

Endoscopic decompression of the first branch of the lateral plantar nerve

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Abstract Entrapment of the first branch of the lateral plantar nerve is one the cause of plantar heel pain. It is easily overlooked. Surgical treatment classically utilizes a long medial incision with release of both the superficial and deep fascia of the abductor hallucis muscle. We decompress the nerve by release of the deep abductor hallucis fascia under arthroscopic visualization. By this approach, the soft tissue trauma and risk of wound complications can be minimized.

Keywords Heel pain · Endoscopy · Arthroscopy · Nerve · Decompression · Plantar

Introduction

Plantar heel pain is one of the most common problems treated by Orthopaedic surgeons. The most common cause of the problem is proximal plantar fasciitis. Symptoms are frequently insidious in onset and often worse with the first few steps on awakening. Clinically, there is tenderness at medial calcaneal tuberosity. Most of the patient is cured with conservative care. One of the most commonly overlooked causes of plantar heel pain is entrapment of the first branch of the lateral plantar nerve. Treatment of the nerve entrapment is similar to that for plantar fasciitis, with rest, activity modification, nonsteroidal anti-inflammatory drugs, stretching exercise and local steroid injection. Surgical release of the nerve is indicated when conservative

treatment failed. Classically, this is performed through a extensive medial incision. Wound breakdown is one of the commonest complications. We describe an endoscopic approach to decompress the nerve in order to minimize the risk of wound complication.

Description of technique

The patient is put on supine position. A pneumatic tourniquet is applied onto the thigh. The patient's big toe is dorsiflexed and the medial border of the plantar fascia is then outlined. The plantar portal is at the proximal end of the medial border of the plantar fascia, just distal to the medial calcaneal tubercle. A 5 mm transverse skin incision is made and the subcutaneous soft tissue is dissected bluntly with a haemostat down to the plantar fascia. The medial border of the plantar fascia is then cut and the inferior end of the deep fascia of the abductor hallucis is identified. The deep surface of the deep fascia of the abductor hallucis is felt (wash board feeling) with a haemostat. A 2.7 mm, 30 arthroscope is then introduced from the plantar portal and is advanced dorsally along the course of the first branch of the lateral plantar nerve till the upper border of the fascia. The dorsal portal is then made at this site. By means of blunt dissection of subcutaneous tissue, the first branch of the lateral plantar nerve is identified and the upper border of the superficial abductor fascia is released, abductor hallucis muscle retracted plantarwards to expose the superior border of the deep abductor fascia. The superior border of the deep abductor fascia is then released and the arthroscope can be advanced through the dorsal portal (Fig. 1).

With the arthroscope switched to the dorsal portal, the plantar heel structures can be visualized. In the presence of a calcaneal spur, an arthroscopic shaver can be used for

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Fig. 1 The dorsal and plantar portals is at the dorsal and plantar margins of the deep fascia of abductor hallucis muscle

visualization, taking care to shave toward the fascia and bone and not distally [3]. The calcaneal spur is resected with a pituitary rongeur. After removal of the calcaneal spur, the plantar fascia can be clearly defined and the medial portion of the plantar fascia is then released with a punch forceps (Fig. 2).

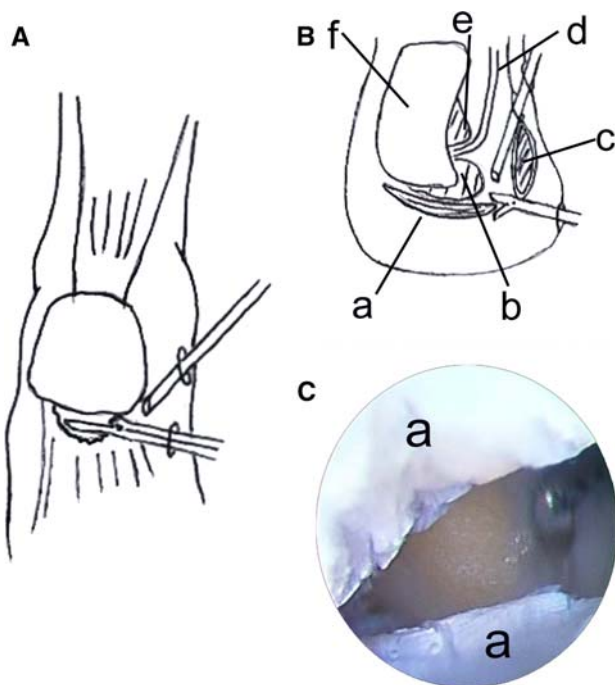


Fig. 2 With the arthroscope in the dorsal portal, the calcaneal spur is resected with a pituitary rongeur through the plantar portal (a). b The coronal diagrammatic illustration of the plantar fascia release. a plantar fascia, b flexor digitorum brevis muscle, c abductor hallucis muscle, d first branch of the lateral plantar nerve, e quadratus plantae muscle, f calcaneus. c Endoscopic view of plantar fascia release with the heel pad fat seen through the proximal portal

Finally, the arthroscope is switched to the plantar portal to visualize the deep surface of the deep abductor fascia. Under direct visualization, a retrograde knife is introduced through the dorsal portal; beware not to injure the first branch of the lateral plantar nerve. The deep abductor fascia is released under arthroscopic visualization (Fig. 3). Post-operatively, the patient is allowed weight bearing walking as pain tolerated.

Discussion

Minimal invasive approach of endoscopic plantar fascia release is well established technique for isolated plantar fasciitis [1, 2]. Blanco [3] described a comprehensive technique of endoscopic removal of plantar calcaneal spur and extended the indication of minimal invasive approach to calcaneal spur syndrome together with plantar fasciitis. However, these approaches do not deal with entrapment of the first branch of the lateral plantar nerve.

Entrapment of the first branch of the lateral plantar nerve is one of the most commonly overlooked causes of chronic plantar heel pain and can occur together with plantar fasciitis. The exact site of compression is between the deep

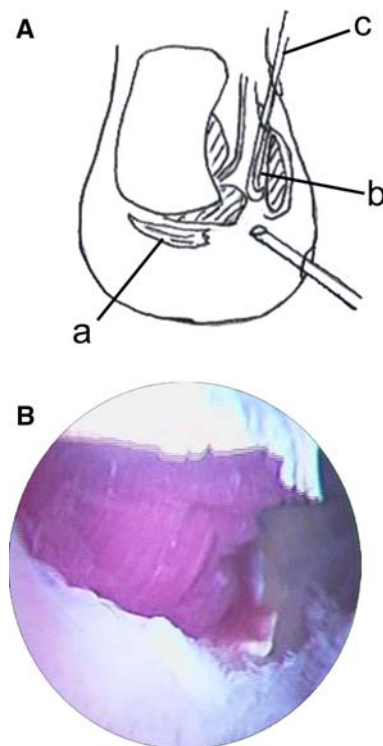


Fig. 3 a With the arthroscope in the plantar portal, the deep abductor fascia is released with a retrograde knife through the dorsal portal. a partially released plantar fascia, b deep abductor fascia, c retrograde knife. b Endoscopic view showed that the deep abductor fascia is released with the abductor hallucis muscle exposed

fascia of the abductor hallucis muscle and the medial caudal margin of the medial head of the quadratus plantae muscle. Surgical decompression of the nerve requires release of the deep abductor fascia. Classically, an open procedure is required and the superficial abductor fascia is released and the abductor hallucis muscle is mobilized in order to visualize the deep abductor fascia.

In our approach, the two portals used, is at the plantar and dorsal margins of the deep fascia of the abductor hallucis muscle. The deep fascia can then be released under arthroscopic visualization without the need of an extensive medial incision or mobilization of the abductor hallucis muscle. Moreover, because of the obscure angle between the arthroscope and the plantar fascia in the coronal plane, the plantar fascia and calcaneal spur can be adequately visualized with the 30° arthroscope through the dorsal portal. Endoscopic partial fascia release and removal of calcaneal spur can be performed through the plantar portal.

Conclusion

By means of portals at the dorsal and plantar margins of the deep fascia of the abductor hallucis muscle, the first branch of lateral plantar nerve can be released endoscopically in addition to the endoscopic plantar fascia release and endoscopic removal of plantar calcaneal spur. This can extend the indication of minimally invasive surgery in management of refractory plantar heel pain.

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