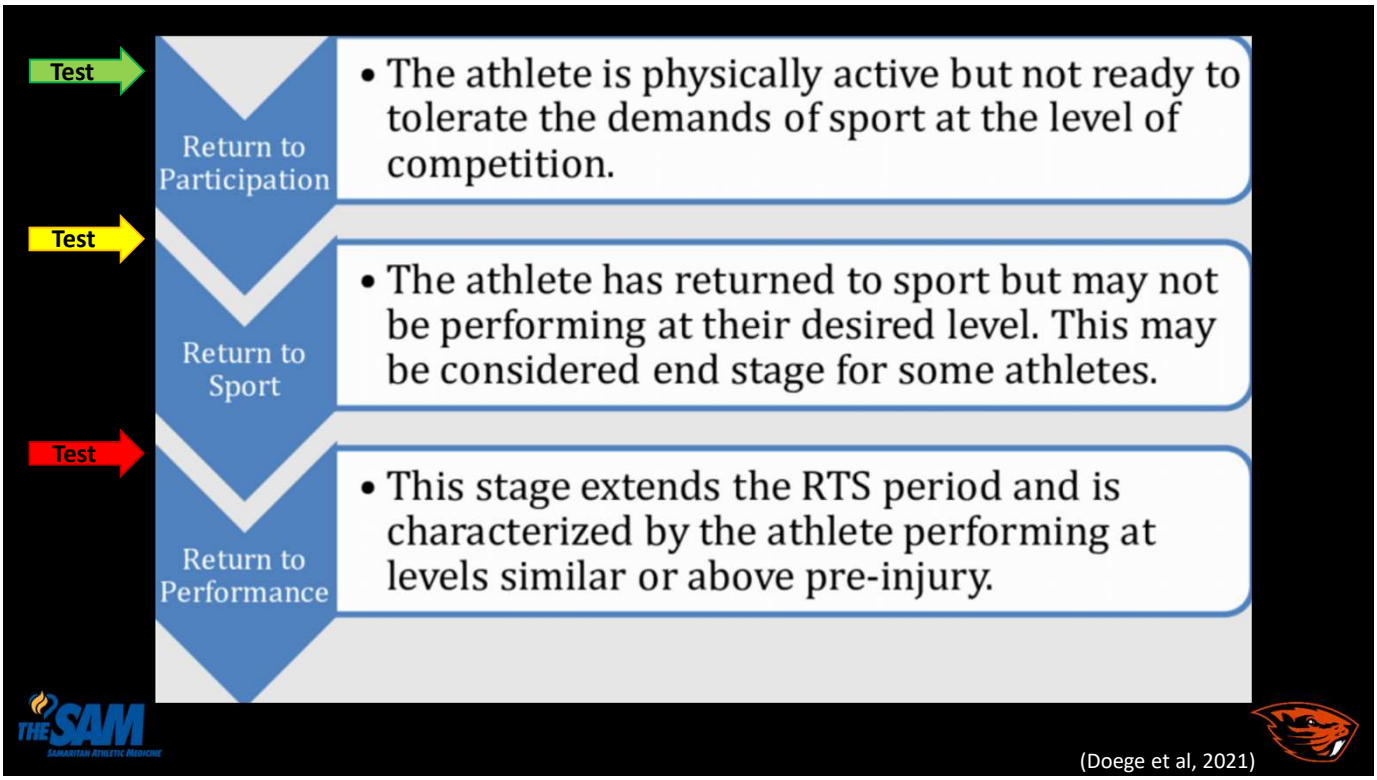
Test
Return to Participation
• The athlete is physically active but not ready to tolerate the demands of sport at the level of competition.
Test
Return to Sport
• The athlete has returned to sport but may not be performing at their desired level. This may be considered end stage for some athletes.
Test
Return to Performance
• This stage extends the RTS period and is characterized by the athlete performing at levels similar or above pre-injury.
(Doege et al, 2021)

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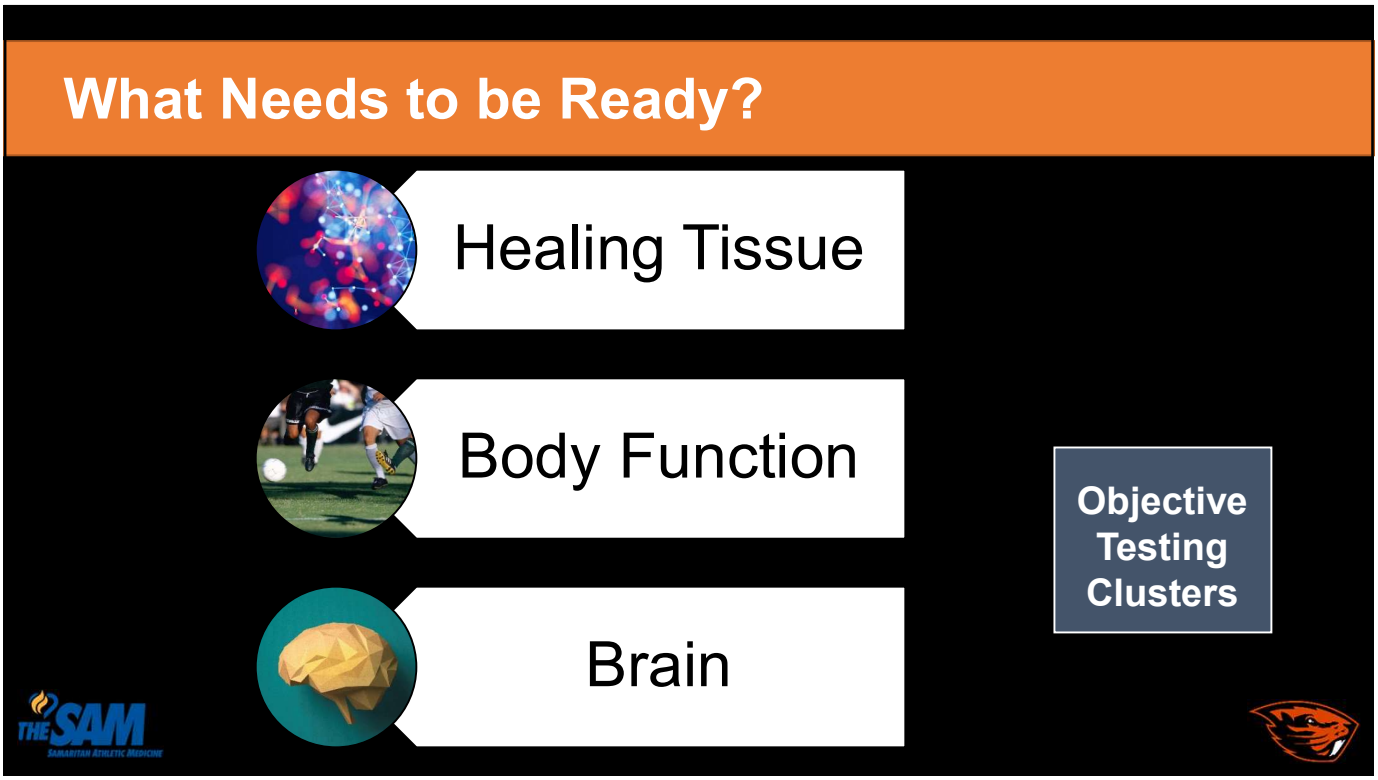
What Needs to be Ready?
Healing Tissue
Body Function
Brain
Objective Testing Clusters

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Objective Criteria Cluster

- Strength
- Biomechanics
- Functional Movement
- Psychological Readiness

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Does Passing Objective Testing Clusters Change Post-Operative Outcomes?

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Outcome Comparison

Status-post ACL Reconstruction

Repeat ACL injury seen in:

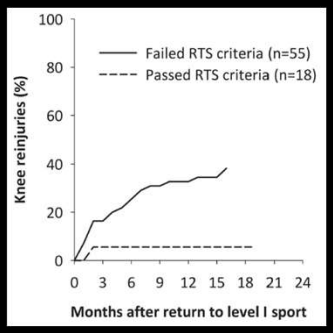
38.2% who failed return to sport criteria

Vs

5.6% who passed return to sport criteria

Criteria based testing cluster:

1. Isokinetic quadriceps strength
2. 4 single leg hop tests
3. 2 patient-reported outcomes



(Grindem et al, 2016)

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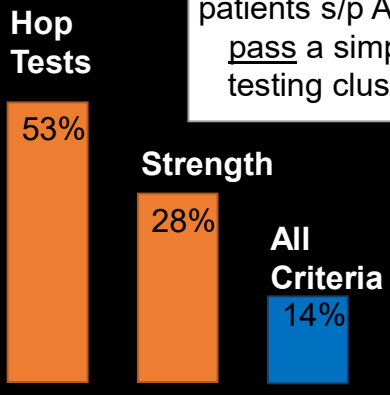
Outcome Comparison



Only 14% of patients s/p ACLR pass a simple testing cluster

Status-post ACLR

Youth athletes who **passed recommended cutoffs** for all objective criteria

Continued in **sports participation** at 1 year following surgery at significantly higher % than those who did not

(Tool et al, 2017)

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Outcome Comparison

Criteria based testing cluster:

1. Isokinetic & isometric IR and ER strength
2. ER endurance test
3. Closed kinetic chain UE stability test
4. Seated shot put test

Status-post Bankart Repair

Athletes who did not pass criteria-based objective testing had **4.85 times** ↑ likelihood of recurrent instability

Vs

Athletes who utilized a criteria-based testing protocol to guide activity clearance

(Drummond et al, 2021)

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Meeting Passing Criteria Matters

Objective Testing Cluster

- **Strength**
- **Biomechanics**
- **Functional Movement**
- **Psychological Readiness**

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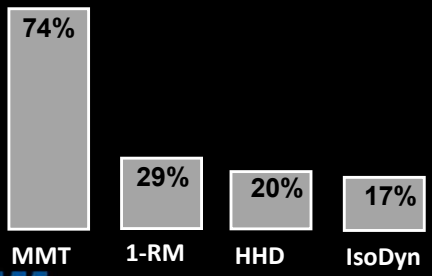
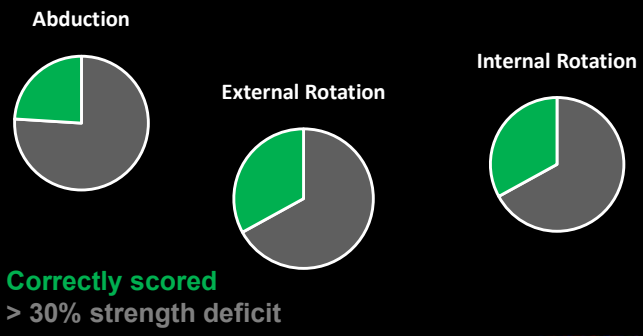
Strength: How should we test it?

20% of Physical Therapists ***do not*** test strength at **ALL** s/p ACLR

Of those who do – <u>inconsistency</u> in objective collection



Manual Muscle Testing (MMT)
Of patients who scored symmetrical in shoulder strength via MMT:



Correctly scored
> 30% strength deficit

(Greenberg et al, 2018; Nagatomi et al, 2016; Croci et al, 2023)

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Movement Quality: How do we test it?

Key Points

- The Landing Error Scoring System (LESS) score may effectively identify elite-youth soccer athletes at higher risk of sustaining anterior cruciate ligament (ACL) injuries.
- Elite-youth soccer athletes with LESS scores of 5 or more were at higher risk of sustaining ACL injuries than athletes with LESS scores less than 5.
- Individuals with LESS scores of 5 or more may be targeted for ACL injury-prevention exercise programs.

(Hanzlíková et al, 2022)

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Psychological Readiness: How do we test it?

	Assessment Tools
Strength	Isokinetic Dynamometer Handheld Dynamometer
Biomechanics	Force Plates Jump Mats Handheld Dynamometer
Functional Movement Quality	iPad Phone Camera Camera
Psycho-social Factors	**Patient reported outcomes**

Upper Extremity
- Quick DASH (Q-DASH)
- Western Ontario Shoulder Instability Index (WOSI)
- Shoulder Instability-Return to Sport after Injury (SIRSI)

Lower Extremity
- Foot and Ankle Ability Measure (FAAM)
- International Knee Documentation Committee (IKDC)
- International Hip Outcome Tool (i-Hot 12)

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Return to Activity / Sport: Objective Criteria Recommendations

Lower Extremity

SCAN ME

Upper Extremity

SCAN ME

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Return to Activity / Sport Readiness

At each post-operative timepoint, assess…

	Assessment Tools
Strength	Isokinetic Dynamometer Handheld Dynamometer
Biomechanics	Force Plates Jump Mats
Functional Movement Quality	iPad Phone Camera Camera
Psycho-social Factors	Patient reported outcomes

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Return to Activity / Sport Readiness

	Assessment Tools
Strength	Isokinetic Dynamometer **Handheld Dynamometer**
Biomechanics	Force Plates Jump Mats
Functional Movement Quality	iPad Phone Camera Camera
Psycho-social Factors	Patient reported outcomes

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Return to Activity / Sport Readiness

	Assessment Tools
Strength	**Isokinetic Dynamometer** Handheld Dynamometer
Biomechanics	Force Plates Jump Mats
Functional Movement Quality	iPad Phone Camera Camera
Psycho-social Factors	Patient reported outcomes

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Return to Activity / Sport Readiness

	Assessment Tools
Strength	Isokinetic Dynamometer Handheld Dynamometer
Biomechanics	**Force Plates** **Jump Mats**
Functional Movement Quality	iPad Phone Camera Camera
Psycho-social Factors	Patient reported outcome

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Return to Activity / Sport Readiness

	Assessment Tools
Strength	Isokinetic Dynamometer Handheld Dynamometer
Biomechanics	Force Plates Jump Mats
Functional Movement Quality	**iPad** **Phone Camera** **Camera**
Psycho-social Factors	Patient reported outcomes

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From Science to Practice

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Implementation

Integration into Post-Operative Protocols

Post-op Timeframe	**12-16 weeks** **(Return to Participation Phase)**
Criteria to progress to next phase	**Strength** **Biomechanics / Movement Quality** **Psychological Readiness**

Outline passing criteria relevant to:
- Surgery / body region
- Post-operative timepoint

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Implementation

Structure specific to practice setting

Outpatient / Hospital-Based Clinic	Private Practice	Collegiate / Professional Organization
• Within PT session • Functional testing appointment type • Fee-for-service	• Fee-for-service	• Requirement for progression / clearance

Billed at $101 per unit (15 min)

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Take-Aways

1. Risk of injury recurrence **significantly** ↓ if patient / athlete passes objective testing cluster

2. Objective testing cluster should **include** assessment of:
   - ✓ Strength
   - ✓ Biomechanics / movement quality
   - ✓ Psychological readiness

3. **Post-operative protocols** should include objective testing clusters as criteria to advance activity / sport in line with tissue healing timeframes

4. Practice setting will dictate how you implement consistent testing in your **post-operative follow-up** process

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Thank You!

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Lower Extremity

SCAN ME

Upper Extremity

SCAN ME

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