

TOTAL PENILE RECONSTRUCTION BY FREE SENSATE OSTEOCUTANEOUS FIBULA FLAP (Case Report)

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SUMMARY

This article is focused on the free sensate osteocutaneous fibula flap as the option that comes closest to meet the diverse aesthetic and functional goals of total penile reconstruction. The main advantages of this flap lie in its intrinsic rigidity, its superior donor site location and its long vascular pedicle. This paper presents a patient who underwent phallic reconstruction with free sensate osteocutaneous fibula flap in the Plastic Surgery Department at Gülhane Military Medical Academy and discusses the advantages and shortcomings of this technique. As far as we know, this is the first phallic reconstruction performed in Turkey by this method.

Key words : Fibula flap, Penile reconstruction, Free flap

INTRODUCTION

The free fibula flap for long bone reconstruction was first described by Taylor et al.¹ and was used for the same purpose by others². Wei et al.³ in China also reported the free osteocutaneous fibula flap for various clinical applications. Later, these flaps have been used in mandibular reconstruction⁴.

Total autogeneous reconstruction of penis has been first reported by Borogaz in 1936⁴. Reconstruction of penis evolved from historical multistaged procedures that were fraught with urethral complications, poor phallic sensitivity and questionable aesthetic value⁶. The advent of microsurgical tissue transfer techniques provided a mean to complete most phallic reconstructions in one stage with fewer complications and more predictable results^{6,7,8}.

The limitations of fasciocutaneous flaps, e.i., radial forearm, medial and lateral upper arm,

ÖZET

Bu makalede, total penis rekonstrüksiyonunda hem estetik hem de fonksiyonel amaçları birarada sağlayabilen serbest osteokütan fibula flebi bildirilmiştir. Bu flebin en önemli avantajları intrinsik sertliği, donor alan lokalizasyonunun üstünlüğü ve uzun vasküler pedikülü olarak sıralanabilir. Bu makalede GATA Plastik Cerrahi AD'nde gerçekleştirilen duyulu serbest osteokütan fibula flebi ile penis rekonstrüksiyonu sunulmuş ve avantajları ve sınırlılığı tartışılmıştır. Bildiğimiz kadarıyla bu olgu Türkiye'de bu yöntemle gerçekleştirilen ilk penis rekonstrüksiyonu olgusudur.

Anahtar Kelimeler : Fibula flebi, Penis rekonstrüksiyonu, Serbest flep

have led the use of osteocutaneous fibula flap^{8,9}. Sadove et al¹⁰ reported four cases who underwent operation for phallic reconstruction by free sensate osteocutaneous fibula flap.

OPERATIVE PROCEDURE

A skin island is planned on the lower leg skin over the fibula. A fasciocutaneous flap is raised carefully protecting the posterior intermuscular septum through which perforating arteries that supply the skin pass. This mesentery is preserved in continuity with periosteum and a small amount of muscle cuff around the anterior and posterior aspects of fibula is also preserved. Lateral sural cutaneous nerve must be included in the flap. Peroneal artery is dissected to the bifurcation and the fibula is transected both 6 cm proximal to the lateral malleolus and distal to the knee. Flap dissection is described in detail elsewhere. Neourethra is reconstructed with tubularized

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full thickness skin graft harvested from groin area.

The fasciocutaneous island flap is then wrapped around both fibular bone and neourethra, and is sewn to itself (Figure 1). After the flap is transferred to the recipient area it is revascularised in an end-to-side manner to the femoral artery and vein. The native urethra is anastomosed with neourethra.

The periosteum of the fibula is sewn to the tunica albuginea. Lateral sural cutaneous nerve and dorsal penile nerve are coapted each other for future sensation. Donor site on the leg is skin grafted. A plaster splint and compression dressing is then applied and the patient is permitted weight bearing at the end of 1 week.

CASE REPORT

A 21-year-old man suffered amputation of his penis following a drastic circumcision accident when he was 5 years old. He was admitted to our Department for penile reconstruction. Physical examination revealed penile stump which was 1 cm. The patient described erection of the penile stump and ejaculation. A 15 x 13 cm skin island was marked over the left lower leg. The fasciocutaneous flap was raised and transferred as described above (Figure 2a, 2b, 2c). Vascular anastomoses were performed to the femoral artery and vein in an end-to-side manner by creating a tunnel in the groin region. Left dorsal penile nerve was coapted to the lateral cutaneous sural nerve within the flap. The periosteum of the fibula was sutured to the tunica albuginea at the site of amputation. While reconstructing the neourethra, tubularization was performed

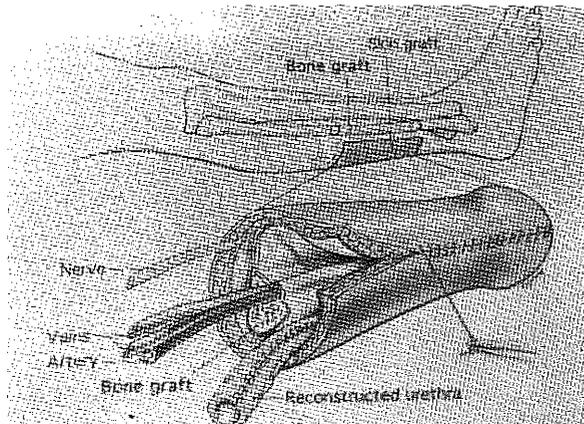


Figure 1: Schematic description of the free fibula phalloplasty

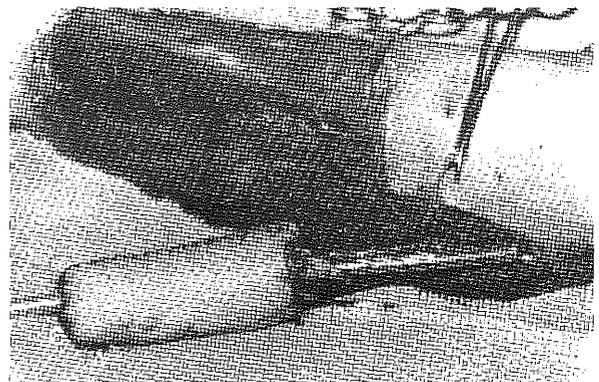
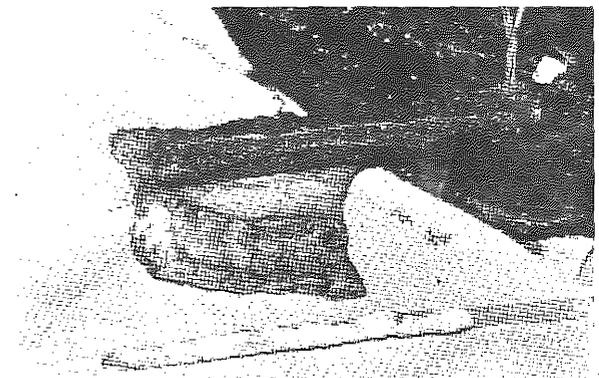
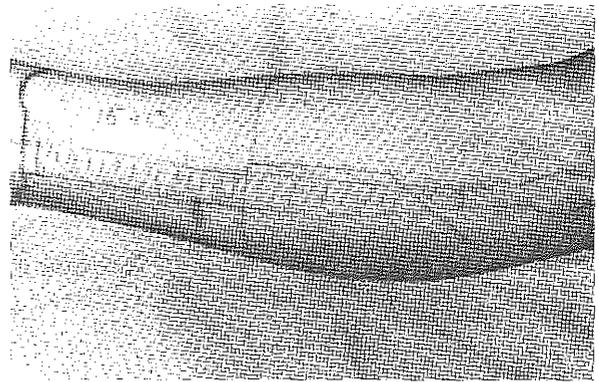


Figure 2a: A skin island is marked over the left lower leg from the tibia anteriorly to the midline posteriorly b: Fibula fasciocutaneous flap is raised protecting the posterior intermuscular septum. Please note the neourethra lying by the dissected flap c: The neophallus is seen just before transfer to the perineum

around a large catheter (French 28) to prevent subsequent urethral strictures.

Healing of both the donor site and neophallus occurred without any complication. Four weeks postoperatively, a glansplasty was performed (Figure 3a, 3b, 3c). French 18 catheter was kept in neourethra continuously for 6 months except during voiding. This

prevented any urethral stricture formation and meatal stenosis. The patient voids without any difficulty (Figure 4). The overall follow up period was seven months. The patient reports full sensation on the entire neophallus. He states that he had a successful sexual intercourse. The bone remains firmly attached to the patient's residual corpora, and erection of corpus cavernosum is transmitted through the bone.

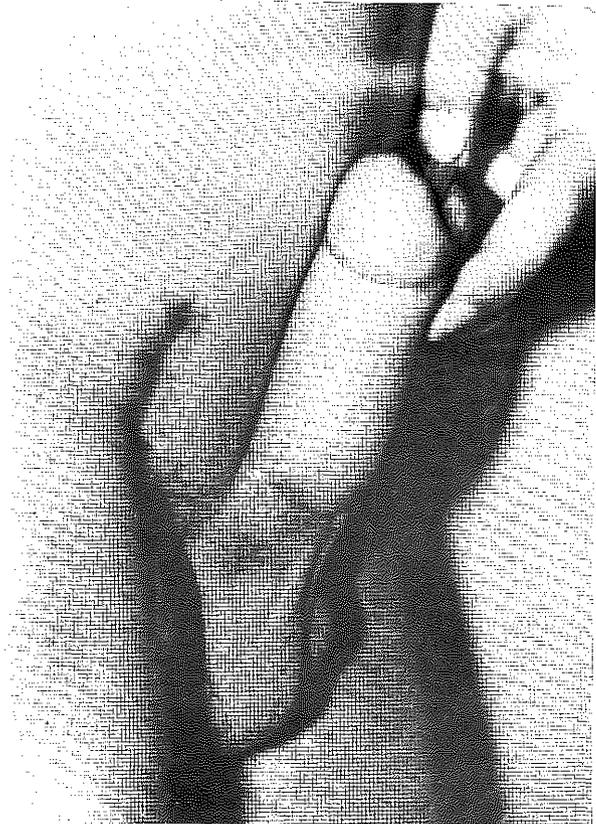
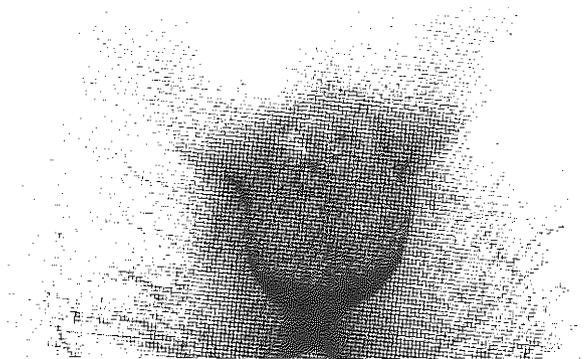


Figure 3a: Preoperative appearance of the amputated penis.
b: Postoperative lateral view of the reconstructed penis at 6 months.
c: Flexibility of the neophallus allows the patient comfort in his daily life.

DISCUSSION

Microsurgical techniques are successfully applied to penile reconstruction. Penis amputation due to trauma or circumcision accident and transsexuality are common cases for penile reconstruction. Although all aesthetic and functional goals were not achieved, radial forearm and lateral upper arm flaps have been reported to be successful for reconstruction of penis in one stage ^{7,11,12}. For penile reconstruction specifically, the fibula flap offers several advantages over these flaps ¹⁰. The fibular phallus has good intrinsic rigidity due to the large volume of bone it consists.

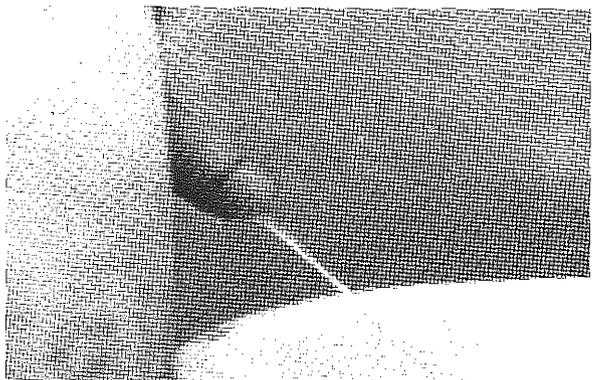


Figure 4: Patient is seen while voiding through his reconstructed urethra

Satisfactory size can be achieved without compromising the donor site. The vascular pedicle of the fibula flap is of sufficient length to allow end-to-side anastomosis for the flap to the femoral artery without interpositional vein graft. It is important that the phallus have sufficient freedom of motion not to interfere

with activities of daily living. The neophallus can easily be placed against the abdomen.

The most important shortcoming of the fibula flap donor site is temporary interference with ambulation¹³. Aesthetically, the lower leg donor site is preferable to either upper arm and forearm donor site since it can be readily covered with a sock.

The radial forearm flap has led several problems in penile reconstruction. Over time, the flap becomes too soft; when penile prostheses are used, erosion occurs in most cases¹⁴. Radial bone in the penis is thin, unicortical and prone to fracture when it is included in the radial forearm flap for phallic reconstruction. The radial forearm flap donor site morbidity is unacceptable for many patients¹⁵.

Vascularized bone grafts are believed to exhibit the greatest degree of bone survival compared to their nonvascularized counterparts¹⁶. Some resorption may be expected. Given the large volume of strong bone, even if the phallic bone was to suffer a 50 % resorption over time it would still probably provide sufficient rigidity for intromission¹⁰.

Urethral reconstruction was performed with full thickness skin graft harvested from the groin region. The fascia enhances graft take and reduces the risk of urethrocutaneous fistula along the penile shaft. Most fistulas occur at the proximal anastomosis to the native urethra but it is reported that most of this type of complication necessitated no surgical intervention⁸. No fistula occurred in our patient. We believe that the risk of urethral stricture can be reduced with the construction of a urethra over a large caliber catheter. It is also important to keep the catheter in the neourethra for a long period of time not less than three months.

Sensory recovery improved with time in our patient. At the end of six months postoperatively the patient described full sensation which was tested by pin prick test. We aimed to provide protective sensation. Patient should be cautioned against unrealistic expectations that we can create or restore erogeneous sensibility.

In conclusion, this flap allows for an

improved autogeneous prostheses, avoidance of high complication rate of conventional prostheses, a natural appearance of the phallus in its erect functional state, satisfactory sexual function for patient and partner, end-to-side anastomosis of the vascular pedicle without the need for interpositional vein graft, improved donor site aesthetics, and reduced donor site complications. The use of osteocutaneous free fibula flap is highly recommended as the choice of treatment in penile reconstruction.

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