

Preconstruction of the Pars Pendulans Urethrae for Phalloplasty with Digestive Mucosa Using a Prefabricated Anterolateral Thigh Flap in a One-arm Patient

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Summary: We herein report a successful preconstruction of the pars pendulans urethrae with the ileum mucosa for phalloplasty in a one-arm patient using a prefabricated anterolateral thigh flap. After a 2-stage operation and an 18-month follow-up, the patient achieved a good postoperative appearance and an excellent function of neophallus. We believe the use of digestive mucosa for urethral reconstruction enlightens us and deserves further comprehensive clinical studies. (*Plast Reconstr Surg Glob Open* 2013;1:e53; doi:10.1097/GOX.0b013e3182aa8779; Published online 18 October 2013.)

Phalloplasty poses a great challenge for plastic and reconstructive surgeons. Construction of a neourethra is always considered to be a difficult part of phalloplasty on account of the high incidence of urethral fistulas and stricture formation.^{1,2} No method has become standardized so far.² We herein reported a successful preconstruction of the pars pendulans urethrae with digestive mucosa for phalloplasty in a one-arm patient using a prefabricated anterolateral thigh flap.

CASE REPORT

A 21-year-old male with only one arm presented to our hospital for further therapy. He lost his penis

and left arm after an electrical injury when he was 5 years old. Physical examination revealed that there was a slight meatal stenosis due to local scar tissues. His thighs had sparse hair and a pinch thickness of 3.5 cm. We designed a 2-stage operation as follows: for the first stage, enlargement of the external urethral orifice was performed with local scrotal flap. Through a transabdominal incision, the ileum was exposed and a 12-cm enterectomy was performed. The digestive connection was immediately restored by an end-to-end anastomosis. The ileum serosa and muscular layer were carefully stripped (Fig. 1). For the preconstruction of the pars pendulans urethrae, the tubed graft of ileum mucosa was buried in the left anterolateral thigh (Fig. 2). Simultaneously, two 18-Fr Foley catheters were used to support the prefabricated urethra. Six months after the first stage, we performed the second stage: phalloplasty was operated with the prefabricated anterolateral thigh flap (Fig. 3) and an autogenous costal cartilage graft was harvested as a stent for reinforcement. Finally, the prefabricated urethra was anastomosed with the native urethral orifice.

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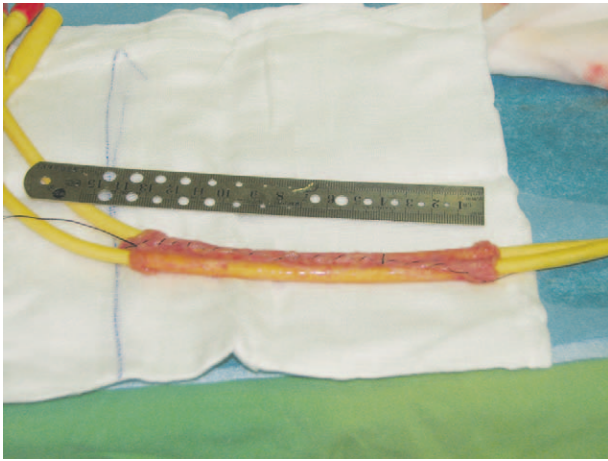


Fig. 1. The ileum serosa and muscular layer were carefully stripped. An ileum mucosa was everted and wrapped around 2 drainage tube (1.5 cm in diameter) to form a 12-cm tube.

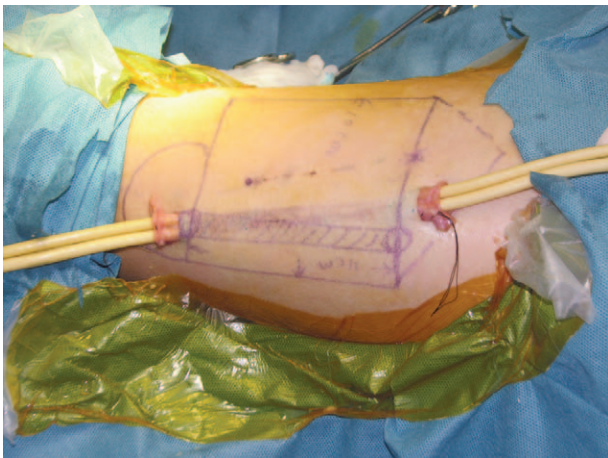


Fig. 2. For the preconstruction of the pars pendulans urethrae, the tubed graft of ileum mucosa was buried in left anterolateral thigh.

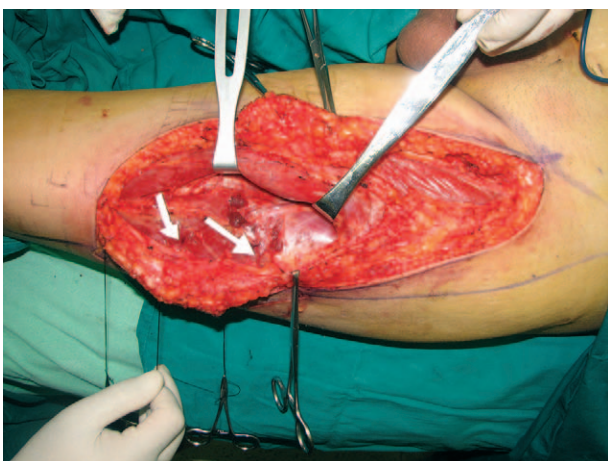


Fig. 3. White arrows show two perforator vessels of anterolateral thigh flap.



Fig. 4. Lateral view during voiding 18 mo postoperatively.

The reconstructed penis survived completely and allowed patient to urinate while standing (Fig. 4). One month after the second stage, moderate and preventative urethral dilations were performed twice a week for 2 months. The patient was followed up for 18 months and did not show apparent complications. The neophallus retained its size (about 10 cm in length and 3.5 cm in diameter) in a good shape. The patient was satisfied with postoperative appearance and function of the neophallus (Fig. 4).

DISCUSSION

Generally speaking, radial forearm flap is most classical for penile reconstruction.² However, it is obviously not suitable for this patient. Moreover, the extensive scarring of both abdomen and scrotum limits the use of local tissue for urethroplasty and his anterolateral thigh with a pinch thickness of 3.5 cm is too thick and bulky to use the tube-within-a-tube design.³ Buccal mucosa has also been used as one of the best substitute materials for the treatment of anterior urethral strictures.⁴ However, inadequacy of buccal mucosa tissues directly limits their role in reconstruction of the pars pendulans urethrae. As we have already reported our successful experience of vaginal reconstruction with the use of a pedicled ileum segment and laparoscope assistance,⁵ we are then wondering if the digestive mucosa could be used for reconstruction of urethra. Lebre et al⁶ had successfully developed a digestive mucosal graft for urethral construction in a Sprague-Dawley rat model and indicated digestive mucosal tube for urethral construction was technically feasible. Besides, Xu et al⁷ reported 1-stage urethral reconstruction using colonic mucosa graft for the treatment of a long complex urethral stricture and received good postoperative results. Based on these above-mentioned reasons, we chose the ileum mucosa for urethral preconstruction in this one-arm patient. To our excite-

ment, no apparent complications were found after an 18-month follow-up, which suggested the feasibility of substituting using a digestive mucosal tube again. We believed that in fabrication of a neourethra, the digestive mucosa has unique merits as follows: (1) it is abundant and easily stretchable; (2) it is a wet epithelium, making its characteristics more histologically similar to the characteristics of urethral mucosa than skin^{6,8}; (3) it is smooth, hairless, and pliable; and (4) it has a dense subdermal plexus, rendering it more prone to obtain a blood supply from the graft site and thus to healing.⁵⁻⁷ Apart from the substitute materials, we believe that the operative idea of urethral prefabrication also plays a significant role in the construction of a neourethra. According to our previously reported operation method in female-to-male transsexual patients,⁹ we continued to use this effective 2-stage method of urethral prefabrication for phalloplasty in this case. On the one hand, the mucosa grafts could establish sufficient blood supply and survived well within a 6-month delay for prefabrication. On the other hand, prefabrication prevented further contracture of graft digestive mucosa. We particularly believed that the entire prefabricated urethra, especially its 2 end points, could efficiently inhibit the primary cicatricial contracture after long-standing support. In this case, we found a slight shortening of the prefabricated urethra (from 12 cm to 10 cm) after 6-month prefabrication, consistent with the study by Lebret et al that revealed a high rate of macroscopic stenosis (25%) in animal models. Besides, we did not find further contracture of the reconstructed urethra following second-stage phalloplasty. For one thing, the mucosa has crossed over contractural period of cicatrices and become relatively stable after a long-time prefabrication. For another, graft and vertical support of an autogenous costal cartilage in phalloplasty could furthest retain the size of neourethra. Eventually, the repeated and moderate urethral dilations (twice a week for 2 mo after second-stage operation) also contributed to preventing horizontal contracture of the graft and potential strictures.

CONCLUSIONS

We believe that sufficient digestive mucosa will be potential and good substitute materials for preconstruction of the pars pendulans urethrae. The incidence of postoperative urethral complications could, in theory, be effectively reduced within a 6-month delay following prefabrication. The use of digestive mucosa for urethral reconstruction enlightens us and deserves further comprehensive studies.

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