Radiation Therapy for Painful Heel Spurs
Results of a Prospective Randomized Study

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**Purpose:** To evaluate the efficacy of two different dose-fractionation schedules for radiation therapy (RT) in patients with painful heel spurs.

**Patients and Methods:** 130 patients were randomized into two groups: the low-dose (LD) group (n = 65 heels) received a total dose of 3.0 Gy given in two weekly fractions of 0.5 Gy; in the high-dose (HD) group (n = 65 heels), two weekly fractions of 1.0 Gy were applied over 3 weeks (total dose 6.0 Gy). In 24 sites of the HD group and 17 sites of the LD group, a second RT course was given. The results were assessed using a five-level function score which was documented before RT, at the end of each RT course, and at 6 weeks and 6 months thereafter.

**Results:** At 6-month follow-up, RT led to a highly significant reduction of symptoms in both groups. In the HD group, 31 sites were classified as excellent (score: 90–100), 13 as good (score: 70–85), twelve as moderate (score: 45–65), and nine as poor (score: 0–40). In the LD group, 35 sites were classified as excellent, eight as good, ten as moderate, and twelve as poor. The comparison of the difference of the sum score and the single criteria before RT and at 6 months after RT using the Wilcoxon-Mann-Whitney U-test revealed no statistically significant difference of response to RT between both groups.

**Conclusion:** RT is an effective treatment option for the management of inflammatory heel spurs. The dose for an RT course should not exceed 3.0 Gy.

**Key Words:** Heel spur · Radiotherapy · Degenerative disorders · Benign disease · Function score · Plantar fasciitis
Introduction
Approximately 15% of patients visiting a podiatrist's office are complaining of heel pain [22] and in nearly 73% of cases a spur formation is radiologically detectable [21]. Differential diagnoses causing painful symptoms beneath the heel include inflammatory arthropathies, tumors, infections, fractures, and also systemic diseases [7]. The spurs can be localized at the plantar or the dorsal aspect of the os calcis or combined (Figures 1a to 1c) and their size is not necessarily related to the degree of symptomatology [22]. The incidence of heel spurs in the Central European population is 15.7%, increasing in middle-aged females [28]. Repetitive stress, obesity, and also history of weight-bearing activities, are known to be specific risk factors promoting the release of heel pain [7].

The pain is specifically localized at the site at which the plantar fascia inserts into the medial tubercle of the os calcis, and it may have a radiating component usually extending toward the medial side of the foot. Pes planus, pes cavus, overpronation, discrepancy in leg lengths, excessive lateral tibial torsion, excessive femoral anteversion, weakness in the gastrocnemius muscle, the soleus muscle and the intrinsic foot muscles, or a tightness of the Achilles tendon are known to be anatomic and functional risk factors [42]. The origin of the spurs appears to be repetitive trauma that produced microtears in the plantar fascia near its attachment and the attempted repair led to inflammation which is responsible for the release and the maintenance of the symptoms [7, 21, 42].

The treatment regimens, once systemic etiologies have been eliminated, vary widely and the use of nonsurgical [2, 4, 6, 7, 9, 16, 18, 40–42] and surgical procedures [3, 14, 15, 22, 33] has been reported. The recommendations for conservative care which is commonly used as the primary treatment approach include the prescription of orthotic devices [18], corticoid infiltrations [6], systemic or local administration of anti-inflammatory medications [40], electrophysiological methods [8], ultrasound or laser applications [2, 4], physical therapy [41], and also extracorporeal shock wave therapy (ESWT) [16]. These methods are used alone or in various combinations and no single method stands out as clearly superior. Surgical procedures vary from minimally invasive endoscopic techniques to open surgical fascia release and removal of the spurs. These methods carry the risk of severe side effects such as wound dehiscence or numbness of the rear foot, and may result in predisposition to calcaneal fractures [3, 14]. Therefore, surgical methods require a critical indication and should be reserved only for cases being refractory to any conservative treatment.

The value of low-dose radiation therapy (RT) has been studied in numerous papers [1, 8, 17, 24, 25, 34, 36]. Apart from the excellent results the optimal RT dose remains controversial. Therefore, a prospective randomized study was conducted to evaluate the efficacy of different dose-fractionation schedules commonly used in clinical practice.

Patients and Methods
Between April 2000 and October 2003, a total of 130 patients entered into our study and were randomized into two groups. 65 patients received a total dose of 3.0 Gy given in two weekly fractions of 0.5 Gy (low-dose [LD] group), and in 65 patients a total dose 6.0 Gy was applied using two weekly fractions of 1.0 Gy (high-dose [HD] group). The patients’ characteristics are summarized in Table 1. Criteria for the prescription of RT were age ≥ 30 years, relapsing symptoms after previous treatment in patients aged 30–45 years, radiologic evidence of spur formation, tenderness in typical location, and evidence of painful symptoms resulting in functional impairment. Only in patients aged > 45 years RT was used as the primary treatment modality.

Patients were referred to our institution by family practitioners, orthopedists or rheumatologists and most of them had recurrent symptoms after previous conservative treatment (see Table 2). Two sites in the LD group (3.1%) and five sites in the HD group (7.7%) received RT as the primary treatment.

Figures 1a to 1c. Plain X-rays showing typical cases having spur formation: a) plantar heel spur in a 49-year-old male, b) dorsal heel spur in a 59-year-old female, and c) combined heel spur in a 60-year-old female.

Abbildungen 1a bis 1c. Konventionelle Röntgenbilder von typischen Fällen mit Fersenspornen: a) plantarer Fersensporn bei einem 49-jährigen Patienten, b) dorsaler Sporn bei einer 59-jährigen Patientin und c) kombinierter Sporn bei einer 60-jährigen Patientin.