

A Pain in the Foot:

RT as an Evidence-Based Treatment for Plantar Fasciitis



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IF YOU WATCHED THE DOCUMENTARY Usain Bolt: The Fastest Man Alive, you would have registered a particularly memorable scene. In preparation for the London Olympics, the superstar sprinter is shown in a linac bunker, getting set up for treatment to his foot. Although the show doesn't elaborate the underlying diagnosis, the setup looks consistent with treatment for plantar fasciitis (PF). Also, given his treatments were supervised by Bayern Munich club doctor Hans-Wilhelm Müller-Wohlfahrt, it highlighted how widely embraced such treatments are in Germany. Ultimately he picked up another three gold medals, which is as good a testament to the efficacy of radiation therapy (RT) as any.

PF is a bane of middle age, and radiotherapy can be an effective treatment. PF affects a range of people from athletes to those on their feet all day for their occupation. It is a painful condition, and in chronic cases, it can be very difficult to manage. Low dose radiotherapy has been shown to provide superior analgesic benefit compared with a steroid injection in a randomized trial, mounting an argument for wider use in the community.¹

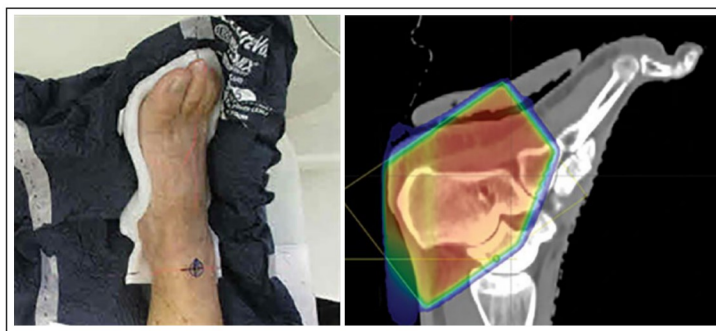
The plantar aponeurosis is susceptible to microtrauma, leading to chronic inflammation and PF. Factors such as running, obesity, occupations involving prolonged standing and poor footwear are all risk factors for this degenerative disease. The classic symptom is a sharp pain just anterior to the calcaneus.

A diagnosis is usually made clinically without a need for further investigations. If performed, an ultrasound or MRI will often show some thickening of the plantar aponeurosis. The classic finding of a calcaneal spur on plain imaging is common but has poor sensitivity or specificity for PF.

The majority of cases of PF will settle with supportive interventions such as orthotics, foot strengthening exercises and simple analgesia. Around 30% of cases persist for more than three months, at which point other interventions can be deployed. Some, such as shock wave therapy, are commonly used despite evidence from randomized trials suggesting limited efficacy.² Others, such as platelet rich perfusions, have emerging efficacy evidence but the disadvantage of being an invasive procedure.³

Low dose radiotherapy for PF takes advantage of the fact that the target cells are the monocytes driving the chronic inflammatory process, and that these tend to apoptose with low doses of radiation. By resetting this chronic inflammation, the microtraumas then have an opportunity to heal. RT has been compared with steroid injection in a randomized clinical trial (RCT) from a single Turkish hospital where 128 patients were accrued over a 13 month period.¹ The median changes on a 10 point visual analogue scale six months after treatment was from seven to five for the steroid group and from eight to two for the RT group, which was statistically significant ($p < 0.001$).

Figure 1



Radiation doses of 6 Gy in 6 fractions delivered over two weeks are commonly deployed, although a German RCT comparing this with 3 Gy in 6 fractions found no difference in the rate of analgesic benefit leading to this lower dose now being recommended as initial treatment in international guidelines.⁴ There is an option for repeat treatment, usually with 6 Gy in 6 fractions after 12 weeks if there has been a suboptimal benefit. Acute side effects are rare at such low doses and 70-80% of people will report some degree of pain relief.

Treatment is via a parallel opposed pair of megavoltage photon fields with 5-10mm of bolus. The field tends to include the whole calcaneus including a margin as shown in Figure 1. Patients are encouraged to continue conservative measures such as avoiding running and use of orthotics as they progress through treatment.

Among all of the potential indications of RT for benign extracranial conditions, PF occupies a relatively unique space as outlined in Table 1. Furthermore, it offers an opportunity to engage with other craft groups such as podiatrists and foot and ankle surgeons collaboratively to embrace their diagnostic and therapeutic skills, so that radiation can complement rather than compete with established practice. It is immensely satisfying to assist someone with chronic pain, as such people have often had numerous fruitless interventions, and the positive quality of life impact

from radiation is commonly rapid and sustained — a key factor to consider when your next oncology patient hobbles into clinic and admits to suffering an intractable case of PF. [A](#)

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Table 1: Plantar fasciitis indications for radiation therapy treatment

Common condition	Thought at some point to affect ~10% of adults in Western countries
Simple treatment	Parallel opposed beams
Low risks	No acute toxicity, and very low second malignancy risk given low dose, physical location and older population affected
Limited efficacy of other non-invasive treatments	Wide range of approaches suggests no 'Gold Standard' definitive treatment
Good level evidence to support use	RCT showing analgesic benefit versus an active comparator