

Neo-glans reconstruction with dartos flaps covered with buccal mucosal graft after total glans amputation during circumcision: novel technique

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ABSTRACT

Penile glans amputation is a rare and catastrophic complication of circumcision. Reconstruction of the penile glans was indicated following amputation. Our report discusses a novel technique for reconfiguration of the amputated penile glans of a 5-year-old male admitted 6 months following a complicated circumcision. The parents complained of severe meatal stenosis and penile disfigurement. The penis was 3 cm long. Complete penile degloving was performed. The distal part of the remaining penis was prepared by removing fibrous tissue. Dartos flaps, which had been placed on the dorsal side by the previous surgery center, were divided into two similar parts from the ventral side and opened to both sides at the top of the penis, such as a curtain, and a glanular collar-like structure was obtained by bringing 5 cm × 3 cm buccal mucosa. This structure was covered on the penis as glans, and the freed urethra with the spongiosum was sutured here. The patient was taken to hyperbaric oxygen therapy in the postoperative period. The patient's glans-like cosmetic structure was observed during follow-up, and the patient was urinating normally. This is the first surgical repair technique to use this method in the literature. The use of a dartos flap covered with a buccal mucosal graft is a successful and simple procedure with acceptable cosmetic and functional results for the late reconfiguring a neoglans shape after a glans penis amputation when the penile size is suitable.

Keywords: Buccal mucosa; circumcision; glans amputation.

INTRODUCTION

The most common surgical procedure in the world is circumcision.^[1] When performed by an experienced operator, circumcision is usually a safe and simple operation.^[2] Although the complication rate is low, it can cause some complications.^[3] Penile glans amputation due to circumcision is an extremely rare complication, and the literature on repairs is limited.^[4] Reconstruction is also a challenge for surgeons due to scant reports.

Here, we would like to present the glanuloplasty surgery of a late application 5-year-old child with urinary and cosmetic

problems who suffered glans amputation after circumcision. Our report discusses a new technique for reconstructing an amputated penile glans with dartos flaps attached to the buccal mucosa 6 months after a complicated circumcision and postoperative hyperbaric oxygen (HBO) therapy.

CASE REPORT

A 5-year-old child presented to our Pediatric Surgery Clinic without a penile glans due to an incident that had occurred 6 months prior. The glans was amputated at the level of the coronal sulcus. The parents gave a history of circumcision performed by an inexperienced person at home and three

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Figure 1. Narrow and closed urethra, no glans, dorsal side of penis covered with penile skin.



Figure 2. To avoid damaging the urethra and flaps brought to the distal part of the penis, degloving started from the proximal side.

operations at local hospitals for bleeding and repair with a dartos flap and skin tissue at the top of the penis. The parents complained that their child could not pass urine freely and that the penis was disfigured. Examination of the penis revealed an outstretched length, normal consistency, and palpable fibrous plaques. The external urethral opening was narrow, and the glans was absent. The upper part of the penis was covered with skin, and the urethra was retracted. The skin of the shaft was normal in appearance, but the tip displayed scar tissue and an external stenosed urethral meatus. The penile length was 3 cm (Fig. 1). The parents requested the improvement of the cosmetic appearance of the glans and relief of the urinary flow obstruction. The procedure was discussed with the parents, and written informed consent was obtained before surgery.

Under general anesthesia, a tourniquet was applied around the base of the penis. A circumferential incision was made at the distal end of the remaining penis around the urethral meatus. Degloving of the penile shaft was performed. An erection test was performed intraoperatively to assess the tunical integrity of the corpora. The test showed no leakage or tunical bulge during artificial erection. Due to adhesions in the dome of the penis, a vertical dorsal incision was made in the skin, and degloving was done from the proximal to the distal points (Fig. 2). The penile skin was separated from the dorsal face. The urethral meatus was freed from scar tissue and dartos flap that was applied at the tip of the penis (Fig.

3a). The urethra was dissected approximately 5 mm to free the end of the urethra and was stented with a silicon 10-Fr Foley catheter (Fig. 3a). The corpus spongiosum and urethra were separated from the corpus cavernosum (Fig. 3b). Next, the oral cavity was opened, and the cheek and lower lip were exposed. The opening of the Stensen duct was identified and protected. A buccal mucosal segment (20 mm × 50 mm) was marked on each side that extended from the interior aspect of the lower lip. The submucosa was elevated by injection of saline and was then incised and dissected on both sides.

The previously constructed dartos flaps were divided into two similar pieces from the ventral side and opened like a curtain, and a glanular collar-like structure was obtained by suturing 5 × 2 cm buccal mucosal graft to the dartos flaps (Fig. 4). This structure mimicked the glans, and the freed urethra with the spongiosum was sutured here (Fig. 5).

The graft was anastomosed with the urethral mucosa and penile skin using Vicryl 6/0 interrupted sutures (Figures 6a and b). The graft was also fixed at its center. Postoperative care was taken to immobilize the anastomosis. We did not need to place a cystostomy catheter. HBO therapy was started immediately and was continued until the 20th postoperative day. The dressing and the Foley catheter were removed 1 week later, and the patient voided with a good stream. Follow-up demonstrated apparently healthy buccal mucosal graft that appropriately simulated the glans penis. One month later, the cosmetic appearance and urethral meatus were evaluated.

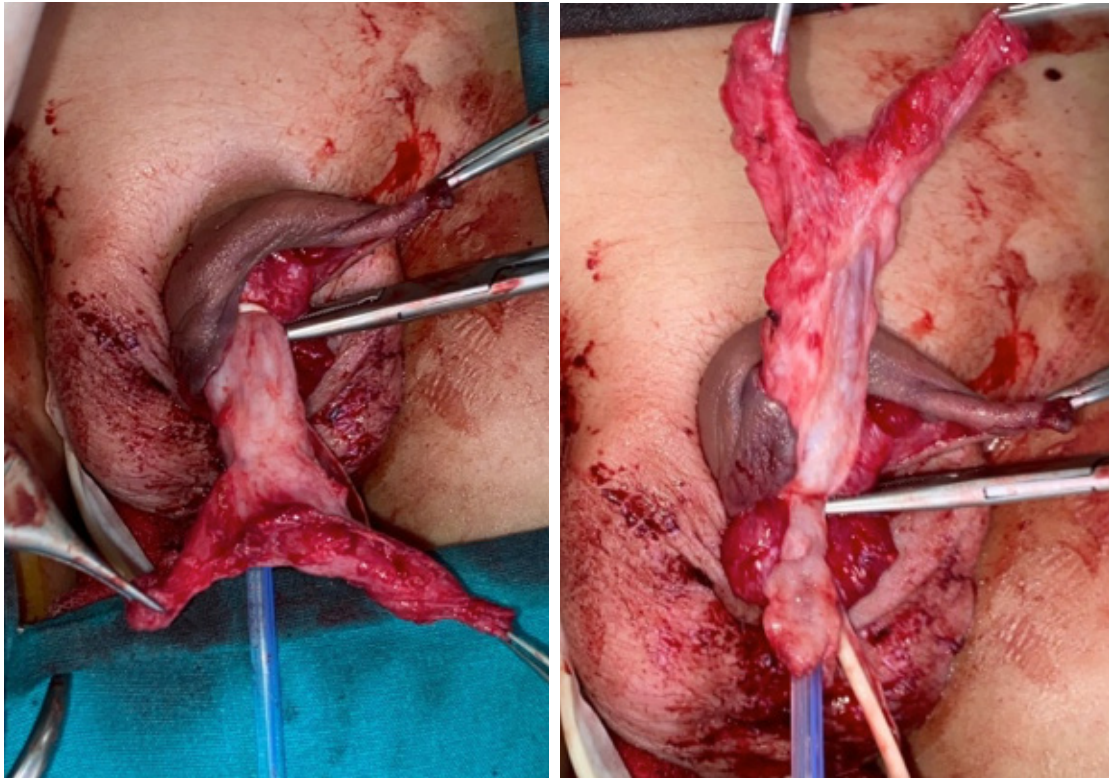


Figure 3. (a,b) The urethra and corpus spongiosum were separated from the corpus cavernosum. The 6-month-old flaps were opened symmetrically to form two glanular-like collars.

His parents reported a normal voiding stream, and the examination revealed no stenosis and satisfactory cosmetic results. Follow-up was done at 3 and 6 months. Follow-up revealed

a successful surgery, and the child's parents were satisfied. The technique was easy and safe and provided an acceptable shape for the new glans.

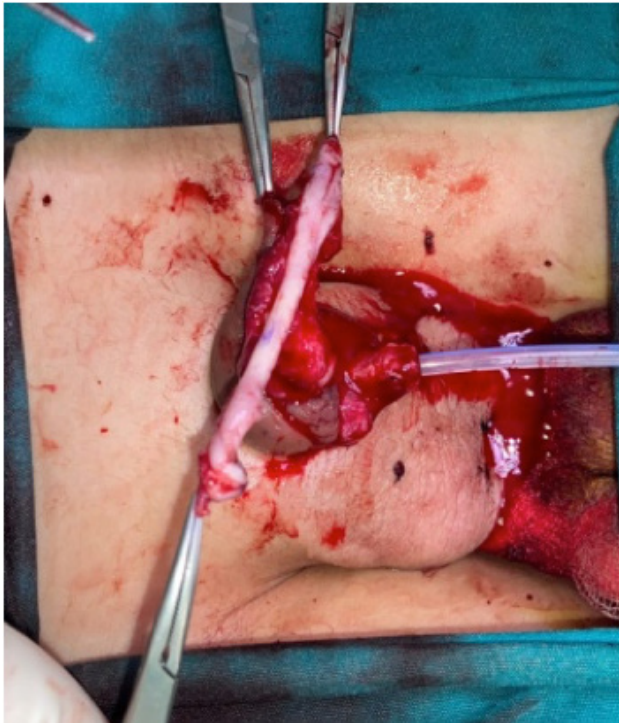


Figure 4. Covering the two-sided dartos flap like a glanular collar with buccal mucosal graft.

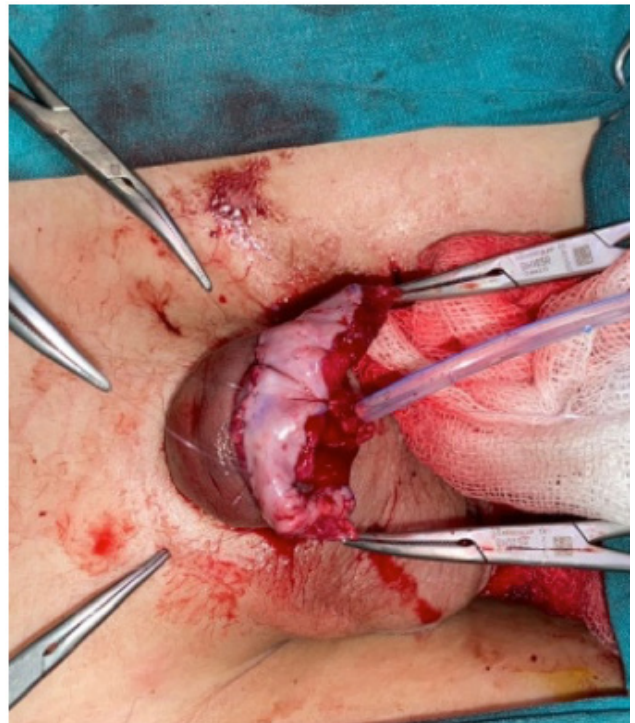


Figure 5. Buccal mucosal graft-covered dartos flaps were combined in the midline to form a regular glans shape and frenulum.



Figure 6. (a,b) The created tissue was sutured to the penile skin.

DISCUSSION

Although some medical benefits are proposed for circumcision, they are mainly due to religious beliefs or routine cultural behavior.^[5] While circumcision is seen as a simple procedure and is done frequently, it is not without complications (0.2%–3%),^[6] which are higher in older children than in neonates.^[7] Circumcision is usually performed by traditional circumcizers, nurses, general practitioners, surgeons, and urologists.^[8,9] The circumcizer's experience is another determining factor for the complication rate. We know that there are fewer complications when done by surgeons and in hospitals. Our case was a complication of the traditional home circumcision of a 5-year-old boy from a rural area. Salle et al.^[2] reported a possible mechanism of amputation during circumcision in six cases. They suggested that the amputation was likely due to the incomplete release of physiological balano-preputial adhesions around the frenulum, which would produce traction of the ventral aspect of the glans when the foreskin was pulled to secure the clamp. Therefore, they proposed that glans amputations during circumcision may be prevented by careful and complete release of the inner preputial mucosa from the glans before the placement of the clamp.

Bleeding and wound infection are the most frequently reported minor complications, whereas delayed complications include excessive foreskin, shortage of penile skin, skin bridges, fistula, buried penis, meatal stenosis, and glans injuries.^[2,4] The most serious circumcision complications are urethral injury and partial or total removal of the glans or penile shaft.^[1,5] Loss of the glans can lead to significant long-term psychological and sexual morbidity. There are several

penile amputation reports in the literature, but only a few glans amputations, most of which were applied early on and resulted in direct suturing of the glans. Our case is a rare one presenting late, and there was no glans tissue to repair. Our case had undergone surgeries (i.e., surgical correction of the distal penis with penile skin and dartos flap bleeding control in various centers) but was admitted to us later due to urination and cosmetic problems.

The degree of amputation is critical in the management. The surgeon should focus on restoring the function of the glans and urethra while preserving the cosmetic appearance of the glans to avoid future psychological burdens. The purpose of the treatment is to create a cosmetically and functionally acceptable penile shaft and glans. If amputation occurs on the shaft of the penis, microvascular replantation is recommended^[6] however, there are some reports of successful replantation of a completely amputated penis using a macro-surgical technique.^[7] If partial glans amputation occurs, the excised tissue should be preserved and immediately sutured back to the penis,^[4] and microscopic repair is unnecessary. When repair is performed within 8 h after the injury, it allows the restoration of the functional and esthetic aspects of the glans, and the penis heals nicely in most cases.^[4] If management is delayed, our technique seems a good option. In our report, total glans loss occurred during clamp-assisted circumcision. If this patient had come earlier, it would have been possible to treat the glans with direct suturing. Due to the injury was initially neglected with the procedure described here, we were able to provide the closest visual appearance to the original penile glans.

A buccal mucosa graft has several advantages over other grafts; hence, it has become the graft of choice in hypospadias repair. The tissue is tough and resilient, which allows manipulation, and the process of harvesting is simple and does not create a visible scar. Cook et al.^[10] reported a case involving a newborn who had partial penile glans amputation. The Toronto group advised using buccal mucosa grafting in similar situations, such as after severe epithelial denudation associated with balano-preputial scarring. Contrary to the literature, we believe that, instead of suturing the buccal mucosa directly to the upper part of the penis, we obtained the glanular collar shape and softness by suturing it to more muscular tissue, such as the dartos flap.

The use of HBO considerably helps to reduce the time taken to treat decompression sickness. Oxygen when respired at very high pressures manages to displace nitrogen accumulated from the tissue.^[11] We used HBO therapy immediately at postoperative day. We think it has a positive contribution to good recovery.

The amputations of the penile glans lead to disturbances of a psychological nature. These can be related to the modification of the body schema and a loss of self-esteem. We think that our neoglans surgery will reduce these effects. We also suggest that the patient be referred to a psychologist for further consultation and support. The sexual function remains to be evaluated later in our patient.

Conclusion

Penile glans amputation is a rare complication of circumcision. Treatment involves the replantation of the amputated part within eight hours of the accident. If not possible, a buccal mucosal graft covering the dartos flap and attaching and covering the distal part of the penis is a good option for re-configuration of the glans if the penis length is acceptable. It is an easy and safe procedure that provides acceptable cosmetic results with good urinary flow and an orthotopic urethral opening.

Informed Consent: Written informed consent was obtained from the patient for the publication of the case report and the accompanying images.

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OLGU SUNUMU - ÖZ

Sünnet sırasında tam glans penis amputasyonu: Bukkal mukozal greft ile kaplı dartos flep ile yeni glans oluşturulması—yeni bir teknik

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Penis başı ampütasyonu sünnetin nadir ve katastrofik bir komplikasyonudur. Ampütasyonu takiben penis başının rekonstrüksiyonu endikedir. Olgumuz, sünnetten altı ay sonra tarafımıza başvuran beş yaşındaki bir erkek çocuğun ampüte penis başının yeniden yapılandırılması için yeni bir tekniği tarif etmektedir. Sünnetten hemen sonra bölge hastanelerinde kanama kontrolü nedeniyle opere olan hastada idrar çıkış deliğinin darlığı, işeme güçlüğü ve penis şekil bozukluğundan dolayı tarafımıza başvurdu. Muayenede penis 3 cm uzunluğundaydı. Ameliyata alınan hastaya tam penil degloving yapıldı. Kalan penisin distal kısmı fibröz doku çıkarılarak hazırlandı. Kanama kontrolü için bölge hastanelerinde penis dorsal tarafa yerleştirilen dartos flepleri ventral taraftan iki eşit benzer parçaya bölünerek penisin üst kısmında iki yana perde şeklinde açıldı ve glanular yaka benzeri bir yapı oluşturuldu. Ağızdan alınan 5×3 cm bukkal mukoza getirilerek dartos flepleri üst yüzeyleri örtüldü. Bu yapı penis başı olarak, glans şekli olarak penisin üzerine örtüldü ve spongiozomla birlikte serbestleştirilen üretra buraya sütüre edildi. Hasta ameliyat sonrası dönemde hiperbarik oksijen tedavisine alındı. Hastanın takiplerinde penis başı benzeri kozmetik yapı gözlemlendi ve hastada normal idrar üroflovmetre sonuçları elde edildi. Bu yöntem, literatürde ilk defa kullanılan cerrahi onarım tekniğidir. Bukkal mukozal greft ile kaplı dartos flep kullanımı, penis boyutu uygun olduğunda amputasyon sonrası penis başının geç rekonfigürasyonu için kabul edilebilir kozmetik ve fonksiyonel sonuçları olan başarılı ve basit bir prosedürdür.

Anahtar sözcükler: Bukkal mukoza; glans amputasyonu; sünnet.

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