

## Technical Aspects in Penile Replantation: Our Experience in two Cases

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### Abstract

Penis is not only an organ of function but also an organ of masculine identity. Penile amputation may be accidental but is more often intentional and in 87% cases it is self- inflicted.<sup>1</sup> There are reports of macroscopic penile replantation with variable success in the literature.<sup>2</sup> Currently, microsurgical replantation is the accepted standard of treatment although there is still controversy on the structures that should be repaired.<sup>3</sup>

**Objectives:** To assess the outcome of microsurgical penile replantation done in two cases of near total amputation of penis, attached by a small skin tag and review the literature.

**Patients:** Two cases of near total amputation penis, attached only by a small skin tag came to our emergency. Penile replantation was done by microsurgical repair of the dorsal arteries, vein and nerves in both the cases and cavernosal arteries in the first case.

**Result:** The postoperative recovery of the first case was uneventful. The second case had complication of minor proximal skin necrosis which needed to be skin grafted. The first patient was followed up for 3 years and the second for 8 months. Both had normal micturition and acceptable appearance. Morning erection occurred in both patients and the second patient reported successful intromission at 4 months postoperatively.

**Conclusion:** Microsurgical penile replantation is the standard of care and timely meticulous repair can give near normal function and appearance. Repair of cavernosal arteries does not necessarily have a bearing on erection and sexual function at least in distal amputations. When amputation is at a proximal level and technically feasible, cavernosal arteries' anastomosis should be attempted.

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**Key words:** Penile replantation; microsurgical; cavernosal artery repair; skin necrosis

### Introduction

Penis is an organ of micturition and sexual function and penile amputation is both a physical and emotional trauma for the patient. The cause for penile amputation may be accidental like with gunshot, penetrating and strangulation injuries. Iatrogenic injuries can

occur during circumcision in infants.<sup>4,5</sup>

But more often than not it is due to intentional trauma, either assault or self- induced. 87% cases are self- mutilation of which 65% have history of psychiatric illness.<sup>1,6</sup> The patients with psychiatric illness who are most prone to this type of injury have been classified into three main groups; schizophrenics, transvestites and patients who suffer from religious and cultural conflicts.<sup>7</sup> These patients often give history of repeated similar attempts but sometimes self- mutilation is an isolated event often in response to a recent stressful event in an otherwise normal individual.<sup>1</sup> The other group of cases are due to assault generally by sexual partners, in particular jilted homosexual lovers.<sup>8,9</sup> In Thailand in the 1970s there was an epidemic

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of penile amputations caused by humiliated wives on their cheating husbands.<sup>2</sup> Since, penile amputation is a rare problem, the literature on its management is confined to scattered case reports and a few series and no specific guidelines exist on its management. Owing to the rich blood supply these patients are at risk of haemorrhagic shock and prompt resuscitation and control of bleeding is the first line of management. If the amputated part is salvaged, an attempt at replantation should be made. There is literature to support that simple end to end repair of urethra and corpora without any microsurgical anastomosis of dorsal artery and veins is sufficient for survival of the amputated penis.<sup>2,9</sup> But these were associated with high rates of complications like skin necrosis, urethral strictures and erectile dysfunction.<sup>2</sup> Microsurgical replantation is the current accepted standard management.<sup>3</sup> With microsurgery, the complications have reduced but not been eliminated. The success of replantation depends on the nature and severity of injury, warm and cold ischemia time as well as equipment and available expertise. We present two cases of penile replantation done at our centre, its outcome and a brief review of literature.

### Patient 1

Patient was a 70 yrs old male with history of schizophrenia who attempted suicide by using a kitchen knife to amputate his penis. The patient was brought to the emergency in shock and was resuscitated. The amputation was 1.5cm from the base and the part was attached by a 5mm skin tag only (Fig\_1, Fig\_2).



Figure 1: Preoperative image of case 1 ventral view



Figure 2: Preoperative image of case 1 dorsal view

The surgery was performed under general anaesthesia. Supra-pubic catheterization was done. The part was irrigated with heparin saline solution, debrided and deep dorsal arteries, vein, nerves and bilateral cavernosal arteries were identified and dissected out. Urethral ends were dissected out and spatulated. First a 16F Foley catheter was introduced in the amputated part then the stump into the bladder. Tunica albuginea on the ventral aspect of the spongiosum was repaired. Then the urethra was repaired by the attending urologist with interrupted absorbable sutures (Fig\_3).



Figure\_3: Intraoperative image of case 1 showing urethral repair and the clamps holding the cavernosal arteries

Tunica albuginea was repaired on the ventral aspect of the corpora to stabilize the penis. Following this the bilateral cavernosal arteries were anastomosed with 10-0 nylon interrupted suture under microscope (Fig\_4, Fig\_5).



Figure 4: Intraoperative image of case 1 showing cavernosal artery repair



Figure 5: Intraoperative image of case 1 showing close up of repaired cavernosal arteries

Corpora cavernosa and tunica albuginea were sutured with 4-0 polyglactin. Two dorsal arteries and the deep dorsal vein were anastomosed using 9-0 nylon and dorsal nerves were repaired using 10-0 nylon epineural sutures under microscope (Fig\_6).



Figure 6: Intraoperative image of case 1 showing repaired dorsal neurovascular structures; dorsal nerves, arteries and vein (from lateral to medial)

Loose suturing of skin was done and covered with loose bulky dressing all around and

positioned at 90 degrees from the body axis. Total ischemia time was 7 hours. Patient received low molecular weight dextran with heparin continuous infusion for three postoperative days. Follow up was uneventful and catheter was removed after 3 weeks.

### Patient 2

Patient was a 25yrs old male who came with history of near total penile amputation by his girlfriend who felt betrayed by him. The patient was resuscitated and taken to operation theatre as soon as possible. There was complete discontinuity of the corpora 3cm from the base and the amputated part was hanging from the stump by a narrow dorsolateral skin tag and a dorsal nerve (Fig\_9, Fig\_10).



Figure 9: Preoperative image of case 2



Figure 10: Preoperative image of case 2 showing complete division of corporal bodies

Suprapubic catheterisation was done by urologist. Under GA, amputated part was debrided, washed with normal saline and structures identified and dissected out. Cavernosal arteries were very small and could not be adequately dissected. The urethra was anastomosed by the urologist and then the corpora cavernosa and tunica albuginea were repaired with 4-0 polyglactin. We decided against repair of cavernosal arteries separately in this case as they were very small, amputation being more distal than the first case. Two dorsal arteries, the deep dorsal vein and the injured single dorsal nerve were repaired using 9-0 and 10-0 nylon respectively under microscope. Buck's fascia and skin was closed with loose stitches. Ischemia time was 6 hours. Postoperatively low molecular weight dextran and heparin was given for 5 days and discharged on day 10. At 2 weeks, patient presented with necrosis of small area of proximal penile skin (Fig\_11).



Figure 11: Postoperative image of case 2 showing penile skin necrosis

Wound healed by conservative management (Fig\_12, Fig\_13).

Supra-pubic catheter was removed at 4 weeks and Foley's catheter was removed at 6 weeks.



Figure 12: Postoperative image at 8 weeks showing well healed graft



Figure 13: Postoperative image at 8 weeks ventral view

### Result:

The first patient had an uncomplicated recovery. At 3 years follow up patient had normal micturition and appearance (Fig\_7, Fig\_8).



Figure\_7: Postoperative image of case 1 dorsal view



Figure\_8: Postoperative image of case 1 lateral view

Erectile function could not be assessed properly as patient was not sexually active but morning erections were often present. Patient is on medication for his psychiatric illness and has not re attempted self- mutilation again.

The second patient had an acceptable aesthetic outcome and was able to void normally. Morning erection was seen one and a half months after surgery and patient had some sensations on the glans by one month time. At 7 months follow up, he did not complain of urinary issues and reported successful intromission.

### Discussion

Penile amputation is a rare case to be encountered. The most common cause is self-inflicted accounting for 87% cases and 65% of these patients suffer from psychiatric illnesses.<sup>1,6</sup> About 20% of such patients have history of similar attempts in the past and they are at high risk for re-attempts.<sup>1</sup> Most of the literature on penile replantation is based on individual case reports and a few series. The first penile replantation was reported in 1929 wherein the corpora and urethra were approximated and penis was buried into the scrotum and no attempt was made at anastomosis of arteries, veins or nerves.<sup>10</sup> Following this, several similar cases have been reported with variable outcomes.<sup>2,3,11</sup> The most common complication was skin necrosis followed by urethral strictures, urethra-cutaneous fistula, erectile dysfunction and poor sensory recovery.<sup>2,3</sup> In 1977, the first microsurgical replantation were reported by Tamai et al and Cohen et al.<sup>12,13</sup> Since then about 43 cases of microsurgical replantation have been reported in the literature and these have seen fewer complications and better function and appearance as compared to macroscopic replantations.<sup>2,3,11-14</sup>

At present, microsurgical replantation is the standard treatment for penile amputation but there is still no consensus on the structures to be repaired.<sup>3</sup> The blood supply of penis comes

from the deep sinusoidal system of cavernosal arteries and a superficial system of deep dorsal penile arteries, both arising from the internal pudendal arteries, with good communication between the two. The sinusoidal flow can be re-established by simple approximation of the corporal bodies, as is evident by numerous reports of successful macroscopic replantation. Deep cavernosal artery repair is recommended by some authors.<sup>15,16</sup> Wei et al advocated that at least repair of a single superficial artery should be done along with deep arteries.<sup>17</sup> Landstrom et al recommended repair of single superficial artery only and did not consider microvascular repair of cavernosal artery mandatory as there is good communication between the superficial and deep vascular system.<sup>14</sup> More recent literature recommends deep cavernosal repair if it is injured proximally and is amenable to repair.<sup>8,9,18</sup>

Skin necrosis is the most common complication and occurs irrespective of the artery repaired.<sup>8,15</sup> The incidence of skin necrosis has been found to be 77.8% and on eliminating cases with some intact skin bridge, it is as high as 87.5%.<sup>19</sup> Primary debridement of penile skin and burying of the replanted penis in the scrotal or supra-pubic skin was suggested earlier.<sup>20,21</sup> This not only prevented skin necrosis but also protected from further assaults on the replanted penis in patients with history of self-mutilation. But this involved further surgery for removing the penis from the skin pocket and the hairy thick scrotal or abdominal skin did not look aesthetically appealing. Recent cadaveric perfusion studies have revealed that the majority of the shaft skin is supplied by the external pudendal system by multiple small vessels in the skin and only the glans and the distal penile skin is supplied from the dorsal arteries.<sup>19</sup> The repair of external pudendal branches has not been documented in any penile replantation reports. In our second case we saw necrosis of proximal penile skin

which could be attributed to the vascular anatomy. In an account of penile replantation by Chou et al, they observed necrosis of dorsal arteries and early prepuce necrosis but long term survival of the prepuce and glans. Although not proven, they postulated that the deep system takes over the supply of the glans and foreskin after the 1<sup>st</sup> week and the superficial system is responsible for maintaining its viability in the first week alone.<sup>15</sup>

Necrosis of the glans and corpora is usually associated with other adverse factors like long ischemia time or deep cavernosal injury.<sup>15</sup> Another critical factor for penile skin viability appears to be venous drainage. Ishida et al advocated repair of as many veins as possible.<sup>22</sup> Postoperative oedema or a contained expanding haematoma under the skin can compromise the skin vascularity. There is repeated emphasis on loose suturing of the skin and dartos, postoperative positioning and timely intervention when suspecting venous compromise such as suture removal and release incisions.<sup>15,22</sup> Chou et al recommended multiple release incisions to relieve oedema.<sup>15</sup> There are also accounts of leech therapy and hyperbaric oxygen therapy used successfully to aid survival of the replanted organ.<sup>14,15</sup>

From the review of literature and our own personal experience, we understand that the deep cavernosal artery need not necessarily be anastomosed, at least in distal cases and simple suturing of the corpora is sufficient to establish sinusoidal circulation. Both our cases had normal morning erection within one month of replantation and the repair of cavernosal arteries at least in distal amputations does not have any bearing on erection and sexual function.

### **Conclusion:**

Microsurgical penile replantation is the standard of care and timely meticulous repair can give near normal function and

appearance. Repair of cavernosal arteries does not necessarily have a bearing on erection and sexual function at least in distal amputations. When amputation is at a proximal level and technically feasible, cavernosal arteries' anastomosis should be attempted.

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