

## Reconstruction of the Glans Penis Using the Staged Laterally Based Tubed Groin Skin Flap

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### ABSTRACT

**Background:** Reconstruction of the glans penis may be indicated following strangulation due to tight bandage or traumatic amputation. Multistage medially based tubed groin skin flap based on the superficial circumflex iliac artery is a well known flap for total Phalloplasty. We present the two staged laterally based tubed groin skin flap for reconstruction of the glans penis as an easy and safe method with excellent results.

**Patients and Methods:** Ten cases with lost glans penis due to amputation of the glans during circumcision (7 cases) and total glans gangrene following hypospadias repair (two cases) and implantation of semirigid penile prosthesis (one case) were managed with our technique.

The laterally based groin flap was elevated, tubed and then sutured to the circumference of the freshened distal end of the remaining penis. The donor site was closed primarily. After 3 weeks, the penis with the attached flap were separated from the groin and the flap was fashioned as a new glans. The urethra was reconstructed later.

**Results:** The flaps were successful and the patients were satisfied. Advantages of this technique are proximity to the pubic area, good shape of the new glans, easily concealed donor scar and an easy operation.

**Conclusion:** Laterally based tubed groin skin flap is a reliable and a suitable flap for reconstruction of the glans penis.

### INTRODUCTION

Sculpturing the glans is a common step in total phalloplasty procedures whatever the technique. Reconstruction of the glans is extremely rare and is required in certain conditions as necrosis following infection, amputation during circumcision, strangulation by hair coil "Penis tourniquet syndrome", self or non-self mutilation, surgical resection for malignancy and iatrogenic ischemia following hypospadias or other penile operations due to vigorous dissection or tight bandage.

Reconstruction of the glans should result in satisfactory function and appearance. Immediate reconstruction can be done by reattachment [1,2,3] or replantation [4,5] while delayed reconstruction can depend on either proximal or distal lengthening.

Proximal lengthening can be done by using gracilis muscle to fill the dead space after detaching the suspensory ligament [6] or using scrotal and suprapubic flaps to cover the advanced penis [7]. Distal lengthening can be done by using rectus abdominis inferiorly based island fascial flap covered by skin graft [8], Scrotal flap in two stages followed by depilation [9], or radial forearm free flap using microvascular technique [10].

In this work we describe our technique for total reconstruction of the glans penis using a laterally based tubed groin skin flap reporting our results using this method.

### PATIENTS AND METHODS

Ten cases with lost glans penis (Fig. 1) were managed in our study. Seven cases were due to amputation of the glans during circumcision, Two cases were due to total glans gangrene following hypospadias repair and one case was due to implantation of semirigid penile prosthesis. At the time of presentation, 8 patients were adults 19 to 31 years old (mean age 23. 4) while the remaining two cases were presented to us during their childhood (7 and 10 years).

Testosterone cream was applied to the penises of the last two cases to augment their size before glanular reconstruction. Since all adult patients reported sexual potency, no diagnostic tests were done to evaluate their erectile function. Children cases were evaluated intra-operatively by artificial

erection test to assess tunical integrity of corpora cavernosa. Since both cases showed no leakage or tunical bulge during artificial erection, they were considered not suffering cavernosal injury.

#### *Operative technique:*

Freshening incision was done for the distal end of the remaining penis. Urethral meatus was freed from scar tissue at the tip of the penis. Urethra was dissected for a distance of about 1cm and stented with a silicon Foleys catheter. Meatus was spatulated (almost all the cases had meatal stenosis) and sutured to the distal cut end of the ventral skin in the mid line.

The circumference of the penis was measured and the required length to be added was estimated. The laterally based groin flap was marked on the skin of the groin of one side so that the width and length of the flap can provide the required girth and length of the added part to the penis (Fig. 2). Incision was done down to fascia scarpa, the flap was then dissected, elevated tubed and then sutured circumferentially to the freshened distal end of the remaining penis and to the dorsal aspect of the spatulated urethral meatus, creating coronal hypospadias (Fig. 3). The donor site was closed primarily (Fig. 4). After 3 weeks, the penis was separated from the groin carrying the flap which was fashioned as the new glans (Fig. 5). The urethra was reconstructed later.

### RESULTS

The ten cases were successful and patients were satisfied (Figs. 6,7,8). In one case wound disruption of the new glans was managed by daily dressing for two weeks followed by small split thickness skin graft with excellent results.

The flap was easy and safe with good shape of the new glans and the donor scar was easily concealed.

### DISCUSSION

Penile loss is a unique and difficult problem to address physically and psychologically. In the newborn period injuries to the external genitalia are related to iatrogenic events. Loss of the glans penis, although rare, can occur as a complication of circumcision, hypospadias repair, bladder extrophy repair or shunt procedures for priapism [11]. During circumcision, glans injury most often occurs when there is failure to take down all of the glanular adhesions at the start of the operation. This facilitates the glans to be inadvertently caught in the circumcision clamp. It usually involves a portion

of, or the entire, glans penis [12]. This type of trauma although rare, but may be relatively common in our community due to the large number of traditional circumcisions done by non professionals.

In our study, all the cases were iatrogenic with the main cause of glans loss was total or nearly total amputation during circumcision (7 cases) in their childhood. These cases were neglected at the time of injury although immediate reattachment or replantation can be successful because the glans tissue is well vascularized and so good graft take is common [13]. However, these cases were referred to us for glans reconstruction during their adulthood except for two cases which were seen during their childhood (7 and 10 years). Testosterone cream was applied to the penis of the last two cases to augment its size before glanular reconstruction.

Loss of the glans penis after hypospadias repair accounted for 2 of the 10 cases in our study. The complications of hypospadias repair have been well described in several reviews [14,15]. In our study the glans injury was attributed to inadvertent ischemia and gangrene due to neglected post-operative tight bandage in one case (Fig. 1) and unknown in the other one because hypospadias repair was done during childhood. Glans gangrene following implantation of semirigid penile prosthesis accounted for the last case in our study. This patient was diabetic and had necrosis of the distal phallus as a result of vascular compromise with extrusion of the penile prosthesis.

Although rare, penile injuries, especially those associated with loss of the glans, can lead to significant long-term psychologic and sexual morbidity [13]. Treatment classically involves reconstructive surgical approaches to create a cosmetically and functionally acceptable penile shaft and glans. Almost all glanuloplasties were originally developed for neophalloplasty and not for cases with amputated glans only [9]. For glanuloplasty Benderev described rotational flaps [16] while Greenberger and Lowe reported scrotal flaps for covering the penile stump [7]. These 2 techniques resolve the lack of penile skin for covering but do not involve neoglans formation. Mazza and Cheliz [9] reported a neoglans reconstruction with a 2-stage tubularized delayed scrotal flap. This technique has the disadvantage of hirsute scrotal skin. Shaer and El-Sebaie [8] used a rectus abdominis myofascial flap for construction of a neoglans that was covered with a split thickness graft obtained from the thigh. However, it is a difficult extensive technique and carries the risk of muscle atrophy by time.



Fig. (1): Lost glans penis.



Fig. (2): Design of the flap: Marking the length and width on the groin.



Fig. (3): Flap sutured to the freshened distal end of the remaining penis.



Fig. (4): The donor site closed primarily.



Fig. (5): The penis was separated from the groin carrying the flap which was fashioned as the new glans.



Fig. (6)



Fig. (7)



Fig. (8)

Figs. (6,7,8): Postoperative results.

In our study, we used a two-stage laterally based groin skin flap for construction of a neoglans penis. Advantages of our technique include creation of a neoglans with penile lengthening in an easy and simple way. The flap is reliable and the subcutaneous fat of the groin skin provides adequate thickness for construction of a durable good girth glans. Groin skin is markedly smooth and less hairy than scrotal skin. Modern techniques of depilation can make at ease our neoglans hairless.

#### *Conclusion:*

The laterally based staged tubed groin skin flap is a good option for total reconstruction of the glans penis with penile lengthening. It is an easy and safe flap that provides excellent cosmetic results with a smooth and durable glans and good girth.

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