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Fenestrated sheet split-thickness skin grafting for reconstruction of penile skin loss in pediatric population

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ABSTRACT

Objectives: We aimed to evaluate our experience with fenestrated sheet split-thickness skin grafts (STSGs) in the pediatric population.
Materials and methods: We retrospectively studied a cohort of 17 children 2–18 years old who underwent skin grafting owing to circumcision injuries (2 patients), traumatic penile injury (1) and after previous multiple hypospadias surgery (14). Fenestrated 0.012 in sheet STSGs from thigh area (15 patients) and buttock area (2) were fashioned to resurface the denuded penis following reconstruction. The median follow up was 13 years (range 1–19 years).
Results: There was 94% take of the grafts. One patient required additional grafting following first graft infection. Six patients underwent concomitant surgery at the time of grafting (4 chordee repair and 2 meatoplasty). Two patients had slight chordee at 3 and 6 years postoperatively, and 2 with the history of preputial tubularized island flap hypospadias repair had developed a urethral stricture, which required staged repair with buccal mucosa 12 and 14 years following primary hypospadias repair. Six sexually active patients reported normal sexual intercourse and sensation following grafting. None of the patients demonstrated shrinkage of the STSGs over the follow up period.
Conclusions: Our data demonstrated that the use of fenestrated sheet STSGs in patients with penile skin loss yields satisfactory functional and cosmetic outcomes. The buttocks might be considered as a preferable donor site in terms of avoiding a visible scar.

Penile skin loss may occur after a variety of disease processes. Reconstructive options are tailored to the defect [1–3]. When skin is missing, skin grafting can achieve the goal of reconstructing like with like. Several disease processes may cause actual or functional loss of penile skin, and skin grafting is often necessary to reconstruct these wounds. The most common problems include necrotizing infections of genital skin (ie, Fournier gangrene), lichen sclerosus, trauma, and burns [4]. Resection of penile cancer or genital lymphedema may require removal of skin from the penis, leading to a need of replacement. A circumcision sometimes results in too much skin removal and the need for a skin graft. In pediatric urology practice, reoperative repair of hypospadias may often require skin grafting. The right choice of the type of the skin graft depends on the needs of the wound to be covered and the inherent compromises associated with graft thickness [3]. Since the penile size may change dramatically with erection and there is a need for durability because of the tissue demands of sexual activity, full-thickness skin grafts (FTSGs) seem to be the preferred choice in the replacement of penile skin [3,4]. Split-thickness skin grafts (STSGs) require less ideal conditions for survival and have a much broader range of application than FTSGs. STSGs are used to resurface large wounds, line cavities, resurface mucosal deficits, close flap donor sites, and resurface muscle flaps. These features make STSGs more functional. We aimed to evaluate our experience with fenestrated sheet split-thickness skin grafts (STSGs) in the pediatric population.

1. Patients and methods

We retrospectively studied a cohort of 17 children 2–18 years old at the time of grafting who underwent skin grafting in both departments of pediatric urology. Two patients required skin graft owing to extensive skin loss following ritual circumcision, one following traumatic penile injury and the remaining 14 patients following previous multiple hypospadias surgery. Five out of 17 operated patients were prepubertal and the remaining 12 postpubertal at the time of grafting. Following combination general and caudal/epidural anesthesia urethral catheter is inserted and full degloving of penile shaft is performed following

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Fig. 1. Full penile degloving.

Fig. 3. Graft suturing.

artificial erection test as we have previously reported [5] (Fig. 1). The residual chordee was repaired using dorsal plication technique when indicated. We have utilized an electric (Aesculap 3Ti GA670) or mechanical dermatome. 0.012 in sheet STSGs were taken from the thigh area in 15 patients and from the buttock area in the remaining 2 in order to resurface the denuded penis (Fig. 2). The graft is fenestrated and sutured around the penile shaft (Fig. 3). Fenestration of the graft is performed utilizing a No. 11 scalpel blade. We have utilized "pie crusted" method although the mechanical mesher can be used when it is available. The slits are 1 cm long, placed 0.5–1 cm apart, and arranged along the length of the graft. We have avoided the larger slits, which provide greater expansion, but also can result in a less cosmetic appearance than will smaller openings.

We then place the graft over the defect area and tack it in place using 4–0 Vicril sutures. The penile graft is secured at the base and the neoventral raphe was created (Fig. 4). Vicril sutures (4–0) are placed at the coronal sulcus and the base to tie over bolsters.

Plastic bolster was used to support the graft and an indwelling catheter was used as a scaffold to immobilize the penis. The dressing and catheter remained in place for 5 days postoperatively. We encourage patients to maintain personal hygiene by showering twice daily and dressing the graft site with Xeroform for 1 month. We suggest the patient avoids direct contact of the penile graft through the application of Xeroform. We follow the patients closely in the early postoperative period through frequent clinic visits, every 4 weeks for 3 months, then at 4, 6, 12 months respectively and then annually. During the clinic visit we ask the patients specifically about erections, sexual performance when appropriate, the patients' or their parents' satisfaction with the graft cosmetic appearance, and whether they have any difficulties urinating. We do not use routinely any anticicatrix cream.

The donor site is dressed utilizing Telfa gauze soaked in saline with epinephrine to help with hemostasis. Once the donor site has healed, the dressing is removed, and the patient is encouraged to apply lotion to the wound daily. The median follow up was 13 years (range 1–19 years).

2. Results

94% of patients had successful take of graft. One patient with the history of multiple hypospadias surgeries required additional grafting following graft infection. Six patients underwent concomitant surgery at the time of grafting. Of those 4 required chordee repair and remaining two patients meatoplasty. Two patients presented with mild residual chordee following chordee repair in the long term follow-up but did not require any surgery. Two patients with the history of Asopa–Duckett operation developed urethral stricture 12 and 14 years

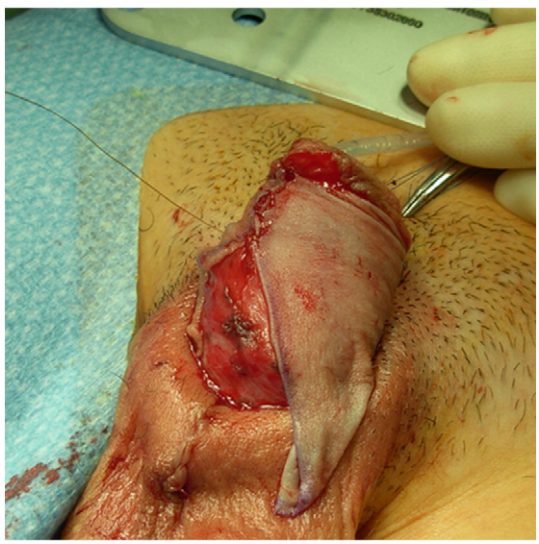

Fig. 2. Graft application.

Fig. 4. Full penile cover.