



## ENHANCING THE SURVIVAL OF INFERIORLY BASED FASCIOCUTANEOUS FLAPS IN COVERAGE OF LOWER LIMB DEFECTS

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**ABSTRACT** • **OBJECTIVE:** To study the role of delay in inferiorly based fasciocutaneous flaps in coverage of lower limb defects.  
 • **METHODS:** 30 Patients with lower limb defects from knee to heel were studied from January 2018 to January 2019. All inferiorly based fasciocutaneous flaps ranging from lateral genicular artery flap for knee defects, medial and lateral inferiorly based flaps for middle and lower third leg defects, reverse sural flap for calcaneal defects were done after delay and their results were analyzed.  
 • **RESULTS :** All 30 flaps survived and served their purpose. 6 flaps had flap tip necrosis.  
 • **CONCLUSION :** The process of delay significantly enhanced the survival of inferiorly based fasciocutaneous flaps in coverage of lower limb defects.

**KEYWORDS :** Delay, Fasciocutaneous flaps, reverse sural artery flap

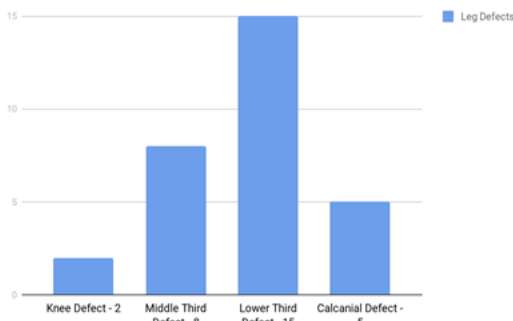
### INTRODUCTION:

Defects of the lower limb following trauma and surgery can range from exposed knee joint, patella, upper, middle and lower third of tibia, medial and lateral malleolus and calcaneum. Coverage of these defects can be challenging and can be done by various methods like pedicled flaps, propellor flaps, free flaps and cross leg flaps. Except for major circumferential and near circumferential defects, majority of these defects can be covered by pedicled flaps if there is adequate skin in medial or lateral or posterior aspect of leg apart from the defect. Inferiorly based fasciocutaneous flaps play a major role in coverage of these defects. The primary problem in inferiorly based fasciocutaneous flaps is impaired venous drainage and majority of flaps are lost due to venous problems if done in single stage. If these flaps are done in multiple stages with the first stage as delay almost all flaps survived and complications are negligible.

### MATERIALS AND METHODS:

This is a retrospective study done between January 2018 to January 2019 where we analyzed the inferiorly based fasciocutaneous flaps used to cover various leg defects after the process of delay done as the first stage. 30 cases were studied. Males were 20 and females 10. Age group ranged from 15 to 70 yrs. The defects were knee defects 2, middle 1/3rd - 8 and lower 1/3rd - 15, calcaneal defects 5. 2 cases of knee defects were covered with inferiorly based lateral genicular artery flap. Among the 8 cases of Middle 1/3rd defects 5 cases were covered with lateral inferiorly based flap and 3 cases with medial inferiorly based flap. Among 15 lower 1/3rd defects 10 were covered with lateral inferiorly based flaps and 5 cases with medial

inferiorly based flaps. All 5 cases of calcaneal defects were covered with reverse sural artery flap. All these flaps were done in multiple stages with delay as the initial stage procedure before inset.



The method of Delay ranged from 2 stages to multiple staged procedure. The 2 stage procedure was performed if the length width ratio was 2;1, with the first stage being complete elevation of the flap

and replacing it in the same area of harvest, and the second stage being flap inset. The multiple stage procedure is done where the ratio of length to width exceeds >2:1, here in the first stage the flap is raised initially as a bipedicle flap, followed by one half of superior delay after 3 days and the other half of superior delay after 3 days and flap inset after 10 days from the first stage.

All flaps were taken with an extra length of 25%, which allowed for flap tip necrosis and shrinkage.

### RESULTS:

Among the 30 cases all flaps survived and were able to cover the various leg defects. 6 cases had flap tip necrosis, since we had harvested extra length of flap the necrosed portion was excised and flaps were able to cover the defects



Figure 1&2 - Delayed reverse sural artery.



Figure 3 - Delayed lateral

Figure 4 - Delayed Medial

### DISCUSSION:

The reconstruction of compound leg defects especially around the middle and lower third of leg is challenging. Middle 1/3rd defects are usually covered by fasciocutaneous flaps or hemi soleus flaps. Fasciocutaneous used to cover middle and lower 1/3rd are usually inferiorly based. The problem that arises with inferiorly based flaps is mostly venous in nature. To avoid this complication and to enhance the survival of flaps we used the delay phenomenon. The flap if turned 90 degrees for inset during the first stage produces venous congestion in

spite of good arterial supply, this leads to flap loss. Hence after raising the flap, if it placed back in its original position the flap gets adequate adaptational time for decreased venous return, the flap if inset after 1 week, venous problems that arise are significantly reduced and flap survival is almost 100%. This 2 stage procedure we did for flaps of 2:1 ratio (length is 2 times the width). If the length required is more than 2:1 we do the delay in multiple stages. First stage the flap is raised as bipedicle flap, in 2<sup>nd</sup> stage a superior delay is done after 3 days in halves (first half after 3 days and second half after 6 days from first stage) and in the next stage, 3 days after the superior delay i.e 9 days after first stage, flap is raised and inset given. Our flap survival with this technique for inferiorly based flaps was almost 100%. The same technique was adapted for inferiorly based lateral genicular artery flap, medial and lateral inferiorly based fasciocutaneous flap and reverse sural artery flap. The process of delay helps in capturing the adjacent angiosome territory by opening up of choke vessels in the arterial side and oscillating veins on the venous side. These opening up of micro vasculature during the delay process greatly enhances the flap survival.

#### CONCLUSION:

The process of delay greatly enhances the survival of inferiorly based fasciocutaneous flaps used to cover leg defects and is a safe technique to be followed in such cases.

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