Transtibial Femoral Tunnel Technique in ACL Reconstruction and Osteoarthritis Incidence

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Conflict of Interest

The authors declare they do not have any conflict of interest.

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Introduction

Femoral tunnel position in ACL reconstruction is an important factor (1)

Transtibial technique has been historically used, but the ability to restore the anatomic position of the native ligament is questioned.(2,3)

The incorrect graft placement could accelerate the onset of osteoarthritis.(4)

This led to the development of the anatomical technique.

The anatomical approach can result in more accurate graft positioning, higher knee stability and better functional results.(5,6,7,8,9,10)

However, other studies do not reach the same conclusion, with similar results between techniques.(1,6,8,11)

Introduction

A recent meta-analysis showed that transtibial technique is associated to a higher knee osteoarthritis incidence after 5 year of follow up, but patients with meniscal or chondral injuries were not excluded, which is a great bias.(12)

The main factors associated to osteoarthritis after ACL injury and reconstruction would be the original trauma intensity and the presence of associated meniscal or chondral injuries.(1,13,14,15)

Objective

Evaluate knee osteoarthritis incidence in patients that undergo ACL reconstruction with the femoral tunnel performed by the transtibial technique, with a minimum of 3 years of follow up, without associated injuries to the knee at the day of surgery.

Material and Methods

The study was approved by the Ethic and Research Committee of the institution, linked to the National Research Ethics Commission (CAAE 50743821.1.0000.5696). All patients included in the study signed an informed consent form.

Inclusion: ACL reconstruction by transtibial technique, with hamstrings graft, and with at least 3 years of follow-up, without any associated injury to the operated knee at the day of the surgery.

Exclusion: impossible to contact, to perform image exams, declined to participated in the study, underwent ACL reconstruction revision or another ligament reconstruction of the affected knee, and meniscal or chondral surgery with more than 1 year of follow-up.

Material and Methods

Image exam: X-Ray (Orthostatic Anterior View; Rosenberg; and Lateral View).

The Kellgren & Lawrence radiographic osteoarthritis classification was used.

The obtained results were analyzed by simple descriptive statistics.

Patients were also divided into 3 groups:

- between 3 and 5 years of surgery;
- between 5 and 10; and
- with more than 10 years.

Results

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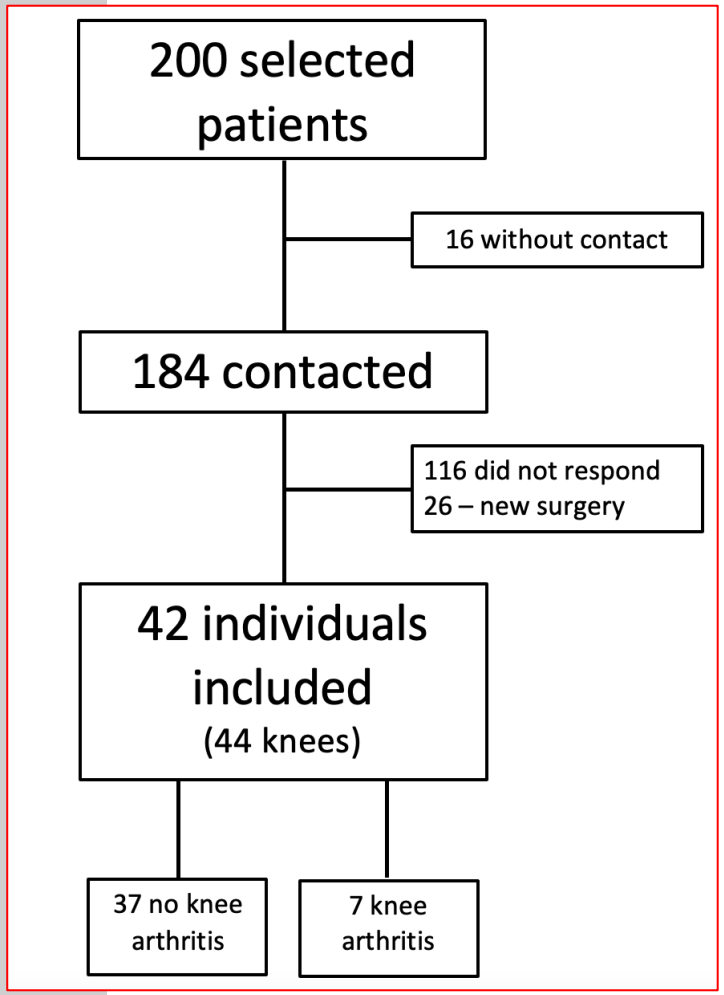

Table 1. Evaluated patients data	
Right knee	23
Left knee	21
Male	28
Female	14
Age *	31 (16-46)
Time since surgery (months) *	91.9 (36-154)

* mean (minimum and maximum values)

Table 2. Osteoarthritis incidence in the evaluated knees	osteoarthritis	no osteoarthritis
More than 10 years *	2 (28.6%)	5 (71.4%)
Between 5 and 10 years *	3 (9.4%)	29 (90.6%)
Between 3 and 5 years *	2 (40%)	3 (60%)
Total	7 (16.7%)	37 (83.3%)

* between surgery and imaging

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Discussion

Our findings contradict the systematic review and meta-analysis of Cinque *et al.* (12) where the osteoarthritis incidence related to the transtibial technique was 49.3%.
The group between 5 to 10 years of follow-up presented an osteoarthritis incidence of **53.7%.**
The same group of patients of our study presented an incidence of only **9.4%.**

The study of Cinque *et al.* does not identify if the patients had associated injuries, which would be a crucial information.

Meniscal and chondral injuries are more related to the evolution to osteoarthritis. (1,13,14)

Franceschi *et al.* (8) evaluated 88 patients with a minimum of 5 years of ACL reconstruction, being 46 transtibial technique and 42 anatomical, also excluding patients with meniscal and chondral injuries. They found similar results regarding function and evolution to degenerative changes for both techniques. This conclusion is in agreement with that of our study.

Discussion

Cuzzolin *et al.* (11) mention that the crucial factor to be discussed is not how the femoral tunnel is made, but where it is made. Transtibial technique variations could allow to perform the femoral tunnel at the ACL anatomical insertion.

This was demonstrated by Piasecki *et al.* (16) by testing different angles for the tibial entrance during performing the tibial tunnel. The authors showed it is possible to create anatomical femoral tunnels through the transtibial technique.

Limitations

The great loss of patients due to lack of contact or response. Even so, the number of evaluated individuals was very similar to other studies with similar objectives.(1,5,8,15)

The absence of a group using the anatomical technique to compare.

The inclusion of a group of patients using the same technique but with associated injuries could also increase the power of the study. However, it was decided to remove this factor and compare with the data already published in the literature.

Conclusion

The ACL reconstruction performing the femoral tunnel through the transtibial technique in patients without another associated injuries to the operated knee, using quadruple hamstring graft, showed an osteoarthritis incidence of 16.7% with a mean follow-up of 91.9 months. This was more evident in patients with a follow-up between 5 to 10 years, where the osteoarthritis incidence was only 9.4%.

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