PROMINENCE OF THE CALCANEUS: IS OPERATION JUSTIFIED?

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Sixty-nine heels in 42 patients with prominence of the calcaneus sufficient to cause symptoms were operated upon after conservative treatment had failed. At review the overall results of operation were found to be poor.

Prominence of the posterosuperior corner of the calcaneus is also known as retrocalcaneal bursitis or Haglund's disease, though Haglund was not the first to describe it nor the first to operate upon it (Steffensen and Evensen 1958). Nisbet (1954) coined the term "winter heel" because the condition is exacerbated by closed shoes worn in winter, while Dickinson et al. (1966) used the term "pump bump", pump being a North American word for a high-heeled court shoe.

This paper presents the results of operative treatment in 42 patients, all of whom presented with footwear problems. Fashionable ladies' shoes with narrow heels or with straps across the heel area were responsible for most of the problems; the inner surface of the back of the shoe rubs against the prominent area of the heel, causing discomfort and skin irritation. Men's shoes occasionally caused problems and one patient experienced difficulty with climbing boots. Thirty-seven patients complained of pain and 12 had blistering and inflammation of the skin, but only eight admitted to being troubled by the appearance of the heel. The site of the protuberance is usually posterolateral (Fig. 1), but in 10 heels it was directly posterior and in one it was medial.

PATIENTS AND METHOD

Forty-two patients who had been treated either at Heatherwood Hospital between 1963 and 1983, or at Wexham Park Hospital between 1973 and 1983, were interviewed and examined by the author. Thirty-two (76%) were female, 10 (24%) were male, and the mean age at operation was 20 years (range 10 to 56 years). Twenty-seven of these patients had both heels treated, making a total of 69 heels available for study. The mean follow-up was 6 years 9 months with a range from four months to 20 years.

Operation. Two different procedures have been described. The most commonly employed method is excision of the posterosuperior aspect of the calcaneus (Fowler and Philip 1945; Keck and Kelly 1965; Dickinson et al. 1966; Nissen 1969; Berlin, Coleman and Nickamin 1982; Jones and James 1984). This operation is usually performed through a longitudinal lateral incision over the prominence and parallel to the tendo achillis, though a medial approach may be used. Gould (1984) recommends a J-shaped lateral incision, while Jones and James (1984), operating on athletes with heel pain, recommend both medial and lateral incisions to ensure adequate remodelling. Fowler and Philip (1945) described a direct posterior approach in two patients in whom they made an incision in the tendo achillis the shape of an inverted Y. A horizontal incision gives poor access.

The prone position facilitates operations through a lateral incision, particularly if both heels are to be treated. After incising the skin, any inflamed bursa is excised. The lateral expansion of the tendo achillis insertion needs releasing to gain access to the posterosuperior aspect of the calcaneus, which is then remodelled by...
excising a generous corner of the bone with an osteotome across to the medial aspect (Fig. 2). Any sharp edges are smoothed off. Sixty-one heels in 37 patients were treated by this method. A lateral longitudinal incision was used for most of them but for seven heels the incision was medial-longitudinal, and in three it was horizontal-lateral. Nine of the heels were managed in a plaster cast for two to three weeks.

The alternative procedure is a closing wedge osteotomy of the calcaneus as originally described by Zadek in 1939. Through either a medial or lateral incision a superiorly based wedge is excised from the calcaneus and the osteotomy closed (Figs 3, 4 and 5). Zadek recommended that the site of the osteotomy should be one-half to three-quarters of an inch from the posterior border of the calcaneus, with the base of the wedge one-quarter of an inch wide. The osteotomy may be held closed with a staple or with the foot in plaster; often both are used. Eight heels in five patients were treated by wedge osteotomy; in three heels, a staple was inserted across the osteotomy. All but one patient (who had a staple inserted) were managed in a plaster cast postoperatively.

RESULTS
The overall hospital stay ranged from 1 to 25 days with a mean of six days (wound infection delayed hospital discharge in the one patient who stayed 25 days).

At review, all patients were asked whether they felt they were cured, better, the same or worse after the operation. Table I shows the outcome of operation in the patients undergoing excision of the posterosuperior corner of the calcaneus. Of this group, 17 of 37 patients (46%) with 22 heels (36%) were dissatisfied with the outcome of surgery; they were either not improved or were made worse.

The findings on clinical examination of these heels are shown in Table II. A quarter of the scars were tender, almost half had healed with widening, and residual prominence was noted in more than half. In 10 heels there was a tender area over the os calcis. Reduced or absent sensation posterior to the wound was found in 23 heels, and four patients had difficulty standing on tiptoe due to discomfort at the insertion of the tendo achillis. Two other patients complained of discomfort in the heel.
area when standing on tiptoe but were easily able to do so for over a minute. Six patients complained of difficulty with sport because of heel pain on running, sports shoes irritating the heel area or, in one patient, because the heels rubbed on the floor during aerobics. Sixteen patients (43%) still had problems with footwear similar to those before the operation but now often complicated by the presence of an uncomfortable scar. Wound dehiscence and delayed healing occurred in six heels and infection in seven but all resolved after treatment. Figures 6 to 9 show examples of poor postoperative results.

The result of calcaneal osteotomy was satisfactory in all eight heels (Table III), but statistically, using Yates' correction of the $\chi^2$ test, this was not significantly better than the results of excision ($0.1 > P > 0.05$). Three patients with five treated heels felt that the operation had cured them and the remaining two patients with three treated heels felt improved. No residual prominences were seen at follow-up, though tender widened scars were still a problem.

**DISCUSSION**

The aetiology of prominence of the calcaneus is unclear. On radiological examination the calcaneus usually appears normal, though it has been described as being hatchet-shaped (Dickinson et al. 1966), prow-shaped or boat-shaped (Fowler and Philip 1945). Various authors have described radiological parameters for the calcaneus, such as the posterior calcaneal angle of Fowler and Philip (1945), the lever angle of Steffensen and Evensen (1958), and the parallel pitch lines of Pavlov et al. (1982). Apart from the last mentioned study, only small numbers of affected individuals were studied. It is of note that in Pavlov's series, visible heel bumps were seen in 15 of 33 control subjects, and that an abnormality on the parallel pitch system was seen on radiographs of 25 out of 78 normal heels. It is likely, therefore, that in affected patients the shape of the heel is within normal limits and

**Table III. Results and complications of wedge osteotomy of the calcaneus in 5 patients (8 heels)**

<table>
<thead>
<tr>
<th>Number of heels</th>
<th>Cured</th>
<th>Improved</th>
<th>Same or worse</th>
<th>Scar tenderness</th>
<th>Scar widening</th>
<th>Remaining prominence</th>
<th>Altered sensation</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>5</td>
<td>3</td>
<td>0</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>2</td>
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that it is the design of the shoes which is to blame for the problem. Pressure and rubbing from the inner back of the shoe results in skin irritation with possible secondary inflammation of the retrocalcaneal or tendo achillis bursa; in a minority of cases the symptoms may be related to an inflammatory disorder. In this present...
series, one male patient later developed ankylosing spondylitis, one of the untraced patients had rheumatoid disease and one patient had marked thickening of the peroneal tendon sheaths. Two patients in Keck and Kelly’s series (1965) later developed rheumatoid disease, and Pavlov et al. described one patient with Reiter’s disease (1982).

Conservative treatment includes wearing footwear which does not compress the heel (for example, open-backed shoes), wearing shoes half a size larger than would otherwise be necessary, padding the prominent area, cutting or modifying footwear and local steroid injections. A pad placed beneath the heel raises it out of the shoe so that the back no longer rubs against the inflamed area. Heneghan and Pavlov (1984) recommended a high heel so that the calcaneus would fall away from the back. In the past even irradiation has been tried (Steffensen and Evensen 1958).

The results of surgery presented here are poor. This is in contrast to those of Keck and Kelly (1965) who reported that of 26 heels in 18 patients only four heels had poor results, and to those of Dickinson et al. (1966) who reported on 40 heels in 21 patients, all with good results. However, Keck and Kelly only followed up 13 patients personally, and Dickinson et al. (1966) only 10. In the present series, all the patients were reviewed by the author. Fuglsang and Torup (1961) presented the results of operation on 53 heels, of which 27 were satisfactory, 14 were improved and 12 were unchanged after operation; these results are more in agreement with those presented here. It may be that the Zadek osteotomy yields better results, though the numbers in this series are too small to draw a valid conclusion. Fuglsang and Torup performed this procedure in 14 of their patients but with only seven good results. They attribute the poor results to callus overgrowth at the osteotomy site.

Wound problems seem to be inevitable. A tender widened scar is common and often responsible for further symptoms. Sensory disturbance posterior to the wound reflects damage to branches of the sural nerve with the lateral approach, or with the saphenous nerve in the medial approach, but this feature did not occur in the present series.

In conclusion, the overall results of surgery for this benign condition appear to be poor. Conservative treatment should be persevered with.

The author would like to thank Mr. M. Swann and Mr. D. W. Wilson for their help with the manuscript. Miss Karen Duncan of the Medical Illustration Department at the Royal Free Hospital, and Mrs. S. Taylor for typing the manuscript.

REFERENCES