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FEATURES OF PATIENT REHABILITATION AFTER ARTHROSCOPIC RECONSTRUCTION OF THE CRUCIATE LIGAMENTS OF THE KNEE JOINT

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Introduction

Cruciate ligament injuries of the knee joint are among the most common injuries among athletes, physically active individuals, and patients who have experienced significant mechanical impacts (falls, blows, accidents, etc.). The anterior cruciate ligament (ACL) is the most frequently injured, leading to knee joint instability, reduced functional capabilities of the limb, and an increased risk of osteoarthritis.

Arthroscopic reconstruction of the cruciate ligaments is considered the "gold standard" of surgical treatment, minimizing invasiveness, accelerating postoperative recovery, and ensuring anatomical alignment of the reconstructed ligament. However, even the most advanced surgical techniques cannot guarantee complete joint function restoration without a properly structured rehabilitation program.

Modern studies show that effective rehabilitation after arthroscopic ACL reconstruction must be comprehensive and phased, taking into account the biomechanical characteristics of the joint, the patient's level of physical fitness, and functional capabilities. However, the optimal timing of loading, types of exercises, and the volume of physical activity remain topics of scientific debate.

Objective

To develop and experimentally substantiate an optimized physical therapy program for patients after arthroscopic reconstruction of the cruciate ligaments of the

knee joint, aimed at:

- Accelerating the restoration of joint function
- Reducing pain levels
- Improving patients' physical activity
- Preventing secondary complications (contractures, muscle atrophy, joint instability)

Materials and methods

The study was conducted at a rehabilitation center and involved 40 patients (26 men, 14 women) aged 20 to 45 years who underwent arthroscopic reconstruction of the anterior cruciate ligament.

Patients were divided into two groups:

- **Group 1 (control, 20 individuals):** Received a standard rehabilitation program.
- **Group 2 (experimental, 20 individuals):** Underwent rehabilitation using a specially adapted program that included modern physical therapy methods (proprioceptive training, kinesiotaping, stabilization exercises, etc.).

To evaluate the effectiveness of rehabilitation, the following methods were used:

- **Goniometry** – to determine the range of motion in the joint.
- **Visual Analog Scale (VAS)** – to assess pain levels.
- **Lachman test and anterior-posterior drawer test** – to evaluate joint stability.
- **Lysholm Knee Scoring Scale (LKSS)** – to assess knee function.
- **Tegner Activity Scale (TAS)** – to determine the level of physical activity.

Results and discussion

A comparative analysis showed that patients who underwent rehabilitation using the adapted program demonstrated faster recovery and improved functional indicators.

At 2 weeks post-surgery:

- The range of motion in the knee joint was $80\pm 5^\circ$ in Group 1** and $95\pm 4^\circ$ in Group 2** ($p<0.05$).

- Pain level on the VAS scale was 5.1 ± 0.6 in Group 1** and 3.8 ± 0.5 in Group 2**.

****At 4 weeks post-surgery:****

- The range of motion was $105\pm 6^\circ$ in Group 1** and $120\pm 5^\circ$ in Group 2** ($p<0.05$).

- Pain level was 3.4 ± 0.7 in Group 1** and 2.1 ± 0.5 in Group 2**.

****At 3 months post-surgery:****

- Patients in Group 2 had significantly better results on the ****LKSS and TAS scales****, indicating a faster return to physical activity.

The study results confirmed the effectiveness of a comprehensive rehabilitation program incorporating modern techniques:

- ****Kinesiotaping**** helped reduce swelling and accelerated muscle function recovery.

- ****Proprioceptive training**** improved coordination and joint stability.

- ****Exercises on unstable surfaces**** contributed to restoring the musculoskeletal system.

Conclusions

The use of an adapted rehabilitation program after arthroscopic reconstruction of the cruciate ligaments of the knee joint significantly accelerates recovery and improves functional outcomes.

Combining classical physical therapy methods with modern technologies (****kinesiotaping, proprioceptive training, stabilization exercises****) allows for better rehabilitation results compared to standard programs.

The adapted program helps reduce pain, increase the range of motion in the knee joint, and improve overall quality of life for patients. The obtained results can be used for further improvement of rehabilitation protocols and the development of individualized recovery programs for patients after arthroscopic knee surgery.