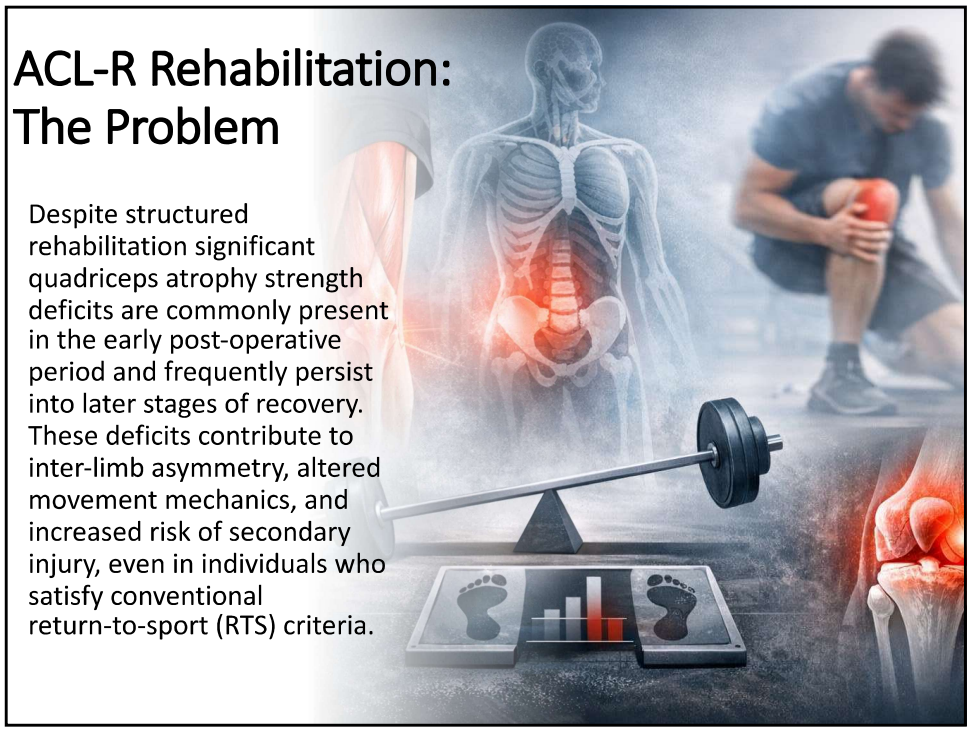
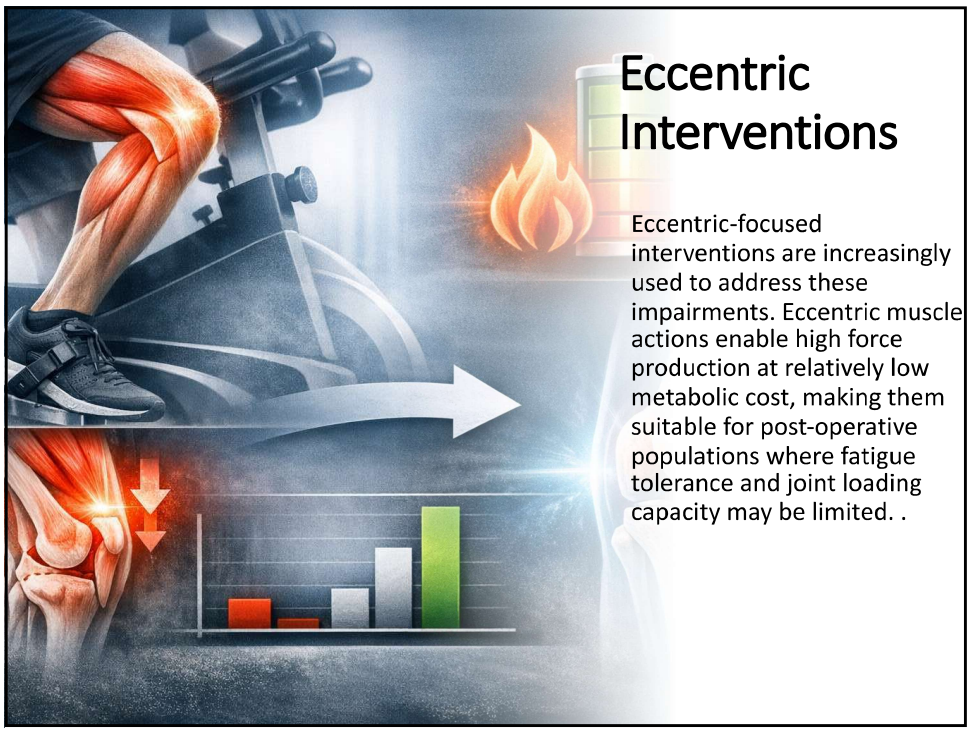

Eccentric Cycling in ACL Reconstruction (ACL-R) Rehabilitation
Tom McLeod - AUT Ventures
AUT SPORT RESEARCH INSTITUTE NEW ZEALAND
AUT
RESEARCH & INNOVATION

1


ACL-R Rehabilitation: The Problem
Despite structured rehabilitation significant quadriceps atrophy strength deficits are commonly present in the early post-operative period and frequently persist into later stages of recovery. These deficits contribute to inter-limb asymmetry, altered movement mechanics, and increased risk of secondary injury, even in individuals who satisfy conventional return-to-sport (RTS) criteria.

2


Eccentric Interventions
Eccentric-focused interventions are increasingly used to address these impairments. Eccentric muscle actions enable high force production at relatively low metabolic cost, making them suitable for post-operative populations where fatigue tolerance and joint loading capacity may be limited. .

3


Eccentric Cycling: A Solution
Eccentric cycling provides a controlled, non-weight-bearing method of delivering progressive eccentric quadriceps loading and could be integrated safely earlier in rehabilitation than traditional eccentric resistance exercises when appropriately prescribed.

4



5

Monitoring Asymmetry and Progression

A	Duration: 0m31s		B	Duration: 0m31s	
	Work Done	Similarity		Work Done	Similarity
L	17	62	L	44	91
R	26		R	48	
	Average			Average	
L	146	58	L	500	92
R	249		R	542	
	Peak			Peak	
L	237	72	L	636	91
R	325		R	693	

On screen, real time recording of work and power output during early (A) and late (B) stages showing improvements in power and symmetry post ACL-R.

6

Eccentric Cycling in ACL Reconstruction (ACL-R) Rehabilitation: Tom Mcleod

Notes