

## Brief communication (Original)

# Anatomical and functional outcome after bilateral scrotal flap in penile reconstruction

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**Background:** Injection of alloplastic material underneath the penile skin for penile augmentation causes many complications such as inflammation, infection, ulceration, and pain during sexual activity. One of the treatments for complications after these penile augmentation procedures is surgical excision of the foreign body granuloma followed by penile skin coverage with bilateral scrotal flaps. There are no prior prospective studies published about anatomical and functional outcomes.

**Objective:** To study the anatomical and functional outcome of one-stage bilateral scrotal flap reconstruction in patients after surgical removal of paraffinoma from penile shafts.

**Methods:** Patients who suffered from complications of penile foreign body granuloma were treated by surgical excision and reconstruction with bilateral scrotal flaps. The penile lengths and circumferences when flaccid and erect were recorded preoperatively and postoperatively. The patients were interviewed using questionnaires and satisfaction scores to determine their sexual experiences were recorded before and after surgery.

**Results:** Thirteen patients were enrolled in this study. The mean follow-up time was 23.5 (11.5–40.5) weeks. The mean erectile length and the maximal circumference were 11.8 (9–15) cm, 14.5 (11.5–17) cm preoperatively, and 11.7 (10–14) cm, 11.8 (10–13) cm postoperatively. Satisfaction scores of sexual activity is 6.84 (0–9) preoperatively, and 8.38 (5–10) postoperatively.

**Conclusion:** One-stage bilateral scrotal flap coverage is a good option for penile skin reconstruction. This technique can achieve satisfactory results both anatomically and functionally.

**Keywords:** Foreign body granuloma, paraffinoma, penile reconstruction, scrotal flap

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Injection of alloplastic material underneath the penile skin for penile augmentation was first reported in 1800 by Robert Gersuny, an Austrian surgeon. The most common material used is silicone. However, the use of paraffin, mineral oil, antibiotic ointment is also reported [1-3]. Many complications such as inflammation, infection, ulceration, and pain during sexual activity have continuously noted since 1906 [4]. In spite of these, ignorance of these complications still causes a serious problem in Thailand.

The treatment of these complications is surgical excision of the foreign body granuloma followed by penile skin coverage. There are many methods to create penile skin coverage such as skin graft, local flap, or free flap [5-8]. Coverage of the penile defect with a scrotal flap, the technique most commonly used

in our center, was reported to give the best outcome by many authors [9, 10]. However, to our knowledge, there is no prior prospective study published of anatomical and functional outcomes after treatment by this technique.

Our aim was to study the outcome of reconstruction with bilateral scrotal flaps in patients after surgical removal of foreign body granulomas from the penile shaft. We studied the sizes of the penile shafts and ability to perform satisfying sexual intercourse in these patients.

## Materials and methods

From July 2010 to December 2010, all patients suffered from complications of penile foreign-body granuloma that came to our special clinic at the Division of Plastic and Reconstructive Surgery, Department of Surgery, King Chulalongkorn Memorial Hospital, Thailand, were recruited to our study. All the surgeries were performed or controlled by the authors. We excluded patients whose lesion extended

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into the scrotal skin and could not be reconstructed with bilateral scrotal flaps, but by using other techniques. Moreover, we excluded patients who were lost to follow up after surgery.

We recorded the penile lengths and circumferences when flaccid and erect, preoperatively and postoperatively. We also determined sexual satisfaction by using a questionnaire and satisfaction score (0–10) before and after surgery and during the follow-up period.

This study was approved by the Institution Review Board (IRB) of King Chulalongkorn Memorial Hospital Ethics Committees (IRB No.470/53).

### Operative technique

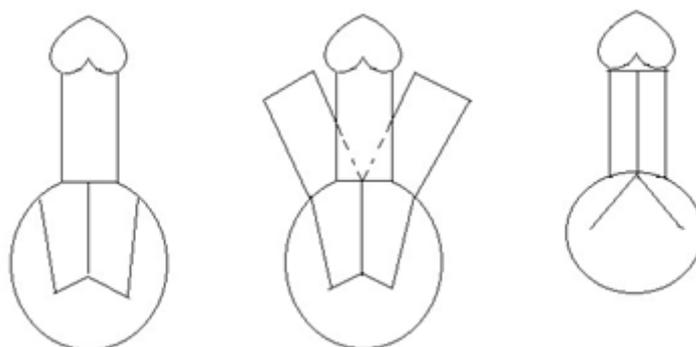
Under spinal anesthesia, a Foley catheter was inserted. After complete removal of the involved skin and subcutaneous tissues, we designed a bilateral scrotal flap as described by Jeong [9] and based on the anterior scrotal artery described [11] (**Figure 1**). The flap was elevated in deep tissue close to tunica vaginalis to protect the main vessels. The pedicle must be wider than 2.5 cm from the midline. A sharp

penoscrotal junction was created to separate the penis and the scrotum to avoid further shortening of the penile appearance. A small Penrose drain and conventional mild compressive dressing were then placed.

The patients were discharged after drain removal within 3 days and they were told to avoid sexual activity for at least 6–8 weeks postoperatively.

### Results

Eighteen patients were enrolled in this study. Two patients were excluded because of scrotal skin involvement that required 2-stage reconstruction. Three patients were lost to follow up after completing surgical treatment. Thirteen patients were evaluated in this study with mean follow-up period of 23.5 (11.5–40.5) weeks. The demographic data of the 13 patients are shown in **Table 1**. The lengths and circumferences in flaccid and erect states preoperatively, intraoperatively and postoperatively are shown in **Table 2**. Satisfaction scores of sexual activities, preoperatively and postoperatively, are shown in **Table 3**.



**Figure 1.** Flap was designed (left). Bilateral scrotal flap was dissected (middle). Flap was transposed to cover the defect at the penile shaft and primary closure was done on donor site (right).

**Table 1.** Patients' demographic data

Age	32.9 (14–53) y
Duration of illness	4.9 (0.7–20.9) y
Injected material	
Olive oil	6 (46 %)
Antibiotic ointment	3 (23%)
Vaseline	2 (15.5 %)
Unknown	2 (15.5 %)
Symptoms	
Pain	4 (30 %)
Ulceration	8 (60 %)
Anesthesia	3 (23 %)
Partner's painful	5 (38 %)
Other	4 (30 %)

**Table 2.** Penile lengths and circumferences

	Preoperative (cm)	Intraoperative (cm)	Postoperative (cm)
<b>Flaccid</b>			
Length	9.8 (8.5–13)	N/A	9.6 (9–13)
Circumference			
Proximal	11.7 (9–15)	N/A	11.5 (9–13.5)
Middle	13.4 (10.5–16)	N/A	11.4 (10–13)
Distal	12.1 (9–15)	N/A	11.1 (10–13.5)
<b>Erect</b>	11.8 (9–15)	10.5 (9–13)	11.7 (10–14)
Length			
Circumference			
Proximal	12.6 (10–15.5)	9.5 (9–11.5)	11.7 (10–14)
Middle	14.5 (11.5–17)	9.2 (9–11)	11.8 (10–13)
Distal	13.5 (11–16.5)	9.2 (9–11)	11.7 (11–13)

**Table 3.** Sexual satisfaction scores

Patient No.	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean
<b>Preoperative</b>	6	8	7	7	9	9	9	9	6	2	0	9	8	6.84
<b>Postoperative</b>	9	8	10	9	9	9	9	9	8	7	9	8	5	8.38

## Discussion

Treatment of paraffinoma by bilateral scrotal flap was first described by Jeong in 1996, and later by Jindarak in 2005. In this paper, we used the design described by Jeong. The flap is supplied from the anterior scrotal artery that runs in the internal spermatic fascia. We dissected the tunica vaginalis with the flap to cover the main vessel that was presented by Angspatt in 2009. We could not identify the penile length and circumference before foreign body injection as that procedure was done elsewhere. The patients came to our Department after injection and complications developed. Our study shows the mean flaccid lengths of the penile shaft preoperatively and postoperatively as 9.8 and 9.6 cm, respectively. These findings show that there is very little effect from foreign body injection on the length of the penile shaft. The shape of the penile shaft after foreign-body injection is abnormally bulky at the mid-shaft of the penis both when flaccid and erect. The mean penile circumferences when flaccid at the proximal, middle and distal part of the penile shaft preoperatively were 11.7, 13.4, and 12.1 cm, respectively. The mean erect penile circumferences at the proximal, middle and distal of the penile shaft preoperatively were 12.6, 14.5, and 13.5 cm, respectively. After removal of the

foreign body and making of the scrotal flap coverage, the shapes of the penile shaft were more natural both when flaccid and erect. The mean flaccid penile circumferences at the proximal, middle and distal parts of the penile shaft postoperatively were 11.5, 11.4, and 11.1 cm, respectively. After foreign-body removal and making the scrotal flap coverage the erect penile circumferences at the proximal, middle and distal of penile shaft were 11.7, 11.8, and 11.7 cm, respectively. The lengths were only slightly changed preoperatively and postoperatively, when flaccid and when erect. However, when compared to normal Thai population presented by Souwanalikit in 2010, the flaccid lengths were longer (9.6 vs. 8.5 cm) and the erect lengths were shorter (11.7 vs. 12.47 cm) [12]. Although the circumferences were decreased postoperatively in both flaccid and erect states, these results were larger than those of the normal Thai population (11.4 vs. 8.89 cm and 11.8 vs. 11.31 cm, respectively). The changes in length and circumference between the flaccid and erect states are greater in the normal population than in this study. This may be the result of the scar from the surgery that restricted the enlargement of the penile length and circumference during erection.

Most patients were satisfied with their postoperative sexual ability compared to their

preoperative status with the sexual satisfaction score increasing from 6.84 to 8.38. The sexual satisfaction score was unchanged in 6 patients as they reported no problems in sexual activity before the operation, but they underwent the procedure because of ulceration and the wish of their partner. However, satisfaction in sexual function decreased in 2 patients. One patient complained of partial loss of penile pleasurable sensation and that he could not complete orgasm in the first 3 months. In this patient, the foreign body involved buck's fascia and we removed the foreign body totally. After 3 months this patient had returning normal sexual satisfaction. Another case reported pain during sexual activity because of scar contracture at the penoscrotal junction that was later corrected with Z plasty after 6 months.

### Conclusion

One-stage bilateral scrotal flap for penile skin reconstruction is a good option for patients who suffered from complications of foreign-body granuloma. This technique can restore both the anatomy of the penile shaft and its function nearly to their normal status.

The authors have no conflicts of interest to declare.

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