

The effect of diaphragmatic breathing training on cardiovascular recovery in professional classical ballet dancers

Assistant Prof. Hüma İŞSEVER¹, Prof. Dr. İlker İŞSEVER²

¹ Istanbul University State Conservatory, Department of Ballet, Performing Arts, Istanbul, Turkey

² Istanbul University State Conservatory, Department of Opera, Performing Arts, Istanbul, Turkey

Corresponding Author: Assistant Prof. Hüma İŞSEVER

Email: huma.issever@istanbul.edu.tr

ORCID: 0009-0002-8388-6822

ABSTRACT

This study investigates the effect of diaphragmatic (abdominal) breathing training on cardiovascular recovery in professional classical ballet dancers. Ballet requires exceptional physical and mental endurance, with dancers frequently experiencing elevated heart rates during intensive training and performance. Efficient cardiovascular recovery is essential for maintaining performance quality and preventing fatigue-related injuries. While diaphragmatic breathing has been shown to enhance parasympathetic nervous system activity and improve heart rate variability in various populations, its specific application to ballet dancers remains underexplored. This research addresses this gap by examining whether a structured two-week diaphragmatic breathing intervention can improve post-exercise heart rate recovery in professional ballet students.

Twenty professional classical ballet students (15 female, 5 male; aged 15-21 years) from Istanbul University State Conservatory participated in this quasi-experimental study. All participants had 6-10 years of ballet training experience and were at intermediate to advanced performance levels. The study employed a pre-test/post-test design with heart rate measurements taken at rest and at 0, 10, 30, and 60 seconds following 64 repetitions of changement jumps. All measurements were conducted in the same ballet studio at the Conservatory during morning hours (9:00-11:00 AM) on different days to ensure consistency. Room temperature was maintained at 20-22°C, and participants were instructed to maintain consistent diet and hydration habits throughout the study period. Following baseline measurements, participants received theoretical instruction on respiratory physiology and diaphragmatic breathing mechanics. The two-week intervention consisted of daily supervised diaphragmatic breathing practice (6 days per week), progressing from supine positions with hands on the abdomen to standing practice integrated into regular ballet training. Post-intervention measurements replicated the pre-test protocol under identical environmental conditions. Heart rate data were analyzed using paired-samples statistical tests to assess changes in cardiovascular recovery patterns.

Statistical analysis revealed significant improvements in cardiovascular recovery following the diaphragmatic breathing intervention. Pre-test measurements showed a mean heart rate of 112.00 ± 28.96 bpm immediately post-exercise (0 seconds), which decreased to 103.75 ± 15.59 bpm in the post-test condition, representing an 8.25 bpm reduction (7.4% improvement). The most substantial improvement occurred at the 10-second recovery point, with heart rates decreasing from 113.15 ± 28.80 bpm to 101.20 ± 13.00 bpm, a reduction of 11.95 bpm (10.6% improvement). At 30 seconds post-exercise, heart rates improved from 107.25 ± 27.85 bpm to 101.15 ± 11.66 bpm (6.10 bpm reduction, 5.7% improvement). The 60-second recovery measurement demonstrated a decrease from 100.95 ± 22.48 bpm to 90.35 ± 12.21 bpm, representing a 10.60 bpm reduction (10.5% improvement). Notably, the standard deviation decreased substantially across all measurement points, indicating more consistent recovery responses across participants. The reduction in variability ranged from 45.7% to 58.1%, suggesting that diaphragmatic breathing training benefits dancers with varying baseline cardiovascular fitness levels. These findings support the hypothesis that structured respiratory training enhances parasympathetic reactivation and cardiovascular efficiency in ballet dancers.

This study provides empirical evidence that a brief, two-week diaphragmatic breathing training program significantly improves cardiovascular recovery in professional ballet dancers. The intervention's effectiveness suggests that respiratory training should be integrated into standard ballet

pedagogy and conditioning programs. Enhanced cardiovascular recovery has important implications for injury prevention, performance sustainability, and overall dancer wellness. The standardized nature of the intervention makes it readily implementable in conservatory and professional ballet training settings. Future research should examine long-term retention effects, optimal training duration, and the integration of respiratory training with other performance enhancement strategies.

Keywords: Diaphragmatic breathing, cardiovascular recovery, ballet dancers, heart rate variability, parasympathetic nervous system, performance enhancement, dance medicine
porting this research initiative.