

## 28th ECSS Anniversary Congress, Paris/France, 4-7 July 2023

Low-load blood flow restriction training and heavy slow resistance training improve clinical outcomes equally in males with unilateral patellar tendinopathy – A randomized controlled trial

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### INTRODUCTION:

Patellar tendinopathy (PT) is a debilitating overuse injury that is particularly prevalent in 'jumping sports' such as e.g., volleyball and basketball. PT is also one of the primary causes of reduced physical activity, which may contribute to reduced quality of life and lifestyle diseases. The current best treatment is heavy slow resistance training (HSRT); however, not all patients can cope with heavy exercise loads. Even with HSRT, the time to improve clinically from tendinopathy might be as long as 3-12 months. The use of low-load resistance training in combination with blood flow restriction (LL-BFRT) has been advocated as a clinically relevant rehabilitation tool since it does not require the large joint and tissue forces and because it might accelerate recovery. In this RCT, we investigated the rehabilitative effect of LL-BFRT compared with HSRT at 3, 6, 12 (primary endpoint) and 52 weeks (data still being collected) in males with chronic (> 3 months) unilateral patellar tendinopathy.

### METHODS:

Adult males were randomized to a 12-week rehabilitation program based on either LL-BFRT (n=16) or HSRT (n=20). Participants performed 3 weekly training sessions of which one was supervised by experienced sports physiotherapists. LL-BFRT exercised at 30% 1-RM but increased their arterial occlusion pressure (AOP) from 50% AOP at baseline to 80% AOP at 9 weeks. HSRT exercised at 55% of 1-RM with loads increasing to 80% of 1-RM at 9 weeks. Primary outcome was pain (numerical rating scale NRS, 1-10) during single-leg decline squatting (SLDS). Secondary outcome variables were Victorian Institute of Sports Assessment-Patella questionnaire (VISA-P) on function and symptoms and pain pressure threshold (PPT) measured by pressure algometry at 3, 6, and 12 (primary endpoint) weeks. A linear mixed effects model was used to analyze longitudinal changes in all outcome variables.

### RESULTS:

LL-BFRT and HSRT both improved based on the NRS SLDS. Values are reported as change from baseline [95% CI] to 3 weeks (LL-BFRT -0.8 [95% CI -1.6 – -0.1] vs. HSRT -1.1 [95% CI -1.6 – -0.7], 6 weeks (LL-BFRT -1.6 [95% CI -2.5 – -0.7] vs. HSRT -1.7 [95% CI -2.3 – -1.1]) and 12 weeks (LL-BFRT -1.9 [95% CI -2.7 – -1.0] vs. HSRT -2.0 [95% CI -2.7 – -1.2]) with no between-group differences. Similarly, VISA-P score improved with no between-group differences at 3, 6 and 12 weeks. PPT (symptomatic tendon) showed a non-significant decrease from baseline to 3 weeks but showed a significant increase from 3 to 6 weeks and 6 to 12 weeks with no group interaction at any timepoint.

### CONCLUSION:

LL-BFRT was not superior to HSRT but achieved comparable clinical improvements in the short- to mid-term. These results are comparable with other studies investigating exercise (HSRT) in the rehabilitation of chronic patellar tendinopathy. LL-BFRT is therefore a viable rehabilitation tool in the treatment of chronic patellar tendinopathy, and as an alternative to reduce peak loads.

Topic: Physiotherapy

Presentation: Oral

