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Distally based tenosynovial sheath flap of peroneal tendons for exposed tendo Achilles: Preliminary report of five cases☆

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KEYWORDS
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Summary A distally based tenosynovial sheath of peroneal tendons was used as a flap with skin graft to cover the exposed tendo Achilles. The flap has a reliable blood supply being perfused by a constant sizeable musculofascial perforator. Cadaveric dissection with methylene blue dye study has been conducted to prove the rationality and reliability of blood supply. The position of the perforator had been confirmed prior to surgery by a hand-held Doppler. The flap used to cover the exposed Achilles tendon in five cases yielded positive results. To our knowledge, a retrograde flap of this nature is unprecedented though an antegrade flap of similar composition has been described.

An exposed tendo Achilles following trauma or repair poses serious morbidity. The distal anatomical position, paucity of tissue, relatively poor blood supply, inadequate rest and associated trauma, all lead to delayed or poor healing. Several options are available such as a V–Y advancement flap,[1] distal sural artery flap,[2] lateral calcaneal artery flap,[3] adipofascial turnover flap, medial plantar artery flap,[4] retrograde fasciocutaneous flaps[5] and free temporoparietal and forearm fascial[6] flaps. However, they all fall short of ideal reconstructive requirements to cover a tendon. The loco regional flaps are bulky, produce an unaesthetic donor site and patients often have difficulty in wearing shoes. Free flaps may not be accessible to all.

In the present article, we describe a new retrograde tenosynovial flap of peroneal tendons with split skin graft to resurface the exposed Achilles tendon in five cases. The flap is thin, provides good gliding surface, and has minimal donor site morbidity, is technically simple and easily accessible. This flap has proved to be durable and more

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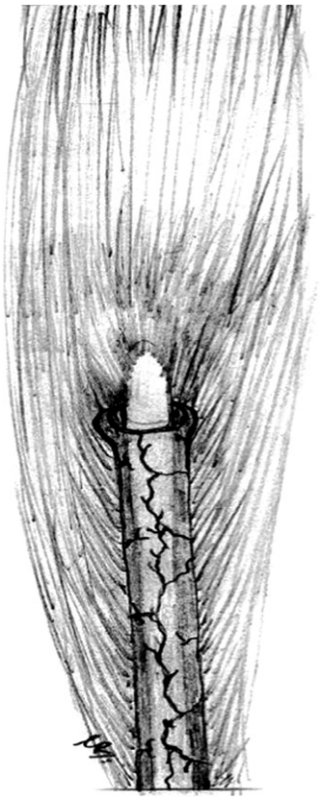

Figure 1 Diagrammatic representation of common tenosynovial sheath on three sides of the peroneal tendons like a funnel; the fourth side is covered by peroneus longus muscle.

versatile than other techniques described so far to cover the tendo Achilles and tendons around the ankle.

Applied anatomy

The peroneus longus arises from the upper two-thirds of the lateral surface of the fibula. It overlaps the peroneus brevis which arises from the lower two-thirds of the same surface. Both the muscles descend with the longus being superficial to reach the posterior surface of the lateral malleolus. These tendons are enclosed by a common tenosynovial sheath, which is the main constituent of the flap[7] (Fig. 1).

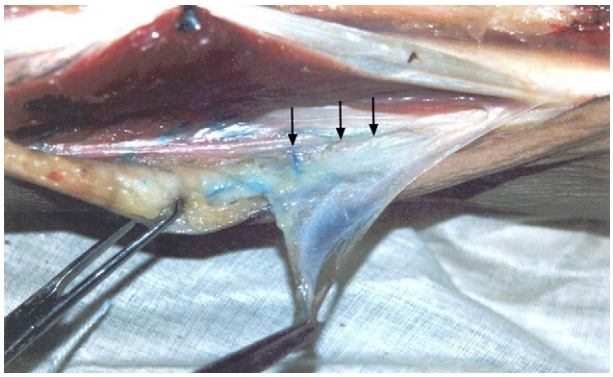

Figure 3 Dye study in cadavers showing multiple stained perforators entering the flap.

Cadaver dissection and dye studies

Cadaveric dissection with dye study was performed in 10 limbs to study the anatomy and blood supply of this flap. We observed that the peroneus longus (PL) muscle continues as muscle even after forming tendon at the junction of upper two-thirds and lower one-third of the leg. In the lower one-third, its tendon joins with the peroneus brevis (PB) muscle. Thereafter both the muscles along with the tendons course up to the lateral border of the foot to be inserted at the bases of the first and fifth metatarsal bones, respectively. Both tendons are enclosed by a common tenosynovial sheath in the lower half, which continues proximally as a thin fascia over the peroneus longus muscle to merge with its epimysium, in the upper half (Fig. 2).

Fifty per cent methylene blue dye (30 cc) was injected in the popliteal artery after ligating it proximally and the flap was dissected. Multiple perforators were seen to arise at regular intervals from the underlying muscle (Fig. 3), to form a continuous longitudinal vascular arcade in the flap (Fig. 4). Further, in seven limbs (70%) a constant sizeable perforator was observed 4—6 cm proximal to the lateral malleolus. Whereas, in three limbs (30%), a vascular network without a dominant perforator was found.

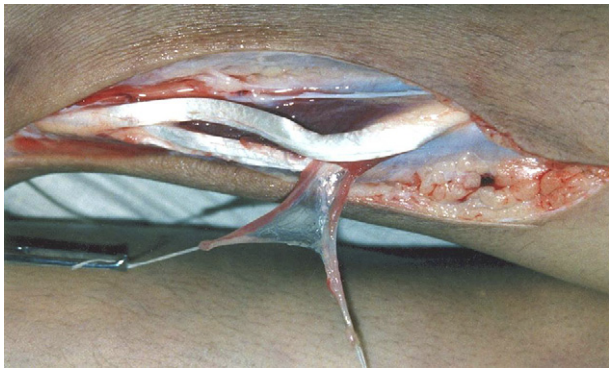

Figure 2 Cadaveric dissection showing dissected tenosynovial sheath and peroneal tendons.

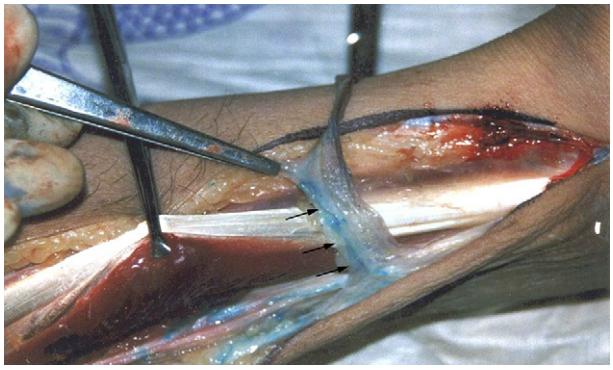

Figure 4 Flap showing a musculofascial perforator along with longitudinally orientated vascular network.