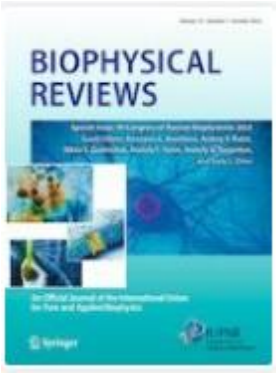

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Abstracts

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S4.234. Assessment of the postural balance of badminton athletes after functional load

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Introduction. Postural and core stability is critical for almost all movements in sports [1], especially when maintaining balance on uneven ground or when responding to sudden disturbances [2]. Balance training improves joint stability, jumping ability, speed, and muscle contraction strength. Excellent body balance is critical for developing badminton skills, athletic performance [3], and injury prevention [4].
Materials and methods. The study involved 12 badminton players (age 20.91±2.03, time spent playing badminton 11.5±3.7 years) and 8 non-athletes (age 21.34±1.87 years). To assess postural stability, the "Tolerance control" test was carried out before and after the functional load (45 squats per 1 minute) The "Tolerance control" test consisted of 3 stages: Romberg test with open eyes (OE), Romberg test with closed eyes (CE) and the "Target" test. In the MedStat program, intragroup differences were determined by the Wilcoxon T-test and intergroup differences by the Mann-Whitney U-test. The level of statistical significance $p < 0.05$.
Results. In nonathletes, the total length of center of pressure displacements after exercise in the OE and CE samples was greater in the frontal plane than before exercise. In athletes, after the load, the displacement length increased in the sagittal plane more than in the frontal one. The shift of the center of pressure in athletes was significantly less after exercise in the OE sample and the "Target" test, and significantly more in the CE sample. Thus, we have shown that in athletes the leading analyzer in maintaining balance is the visual one. After exercise, non-athletes showed an increase in body displacement along the front, which indicates a change in the ankle balance strategy to a less effective femoral one. All participants showed a decrease in KFR in the CE test and in the "Target" test. In the "Target" test, badminton players showed high productivity, an effective strategy for maintaining the center of gravity in a given zone before and after the load test. It has been shown that, in general, regular physical activity improves postural control due to the structural adaptation of the extensor muscles of the lower limb, which allows athletes to use anticipatory strategies in maintaining balance.
Conclusion. The visual analyzer is the leading one in maintaining postural balance in badminton players. We assume that the current active neuromuscular regulation of the posture as a result of training in athletes leads to stabilization in the sagittal plane with the complication of postural tasks.
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S4.235. Biomechanical aspects of shoulder girdle muscle power assessment of wrestlers

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Muscle power is an important indicator that is needed in many sports where a demonstration of strength and speed is required, in particular in wrestling. The Wingate test is often used to assess muscle power, it allows to assess the anaerobic performance of muscles and evaluate the results with existing standards [Popadic, 2009]. The results of this test can be presented both in absolute (W) and relative (W/kg) values, which allows a more accurate assessment of the athlete's physical performance. According to researchers, other indicators calculated during the test are less reliable and not always reproducible. The unresolved question remains that power, as a combination of speed and strength, during the test, will also depend on the length and diameter of the limbs, which can contribute to the final result. In this case, the diameter of the limbs, with the same level of subcutaneous fat and bone diameter, will indirectly determine the size of the working muscles, while the length of the limbs will determine the length of the levers through which this power will be realized. Therefore, with the same length of the ergometer handles, there may be a significant difference between the test results of the subjects only due to differences in limb lengths.
Wrestlers engaged in local ethnic Kuresh, judo, freestyle wrestling, sambo and having 1 category and above were tested to assess the possible impact on the power of anthropometric parameters. Measuring tape, weighing machine were used to anthropometric measurements viz. height, arm diameter and length, forearm length (cm) and weight (kg) for each of these athletes. The body length of the subjects was 176.9 ± 8 cm, weight 76 ± 7.8 kg, arm circumference 30 ± 2 cm, arm length 32.8 ± 2 cm, forearm 27.6 ± 1.4 cm. Age of wrestlers at the time of testing was 19 .8±1.5 years. Monark Cycle Handheld Ergometer with Wingate testing software (891 E) lasting 5 seconds was used to measure an absolute and relative peak power (W, W/kg), as well as the rotational speed of the ergometer handle (rpm). All the subjects did a warm-up and a trial test before testing to level the technical aspects of the test. Testing was carried out 3 times for 5 seconds with a rest between attempts. The load on the ergometer was dosed as 3.75% of body weight.
The analysis shows that the circumference of the shoulder doesn't correlate with the indicators of both absolute and relative power. Perhaps this is determined by the fact that power is achieved by the total activity of not only the shoulder muscles, but also the muscles of the body (pectoral muscles and the latissimus dorsi), which are actively involved in the test by bending and unbending the arms in the shoulder joints, as well as the consistency of their work.
Shoulder length, as well as forearm length, had positive correlations with the test results: with absolute peak power r=0.61-0.068 ($p<0.006$-0.044), forearm length also correlated with absolute peak power r=0.61-0.74 ($p<0.025$-0.008), in addition, the length of the shoulder and forearm correlated with the speed of rotation of the ergometer handle - r=0.68-0.73 ($p<0.01$-0.02). Correlations with relative powers weren't found.
These data indicate the need to take into account not only the mass of the subject, but also the parameters of limb lengths, which, other things being equal, can affect the power indicators of athletes. The influence of the length of the shoulders and forearms on the demonstrated power is apparently realized through a higher speed of rotation of the ergometer handle of athletes with longer limbs. These influences can significantly distort the indicators of the power of the muscles of the shoulder girdle, in particular in adolescent children, whose biological maturity, and, accordingly, the body length as a whole, will be different at the same passport age.