



Case Report ●●●

Subtotal calcaneotomy for the treatment of calcaneal pressure sores with associated osteomyelitis: a report of 2 cases

Calcanectomia subtotal para tratamento de úlcera de pressão com osteomielite associada: relato de 2 casos

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Article received: April 19, 2011.
 Article accepted: May 23, 2011.

DOI: 10.5935/2177-1235.2014RBCP0035

■ ABSTRACT

Introduction: Feet wounds are very common and require multidisciplinary approach for prevention, treatment and rehabilitation. When involving the calcaneus, they offer even greater difficulty and may complicate with osteomyelitis. Debridement of devitalized tissue and antibiotics are important steps for treatment. For the reconstruction, local or free flaps are needed. However, not all patients, due to systemic conditions or local blood supply, are not candidates for this type of reconstruction and some times are submitted to amputations. **Cases Report:** The authors report two cases in which subtotals calcaneotomies were used for the treatment of wounds in the calcaneus. In both cases, amputations were avoided.

Keywords: Calcaneus; Osteomyelitis; Pressure Ulcer.

■ RESUMO

Introdução: Feridas em pés são muito frequentes e requerem abordagem multidisciplinar para a sua prevenção, tratamento e reabilitação. Quando acometem o calcâneo, oferecem dificuldade ainda maior e podem apresentar complicação com a ocorrência de osteomielite. Debridamento de tecido desvitalizado e antibioticoterapia são etapas obrigatórias para o tratamento. Na reconstrução, retalhos locais ou livres são necessários. Porém, nem todos os pacientes, devido a condições sistêmicas ou de vascularização local, são candidatos a esse tipo de reconstrução e acabam sendo submetidos a amputações. **Relato de caso:** Os autores relatam dois casos nos quais foram utilizadas calcaneotomias subtotais para o tratamento de feridas em calcâneo. Em ambos os casos, foram evitadas as amputações.

Descritores: Calcâneo; Osteomielite; Úlcera por Pressão.

INTRODUCTION

Feet wounds occur very frequently and require a multidisciplinary approach for their prevention, treatment, and

rehabilitation¹. Ulcers normally originate from pressure or trauma, and occur in patients with decreased sensibility due to diabetes, paraplegia, poliomyelitis, mielomeningocele, fracture, or rheumatoid arthritis^{2,3}.

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When the calcaneus bone is affected, the wounds may present complications and evolve into osteomyelitis. Debridement of dead tissue and antibiotics are mandatory in the treatment. Local or free flaps are required for reconstruction^{4,5}. However, because of systemic or local vascularization conditions, not all patients are suitable candidates for this type of reconstruction and amputations eventually become unavoidable.

Total or subtotal calcaneotomy is an alternative procedure to more radical amputations^{2,6,7,8-11}.

OBJECTIVE

The objective of the present study was to report two cases of subtotal calcaneotomy performed for the treatment of calcaneal wounds.

METHOD

Case 1

A female patient with type 2 diabetes underwent a hemicolectomy because of a malignant neoplasm. In the postoperative period, she presented complications of anastomotic dehiscence and septic shock. She underwent a new abdominal surgery and remained hospitalized in the intensive care unit (ICU) for 23 days. During this time, because of hemodynamic instability and mobilization difficulty, she developed a pressure ulcer on the right calcaneus (Figure 1), with radiological symptoms of osteomyelitis and an instep wound. Several attempts of debridement and partial skin flaps were made, with success only on the dorsal wound. As the next option would have been a transtibial amputation, we opted for debridement of dead tissue (Figure 2) and to allow primary wound closure, partial calcaneotomy (Figure 3). *Staphylococcus aureus* and *Pseudomonas aeruginosa* were isolated from a culture of the material obtained from the debridement.



Figure 1. Chronic wound on the calcaneus.



Figure 2. Appearance of the wound after debridement and calcaneotomy.



Figure 3. Immediate postoperative appearance.

Case 2

The patient was a 31-year-old man with type 1 diabetes, diabetic retinopathy (with very low bilateral visual accuracy), diabetic nephropathy (requiring hemodialysis at home), and peripheral neuropathy. In February 2011, he experienced a fall from his own height that resulted in a serious cranio-encephalic trauma; he underwent an orotracheal intubation and remained hospitalized in the ICU. During this time, he developed pressure ulcers in both calcaneus bones. He presented fever from an unidentifiable origin, except for a radiological indication of calcaneal osteomyelitis. He underwent debridement of dead tissue and partial calcaneotomy to allow primary wound closure. *Enterococcus faecium* and *Acinetobacter baumannii* were isolated from a culture of the material obtained from the debridement.

RESULTS

Case 1

The patient had a good prognosis in the postoperative



Figure 4. Late postoperative appearance.



Figure 5. Patient in the orthostatic position.

period. She was released from the hospital on the 37th day after the surgery. After 5 months, she could walk with crutches (Figures 4 and 5).

Case 2

The patient remained hospitalized until the 25th day postoperatively with intravenous antibiotics administration. He was released without any signs of complications. During the ambulatory follow-up, he showed a minimal postoperative wound dehiscence, which was treated with bandages. Presently, 2 months after the surgery, the wound has cicatrized and the patient has started rehabilitation.

DISCUSSION

Wounds on the plantar surface of the foot and on the calcaneus represent a challenge for the plastic surgeon because of the low amount of neighboring tissue available for reconstruction. In the presence of osteomyelitis, the treatment is even more difficult, as it involves, besides debridement of dead

tissue, the use of vascularized tissue to cover the wound and requires prolonged intravenous administration of antibiotics. To cover the wound after debridement, free or reticulated flaps can be used^{4,5}. However, owing to comorbidities, previous clinical conditions, or local vascularization conditions, a transtibial amputation may eventually be necessary. A total or subtotal calcaneotomy can be performed as an alternative procedure to more radical amputations⁶⁻¹¹.

In the cases presented here, the wound could be accessed after debridement of skin necrosis, although other incisions may help expose the calcaneus¹². The bone tissue affected by osteomyelitis, obviously, debrided. Nevertheless, even if it is not affected by the disease, part of the calcaneus is removed to allow primary wound closure.

The expected local complication is the dehiscence of the postoperative wound. Despite closure without tension, the region has low vascularization. Such complication was observed in Case 2. Jeremy Cook and colleagues¹³ analyzed several calcaneotomies and observed a 71.4% rate of wound healing in the first year. Vasculopathy and wound depth were the factors that mostly affected the wound healing process. There was wound recurrence after complete closure in 40% of the cases, and eight patients required a transtibial amputation of the same limb for which calcaneotomy was performed. Therefore, these patients must be observed for a prolonged time, with preventive care to avoid the development of new wounds; furthermore, intravenous administration of antibiotics is recommended, based on the bone tissue culture^{4,5}. In both cases reported in this work, bacteria were isolated and the patients remained hospitalized for treatment with antibiotics for approximately 1 month. The presence of bacteria in the lesions, as in all open wounds, is very common. In the analyses of Crandall and colleagues², involving 31 cases, the most frequently isolated bacteria were *Staphylococcus aureus* and *Proteus* spp.

The selection of patients probably affects the results. For this selection, Smith and colleagues⁶ used the ankle/brachial index, albumin levels, and lymphocyte count. Thereby, they intended to evaluate the vascularization of the limb and the nutritional state of the patients. Our patients underwent this procedure without such evaluation, as the treatment was performed to preserve the limb. An unsuccessful therapy would have resulted in a transtibial amputation.

An important concern is rehabilitation. After a transtibial amputation, the use of prosthesis can, in most cases, restore the patient's ability to walk to the same level as before the amputation¹⁴. In the cases reported by Smith and colleagues⁶, after a subtotal calcaneotomy, a hard foot orthosis was designed especially for their patients who retained their ability to walk without any functional impairment. Yildirim⁵, on the other hand, in their series of nine cases, used distally based neurocutaneous flaps, and all patients returned to their preoperative state, eight of whom without using any type of orthosis. In this work, the patient in case 1 can walk with crutches and the patient in case 2 has recently started rehabilitation. A longer follow-up time will be necessary to assess the existence of any functional sequela.

CONCLUSION

The authors described two cases in which subtotal calcaneotomy was successfully performed for the treatment of calcaneal wounds.

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