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Case Report

The Flexor Digitorum Brevis Muscle Flap: Reconstruction of small heel pad defects

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ABSTRACT:
Treatment of skin defects of the foot, particularly the sole and heel, is often difficult because of the foot's special anatomic structures and its function of bearing the body weight. The purpose of this presentation is to introduce a rare yet impressive modality in which Flexor Digitorum Brevis muscle flap is transposed for soft tissue coverage of the heel area. We are reporting a case of a 24 year old male non-diabetic, non- smoker with history of bike silencer burn over the left heel which was managed by Flexor Digitorum Brevis Muscle Flap.

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INTRODUCTION

Reconstruction of plantar defects especially the plantar heel remains a difficult and challenging problem as one of the main functions of this area is weight bearing and therefore reconstruction needs more consideration than only coverage. The majority of recent operations for reconstruction of plantar defects prefer a local plantar flap in order to have similar tissue and functional replacement. As an intrinsic muscle of the foot, the Flexor digitorum brevis plays an important role in stabilising the longitudinal arch of the foot. The flexor digitorum brevis muscle is located between the abductor hallucis and the abducter digiti minimi and together they form the first layer muscles of the sole. It originates from the medial process of the calcaneous and the plantar aponeurosis and inserts on the middle phalanges of the 2nd,3rd,4thand 5th toe. The neurovascular bundle of this muscle enters from the dorsal aspect and is supplied by posterior tibial artery , vein and nerve which are divided into medial and lateral plantar neurovascular bundles immediately distal to the medial malleolus.

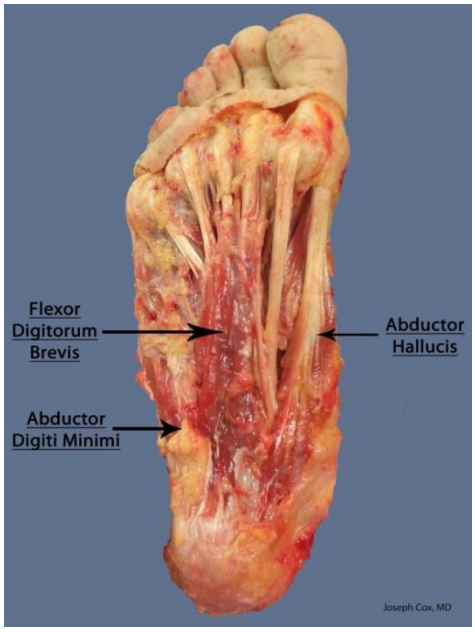

Figure 1: Surgical anatomy of FDB muscle (origin and insertion)

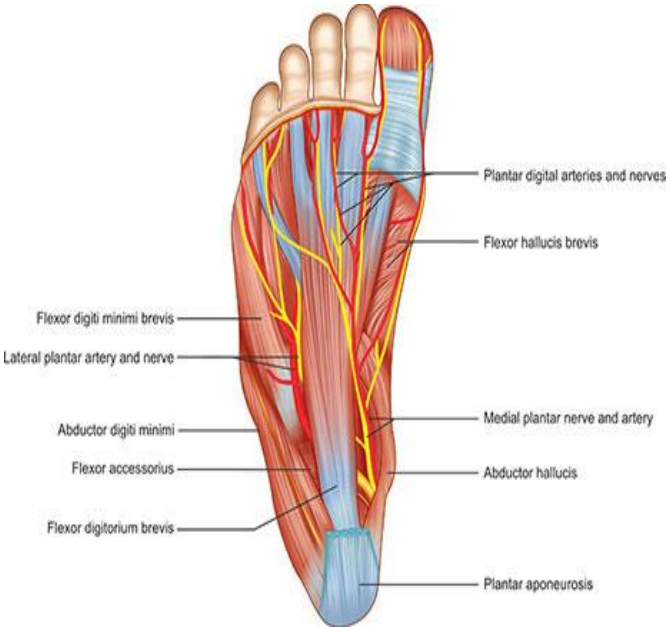

Figure 2: Neurovascular supply of heel of foot.

CASE REPORT

A 24 year old male presented to Plastic Surgery OPD of our Hospital with history of bike silencer burn over the left heel, 1year back. The patient is non-diabetic and non-smoker. Patient gave past history of injection over gluteal region after which he developed sciatic nerve neuropathy.

On local examination

- Heel pad wound ms 3x2cm was present over the calcaneus area of the foot.
- There was loss of sensations in posterior aspect of thigh, calf region and plantar aspect of foot.

The flexor digitorum brevis muscle flap was transferred to reconstruct the heel and skin grafting was done over the transferred muscle flap. The flap was elevated with the lateral and medial plantar vessels but the medial plantar nerve was retained in the foot.

Post-op findings

- Light touch could be felt on the flap by the patient postoperatively.
- Full weight bearing was obtained 6 weeks later and normal activities were resumed. No ulceration in the flap has been noted in the follow up period. Sensation remains at a satisfactory level.
- At present, he can walk normally and there is no disturbance in movement of the toes.

Figure 3: Pre op, Intra op and Post op images of a patient with a heel pad defect.

DISCUSSION

On the basis of our clinical experience, the Flexor digitorum brevis flap should be considered for both mechanical and vascular reasons. Good sensation in the transplanted flap, and a firmly attached muscle pad are the important factors in the success of this reconstruction. Main advantages of using a Flexor digitorum brevis muscle flap include the close proximity to the defect, limited donor defect, the non weight bearing surface of the heel and limited functional disability. Another dimension has been added to aid the arc of rotation of the Flexor digitorum brevis muscle so that it can reach upto either the malleolus or the entire posterosuperior aspect of the heel pad. This is achieved by elevating it as an island pedicle flap by isolating and mobilizing the vascular supply of the unit. Anatomic studies of the posterior tibial neurovascular bundle, are suggestive that the medial condyle of the tibia ,the medial side of the ankle joint, the posterior part of the calcaneus and the insertion of the Achilles tendon can be covered with this flap. The limitation of this procedure is that it cannot be applied when there is extensive skin defect that involves the instep area and it cannot be used for defects beyond the instep area.

CONCLUSION

The Flexor Digitorum Brevis muscle flap with or without overlying skin provides an effective, feasible and reliable procedure for covering and reconstructing the weight bearing area of the heel. Also this muscle flap provides adequate cushioning and helps to cover the calcaneal region with normal, sensate skin. Further, since it requires only one operation it can be considered as the ideal method. Thus, the Flexor Digitorum Brevis muscle flap can be considered as a robust flap for small heel pad defects.

REFERENCES

1. Maisels DO. Repairs of the heel. British Journal of Plastic Surgery. 1961 Jan 1;14:117-25.
2. Mathes SJ, Nahai F, Friedman VM. Clinical atlas of muscle and musculocutaneous flaps. St. Louis: Mosby; 1979 Jan.
3. Hartrampf Jr CR, Scheflan M, Bostwick III J. The flexor digitorum brevis muscle island pedicle flap: a new dimension in heel reconstruction. Plastic and Reconstructive Surgery. 1980 Aug 1;66(2):264-70.
4. Stevenson TR, Mathes SJ. Management of foot injuries with free-muscle flaps. Plastic and reconstructive surgery. 1986 Nov 1;78(5):665-9.
5. Harrison DH, Morgan BD. The instep island flap to resurface plantar defects. British Journal of Plastic Surgery. 1981 Jul 1;34(3):315-8.
6. Gidumal R, Carl A, Evanski P, Shaw W, Waugh TR. Functional evaluation of nonsensate free flaps to the sole of the foot. Foot & Ankle. 1986 Oct;7(2):118-23.
7. Hidalgo DA, Shaw WW. Reconstruction of foot injuries. Clinics in Plastic Surgery. 1986 Oct 1;13(4):663-80.
8. Ikuta Y, Murakami T, Yoshioka K, Tsuge K. Reconstruction of the heel pad by flexor digitorum brevis musculocutanous flap transfer. Plastic and reconstructive surgery. 1984 Jul 1;74(1):86-94.