Case Report

Isolated distal semitendinosus tendon tear in a collegiate athlete

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ABSTRACT

Complete distal semitendinosus tendon tears are rare hamstring injuries. They often present with a “pop” followed by delayed pain and swelling. We describe the case of a collegiate athlete with an isolated distal semitendinosus tendon tear diagnosed by MRI and ultrasound after being treated for a stress fracture of the anterior tibial shaft with an intramedullary nail. The tear progressed from partial to complete after 2 weeks of rehabilitation and return to practice. The patient was ultimately successfully treated with semitendinosus tenodesis.

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Introduction

Proximal hamstring injuries are common, particularly in the competitive athlete population. However, isolated tears of distal hamstring tendons from their tibial insertion are rare, even in high-level athletes. The semitendinosus tendon comprises one of the hamstring tendons which inserts distally onto the tibia. Since isolated tears of the distal semitendinosus tendon are uncommon, there is not uniform consensus on surgical or nonsurgical treatment strategies nor rehabilitation programs.

Case report

A collegiate athlete with no significant medical history presented with tibial pain. Radiographic images demonstrated a stress fracture of the anterior tibial shaft (Fig. 1). Five days later, an intramedullary nail was placed to treat the stress fracture (Fig. 2). No complications were noted after performing the procedure, nor at post-operative clinic visits 2 and 5 weeks following surgery. His initial rehabilitation program initially included the use of crutches and a resisted exercise bicycle for

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practice resulting in pain in the semitendinosus tendon region. A same day MRI revealed that the distal semitendinosus tendon had a partial thickness tear at the tibial insertion with retraction of at least a portion of the tendon (Fig. 3). During the next day clinic visit, point tenderness was elicited at the distal semitendinosus tendon.

The patient was instructed to undergo a week of rehabilitation without returning to practice or competition. After a week of rehabilitation, the patient’s pain subsided and they were determined to be at full strength based upon training room activity. The patient was instructed to undergo 2 additional weeks of rehabilitation prior to return to practice. Three weeks after beginning rehabilitation, the patient participated in light warm-up exercises. Six hours later, they felt pain and swelling in the thigh and were unable to walk without crutches by the following morning.

The patient underwent a diagnostic ultrasound where a large hematoma was discovered within the hamstring musculature with a retracted semitendinosus tendon stump at the hematoma’s distal margin (Fig. 4). An MRI followed, showing a complete distal semitendinosus tendon tear with 22 cm of retraction from the tibial insertion and a hematoma surrounding the retracted stump (Fig. 5). One week following the ultrasound and MRI, the patient underwent semitendinosus tenodesis to the semimembranosus tendon without complications. Eight months later at the time of this writing, the patient continues to progress well from rehabilitation and is preparing for the upcoming season.

**Discussion**

Although hamstring injuries make up 29% of sports-related injuries, complete tears of the distal semitendinosus tendon are rare. This tendon is often harvested for reconstructing the anterior cruciate ligament (ACL) [1]. Though rare, causes of distal semitendinosus tendon tears include running, knee hyperextension, changing direction via foot planting, diving towards a ball, and stepping into a throw. Each of these activities is most often in non-contact situations. Such tears are usually larger than proximal tendon or muscle belly tears. These cases often present with the patient experiencing a “pop” in the posterior knee, followed by delayed pain and tenderness in the distal posterior thigh [2]. The risk for a distal semitendinosus tendon tear is increased when there has been previous injury to the area, including harvesting the tendon for ACL repair [1]. Proper diagnosis typically includes an MRI for accuracy of the location and extent of the injury, especially to distinguish between tears in the muscle belly and tendon [3]. MRI imaging also is useful for delineating which hamstring tendon is injured. Treatments have traditionally considered the hamstring muscles and tendons as a unit together, without necessarily identifying which structure was injured. However modern treatments are now tailored to the specific site of injury and have significantly improved recovery outcomes [4].

Treatments can vary depending on the severity of the tendon injury. Additionally, since this is a rare injury, there is currently not a standardized treatment algorithm. Non-operative repair may be the best initial option for athletes due to shorter
Fig. 3 – Axial T2 fat-saturated images at the proximal tibia (A) demonstrates artifact within the tibia from the proximal screw and the intramedullary nail. Also, at least a partial tear of the semitendinosus tendon is noted with surrounding edema and a few residual intact fibers (arrow). Axial T2 fat-saturated image (B) at the semitendinosus musculotendinous junction demonstrates edema surrounding the muscle and tendon (arrow).

Fig. 4 – Short axis sonographic image (A) demonstrates shadowing created by the retracted semitendinosus tendon stump (arrow) with surrounding hematoma formation (arrowhead). Long axis panoramic sonographic image (B) demonstrates a large hematoma in the hamstring muscles measuring 22 cm in length (arrow and also between the 2 cursors on the image).

recovery times. However, our patient progressed from a partial to a complete tear during initial rehabilitation, thus requiring surgery for repair [2]. The possibility for spontaneous tendon healing and scarring without surgical intervention is noted in some cases, including those in which the tendon was harvested for ACL reconstruction [5]. Unfortunately, rehabilitation complications, potentially due to attempting to recover from multiple injuries simultaneously, may impede healing without surgical intervention. Therefore, many patients only attain partial recovery from rehabilitation alone, which has been re-
ported as low as 42% for complete recovery [3,6]. Surgery may be a necessary consideration earlier in the treatment process rather than later depending on the injury [4]. With the patient in this case report, there was a stress fracture prior to the distal semitendinosus tendon tear. Placement of an intramedullary nail with screw fixation for tibial stress fractures poses a risk of tendon injury due to the location of the tibial screws. Therefore, in this case, potentially the screws may have led to a possible tear of the distal semitendinosus tendon and additionally prevented subsequent healing without surgery. Currently, long-term recovery data is insufficient to know the outcomes of patients treated with or without surgery to establish a universal treatment plan. Therefore, each case requires clinical judgement to determine the best treatment option [1,6]. The competitive level of the athlete and the quality of available rehabilitation services should also be considered when evaluating treatment options [1]. Each athlete may experience different patterns in a distal semitendinosus tendon tear, especially since this injury is extremely rare in recreational athletes compared to professional and collegiate athletes, and therefore this further necessitates assessing each patient’s treatment plan individually [1,6].

MRI can help identify distal semitendinosus tendon tears, their location, and extent of the injury. Such information can be used to better implement a treatment plan, including surgical approach. Although surgery should not always be the first treatment option, previous injuries and lack of improvement in non-surgical treatment should suggest surgical consideration sooner in the treatment process.

**Patient consent**

Written, informed consent for publication of the patient’s case was obtained from the patient.

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