



Original article

Total bilateral ruptures of the knee extensor apparatus[☆]

Diogo Moura^{a,*}, José Pedro Marques^b, João Páscoa Pinheiro^c, Fernando Fonseca^a

^a Coimbra University Hospital, Orthopedics Department, Coimbra, Portugal

^b Coimbra University Hospital, Sports Medicine Department, Coimbra, Portugal

^c Coimbra University Hospital, Physical Rehabilitation Medicine Department, Coimbra, Portugal

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ABSTRACT

Objective: Bilateral extensor tendon ruptures of the knee are rare and have only been published in the form of case reports or small series.

Methods: Seven patients corresponding to 14 extensor tendon ruptures of the knee were evaluated by the same examiner after a minimum one year post-surgery. Clinical and radiographic evaluations were performed; for statistical analysis, the level of significance was set at 0.05.

Results: The most common injury was patellar tendon rupture ($n=9$; 64.29%) followed by quadriceps tendon rupture ($n=5$, 35.71%). The intrasubstance was the most affected location (57.15%), followed by the myotendinous junction (21.43%) and the patellar bone insertions (21.43%). Quadriceps tendon ruptures were more prevalent in patients older than 50 years, while patellar tendon ruptures tended to occur in younger individuals. All but one patient had recognized risk factors for tendinous degeneration and rupture: 75% of the cases suffered from diseases, 50% had history of drug use and/or abuse, and 37.5% had both disease and drug use history. Mean attained values for flexion ROM were $124.64^\circ \pm 9.43$ (110–140°) and 89.57 ± 6.02 (78–94) for Kujala score. More than half of the patients complained of residual pain and quadriceps muscular weakness. Mean age was younger in the individuals who complained of residual pain.

Conclusion: Bilateral tendon ruptures of the knee extensor apparatus ruptures are rare and serious injuries, mostly associated with risk factors. Early surgical repair and intensive rehabilitation program for bilateral extensor tendon ruptures of the knee may warrant satisfactory functional outcomes in the medium to long term, despite non-negligible levels of residual pain, quadriceps muscle weakness, and atrophy.

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[☆] Study conducted at the Coimbra University Hospital, Coimbra, Portugal.

* Corresponding author.

E-mail: dflmoura@gmail.com (D. Moura).

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Ruptura bilateral total do aparelho extensor do joelho

R E S U M O

Palavras-chave:

Articulação do joelho
Lesões do tendão
Ligamento patelar/lesões
Ruptura

Objetivo: As rupturas bilaterais do tendão extensor do joelho são raras e só foram publicadas na forma de relatos de casos ou de pequenas séries.

Métodos: Sete pacientes (14 rupturas do tendão extensor do joelho) foram avaliados pelo mesmo examinador após um período mínimo de um ano de pós-operatório. Foram realizadas avaliações clínicas e radiográficas. Para a análise estatística, o nível de significância foi fixado em 0,05.

Resultados: A lesão mais comum foi ruptura do tendão patelar (n=9; 64,29%) seguida de ruptura do tendão do quadríceps (n=5, 35,71%). A intrasubstância foi a localização mais acometida (57,15%), seguida pela junção miotendinosa (21,43%) e inserção óssea patelar (21,43%). As rupturas do tendão do quadríceps foram mais prevalentes em pacientes com mais de 50 anos; por outro lado, as rupturas do tendão patelar tenderam a ocorrer em indivíduos mais jovens. À exceção de um paciente, todos os demais apresentavam reconhecidos fatores de risco para degeneração e ruptura tendínea: 75% dos casos sofriam de doenças, 50% tinham histórico de uso e/ou abuso de drogas e 37,5% apresentavam simultaneamente histórico de doença e uso de drogas. Os valores médios obtidos para a ADM de flexão foram de $124,6^\circ \pm 9,43$ (110 - 140°); no escore de Kujala, os valores médios foram $89,57 \pm 6,02$ (78 - 94). Mais da metade dos pacientes se queixou de dor residual e fraqueza muscular no quadríceps. A idade média dos indivíduos que se queixaram de dor residual era menor.

Conclusão: As rupturas bilaterais do tendão nas rupturas do aparelho extensor do joelho são lesões raras e graves e na maioria dos casos estão associadas a fatores de risco. O reparo cirúrgico precoce e a instauração de um programa de reabilitação intensiva para rupturas bilaterais do tendão extensor do joelho podem levar resultados funcionais satisfatórios a médio e longo prazo, apesar dos níveis não negligenciáveis de dor residual, fraqueza muscular no quadríceps e atrofia.

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Introduction

The knee extensor apparatus encompasses two tendons, quadriceps and patellar, and the patellar bone. Unilateral ruptures are quite common, as opposed to the rare bilateral knee extensor ruptures. This is highlighted by the fact that the latter have only been published in the form of case reports or small series. Bilateral knee tendon extensor apparatus ruptures are serious and disabling injuries, mostly associated with risk factors. They are frequently reported as difficult to treat injuries, demanding long recovery periods.¹⁻¹⁰ This paper reports on our centre's experience treating patients with bilateral knee tendon extensor ruptures and represents the largest series published to date. The aim of this study is to provide information regarding prognosis on various clinical outcomes of these patients, increasing our understanding of the natural history of this rare clinical presentation. Also we hope our results may help clinicians identifying patients at risk, leading to the introduction of preventive measures.

Methods

Medical records were retrospectively reviewed and 7 patients were identified and included in our study. They had all been previously submitted to surgery due to total bilateral knee tendon extensor rupture (time between surgery and

clinical evaluation – average: 5.29 years; range 1–8 years). All patients were summoned and evaluated by the same examiner after a minimum of 1-year post-surgery. Clinical examination included range of motion (ROM) assessment and the application of Kujala score.¹¹ Additionally a satisfaction index (scale 0–5: 0 – insatisfied to 5 – totally satisfied), the presence of residual symptoms and its characterization were assessed. Radiographic evaluation aimed at detecting the presence of patellofemoral arthritis using Merchant patellar view and measuring patellar height with Insall-Salvati ratio.^{12,13} For statistical analysis we used SPSS (version 23, IBM Corp, Armonk, New York) with the level of significance set at 0.05. Quantitative measures are presented as mean \pm standard deviation (SD; minimum value–maximum value) and qualitative measures with total number (n) or percent (%). We used Mann–Whitney test for comparing quantitative and Chi-square test for qualitative data. To study the association between quantitative outcomes we used Spearman correlation test.

Results

Demographic and injury characterization data

The sample includes seven patients, corresponding to a total of 14 ruptures (Table 1). The mean age was 46.43 ± 14.84 years

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