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**A COMPARATIVE STUDY OF THE EXERCISE CAPACITY
IN AGE-MATCHED SMOKERS AND NON-SMOKERS**

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Relevance. Cigarette smoking has been identified as one of the vital public health concerns globally. It has been demonstrated that smoking has a well-established detrimental effect on cardiovascular, respiratory as well as the muscular systems. Current epidemiological studies confirm that smoking causes early physiological changes through multiple mechanisms starting from toxic carbon monoxide stimulating reduction of oxygen transport to alteration in the skeletal muscle efficiency (Kerget B., 2025). However, its impact on the physical activity, particularly in young university students, receives considerably less attention. The 6-Minute Walk Test (6MWT) serves as a simple, safe and reliable measure of functional exercise capacity and thus understanding the levels of which smoking affects this capacity in an age-matched population is crucial for developing intervention strategies and raising awareness about the striking effects of smoking.

Aim: to compare the functional exercise capacity, measured by the 6-Minute Walk Distance (6MWD), and associated physiological parameters such as heart rate, oxygen saturation and blood pressure between an age-matched group of smokers and non-smokers.

Materials and methods. A comparative cross-sectional study was performed using 20 male university students, consisting of 10 smokers and 10 non-smokers of similar age, weight and height. Smokers were described as students with a smoking exposure for at least a year and consumed a minimum of 2 to 3 cigarettes per day. All participants underwent the 6MWT according to the standard American Thoracic Society (ATS) guidelines (2002). The primary physiological measure was the total distance walked in 6 minutes (6MWD). Secondary physiological variables measured included heart rate (HR), peripheral oxygen saturation (SpO₂) and systolic and diastolic blood pressure (BP), recorded at rest, immediately post-test and at every minute. Statistical dates and plotting were performed using JASP application and all values are presented as Median [Q1-Q3]. The Mann-Whitney method was used for comparative analysis of the reliability of differences between groups. Statistical significance was considered at $p < 0.05$.

Results and their discussion. The median age and BMI of smokers and non-smokers were similar: 20 [19-21] and 20 [19-21]; 24.6 [23.9-25.7] and 24.7 [23.2-26.0] respectively. The median distance (m) was significantly lower in the smoker group 575.0 [556.5–615.0] compared to the non-smoker group 693.0 [673.5–712.3]. At rest, the median heart rate (bpm) was significantly higher in smokers 82.5 [80.3–87.5] compared to non-smokers 74.0 [71.3–78.3]. Following the 6MWT, the median post-test heart rate was significantly elevated in smokers 153.5 [146.8–158.8] compared to non-smokers 121.0 [117.3–125.8]. No significant differences were observed in median post-test peripheral oxygen saturation between smoking groups at rest 97.5 [97.0–98.0] compared to non-smoking groups 99.0 [98.0–99.0]. Several physiological mechanisms could be considered to justify these results since smoking leads to endothelial disruption and oxidative stress in the lungs and muscles, causing inefficiency of muscle performances and increased fatigue. The higher heart rate recorded among smokers is an indication of a compensation pathway adopted by the body to ensure cardiac output remains normal. These findings also carry a significant implication for prevention.

Conclusions. The outcomes of this comparative research reveals that young, asymptomatic and healthy smokers have a much lower functional exercise capacity, considering the lower 6MWD as well as increased heart rate levels compared to non-smokers of similar age. Prevention strategies may focus on introducing routine screening of functional capacity using simple, reliable tools like the 6MWT in school and university health programs to demonstrate the concrete impacts of smoking on specific physiological parameters. Development of targeted educational campaigns also can highlight the long-term risks of smoking related to heart disease and respiratory disorders.