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Exercise and respiratory system: Is there room for improvement?

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The pulmonary system has a crucial role in the performance and can be a limiting factor during exercise. What is known about exercise and respiratory function? It is known that regular physical activity is associated with higher ventilatory parameters and a slowdown of the physiological decline in pulmonary function. Another interesting topic is the analysis of breathing pattern. In fact, given ventilation can be achieved by different combinations of tidal volume and respiratory rate and a breathing pattern characterized by a higher tidal volume and a lower respiratory rate for the same ventilation is more efficient. Is it possible to exercise the ventilator capacity? The well-known information about this question is the reduction of ventilation for the same work rate, after a training program, but not much is known about other specific breathing training. The first point concerns the respiratory muscles. As breathing is a muscular exercise, it could also be trained. In fact, it has been shown that respiratory muscle training improves endurance exercise performance and time trials in healthy individuals with greater improvements in less fit individuals and in sports of longer durations. Also a regular yoga practice improves pulmonary function in healthy individuals. No information is available for athletes. The second point concerns the breathing pattern and in particular the possibility of training individuals or athletes to adopt a more efficient ventilatory pattern. Up to now there is no research devoted to this topic in athletes.

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Comprehensive ECG analysis and definition of individual ECG norm and its value for fitness and sports training

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Is it possible to personalize the monitoring of the effectiveness of physical activity in sport and fitness using ECG analysis, i.e., without the use of expensive technologies inaccessible in everyday life? Multilateral electrocardiogram analysis: 4 levels of the analysis result in the formation 4 data blocks. Establishment of a representative database of healthy people ECGs including parameters of heart rate variability, structured by age and sex. Thus, it creates out sex-age standard. Forming the individual ECG standard for each person is possible. Moreover, each person has several of these standards: morning (absolutely optimal state), the best condition in the middle of the day, in the evening after work, the optimal condition after the physical exercise, etc. It is also possible to determine the distance from the current measurement up to standard. This distance is determined in several ways, and the result is an overall assessment. Consequently, each dimension of each person is located, firstly, on the age scale (for example, corresponds to the age of 40 years) and, secondly, on the scale of the distance from the individual standard. It allows to personalize the monitoring of the effectiveness of physical activity in sport and fitness, i.e., to make such control more sensitive to the impact of training on an individual trainee.

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