

Impact of Resistance Training on Muscular Endurance and Cardiovascular Health in Young Adults

Authors

Rahul Mehta, Priya Verma

¹Department of Sports Sciences, Global University of Physical Education, Delhi, India

²Department of Human Physiology, Sunrise Institute of Health Studies, Mumbai, India

Abstract

Resistance training (RT) has long been associated with improvements in muscular strength; however, its role in enhancing muscular endurance and cardiovascular health is increasingly being recognized. This study investigates the impact of a structured 12-week resistance training program on muscular endurance and cardiovascular health parameters in young adults. The results reveal significant gains in muscle endurance and improvements in cardiovascular markers such as resting heart rate and blood pressure. These findings support the integration of RT into fitness regimes for overall health promotion in young populations.

Keywords: Resistance training, muscular endurance, cardiovascular health, young adults, fitness, heart rate, blood pressure

Introduction

Physical inactivity is a significant risk factor for various non-communicable diseases including cardiovascular disorders and musculoskeletal degeneration. Resistance training (RT) is commonly employed to enhance muscular strength; however, its contribution to cardiovascular well-being and muscular endurance has gained attention recently.

Young adults often engage in aerobic forms of exercise to improve endurance and cardiovascular function. However, incorporating RT may serve dual benefits—enhancing muscle function while supporting cardiac health. This research explores how structured RT affects endurance and cardiovascular health in young adults aged 18–25 years.

Materials and Methods

Participants

Fifty healthy young adults (25 males, 25 females; age 18–25 years) volunteered for this study. All participants were non-athletes, with no known cardiovascular or musculoskeletal conditions. Written informed consent was obtained.

Study Design

This was a prospective interventional study over 12 weeks. Participants were randomly

divided into a control group (n=25) and an intervention group (n=25). The intervention group underwent RT thrice weekly, while the control group maintained their regular lifestyle.

Resistance Training Protocol

The RT program consisted of exercises targeting all major muscle groups: squats, lunges, deadlifts, bench press, lat pulldown, bicep curls, and tricep extensions. Each session lasted 60 minutes, including warm-up and cool-down, with progressive overload applied biweekly.

Outcome Measures

- **Muscular Endurance:** Assessed via push-up and sit-up tests.
- **Cardiovascular Health:** Measured by resting heart rate (RHR), systolic and diastolic blood pressure (SBP and DBP).
- Measurements were taken pre- and post-intervention.

Statistical Analysis

Data were analyzed using SPSS v25. Paired t-tests were used to compare pre- and post-intervention values. A p-value <0.05 was considered statistically significant.

Results

Baseline Characteristics

Both groups were comparable in terms of baseline age, BMI, and fitness parameters (p>0.05).

Muscular Endurance

Participants in the RT group showed significant improvements in both push-up and sit-up tests (Table 1). The control group showed no change.

Table 1. Muscular Endurance (Mean ± SD)

Test	Control Group Pre	Control Group Post	RT Group Pre	RT Group Post	p-value (RT)
Push-Ups (count)	17.3 ± 3.1	17.8 ± 3.3	18.2 ± 2.9	26.4 ± 3.5	<0.001
Sit-Ups (count)	22.1 ± 4.2	22.5 ± 4.0	23.0 ± 3.8	30.2 ± 4.1	<0.001

Cardiovascular Health

The RT group demonstrated a reduction in RHR, SBP, and DBP (Table 2). No significant changes were observed in the control group.

Table 2. Cardiovascular Parameters (Mean ± SD)

Parameter	Control Pre	Control Post	RT Pre	RT Post	p-value (RT)
RHR (bpm)	76.2 ± 5.5	75.8 ± 5.4	75.6 ± 5.8	69.3 ± 4.7	<0.01
SBP (mmHg)	122 ± 8	121 ± 9	123 ± 7	117 ± 6	<0.01

Parameter	Control Pre	Control Post	RT Pre	RT Post	p-value (RT)
DBP (mmHg)	78 ± 6	78 ± 5	79 ± 5	74 ± 4	<0.01

Figure 1. Comparison of Pre and Post Cardiovascular Parameters in RT Group
(Bar graph showing RHR, SBP, DBP reduction)

Discussion

Our findings suggest that RT not only improves muscular endurance but also contributes to cardiovascular health. A reduction in resting heart rate and blood pressure indicates improved heart efficiency and vascular function.

These outcomes are consistent with prior studies that have demonstrated cardiovascular benefits of resistance training [1-3]. The mechanism may include enhanced endothelial function, improved autonomic balance, and reduction in peripheral vascular resistance [4,5].

RT is generally underutilized for endurance and cardiovascular conditioning, particularly in young adults. This study advocates for its inclusion in general fitness programs.

Limitations

The study sample was limited to urban college students; results may not generalize to other populations. Future studies should consider long-term effects and compare RT with aerobic training.

Conclusion

A structured resistance training program significantly improves muscular endurance and cardiovascular health parameters in young adults. RT should be considered an essential component of health and fitness interventions targeting young populations.

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