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## Early rehabilitation after anterior cruciate ligamente reconstruction - literature review

### Wczesna rehabilitacja po rekonstrukcji więzadła krzyżowego przedniego - przegląd piśmiennictwa

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**Key words:** anterior cruciate ligamente, early rehabilitation, reconstruction

**Słowa klucz:** więzadło krzyżowe przednie, wczesna rehabilitacja, rekonstrukcja

#### Abstract

Rehabilitation of patients after reconstruction of the anterior cruciate ligament is the subject of many physiotherapeutic discussions. Of all sports injuries, about 70% are damage to the knee joint. Among these, in turn, the injuries of the anterior cruciate ligament occupy the leading position. Reconstruction is the best way to recreate a damaged ACL. The return of the patient to full physical fitness and daily activities are conditioned by surgery and improvement procedures. Early rehabilitation, the selection of appropriate rehabilitation methods, as well as individual characteristics of the patient affect the acceleration of the rehabilitation procedure and the results achieved at particular stages of physiotherapy

## **Abstrakt**

Rehabilitacja pacjentów po rekonstrukcji więzadła krzyżowego przedniego stanowi temat wielu dyskusji fizjoterapeutycznych. Spośród wszystkich urazów sportowych około 70% stanowią uszkodzenia w obrębie stawu kolanowego. Wśród tych z kolei czołowe miejsce zajmują urazy więzadła krzyżowego przedniego. Rekonstrukcja jest najlepszą metodą odtworzenia uszkodzonego ACL. Powrót pacjenta do pełnej sprawności fizycznej i czynności dnia codziennego warunkują: zabieg operacyjny oraz postępowanie usprawniające. Wczesne podjęcie usprawniania, dobór odpowiednich metod rehabilitacji, a także cechy osobnicze pacjenta wpływają na przyspieszenie postępowania usprawniającego oraz na osiągnięte efekty na poszczególnych etapach fizjoterapii

## **Introduction**

The knee joint is a joint characterized by a complex anatomical structure and complex motoriness. In everyday functioning, the joint is exposed to numerous overloads. The internal ligaments and meniscus are particularly susceptible to any damage. There is less frequent fracture of joint surfaces. Stabilization of the joint in the sagittal plane is mainly provided by the anterior and posterior cruciate ligaments. The superior function of both ligaments is to limit the femoral shift relative to the tibia bone. During the physical activity, the anterior and posterior cruciate ligaments, thanks to the extensive proprioception, affect the muscular balance within the knee joint. Loss of any of them is visible in the disorder of the lower limb movement pattern.<sup>1</sup>

Of all the traumatic injuries of the musculoskeletal system, over 15% are affected by ACL. According to statistics, as much as 50% of injuries in the knee joint include damage to the anterior cruciate ligament. Damage to the ligament most often occurs in the practice of physical activity (most often during knee deformity).<sup>2,3</sup>

## **Reconstruction of the anterior cruciate ligament**

The arthroscopic reconstruction of the anterior cruciate ligament is currently a routine procedure. It is estimated that about 100,000 treatments are performed each year in the United States to recreate a ruptured ligament. Polish statistics note that 1 person per 1000 inhabitants suffers an ACL injury and must be operated for this reason.<sup>4,5</sup> Direct contraindications for surgery are very narrow. The most common among them are: very old age or a large number of comorbidities (serious cardiological diseases, unbalanced blood pressure disorders). The reconstruction surgery takes place in a multi-stage. In the first place patients are subjected to accurate arthroscopy, used to assess the degree of damage to the ligaments and possible

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<sup>1</sup> Josephe E. Muscolino Palpation of the muscular and skeletal systems // edytęd by Śliwiński Z.: Badanie palpacyjne układów mięśniowego i kostnego, Wrocław 2011, s.563

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additional damage. At the time of the decision on full reconstruction, the appropriate tendons for transplantation are also selected. During the proper procedure, the operator drills bony tunnels in the femur and tibia, through which tendons prepared for transplantation will be performed. In the last stage, the transplanted tendons in the bone tunnels are stabilized under the appropriate tension. Other additional damage is also stapled.<sup>6</sup>

### **Rehabilitation after reconstruction**

The patient's return to full daily routine and physical activity is largely determined by the way the reconstruction is performed.<sup>7,8</sup> It affects the reduction of hospital stay time and the number of complications compared to the arthrotomy used previously.<sup>9,10</sup>

Due to rupture of the anterior cruciate ligament, the strength of the quadriceps succumbs to the affected limb and decreases the thigh circumference. The weakened limb compensates for the healthy limb, which is also overloaded. The intensive physiotherapy process seems to be extremely important. A well-performed reconstruction procedure and no post-operative complications promise a positive effect for the therapy. Any unforeseen situations may cause delays in intense physiotherapy, but also significantly weaken and reduce the operated limb

A big problem is the right moment to start improving. Recently, the advantages of starting the physiotherapy process were highlighted as soon as possible. The purpose of this procedure was to recover the patient's full physical activity as soon as possible, i.e. about 4-6 months after surgery<sup>11</sup>, and sometimes even 6-9 weeks after reconstruction.<sup>12,13</sup> Currently, the prevailing standard in the physiotherapy of patients after ACL reconstruction is the implementation of rehabilitation already on the second day of arthroscopic reconstruction.<sup>14,15</sup>

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<sup>6</sup> Fu F.H., Bennett C.H., Ma C.B., Menetrey J., Lattermann C.: Current trends in anterior cruciate ligament reconstruction. Part II, Operative procedures and clinical correlations. [w:] *Am JSports Med* 2000, 28, s. 124 - 130

<sup>7</sup> Isberg J. Kinematics and laxity in the knee, before and after anterior cruciate ligament reconstruction. Department of Orthopaedics Institute of Clinical Sciences Iahlgrenska; Academy at Iniversity of Göteborg, Sweden. 2008:s. 77- 85

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<sup>9</sup> Jędrzyk M., Noga H., Żerebiec J.: Rekonstrukcja więzadła krzyżowego przedniego z użyciem pasma centralnego więzadła rzepki [w:] *Acta Clinic.* 2002, 2, 1, s.26

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Frańczuk B. et al. Showed in their studies that the delay of 2 weeks of rehabilitation after arthroscopic reconstruction of the anterior cruciate ligament has no negative effect on the final effect of the early treatment period. According to the authors of the article, two weeks is the time given to the patient to rest and heal soft tissues, allowing later effective rehabilitation. The obtained results confirm the thesis that one of the main factors affecting the improvement of knee joint parameters after the procedure is the resolution of inflammation within the soft tissues of the knee joint, and consequently the reduction of exudate and pain of the knee joint area.<sup>16, 17, 18</sup> The most important, however, seems to be an individual approach to the patient. When the pain and swelling disappear, start the first elements of physiotherapy.<sup>19</sup>

### **Summary**

It seems that early improvement, the selection of appropriate rehabilitation methods, as well as individual patient characteristics can have a positive effect on accelerating the rehabilitation procedure and on achieving better results at particular stages of physiotherapy. As a consequence, they reduce the time of hospital stay as well as the number of postoperative complications. Despite the huge knowledge about the phenomenon, there is still no consensus on the optimal surgical technique for ACL reconstruction, let alone for the ideal rehabilitation protocol after surgery.

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