

Long-term Follow-up of Heel Spur Surgery

A 10-Year Retrospective Study

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A comparative retrospective study of 48 open heel spur surgeries and 20 endoscopic plantar fasciotomies was conducted involving 59 patients over a 10-year period. There was a significant reduction in heel pain at the time of follow-up (average, 3 years) for both groups. Overall, 85% of procedures were associated with patient satisfaction with the results, and patients said that they would recommend heel spur surgery for relief of severe heel pain in 94% of cases. Factors influencing the postoperative outcome, such as duration of preoperative symptoms, extent of conservative care, and obesity, are discussed. (*J Am Podiatr Med Assoc* 89(2): 81-88, 1999)

The discovery and popularization of roentgenography at the beginning of the century enabled the visualization of heel spurs.¹ Wachter and Sonnenschein² in 1915 correlated four cases of painful heels with calcaneal spurs; after all four patients returned for surgery following conservative care, the authors concluded that surgical intervention was the best treatment. Heel spur syndrome or plantar fasciitis—a condition in which there are no calcaneal spurs but there is heel pain—is another foot problem for which

a patient will seek treatment. Fifteen percent of all patients who are treated in a podiatric physician's office have heel pain, and 11% of those patients have heel spur formation.^{3,4} Surgery is considered when a patient presents with chronic or acute heel pain that has proved resistant to conservative therapy. Some surgical procedures involve open excision. This study compares open *versus* endoscopic plantar fasciotomy heel procedures. Factors that may influence the outcome of surgery are also discussed.

Materials and Methods

A retrospective study was conducted that initially involved 120 patients who had heel spur surgery between January 1990 and April 1998. Patients were asked to complete a mailed questionnaire (Fig. 1) and return it in a postage-paid envelope. After 4 weeks, those who had not replied were sent another copy of the questionnaire or contacted by telephone.

The questionnaire elicited demographic characteristics such as age, sex, height, weight, date of surgery, and comorbid conditions. Patients were asked about their previous conservative therapy and to rate their

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SURVEY OF HEEL SPUR SURGERY PROCEDURE

NAME: _____

TODAY'S DATE: _____

DATE OF SURGERY: _____

AGE: _____

MALE / FEMALE (CIRCLE ONE)

HEIGHT: _____

WEIGHT (NOW): _____

WEIGHT (BEFORE SURGERY): _____

1. How long have you experienced heel pain? _____ (weeks, months, years)
2. How long ago did you first see a foot doctor for treatment of your heel pain? _____ (weeks, months, years)
3. Which foot was operated on? Right Left Both (Circle appropriate one)
4. Before surgery, what treatment modalities did you receive?
(Check all that apply)

<input type="checkbox"/> Oral pain medicine	<input type="checkbox"/> Prefab orthotic (arch support)
<input type="checkbox"/> Injections	<input type="checkbox"/> Heel lifts
<input type="checkbox"/> Physical therapy	<input type="checkbox"/> Custom orthotics (arch support)
<input type="checkbox"/> Ultrasound	<input type="checkbox"/> Heel cup
<input type="checkbox"/> Whirlpool	<input type="checkbox"/> Other
<input type="checkbox"/> Stretching	
<input type="checkbox"/> Taping/Padding	
<input type="checkbox"/> Plaster cast or soft cast	
5. Now, what treatment modalities are you using?
(Check all that apply)

<input type="checkbox"/> Oral pain medicine	<input type="checkbox"/> Prefab orthotic (arch support)
<input type="checkbox"/> Injections	<input type="checkbox"/> Heel lifts
<input type="checkbox"/> Physical therapy	<input type="checkbox"/> Custom orthotics (arch support)
<input type="checkbox"/> Ultrasound	<input type="checkbox"/> Heel cup
<input type="checkbox"/> Whirlpool	<input type="checkbox"/> Other
<input type="checkbox"/> Stretching	
<input type="checkbox"/> Taping/Padding	
<input type="checkbox"/> Plaster cast or soft cast	
6. How severe was the heel pain BEFORE the operation?
Circle correct choice – "5" is most severe
None 0 1 2 3 4 5 Severe
7. How severe is the heel pain NOW AFTER the operation?
Circle correct choice – "5" is most severe
None 0 1 2 3 4 5 Severe
8. How often do you NOW have heel pain?
(Check the appropriate category)

<input type="checkbox"/> No pain at any time
<input type="checkbox"/> Pain present sometimes
<input type="checkbox"/> Pain present frequently
<input type="checkbox"/> Pain present all of the time
9. Do you have heel pain when you walk?
(Check appropriate category)

<input type="checkbox"/> No heel pain when walking
<input type="checkbox"/> Mild pain when walking
<input type="checkbox"/> Moderate heel pain when walking
<input type="checkbox"/> Severe heel pain when walking
10. Before surgery, did you exercise? (Circle appropriate response)
NO YES DESCRIBE: _____
11. Before surgery, did heel pain limit your daily activities? (Circle appropriate response) YES NO
12. Now after surgery, are your daily activities limited? (Circle appropriate response) YES NO
13. Before surgery, did wearing shoes limit heel pain? (Circle appropriate response) YES NO
14. Did you use any of these to walk before the operation?
(Check appropriate response)

Cane	Yes ___	No ___
Crutch	Yes ___	No ___
Orthotics	Yes ___	No ___
Heel cup	Yes ___	No ___
Heel lifts/Cushion	Yes ___	No ___
Innersole cushion	Yes ___	No ___
Ankle supportive devices	Yes ___	No ___
Other	Yes ___	No ___
15. Do you NOW use any of these to walk after having surgery?
(Check appropriate response)

Cane	Yes ___	No ___
Crutch	Yes ___	No ___
Orthotics	Yes ___	No ___
Heel cup	Yes ___	No ___
Heel lifts/Cushion	Yes ___	No ___
Innersole cushion	Yes ___	No ___
Ankle supportive devices	Yes ___	No ___
Other	Yes ___	No ___
16. Overall, how satisfied are you with the surgical results?
NOT TOTALLY SATISFIED 1 2 3 4 5 6 7 8 9 10 COMPLETELY SATISFIED
17. Would you recommend this procedure to a friend with a similar problem? YES NO

Figure 1. The questionnaire that was mailed to study participants.

preoperative and postoperative pain levels. Pain was measured using a pain-intensity scale that ranged from 0 to 5, with 0 representing no pain and 5 representing severe pain.⁵ Patients were asked to rate their level of satisfaction on a 10-point scale, with 10 indicating complete satisfaction. They were also asked whether they would recommend the procedure to others.

Heel spur surgery was performed at nine medical/surgical centers in the New York City area and Chicago. The centers were Day Surgicenter, Chicago; Brooklyn Veterans Affairs Medical Center, Brooklyn; New York Veterans Affairs Medical Center, New York; North General Hospital, New York; Massapequa General Hospital, Massapequa, NY; Brunswick Hospital Center, Amityville, NY; Good Samaritan Hospital, West Islip, NY; Long Island Surgicenter, Melville, NY; and Southside Hospital, Bayshore, NY. Five surgeons performed the surgeries. Of the five surgeons, three performed the endoscopic plantar

fasciotomies and four performed the open heel spur surgeries, with two performing both types of surgery.

In the present study, procedures classified as traditional open techniques involved a 3- to 6-cm plantar medial incision with release of the fascia using a scalpel blade and/or scissors. The calcaneal spur was removed with a rasp, power bur, curette, or power saw (Fig. 2). Endoscopic plantar fasciotomy is the release of the plantar fascia using the Endotrac^{®1} System, with the cannula inserted across the plantar aspect of the plantar fascia band (Fig. 3). Resection of the calcaneal spur was not performed with this technique.

To determine the effect of obesity on postoperative outcome, the body mass index for each patient was calculated twice: it was obtained first from the operative record and again at the time the survey was conducted.⁶ The body mass index is the weight in kilograms divided by the square of the height in meters.

^{®1} Instratek, Inc, Houston, TX.

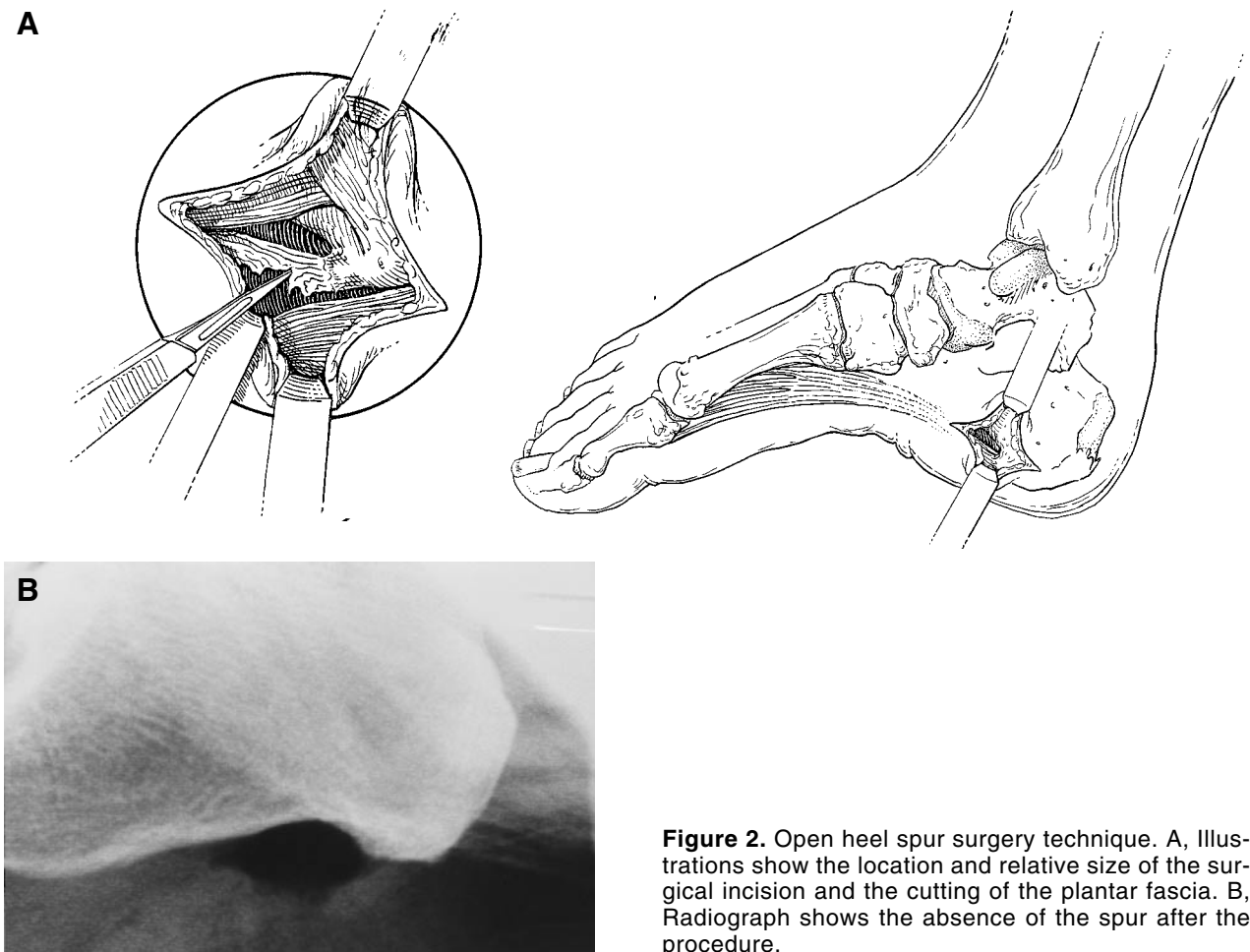


Figure 2. Open heel spur surgery technique. A, Illustrations show the location and relative size of the surgical incision and the cutting of the plantar fascia. B, Radiograph shows the absence of the spur after the procedure.

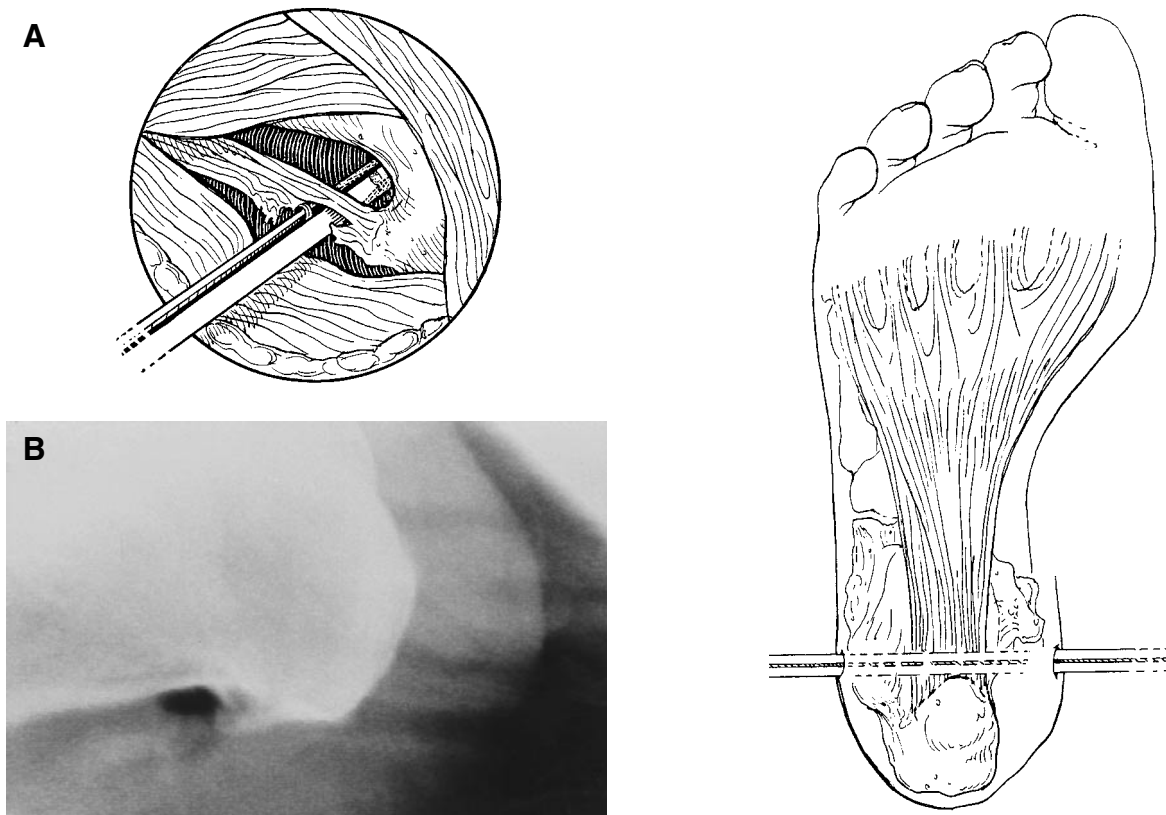


Figure 3. Endoscopic plantar fascial release technique. A, Illustrations show the location and relative size of the surgical incisions and the placement of the cannula at the surgical site. B, Postoperative radiograph shows a soft-tissue deficit of the plantar fascia distal to the remaining heel spur.

The measurement of obesity by means of body mass index was discussed in the Framingham Study,⁶ the Nurses' Health Study,⁷ and the *Healthy People 2000 Report*⁸ (Table 1). In the present study, patients with a body mass index of 28 or greater were considered obese.

Results

Fifty-nine patients who had undergone 68 procedures completed the study. None of these patients had a previous history of heel surgery. Forty-eight procedures were performed as traditional open heel spur surgery and 20 procedures consisted of endoscopic plantar fasciotomy. Patients were surveyed, on average, 31 months from the date of surgery (range, 3 to 100 months). Table 2 gives the characteristics of the study population. There was no significant change in the body mass index of the patients at the time of follow-up ($P < .01$). Most patients (61%) had other disease processes, including diabetes mellitus (17%) and arthritis (19%).

Heel pain was rated on a numeric scale of 0 to 5, with 5 representing the worst possible pain.⁵ The average heel pain rating was 4.5 prior to surgery and 1.77 at the time of follow-up. For the 42 patients having open heel spur surgery, heel pain was rated 4.6 preoperatively and decreased to 1.6 at follow-up time. The group of 17 patients undergoing endoscopic plantar fasciotomy had heel pain that rated 4.76 preoperatively and decreased to 1.88 at the time of follow-up.

Table 1. Obesity as Measured by Body Mass Index

Study	Body Mass Index Cut Points	
	Males	Females
<i>Healthy People 2000 Report</i> (1990) ⁸	27.8	27.3
Framingham Study (1988) ⁶	24	—
Nurses' Health Study (1990) ⁷	—	21

Table 2. Characteristics of the Study Population

	Open		Endoscopic Plantar Fasciotomy		Total	
	N	(%)	N	(%)	N	(%)
Patients	42	(71)	17	(29)	59	(100)
Procedures	48	(71)	20	(29)	68	(100)
Mean age (years)	52	(37)	30	(63)	47	(100)
Female patients	25	(69)	11	(31)	36	(100)
Male patients	17	(74)	6	(26)	23	(100)
Obese patients	28	(76)	9	(24)	37	(100)
Nonobese patients	14	(64)	8	(36)	22	(100)
Left heel	20	(74)	7	(26)	27	(100)
Right heel	16	(70)	7	(30)	23	(100)
Both heels	6	(67)	3	(33)	9	(100)
Conservative care						
Minimal	9	(50)	9	(50)	18	(100)
Moderate	10	(67)	5	(33)	15	(100)
Extensive	23	(88)	3	(12)	26	(100)
Duration of preoperative pain						
Mean (months)	23.1		13.8		21.7	
Range (months)	4–72		4–48		1–108	

Thirty-one percent of patients (18) had minimal conservative therapy—two or fewer forms of therapy performed fewer than two times—prior to surgery. Twenty-five percent of patients (15) had moderate conservative therapy—three forms of therapy performed between two and ten times—before having surgery. Forty-four percent of patients (26) had extensive conservative therapy—three or more forms of physical therapy performed more than ten times—prior to surgery. There was a significant difference in postoperative pain values at follow-up that correlated with the amount of conservative therapy patients received prior to surgery. Overall, patients who had extensive preoperative conservative care had the

greatest pain reduction compared with those who received minimal or moderate conservative care ($P < .01$). Those patients who had moderate or extensive preoperative conservative care and underwent the open procedure had greater overall pain reduction compared with the patients who underwent endoscopic plantar fasciotomy (Table 3). Furthermore, obese patients who had moderate or extensive conservative care had greater pain relief than their non-obese counterparts ($P < .01$) (Table 3).

Patients were considered to be satisfied with the results of their surgery if they rated their satisfaction level as 7 or higher on the 10-point scale described above. Eighty-five percent of all heel spur surgery

Table 3. Preoperative and Postoperative Pain by Patient Category and Extent of Conservative Care

Patient Category	Minimal Conservative Care			Moderate Conservative Care			Extensive Conservative Care		
	Pain ^a	Pain ^a	<i>P</i>	Pain ^a	Pain ^a	<i>P</i>	Pain ^a	Pain ^a	<i>P</i>
	Before Surgery	After Surgery		Before Surgery	After Surgery		Before Surgery	After Surgery	
Endoscopic plantar fasciotomy	4.55	1.66	<.01	5.00	2.40	.07	5.00	2.00	–
Open	4.40	2.00	<.01	4.83	1.41	<.01	5.00	1.59	<.01
Obese	4.37	2.00	<.01	4.50	1.10	<.01	4.89	1.47	<.01
Nonobese	4.66	1.33	<.01	4.50	1.25	.02	4.75	2.63	<.01

^a Pain scale: 0 = no pain, 5 = most pain. Values are means.

procedures (58 of 68) were associated with patient satisfaction with the surgical results in relieving heel pain (Table 4). Eighty-eight percent of open surgical procedures (42 of 48) were associated with patient satisfaction, *versus* 80% (16 of 20) of endoscopic plantar fasciotomy procedures (Table 4). The surgical procedure was recommended by patients in 96% of cases of open surgery (46 of 48) and in 90% of cases of endoscopic plantar fasciotomy (18 of 20). Similarly, 88% (22 of 25) of procedures in nonobese patients were associated with patient satisfaction with the results, as compared with 84% (36 of 43) of procedures in obese patients (Table 5).

Discussion

In the present study, 85% of heel spur surgeries (58 of 68) were associated with patient satisfaction with relief of heel pain. The results of other studies are variable, ranging from 100% success to 90% unsatisfactory results (Table 6).⁹⁻¹⁸ In 1957, DuVries¹⁴ reported 100% success in the alleviation of heel pain in 37 patients; however, the length of follow-up was not reported. Ali¹⁵ reviewed 90 cases of heel surgery with up to 3 years of follow-up. He found that fascial release alone gave complete relief in 28 of 38 cases (74%), while a combination of fascial release and spur resection resulted in complete pain relief in 45 of 52 patients (87%). Contompasis¹⁶ reported on a 3-year retrospective study of 126 surgeries for heel

spur syndrome.¹⁶ Plantar fascial release alone provided satisfactory or complete relief in 4 of 11 cases (36%). A combination of fascial release and spur resection in 115 cases yielded the following results: 44.3% had complete resolution of heel pain, 45.2% had some improvement of pain, and the remaining 10.5% had no improvement, based on a self-assessment questionnaire. Lutter¹³ reported very good relief of pain in two of four surgeries (50%) he performed in athletes. He performed nerve exploration along with plantar fascial release. This is similar to the success rate of 50% to 60% that Mann¹⁹ obtained in patients with heel pain using calcaneal spur excision only. Savastano²⁰ performed neurectomy of the medial calcaneal nerve branch in 19 patients. There was complete relief of heel pain in 84% of patients (16), and some improvement in 16% (3).

In the present study, there were no postoperative complications. However, some complications have been reported by other authors. Lester and Buchanan²¹ noted that 5 of 12 patients (42%) had hypoesthesia of the heel postoperatively. Their procedure consisted of spur resection, release of all first-layer plantar musculature, and fascial release. Such extensive dissection may have resulted in transection of the abductor digiti quinti muscle and the calcaneal nerve branches.

Several authors have reported that nerve impingement causes heel pain during weightbearing. Baxter and Thigpen²² found entrapment of the nerve to the abductor digiti quinti muscle in 34 cases; neurolysis

Table 4. Results of Heel Spur Surgery

Type of Procedure	Number of Procedures	Mean Follow-up Time (months)	Surgery Satisfaction (%)	Recommend Surgery? (%)
Open	48	36	88	96
Endoscopic plantar fasciotomy	20	14.5	80	90
Total	68	31	85	94

Table 5. Postoperative Heel Spur Surgery Findings: Nonobese *versus* Obese Patients

Patient Category	Number of Procedures	Mean Body Mass Index ^a (kg/m ²)	Mean Follow-up Time (months)	Heel Pain ^b		Surgery Satisfaction (%)	Recommend Surgery? (%)
				Before Surgery	After Surgery		
Nonobese	25	26.2	27	4.60	1.60	88	92
Obese	43	37.4	33	4.76	1.88	84	95
Total	68	33.2	31	4.50	1.77	85	94

^a At the time of surgery.

^b Pain scale: 0 = no pain, 5 = most pain. Values are means.

Table 6. Surgical Treatment of Heel Spur

Author(s)	Year	Treatment Type ^a	Patients Receiving Relief	
			N	(%)
Current study	1999	Open	34/42	(81)
Current study	1999	Endoscopic plantar fasciotomy	15/17	(88)
Current study	1999	Total	49/59	(83)
Barrett and Day ⁹	1991	Endoscopic plantar fasciotomy	59/62	(95)
Gormley and Kuwada ¹⁰	1992	Open	83/87	(95)
Gormley and Kuwada ¹⁰	1992	Fascial release	9/9	(100)
Lewis et al ¹¹	1991	Open (plantar approach)	21/22	(95)
Kenzora ¹²	1987	Open	6/6	(100)
Lutter ¹³	1986	Fascial release	2/4	(50)
Ali ¹⁵	1980	Open	45/52	(87)
Ali ¹⁵	1980	Fascial release	28/38	(74)
Contompasis ¹⁶	1974	Fascial release	4/11	(36)
Contompasis ¹⁶	1974	Open	50/115	(43)
DuVries ¹⁴	1957	Open	37/37	(100)
Chang and Miltner ¹⁸	1934	Open	29/35	(83)

^a Fascial release refers to open plantar fascial release.

provided complete relief in 82% (28) of these cases. Beito et al²³ identified fibrosis of the medial calcaneal nerve branch in 16 patients with heel pain. Neurectomy and excision of the fibrotic tissue resulted in complete relief of pain in 56% (9) of their cases. The remaining patients reported partial relief of pain but continued to experience dull aches and morning heel pain. Lastly, with regard to athletes, Leach et al²⁴ and Snider et al²⁵ reported complete relief of heel pain in 93% (14 of 15) and 89% (8 of 9) of patients, respectively. Snider et al performed fascial release and/or resection of fascia for chronic plantar fascial pain in runners, whereas Leach et al performed fascial release and os calcis ostectomies. The athletes returned to running an average of 2.1 and 2.5 months postoperatively in the studies by Leach et al and Snider et al, respectively. The patients in both studies continued to improve up to 6 months postoperatively.

Summary

Fifty-nine patients with 68 painful heels had 48 open heel spur resection procedures and 20 endoscopic plantar fasciotomy procedures. There was a significant reduction of heel pain at the time of follow-up in both groups ($P < .01$). Patients who had open heel spur surgery experienced a greater reduction of pain than patients who had endoscopic plantar fasciotomy at the time of follow-up. Overall, those surgical patients who had extensive preoperative conservative care experienced greater pain reduction than those who had moderate or minimal conservative care.

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