

CASE REPORT

Simultaneous bilateral quadriceps tendon rupture while playing basketball

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Simultaneous bilateral quadriceps tendon rupture is an uncommon injury in healthy people and only a few cases have been reported in athletes. This is the first report of a patient with simultaneous bilateral quadriceps tendon rupture incurred while playing basketball. The injury was surgically repaired and the patient had a good functional outcome.

Steiner and Palmer¹ were the first to report on a patient with simultaneous bilateral quadriceps tendon rupture in 1949. This unusual injury has been reported in only four patients during a sporting event.^{2–5} This report describes a patient with simultaneous bilateral quadriceps tendon rupture with no other identifiable risk factors while playing basketball.

CASE REPORT

A 39 year old black man with no significant past medical history presented to the emergency room with a two day history of bilateral knee pain and swelling. He stated that the pain began after an injury experienced while playing basketball. He was shooting a basket when he was undercut by another player and fell on to the court with both knees flexed underneath his body. He waited two days before receiving treatment because he thought the pain would resolve spontaneously. He was unable to walk after the incident. On further questioning, he complained of swelling and of not being able to extend his legs. Physical examination showed the patient to be a well developed athletically fit man. He was unable to actively extend his legs and had bilateral suprapatellar gaps. Radiographs of the knees showed an effusion, with disruption of the quadriceps unit on the right and quadriceps avulsion fracture on the left. His haematological and metabolic profiles were all within normal limits. There was no history of use of anabolic steroids, previous local steroid injections, or tendinitis. A clinical diagnosis of bilateral quadriceps tendon rupture was made, and the patient was admitted for surgical repair the next day. With the use of transverse incisions, both quadriceps tendons were repaired with baseball sutures through patellar drill holes. The extensor retinaculum was reapproximated both medially and laterally. Both legs were then immobilised in casts for six weeks. He received physiotherapy on an outpatient basis to regain strength and range of motion. Six months after the operation, the patient had completely recovered, with bilateral knee extension to zero degrees and flexion to 90 degrees bilaterally. He had no difficulties with the activities of daily living, but was not back to playing sports.

DISCUSSION

Bilateral simultaneous quadriceps tendon rupture is a rare injury in an otherwise healthy person. This report represents the first case where a previously healthy athlete ruptures his

quadriceps tendon bilaterally and simultaneously with minor trauma while playing basketball. Only four cases of athletes with this injury have been described in the literature, but in three of them there were predisposing conditions.^{2–5} Table 1 summarises all of them.

Simultaneous bilateral quadriceps tendon rupture generally occurs in men over the age of 50, who are diabetics, obese, or have age related changes in their tendons.⁶ However, many cases are reported in younger people with chronic diseases such as gout, chronic renal failure, and hyperparathyroidism.⁶ Other factors leading to tendon rupture include local steroid injections, use of anabolic steroids, and history of chronic tendinitis.^{3,4,7} These predisposing conditions cause tendon degeneration by altering collagen synthesis or strength, causing sclerosis and fibrosis in the tendon, fatty degeneration, necrosis, or calcification.^{5,6}

The diagnosis of bilateral rupture is based on clinical findings. Patients typically present after a fall with their knees flexed or a sudden, sharp pain above the patella and are unable to stand without assistance.^{1,5,8} During examination, patients cannot actively extend their knees and often have a palpable gap above the patella, the so called “sulcus sign” or “gap test”.⁸ Patients are able to actively flex their knees and have full passive range of motion on flexion and extension. Other physical examination signs include hemiarthrosis of the knee or an effusion, absent patellar reflexes, or a free floating patella.^{5,8} These signs and symptoms along with a predisposing condition suggest a diagnosis of bilateral quadriceps tendon rupture.

Plain radiographs of the knee are an inexpensive tool in diagnosis; however, often they show non-specific changes and only indirect signs of rupture. Soft tissue swelling, knee effusions, calcifications, low lying patella, or a forward tilted patella, and disruption of the quadriceps shadow are all signs seen on plain films.⁹ Ultrasound is another inexpensive method in diagnosing tendon ruptures at the bedside.^{4,5} Magnetic resonance imaging is a more expensive method in diagnosing tendon ruptures and is particularly useful for preoperative details because it allows better visualisation of soft tissues and anatomical detail, and the precise location and extent of rupture can be identified.¹⁰

For complete ruptures, treatment requires surgery. Early surgical intervention is associated with optimal function.⁸ Delayed surgical repair has been associated with protracted physiotherapy, extension lag, inadequate flexion, and use of adaptive equipment.⁸ After surgical repair, patients are immobilised in cylindrical casts for four to six weeks, and physiotherapy is used to regain full strength and range of motion. With this regimen, most patients return to full function without the need for an assistive device.

Simultaneous rupture of the quadriceps tendon bilaterally is rare in young healthy people who play sports. This is the first case of an athlete playing basketball with this type of injury and shows that early treatment can result in maximal recovery.

Table 1 Simultaneous bilateral quadriceps tendon rupture in sports

Reference	Year	Age	Sex	How happened	Time before diagnosis	Method of repair	Where torn	Chronic disease	Postoperative regimen	Result
This paper	2001	39	M	Fell	Same day	Operative	Osseotendinous junction	None	Plaster cylinder for 4–6 weeks	Flex: 90 deg (L), 73 deg (R), no ext lag at 6 months
Liow & Tavares ⁴	1995	29	M	Fell	Same day	Operative	Osseotendinous junction	Steroid use	Plaster cylinder for 8 weeks	Flex: 60 deg; Ext lag: minimal at 4 months
David <i>et al</i> ²	1994	32	M	Spont	Not mentioned	Operative	Osseotendinous junction	Steroid use	Plaster cylinder for 6 weeks	Ext lag 5–10 deg at 1 year
Stephens & Anderson ⁵	1987	22	M	Fell	Same day	Operative	Osseotendinous junction	CRF, secondary hyperPTH, obesity	Not mentioned	Back to work at 14th week, normal power at 10 weeks
Grenier & Guimont ⁶	1983	39	M	Spont	One day	Operative	Osseotendinous junction	None	Plaster cylinder for 5 weeks	FROM at 7 months

M, Male; spont, spontaneous; CRF, chronic renal failure; PTH, parathyroidism; L, left; R, right; Flex, flexion; Ext, extension.

Take home message

- Diagnosis of quadriceps tendon rupture can be made by clinical findings (not being able to actively extend the legs while active flexion is preserved and a suprapatellar “gap”) and magnetic resonance imaging visualisation
- Risk factors for rupture include steroid use, local steroid injection, diabetes, chronic renal failure, gout, parathyroidism, and trauma
- Early diagnosis and treatment lead to a good functional outcome

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COMMENTARY

The authors are to be congratulated on making the effort to produce this case report for publication. It highlights the unusual nature of this problem, in particular as the patient has few predisposing factors that could put him at risk for this injury. The treatment they undertook has obviously led to a reasonably successful outcome and highlights the importance of treating such problems as early as possible. It is interesting that there have been a number of reports, in the literature and presented at meetings, of bilateral spontaneous patellar tendon rupture usually on the basis of previous patellar tendonitis, but this is a rare case of bilateral quadriceps tendon rupture. It also highlights some of the risks of continuing to play explosive sports into the 4th and 5th decade of life. As people continue to be active at older ages, this may be a problem that is more commonly seen.

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