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„Analiza czynników wpływających na wskaźniki wydolności fizycznej oraz maksymalne tętno (HRmax) w populacji aktywnej fizycznie”.

Rozprawa na stopień naukowy doktora nauk medycznych
w dyscyplinie nauki medyczne

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SUMMARY

„Analysis of factors affecting physical fitness indices and maximum heart rate (HRmax) in a physically active population."

Maximum heart rate (HRmax) is a parameter used both during exercise testing for the diagnosis of cardiovascular disease and for the assessment of exercise intensity in sports. Its value is strongly correlated with age, which is inter alia associated with changes in the sinus node.

In this doctoral dissertation, in addition to age, the effects of other factors such as body composition, BMI, physical capacity, type of test performed, and gender on HRmax were evaluated in a group of 3374 healthy physically active individuals who underwent spiroergometric testing. Previously used formulas for estimating HRmax, including the 220-age formula, the method of Tanaka, Inbar, Nes, Londeree and Moeschberger in the study population were inaccurate. New formulas were developed, both univariate (only age was considered) and multivariate taking into account the above-mentioned factors to estimate HRmax in a group of physically active people. The proposed formulas had the lowest error in the study group. The role of factors other than age has been shown to contribute to a small improvement in the accuracy of HRmax determination.

In a group of triathlon trainees, the results achieved during the spiroergometric test (CPET) on a treadmill and on a cycle ergometer were compared. It was shown that in both cases the physiological parameters obtained differ from each other, indicating the need to perform both tests independently. In men over 40 years of age, BMI, body fat and lean body mass significantly correlate with heart rate, oxygen uptake at peak exercise, at the anaerobic threshold as well as at the point of respiratory compensation.