

PERI-INCISIONAL DYSESTHESIA FOLLOWING ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION USING CENTRAL THIRD OF PATELLAR TENDON

Lúcio Honório de Carvalho Júnior¹, Luiz Fernando Machado Soares², Matheus Braga Jacques Gonçalves², Paulo Randal Pires Júnior³, Daniel Soares Baumfeld³, Marcelo Lobo Pereira⁴, Rodrigo Rosa Lessa⁴, Lincoln Paiva Costa⁴, Henrique Barra Bisinoto⁵

ABSTRACT

Objective: To evaluate the prevalence and type of dysesthesia around the incision used to obtain the patellar tendon for anterior cruciate ligament (ACL) reconstruction surgery. **Methods:** Out of a population of 1368 ACL reconstructions using the central third of the patellar tendon, 102 patients (111 knees) were evaluated by means of telephone interview. **Results:** The mean follow-up was 52 months (ranging from 12 to 88 months). The patients' ages ranged from 16 to 58 years (mean: 34.7 years). There was some

degree of peri-incisional dysesthesia in 66 knees (59.46%). In 40.54% of the knees, this condition was not found. In all the cases of dysesthesia, the type encountered was Highet's type II. **Conclusion:** Peri-incisional dysesthesia following ACL reconstruction using the central third of the patellar tendon is highly prevalent. It affected more than half of the cases in this series.

Keywords – Knee/surgery; Anterior Cruciate Ligament/surgery; Paresthesia

INTRODUCTION

Reconstruction of the anterior cruciate ligament (ACL) is a procedure that is being performed increasing often, given that ACL injuries are directly related to increased practice of sports activities⁽¹⁻³⁾. Its reconstruction involves the use of free grafts, which may be autologous or homologous⁽¹⁻³⁾. Among the autologous options, one of the possibilities most used is the middle third of the patellar tendon⁽¹⁻⁵⁾. The other autologous options include the flexor tendons (semi-

tendinosus and gracilis) and the quadriceps.

Morbidity in the donor area is a prominent factor in the process of deciding which type of graft to use. One of the criticisms regarding the use of the central third of the patellar tendon is the possibility that the surgical access might interfere with the infrapatellar branch of the saphenous nerve. This branch innervates the medial and lateral region of the skin below the patella⁽⁶⁻⁸⁾ and, when subjected to trauma or injury, peri-incisional dysesthesia of varying degrees may be caused.

1 – PhD from UNIFESP. Adjunct Professor in the Department of the Locomotor Apparatus, School of Medicine, UFMG. Member of the Knee Group at Hospital Mother Teresa.

2 – Member of the Knee Group at Hospital Mother Teresa.

3 – Resident Physician in Orthopedics and Traumatology, Hospital Madre Teresa, Belo Horizonte.

4 – Physician undergoing fourth-year specialization training in the Orthopedics Service, Hospital Mother Teresa.

5 – Undergraduate Medical Student at UFMG.

Work performed at Hospital Mother Teresa, Belo Horizonte.

Correspondence: R. Olavo Carsalade Vilela 264 - Ipê da Serra - 34000-000 - Nova Lima, MG. E-mail: luciohcj@medicina.ufmg.br

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The aim of this study was to evaluate the prevalence of peri-incisional dysesthesia after ACL reconstruction using the central third of the patellar tendon.

METHODOLOGY

This was a cross-sectional study that assessed patients who had undergone ACL reconstruction using a free graft from the central third of the patellar tendon. All the patients were operated by the present authors at Hospital Madre Teresa, in Belo Horizonte, between May 2001 and September 2008, totaling 1,368 patients.

The assessments were done by telephone, asking the patient to investigate the region adjacent to the surgical access, by means of palpation. This assessment method was validated through a pilot test carried out at the same service.

By definition, dysesthesia is an abnormality of sensitivity, especially with regard to the sense of touch. Individuals may feel pain upon a light touch but not when touch firmly or when pressure is applied. Dysesthesia is classified in accordance with the Highet scale⁽⁹⁾:

- S0: anesthesia;
- S1: deep sensitivity preserved;
- S2: sensitivity to pain and touch preserved but with dysesthesia;
- S3: sensitivity to pain and touch preserved without dysesthesia;
- S4: discriminative sensitivity present; and
- S5: normal sensitivity.

The patients' characteristics, the date of the surgery, the presence or absence of peri-incisional dysesthesia and, if present, its location (above, below, alongside or medial in relation to the incision) and characteristics according to the Highet scale were recorded⁽⁹⁾.

A sample size calculation was made, which found that 108 knees would be sufficient for the findings to have a 95% chance of being representative of the sample (confidence interval of nine percentage points upwards or downwards). The knees were chosen by means of a draw.

This study was presented to and approved by the institution's research ethics committee.

RESULTS

One hundred and two patients were evaluated (111 knees). Of these knees, 61 were right knees (54.95%) and 41 were left knees (36.94%). Nine patients (8.11%) underwent bilateral reconstruction.

The patients' ages ranged from 16 to 58 years, with a mean of 34.7 years.

The length of the postoperative follow-up ranged from 12 to 88 months, with an average of 52 months.

In 66 knees (59.46%), there was some degree of peri-incisional dysesthesia. In 40.54% of the knees, this condition was not found.

The location of the dysesthesia was evaluated regarding the number of sites affected (above, below, alongside or medial to the incision), and it was found to be most common that only one of these four sites was affected.

The site most affected was alongside the incision (37 knees; 33.3%), followed by below it (12 knees; 10.8%), medial to it (five knees; 4.5%) and above it (two knees; 1.8%). All the patients with dysesthesia present Highet type S2⁽⁹⁾.

Other patients presented dysesthesia at more than one site. Among the locations associated, dysesthesia alongside and below the incision was observed in four knees (3.6%), alongside and medial in three (2.7%) and alongside and above in two (1.8%). There was a single patient (0.9%) with dysesthesia at all four sites of the knee.

Among the asymptomatic patients, 18 stated that they had already had dysesthesia at some time since the operation (of Highet type S2). However, these individuals had observed progressive improvement with the passage of time, thereby reaching the classification S5. Of these patients, three said that they had recovered from their dysesthesia within one month after the operation, one after four months, two after six months, one after 10 months, six after more than 12 months and five after 24 months.

DISCUSSION

Peripheral sensory loss follows a defined anatomical pattern. After a peripheral nerve has been cut, only a small peripheral innervated area is found to have total loss of sensitivity. Such areas are named autonomous zones or isolated zones. Autonomous zones

present recovery that may take between a few days and several weeks after the injury, and possibly a long regeneration time⁽¹⁰⁾.

The order in which sensitivity is recovered has already been defined and, according to Horner and Dellon⁽⁸⁾, it takes place with the following sequence: firstly, perception of pain and temperature; and secondly, perception of touch.

Busam et al⁽¹¹⁾ and Cohen et al⁽¹²⁾ reported that lesions of the infrapatellar branch of the saphenous nerve were one of the possible complications after ACL reconstruction using the central third of the patellar tendon. However, neither of these two studies described the prevalence of such complications.

Differently from sensory disorders of the hand and foot, which cause major limitations, the majority of lesions of the infrapatellar branch of the saphenous nerve do not impede patients' daily activities. The anatomical distribution of this nerve follows two types of pattern. In the first type, the nerve crosses the proximal region of the tibia from medial to lateral, close to the distal third of the patellar tendon. In the second type, the nerve crosses the proximal region over the middle third of the patellar tendon. The first type occurs more frequently⁽⁷⁾.

In the present study, in 56.46% of the patients,

some degree of postoperative peri-incisional dysesthesia was found. In the literature consulted, neither the percentage nor the characteristics of this postoperative abnormality were described.

The most common location for sensitivity abnormalities was alongside the incision (33.3%), and this may be related to the anatomy of the infrapatellar branch of the nerve (transverse, from medial to lateral).

Despite the close relationship with the patellar tendon, peri-incisional dysesthesia relating to damage to the saphenous nerve does not present functional implications other than those already correlated specifically with tendon removal⁽¹³⁾.

The condition studied here was considered to be definitive at the time of the assessments. These, in turn, were done on random samples calculated on the total number of individuals. No difference in follow-up time was found between the groups with and without peri-incisional dysesthesia.

CONCLUSION

Peri-incisional dysesthesia following ACL reconstruction using the central third of the patellar tendon is highly prevalent. It affected more than half of the cases in this series.

REFERENCES

1. Fox JA, Nedeff DD, Bach BR Jr, Spindler KP. Anterior cruciate ligament reconstruction with patellar autograft tendon. *Clin Orthop Relat Res.* 2002;(402):5363
2. Simon NJ, Roberts MA. Graft choice in anterior cruciate ligament reconstruction. *Tech Knee Surg.* 2005 4(2):112-9
3. Denti M, Vetere D, Bait C, Schönhuber H, Melegati G, Volpi P. Revision anterior cruciate ligament reconstruction: causes of failure, surgical technique, and clinical results. *Am J Sports Med.* 2008;36(10):1896-902.
4. Johnson D. Techniques in knee surgery: anterior cruciate ligament reconstruction. *Tech Knee Surg* 2006;5(2):107-20.
5. Camanho GL, Camanho LF, Munhoz MAS, Moura MC. Tratamento da lesão aguda do ligamento cruzado anterior. *Rev Bras Ortop.* 1997;32(5):347-52.
6. Strum GM, Friedman MJ, Fox JM, Ferkel RD, Dorey FH, Del Pizzo W, et al. Acute anterior cruciate ligament reconstruction. Analysis of complications. *Clin Orthop Relat Res.* 1990;(253):184-9.
7. Mmochida H, Kikuchi S. Injury to infrapatellar branch of saphenous nerve in arthroscopic knee surgery. *Clin Orthop Relat Res.* 1995;(320):88-94.
8. Horner G, Dellon AL. Innervation of the human knee joint and implications for surgery. *Clin Orthop Relat Res.* 1994;(301):221-6.
9. Shaw Wilgis EF, Brushart TM. Nerve repair and grafting. In: Green DP, Hotckis D, Robert N. editors. *Operative hand surgery: 3rd ed.* New York: Churchill Livingstone; 1993. p. 1335-6.
10. Clarke HD, Scott WN, Insall JN, Pedersen HB, Math KR, et al. *Anatomy. In: Insall JN, Scott WN. Surgery of the knee. 4th ed.* New York: Churchill Livingstone; 2006. p. 3-66.
11. Busam ML, Provencher MT, Bach BR Jr. Complications of anterior cruciate ligament reconstruction with bone-patellar tendon-bone constructs: care and prevention. *Am J Sports Med.* 2008;36(2):379-94
12. Cohen, M, Abdalla, RJ, Carneiro Filho M, Queiroz AAB, Ferreira Filho FS. Complicações da reconstrução intra-articular com tendão patelar: relato preliminar. *Rev Bras Ortop.* 1992;27(4):245-8.
13. Andrade MAP, Cenni MHF, Pinheiro Júnior LFB, Lemos WG. A repercussão da retirada do enxerto do tendão patelar no mecanismo extensor do joelho. *Rev Bras Ortop.* 1999;34(8):461-4.