

CROSS LEG FLAP – A DEPENDABLE SAVIOUR IN COMPLEX LEG DEFECTS.

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Abstract

Background: Cross-leg flap is a final flap option when other coverage solutions fail. Extensive traumatic wounds of leg have been managed successfully with free tissue transfer since the advent of microsurgery. Various local and systemic factors may preclude the use of free flaps even in units with available expertise and infrastructure. In these situations, the “cross leg flap” come into play. However, owing to the various limitations of free flap surgeries, the usage of cross-leg flaps has been revived. This study has been done to assess the efficacy of cross-leg flaps in reconstructing lower limb defects. **Materials and Methods:** 20 patients with defects of leg and foot were included in this study in whom cross-leg flap was used to reconstruct the defect. **Result:** Of the 20 patients, 19 were males and 1 was female. Most of the patients were aged between 21-30 yrs. 10 patients had foot defect. All the cross- leg flaps were completely viable after division. **Conclusion:** Cross-leg flap is simple, reliable, cost-effective procedure that can be used to reconstruct complex defects even in secondary level hospitals.

INTRODUCTION

Composite tissue loss in extremities involving neurovascular structures has been a major challenge for reconstructive surgeons.^[1] Cross leg flaps were first described by Hamilton in 1854, and have been in use since then for any type of lower limb defects.^[2] The flap was widely used during World War II, with satisfying results. However, with the advent of microsurgical techniques, there was a shift towards preferring microvascular surgery, and they became the gold standard for reconstructing any lower limb defects.

Free flap surgeries are technically more demanding, tedious, and expensive procedures. Free flap surgeries are not useful in patients with venous thrombosis, or who have extensive lower limb injury with damage to axial vessels. In such cases, cross-leg flaps score over free-flap surgeries, as they too provide different types of tissues.^[3]

The cross-leg flaps have undergone adaptations and modifications in procedure over time and with the advent of fascio-cutaneous flaps by Ponten in 1983, the cross-leg flaps have been raised safely and easily with 1:3 to 1:3.5 widths to length ratio.^[4] This allows a much greater area of skin to be transferred with much more freedom of leg position.^[5]

Whenever there are no other possible options to reconstruct the foot and leg trauma with tissue loss, or due to technical deficiency, or when there is no

available local tissue, and/or loss of healthy donor vessels for microsurgical reconstruction, the cross-leg flap is the only choice for reconstruction.

This study was done to assess the efficacy of cross-leg flaps in salvaging lower extremity defects.

MATERIALS AND METHODS

All patients with defects of leg, foot, leg and foot due to trauma or burns in whom cross leg flap was done in the Department of Plastic Surgery, Government General Hospital, Guntur from June 2020 to June 2023 were included in this study.

A total of 20 patients were included in this retrospective study. Case sheets, radiographs and photographs from hospital records were retrieved and analyzed with special emphasis on local examination findings like the site and size of defect, the presence of exposed bone, tendons, or neurovascular structures, the degree of wound contamination, the condition of surrounding skin, distal neurovascular deficits in the same limb and injuries of the contralateral leg. All the relevant details of the patients during preoperative, intraoperative, and postoperative follow-up periods were collected and analyzed.

Skeletal stability and restoration of the circulation of the injured limb were achieved before or simultaneously with reconstruction. Fixation of the two limbs was achieved by an External fixator.

Surgical Technique: The calf was the principal donor site for the cross-leg flap but maybe extended distally if a large flap is needed. The choice of location of the base of the flap depends on the site, the size of the defect, and the comfortable position of the leg.

The defect was debrided, and the margin was freshened. After proper preoperative marking, the flap was raised including the fascia and multiple skin to fascia stitches were taken to prevent any shearing movement to affect the blood supply. Preservation of the sural nerve and short saphenous vein was achieved (not included in the flap), if possible. The donor site of the flap was split-thickness skin grafted, and the flap was sutured over the defect.

Three weeks later the flap was divided and any residual raw areas, if present were resurfaced with split-thickness skin graft.

Post-operative Care: 1st dressing was done on the 2nd post-operative day and twice weekly after that, unless extensive infection was present, then daily dressing was done.

All the patients received postoperative care including proper broad-spectrum antibiotic therapy, potent pethidine analgesics in the postoperative period, the elevation of the limbs to prevent edema. After flap division early ambulation was encouraged unless there was any orthopedic contraindication.

At follow-up, the patients were evaluated for functional (mobility without limping) as well as for cosmetic outcome.

RESULTS

All twenty flaps were completely viable after division.

Table 1: Age distribution

Age	No of patients
0–10	1
11–20	0
21–30	7
31–40	5
41–50	3
51–60	4

Most of the patients were aged between 21-30 years. There was 1 patient below 10 years of age and 4 patients above 50 years of age.

Table 2: Gender distribution

Gender	No of Patients
Male	19
Female	1

The male-to-female ratio was 19:1.

Table 3: Etiology

Etiology	No of Patients:
Trauma: Acute	18
Chronic	1
Burns	1

19 patients had a history of trauma, while 1 patient had an injury due to burns.

Table 4: Site of Defect

Site of Defect	No of Patients
Leg	6
Foot	10
Ankle	4
Leg & Foot	1

10 patients of 20 had defect over the foot, while 6 patients had defect over the leg. One patient with electric burn injury had two defects one over distal third of leg and another on dorsum of foot.

Table 5: Patient Satisfaction scale

10/10	1
9/10	6
8/10	5
7/10	2
6/10	2
Not Reviewed	3



Figure 1: Post-operative pictures of well settled flap.

DISCUSSION

Microsurgical free tissue transfer is the gold standard in the management of complex, lower extremity trauma. However, there are certain limitations to free flap surgery. Patients with a locally diseased arterial tree, recipient vessel not available on exploration, and general condition of the patient not permitting long-standing surgery are contraindications for the free flap. Relative contraindications of free flap include electrical burns, single vessel limbs, delayed referral, and in patients after bone tumor resection that had radiotherapy. Moreover, free flap surgery requires a high level of expertise and is expensive. In such conditions, the cross leg fascia-cutaneous flap is a good alternative to free flap surgeries.^[6-8]

We describe our experience with cross-leg flaps in 20 patients for the reconstruction of difficult leg defects. In our study, the mean length of time from the first operation to complete healing was 28 days, and the mean operating time was 2½ hours. All twenty flaps were completely viable after division.

For one patient with electrical burn injury with exposed distal tibia and exposed metatarsals two flaps from uninjured limb were used-classical cross-leg flap for leg defect and RSA flap for foot defect. For another patient with severe crush injury of leg with circumferential de-gloving of skin and complex compound comminuted fractures of both bones leg, classical cross leg (CCL) flap was used to cover the anterior aspect of leg and the posterior raw area was resurfaced with skin graft. A CCL flap was done for a 5-year-old child for his dorsum foot defect. Free flap surgery was not suitable for this child because of narrow vessels.

Previously, cross-leg flaps had their limitations due to the incidence of necrosis, difficulty of immobilizing both legs for 2–3 weeks, joint stiffness, chances of thrombo-embolism, and concern about donor site cosmetic deformity especially in women.

However, over the years, cross-leg flaps have undergone tremendous refinements. The use of an external fixator for immobilization circumvents many of the previous problems with both-leg immobilization. An external fixator is quick and easy to apply, light in weight, less awkward both for

the patient and for nursing personnel, and easy to adjust in the ward. It provides the necessary strength for immobilization, and ease of patient mobility and positioning.^[9]

Incorporation of fascia or muscle enhances the reliability of the flap, and the flap can be raised in a proportion up to 3: 1 to 5: 1.4 Lower-extremity range of motion is regained rapidly, and each patient resumed essentially normal gait and activity.

Morris et al. reported a 94% success rate with conventional cross-leg flap, and by incorporating the fascia, the success rate approaches nearly 100%.^[10]

Cross-leg flaps function as a nutrient flap for the distal limb even though the pedicle has been divided.^[11] It is a backup procedure in an urgent situation and supplies a large quantity of skin. Advantages of cross-leg flap include ease of dissection, versatility, shorter operating time, minimal donor site morbidity, and replacement of like tissue with little or no need for secondary revision.^[12] It can be easily done with minimal technical expertise even by beginners in periphery also.

With its simplicity, reliability, absence of functional deficit and good-quality coverage with only moderate aesthetic disadvantage, cross-leg flap finds a definite place in reconstructive trauma surgery.^[13]

CONCLUSION

The cross-leg flap is a simple, safe, and reliable alternative to free tissue transfer in salvaging the Limb. This flap is easy to perform and can be performed where sophisticated instruments are not available, or when the patient is not affordable for advanced microsurgical procedures.

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