

## Successfully Performed Reanastomosis of a Completely Amputated Penis: Surgical Technique

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### ABSTRACT

Complete penile amputation is a rare condition that requires immediate and complex surgical treatment. There are few descriptions of successful operative techniques using microsurgical methods in the literature.

The authors present the rare case of 30-year-old man who amputated his penis at its base using an ax. Nine hours after the injury, the patient underwent microsurgical anastomosis of the arteries, veins, corpora cavernosa, and urethra. The authors describe the steps in their surgical procedure and provide illustrative figures. They also explain their perioperative and postoperative support therapy.

Approximately 20% of the distal spongy body and skin of the penis became necrotic beginning on the 6<sup>th</sup> postoperative day. On the 18<sup>th</sup> day, necrectomy of the penile skin flap was performed and the phallus was buried in the scrotum. Exteriorization of the penis that was partially covered by scrotal skin was completed 2 months after reanastomosis. The distal necrotic part of the urethra was reconstructed using buccal mucosa graft transplantation. A split-thickness skin graft from a lower limb was used to cover the rest of the phallus. The patient achieved return of physiologic micturition with no urethral structures. He also experienced incomplete erectile function.

**KEYWORDS:** Penile amputation; Penile replantation; Surgical techniques

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### INTRODUCTION

Complete penile amputation is a rare condition that requires immediate and complex surgical treatment. The amputation is usually the result of accidents, workplace injury, or self-mutilation by patients with psychiatric disorders [1,2]. The first penile reanastomosis was described in 1929 [2,3]. There

are few successful operative techniques using microsurgical methods described in the literature.

### CASE REPORT

A 30-year-old male was admitted to the hospital 8 hours after self-inflicted penile amputation at the base of the penis using

an ax. The patient was brought immediately to the hospital after the incident. A tourniquet dressing was used because of moderate bleeding. The penis was totally amputated. The wound was covered with blood clots. Four hours after the incident, the penis was stored in ice and identified vessels were injected with a solution of heparin. Microsurgical replantation was started 9 hours after the injury.

### *Surgical Procedure*

The primary steps of surgical reconstruction were:

1. The penile corpus was cleaned and the vessels were identified as dorsal arteries, cavernosal arteries, and dorsal veins. Cavernosal penile arteries were marked with colored sutures (Figure 1).
2. The left dorsal artery was anastomosed (Figure 2). For anastomosis protection, the external wall of the tunica albuginea of the left cavernous body was sutured. Slow blood outflow was noticed from the left cavernous body of the amputated penis.
3. The left cavernosal artery was anastomosed (Figure 3).
4. The same procedure was followed for the right cavernous body and vessels.
5. The dorsal penis vein was anastomosed (Figure 4).
6. The superficial dorsal penis vein was anastomosed (Figure 5).
7. The amputated skin flap was sutured, with double tube 12F drainage.
8. The 4 nerves located on the surface of the dorsal cavernosal body were anastomosed.

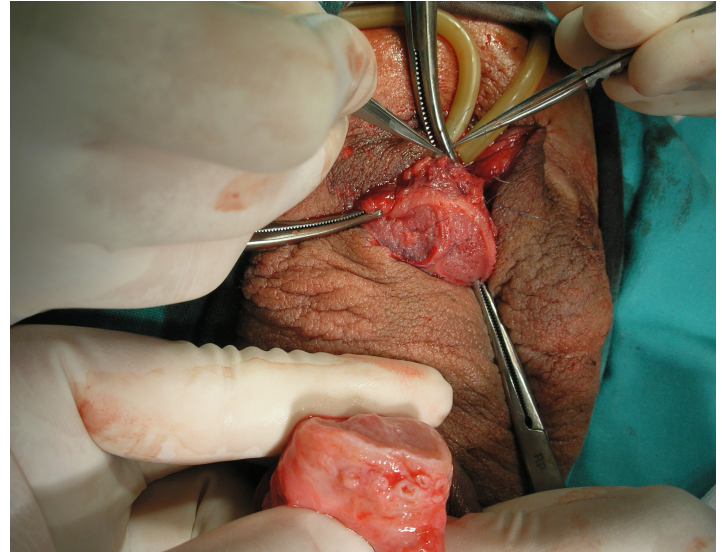
All anastomoses were performed with Ethilon (Ethicon Inc., Somerville, NJ, USA) 8.0 and 9.0. The bulbar artery and skin arteries were not identified. The urethra was anastomosed initially. The patient lost approximately 6 units of blood before and during the operation. Antithrombotic prophylaxis was introduced according to procedures described for finger replantation.

### *Pharmaceutical Management*

Intraoperatively, after the first artery reanastomosis, heparin was injected as a bolus and a 24-hour intravenous infusion of 500 mL of low molecular dextran was started. Pentilin (pentoxifylin) was added at 12 hours and continued for the next 24 hours as an intravenous infusion of 900 mg and 1200 mg/24 hours. The low molecular heparin (Fraxiparine) 0.6 mL

Figure 1. Preparation for Surgery.

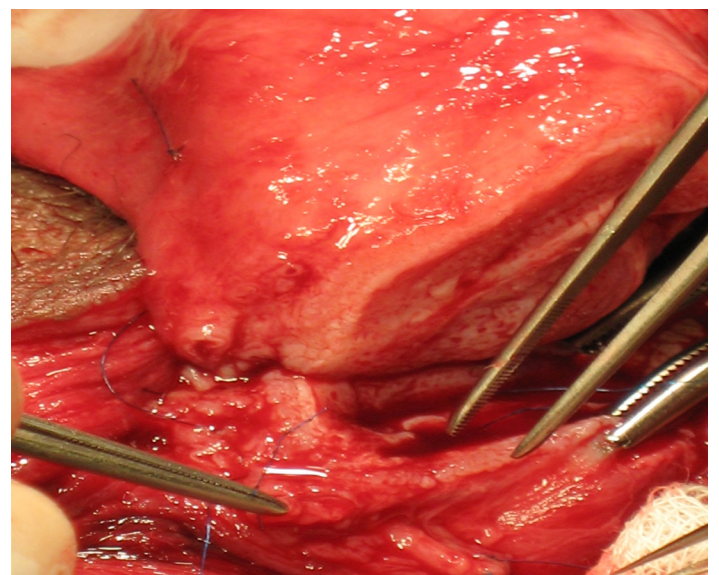
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The penile corpus was cleaned and the vessels were identified as dorsal arteries, cavernosal arteries, and dorsal veins. Cavernosal penile arteries were marked with colored sutures.

Figure 2. Anastomosis of the Left Dorsal Artery.

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For anastomosis protection, the external wall of the tunica albuginea of the left cavernous body was sutured. Slow blood outflow was noticed from the left cavernous body of the amputated penis.



Figure 3. Reanastomosis of the Left Cavernosal Artery. doi: 10.3834/uij.1944-5784.2009.12.08f3

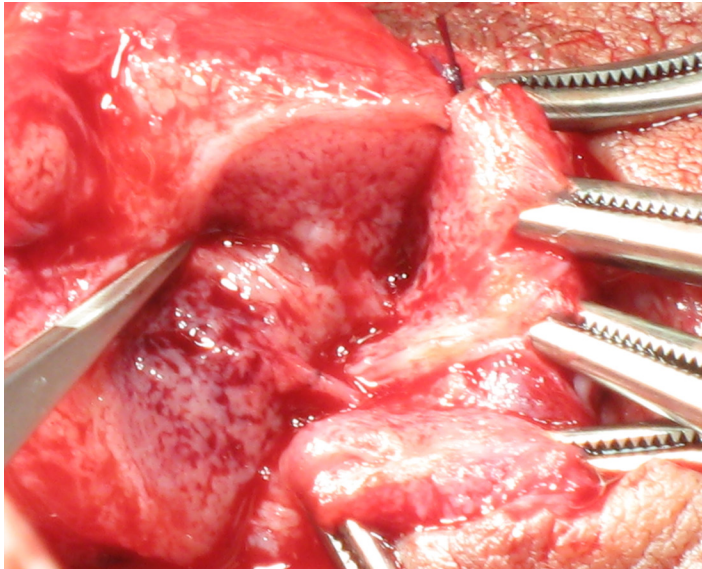
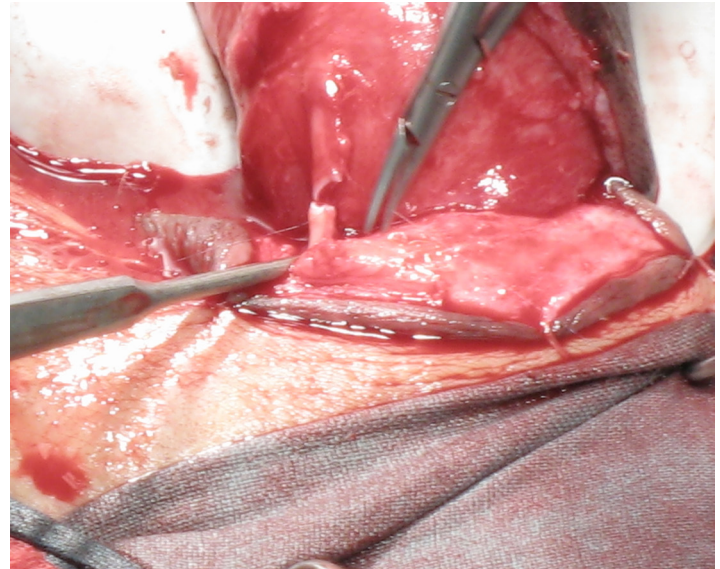
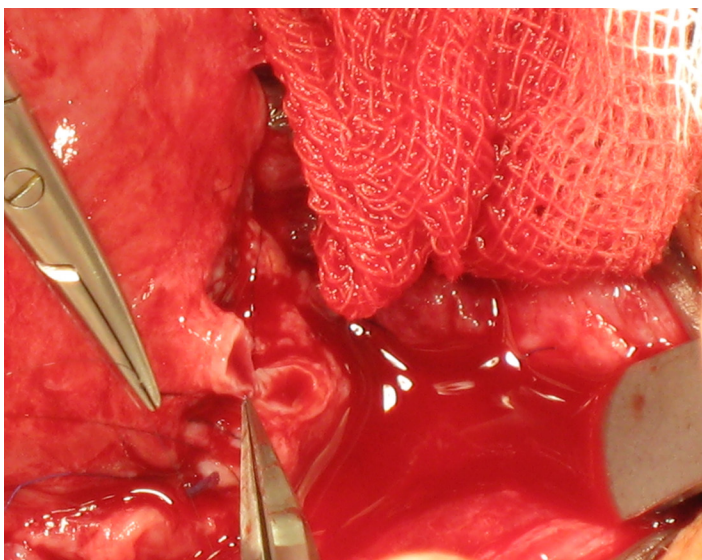


Figure 5. Reanastomosis of the Superficial Dorsal Penis Vein. doi: 10.3834/uij.1944-5784.2009.12.08f5



was injected subcutaneously every day during hospitalization, under the control of coagulation parameters. Because of the small caliber of the cavernous artery ( $< 1$  mm), the hematocrit was kept between 25% and 30%. During the hospitalization, the dosages of medicine were reduced and a prophylactic dose of Fraxiparine 0.6 mL was continued for 30 days.

Figure 4. Reanastomosis of the Dorsal Penis Vein. doi: 10.3834/uij.1944-5784.2009.12.08f4



### Follow-up Surgery

Approximately 20% of the distal spongy body and skin of the penis became necrotic beginning on the 6<sup>th</sup> postoperative day. On the 18<sup>th</sup> day, necrectomy of the penile skin flap was performed and the phallus was buried in the scrotum (Figure 6). Exteriorization of the penis that was partially covered by scrotal skin was done 2 months after reanastomosis. The distal necrotic part of the urethra was reconstructed using 4 cm x 5 cm buccal mucosa graft (Figure 7). A split-thickness skin graft from a lower limb was used to cover the rest of the phallus (Figure 8).

### Patient Evaluation

The patient received psychiatric, psychological, and sexuality evaluations. Results revealed masochism that was classified on ICD-10 as an extremely rare apotemnophilia (F 65-5), along with schizoid personality [4]. The patient had a previous history of self-mutilation and had amputated his right testis 4 years before this incident.

A neurologist examined the sensation of the reconstructed penis 3 months after the initial surgery. Results showed return of sensation with incomplete erectile function (Figure 9a; Figure 9b). The patient also experienced return of physiologic micturition. Uroflowmetry revealed no urethral strictures.



Figure 6. Phallus Buried in the Scrotum.

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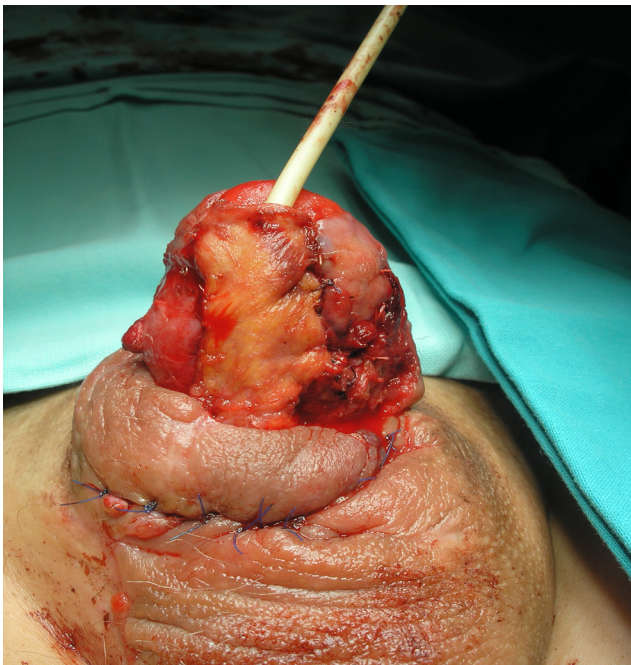
## DISCUSSION

Complete penile amputation is a rare condition. There are few reports in the literature that describe the surgical techniques of penile replantation and its follow-up. Most of the microsurgical replantation operations are for hand injuries, especially amputated fingers. Until 2007, there were only 46 studies about penile amputation [3]. In 30 cases, microsurgical anastomoses of arteries, veins, and nerves were performed. Good results were achieved in 27 cases.

Reimplantation of the penis without microsurgical anastomosis of the arteries is associated with many complications (eg, fistula formation, urethral stenosis, skin necrosis, loss of sensation, erectile dysfunction) [3]. Bhanganada [5] revealed that skin necrosis was observed in 12 of 14 cases and complete necrosis of the replantation was found in 6 cases. The author performed anastomosis of the penile dorsal vein in an unknown number of cases. Theoretically, avoidance of penile necrosis is possible when there is no artery anastomosis if blood flow is maintained between the cavernous and spongy bodies. This blood flow occurs after a shunt is surgically formed between these structures and anastomosis of the dorsal penis vein is performed. Even

Figure 7. Reconstruction of the Urethra.

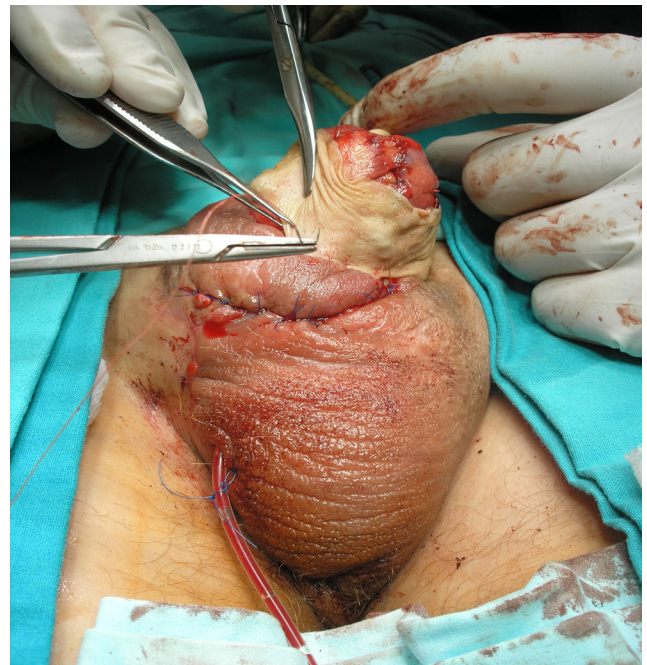
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The distal necrotic part of the urethra was reconstructed using buccal mucosa graft transplantation.

Figure 8. Skin Graft.

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A split-thickness skin graft from a lower limb was used to cover the rest of the phallus.

Figure 9a. Penile Erection, 6 Months After Penile Replantation (Lateral View).

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Figure 9b. Penile Erection, 6 Months After Penile Replantation (Superior View).

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theoretically, the avoidance of skin necrosis seems impossible after such a procedure. The present authors postulated that survival of a replanted organ without microsurgical vessel anastomosis was not probable.

Immediate microsurgical arterial and vein anastomosis seems necessary for survival of the amputated part of an organ because it enables proper blood inflow and outflow to the tissue. Improper blood inflow leads to ischemic necrosis; improper blood outflow causes stasis necrosis. In such pathological conditions, there are no chances for restoration of blood supply.

In the case of proper blood inflow and deteriorated outflow of venule blood in patients with low-flow priapism, the aspirated blood from the cavernosal bodies is characterized by hypoxia, hypercapnia, and acidity. After 4 hours of ischemia, the fibrosis processed from cavernosal bodies occurs; after 20 hours necrosis of the penis is observed. Therefore, it may not be possible to achieve good anatomical and functional effects without anastomosis of the vessels.

In the present case, the authors anastomosed the deep and dorsal arteries as well as the dorsal vein. They achieved good functional results within the cavernosal bodies. They could not find and connect the bulbar and skin arteries. Consequently, partial necrotic areas occurred within the glans of the penis and

the distal part of the urethra. The cutis of the penis became necrotic.

Based on the present case and data in the literature, the authors postulate that reimplantation of a completely amputated penis without the anastomosis of vessels is improper procedure. Microsurgical penile replantation should be the obligatory surgical technique, to enable better postoperative results and avoid many complications.

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