

Analysis of the Gracilis Myocutaneous Flap as a Workhorse Flap for Reconstruction of Perineal and Ischial Soft Tissue Defects

U Rasheedha Begum¹, A Sivakumar²

¹Assistant Professor, Department of Burns, Plastic and Reconstructive Surgery, Kilpauk Medical College, Chennai, Tamil Nadu, India,

²Managing Director, Desire Aesthetics, Q-100, Chennai, Tamil Nadu, India

Abstract

Introduction: The gracilismyocutaneous flap is useful in reconstruction of perineal defects. Management of perineal and ischial wounds can be very frustrating as these invariably get contaminated from the anogenital tract. Moreover, the apparent skin defect may be associated with a significant three-dimensional dead space in the pelvic region. Such wounds are likely to become chronic and recalcitrant if appropriate wound management is not instituted in a timely manner.

Materials and Methods: The study was performed over a period of 5 years and 10 patients were included in the study, who required cover for perineal defects.

Results and Conclusion: The study highlights the usefulness of the gracilismyocutaneous flap in reconstruction of soft tissue defects in the perineal and ischial regions.

Key words: Gracilis myocutaneous flap, Ischial pressure sore, Perineal reconstruction, Perineum, Water-can perineum

INTRODUCTION

The perineum is Greek words “Peri + inan” meaning to “empty out.” The perineum is an anatomical region located in the pelvis. It is the most inferior part of the pelvic outlet, located between the thighs. It is separated from pelvic cavity superiorly by the pelvic floor. Functionally the perineum contains structures that support the urinary, genital and gastro intestinal viscera, they play a vital role in micturition, defecation, sexual intercourse, and child birth.

The perineum is a diamond-shaped structure (Figure 1). There are two ways in which the boundaries of the perineum can be described. Anatomical borders refer to the exact bony margins. The perineum can be subdivided

by a theoretical line drawn transversely between the ischial tuberosities into anterior urogenital and posterior anal triangles. These triangles are associated with different components of the perineum.

Perineal defects result due to post-surgical wound in case of genital malignancies, anorectal malignancies, chronic inflammatory diseases, perineal trauma, infections, postradiation, and perineal burns.

The reconstruction of the perineum can be quite demanding as one has to preserve both sexual as well as the excretory functions of the perineal area. The perineal defects need to be assessed in three dimensions, the skin defects may be associated with a large dead space in the pelvis following surgical excision of tumors, and it must be remembered that the rigid bony pelvis does not allow the wounds to collapse, resulting in fluid collection.

It is also important to know if the patient has received, or is likely to receive radiotherapy. Provision of a well-vascularized muscle cover is very important in such a situation.

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Corresponding Author: Dr U Rasheedha Begum, Assistant Professor, Department of Burns, Plastic and Reconstructive Surgery, Kilpauk Medical College, Chennai, Tamil Nadu, India. E-mail: rasheedhabegum124@gmail.com. Phone: 8838479138

There are many options for reconstruction of the perineum. They range from primary closure, grafting to flaps.¹ Flaps include fasciocutaneous/muscle flap, gracilis myocutaneous flap, rectus abdominis flaps, posterior thigh flaps, groin flap, pudendal fasciocutaneous flap, gluteal flaps, rectus femoris flaps, tensor fascia lata flap, vastus lateralis flap, and perforator flaps. Less commonly used options are internal oblique muscle flap and omental flaps.

The gracilis myocutaneous flap²⁻⁵ is favored by several influential groups of reconstructive surgeons due to the donor site profile and speed of dissections and has traditionally been used to reconstruct small to large size perineal defects.^{6,7} It is particularly attractive to patients who do not want abdominal, buttock, or back scars. In gracilis myocutaneous flap, donor site scars are well concealed, and it gives the added benefit of a thigh lift.

In this article, we present a case series of 10 gracilis myocutaneous flap (Table 1) used for reconstructing perineal and ischial defects.

MATERIALS AND METHODS

The study was performed over a period of 5 years (August 2007 to August 2012). 10 patients were included in the study, who required cover for perineal defects. The study included 4 male and 6 female patients with age group 35-67 years. The etiology of the defect was Ischial pressure sore (4 cases) (Figures 2 and 3), post radiation ulcer (1 case) (Figure 4), sarcoma lateral wall of vagina (1 case) (Figure 5), vulvar malignancy (2 cases) (Figures 6 and 7), watering-can perineum (1 case) (Figure 8), and hidradenitis suppurativa (1 case). Two patients with vulvar malignancy needed bilateral gracilis flap, radiation ulcer, and watering-can perineum required bilateral gracilis flap. The cases with

ischial pressure sore and one case of vaginal malignancy covered with single gracilis myocutaneous flap. Standard

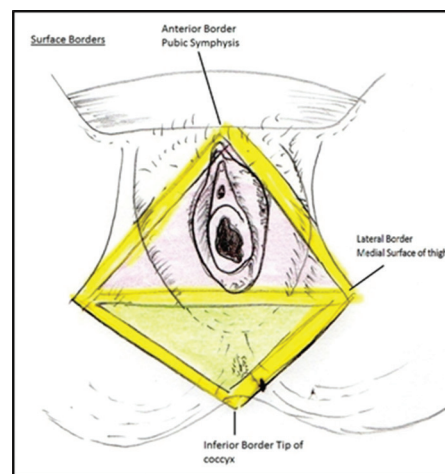


Figure 1: The area defined as the perineum



Figure 2: (a-d) Ischial pressure sore: A case of ischial pressure on the left side sore reconstructed with a gracilis myocutaneous flap

Table 1: Cases of reconstruction with gracilis myocutaneous flap

Case No.	Age	Sex	Diagnosis	Size defect	Size of flap	Result
Case 1	67	F	Soft tissue sarcoma lateral wall of vagina	6 cm × 3 cm	7 × 4 cm	Flap survived completely
Case 2	60	F	Carcinoma vulva	Bilateral 8 cm × 4 cm right, 6 cm × 5 cm left	Bilateral 9 × 5 cm right, 7 cm × 6 cm left	Flap survived completely
Case 3	60	F	Carcinoma vulva	Bilateral 9 cm × 4 cm right, 7 cm × 5 cm left	Bilateral 10 cm × 5 cm right, 8 cm × 6 cm left	Flap survived completely
Case 4	57	M	Radiation ulcer perineum	Bilateral 8 cm × 12 cm right, 8 cm × 11 cm left	Bilateral 9 cm × 13 cm right, 9 cm × 12 cm left	Bilateral flap cover. flap survived completely with minimal wound dehiscence
Case 5	54	M	Watering can perineum	Bilateral 10 cm × 7 cm right, 10 cm × 8 cm left	Bilateral 11 cm × 8 cm right, 11 cm × 9 cm left	Bilateral flap cover. Flap survived completely
Case 6	42	M	Ischial pressure sore	6 cm × 4 cm	7 cm × 5 cm	Flap survived completely with minimal wound dehiscence
Case 7	42	F	Ischial pressure sore	5 cm × 3 cm	6 cm × 4 cm	Flap survived completely
Case 8	45	F	Ischial pressure sore	6 cm × 5 cm	7 cm × 6 cm	Flap survived completely
Case 9	48	M	Ischial pressure sore	6 cm × 5 cm	7 cm × 6 cm	Flap survived completely
Case 10	35	F	Hidradenitis suppurativa	10 cm × 11 cm	11 cm × 12 cm	Flap survived completely

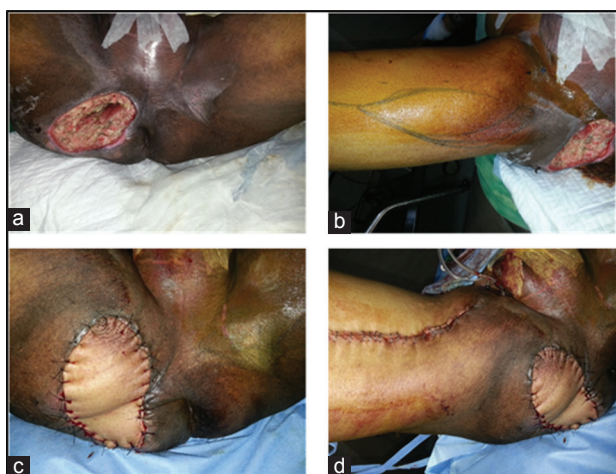


Figure 3: (a-d) Ischial pressure sore: Right-sided ischial pressure sore, reconstructed with gracilis myocutaneous flap

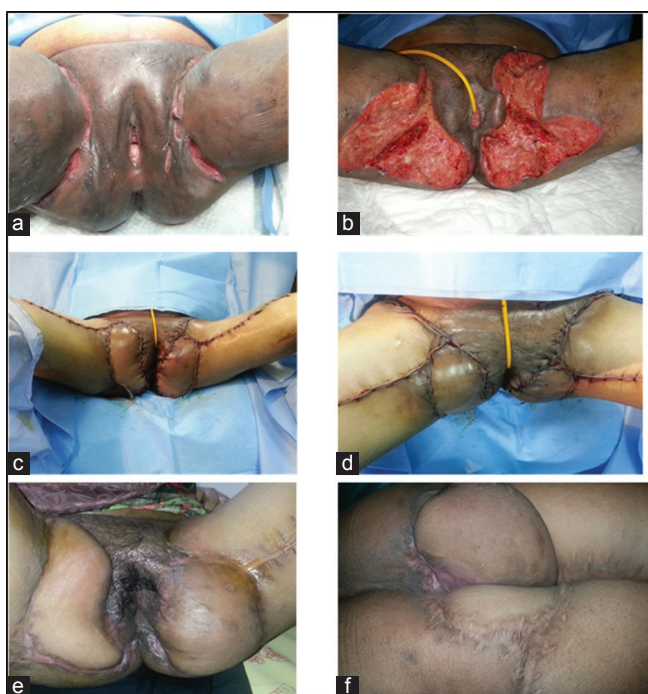


Figure 4: (a-f) Post-radiation ulcer: Post-irradiation ulcers in the perineum, treated with gracilis myocutaneous flap cover

operative protocol was followed. Patients were operated in lithotomy position. The vulval malignancies were resected by surgical oncologist and reconstruction was done in single stage. The wounds of patients with radiation ulcer and multiple fistula case were debrided and vacuum-assisted closure application was done in the first stage. Gracilis flap was done in the 2nd stage. The ischial pressure sore patient had a debridement and gracilis flap cover in single sitting.

After the surgery, perineal wound was regularly dressed. Prophylactic antibiotic was given and followed in the post-operative period for 5 days. Drains were removed on 3rd post-operative day. Patient discharged on 7th to 10th post-operative



Figure 5: (a-f) Sarcoma lateral wall of vagina: Gracilis myocutaneous flap used for reconstruction of defect following wide excision for sarcoma of the lateral wall of the vagina

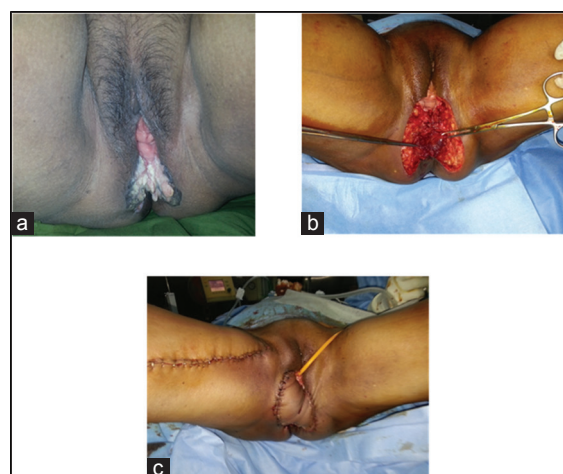


Figure 6: (a-c) Carcinoma vulva: Reconstruction of the defect with unilateral gracilis myocutaneous flap, following wide excision of carcinoma vulva

day. All the patients were followed for 3 years. There was no recurrence in case of malignancies and pressure sores. No urinary and fecal fistulas. All the wounds healed well.

This defect bordered on the perineum and has been included in the study. The reach of the gracilis myocutaneous flap was demonstrated in this surgery.

Post-irradiation ulcers are common in the perineal region following irradiation for malignancy of the

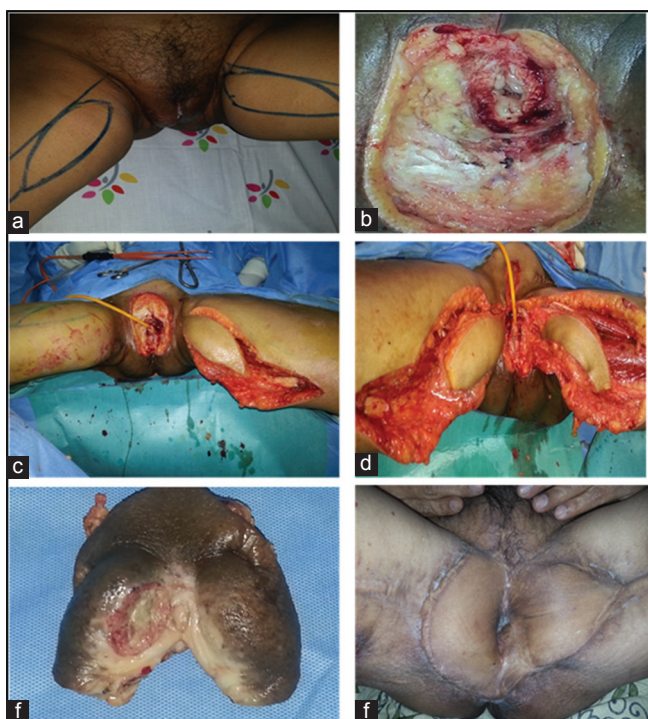


Figure 7: (a-f) Carcinoma vulva: Use of bilateral gracilis myocutaneous flap after wide excision of carcinoma of the vulva



Figure 8: (a-f) Water can perineum: Use of bilateral gracilis muscle flap to replace chronically ulcerated skin in "water-can perineum"

vagina/cervix. These ulcers are very recalcitrant, as the vascularity is very much reduced. Healing of these wounds has been possible with the use of the gracilis myocutaneous flap, which not only provides the soft

tissue cover but also brings in vascularized tissue that can heal the wounds faster.

Tumors of the vagina or vulva, when excised, lead to a soft tissue defect in the perineum. These defects require reconstruction with stable skin cover,^{8,9} as they may require adjunctive therapy with irradiation. The gracilis myocutaneous flap provides immediate cover of vascularized soft tissue that allows immediate irradiation therapy.

The "water-can" perineum is a debilitating condition following multiple attempts at reconstruction of hypospadias. The skin is chronically macerated and needs to be covered with vascularized soft tissue to permit healing. The gracilis myocutaneous flap was used in this patient to achieve good healing of the area.

DISCUSSION

The gracilis flap represents the workhorse for reconstruction of the perineal and pelvic defect. The use of the gracilis muscle in reconstructive surgery was first described by Pickrell in 1952 for rectal sphincter reconstruction. Use of the musculocutaneous variant was first reported by Orticochea,¹ in 1972 as a cross leg flap, before McCraw *et al.* used a pedicled gracilis musculocutaneous flap for vaginal reconstruction in 1976.² In the same year Harii *et al.* reported the first gracilis free flap for reconstruction of the head and neck.

Gracilis myocutaneous flap^{10,11} reconstruction of perineal defects has added advantages of reliability and long-standing use. Many methods of vaginal reconstruction have been used in the past including skin graft, local flaps, and distant tubed flaps. Each has significant advantages and disadvantages. In rectus abdominis, flap donor site morbidity is more when compare to gracilis flap. Anterior abdominal wall weakness, incisional hernia, and unsightly scar in the anterior abdominal wall these are the disadvantages of rectus abdominis flap. When compare to rectus abdominis flap, the deep inferior epigastric perforator (DIEP) flap has less abdominal wall morbidity. The major disadvantages of DIEP flap is harvesting the flap is difficult. Venous insufficiency and perforator injury is more while harvesting the DIEP flap. When compare to other flaps gracilis flap has many advantages as already mentioned.

McCraw *et al.* concluded that gracilis myocutaneous flap¹²⁻¹⁴ is superior to the other methods of vaginal reconstruction in a study conducted on 22 patients with pelvic exenteration or abdominoperineal resection.² In a case study done by

Solomon *et al.*, on 5 patients with inflammatory bowel disease have chronic non-healing perineal sinuses, they inferred that the gracilis muscle and myocutaneous flaps are simple flaps that are of particular use when a laparotomy is not necessary. Gracilis flap also has the advantage of being mobilized relatively easily.³

CONCLUSION

Gracilis myocutaneous flap is a time-honored flap of choice for perineal reconstruction. It has the advantage of bringing a well-vascularized tissue for reconstruction. It is better than fasciocutaneous flap in a place where the infection chances are very high. The donor scar is well tolerated and hidden. Gracilis muscle is expandable muscle. Technique of harvesting is simple and fast. Bulky flap and lymphedema of the flap are only disadvantages. It takes longer time for reduction of edema.

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