Return to play with *R2Play*: A dynamic multidomain simulated sport assessment tool for youth with concussion.

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SIRC Concussion Symposium
January 31, 2024

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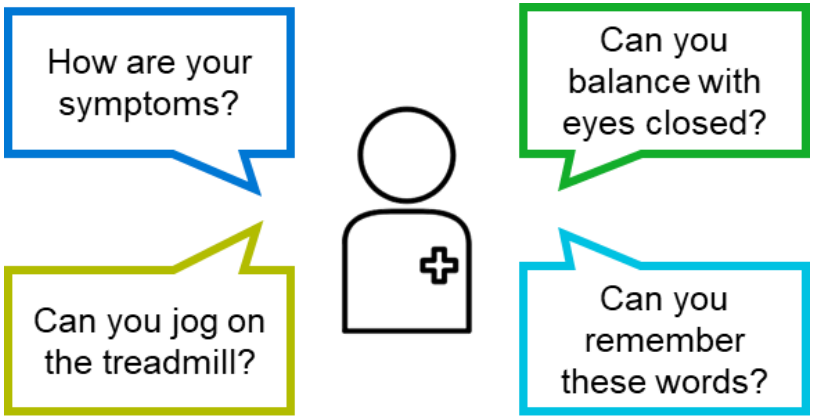
Return to Play

How do we know when a concussion has resolved?

Currently, we assess **one domain at a time:**



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Return to Play

However, research shows that symptoms and changes can be revealed using more ecological **multi-domain assessments.**

Can you run and think and talk at the same time?

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The *R2Play* Project

“Can we creatively apply technology to administer a multidomain return-to-play assessment that simulates the demands of sport?”

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R2Play Design Objectives

Sport-like	Fun for youth athletes	Easy to use
Low-cost	Flexible	Clinically informative

R2Play Development

Overarching user-centered design approach:

1. Problem definition

- Scoping review
- Structured team discussion

2. Needs assessment

- Qualitative interviews
- Clinicians (n=6) & sport coaches (n=4)

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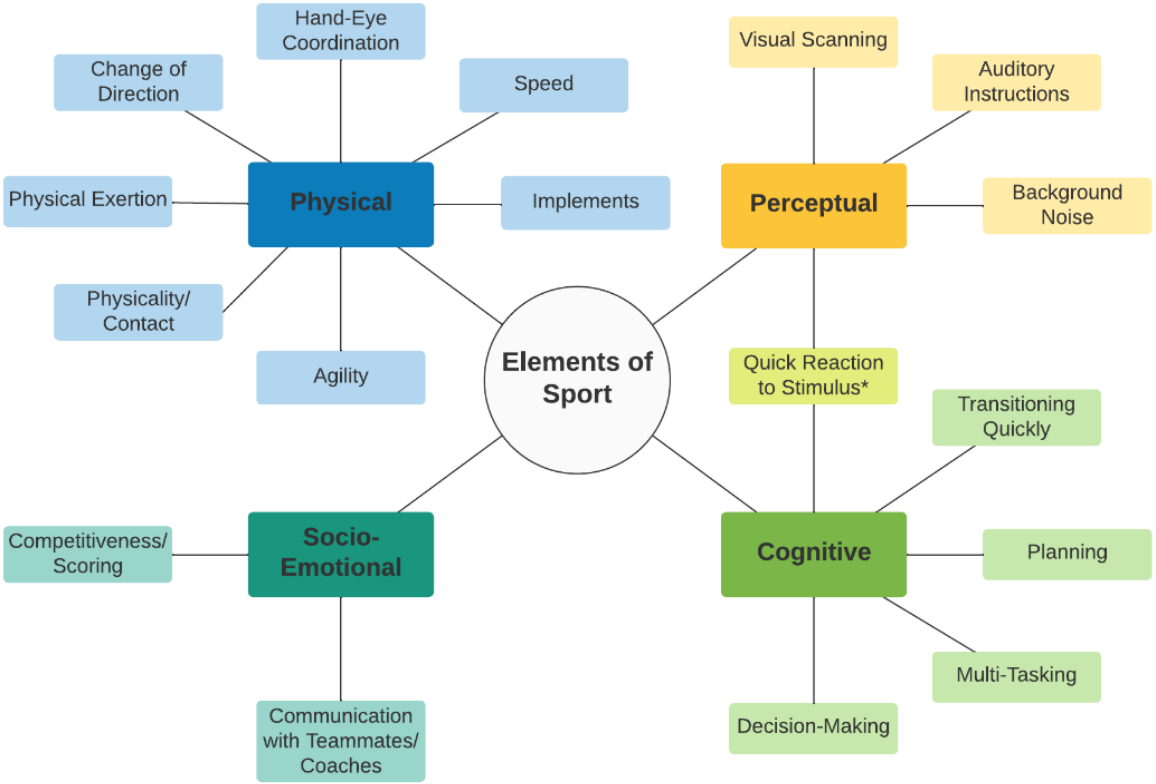

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R2Play Development

Overarching user-centered design approach:

3. Prototype build

- Task refinement
- Hierarchal task analysis & wireframes

4. Usability testing

- Cognitive walkthrough with clinicians (n=5)
- SUS = 81% (SD 8.02)

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R2Play Concept

Clinician Interface

Six Tablets

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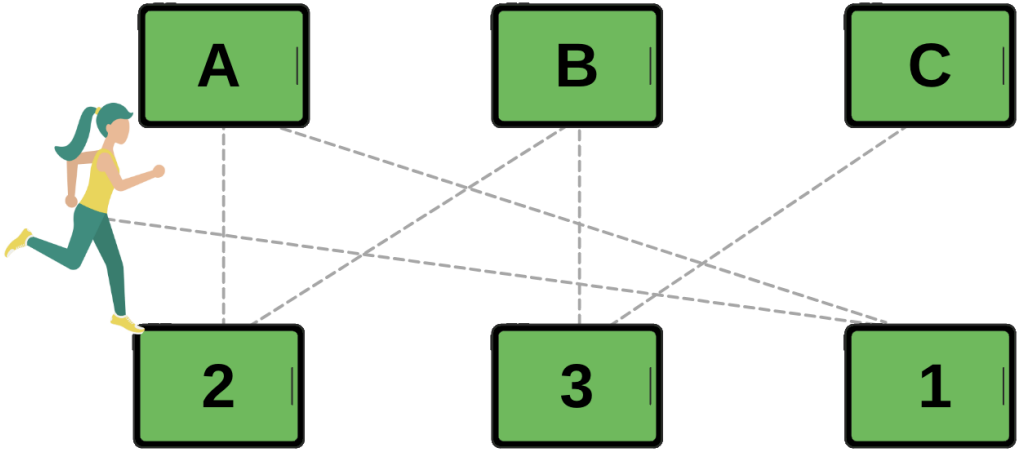
R2Play Concept



Leveling: layered perceptual, cognitive, and exertional demands.

Scoring: Speed, accuracy, and dual-task costs.

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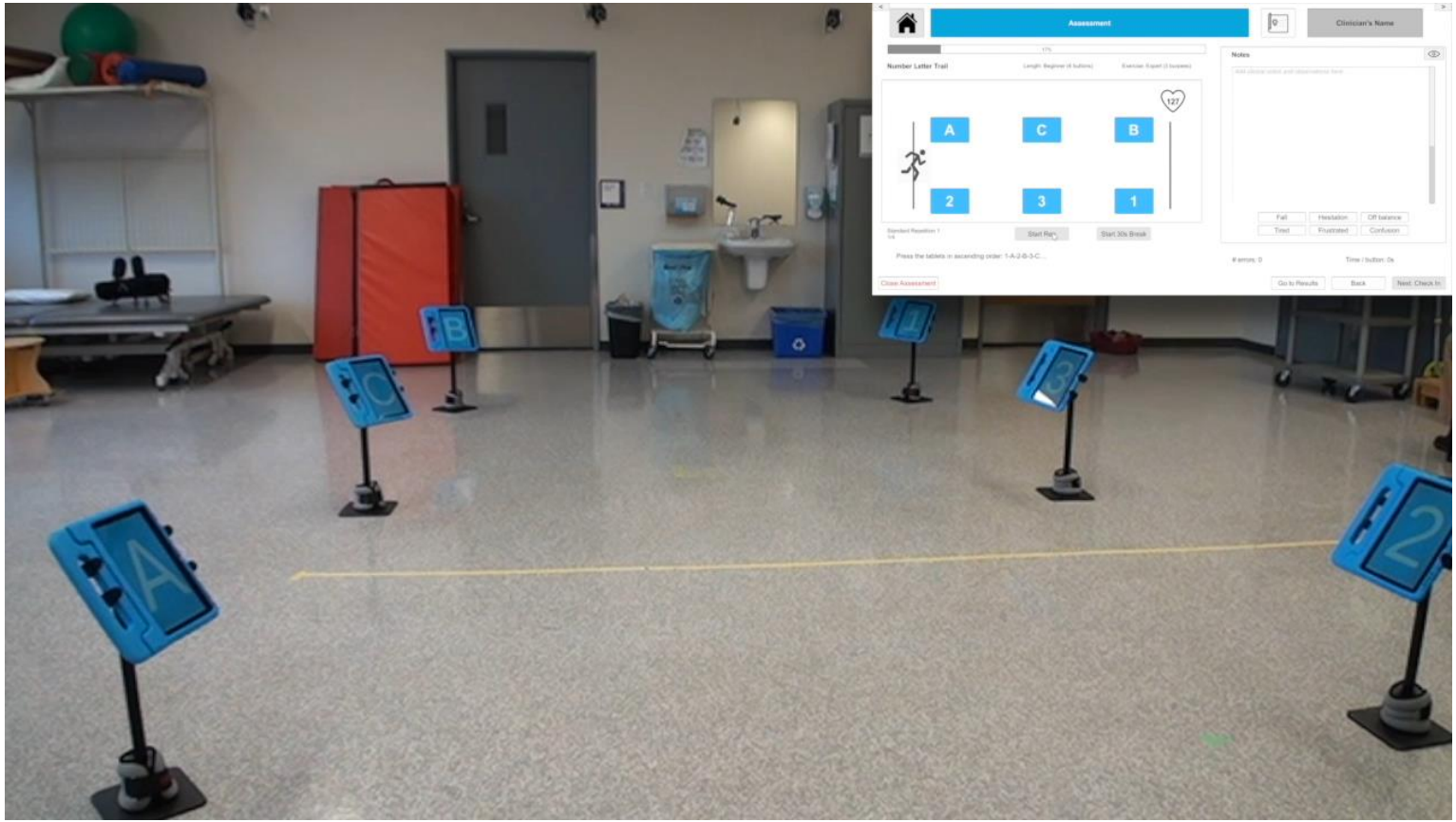

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Proof-of-Concept Testing

Youth Athletes
(n=10)

- ✓ Fun
- ✓ Easy to understand
- ✓ Sport-like

Clinicians
(n=5)

- ✓ Better simulated sport
- ✓ Integration of cognitive, motor, perceptual skills
- ✓ Rich clinical observation

High Exertion
(63-94% HR_{max})

Moderate duration
~30-40 minutes

Excellent Usability
(SUS = 81)

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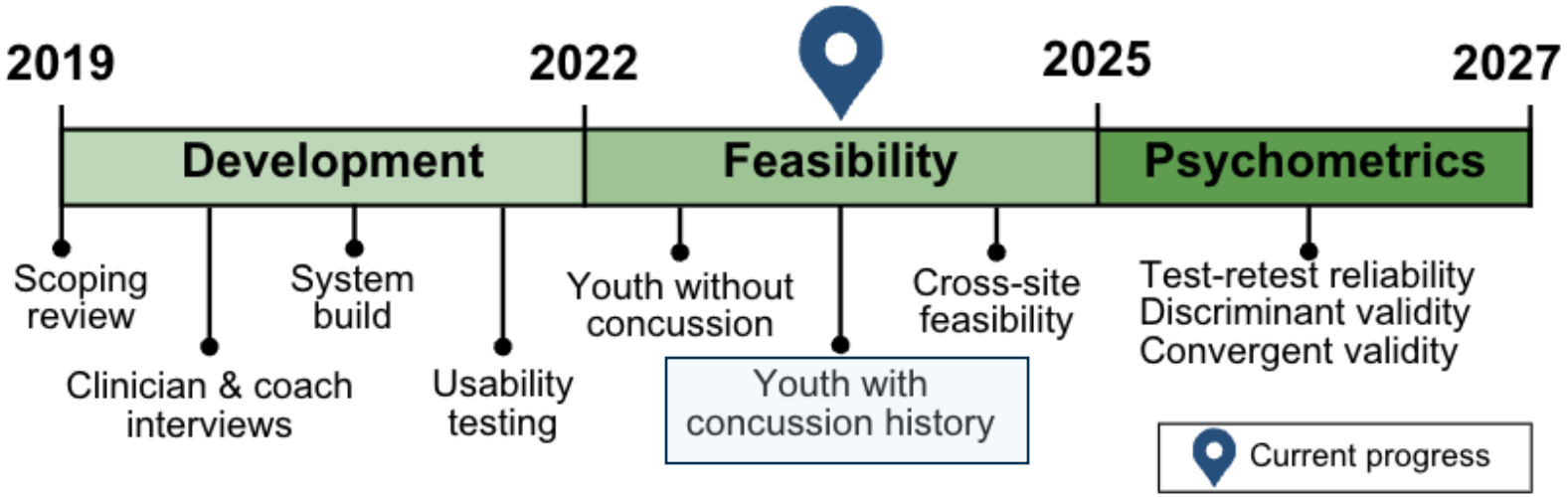
Timeline & Next Steps



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Cross-Site Testing

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University of Toronto

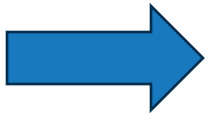
360 concussion care

University of Calgary

Montreal Children's Hospital

Phase 1 - Pilot

- Feasibility: How well can *R2Play* be used at different sites?
- Face validity: How well does *R2Play* simulate sport?



Phase 2 - Psychometrics

- Test-retest reliability
- Convergent validity
- Discriminant validity

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R2Play Adaptations

R2Play-Para

How can *R2Play* be adapted for para-sport participants?

R2Play-Rehab

How can *R2Play* be used as a therapeutic rehabilitation tool?

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Implications for Sport

1. More sport-like assessments are needed to guide return-to-play.

2. Creative applications of low-cost technology can help simulate sport in a clinic environment.

3. Engaging the sport community in research is critical to addressing challenges in sport medicine.

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Thank you!

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