A COMPARATIVE ISOKINETIC EVALUATION POST HIIT TRAINING: STEMI PATIENTS VS. HEALTHY COUNTERPARTS

Sandra Rusac-Kukić[1,2], Smiljana Šupak[1], Barbara Ravnić Marušić[1], Vedrana Mužić Radović[1,2,5], Matija Brentin[1,2], Kristina Skroče[1,2], Viktor Peršić[1,2,3], Dijana Travica Samsa[1,2,4]

1 Thalassotherapia Opatija – Special Hospital for Medical Rehabilitation of the Heart and Lung Diseases and Rheumatism, Opatija, Croatia
2 Faculty of Medicine, University of Rijeka, Rijeka, Croatia
3 Faculty of Health Studies, University of Rijeka, Rijeka, Croatia
4 Faculty of dental medicine and health, Josip Juraj Strossmayer University of Osijek, Osijek, Croatia
5 Faculty of Medicine, University of Zagreb, Zagreb, Croatia
e-mail: rusacs@gmail.com

Introduction

High-intensity interval training (HIIT) is recognized for improving cardiorespiratory fitness. However, its effects on muscular strength, in-STEMI patients are less understood. This study investigated the impact of a 12-week HIIT program on aerobic capacity and isokinetic muscle strength in post-STEMI patients and healthy controls, respectively.

Methods

A total of 32 participants (16 post-STEMI patients, 16 age-matched healthy controls) completed a supervised 12-week HIIT protocol (3 sessions including 4x4 min at 85-95% of HR-max/week). Pre- and post-intervention assessments included a cardiopulmonary exercise test (CPET) to determine VO_2 max and isokinetic dynamometry to evaluate peak torque of the quadriceps and hamstrings at 60°/s and 240°/s angular velocities. No resistance training was included in the intervention. Paired t-tests and Wilcoxon signed-rank test valuated pre- to post-intervention changes, while independent t-tests as well as Wilcoxon rank-sum test assessed group differences. $P < 0.05$ was set for statistical significance.

Results

CPET testing showed significant improvements for both groups from baseline (+32%, $p<0.001$ and +34%, $p<0.001$ for MI and CTRL, respectively). Significant improvements were found in extension peak torque at 60°/s (PRE: 86.36±28.1 Nm; POST: 89.82±29.3 Nm; $p = 0.035$) and extension torque relative to body weight ($p = 0.050$). Flexion torques and deficits did not change significantly. Group comparison revealed no statistically significant differences between MI and CTRL groups for other parameters. Deficit trends remained stable post-intervention.

Conclusion

Both STEMI patients and healthy individuals showed significant improvements in VO_2 max following the HIIT intervention. Notably, both groups also demonstrated marked increases in peak torque at both isokinetic velocities, despite the absence of dedicated strength training. These findings suggest that HIIT may confer neuromuscular adaptations contributing to increased dynamic strength, highlighting its potential as a dual-benefit modality for improving both cardiovascular and muscular function in clinical and healthy populations.

Keywords: HIIT, STEMI, isokinetic dynamometry, exercise