



## Sexual Medicine

# Total Phallic Reconstruction in Female-to-Male Transsexuals

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### Abstract

**Background:** The goal of total phallic construction is the creation of a sensate and cosmetically acceptable phallus. An incorporated neourethra allows the patient to void while standing, and the insertion of a penile implant allows the patient to resume sexual activities, thus improving quality of life.

**Objective:** To report our experience of total phallic construction with the use of the radial artery free flap in female-to-male transsexuals.

**Design, settings, and participants:** The notes of the 115 patients who underwent total phallic construction with the use of the radial artery-based forearm free flap between January 1998 and December 2008 were reviewed retrospectively.

**Measurements:** The surgical outcome, cosmesis of the phallus, complications, eventual need for revision surgery, and patient satisfaction were recorded during the follow-up.

**Results and limitations:** This technique allowed the reconstruction of a cosmetically acceptable phallus in 112 patients; 3 patients lost the phallus due to venous thrombosis in the immediate postoperative period. After a median follow-up of 26 mo (range: 1–270 mo), 97% of patients are fully satisfied with cosmesis and size of the phallus. Sensation of the phallus was reported by 86% of patients. Urethral strictures and fistulae in the phallus and join-up site were the most common complications, occurring respectively in 9 and 20 patients; however, after revision surgery, 99% of patients were able to void from the tip of the phallus while standing.

**Conclusions:** The radial artery-based forearm free flap technique is excellent for total phallic construction, providing excellent cosmetic and functional results.

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## 1. Introduction

Gender reassignment surgery for the female-to-male transsexual (FTMT) involves subcutaneous mastectomy, hysterectomy, salpingo-oophorectomy, vaginectomy, total phallic construction, and placement of penile and testicular prostheses. The main goals of surgery are the creation of a cosmetically acceptable sensate phallus with the

incorporation of a neourethra to allow voiding in a urinal and with enough bulk to allow the insertion of a penile prosthesis for sexual intercourse [1].

The classic method of penile reconstruction involves the use of abdominal flaps. The first total phallic construction was attempted in 1936 by Bogoras [2], who used a random pedicled oblique abdominal singular tube with no incorporated neourethra. Phallic rigidity was obtained by inserting rib cartilage inside the flap.

Maltz [3] and Gillies and Harrison [4] subsequently improved the Bogoras technique by creating a phallus which incorporated a neourethra using the *tube within a tube* concept. These procedures were multistaged, resulted in extensive scarring and disfigurement of the donor area, and produced a phallus with no sensation.

Further advances involved the use of infraumbilical skin and groin flaps [5–10]. The main limitation of these techniques was the formation of an insensate and wedge-shaped phallus. Musculocutaneous thigh flaps, used when there was extensive abdominal scarring from previous surgery or radiotherapy, have also been abandoned due to poor results [11–16].

With the advent of microsurgical techniques, a new era has started for total phallic construction. Originally described in 1982 by Song et al [17], the use of the radial artery free flap phalloplasty was first published in 1984 by Chang and Hwang [16], who used this technique successfully for total phallic reconstruction in seven patients who had previously had a penile amputation. The reconstructive procedure involved the creation of a tube within a tube using forearm skin, with the urethra fashioned from the non-hair-bearing area, and the whole flap was based on the radial artery.

After the success of this series, many teams adopted this technique and applied some modifications in flap design to improve the cosmesis of the neophallus and to minimise the overall complication rate and donor-site morbidity that can occur in 45% of cases [18]. Particularly, the shape of the forearm flap has been modified to improve the blood supply to the flap and to reduce the risk of meatal stenosis [19–24]. Ulnar artery-based flaps have also been used to reduce the amount of hair-bearing skin that is incorporated [25].

## 2. Patients and methods

The notes of 115 FTMT patients who had undergone total phallic construction using the radial artery-based forearm free flap were reviewed. The median age at surgery was 34.9 yr (range: 20–55 yr).

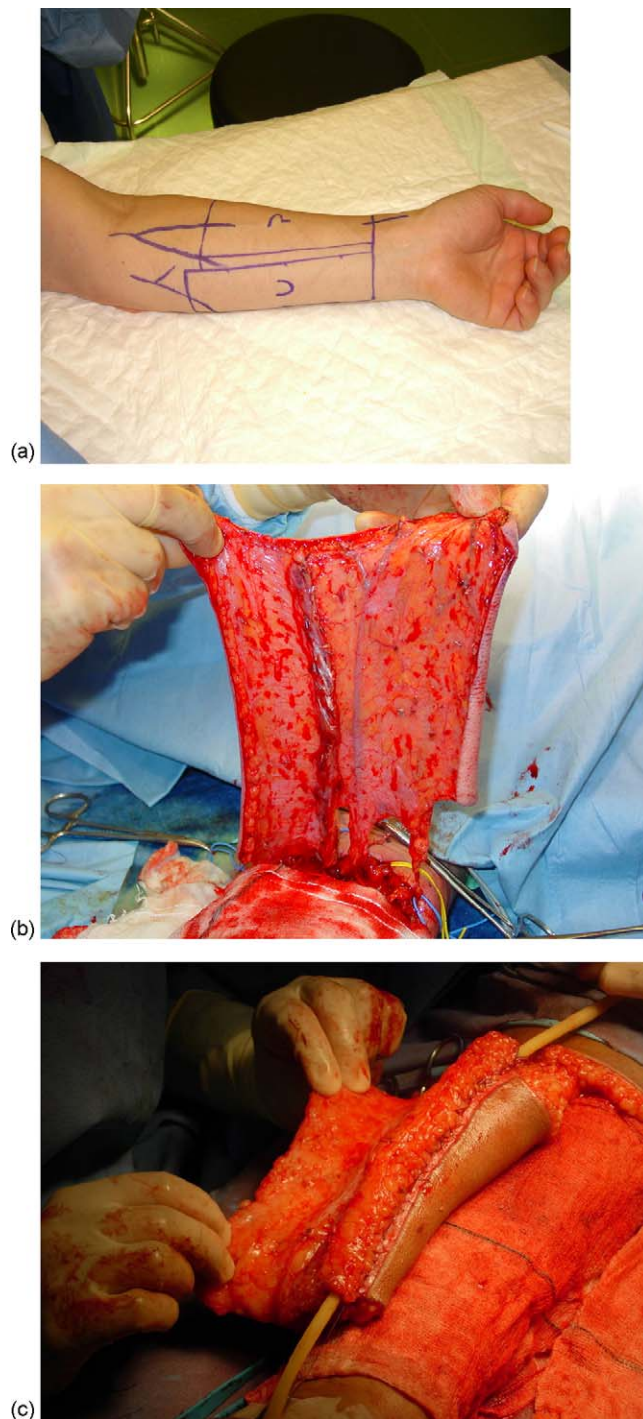
The subordinate forearm was used in all patients. The vascular competency of the superficial and deep palmar arteries was checked with an Allen test, followed by duplex ultrasonography when in doubt.

The total phallic construction was done using a modified Chang and Hwang flap [16]. The process of total phallic construction involved the following stages: 1) creation of the phallus with a competent neourethra and microvascular transfer to the recipient site, 2) anastomosis of the native urethra to the phallic urethra with the use of local labial flaps, 3) sculpture of the glans according to the Norfolk technique [15] and insertion of one testicular prosthesis in one of the labia, and 4) insertion of a penile implant into the phallus. Usually, hysterectomy and bilateral salpingo-oophorectomy are performed at stage 1, a vaginectomy is offered to patients at stage 2 or 3, and the reservoir of a three-piece inflatable penile implant can be inserted at stage 3.

Each stage was done at 3-mo intervals, with complications of one stage being dealt with during the following stage to reduce the overall number of operations.

### 2.1. Stage 1

The general dimension of the flap varied according to the size of the donor forearm and at the patient's request. On average, a 4 × 17-cm strip from the hairless medial aspect of the forearm was used for the



**Fig. 1 – The radial artery-based forearm free flap: (a) the 4 × 17-cm strip is located on the relatively less hairy ulnar aspect of the forearm; (b) the flap is raised on its pedicle; (c) the flap is tubularised around a 16-Ch Foley catheter.**

neourethra. This strip was tubularised over a 16-F catheter and spatulated at the proximal end. The phallic part was generally 13–14 cm long and was wrapped around the urethra in a tube-within-a-tube fashion (Fig. 1).

The flap is based on the radial artery, which is dissected to its origin with the brachial artery. The venous drainage was based on the cephalic vein, other flap veins, and venae comitantes of the radial artery. The

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