ISBN 978-985-21-1695-4
УДК [61+615.1]:001.895(06)(476)
ББК 53+52.82
И 66

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ПАТЕЛЛОФЕМОРАЛЬНЫЙ ТЕНДОНИТ: ПРОБЛЕМА СО МНОГИМИ ОСЛОЖНЕНИЯМИ И ВЗГЛЯД НА ЕГО ВЕДУЩИЕ ПРИЧИНЫ

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PATELLOFEMORAL TENDONITIS: AN ISSUE WITH MANY COMPLICATIONS AND AN OUTLOOK TOWARDS ITS LEADING CAUSES

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Резюме. Боль и дискомфорт в коленном суставе – наиболее частые жалобы среди пациентов, страдающих от воспаления в области бедренной кости и надколенника. По данным ВОЗ около 365 миллионов людей имеют патологию коленного сустава. Данное исследование направлено на освещение проблемы консервативного лечения, включая физическую реабилитацию и физиотерапевтические методы, данной патологии.

Ключевые слова: надколенно-бедренное сочленение, физическая реабилитация, физиотерапия.

Resume. Pain and discomfort in the knee joint are the most common complaints in patients suffering from inflammation in the area of the articulation of the femur and patella. According to the WHO, about 365 million people suffer from knee problems. The study attempted to solve the problem conservatively, using physical rehabilitation and physiotherapeutic methods.

Keywords: patellofemoral joint, physical rehabilitation, physiotherapy.

Relevance. Tendinitis is an inflammation of a tendon, accompanied by pain, swelling, and reactive limitation of mobility, which complicates the execution of active movements. Most often, the inflammatory process affects tendons located near the elbow, shoulder, hip, or knee joint (Fig.1). This is due to the fact that they are subjected to the maximum load. Less frequently, the problem is diagnosed in the ankle or wrist joint area.

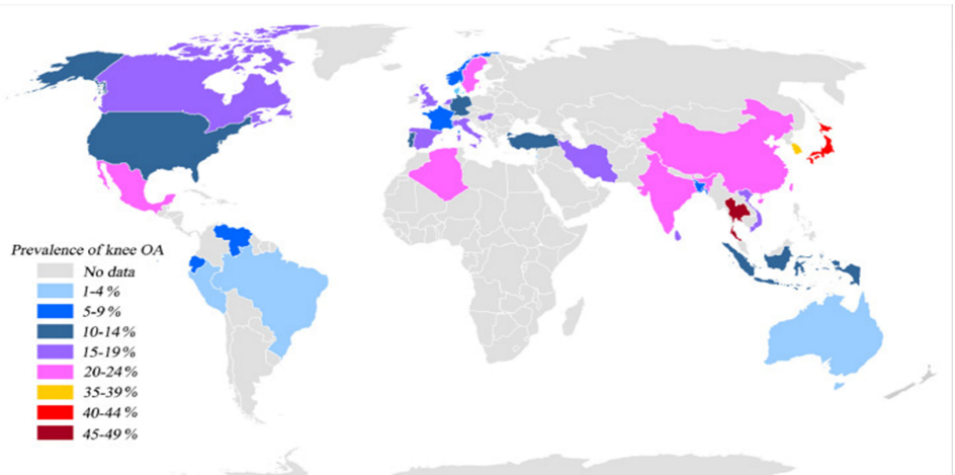

Fig. 1 – Epidemiology of knee joint pain prevalence

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The cause of tendinitis, and in the case of chronic overuse, tendinopathy, is, for example, microtraumatization during sports activities. In this regard, inflammation of the hip bone joint and patella (patellofemoral joint) (Fig. 2), clinically manifested as patellofemoral pain syndrome (PFPS) [1], is typical for athletes and individuals with high physical activity.

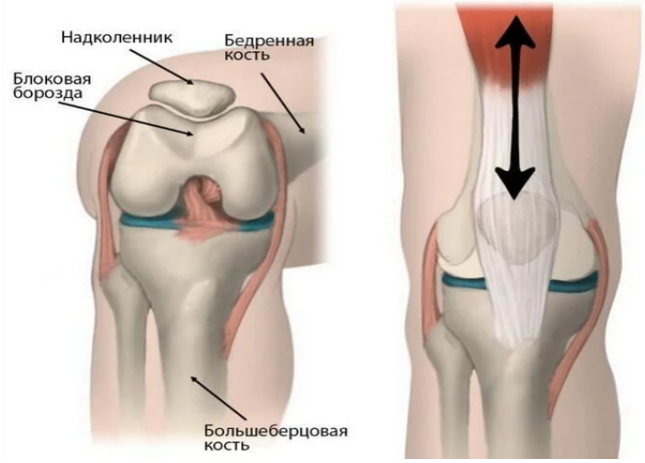

Fig. 2 – Anatomical structure of the patellofemoral joint

The main reason for the change in the position of the patella during the execution of movement (flexion and extension during running or jumping) against the background of joint biomechanical disturbances, i.e., pathobiomechanical pattern. The following are distinguished:

• lateral (external) displacement of the patella. The patella itself may shift outward (due to weakness of the quadriceps), as well as excessive hip rotation (due to weakness of the adductor muscle group). Then, a normally positioned patella ends up in a lateral position relative to the thigh – this is a more common cause.

• Inadequate flexibility caused by hypertonia of the quadriceps muscle. The quadriceps tendon continues as the patellar ligament, connecting it to the fibula. Thus, the hypertrophied quadriceps muscle of the thigh pulls the patella upward when the joint is extended, shifting and holding it, and with greater force when the joint is flexed.

• Instability of the ankle joint caused by injury to its ligaments. For example, an increase in the internal rotation of the fibula when the talocalcaneal ligament is damaged.

• Excessive pronation of the foot caused, for example, by flatfoot and valgus deformity. In this case, chronic foot positioning in hyperpronation, causes increased tension during the transition of the foot from external to internal rotation during movement.

Performing movements with a pathological pattern leads to chronic pain in the knee joint area. This condition does not allow athletes to continue sports training and requires appropriate recovery treatment. The use of conventional analgesics and anti-inflammatory agents is little effective, as they affect symptoms rather than the cause. On one hand, temporary restriction of mobility (orthoses) ensures joint decompression, reducing the pain syndrome. On the other hand, it creates conditions for the chronicization of the process, as it does not exclude the cause of pain, which in turn destroys the joint to a greater extent.

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The prevalence of this syndrome and its susceptibility among people of working age make it necessary to search for new methods of treating patellofemoral syndrome [2].

Objective: to determine an effective combination of medical rehabilitation measures in the treatment of patellofemoral pain syndrome.

Materials and methods. Nine patients, medical students engaged in football (3 men); volleyball (2 women, 1 man); power gymnastics on strength training equipment (3 men) participated in the study. All patients complained of pain in the knee joint, swelling, and limitation of movement. Hypotrophy of the quadriceps muscle of the thigh and a decrease in the volume of the thigh relative to the healthy limb by 2.8±1.2 cm were observed in all participants. The examination data (CT, MRI) indicated the presence of changes in soft tissues (anterior cruciate ligament (1), lateral and medial menisci (2), collateral lateral and medial ligaments (6), which together form the PFBS. The diagnosis of deforming arthritis of the knee joint was not established in any of the 9 patients. In addition, the following was found: longitudinal flatfoot and valgus deformity of the feet in 2 people; hyperlordosis of the lumbar spine – 2; deformities of the lower limbs: X-shaped – 3; O-shaped – 2 (Fig. 3).

Fig. 3 – Orthopedic examination data of patients with PFBS

For each patient, an individual rehabilitation program was developed, consisting of complexes of corrective exercises selected based on pathobiomechanical patterns and aimed at correction: flat feet, quadriceps muscle tension of the thigh, gluteal muscles, posture, including physiotherapeutic techniques: shock wave therapy (SWT), magnetotherapy (MT), electrical stimulation (ES), phonophoresis of potassium, laser therapy [3]. The number of necessary procedures to achieve the result was determined by the physiotherapist. On average, the course of each technique consisted of 8-10 procedures and was adjusted depending on the stage of the inflammatory process. The duration of treatment was 1.5-2 months. Remission occurred in all participants in the study after the course of rehabilitation treatment, lasting 6 months. All were able to return to physical training. Subsequently, therapy was renewed as needed (in case of exacerbation of the process).

Results and their discussion. Pain relief was observed (MT 10 days), SWT - 4-5 procedures every three days) within 12±2.5 days. It was noted that the effectiveness of

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exercises is higher when directed at muscle tone - the curvature of the spine was smoothed to normal in patients with posture disorders. Stabilization of the knee joint during extension (subjectively, patients reported relief during climbing stairs), objectively, the hip circumference increased by 2.5±0.9 cm. The least correcting effect was observed in patients with valgus foot deformity. Orthopedic insoles were proposed for them. During a persistent painless period, transcutaneous electrical stimulation (TES) was prescribed. Phonophoresis with hydrocortisone individually as the physiological edema increased (reaction to strength training).

Special corrective exercises were performed by all participants in the study and aimed at correcting the tone of the thigh muscles (Table 1).

Tab. 1. Method of performing special corrective exercises

Type of training	Method of execution	Mechanism of exercise action
Isometric	Perform 5 approaches of the exercise (extension of the knee joint in a sitting position) holding for 45 seconds. Training at 70% of maximum load reduces the pain in the tendons of the patella for 45 minutes after the workout.	Reaction based on reduction of irritation of the motor cortex of the quadriceps muscle caused by patella tendinopathy.
Isotonic	performing knee flexion while sitting with a fixed foot, with a limitation of 10–60° of knee joint flexion. In case of pain, increase the flexion to 90° or use support.	Isotonic exercises are important for muscle mass and quality recovery due to beneficial contraction ranges.
Power	Perform 4 sets of 8 repetitions of one-legged press with a weight of about 50% of your body weight. Muscle effort (with maximum resistance) at the beginning of the training, with followed by slight effort (3/10 or less on the VAS scale (pain assessment) during the training process	Helps to increase muscle tone, and with increased resistance, it contributes to muscle hypertrophy

For the reduction of joint stiffness, it is recommended as a preventive measure to perform exercises promoting muscle stretching and their uniform functioning [4], for example, cyclic ones: walking, cycling. These types of physical activity should be performed systematically and regularly.

Conclusions. The comprehensive impact of rehabilitation treatments in a short period of time has contributed to the alleviation of pain and biomechanical correction of musculoskeletal segments.

For the prevention of pain in the knee joint caused by patellofemoral tendinopathy, the following should be considered:

- ✓ the condition and degree of mobility in the joint;
- ✓ onset of pain during movement;
- ✓ degree and nature of pain.

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