Improvement in cardiac and functional parameters, glycemic control and quality of life during 21 days of exercise-based cardiac rehabilitation

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Introduction: Cardiac rehabilitation (CR) is a cornerstone intervention for patients with cardiovascular and metabolic disease. Exercise-based CR programmes improve functional capacity, metabolic regulation, and psychosocial wellbeing, yet evidence from short-term interventions in patients with type 2 diabetes remains limited[1].

Methods: Twelve patients with type 2 diabetes (age 65 ± 6 years, height 177 ± 12 cm, weight 89 ± 16 kg) participated in a 21-day pilot CR programme. Training included aerobic exercise, high-intensity interval training (HIIT), and resistance training, all individually tailored based on cardiopulmonary exercise testing (CPET) to define optimal training zones.

Results: VO_2 at VT_2 increased from approximately 13.5 ± 3.0 to 15.5 ± 2.0 mL/min/kg after 21 days ($p < 0.05$; $d = 1.21$), indicating a large effect size. VO_2max showed an even greater improvement, rising from about 16.0 ± 2.5 to 18.0 ± 2.0 mL/min/kg ($p < 0.001$; $d = 1.93$), representing a very large effect size. Glycemic control improved, with time in range (3.9–10.0 mmol/L) rising from 87 ± 10% to 93 ± 5% by Week 2 ($p < 0.05$; $d = 0.87$) and remaining stable in Week 3. Time below range (<3.0 mmol/L) decreased from 2.0% to <1.0% ($p < 0.05$) and was nearly eliminated by Week 3 ($p < 0.01$). Time above range (10.0–13.1 mmol/L) fell from 9.1% to 5.2% ($p < 0.05$). SF-36 scores showed notable improvements in emotional limitations, physical health limitations, social functioning and emotional wellbeing. Pain remained unchanged, while physical functioning.

Conclusion: A 21-day comprehensive CR programme combining aerobic, HIIT, and resistance training improved aerobic capacity, glycemic stability, cardiac stress biomarkers, and several quality-of-life domains in patients with type 2 diabetes. These findings highlight the multidimensional benefits of short-term CR, warranting confirmation in larger trials.

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LITERATURE

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