

Non-Surgical Treatment Of Partially Thickness Tear Of Quadriceps Tendon: A Case Report

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ABSTRACT

In this study, we present a 40 year old male, who sustained an injury of the left knee and sought medical advice because of continuous pain. Based on the clinical examination and MRI the diagnose was a partial tear of the quadriceps tendon, consisting of a full thickness tear of the distal rectus femoris tendon sheath and a partial tear of the intermediate layer of quadriceps tendon. Due to the good muscle tone and absent functional deficit, a non-surgical management plan was planned and executed. The treatment consisted of a long knee brace, a period of non-weight bearing followed by protected weight bearing and gradual return to strength training. In order to decrease the load of rectus femoris muscle and to prevent reinjury, core stability exercises were also implemented with good functional outcome. We report the case for its rare incidence and the suggested non-surgical treatment with good outcome. We also present the current literature concerning mechanism and conservative management of extensor mechanism ruptures.

Keywords: Quadriceps tendon, conservative management, distal rectus femoris tears

INTRODUCTION

CASE PRESENTATION

A 40 years old male bank employee presented with sudden knee pain after slipping on a wet floor. Thereby he went through his left knee and felt a sudden pop in his left knee. There was no fall on the ground and no direct trauma to the knee. Afterwards he had difficulty in walking. He was able to stand without the feeling of instability and locking. There was a presentation with a health care provider, who prescribed analgesics without any pain relief. During the evening he underwent X-rays and he presented himself on the next day in our orthopaedic outpatient department.

Aside of a mild hypertension without the use of antihypertensive drugs, there was no medical history. No history of medication especially regarding to tendon degeneration like Statines, antibiotics or cortisone.

The patient weighs 81 kg, his height is 1.70m with a BMI of 28 kg/m². He did not participate in any sports and could be regarded as sedentary.

CLINICAL INVESTIGATION AND IMAGING

On clinical examination there was a palpable depression just above the patella on the lower end of the quadriceps (Fig-1). There was no marked effusion with pressure pain localized above the patella. ROM was limited to 0-90 because of pain, there was no extension lag and the extension strength was 4/5, The patient was able to perform a straight leg raise. The MCL and LCL were stable in 0 and 30 degrees of flexion, the PCL was tested using the posterior drawer test and showed no signs of instability, The ACL also showed no signs of instability using the Lachman and Pivot shift test, the medial and lateral meniscus were tested with the Mc murray test were intact, Patella Apprehension was also negative. The X-ray showed no bony defect and no intraarticular effusion. An MRI was then performed, and it showed a complete thickness tear of the distal rectus femoris tendon and a

partial tear of the intermediate layer of the quadriceps tendon.

Fig 1 Depression above the patella on the lower end of quadriceps



INTERVENTION

Due to our clinical findings such as a good muscle tone of the quadriceps, the ability to do a straight leg raise, absent extension lag sign and the MRI finding that there was an incomplete tear of the quadriceps tendon consisting of mainly the superficial Rectus femoris part we decided to go for conservative treatment.

Our treatment plan consisted of different phases:

The initial phase was composed of a long knee brace for 3 weeks, pain medication and non weight bearing for 4 weeks.

After 3 weeks range of movement exercises were initiated and after 4 weeks partial weight bearing was tolerated, together with cryotherapy and transcutaneous electrical nerve stimulation (TENS).

After 6 weeks the patient proceeded to full weight bearing. At this stage we included strength training with isometric contractions and light eccentric exercises. The next exercises were introduced: the straight leg raise with additional weight after time and the ball press for the hamstrings. After 1 week wall squats were introduced. Core training with ventral and dorsal planking was also introduced to reduce the load on the Quadriceps muscle and to reduce the possibility of re-injury. These exercises were continued during a home training plan with regular follow up in our centre. For our rehabilitation program we followed the guidelines outlined in Suchomel et al. and (3 and 4)

At 8 weeks after injury we noticed a complete reduction of the depression in the quadriceps tendon. The power improved to grade 5. The patient was able to walk comfortably without a walker and he had no complaints of pain. We contacted the patient again after 6 months and did a KOOS score, which was 75%, suggesting excellent recovery.



Fig.2 No depression above the patella on the lower end of quadriceps

LITERATURE AND DISCUSSION

The rectus femoris muscle is one of the four muscle bellies that compose the quadriceps muscle, which is located in the anterior compartment of the thigh. Proximally it is attached to the pelvis at the spina iliaca anterior inferior and distally the tendon merges with the other tendons of the Quadriceps muscle. The distal quadriceps femoris tendon normally consists of three layers: the rectus femoris forms the superficial layer. The middle layer consists of the combination of the Vastus medialis and Vastus lateralis and the deep layer is made up of the vastus intermedius tendon. [8] The superficial layer attaches in part to the patella and the remainder continues superficial of the patella to join the ligamentum patellae. Multiple variations of the normal anatomy of the tendon are described. [13]

Extensor mechanism ruptures are rare injuries with a found incidence of 1,9% over a 5-year period in an UK study (10).two to three times more common a patella fracture is seen. The rupture scan involve either the quadriceps or patellar tendon or more seldom the muscle itself and they may be partial or complete. Patellar tendon rupture is mostly seen in younger patients with an age less than 40 after direct traumatic injuries or end-stage patellar tendinopathy compared to patients older than 40 years, who are more likely to have a quadriceps tendon rupture. For quadriceps tendon ruptures comorbidities, medication and degeneration of the tendon, plays a role in the predisposition of the injury as well as age (11). Fatty and cystic degeneration, micro angioblastic dysplasia, mixed degeneration, decrease in collagen and calcifications are structural changes that weaken the tendon with increasing age. (12)

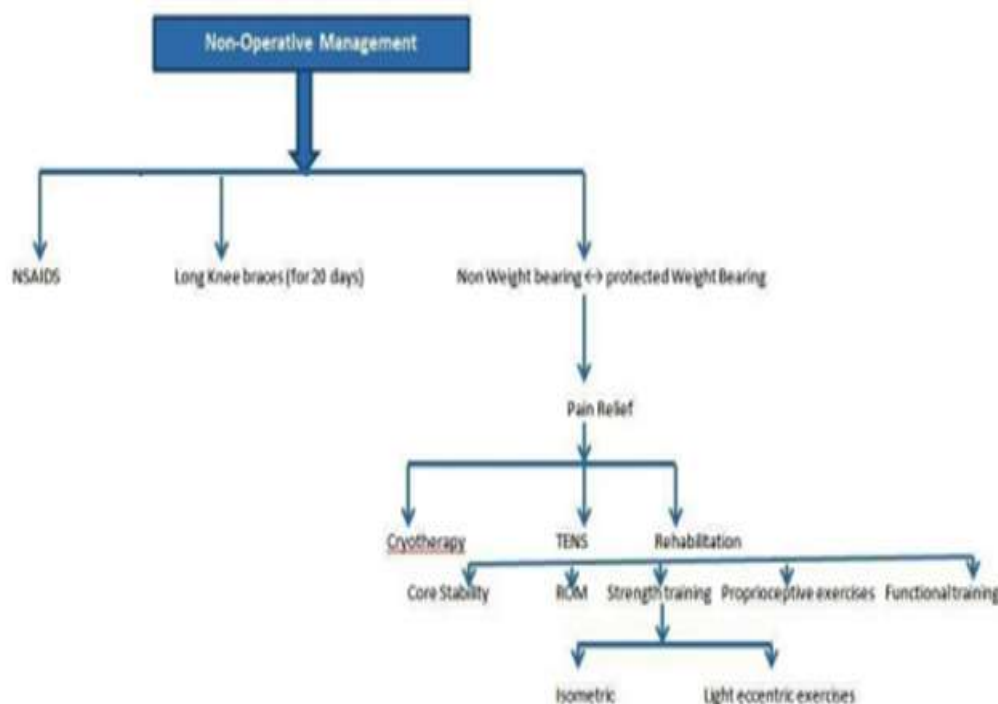
The most common injury pattern here is an eccentric contraction during a fall. (14) This was also the injury mechanism of this case. There were however no predisposing factors leading to tendon degeneration.

Although quadriceps muscle strains are common, Rupture of the quadriceps muscle is an extremely uncommon type of injury except following direct major trauma or as a sports-related injury (12) isolated full thickness tear of the distal rectus femoris is even more rare and there are only a few reports published till date. These injuries can be seen mainly at the junction of the conjoined tendon with the muscle belly. [6] In 1933 isolated tears of rectus femoris muscle were first described by McMaster at the location mentioned above. [2] Proximal avulsions are also seen, mainly in soccer players after sudden sprints, in the skeletally immature patients a bony avulsion of the anterior inferior iliac spine can be seen. Both can be managed conservatively. Sometimes resection of heterotopic ossification is needed as this can lead to impingement of the hip. [16]

The rectus femoris muscle is more prone to injury than others due to its superficial location, the predominance of type 2 fibres (approximately 65%), mostly eccentric muscle contraction and extension across two joints. [5][6]. The primary functions of the Rectus femoris muscle are knee extension and hip flexion. Since it traverses both the hip and knee joint, the chances of injuries are greater in comparison than the other parts of the quadriceps muscle. [1]

If a complete tendon tear is present or if there is a functional deficit with an incomplete tendon rupture, surgery is indicated with good results if performed acutely. Delay of surgery can result in tendon retraction, resulting in inferior results. Surgery requires to key basic steps with alterations according to location. A conservative course can be maintained if there is an incomplete tendon tear without functional deficit. (15)

Ilan et al described a conservative management for incomplete quadriceps tendon ruptures by knee immobilisation in full extension for 6 weeks with ice compression and aggressive decompressive management for the knee effusion (17). Conservative treatment of affected extremity in a cast for 3 weeks showed good result stated by Aydemir et al, likewise conservative treatment of a patient with isolated distal rectus femoris tendon rupture had shown good functional outcome stated by Weber et al. [9]



A flowchart of treatment hierarchically is presented above


CONCLUSION

A conservative treatment protocol can be considered a valuable alternative to surgical management in partial quadriceps tendon ruptures concerning the Rectus femoris. There fore a thorough clinical examination and good muscular tone is mandatory.

Rehab should include isometric contractions, light eccentric exercises flexibility training, core stability exercises, proprioceptive exercises.

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