

# Percutaneous release of the plantar fascia. New surgical procedure

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## Summary

**Background:** Plantar fasciopathy presents with pain at the plantar and medial aspect of the heel. If chronic, it can negatively impact on quality of life. Plantar fasciopathy is not always self-limiting, and can be debilitating.

**Methods:** Surgical management involves different procedures. We describe a percutaneous plantar fascia release. A minimally invasive access to the plantar tuberosity of the calcaneus is performed, and a small scalpel blade is used to release the fascia.

**Conclusion:** With this procedure, skin healing problems, nerve injuries, infection and prolonged recovery time are minimised, allowing early return to normal activities.

**Level of Evidence:** V.

**KEY WORDS:** plantar fasciopathy, plantar fascia release, minimally invasive release, percutaneous surgery.

## Background

Patients with plantar fasciopathy report sharp pain in the plantar aspect of the foot, in the medial portion of

the heel<sup>1</sup>. Both sedentary patients and athletes<sup>2</sup> suffer from it, with a higher frequency between the age of 40 and 60<sup>3</sup>. The plantar fascia, a fibrous band of connective tissue (aponeurosis), helps to maintain the stability and the arch of the foot<sup>4</sup>. In plantar fasciopathy there is non-inflammatory structural breakdown of the plantar fascia rather than an inflammatory process<sup>5</sup>, secondary to myxoid degeneration with microtears within the plantar fascia, collagen necrosis and angiofibroblastic hyperplasia of it<sup>6</sup>. The diagnosis is essentially clinical. Plain radiography has limited value, while ultrasonography is an useful, non-invasive, well-tolerated and reliable tool<sup>7</sup>. Plantar fasciopathy is not always self-limiting. Conservative management involves activity modifications, stretching<sup>7-10</sup> of the plantar fascia, ice massage, and night dorsiflexion splints or orthotics. If patients do not experience a resolution of symptoms, the use of non-steroidal anti-inflammatory drugs (NSAIDs) is common. Steroid injections can be performed for a short term pain relief<sup>7, 11</sup>. There is no clear evidence on the efficacy of platelet-rich plasma (PRP) injections in chronic cases<sup>7, 12</sup>. Focal extracorporeal shockwave therapy can be used in patients with recalcitrant plantar fasciopathy after non-invasive treatments have failed<sup>13</sup>, with success rates between 50 and 65%<sup>14</sup> and the possibility for the patients to remain active during treatment<sup>15</sup>. Manual stretching exercises specific to the plantar fascia in combination with repetitive low-energy radial shock-wave therapy can be of help<sup>16</sup>. If the patient continues to have symptoms which do not respond to conservative management for more than 6-12 months, more invasive measures or surgery should be contemplated. Several procedures have been described: open plantar fascia release, endoscopic plantar fasciotomy through a medial portal<sup>17</sup> that can be associated to ultrasound assistance<sup>18</sup>, percutaneous or open plantar fasciotomy with heel spur resection<sup>19</sup>, neurectomy or neurolysis of the medial calcaneal nerve, gastrocnemius recession<sup>20</sup>. Calcaneal osteotomy has been associated to prevent lateral column pain from the loss of the longitudinal arch height after surgery<sup>21</sup>. We describe a minimally invasive technique for percutaneous plantar fascia release.

## Surgical procedure

Under general or regional anesthesia, the patient is supine, and fluoroscopy is used to identify the calcaneal tuberosity and the correct site of section of the origin of plantar fascia (Fig. 1). A stab wound is pro-



Figure 1. Identification of the calcaneal tuberosity and the correct site of insertion at the origin of plantar fascia.

duced over the plantar aspect of the foot, to reach the plantar tuberosity of the calcaneus (Fig. 2). A section of the medial 1/3 of the plantar fascia from its calcaneal attachment is performed. If a calcaneal spur is present, a cylindrical burr with four sectors  $\text{Ø}$  4.1 mm (produced by *Bone*) is inserted in the wound, and advanced towards the plantar aspect of the calcaneus. The lateral portion of the plantar fascia is then identified by moving the burr medially and laterally, until the surgeon experiences the resistance of the plantar fascia (Fig. 3). The calcaneal spur is then resected under image intensifier control. At the end of the procedure, the burr is removed, abundant wash out is performed with normosaline, and the wound is closed with a non absorbable monofilament suture (Fig. 4). Weight bearing as able is allowed from the day of the surgery, protecting the foot with a bulky bandage for two weeks, during which the patient performs mobi-



Figure 2. Insertion of the burr to reach the plantar tuberosity of the calcaneus.



Figure 3. The burr is moved medially and laterally to identify the plantar fascia.



Figure 4. The burr is removed at the end of the procedure.

lization of the toes, ankle and foot. After removal of the bandage, formal rehabilitation is started. Over the next four weeks, patients can gradually return to their normal activities. A gradual return to sports is allowed, avoiding those that involve repetitive impact, such as running (even on a treadmill), for three months.

## Discussion

Plantar fasciopathy is a common cause of foot pain, often resistant to conservative management. Different surgical techniques have been described to manage plantar fasciopathy<sup>22</sup>. Many of these techniques impact negatively on the anatomy of the soft tissues of the plantar aspect of the foot, and may alter the foot biomechanics and its ability to balance the stress of weight bearing. In addition, total plantar fasciotomy may result in changes to the pressure zones of the foot and it could lead to a secondary collapsed arch

with persistent severe pain after surgery<sup>23</sup>. The percutaneous technique described in the present article releases the medial one third of the plantar fascia through a single posterior plantar portal. In this way, skin healing problems, nerve disturbance, infection and persistent pain associated with prolonged recovery time are avoided. This minimal release impacts favourably with pain, allowing an early return to normal activities<sup>24</sup>.

### Conflict of interest

The Authors have no conflict of interest.

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