



Original article

Hamstring tendons insertion – an anatomical study^{☆,☆☆}

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ARTICLE INFO

Article history:

Received 13 June 2012

Accepted 23 July 2012

Keywords:

Anatomy

Cadaver

Knee

ABSTRACT

Objective: To study the anatomy of the hamstring tendons insertion and anatomical relationships.

Methods: Ten cadaver knees with medial and anterior intact structures were selected. The dissection was performed from anteromedial access to exposure of the insertion of the flexor tendons (FT), tibial plateau (TP) and tibial tuberosity (TT). A needle of 40 × 12 and a caliper were used to measure the distance of the tibial plateau of the knee flexor tendons insertion at 15 mm from the medial border of the patellar tendon and tibial tuberosity to the insertion of the flexor tendons of the knee. The angle between tibial plateau and the insertion of the flexor tendons of the knee (A-TP-FT) was calculated using Image Pro Plus software.

[☆] Please cite this article as: Grassi CA, Fruheling VM, Abdo JC, de Moura MFA, Namba M, da Silva JLV, et al. Estudo anatômico da inserção dos tendões flexores do joelho. Rev Bras Ortop. 2013;48:417-420.

^{☆☆} Study conducted at the Biological Sciences Sector, Universidade Federal do Paraná, Curitiba, PR, Brazil.

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Results: The mean distance TP-FT was 41 ± 4.6 mm. The distance between the TT-FT was 6.88 ± 1 mm. The (A-TP-FT) was $20.3 \pm 4.9^\circ$.

Conclusion: In the anterior tibial flexor tendons are about 40 mm from the plateau with an average of 20° .

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Estudo anatômico da inserção dos tendões flexores do joelho

R E S U M O

Palavras-chave:

Anatomia

Cadáver

Joelho

Objetivo: Determinar parâmetros anatômicos para localizar a inserção dos tendões flexores do joelho na tíbia.

Métodos: Foram selecionados 10 joelhos de cadáveres com estruturas mediais e anteriores íntegras. A dissecação foi feita por acesso ântero-medial até a exposição adequada da inserção dos tendões flexores (TF), do planalto tibial (PT) e da tuberosidade anterior da tíbia (TAT). Uma agulha 40×12 e um paquímetro digital foram usados para aferir a distância do planalto tibial da inserção dos tendões flexores do joelho a 15 mm da borda medial ao tendão patelar e da tuberosidade anterior da tíbia à inserção dos tendões flexores do joelho. O ângulo formado entre o planalto tibial e a inserção dos tendões flexores do joelho (Â PT-TF) foi calculado com o auxílio do software ImagePro Plus®.

Resultados: A distância PT-TF foi de $41 \pm 4,6$ mm em média. A distância entre a TAT-TF foi de $6,88 \pm 1$ mm. A angulação (Â PT-TF) foi de $20,3 \pm 4,9$ graus.

Conclusão: Na região anterior da tíbia os tendões flexores estão a cerca de 40 mm do planalto com um ângulo médio de 20 graus.

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Introduction

Reconstruction of the anterior cruciate ligament is the principal surgical procedure performed in sports medicine.¹ The arthroscopic technique used for reconstructions of the anterior cruciate ligament presents satisfactory results with regard to stability, which allows patients to return to sports practise.^{2,3}

Semitendinosus and gracilis tendons (knee flexors) are currently the main source of grafts for intra and extra-articular ligament reconstruction.⁴ Among the advantages of using this graft is the fact that it is autologous, gives rise to less morbidity at the donor site, preserves the integrity of the knee extensor and has a lower rate of anterior knee pain.^{4,5}

Lack of knowledge of the anatomy of the insertions of the flexor tendons may lead to technical problems during harvesting, such as injury to the saphenous nerve and technical difficulty in harvesting because the incision was made in an inappropriate location.^{4,6} It is not uncommon for the flexor tendons to be lost, with a consequent need to harvest another graft from a second donor site.^{6,7} There is a shortage of articles in the literature relating to applied anatomy of the knee flexor tendons.

The aim of this study was to determine anatomical parameters for locating the insertions of the knee flexor tendons in the tibia.

Materials and methods

This study was conducted in the Department of Anatomy of the Biological Sciences Sector of UFPR, during April and May

2011. The inclusion criteria were that the material should be knees from cadavers with intact medial and anterior structures. Ten knees from cadavers that fulfilled these criteria were dissected. All of these were conserved in formol. An anteromedial access was used, with dissection in layers until obtaining a complete view of the tibial plateau and the insertion of the knee flexor tendons.

The distance from the tibial plateau to the insertion of the knee flexor tendons was measured 15 mm from the medial border of the patellar tendon. The horizontal distance from the anterior tibial tuberosity to the insertion of the knee flexor tendons was also measured (Fig. 1).

The qualitative nature of this specific region of the flexor tendons was also observed.

The points were previously marked out using 40×12 needle and were measured with the aid of digital calipers (Aero Space – 150 mm).

The angle formed between the tibial plateau and the insertion of the knee flexor tendons was also measured with the aid of the ImagePro Plus® software 4.5 for Windows (Media Cybernetics, Inc., USA).

Results

The mean distance between the insertion of the flexor tendons and the tibial plateau, measured 15 mm from the medial border of the patellar tendon (TP-FT), was 41 ± 4.6 mm. The mean distance from the insertion of the flexor tendons to the anterior tibial tuberosity (ATT-FT) was 6.88 ± 1 mm. The mean angle between the insertion of the flexor

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