

ORIGINAL RESEARCH—SURGERY

Construction of Neoglans Penis: A New Sculpturing Technique from Rectus Abdominis Myofascial Flap

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ABSTRACT

Introduction. Construction of a neoglans penis may be required following glans amputation at circumcision, strangulation by a hair coil, or self-mutilation, among other indications. It may also be combined with phalloplasty to imitate the natural appearance and to support a penile prosthesis.

Aim. This is a report on a novel technique of neoglans construction for a patient with an amputated glans penis as a result of circumcision injury.

Methods. A rectus abdominis myofascial flap was used. The flap was deigned to be a 12 × 4 cm segment of the infraumbilical portion of the muscle, based on the inferior epigastric vessels. The flap was harvested through a paramedian incision. The penis was partially degloved through a circumferential incision 1 cm below its summit. The distal penile skin was utilized to elongate the urethra, so that the urethral meatus would be at the tip of the neoglans. The flap was reflected and tunneled underneath the mons veneris and alongside the penis, to emerge distal to the summit of the penis. The flap was fashioned into the shape of a glans and secured in place around the neourethra. The impression of a corona was achieved by tucking the proximal edge of the flap to its undersurface.

Result. Six months following surgery, the patient had a neoglans penis, a corona, and a urethral meatus at the very tip. The neoglans had similar consistency, color, and shape to the normal glans.

Conclusion. Construction of a neoglans penis is possible using the described sculpturing techniques, with satisfactory cosmetic results.

Key Words. Glans; Penis; Amputation; Rectus; Injury

Introduction

A 33-year-old male patient presented to the Plastic Surgery Clinic, requesting reconstruction of the glans penis, which was accidentally amputated during circumcision in his childhood. His complaint was mainly disfigurement, but he also suffered from pain upon intercourse and difficulty in micturition. Pain was due to compression of the scar tissue on the summit against the rigid corpora cavernosa at intercourse. Difficulty in micturition was due to stricture of the urethral

meatus on account of the circumcision injury. The patient also complained of aversion from sexual contact, ascribed to his disfigurement. Examination of the penis revealed an outstretched length of 11 cm, normal consistency with no palpable fibrous plaques. Skin of the shaft was normal in appearance, but the summit showed scar tissue and a strictured external urethral meatus (Figures 1 and 2).

Penile hemodynamics were evaluated by intracorporal injection of Prostaglandin E1 and duplex examination. Erectile response was adequate and

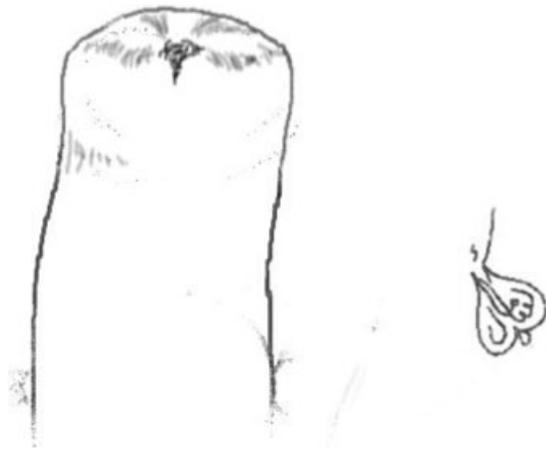


Figure 1 Preoperative appearance.

no abnormality was detected. The patient requested construction of a glans penis and relief of the urinary flow obstruction.

Methods

A written informed consent was obtained from the patient prior to surgery. The distance from the mid-inguinal point to the tip of the stretched penis



Figure 2 Preoperative appearance.

was measured, and accordingly, the flap and its pedicle were outlined. The vertical axis of the flap started from a point 2 cm below the umbilicus and extended 12 cm caudally. Flap width was designed to be 4 cm. A paramedian abdominal incision was made. The anterior rectus sheath was incised, stopping short of the lower border of the designed flap. The lateral border of the muscle was reflected upwards and medially so as to expose the inferior epigastric vessels. The vessels were skeletonized and their side-branches carefully ligated, freeing up the main trunks from around the mid-inguinal point to the lower border of the designed flap. Dissection and branch ligation stopped once this lower border was reached. This point was slightly above the linea semicircularis. The vessels and their branches were left intact underneath the flap.

The vascularized flap was separated from the muscle, together with the overlying anterior rectus sheath, based on the inferior epigastric vessels. The flap extended 12 cm caudal to a point 2 cm below the umbilicus, and its width was 4 cm. During flap separation, the periumbilical branches of the inferior epigastric vessels that extended cranial to the upper border of the flap were ligated (Figures 3 and 4).

A circumferential incision was made 1 cm below the tip of the penis (Figure 5). The penis was partially degloved in a proximal direction. A plane was created underneath the distal skin, which was dissected and elevated off the corpora cavernosa, maintaining its attachment around the urethral meatus (Figures 6 and 7). The native stenosed urethral meatus was slit open. The dissected distal skin was trimmed ventrally so as to fit snugly around the catheter. It was then shaped into a tube by subcuticular continuous sutures, approximating the lateral edges around the catheter, in-line with the slit meatus, forming an extension to the urethra, 1.5 cm long (Figure 8).

A subcutaneous tunnel was created alongside the penis, underneath the mons pubis, and into the abdominal incision. The muscle flap was passed through the tunnel, to emerge distal to the summit of the penis, making sure torsion of the pedicle did not occur (Figures 9 and 10). The anterior rectus sheath was slit to accommodate the pedicle comfortably. The penis was outstretched to confirm that the pedicle was long enough to stretch along an erect penis.

The flap was wrapped around the neourethra, sheath outwards, and seated in place on the tips of the corpora cavernosa. The distal edge of the flap was tucked inwards and sutured to the flap's

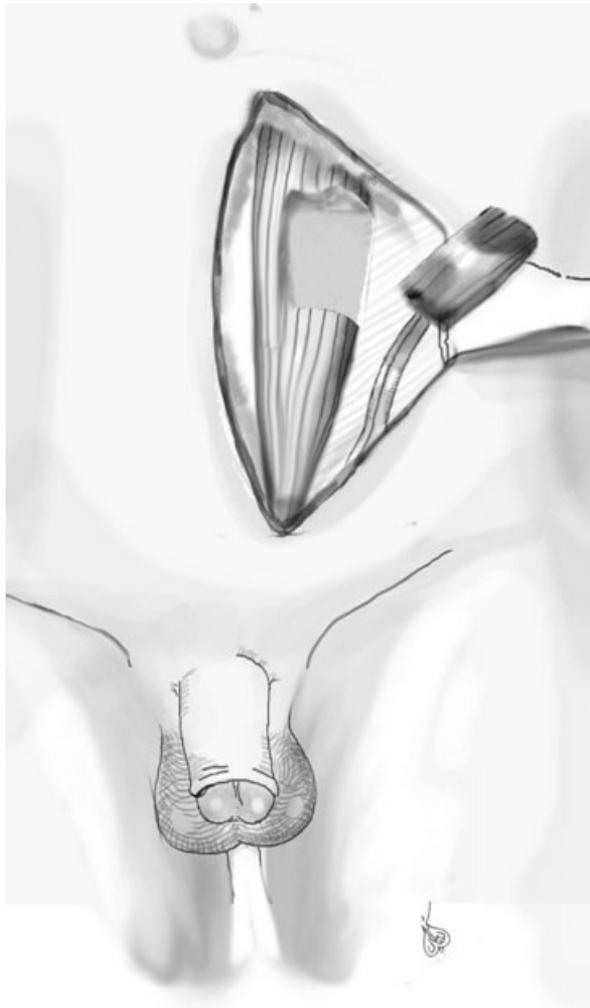


Figure 3 The pedicle skeletonized and the flap separated.

undersurface as well as to the edges of the neourethra, giving a V-shaped meatus. The proximal edge was also tucked inwards, and sutured to the flap's undersurface as well as to the corpora cavernosa, creating an impression of a corona. The skin of the penile shaft was sutured underneath the proximal edge of the flap, thus augmenting the impression of the corona (Figures 11–13). The undersurface of the flap was secured to the body of the neourethra. The lateral edges of the flap were approximated and sutured around the neourethra (Figures 14 and 15).

The flap was covered with a split thickness graft obtained from the thigh, and sutured to the neourethra distally, the skin of the shaft proximally, and the body of the flap. The remnants of the rectus abdominis were approximated. The abdominal incision was closed in layers over a

suction drain, minding the point of exit of the pedicle (Figure 16).

The main outcome measures were the cosmetic result, viability of flap, and function of the neourethra.



Figure 4 The pedicle skeletonized and the flap separated.

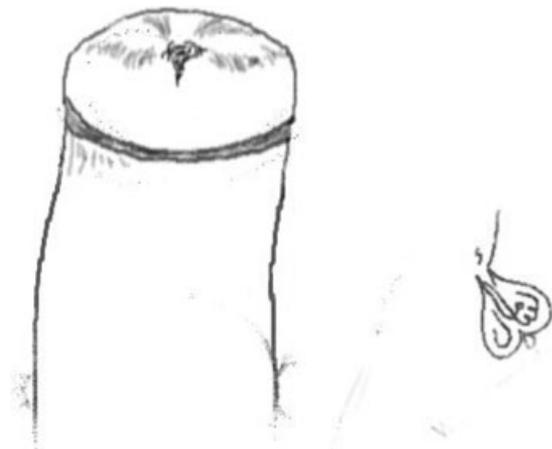


Figure 5 Penile incision.

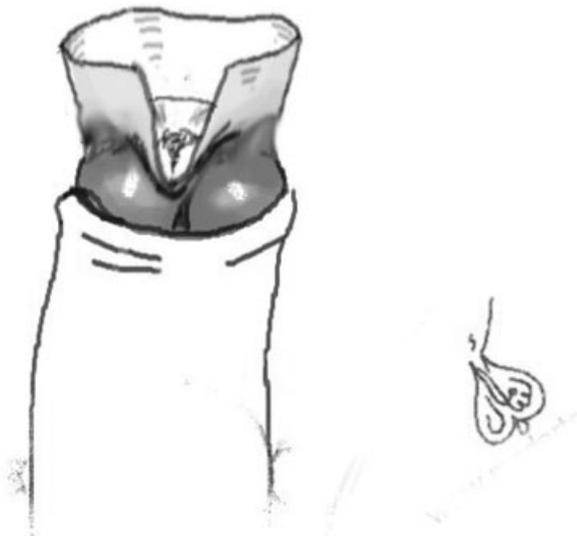


Figure 6 Elevation of the distal penile skin.

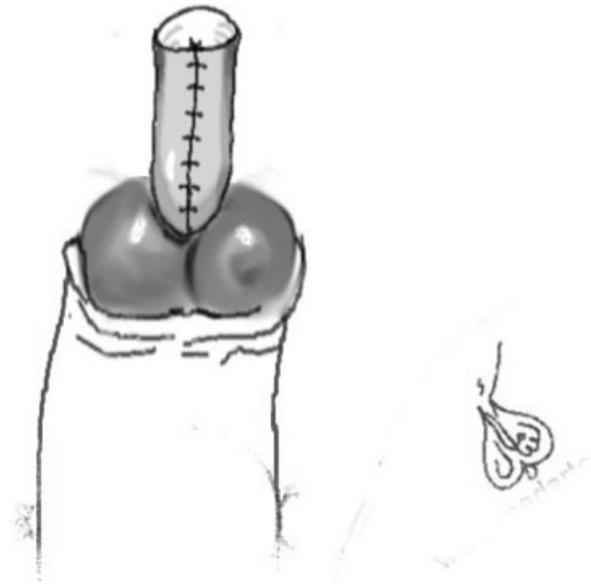


Figure 8 Formation of the neourethra.

Results

Six months following surgery, the patient had a neoglans penis and a corona (Figure 17). The neoglans had similar consistency, color, and shape to the normal glans. The outstretched length was 13 cm, in comparison to 11 cm prior to surgery.

Although parts of the skin of the neourethra did slough, these parts re-epithelialized during the period of catheter placement (3 weeks). Eventually, urine flow was normal, through the neomeatus at the tip of the penis.



Figure 7 Trimming the excess distal penile skin.



Figure 9 The flap tunneled underneath the pubic and penile skin.



Figure 10 The flap tunneled underneath the pubic and penile skin.

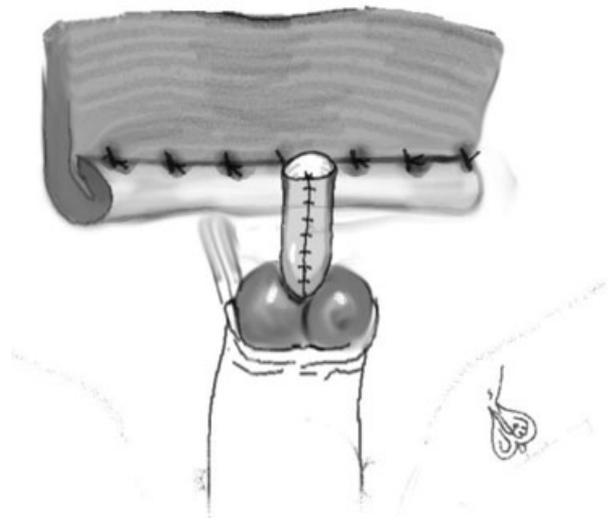


Figure 12 Sculpturing of the corona.

The remains of the rectus abdominis did not survive given the hypovascularity, underwent autolytic changes, and were extruded through the wound. This delayed healing of the incision for 2 weeks, but it eventually healed with strict wound care. We therefore suggest excising the remnants of the lower part of the rectus abdominis after fashioning the flap.

Discussion

Reconstruction of the glans or construction of a neoglans penis may be required following glans amputation at circumcision [1], strangulation by a hair coil [2], or self-mutilation [3], among other indications.

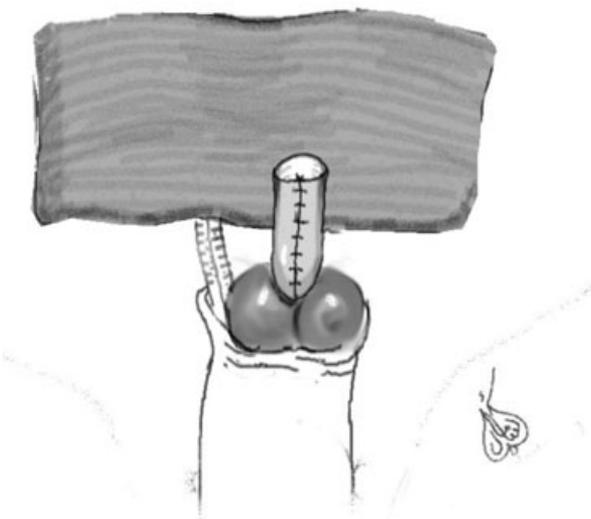


Figure 11 The tunneled flap emerging at the tip of the penis.

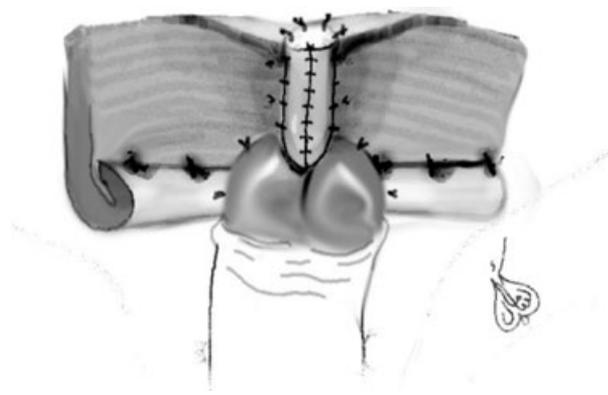


Figure 13 Attaching the flap to the neourethra and the corpora.

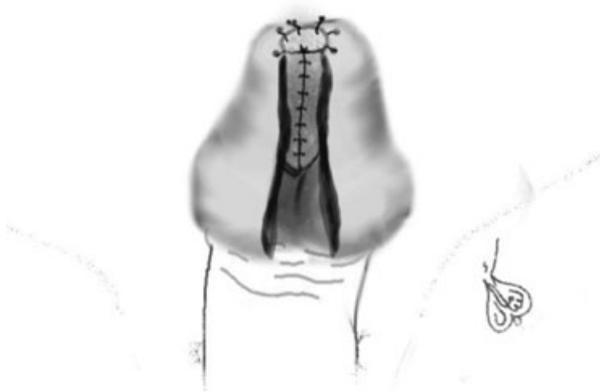


Figure 14 Wrapping the flap.

Replantation of the amputated glans is possible if the timing and setting of presentation is favorable [4].

Martina et al. described a case of traumatic avulsion of penile skin with amputation of the penis and sectioning of the urethra, managed by embedding the penis in the scrotum for primary coverage by scrotal skin [5].

The current experience with neoglans formation is mostly limited to the use of skin flaps, mostly in the process of phalloplasty. An example is the Chinese forearm flap, designed with a distal broad triangle of skin that is fashioned into a glans [6].

However, the aforementioned methods do not provide the characteristic consistency of the glans, that is almost completely reproduced by our technique. Moreover, the thick, well-vascularized muscle flap should be more tolerant to the impact of a penile prosthesis than is skin, in case our technique is integrated into one of the current phalloplasty procedures. Tattooing can be used to

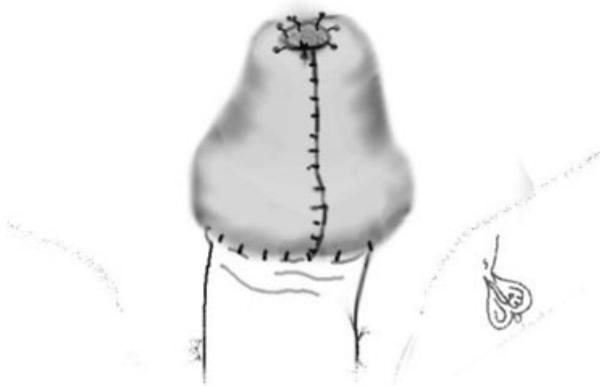


Figure 15 End result.



Figure 16 Immediately postoperative.

enhance the appearance of the neoglans [7]. This is not needed in our technique, as the color of the muscle shows naturally through the split thickness graft, mimicking the color of the glans.

To enhance the final appearance, the following was implemented in our technique: The flap was designed to be oversized; 12 cm long, to substitute for the recoil that occurs when the muscle is separated from its natural attachments, as well as some degree of atrophy that may occur on account of denervation.

While a natural glans exhibits tumescence during erection, the neoglans does not. This was one more reason to harvest an oversized flap, so as to match the glans of an erect penis, rather than that of a flaccid one. The only drawback was that the neoglans appeared a bit large relative to the flaccid penis. But it perfectly matched the erect penis.

The overlying rectus sheath gave a more smooth external surface, and reduced fasciculation of the flap upon suturing.



Figure 17 Three weeks postoperative, showing neoglans and the site of harvesting of the partial thickness graft.

Conclusion

Inferiorly based, skeletonized, pedicled rectus abdominis muscle flap is a suitable option for reconstruction of the glans penis. This technique can be of benefit as a stand-alone procedure, or as

a refinement for the current phalloplasty techniques. Moulding the flap properly can provide excellent cosmetic results.

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