

GASTROCNEMIUS MYOCUTANEOUS FLAP FOR COVERAGE OF KNEE DEFECTS

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Abstract

Background: Surgery continues to be difficult for treating large soft tissue leg deformities that involve the knee. This study's goal was to assess the efficacy of the gastrocnemius myocutaneous flap in treating post-traumatic knee deformities. **Materials and Methods:** This prospective study was conducted from January 2022 to June 2022. Five cases of large post-traumatic defects in the knee were treated with gastrocnemius myocutaneous flap in the department of plastic surgery in Coimbatore Medical College Hospital, Tamil Nadu. The functional and aesthetic outcomes were evaluated. **Result:** There was no case of complete flap failure. Skin necrosis of a non-critical area occurred in 1 patient who was debrided and whose flap advanced. Post-operative wound discharge was present in 1 patient. There was no donor site morbidity. The procedure was found to be technically easy and reliable. **Conclusion:** Using a local gastrocnemius myocutaneous flap to cover post-traumatic big knee deformities produced outstanding results and aesthetically pleasing skin coverage without significant problems.

INTRODUCTION

The Gastrocnemius myocutaneous flap was originally described in 1977,^[1] as a means of covering the knee area. There are medial and lateral heads to the gastrocnemius muscle. Each head has a neurovascular pedicle that can be moved independently. The medial and lateral heads of the gastrocnemius muscle are supplied by two Sural arteries, one medial and one lateral. Each musculocutaneous perforator can provide a sizable patch of skin proximally and distally to the muscle belly.^[1-3]

The etiologies of soft tissue abnormalities surrounding the knee joint vary. These typically present a difficulty to the treating surgeon since the flap used for their needs is flexible enough to restore complete joint mobility after the healing process and cover the defect. Many flaps, including muscle and skin, have unique benefits and drawbacks.^[2,4]

Due to its stable anatomy and robust blood supply, the gastrocnemius myocutaneous flap is a great and adaptable alternative for a large defect, even when the front portion of the leg suffers severe trauma. As a result, the posterior part of the leg is typically spared. Most gastrocnemius myocutaneous flap's perforators are 7–18 cm from the popliteal crease.^[1,5,6] The lesser

saphenous vein may also be connected to the flap to improve venous drainage or serve as the flap's sole outflow. In addition, Doppler mapping of skin perforators may help to ensure that the skin has enough blood flow.^[1,4-6] Thus, we have evaluated the use of gastrocnemius myocutaneous flap as a versatile option for the coverage of large post-traumatic knee defects.

MATERIALS AND METHODS

Five cases of large post-traumatic defects in the knee were treated with gastrocnemius myocutaneous flap in the Department Of Plastic Surgery at Coimbatore Medical College Hospital, Tamil Nadu. from January 2022 to June 2022. All cases were initially treated with debridement, and fixation of a fractured bone with external fixators was done. They were aged between 10 to 50 years. Patients having associated injuries that required multidisciplinary treatment were excluded from the study. All nonviable and poorly vascularized tissues were aggressively debrided, and the defect was measured. The procedure was done under regional anaesthesia with the patient lying prone. According to the defect, the skin pedicle was marked over the medial or lateral head of the gastrocnemius muscle, not crossing more

than 1 cm of the midline. In addition, Midline and popliteal creases were marked.

The skin incision was given over the previously marked site. The gastrocnemius muscle was identified and separated from the soleus muscle, and the attachment with the Achilles tendon was divided. Both heads were sharply divided, and the musculocutaneous flap was raised to the knee joint to preserve the vascular pedicle. To increase the approach of the flap, we divided the origin of the muscle, which also increased the rotation point of the flap. The upward mobility of the flap was ultimately facilitated by dividing the proximal part of the skin, which created an island myocutaneous flap. After tunnelling, the flap was set over the defect with sutures. Suction drainage and post-operative splinting were done in all patients. Informed consent was obtained from all patients included in the studies when applicable. Patients were immobilized post-operatively for 2-3 weeks to allow the flap and skin graft to heal. Mobilization was initiated as soon as healing was achieved. Patients were then transferred to the Orthopedics department for further management.

RESULTS

This study included 5 cases; 4 were male, and 1 was female. Medial muscle heads were used in all cases. All cases were admitted to a trauma centre and treated with debridement and fracture fixations, and then residual defect coverage was done. After the flap elevation, donor site closure was achieved with split-thickness skin grafting. There was no case of complete flap failure.

Flap tip necrosis was seen in one case, debrided and re-advanced. No functional deformity was seen in the follow-up period. Discharge from the wound was seen in one patient. It was managed with wound dressing and topical antibiotics. The follow-up period ranged from 4 to 6 months, during which stable wound coverage by the myocutaneous flap was noted. No patient complained of any functional deficit, and all patients had an aesthetically acceptable appearance with complete coverage of the defect.

Case 1:



Figure 1: The post-traumatic raw area over the anterior aspect of the right knee with implant exposed (Pre-op)



Figure 2: Medial gastrocnemius myocutaneous flap raised. (Intra-op)



Figure 3: Post-op



Figure 4: Follow Up

Case 2:



Figure 5: Raw area- Anterior aspect of the left knee (pre-op)



Figure 6: Flap raised (intra-op)



Figure 7: Post-operative



Figure 8: Follow up

Case 3



Figure 9: Raw area left knee and upper one-third of Leg (Pre-Op)



Figure 10: Flap marking done

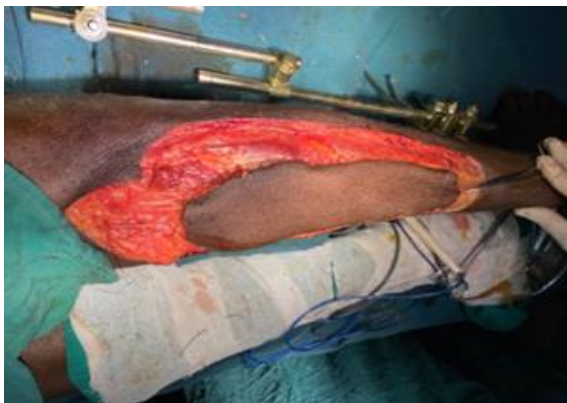


Figure 11: Flap raised (Intra-Op)

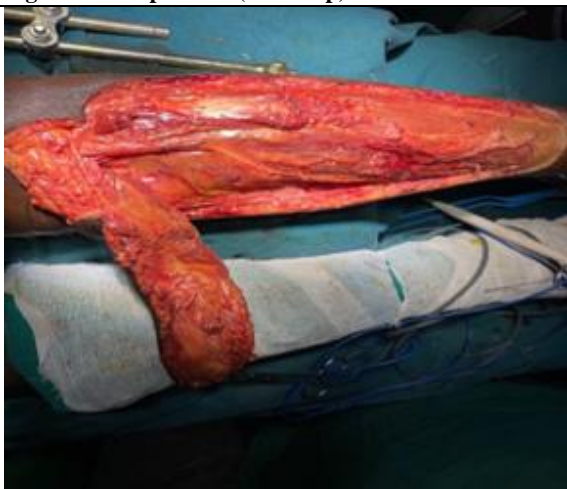


Figure 12: Flap raised (Intra-Op)



Figure 13: Post-Operative

DISCUSSION

Leg skin and soft tissue defects following prevalent trauma and prompt and accurate patient management can improve the final result's aesthetics and functionality. While the upper and middle thirds of the leg each have a wide range of treatment choices, the big defect involving the transition zone between the two only has a few, such as the cross-leg flap, gastrocnemius flap, and free flap. Cross-leg flap is no longer often utilized since it causes long-term morbidity and patient pain because of its awkward location.^[7]

The benefit of a gastrocnemius myocutaneous flap is that the defect can be properly covered up to the middle portion of the leg without any difficulties. No patient in our study experienced functional loss, and the contour deformity was acceptable. This finding is comparable to the study by Kroll et al., who concluded that the functional and cosmetic consequence is satisfactory when only one flap is lifted.^[8] By tunnelling under the skin-bridge flap, a scar can be avoided. In their investigation, Bashir et al. described the gastrocnemius myocutaneous island flap at the muscle's lower end.^[9]

CONCLUSION

In microsurgery, the free flap is the most frequently used for covering any defect, although the free flap causes morbidity at the donor site and calls for expertise. The areas of concern with free flap also include the need for thorough post-operative surveillance, the requirement of a healthy recipient vessel, and the possibility of re-exploration.

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