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Original article

Functional result relating to the positioning of the graft in anterior cruciate ligament reconstruction☆

Otávio de Melo Silva Júnior, Bruno do Nascimento Ohashi, Murilo Oliveira de Almeida, Murilo Reis Gonçalves*

Sobradinho Regional Hospital, Brasília, DF, Brazil

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ABSTRACT

Objective: To ascertain the coronal angles for the femoral and tibial tunnels that provide the best postoperative result from anterior cruciate ligament (ACL) reconstruction surgery, through assessing the variables of the IKDC and Lysholm–Tegner questionnaires and the hop test.

Methods: Sixteen patients with a single unilateral ACL injury who underwent this surgery between 24 and 36 months earlier were evaluated. They were divided into four groups in which the tibial and femoral tunnel angles were greater than or less than 65° in the coronal plane.

Results: The results demonstrated that a more vertical angle for the tibial tunnel (72°) and a more horizontal angle for the femoral tunnel (60°), with valgus alignment of 12° correlated with the best values for the variables studied. This may indicate that the long-term results from this surgery are excellent.

Conclusion: A more horizontal femoral angle and a more vertical tibial angle produced better assessments in the tests that were applied and in the functional results evaluated.

Resultado funcional relacionado ao posicionamento do enxerto na reconstrução do ligamento cruzado anterior

Palavras-chave:
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RESUMO

Objetivo: Averiguar qual a angulação coronal dos túneis femoral e tibial que proporciona o melhor resultado no pós-operatório de cirurgia de reconstrução do LCA. As variáveis avaliadas foram os questionários IKDC e Lysholm-Tegner e o Hop-Test.

Métodos: Foram analisados 16 pacientes com pós-operatório entre 24 e 36 meses, com lesão isolada unilateral do LCA. Foram divididos em quatro grupos, nos quais os ângulos dos túneis tibial e femoral foram menores ou maiores do que 65° no plano coronal.

☆ Work done at the Orthopedics and Traumatology Service, Sobradinho Regional Hospital, Brasília, Federal District, Brazil.

* *Corresponding author.*
E-mail: ortopediamurilo@gmail.com (M.O. de Almeida).

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Resultados: A angulação do túnel tibial mais verticalizada (72°) e do túnel femoral mais horizontalizada (60°) com o alinhamento em valgo de 12° relacionou-se com os melhores valores para as variáveis estudadas, o que pode indicar um resultado ótimo para a cirurgia em longo prazo.

Conclusão: A angulação femoral mais horizontalizada e a angulação tibial mais verticalizada têm melhores avaliações nos testes aplicados e nos resultados funcionais avaliados.

Introduction

Injuries or tears to the anterior cruciate ligament (ACL) in athletes or physically active individuals are seen very often in orthopedic practice. Epidemiological studies have showed that the incidence is approximately 80,000 injuries per year.[1]

The first reports on ACL injuries appeared in the literature in the nineteenth century.[2] Records of surgical reconstruction first appeared at the beginning of the twentieth century.[3] Over the last 30 years, many surgical techniques have been described for reconstructing this ligament, using several structures as a graft source. A long path was followed until the technique described by Campbell[4] in 1939, which used the patellar ligament, was returned to. Also in that year, Macey[5] described the first technique using the flexor tendons of the semitendinosus and gracilis (ST-G).

Although the great advances in surgical techniques have reduced the time taken for patients undergoing ACL reconstruction to return to their activities,[6] we did not find any studies in the literature correlating the angles of the tunnels with the postoperative results.

There is no consensus regarding the various techniques for ACL reconstruction that have been described, in relation to comparisons between the postoperative results. There is therefore a need for better examination of the possible variable that might correlate with a better final result.

Currently, tibial tunnels are constructed using prefabricated guides that are adjustable according to the angle that is desired.

The objective of this study was to ascertain the coronal angle of the femoral and tibial tunnels that would provide the best postoperative result from ACL reconstruction surgery, using the following assessment criteria: patient's complaints, satisfaction with the result, Lysholm–Tegner questionnaire (Annex 1), IKDC questionnaire (Annex 2), clinical examination and hopping on one foot.

Material

The knees of 16 patients were evaluated (Table 1). These patients were seen at the knee surgery outpatient clinic of the Sobradinho Regional Hospital, Federal District, Brazil, and had undergone ACL reconstruction performed by the same surgeon, who was a specialist in knee surgeon.

The demographic characteristics (gender, age body mass index (BMI) and dominant leg) are listed in Table 1.

Table 1 – Characteristics of the sample.

	n (%)
Gender	
Male	13 (83.25)
Female	3 (17.75)
Age (years)	
Up to 20	1 (6.25)
21–30	9 (56.25)
31–40	4 (25)
Over 40	2 (12.5)
Mean = 29.7	
BMI (kg/m²)	
18.5–24.9 (Normal)	10 (62.5)
25–29.9 (Overweight)	6 (37.5)
Mean = 24.96	
Dominant leg	
Right	11 (68.75)
Left	3 (18.75)
Ambidextrous	2 (12.5)

The inclusion criteria were as follows: a postoperative period of between 24 and 48 months; ACL injury alone, as confirmed by means of magnetic resonance imaging before the operation; physiotherapy applied after the operation; and having been released from rehabilitation (with or without returning to the same activity level as before the injury).

The exclusion criteria comprised presence of any associated injuries to the ligaments, menisci or joint cartilage, revision surgery, inflammatory signs, neuromuscular disorders, infection, arthrofibrosis, lower-limb fractures, or advanced osteoarthrosis in the femoropatellar or tibiofemoral joints with evident displacement of the joint axis.

Table 2 details the factors correlated with the type of sport practiced, the ground and the conditions under which the injury and the rehabilitation took place.

All the patients underwent the same standard surgical technique, consisting of grafting a single band from the semitendinosus and gracilis tendons (ST-G) and use of a proximal crosspin fixation implant and an absorbable interference screw, with a distal cortical post (Fig. 1).

Method

The patients were given explanations regarding the aims of the study and, after agreeing to participate, they signed a free and informed consent statement.