

Case Report

Minimising the donor area morbidity of radial forearm phalloplasty using prefabricated thigh flap: A new technique

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ABSTRACT

Phalloplasty is indicated in various conditions of penile loss or absence. There are numerous techniques for phalloplasty including the pedicle and free flaps with the ultimate goal of micturition in standing position, attaining adequate size, aesthesis and sensations for sexual intercourse. Radial forearm phalloplasty is the gold standard flap to achieve above results but gives a very bad scar on the forearm. We present a technique of using prefabricated thigh flap to reduce the morbidity of donor area. The descending branch of lateral circumflex femoral pedicle was placed in a subcutaneous plane over tissue expander. After attaining an adequate size of flap with tissue expansion, it was delayed 3 weeks before phalloplasty. Prefabricated flap was thin and of large size replicating the radial forearm flap used for phalloplasty. Whole forearm defect was covered with the thigh flap, and the thigh could be closed primarily. This new technique of using prefabricated thigh flap has significantly reduced the donor site morbidity both aesthetically and functionally without the use of skin grafting in the whole procedure.

KEY WORDS

Donor site morbidity; phalloplasty; prefabricated flap

INTRODUCTION

Phalloplasty is commonly indicated for penile loss (secondary to trauma, infection and tumour ablation), transsexuals, congenital anomalies,^[1] ectopia vesicae complex.^[2] There are numerous methods described for phalloplasty; these methods include various

pedicled and free flaps. The ideal phalloplasty should have following: one stage procedure that is predictable and reproducible, minimal donor site disfigurement, no functional loss, aesthetically acceptable phallus including a competent neourethra that will allow for voiding while

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standing with tactile and erogenous sensations and enough bulk to tolerate the insertion of the erectile prosthesis for sexual intercourse.^[3]

The technique closest to ideal phalloplasty is radial forearm free flap phalloplasty. Major advantages of this flap are use of hairless skin for urethral reconstruction, very good sensations due to the incorporation of multiple sensory nerves in flap, good aesthesis as the flap vascularity is very robust and it can be moulded easily. Apart from other complications, this technique is associated with donor site morbidities such as impaired healing, poor scarring, unaesthetic result and varying degree of functional loss. The major disadvantage of this flap is its donor site morbidity including a readily apparent and potentially stigmatising scar on forearm.^[4]

There are many techniques illustrated in the literature to reduce down the donor site morbidity of smaller radial forearm flaps as commonly used for head neck reconstruction and trauma. The soft tissue defect of radial forearm flap for phalloplasty is large often involving near total or total circumference; these measures cannot be applied to the phalloplasty donor area.

PROCEDURE

We present here a noble method of minimising the donor area morbidity of phalloplasty using prefabricated thigh flap. This patient a 35-year-old female wants gender reassignment surgery. After psychiatric consultation and completing the legal formalities, patient underwent subcutaneous mastectomy, hysterectomy, oophorectomy, vaginectomy in various stages. The patient was very conscious about the post-surgical skin grafting scar on the forearm.

The prefabrication of the right thigh flap was done as per markings of standard anterolateral thigh (ALT) flap. The descending branch of the lateral circumflex femoral artery was dissected away from the muscle keeping fatty cushion around it. The skin over the ALT region was dissected in the subcutaneous plane to reduce the thickness of the flap. The proximal part of the pedicle was encased in silicon sheet, and distal part was placed over the tissue expander (volume 500cc) placed in the subcutaneous plane. Hence, the distal part of the descending branch of lateral circumflex femoral pedicle was sandwiched between tissue expander and subcutaneous tissue and was stabilised there with anchoring stitches.

Expansion of tissue expander was started on the 10th post-operative day; weekly expansions were done till adequate size was reached. On attaining the desired size, the expander was left *in situ* for 3 months. Delay of the prefabricated thigh flap was done by cutting the skin on the lateral margins and stitching back 3 weeks before proposed phalloplasty [Figure 1]. Vascularity of the descending branch of lateral circumflex femoral artery to delayed flap was confirmed over the expander with the help of handheld Doppler. On the day of phalloplasty, simultaneous harvesting of radial forearm flap for phalloplasty and delayed thigh flap for donor area was done. The delayed thigh flap was dissected and isolated on one artery and 2 veins in the pedicle [Figure 2]. The delayed flap was measuring 30 cm × 14 cm [Figure 3]. The flap was thin and pliable. The silicone sheet had isolated the pedicle hence making the dissection proximally easy.

Radial forearm phalloplasty was done in a standard tube-within-a-tube method. After the radial forearm flap was divided and taken to perineum for anastomosis, the thigh flap was divided. The phalloplasty flap had consumed near total forearm skin except a skin bridge of 4 cm dorsally [Figure 4]. The thigh flap was temporarily stabilised with staples on the forearm and anastomosis was done with radial artery and venae comitantes [Figure 5]. The flap could cover whole of the donor area defect without the need of skin graft [Figure 6]. Meanwhile, the donor area of thigh flap was closed primarily obviating the need for skin graft in whole procedure [Figure 7].

DISCUSSION

The Russian surgeon Nicolaj Bograz performed the first reconstruction of total penis using rib cartilage in a reconstructed phallus made from a tubed abdominal flap in 1936.^[5] The first female to male gender reassignment surgery was performed in 1946 by Sir Harold Gilles on fellow physician Michael Dillon.^[6] Following these earlier flaps numerous pedicled flaps were tried for phalloplasty like groin flap^[7] with or without Iliac crest bone, abdominal flaps,^[8] island TFL flaps^[9] and recently pedicled ALT flaps.^[10]

With the advent of microsurgery, one stage reconstruction of the phallus with free tissue transfer became a reality. Not only does the number of surgeries reduced but the aesthesis of reconstructed phallus, the tactile and erogenous sensations also improved.^[11] Chang and Hwang popularised the tube within-a-tube



Figure 1: Prefabricated flap in the thigh

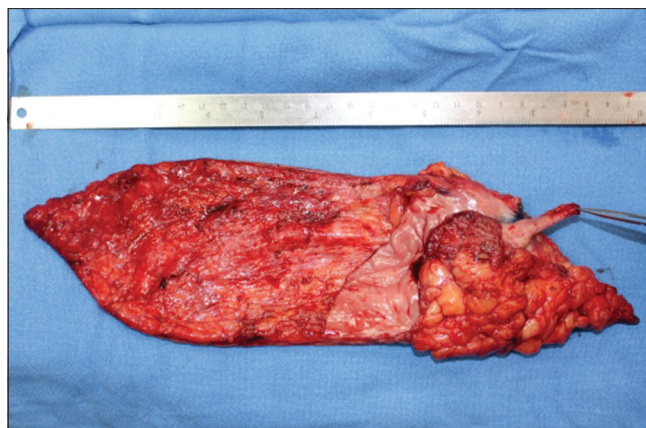


Figure 2: Harvested flap demonstrating the pedicle



Figure 3: Harvested flap showing dimensions

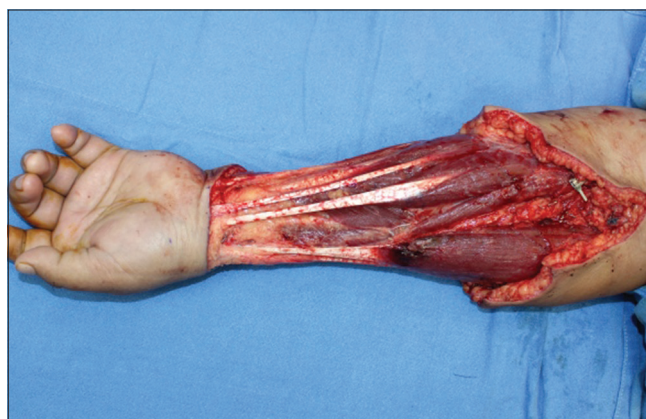


Figure 4: Donor area defect on forearm



Figure 5: Prefabricated flap covering the donor defect



Figure 6: Aesthetically good result of donor area

design in 1980 using the radial forearm flap.^[12] Radial forearm flap soon became gold standard flap for phalloplasty.^[13] Apart from these many free flaps are used for phalloplasty-Latissimus dorsi flap,^[14] free fibular flap,^[15] ulnar artery flap,^[16] lateral arm flap,^[17] free ALT flap^[18] and scapular flap.^[19]

Donor area morbidity remains the unsolved problem in all these techniques. Donor area disfigurement of ALT flap, fibular flap, scapular flap is not much bothering as it is hidden in the clothing usually. Donor area of radial

forearm flap being at exposed area troubles more. Many techniques are used to reduce the donor site morbidity of radial forearm flaps-suprafascial dissection, split thickness skin graft, full thickness skin graft, tissue expansions, use of artificial dermis, local flaps.^[4] None of these techniques could reduce the unaesthetic appearance of forearm significantly although skin graft may do fairly well in some situations.



Figure 7: Primary closure of thigh, forearm defects and newly reconstructed phallus

The phalloplasty and use of prefabricated thigh flap for donor area as in this case requires double free flaps. The total operating time is not prolonged as both the flaps are harvested and anastomosed simultaneously. It needs a dedicated team with good experience in microsurgery.

The use of prefabricated flaps for penile reconstruction has been enumerated in literature many times.^[20,21] Rieger *et al.* have used the free groin flap to minimise the donor area morbidity by partially covering it and demonstrating good results both aesthetically and functionally.^[22] However, there has been no reported case of use of prefabricated flap to cover the whole donor area of radial forearm phalloplasty without using skin graft minimising the donor area morbidity.

CONCLUSION

This new technique of using prefabricated thigh flap has significantly reduced the donor site morbidity both aesthetically and functionally without the use of skin grafting in whole procedure. The use of prefabricated flap has shown good aesthetic result but at the cost of multiple surgeries.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Bluebond-Langner R, Redett RJ. Phalloplasty in complete aphallia and ambiguous genitalia. *Semin Plast Surg* 2011;25:196-205.
2. Rashid M, Tamimy MS. Phalloplasty: The dream and the reality. *Indian J Plast Surg* 2013;46:283-93.
3. Hage JJ, De Graaf FH. Addressing the ideal requirements by free flap phalloplasty: Some reflections on refinements of technique. *Microsurgery* 1993;14:592-8.
4. Selvaggi G, Monstrey S, Hoebeke P, Ceulemans P, Van Landuyt K, Hamdi M, *et al.* Donor-site morbidity of the radial forearm free flap after 125 phalloplasties in gender identity disorder. *Plast Reconstr Surg* 2006;118:1171-7.
5. Schultheiss D, Gabouev AI, Jonas U, Nikolaj A, Bogoraz (1874-1952): Pioneer of phalloplasty and penile implant surgery. *J Sex Med* 2005;2:139-46.
6. Nair R, Sriprasad S. 1129 Sir Harold Gillies: Pioneer of phalloplasty and the birth of uroplastic surgery. *J Urol* 2010;183:e437.
7. Sun GC, Huang JJ. One-stage reconstruction of the penis with composite iliac crest and lateral groin skin flap. *Ann Plast Surg* 1985;15:519-28.
8. Bajpai M. "Bird-Wing" abdominal phalloplasty: A novel surgical technique for penile reconstruction. *J Indian Assoc Pediatr Surg* 2013;18:49-52.
9. Santanelli F, Scuderi N. Neophalloplasty in female-to-male transsexuals with the island tensor fasciae latae flap. *Plast Reconstr Surg* 2000;105:1990-6.
10. Rubino C, Figus A, Dessy LA, Alei G, Mazzocchi M, Trignano E, *et al.* Innervated island pedicled anterolateral thigh flap for neo-phallic reconstruction in female-to-male transsexuals. *J Plast Reconstr Aesthet Surg* 2009;62:e45-9.
11. Selvaggi G, Bellringer J. Gender reassignment surgery: An overview. *Nat Rev Urol* 2011;8:274-82.
12. Chang TS, Hwang WY. Forearm flap in one-stage reconstruction of the penis. *Plast Reconstr Surg* 1984;74:251-8.
13. Monstrey S, Hoebeke P, Selvaggi G, Ceulemans P, Van Landuyt K, Blondeel P, *et al.* Penile reconstruction: Is the radial forearm flap really the standard technique? *Plast Reconstr Surg* 2009;124:510-8.
14. Djordjevic ML, Bumbasirevic MZ, Vukovic PM, Sansalone S, Perovic SV. Musculocutaneous latissimus dorsi free transfer flap for total phalloplasty in children. *J Pediatr Urol* 2006;2:333-9.
15. Sadove RC, Sengezer M, McRoberts JW, Wells MD. One-stage total penile reconstruction with a free sensate osteocutaneous fibula flap. *Plast Reconstr Surg* 1993;92:1314-23.
16. Glasson DW, Lovie MJ, Duncan GM. The ulnar forearm free flap in penile reconstruction. *Aust N Z J Surg* 1986;56:477-9.
17. Upton J, Mutimer KL, Loughlin K, Ritchie J. Penile reconstruction using the lateral arm flap. *J R Coll Surg Edinb* 1987;32:97-101.
18. Felici N, Felici A. A new phalloplasty technique: The free anterolateral thigh flap phalloplasty. *J Plast Reconstr Aesthet Surg* 2006;59:153-7.
19. Mingyong Y, Muxin Z, Senkai L, Yangqun L. Penile reconstruction by the free scapular flap and malleable penis prosthesis. *PRS* 2007;59:369-73.
20. Ramesh S, Serjius A, Wong TB, Jagjeet S, John R. Two stage penile reconstruction with free prefabricated sensate radial

- forearm osteocutaneous flap. Med J Malaysia 2008;63:343-5.
21. Khouri RK, Young VL, Casoli VM. Long-term results of total penile reconstruction with a prefabricated lateral arm free flap. J Urol 1998;160:383-8.
22. Rieger UM, Majenka P, Wirthmann A, Sohn M, Bozkurt A, Djedovic G. Comparative study of the free microvascular groin flap: Optimizing the donor site after free radial forearm flap phalloplasty. Urology 2016;95:192-6.