

INFLUENCE OF ANTERIOR PAIN ON RESULTS FROM ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

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ABSTRACT

Objective: To examine the impact of residual pain on functional outcomes two years after arthroscopic anterior cruciate ligament (ACL) reconstruction and compare the types of graft used during the procedure (patellar vs. flexor). **Method:** A retrospective epidemiological study on 129 ACL reconstructions with a mean follow-up of 28 months was conducted. The presence, intensity and location of the anterior pain were investigated. Pain provocation tests were conducted, sensitivity was analyzed and functional scores were applied (IKDC, femoropatellar and SF-36), comparing the results with the type of graft used. **Results:** Anterior pain was present in 28% of patients with a mean intensity of 2.9 in 10.

When pain was present, the functional scores decreased significantly. Abnormalities of knee sensitivity and gait occurred frequently with use of the patellar tendon, but there was no statistical difference regarding the presence of pain. **Conclusion:** The presence of anterior pain in ACL reconstructions, even if minimal, has a deleterious effect on the final outcome over the medium term. Because of the influence of graft harvesting on the presence of abnormalities of knee sensitivity and gait, choosing the graft should take into account the patient's professional and sports activities.

Keywords – Anterior Cruciate Ligament; Pain; Patellar Ligament

INTRODUCTION

The anterior cruciate ligament (ACL) has the primary function of impeding anterior displacement of the tibia. Injury to the ACL leads to a varying degree of symptomatic instability and high incidence of associated lesions caused by changes to knee joint kinematics, and also prematurely predisposes the knee to joint degeneration processes⁽¹⁾.

Improvements in surgical techniques for reconstructing this ligament have made the procedures

less invasive. In addition, early rehabilitation has led to joint stabilization and diminished the time taken to return to habitual activities: not only among professional athletes but also, especially, among non-athletes, i.e. ordinary people returning to work. This has considerably increased the volume of reconstruction surgery performed over recent years. Currently, the tendency is towards using a resistant biological graft: the autologous grafts most commonly used for ACL replacement are from the patellar tendon and the semitendinosus and gracilis tendons⁽²⁾.

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The items that contribute towards satisfactory evolution of the procedure are: appropriate choice of surgical technique for each patient; the condition of the secondary restrictors (meniscus and ligaments), the postoperative analgesia used and safe early rehabilitation. Improvements and innovations in ACL reconstruction techniques have made it possible to achieve satisfactory results with regard to control over instability and early return to sports⁽³⁾. Among the most frequent complications from ACL reconstruction, pain on the anterior face of the knee and residual muscle strength deficit seem to be connected with the choice of donor source⁽⁴⁻⁶⁾.

The aim of this study was to analyze the impact that residual pain has on functional results, two years after arthroscopic ACL reconstruction, comparing the use of grafts from the central third of the patellar ligament with the use of grafts from the flexor tendons of the semitendinosus and gracilis muscles.

METHODS

In this series, 129 patients who underwent ACL ligament reconstruction were evaluated descriptively and retrospectively. Sixty-eight patients were benefited through using the patellar tendon as the graft (patellar group) and 61 received grafts from the flexor tendons of the semitendinosus and gracilis muscles (flexor group). The patients were evaluated after an average follow-up of 28 months. The series was composed of 81 men and 48 women, and their average age was 27.8 years.

All the patients were operated by the same surgeon, Dr. David Dejour, and were reassessed by the same examiner, Dr. Wilson Vasconcelos. The choice of donor source for the graft was made according to the sport practiced by the patient (Table 1). The inclusion criteria were that these were patients operated in the years 2005 and 2006, aged between 16 and 45 years, who did not present any associated ligament injury and did not have any injury in the contralateral knee. Patients were excluded if they had been followed up for less than 18 months or if they presented an advanced chondral lesion diagnosed at the time of the surgery. Associated meniscal movement was considered to be an exclusion criterion.

During the reassessment, the following data were

Table 1 – Choice of graft according to type of sport practiced.

Patellar group	Flexor group
Football (soccer) Handball Skiing Rugby	Volleyball Basketball Judo Karate Tennis

gathered: anamnesis; surgical characteristics (status of the joint cartilage, associated movements and complications); subjective information on the pain (presence and intensity on a numerical scale from 0 to 10 and topographic location on a tracing) (Figure 1); objective information on the pain (walking on knees) (Figure 2); information on touch sensitivity (topographic location and intensity (Figure 1) and scores (subjective IKFC, subjective IKDC, femoropatellar LILOAS and the SF-36 quality-of-life score).

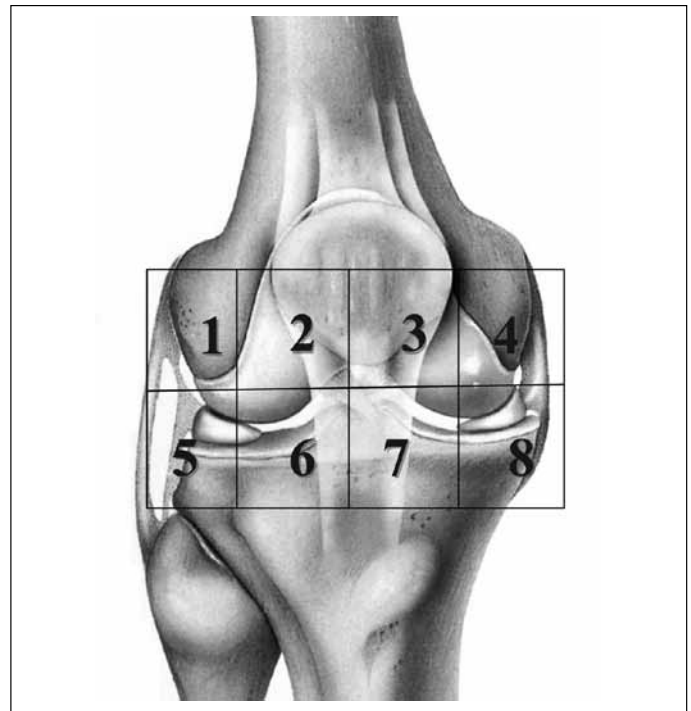


Figure 1 – Topographical location of the pain after ACL reconstruction.

The data gathered were collated using Excel (Microsoft) and were analyzed with the aid of the Statview[®] software. The statistical significance level was taken to be 5%. Qualitative variables were assessed according to their frequency distribution and quantitative variables were assessed according to their means, medians and standard deviations.

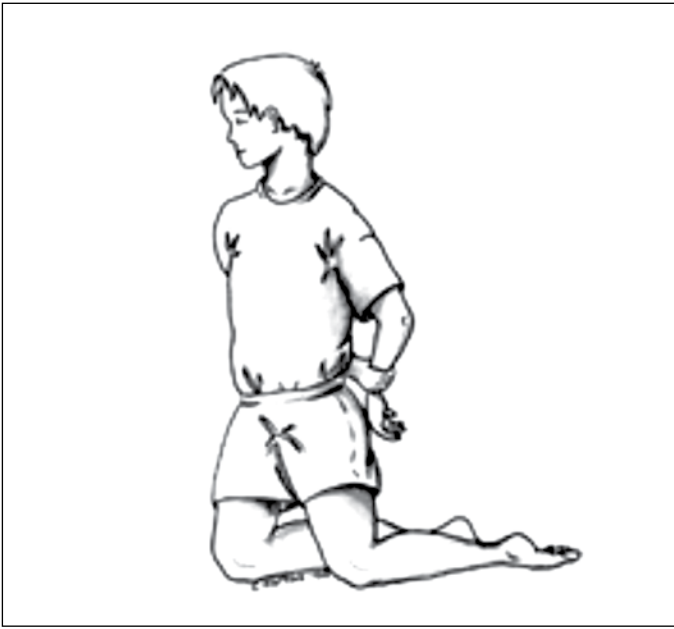


Figure 2 – Knee walking test.

RESULTS

Overall in this series, 26% of the patients reported the presence of anterior pain; 45%, abnormalities regarding walking on the knees; and 47%, sensitivity alterations. The mean pain intensity gauged by the patients was 2.9 out of 10. The mean scores were: 90.4 out of 100 on the femoropatellar scale; 84/100 on the subjective IKDC; and 84/100 on the overall SF-36, while the physical SF-36 was 83/100 and the mental SF-36 was 80/100. For the patients with complains of residual pain, the femoropatellar score was 84, versus 93 for those without complaints of pain ($p < 0.005$). Likewise, the IKDC went from 84 to 78 ($p < 0.05$) in cases with pain and the physical SF-36 went from 83 to 78 ($p = 0.01$).

The frequency of anterior pain for the patellar tendon group was 34%, while it was 27% for the flexor group ($p = 0.03$). On the other hand, the pain intensity classified by the patients was 2.1/10 in the patellar group, versus 3.3/10 for the flexor group ($p = 0.004$).

The most common location for pain in the patellar group was on the patellar tendon (37%), whereas for the flexor group, the most common location was close to the tibial tunnel (51%), followed by on the patellar tendon (26%). The mean femoropatellar score was 90.5% for the patellar group, versus 91.5% for the flexor group. The mean score for the subjective IKDC was 84.1 for the patellar group and 83 for the

flexor group. The mean SF-36 score was 83/100 for the patellar group versus 80/100 for the flexor group. There were no statistically significant differences in these three scores.

Walking on the knees produced better results in the flexor group, given that 68% of these patients presented normal results in the test, versus only 35% in the patellar group ($p = 0.01$). This task was considered to be impossible by 10% of the patients in the patellar group, versus none of the patients in the flexor group (Figure 3).

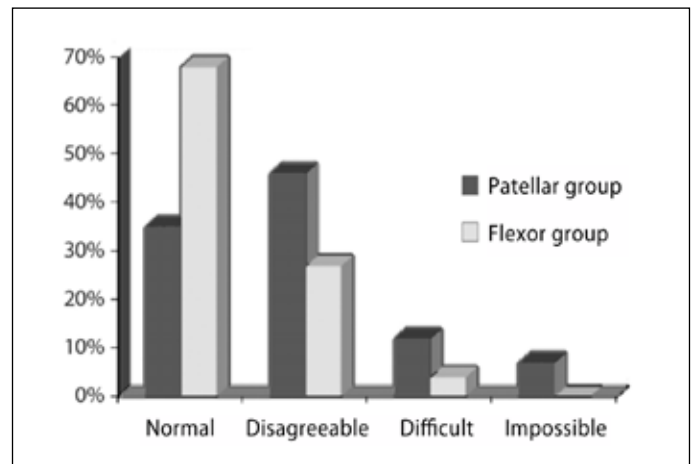


Figure 3 – Knee walking test in relation to the type of graft chosen.

With regard to sensitivity problems, hypoesthesia was found to be present in 68% of the patients in the patellar group, versus 32% in the flexor group ($p < 0.001$). Regarding topographical location, there was a difference: the patellar group presented a deficit at the side of the scar, while the flexor group showed abnormalities in the middle lower part of the scar (Figure 4).

Among the patients who complained about sensitivity abnormalities, 40% presented pain. On the other hand, among the patients without such complaints, only 18% presented pain (Figure 5). Out of the 26% with pain, 17% presented an association with sensitivity problems. Abnormalities with regard to walking on the knees were only present in 28% of the patients without complaints of pain; they were present in 48% of the patients with pain alone; they were present in 56% of the patients with hypoesthesia alone; and they were present in 82% of the patients with both pain and hypoesthesia.

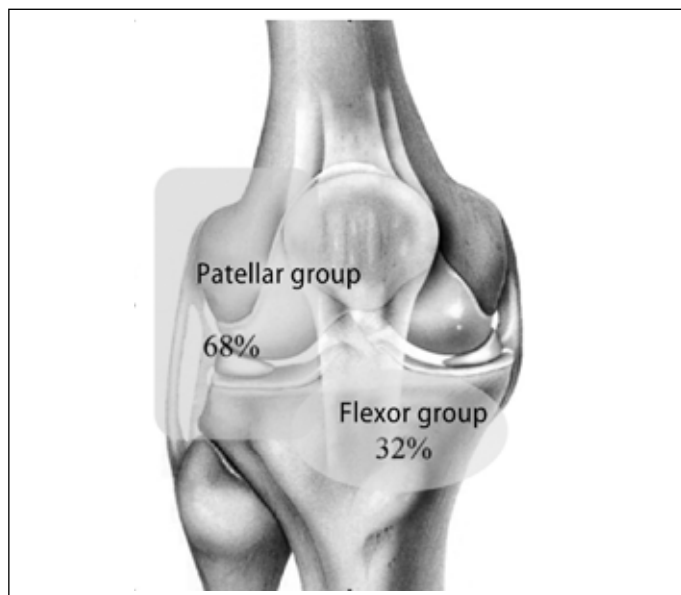


Figure 4 – Topographic location of hypoesthesia.

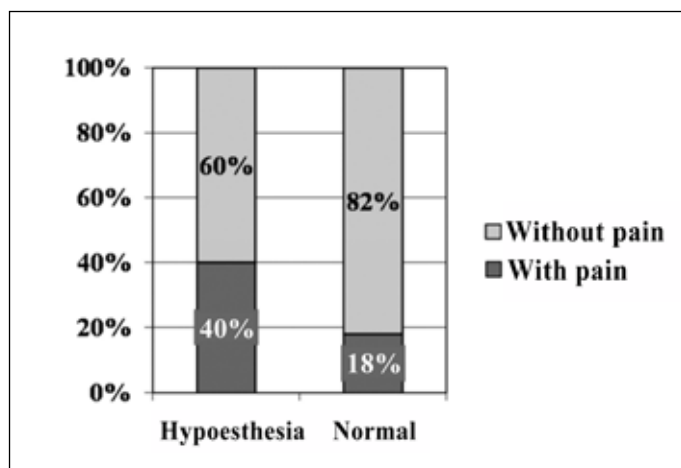


Figure 5 – Relationship between pain and sensitivity abnormalities.

DISCUSSION

Analysis on the frequency of anterior pain leads to a variety of interpretations, in view of the subjective nature of such pain. In most studies, these data are gathered according to the authors’ analyses, thereby giving rise to considerable differences. In our series, in order to avoid the observer’s influence regarding the frequency and intensity of the pain, the criterion adopted was a positive response from the patient to the question: “Do you have any pain in the front of your knee?”

Thus, even pains of lesser intensity were recorded, which increased the sensitivity of the study to this question. In a general manner, and without taking

into consideration the technique used, when pain was present, it was at a low level. In our series, the frequency of pain was greater in the patellar group than in the flexor group, but this difference was not statistically significant ($p = 0.03$). The primary cause of this pain is believed to be correlated with graft harvesting, given the topographical locations of the pains, which were more anterior for the patellar group and more medial for the flexor group. A large portion of the studies have reported that there was no difference in the frequency of anterior pain, in comparisons between the two groups⁽⁷⁻¹²⁾.

Between our two groups, there was a statistically significant difference in relation to walking on the knees. The flexor group showed better performance, which should be taken into consideration at the time of choosing the graft to be used in the reconstruction. For patients who, during their professional or sports activities support themselves with their knees on the ground, the flexor group will be a better choice. The literature confirms that techniques using the flexors are superior in this respect^(7,9,10).

With regard to sensitivity abnormalities, reconstruction using the flexors is significantly less iatrogenic than with the use of the patellar tendon (0.001). There was a close correlation with the presence of pain and hypoesthesia. It was observed that, among the patients without sensitivity problems, only 18% presented pain. On the other hand, among the patients with hypoesthesia, 40% presented pain, which denotes imprinting of hypoesthesia over the residual pain. It is known that sensitivity problems originate from lesions of the infrapatellar branches of the medial saphenous nerve^(13,14), and thus, minimizing the aggression during graft harvesting will benefit such patients.

In our assessment of the two groups, one with reconstruction using the central third of the patellar ligament and the other with flexor tendons from the semitendinosus and gracilis muscles, with a minimum of two years of follow-up, there was no difference in terms of patient satisfaction, from the SF-36 questionnaire, subjective IKDC evaluation, femoropatellar score and pain analysis using a numerical scale. The literature also shows that neither group was better regarding patient satisfaction^(7,15-17).

In our study, the pain levels reported by the patients were low, as also found by Aglietti et al⁽¹⁸⁾.

However, even though this pain was low, it significantly decreased the subjective IKDC, femoropatellar and SF-36 scores. Thus, the result was related to the presence of such pain. Seeking to achieve lower morbidity in graft harvesting will have a direct repercussion on the patient satisfaction rate.

CONCLUSION

The presence of anterior pain in ACL reconstruc-

tions, even if at low levels, has a deleterious effect on the final result over the medium term. The cause of this pain is multifactorial, but there is an important neuropathic contribution relating to the morbidity caused through graft harvesting. Because of the influence of this harvesting on the presence of sensitivity abnormalities and on walking on the knees, the choice of graft should take into account the patient's professional and sports activities.

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