



## Simultaneous Bilateral Rupture of the Quadriceps Tendon Associated with Anabolic Steroids – A Case Report

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### Abstract

Quadriceps tendon injuries are quite common but seldom ruptures can be seen bilaterally in both tendons. Bilateral quadriceps tendon rupture is usually associated with certain chronic metabolic syndromes. Usually ruptures happen to older people and they are thought to be the result of tendon weakening. There are only few cases reported in the literature where the only predisposing cause is previous anabolic steroid abuse. We describe the simultaneous rupture of both quadriceps tendons in a bodybuilder who had taken anabolic steroids for years.

**Keywords:** Quadriceps tendon; Tendon injury; Anabolic steroids; Sports injury

### Introduction

Quadriceps tendon injuries are quite common but seldom ruptures can be seen bilaterally in both tendons. Simultaneous bilateral rupture is usually associated with certain chronic generalized conditions. It is more common in older people and is thought to be the result of tendon weakening due to obesity and arteriosclerosis induced fibrotic changes, or previous injuries. There are only few cases reported in the literature where the only predisposing cause is previous anabolic steroid abuse [1-6]. We describe the simultaneous rupture of both quadriceps tendons in a bodybuilder who had taken anabolic steroids for years.

### Case Presentation

A 51 year otherwise healthy male had used anabolic steroids and testosterone for ten years to enhance his physique and performance. The drugs he used were Sustanon (testosterone) and Deca-Durabolin (nandrolone) both of which he injected to him. He claimed that he used both of the drugs mostly in the spring time and summer and only small doses at autumn and winter. Previous to this accident he had used both drugs on a weekly basis. He had not suffered from other steroid related problems.

He experienced sudden severe pain in both knees after a vigorous leg exercise while attempting to front squat 100 kg of weight. He was unable to stand or walk and in the emergency department he was not able to raise a straight leg from the bed. He has also bilateral swelling and hematoma in both knee joints. In the x-rays (Figure 1). There was a bilateral front tilting patella and patella baja and massive swelling. The clinical diagnosis was confirmed with ultrasound which showed a complete bilateral quadriceps tendon rupture. The patient was checked thoroughly but no other predisposing cause to this incident was found. In laboratory tests creatinine and parathormone levels were normal.

At the operation in the both side a complete avulsion of the quadriceps tendon from the patella extending to medial and lateral retinacula (Figures 2-7). The tendons were re attached with sutures (5 Ticron) using three vertical bone tunnels to the patella. The retina culums were also repaired. In the operating table the right knee could be flexed up to 90 degrees and the left up to 60 degrees. Both legs were immobilized in hinged brace for eight weeks and the range of motion was gradually increased. The patient was allowed to return full weight bearing immediately after the operation.

The patient was able to make straight leg raise with minimal lag and could flex his knees up to 90 degrees three months after operation. He was also able to walk normally and maintain full weight bearing. No further visits in day care unit were organized but patient was contacted by phone almost a year after the injury and at that point he was able to flex his knees up to 115-120 degrees and he had returned to the gym.

### OPEN ACCESS

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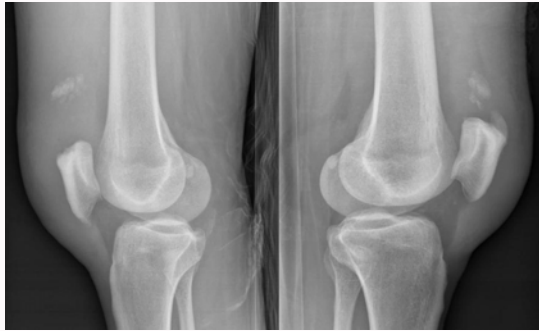
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**Figure 1:** Radiographs (right and left knee) from the emergency departments showing bilateral front tilting patella and patella baja.



**Figure 2:** 2-7 Intraoperative photos showing a complete avulsion of the quadriceps tendon from the patella extending to medical and lateral retinacula. The tendons were reattached with sutures (5 Ticron) using vertical bone tunnels to the patella. The retinaculum were also repaired. The findings and procedures were identical in both knees.

## Discussion

There are several case reports regarding different tendon ruptures associated to the anabolic steroid abuse [2,3,7]. But very few of them are in the quadriceps tendon.

Simultaneous bilateral ruptures of the quadriceps tendons are rare and associated with some predisposing generalized conditions. Chronic renal failure, gout and hyperparathyroidism are implicated in younger patients, with diabetes and obesity in the older. These

conditions were excluded in our patient and it is reasonable to attribute the injury to his steroid ingestion. The effect of anabolic steroids to induce tendon pathology is well supported in animal experiments, especially in combination with exercise. Michna found dose-related abnormalities of collagen fibrils in mice tendons and it was greatest degree in steroid-treated mice with combination of exercise. These morphological changes in the mice tendons with anabolic steroids and exercise are accompanied by changes in the mechanical properties [5]. Wood et al. [8] postulated that these biomechanical changes can result in complete tendon failure and predispose to a rupture.

There are only a few previous case reports which describe simultaneous bilateral quadriceps tendon rupture after anabolic steroid abuse. Conclusive cause-effect relationships cannot be established in any of them but this case report supports the suggestion that anabolic steroids in exercising individuals play a significant role in their tendon ruptures.

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