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Results of Achilles Tendon Excision for Purpose of Wound Closure: Case Series

Wei Yuan, MD, Mala Satkunanantham, MMed (Orth), Sreedharan Sechachalam, MBBS, MRCS, MMed (Orth)

Department of Orthopaedic Surgery, Tan Tock Seng Hospital, Singapore

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ABSTRACT

The loss of Achilles tendon results in reduced plantar flexion strength; however, in patients who are not fit for major reconstructive surgery, with soft-tissue defects overlying the tendon, Achilles tendon excision is a useful adjunct procedure for wound closure. We report 3 patients with infections around the Achilles tendons needing debridement procedures who underwent Achilles tendon excision for the purpose of wound closure. Local healing was achieved in all patients; all returned to their premorbid ambulatory status, and 2 could perform heel raise. Our series showed that Achilles tendon excision eases soft-tissue reconstruction around it and that the primary aim of wound closure was met with a reasonable functional outcome. As such, it is a viable option for selected patients with infections around the Achilles tendon who are poor candidates for flaps.

Soft-tissue defects overlying the Achilles tendon commonly result from trauma or infection. Soft-tissue coverage in this area is particularly challenging. Healing by secondary intention is not feasible because of the highly mobile and often poorly vascularized tendon. For the same reasons, skin grafting is not a good option, especially because the tendon is usually void of paratenon in the setting of infection and trauma; even if the skin graft takes, the resulting tethering of the tendon to the graft can result in restricted ankle flexion and extension.

Reconstruction with various local or free flaps has been described (1–10); however, not all patients are suitable for flap surgeries because of either poor limb vascularity or systemic conditions. For patients who are poor candidates for flap surgeries, treatment options include long-term negative pressure dressing and subsequent skin grafting, as well as amputation. An alternative procedure is Achilles tendon excision, which avoids the need for flap coverage because the resultant exposed soft tissue is often well vascularized. Furthermore, excision of the tendon makes the soft-tissue defect smaller.

We present 3 cases of patients with soft-tissue defect over the Achilles tendon following infection, for which Achilles tendon excision was performed to enable simpler wound coverage.

Case Series

Case 1

A 62-year-old woman, with poorly controlled diabetes mellitus, presented with an abscess over the posterior aspect of right distal leg in December 2016. Bacterial cultures grew methicillin-susceptible *Streptococcus aureus*. After several debridement procedures and systemic antibiotics, the infection was well controlled; however, there was an 8 cm × 4 cm skin defect and the Achilles tendon was exposed. An initial attempt at a distally based hemisoleus flap failed because of flap necrosis (Fig. 1).

Following flap failure, the flap was debrided, exposing the Achilles tendon. At the next surgery, the Achilles tendon, together with the gastrocnemius-soleus complex up to the proximal edge of the wound, was completely excised. The wound was closed primarily a few days later in January 2017.

Physiotherapy with bed exercises was started immediately after wound closure. She was kept non-weightbearing on the right lower limb until the wound healed, after which progressive weightbearing commenced. No further formal physiotherapy was required after the wound healed. She was followed for 8.5 months. The wound healed well in 3 weeks and she was able to ambulate without aid. She also retained her ability to perform heel raise (Fig. 1).

Case 2

A 59-year-old man, with hypertension and gout, presented with infected tophi, involving his left Achilles tendon, in December 2012. He

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Corresponding author: Sreedharan Sechachalam, MBBS, MRCS, MMed (Orth), Department of Orthopaedic Surgery, Tan Tock Seng Hospital, 11 Jalan Tan Tock Seng, Singapore, 308433

E-mail address: Sreedharan_sechachalam@ttsh.com.sg (S. Sechachalam).

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Fig. 1. Clinical pictures of a patient with a posterior distal calf abscess. (*A*) Initial abscess. (*B*) Wound was clean after debridement procedures; however, the Achilles tendon was exposed. (*C*) After Achilles tendon excision, the wound closed without tension. (*D, E*) Photographs at 8.5 months after wound closure. The wound healed completely and the patient was able to perform heel raise.

underwent excisional debridement and debulking of tophi. The Achilles tendon was exposed with a large overlying soft-tissue defect (Fig. 2). Wound cultures grew *Streptococcus agalactiae*.

Fig. 2. Clinical pictures of a patient with infected gouty tophi around the Achilles tendon. (*A*) After debridement, the Achilles tendon was exposed. (*B*) After Achilles tendon excision and negative pressure dressing, sufficient granulation tissue grew over the wound. (*C, D*) Photographs at 4.5 years after skin grafting. The wound healed completely and the patient was able to perform heel raise.

To manage the soft-tissue defect, in view of the poorly vascularized underlying tendon, the Achilles tendon was completely excised. After 5 days of negative pressure dressing, skin grafting was performed in January 2013.

Postoperatively, weightbearing was not allowed on the affected lower limb until the wound completely healed. The ankle was immobilized with a slab, followed by an ankle foot orthosis for 1 month to facilitate wound healing. Once the wound had healed fully, weightbearing exercises were commenced progressively by the physiotherapist.

The patient was last reviewed 4.5 years postsurgery. He was able to walk without aid and perform heel raise (Fig. 2).

Case 3

A 46-year-old woman with diabetes mellitus, diabetic nephropathy, cardiomyopathy and left lower limb peripheral vascular disease presented with left lower limb necrotizing fasciitis. Once the infection was under control, there was a large soft-tissue defect over the gastrocnemius-soleus muscle complex and the Achilles tendon. Because the patient was a poor surgical candidate for flap reconstruction, the whole gastrocnemius-soleus muscle complex and Achilles tendon were excised (Fig. 3); subsequently, the proximal part of the wound was closed without tension and skin grafting was performed for the distal half of the soft-tissue defect in December 2011.

A cast was used to keep the ankle immobilized for 4 weeks. Because the skin graft had not fully healed at the end of 4 weeks and although the cast was removed, she was not allowed to weightbear until 2 months after surgery, when the skin graft had fully healed. Again, the physiotherapist assisted with progressive weight bearing exercises.

The patient was last seen 7 years postoperatively; she had developed end-stage renal failure and was on dialysis. She reported occasions of minor wound breakdown over the skin-grafted areas that heal with regular dressing changes. She had returned to her premorbid ambulatory status, which was ambulation with a walking aid. She was also able to perform heel raise (Fig. 3).

Fig. 3. Clinical pictures of a patient with infected left heel ulcer, which progressed to necrotizing fasciitis. (*A*) The left heel wound was clean after debridement. (*B*) The wound progressed to necrotizing fasciitis and the Achilles tendon was excised after debridement. (*C*) The wound was clean after debridement procedures. (*D*) Proximal aspect of the wound was closed. Skin grafting was performed to the distal aspect of the wound later. (*E*) At the final follow-up, the wound healed completely and the patient was able to perform heel raise. (*F, G*) Marked contracture of ipsilateral toes was noted.

Discussion

Reconstruction of soft-tissue defects around the Achilles tendon is challenging. Skin graft alone is a poor option because the Achilles tendon is often devoid of paratenon, particularly following debridement surgeries for infections. Additionally, excessive motion at the region predisposes the skin graft to primary or secondary failure; therefore, flaps are often required for coverage of the exposed tendon.

Numerous flap options are available. Free flaps such as lateral arm and anterolateral thigh flaps have been used (1,2). Local flaps including distally based peroneus brevis muscle flap, perforator-based propeller flaps, and bipedicle fasciocutaneous flap have also been described (6,10).

Patients who present with infections around the Achilles tendon are often older and/or with systemic disease, such as diabetes mellitus and peripheral vascular disease. These conditions predispose them to poorer outcome following flap reconstructive surgeries because of a higher risk of flap failure and higher anesthetic complications from longer surgeries. However, these patients also have lower functional demands and therefore cope with reduced ankle plantar flexion strength. As such, Achilles tendon excision is a good option because the wound bed then becomes amenable to skin grafting, as in our second and third cases, or even direct closure, as in our first case.

Ankle plantar flexion strength is impaired after Achilles tendon excision; however, the exact effect on gait and function is less clear. Fourniols et al. (11) reported 15 cases of patients with necrotic Achilles tendon treated with radical debridement and gradual wound closure; healing was achieved after 30–100 days. All patients were able to stand on 1 foot and normal strength was regained in 9 of 15 patients. Two athletes could return to sports at an international level after 1 year.

On the other hand, Barnes et al. (12) reported poor functional outcome with unreconstructed Achilles tendon rupture. Two patients with Achilles tendon rupture who did not opt for reconstruction were unable to run, tiptoe, climb stairs flat-footed, or play sports. As such, Achilles tendon excision, for the management of soft-tissue defects, should be contraindicated in the young and active patient.

All 3 of our patients were able to return to their premorbid ambulatory status, and all who were able to perform heel raise preoperatively managed to retain that function. This occurs because of compensation by other muscles; namely, tibialis posterior, flexor hallucis longus (FHL), and flexor digitorum longus. Boorboor et al. (13) compared calf muscle sizes of 3 patients with nonreconstructed Achilles tendon rupture on magnetic resonance imaging and found hypertrophy of these muscles in the deep posterior compartment.

FHL tendon transfer has been described to augment plantar flexion after Achilles tendon excision. Martin et al. (14) reported results of 44 patients who underwent FHL tendon transfer after Achilles tendon excision for chronic Achilles tendinosis; they reported a high satisfaction rate. Mahajan et al. (15) reported results of 36 patients with FHL tendon transfer for chronically ruptured Achilles tendons, with significant improvement in the mean American Orthopaedic Foot and Ankle Society foot and ankle scores (16,17). In our series, the patients have been functioning well thus far; however, if function is affected as a result of the excision of the Achilles tendon, our plan is to offer a secondary FHL tendon transfer.

In our series, we noticed marked contraction of the ipsilateral toes in all the patients (Figs. 1–3). This phenomenon is likely caused by contraction of the flexor digitorum longus to compensate for the loss of plantar flexion strength. None of our patients reported clawing as an issue, however.

There are certain limitations in our case series. The number of subjects is small, we did not quantify ankle plantar flexion strength, and we did not administer formal functional assessments. Future studies should include more patients, with quantification of plantar flexion strength with torque testing devices and adoption of functional assessment tools, such as the American Orthopaedic Foot and Ankle Society scores.

We do not advocate Achilles tendon excision as the treatment of choice for soft-tissue defects around the Achilles tendon: the Achilles tendon should be preserved as far as possible. In patients with low functional demands and multiple comorbidities, however, where flap surgeries may not be suitable, Achilles tendon excision may be considered to assist in wound closure. Apart from excising the tendon, residual infection must be cleared before wound closure, with additional skin grafting if necessary to avoid undue tension on wound edges.

In conclusion, excision of the Achilles tendon eases reconstruction of soft-tissue defects exposing the tendon. Our series show that the primary aim of wound closure was met with a reasonable functional outcome in the low-demand patient.

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Supplementary Materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1053/j.jfas.2018.08.006.

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