IMPACT OF REGULAR AEROBIC EXERCISE ON CARDIOVASCULAR FUNCTION: A PHYSIOLOGICAL PERSPECTIVE

Jabborova Etibor Jurakulovna

Head of the Department of Dentistry, College of Public Health. Abu Ali Sino Buxoro, Uzbekistan

Ruzieva Gulchehra Atoevna

Lecturer in Anatomy at the TECHNIKUM OF PUBLIC HEALTH NAMED AFTER AFSHONA ABU ALI IBN SINA

Abstract

Regular aerobic exercise induces significant adaptive changes in the cardiovascular system. These changes include improved myocardial contractility, enhanced vascular elasticity, and increased oxygen delivery to peripheral tissues. This paper analyzes the physiological mechanisms underlying cardiovascular adaptation to aerobic training and highlights clinical implications for prevention and management of cardiovascular diseases.

Keywords: aerobic exercise; cardiovascular physiology; myocardial adaptation; vascular function; oxygen transport

1. Introduction

Cardiovascular diseases (CVDs) remain the leading cause of mortality worldwide. Numerous studies have demonstrated that regular aerobic exercise is one of the most effective, low-cost, and accessible interventions for cardiovascular health promotion. Understanding the physiological basis of exercise-induced cardiovascular adaptations is essential for clinicians, medical students, and health professionals.

2. Methods

This article is based on a narrative review of peer-reviewed scientific literature published between 2010 and 2024. Databases searched included PubMed, Scopus, and Google Scholar. Keywords used: *aerobic training, cardiovascular adaptation, oxygen delivery, stroke volume, endothelial function.*

3. Results

3.1 Cardiac Adaptations

- Aerobic training increases **stroke volume** due to enhanced ventricular filling and myocardial contractility.
- Long-term exercise leads to **physiological cardiac hypertrophy**, particularly of the left ventricle.
- Resting heart rate decreases as a result of improved autonomic regulation.

3.2 Vascular Adaptations

- Regular exercise improves **endothelial function** by increasing nitric oxide (NO) production.
- Arterial compliance is enhanced, reducing peripheral resistance and improving blood flow.

3.3 Oxygen Transport Improvement

- Aerobic exercise increases **capillary density** in skeletal muscles.
- Hemoglobin concentration and mitochondrial efficiency significantly improve, enhancing oxygen extraction

4. Discussion

The adaptive changes induced by aerobic training contribute to improved cardiovascular efficiency. Enhanced endothelial function lowers the risk of hypertension and atherosclerosis. Physiological hypertrophy, unlike pathological hypertrophy, results in increased cardiac output without compromising cardiac structure. These adaptations collectively reduce the incidence and progression of CVDs.

Additionally, exercise benefits metabolic health by improving lipid profile, glucose tolerance, and inflammatory markers. Therefore, aerobic exercise should be incorporated into routine clinical recommendations for both healthy individuals and patients with cardiovascular risk factors.

5. Conclusion

Regular aerobic exercise triggers beneficial structural and functional adaptations within the cardiovascular system. These physiological changes significantly improve cardiac performance, vascular health, and oxygen transport. Promoting aerobic activity remains a key strategy for CVD prevention and rehabilitation.

References

1. Wen CP, et al. *Benefits of Exercise for Cardiovascular Health*. J Am Coll Cardiol. 2019.
2. Joyner MJ, Casey DP. *Regulation of Blood Flow During Exercise*. Physiol Rev. 2015.
3. Green DJ, et al. *Exercise and Vascular Adaptation*. J Physiol. 2017.
4. Lavie CJ, et al. *Exercise and the Heart: Clinical Implications*. Prog Cardiovasc Dis. 2020.