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Ocena stabilności posturalnej i propriocepcji stawu kolanowego u łyżworolkarzy

Summary

Title:

Evaluation of postural stability and proprioception of the knee in inline skaters

Introduction:

Inline skating requires general physical fitness and good neuromuscular coordination in order to maintain balance with the alternating movement of load transfer of the lower limbs. Postural stability control and proprioception weaken with age. Physical activity, such as inline skating, has the potential to improve musculoskeletal coordination and reduce the risk of falling in old age. Despite the popularity of inline skating however, there is no comprehensive analysis of the impact of this sport on postural stability and knee joint proprioception, and neuromotor assessment of inline skaters with age.

Purpose

The aim of the study is to assess the postural stability and proprioception of the knee joint in people regularly practicing inline skating, taking into account gender and age.

Materials:

The groups consisted of 60 people. Study group - people training inline skating for at least 3 years, on average 2 times a week for 6 months a year. Control group - a group similar in terms of demographics to the study group of people not inline skating and not practicing sports regularly in the last 12 months. In both groups, subgroups of people ≥ 55 years old consisting of 15 people were distinguished.

Methods:

The assessment of knee joint proprioception was performed on the Biodex 4 Pro (Technomex) biomechanical chair. The dominant limb was assessed twice for 45° and 60° knee flexion in passive motion. The study of muscle coordination and balance was carried out using the Biodex Balance System dynamometric platform and the Y- Balance (Move2Perform) test of the lower limb (YBT-LQ). In order to answer the research questions, statistical analysis was performed using the IBM SPSS Statistics 28 package. The threshold of $\alpha = 0.05$ was considered the significance level.

Results:

In the assessment of postural stability in the BBS test, statistically significant differences were noted for the medial-lateral stability index (MLI) in the test at level 2 with eyes closed and the ASL test with eyes open in the study and control groups, better results were observed in inline skaters. In the assessment of postural stability, in the BBS test of younger skaters compared to younger people in the control group, the analysis showed statistically significant differences in the BBS test - for the anterior-posterior stability index (API) in the test at level 2 with eyes open and the ASL test with eyes open, and also for the Medial-Lateral Stability Index (MLI) in a level 8 eye-closed test and a level 2 eye-open test, with younger skaters performing better. In the assessment of postural stability in the BBS test of older skaters to the elderly in the control group, no differences were found. Only in the YBT test was there a statistically significant difference in the greater measurement of the posterolateral (PL) reach for the dominant limb in older skaters. In the assessment of postural stability, taking into account gender, the results of female inline skaters in most comparisons in the BBS test were statistically significantly better, and in the YBT test the result of the combined range were also significantly better. In the analysis comparing the postural stability of men and women in the group of younger skaters, statistically significant differences were observed for most indicators, both in the BBS and Y- Balance tests, with better parameters of postural stability in men. The results of postural stability of skaters assessed in YBT tests on the dominant and non-dominant limb were comparable. In the assessment of the asymmetry of the lower limbs in the Y- Balance test, in the study group and the control group, taking into account age and sex, the only increased percentage of people with a significant asymmetry of the posterolateral range between the lower limbs was observed in younger female skaters compared to younger women in the control group. The results of postural stability of the subgroup of younger skaters in the Y- Balance test were compared to other sports disciplines, noting a number of statistically significant

differences. There was no close correlation of the results in the assessment of postural stability tested with the BBS and YBT tests. The level of proprioception of the knee joint of the dominant limb in the compared groups was similar. A number of statistically significant relationships were found between some results of the BBS test and proprioception of the knee joint of the dominant limb, indicating better postural stability and better proprioception of the knee joint of the dominant limb assessed at a flexion angle of 45°.

Conclusions:

1. Inline skaters (<55 years of age) have better postural than inactive peers in selected parameters Biodex Balance System test, but not in the Y - Balance test.
2. Inline skating has not been shown to improve postural stability in older skaters (≥ 55 years old).
3. Inline skating improves postural stability in women.
4. Male skaters have better postural stability than female skaters.
5. Inline skaters have comparable postural stability in YBT tests on the dominant and non-dominant limb.
6. The risk of injury associated with the increased asymmetry of the ranges of subjects in the Y- Balance test is similar for skaters in than control group. Only among younger skaters (<55 years of age), was a significantly higher percentage of asymmetry observed in the PL YBT range test.
7. Strict correlation of the results between the BBS and YBT tests has not been demonstrated.
8. Inline skating has not been shown to improve knee joint proprioception.
9. There is a positive correlation between postural stability of selected BBS test parameters and knee joint proprioception.