Original Article

Outcome of Adipofascial Flap in Patients Having Soft Tissue Defects of Lower Third of Leg, Ankle and Hind Foot

Muhammad Bilal Saeed, Ijaz Hussain Shah, Naheed Ahmed

ABSTRACT

Objective: To determine the outcome of Adipofascial flap in patients having soft tissue defects of lower third of leg, ankle and hind foot.

Study Design: Descriptive case series

Place and Duration of the Study: The Study was conducted at the Pak Italian Modern Burn CenterNishtar Medical University and Hospital Multan from January 2017 to December 2017.

Materials and Methods: 75 patients requiring soft tissue reconstruction of the lower leg, ankle, and hind foot**.** Twenty-one patients (70%) were having their defects in ankle area. The next most common site was lower third of leg. Five patients (16.7%) were having their defects located in this area. One patient (3.3%) was having defect on the hind foot**.**

Results: A total number of 75 patients were included in this study. There were 13 (43.3%) male and 17 (56.7%) female patients. The age of the patients ranged from 10-40 years, with the mean age of 29.7 years and a standard deviation of 16.2.heel was found to be the most common site requiring reconstruction. Twenty-one patients (70%) were having their defects in this area. The next most common site was lower third of leg. Five patients (16.7%) were having their defects located in this area. One patient (3.3%) was having defect on the hind foot. The dimensions of flap required were found to be different depending upon the size of the defect. The flap length ranged from 10 to 25 cm with a mean of 18.6 ± 3.9 cm. The flap width ranged from 6 to 12 cm with a mean of 9.8 ± 1.5 cm. In 28 (93.3%) patients, flap survival was noted to be 100 percent. In only 2 (6.7%) patients, it was found to be 90 percent, as the distal 10% of the flap underwent necrosis.

Conclusion: The adipofscial flap is a reliable, thin and pliant flap .It is simple to learn, quick to perform and can provide an excellent aesthetic and functional restoration in the lower third leg ,ankle and foot region with good donor site appearance.

Key Words: Adipofacial, flap, hind foot

Citation of articles: Saeed MB, Shah IH, Ahmed N. Outcome of Adipofascial Flap in Patients Having Soft Tissue Defects of Lower Third of Leg, Ankle and Hind Foot. Med Forum 2018;29(5):46-49.

INTRODUCTION

Lower limb reconstruction, especially in the aquilian and calcaneal regions, represent a therapeutic problem for the surgeon. Appropriate protection to the mobility and vascular structures causing minimum sequelae in the donor site, and promoting constant vascular activity are some of the desired factors in an ideal coverage. [1-6]

Most open fractures of lower 1/3 of tibia are associated with soft tissue defects, because tibia is subcutaneous bone with almost no muscles around its lower 1/3 with tight skin and poor circulation. Heel is another problemsite because of weight bearing properties, hence it needs a full thickness skin cover.

Pak Italian Modern Burn Center, Nishtar Medical University Hospital Multan.

Correspondence: Dr. Muhammad Bilal Saeed, Assistant Professor, Pak Italian Modern Burn Center, Nishtar Medical University Hospital Multan.
Contact No: 0323-8644486
Email: drmianbilal@yahoo.com

Received: January, 2018; Accepted: March, 2018

Different forms of soft tissue cover are available e.g., muscle flap, facial flaps, septocutaneousflaps, axial flaps and free flaps with their ownindications and disadvantages.[7]

A lateral calcaneal artery skin flap is an axialpattern flap that includes the lateral calcaneal artery, lesser saphenous vein and

the sural nerve.[8] Since its developmentin 1981, this flap has been demonstrated to be both an effective and reliable local flap for reconstructingsoft tissue defects about the posterior heel and both malleoli.[9,10]

Modifications of this flap include island arterial flaps,[9-12] distally based flaps [12] and free flaps,[13] all of which have a wide variety of clinical applications. Lin et al.[14] modified this flap as an adipofascial flap and used it toreconstruct soft tissue defects of the posterior heel as wellas the lateral malleolar and lateral supramalleolar areas.

Adipofascial flaps have inherent shortcomings that warrant consideration.[15]These include flap thinness, bleeding or hematoma, monitoring difficulties and skin graft associated problems.[16-18]

MATERIALS AND METHODS

75 patients from both sexes those fulfilling the inclusion criteria were recruited for the study through the Emergency and OPD of Pak Italian Modern Burn Center Nishtar hospital Multan. After taking complete history, general physical, local and systemic examination was done. Routine and specific investigations were carried out. Pre-anesthesia evaluation was done. An informed consent was taken. The procedures were performed under spinal and general anesthesia. X ray was taken when there were underlying fractures. Defects were analyzed and measured pre-operatively. Pre-operatively, a 10 MHZ hand held Doppler probe was used to exactly locate and mark the origin and course of the vessels, and flap design was outlined on the selected donor-site according to the dimensions of the defect. Wound was debrided. Its dimensions were mapped out with the help of a template. The planning in reverse was used to confirm the flap design already marked. The flap was elevated and inset into the defect. Flaps was grafted with split thickness skin graft taken from the thigh. The donor site was closed directly. In all cases back slab was applied.

Flap dressing was opened on fourth postoperative day. All patients were observed for survival of the flap and graft, and any early flap or donor-site complication. The patients were discharged on 7 days after operation. At discharge, study proforma were filled and photographs of the donor and recipient site were taken.

The first follow-up visit was after one week. All the patients were subsequently followed-up at every week for four weeks. At each follow-up, the flap and donor site were examined for any late complications like graft loss (partial or complete) and flap loss (partial or complete), the functional and aesthetic restorations were assessed and donor-site appearance was observed.

All the data collected was entered and analyzed by SPSS version 20. Numerical variables of interest like age was presented as mean and standard deviation. Nominal variables like sex, success of flap were presented as frequency and percentages. Data was stratified for any underlying fracture and duration of injury. Data was presented separately for location of defect (lower third of leg, ankle and hind foot) and flap used (sural artery flap, posterior tibial artery flap and supremalleolar flap).

RESULTS

A total this number of 75 patients were included in study. There were 13 (43.3%) male and 17 (56.7%) female patients, as shown in table 1.

The age of the patients ranged from 10-40 years, with the mean age of 29.7 years and a standard deviation of 16.2.

Table No.1: Age distribution

Sex	Frequency (%)
Male	13 (43.3)
Female	17 (56.7)
Total	**75 (100.0)**

Table No.2: Location of defect

Location of Defect	Frequency (%)
Lower third leg	21 (70.0)
ankle	5 (16.7)
Hind foot	1 (3.3)
Total	**75 (100.0)**

Table No.3: Distribution of Cases by Flap Length

Flap Length (cm)	Frequency (%)
23.0	1 (3.3)
13.0	2 (6.7)
14.0	2 (6.7)
15.0	2 (6.7)
16.0	3 (10.0)
17.0	2 (6.7)
18.0	2 (6.7)
20.0	7 (23.3)
21.0	2 (6.7)
22.0	2 (6.7)

Table No.4: Distribution of Cases by Flap Width

Flap Width (cm)	Frequency (%)
6.0	1 (3.3)
7.0	1 (3.3)
8.0	3 (10.0)
8.5	2 (6.7)
9.0	3 (10.0)
9.5	1 (3.3)

Table No.5: Distribution of Cases by Flap Survival

Flap Survival (%)	Frequency (%)
100	28 (93.3)
90	2 (6.7)
Total	**75**

Figure No.1: Defect With Marking of Adipofacial Reverse Sural Artery Flap

Figure No.2: In setting of Adipofacial Reverse Sural Artery Flap

Figure No. 3: Defect with marking of flap

Figure No.4: In setting of Adipofacial Reverse Sural Artery Flap

Heel was found to be the most common site requiring reconstruction. Twenty-one patients (70%) were having their defects in this area. The next most common site was lower third of leg. Five patients (16.7%) were having their defects located in this area. One patient (3.3%) was having defect on the hind foot, as shown in table 2.

The dimensions of flap required were found to be different depending upon the size of the defect. The flap length ranged from 10 to 25 cm with a mean of 18.6 ± 3.9 cm, as shown in table 3. The flap width ranged from 6 to 12 cm with a mean of 9.8 ± 1.5 cm, as shown in table 4.

In 28 (93.3%) patients, flap survival was noted to be 100 percent. In only 2 (6.7%) patients, it was found to be 90 percent, as the distal 10% of the flap underwent necrosis as shown in table no. 5.

DISCUSSION

The third-distal leg and calcaneal region is frequently exposedto trauma and, when cutaneous coverage is made necessary, one ascertains how difficult the reconstruction of this zone may be.[9]Among the adipofascial flaps described in the coverage of the lower limb, Hong and his co-authors used the flap based on the posterior tibial artery, while Yoshima and hisco-authors suggested the peroneal artery and vein flap.

Masquelet and his co-authors described a flap based on cutaneous branches originated from perforating branches of the peroneal artery.8 Adipofascial flaps can be made large, easily reaching the most distal regions in the lower limb. The inclusion of the subcutaneous tissue increases the thickness of the flap and, at the same time, assures its vascularization.[2,3,7]

Adipofascial flaps have inherent shortcomings that warrant consideration.19 These include flap thinness, bleeding or hematoma, monitoring difficulties and skingraft associated problems.[8-10]

An axial pattern adipofascial flap has a rich blood supply for the vessels to run and form a redundant vascular network within the fascia.[8] Therefore, the potential difficulties associated with intraoperativeand postoperative bleeding are a valid concern.[9]

Intraoperative bleeding can be minimized by the carefuluse of bipolar cauterization. The problems associated apostoperative hematoma beneath flaps is best address edusing small-caliber suction drains, as recommended by Brent and Byrd,[11] rather by applying external pressure.[9]

CONCLUSION

Adipofacial flap is very good for coverage of lower limb defects. It is simple, quick to do and provide excellent aesthetic and functional results.

Author's Contribution:

Concept & Design of Study:	Muhammad Bilal Saeed
Drafting:	Ijaz Hussain Shah, Naheed Ahmed
Data Analysis:	Ijaz Hussain Shah, Naheed Ahmed

Revisiting Critically:	Muhammad Bilal Saeed, Ijaz Hussain Shah
Final Approval of version:	Muhammad Bilal Saeed

Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

1. Donski PK, Fogdestam I. Distally based fasciocutaneous flap from the sural region. Scand J Plast Reconstr Surg 1983(17):191–6.
2. Gumener R, Zbrodowski A, Montandon D. The reverse fasciocutaneous flap in the leg. Plast Reconstr Surg 1990;88(6):1034–43.
3. Jeng SF, Wei FC, Kuo YR. Salvage of the distal foot using the distally based sural island flap. Ann Plast Surg 1999;43(5):449–505.
4. Hyakusoku H, Tonegawa H, Fumiiri M. Heel coverage with a Tshaped distally based sural island fasciocutaneous flap. Plast Reconstr Surg 1993; 93(40):872–6.
5. Carriquiry CE. Heel coverage with a deepithelialized distally fasciocutaneous flap. Plast Reconstr Surg 1990;85(1):116–9.
6. Attinger A, Cooper P. Soft tissue reconstruction for calcaneal fractures or osteomielites. Orthop Clin North Am 2001;32(1):135–70.
7. Masquelet AC, Romana MC, Wolf G. Skin island flaps supplied by the vascularaxis of the sensitive superficial nerves: anatomic study and clinical in the leg. Plast Reconstr Surg 1992; 89(6):1115–21.
8. Grabb WC, Argenta LC. The lateral calcaneal artery skin flap(the lateral calcaneal artery, lesser saphenous vein, and sural nerve skin flap). Plast Reconstr Surg 1981;68(5):723-30.
9. Holmes J, Rayner CR. Lateral calcaneal artery island flaps. Br J Plast Surg 1984;37(3):402-5.
10. Yanai A, Park S, Iwao T, Nakamura N. Reconstruction of a skin defect of the posterior heel by a lateral calcaneal flap. Plast Reconstr Surg 1985;75(5):642-7
11. Gang RK. Reconstruction of soft-tissue defect of the posterior heel with a lateral calcaneal artery island flap. Plast Reconstr Surg 1987;79(3): 415-21.
12. Ishikawa K, Isshiki N, Hoshino K, Mori C. Distally based lateral calcaneal flap. Ann Plast Surg 1990;24(1):10-6.
13. Ishikawa K, Kyutoku S, Takeuchi E. Free lateral calcaneal flap. Ann Plast Surg 1993;30(2):167-70.
14. Lin SD, Lai CS, Chiu YT, Lin TM. The lateral calcaneal artery adipofascial flap. Br J Plast Surg 1996;49(1):52-7.
15. Lee YH, Rah SK, Choi SJ, Chung MS, Baek GH. Distally based lateral supramalleolar adipofascial flap for reconstruction of the dorsum of the foot and ankle. PlastReconstr Surg 2004;114(6): 1478-85.
16. Jin YT, Cao HP, Chang TS. Clinical application of the free scapular fascial flap. Ann Plast Surg 1989;23(2):170-7.
17. Meland NB, Weimar R. Microsurgical reconstruction: experience with free fascia flaps. Ann Plast Surg 1991;27(1):1-8.
18. Walton RL, Matory WE Jr, Petry JJ. The posterior calf fascial free flap. PlastReconstr Surg 1985; 76(6):914-26.
19. Bocchi A, Merelli S, Morellini A, Baldassarre S, Caleffi S, Papadia F. Reverse fasciocutaneous flap versus distally pedicle sural island flap: two elective methods for distal-third leg reconstruction. Ann Plast Surg 2000;45(3):284–91.
20. Almeida MF, Da Costa PR, Okawa RY. Reverse-flow island sural flap. Plast Reconstr Surg 2002; 109(2):583–91.
21. Baudet J, Peres JM. The reverse fasciocutaneous flap in the leg. Plast Reconstr Surg 1991;88(6): 1042–3.