



ELSEVIER



The medial gastrocnemius muscle with an Achilles tendon sheath extension flap as a versatile myo-tendon sheath flap for coverage of the upper two-thirds of the tibia and pre-tibial area: A preliminary report

Ashraf Hussein Elghamry*

Plastic Surgery Unit, Fayoum University, Borg El Adalla, Dalla, Gamal Abd Elnaser Street, Fayoum, Egypt

Received 21 January 2013; accepted 21 October 2013

KEYWORDS

Tendon sheath;
Tendofascial;
Fascia;
Tibia

Summary The idea of using the leg tendon sheath as a pedicled fascial flap was first described by the author in April 2003. To extend this new idea, the author studied the blood supply and gross features of the outer layer of the Achilles tendon sheath. The findings of that study supported the feasibility of using the medial gastrocnemius muscle with an Achilles tendon sheath extension flap to cover defects over the upper two-thirds of the tibia. Six flaps of the Achilles tendon sheath survived, and the split skin grafts over the tibia took; but, in one flap, the distal 1 cm was lost. The length of follow-up was 3 years for all cases. The results demonstrated safe elevation of up to 8 cm of distal extension.

© 2013 British Association of Plastic, Reconstructive and Aesthetic Surgeons. Published by Elsevier Ltd. All rights reserved.

The idea of using the leg tendon sheath as a pedicled fascial flap was first described by the author in April 2003.¹ Later on, many successful applications were reported.^{2–6}

To extend the application of this new idea, the author studied the gross anatomy and vascularity of the outer layer of the Achilles tendon sheath. This article presents the feasibility of using the outer layer of the Achilles tendon sheath as an extension of the medial gastrocnemius muscle flap to achieve soft tissue coverage of defects lying along the upper two-thirds of the tibia.

In contrast to other leg tendons, the Achilles tendon does not have a true synovial sheath. Instead, it has a

* Tel.: +20 1005368477.

E-mail addresses: ashrafh188@yahoo.com, ahm00@fayoum.edu.eg.

sheath of two layers. The inner layer is thin and adherent to the tendon. The outer, thicker layer separates the tendon from the deep fascia and is called the paratenon.⁷ The paratenon has a rich blood supply⁸ and it has been described to be proximally continuous with the fascia overlying the soleus and gastrocnemius muscles.

Material and methods

Anatomical study

The study was performed in the year 2007 on 23 men and seven women. Their ages ranged from 18 to 40 years with a mean age of 25 years. The gross features and vascular 'plexus and feeder vessels' of the fascia overlying the proximal 10 cm of the Achilles tendon and distal half of the gastrocnemius muscle were studied by direct intra-operative inspection. This layer, which lies just deep to the deep fascia, was exposed after complete dissection of a reversed sural flap in 21 cases and after complete dissection of a distally based posterior calf flap in nine cases (Figure 1).

Anatomical findings

The anatomical findings are given below:

- 1) the outer layer of the Achilles tendon sheath appeared as one continuous sheet covering the gastrocnemius muscle, soleus muscle and Achilles tendon, and it was lying just deep to the deep fascia (Figure 1),
- 2) the blood supply was studied only in the 20 cases where the fascia was sufficiently transparent to identify the vessels (Figure 1) and
- 3) vessels in the fascia over the muscles were observed to run freely through the fascia over the tendon and communicate with each other: however, these vessels only extended for a short distance. Over the tendon, the vessels were observed emerging at the periphery through the soleus muscle and passing towards the midline of the calf (Figure 1).



Figure 1 Intra-operative photo showing a continuous transparent fascial sheet covering the muscles and Achilles tendon.

The rationale of the flap

Based on these findings, the medial head of the gastrocnemius can be raised using a vascularised fascial extension distally on both sides. The expected safe extension medially is 2–4 cm up to the bony boundaries and distally is 5–6 cm depending on the 'random pattern' of the rich continuous plexus. However, to increase the distal extension, the vessels emerging from the medial border of the soleus muscle must be included in the flap. The lateral extension could be increased only lateral to the tapering part, and it would be limited by the midline of the calf. As a result, the flap was small and similar in size in all of the cases.

Clinical cases

In 2008, the author treated six soft tissue defects located along the upper two-thirds of the tibia. Coverage was accomplished using the medial gastrocnemius muscle with an Achilles tendon sheath extension flap and a covering split-thickness skin graft (STSG). The demographics of the cases are shown in Table 1.

Surgical technique

The surgical techniques are given below:

- 1) A vertical skin incision was made parallel to the medial border of the tibia in the midline of the calf or few centimetres medial. The incision was deepened through the subcutaneous fat, the deep fascia was incised very carefully and then, the dissection proceeded just deep to the deep fascia with preservation of the fascial covering of the muscles and tendons underneath.
- 2) Elevation of the flap was begun by incising the outer layer in the midline of the calf at the level of the lower muscle fibres of the medial head. Blunt dissection using mosquito forceps was employed to separate the two layers of the Achilles tendon sheath (Figure 2).
- 3) A transverse cut was made in the outer layer at the distal end of the required length from the midline to the medial border of the tibia. The upward dissection then proceeded along two parallel incisions in the fascia over the muscles, one at the midline of the calf and the other at the medial border of the tibia. The medial head muscle fibres were sharply dissected away from the tendon, while its posterior aspect remained attached to its covering fascia and the extension (Figure 3b).
- 4) There were a few different technical points in the case No. 6:
 - a) the flap was exposed by dissecting the remaining skin as a fasciocutaneous flap and by incising the skin of the distal calf and
 - b) the proximal part of the medial edge of the fascial extension was left attached to the intact soleus muscle for a breadth of 1 cm, while its distal 4-cm part was elevated attached to the dissected 2 × 4-cm part of the soleus muscle at the tibial border as a proximally based

Download English Version:

<https://daneshyari.com/en/article/4118147>

Download Persian Version:

<https://daneshyari.com/article/4118147>

[Daneshyari.com](https://daneshyari.com)