

Peroneus Longus Rupture at Its Origin Managed With Platelet Rich Plasma

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Tears of the peroneus longus muscle are unusual, and typically involve the distal insertion at the musculotendon junction. Although tears of the mid-portion of the peroneus longus muscle/tendon complex have been reported, no reports of a tear at the origin of the peroneus muscle have been published, to the authors' knowledge. Herein a case of proximal peroneus longus muscle tear and its subsequent management with platelet rich plasma is reported.

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Injuries to the peroneus longus muscle typically involve the distal insertion at or near the ankle.¹⁻⁶ To our knowledge, no previous case of a tear at the origin of the peroneus muscle has been reported.

The peroneus longus is a major muscle in the lower leg that, with the peroneus brevis muscle, plantar flexes and everts the foot at the ankle. The peroneus longus muscle-tendon complex has its origin along the lateral edge of the head and proximal shaft of the fibula. From the origin, it descends along the lateral edge of the leg to a point halfway between the knee and ankle, where it tapers to form a long tendon. The tendon portion of the peroneus longus passes posterior to the lateral malleolus, wraps around the sole of the foot, and inserts at the first metatarsal and first cuneiform bones on the medial edge of the foot.

Tears of the peroneal tendons typically result from forced inversion and dorsiflexion of the ankle. Muscle tears are rare in the absence of trauma.

In a retrospective review² of surgical repair of peroneal tendon tears, 5 of 40 patients had peroneus longus tears, and all occurred at the ankle. In a case series⁶ of 14 peroneus longus tears, 12 were at the cuboid and 2 were at the lateral calcaneus. In 9 patients with tears of the peroneus longus tendon, all occurred at or slightly proximal to the cuboid.⁵ A trauma-induced tear of the muscle portion of the peroneus longus muscle-tendon complex near the musculotendon junction, with subsequent compartment syndrome, was reported in a high school football player.³ Beginning in the 1930s, before the development of platelet rich plasma (PRP), prolotherapy (also referred to as *sclerotherapy*) was used for chronic injuries of ligaments and tendons. Dextrose solution, when injected into injured tendons and ligaments, irritates the tissue and theoretically stimulates the release of intrinsic factors to promote healing. Although several reports of the use of prolotherapy in chronic muscle problems have been published,¹¹ to our knowledge, no report of its use in acute muscle injury has been published.

The therapeutic rationale for the use of PRP is based on the role of platelets in stimulating angiogenesis and wound healing.⁷ Stored within platelet α -granules are several growth factors, including platelet-derived growth factor, insulinlike growth factor, vascular endothelial growth factor, platelet derived angiogenic factor, and transforming growth factor β .

Since the initial report¹⁰ on the use of autologous conditioned serum in 2004, PRP has become common in the management of tendon and ligament injuries,⁷ but few reports of its use in muscle injuries have been published.^{8,9} The use of PRP in muscle injury is currently not standard. We describe a patient with proximal peroneus longus muscle tear and his subsequent treatment with PRP.

Report of Case

An 18-year-old high school football player presented with a 3-week history of right lower leg pain. He reported that the pain began insidiously but recalled no injury or precipitating event. He described the pain as a heavy throbbing but with no numbness and no foot drop. The pain was exacerbated by exercise and somewhat alleviated by rest and ice. He attempted to return to football practice, but the pain intensified.

Initial examination revealed exquisite tenderness over the shaft of the fibula and the lateral aspect of the leg. Results of motor testing of the peroneus longus and brevis muscles were normal. Radiographs of the knee and leg were negative for acute bony abnormality. Magnetic resonance imaging revealed a full-thickness tear of the peroneus longus muscle at the proximal aspect of the right lower leg with distal retraction of the fibers of approximately 15 to 20 cm (*Figure 1* and *Figure 2*). The peroneus brevis muscle appeared intact. Naproxen sodium, an ankle brace and calf sleeve, and physical therapy were prescribed but provided minimal relief.

Treatment options were discussed with the patient and his family. Surgical repair was not considered an option, owing to extensive muscle disruption. The patient and his family were advised of 2 approaches: allowing the muscle to heal on its own, with probable scarring or fibrosis, or undergoing a newer treatment that has been successful in patients with other muscle tears—PRP injections. He and his family elected to try PRP injections.

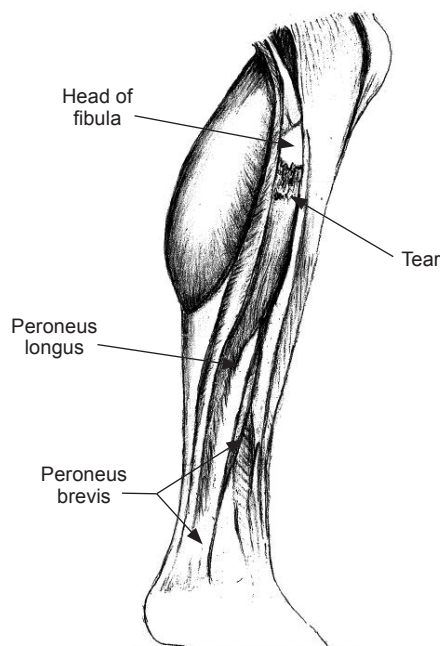


Figure 1. Artist's depiction of a peroneus longus tear at its origin. Illustration courtesy of Charles W. Ward.

Sixty milliliters of peripheral blood was drawn from the patient for PRP preparation. Under sterile conditions, the autologous PRP was prepared using a commercially available instrument (Magellan PRP, Arteriocyte Medical Systems Inc) in accordance with the manufacturer's guidelines. An aliquot of 8 mL was obtained and slowly injected under ultrasound guidance into the damaged area of the muscle. The patient experienced the expected mild pain at the injection site. No weight bearing was advised until reexamination.

Seventy-two hours after the PRP injection, the pain had significantly improved. Tenderness was minimal, and motor and sensory function remained intact. On the ninth postinjection day, no pain was present. He was permitted to resume jogging and running but with no side-to-side motion. Fifteen days after the PRP injection, he was permitted to return to full-contact football.

We anticipated minimal residual scarring at the defect site. At 90 days after PRP injection, magnetic resonance imaging revealed slight intramuscular edema at the defect site, with normalization of the muscle architecture beginning 15 cm distal to the fibular head (*Figure 3*).

Discussion

An isolated tear at the origin of the peroneus longus muscle has not been previously reported, to our knowledge. The initial evaluation of this patient suggested a proximal fibular stress fracture or a peroneus longus strain. Because most injuries to the peroneus longus complex occur in the tendon rather than in the muscle body and manifest as chronic ankle pain, the tear in the peroneus longus muscle was revealed only after imaging. Extensive muscle disruption made satisfactory surgical repair unlikely. The patient elected to undergo PRP injection. Four weeks after his initial presentation, the patient was able to return to full activity.



Figure 2. Initial magnetic resonance image demonstrating peroneus longus muscle tear at its origin (arrow) in an 18-year-old football player.



Figure 3. Magnetic resonance image 14 weeks after injury and injections of platelet rich plasma, demonstrating healing of peroneus longus muscle tear (arrow) in an 18-year-old football player.

This case report demonstrates both a rare injury and a novel therapeutic approach. In our opinion, the use of PRP contributed to the rapid healing of the muscle injury without apparent sequelae and permitted the patient to return to full athletic activity more rapidly than anticipated.

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