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ASSESSMENT OF THE FUNCTION OF THE KNEE JOINTS AND THE IMPACT OF THEIR STATE ON THE PHYSICAL ACTIVITY OF THE STUDENTS

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Abstract: *The purpose of this study is to evaluate the function of the knee joints and how their condition affects the ability of students to participate in training activities. Students from the Vasil Levski National Sports Academy in Sofia, Bulgaria participated in the study. The evaluation of the function of the knee joints was made with a structured questionnaire modified by us on the basis of the Knee injury and Osteoarthritis Outcome Score (KOOS). The survey was done using Google Forms and standard survey. The questionnaire included questions aimed at assessing the subjective sensation of the magnitude of the knee joint problem when available.The incidence of knee problems with gradation from never to constant has also been reported.*

Key words: *knee joints, students, screening studies, sport, fitness*

1. Introduction

The prevalence of knee joint damage in young and active students has been the subject of research by a number of researchers. One of the large-scale studies conducted is that of Mitchell et al. (2015) [12]. The authors follow through on 2007–2013, a large nationally disperse sample of US high schools reported athlete exposure and injury data for 22 sports by having certified athletic trainers complete an internet-based data collection tool. The results obtained are summarized 1082 meniscal injuries were reported during 21 088 365 athlete exposures with a total injury rate of 5.1 per 100,000 athlete exposures. Van Beijsterveldt, A. M., et al. (2017) [18] investigate sports injuries and illnesses in first-year physical education teacher education students.

Their methodology involves online using the Oslo Sports Trauma Research Centre (OSTRC) Questionnaire on Health Problems. During the first 21 weeks of the academic year, 245 first-year students registered their health problems. A total of 276 injuries, 140 illnesses and 69 unclassified health problems were reported. Sixty per cent of all health problems were injuries (n=276). The authors point out top 10 of the relative impact of injuries in each anatomical area, based on the adjusted

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cumulative severity score over the total study period. The results show that knee, lower leg and shoulder injuries had the greatest impact.

Clifton, D. et al. (2017) [1] are researching the Epidemiology of Knee Sprains in Youth, High School, and Collegiate American Football Players. They participate in the study 310 youth, 184 high school, and 71 collegiate football team-seasons were collected during the 2012 through 2014 seasons. The risk of knee sprains increased with increasing levels of competition, with the highest risk occurring in college football players.

As a key point, the authors emphasize that deviations in the level of distribution of knee dislocations during injury activity may emphasize the need to develop prevention policies and strategies to ensure safe sports play.

2. Purpose of astudy

The purpose of this study is to evaluate the function of the knee joints and how their condition affects the ability of students to participate in training activities.

3. Material and methods

The study included 73 physically active students from the National Sports Academy "V. Levski"

The evaluation of the function of the knee joints was made with a structured questionnaire modified by us on the basis of the Knee injury and Osteoarthritis Outcome Score (KOOS). The survey was done using Google Forms and standard survey.

The questionnaire included questions aimed at assessing the subjective sensation of the magnitude of the knee joint problem when available.The incidence of knee problems with gradation from never to constant has also been reported.

4. Results

The function of the knee joint is to prove itself to students in several directions: swelling, noise, stiffness, knee block and pain.

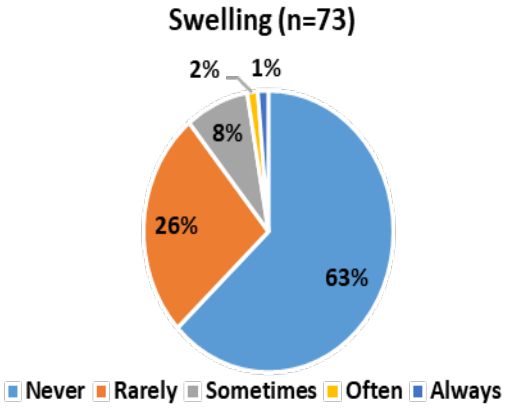

Fig. 1. *Do you have swelling in your knee?*

When asked Do you have swelling in the knee, 63% of students respond negatively. A total of 37% of them have some swelling, with most of them 26% rarely, or sometimes 8%. In 3% of the contingent studies, the incidence of the symptom was high.

Analyzing these and the subsequent results, we should emphasize the fact that these are clinically healthy and young people who participate in active physical activity.

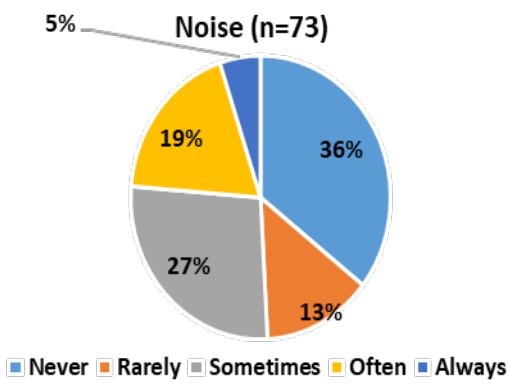

Fig. 2. *Do you feel grinding, hear clicking or any other type of noise when your knee moves?*

The results obtained show a very common manifestation of the symptom of knee noise when moving in the studied contingent. Only 36% of students reported no noise while driving. In the rest of them, the symptom has a different frequency of manifestation - rarely (13%), sometimes (27%), often (19%), and 5% of students hear noise from their knee at each movement.

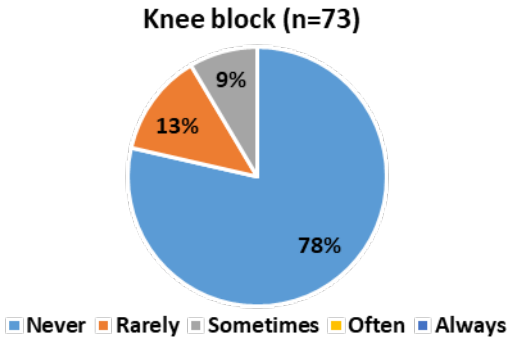

Fig. 3. *Do you have a knee block when moving?*

A total of 22% of students have had a knee joint blockage in the last week (9% sometimes and 13% rarely). In 78% of students, there was no knee blockage.

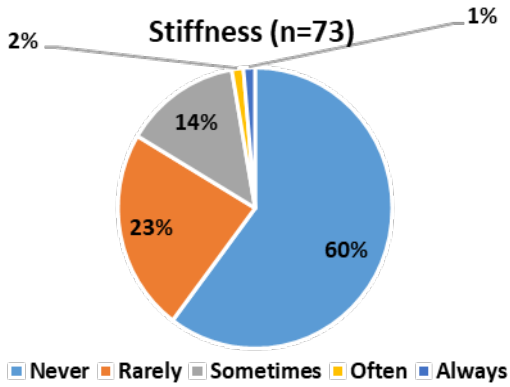

Fig. 4. *Do you have a morning stiffness in your knee joint?*

Sixty percent of the subjects examined did not experience stiffness in the knee joint. Again the surprisingly high percentage of students with some symptom frequency - a total of 40%. The incidence rate is as follows: 23% infrequent, 14% occasional, 2% frequent and 1% always.

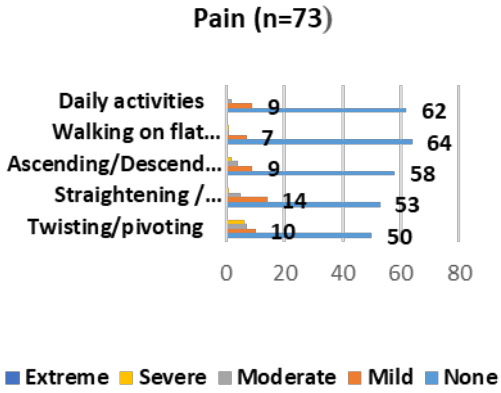

Fig. 5. *What is the strength of pain in your knee joint in the performance of activities of daily living?*

The severity of pain was examined in the following activities: Daily activities; Walking on flat surface; Ascending/Descending stairs; Straightening / Bending knee fully; Twisting/pivoting.

13% (9 students) have been experiencing pain on a daily basis over the past week; 10% experienced pain when walking on a flat surface; 13% on ascending and descending stairs; 19% for full knee flexion and expansion and 14% for Twisting / pivoting. The severity of pain is ranked as mild, moderate, severe, extreme. The predominant indicated severity of pain in all activities is mild.

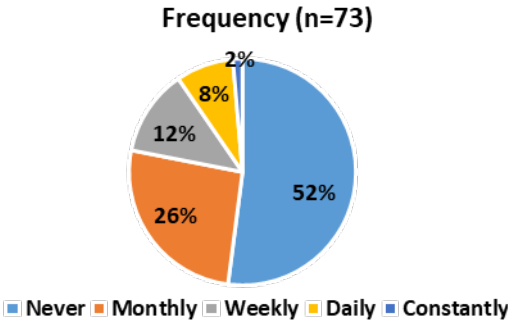

Fig. 7. *How often does your knee function cause you a problem?*

How often does your knee cause a problem for the surveyed person to answer as follows: 52% never; 26% once a month; 12% once a week, 8% daily and 2% permanently. What is striking is the huge overall percentage (48%) of the subjects reporting a problem with knee function.

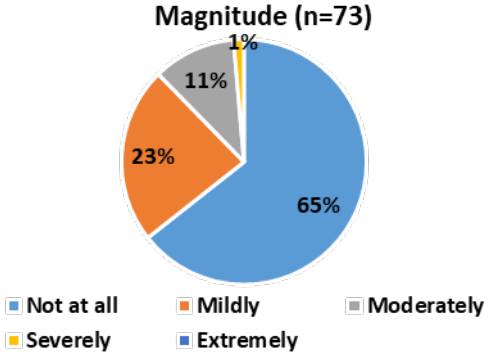

Fig. 8. *Overall, what is the magnitude of the problem that your knee function creates?*

When asked what is the magnitude of the problem that your knee joints create, students respond as follows: 65% have no problem; 23% mildly; 11% moderately; 1% severely.

It is noteworthy that for 13% of students with manifestation of knee joint dysfunction this does not present a problem (Figs. 8 - 65% lack of problem; Figs. 7 - 52% lack of manifestation of knee joint dysfunction).

5. Discussion

Our study confirms the high prevalence of dysfunction in particular affecting the function of the knee joint, which are associated with sports activities. There is a need to promote the problem and create and approve prevention methodologies. The interest in the topic in the world methodological literature is growing.

Foss, K. et al. (2018) [8] set themselves a goal to determine the effects of a school-based neuromuscular training (NMT) program on sport-related injury incidence across 3 sports at the high school and middle school levels, focusing particularly on knee and ankle injuries. Two methodologies are applied – CORE and SHAM. The CORE intervention consisted of exercises focused on the trunk and lower extremity, whereas the SHAM protocol consisted of resisted running using elastic bands. Each intervention was implemented at the start of the season and continued until the last competition. An athletic trainer evaluated athletes weekly for sport-related injuries.

The authors' conclusions are that participation in the CORE intervention program reduced injury incidence compared with participation in a SHAM intervention. Thus, the CORE intervention

program offered protection against injury in young female athletes over the athletic season. According to the authors of particular interest was the knee-injury reduction observed for middle school volleyball athletes. These data might reflect an important window of opportunity for implementing injury-prevention strategies at younger ages to have the greatest effects on the susceptible female population.

In the Bulgarian methodological literature there is a series of studies related to the function, dysfunctions and traumas of the knee joint as well as their physiotherapy [3-8], [10] [11], [13–18].

An example of good practice is the thesis, developed by Mitrev G (2016), entitled "Prevention of Basketball Injuries in Basketball," in which a prophylactic was developed using physiotherapy.

6. Conclusions

Too many (48%) of the students surveyed report having a problem with their knee joint function, given that they are young active students attending a sports academy.

Students tend to underestimate the importance of having a problem with one of their knee joints.

It is necessary to promote methodologies and possibilities for the prevention of traumatism and the damaging load of the musculoskeletal system in young active people who regularly participate in active physical activity.

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