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CASE REPORT
Reconstructive

# Fertility-sparing Scrotal Reconstruction with a Superficial Circumflex Iliac Perforator Flap

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**Summary:** It is believed that skin flaps should not be used to reconstruct large scrotal defects because thick flaps increase testicular temperature and decrease fertility, and those skin grafts should be used to reconstruct large scrotal defects. We report a case of extensive scrotal defect reconstructed with bilateral superficial circumflex iliac perforator (SCIP) flaps in which spermatogenesis improved postoperatively over time. A 44-year-old man underwent reconstruction of an extensive scrotal defect caused by Fournier gangrene, and bilateral SCIP flaps were used for the reconstruction. In the third postoperative month, his semen volume and sperm count after centrifugation were 1.5 mL and eight, respectively. Based on these semen findings, fertility specialists diagnosed the patient with extremely low fertility. In the ninth postoperative month, the semen volume was 2.2 mL, sperm density was $2.7 \times 10^6$/mL, sperm motility was 64%, and normal sperm morphology was 54%, indicating significant improvement. Based on the sperm findings, fertility specialists considered the patient capable of causing pregnancy. There have been no reports of preservation of spermatogenesis after scrotal reconstruction with a thinned perforator flap. In the postoperative period, we observed improvement of spermatogenesis, which suggests that scrotal reconstruction with an SCIP flap may be effective for improving both cosmetic appearance and fertility. *(Plast Reconstr Surg Glob Open 2023; 11:e5015; doi: 10.1097/GOX.0000000000005015; Published online 24 May 2023.)*

## INTRODUCTION

The optimal method for the reconstruction for extensive scrotal defects is yet to be determined. In many previous studies, skin grafting was recommended for flap reconstruction because fertility decreases with increasing testicular temperature.[1–5] However, some recent studies reported that superficial circumflex iliac perforator (SCIP) flaps, which are thinner than conventional groin flaps, provide good cosmetic outcomes after scrotal defect reconstruction.[6–8] Nevertheless, no study has specifically investigated the effect of SCIP flap use during scrotal defect reconstruction on fertility.

We report a case of reconstruction of an extensive scrotal defect with a bilateral SCIP flap in which spermatogenesis improved postoperatively over time. This is the first report of a case in which sperm findings indicated that fertility can be preserved after reconstruction with an SCIP flap.

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*Received for publication December 19, 2022; accepted March 13, 2023.*



DOI: 10.1097/GOX.0000000000005015

## CASE PRESENTATION

A 44-year-old man was transported to our hospital with a 3-day history of severe pain and swelling in the perineum and scrotum. The patient was not diabetic or obese, which are risk factors for Fournier gangrene. However, his medical history included depression, alcoholism, and right kidney cancer without recurrence. A urologist diagnosed him with Fournier gangrene and performed emergency debridement. On the fifth day after disease onset, the patient was sent to our department for consultation regarding scrotal defect reconstruction. Initial examination revealed an extensive scrotal defect with exposed testes and spermatic cords (Fig. 1). Ceftriaxone was administered intravenously at a dose of 1 g/d to control infection. For wound treatment, it was washed daily, and iodoform gauze and isodine sugar paste ointment were applied.

Disclosure statements are at the end of this article, following the correspondence information.

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**Fig. 1.** Initial image of the scrotal defect following debridement for Fournier gangrene. The image shows an extensive scrotal defect and exposed testes and spermatic cords.

Because the wound infection could be controlled, we planned to reconstruct the scrotum with SCIP flaps from the bilateral inguinal areas. Preoperatively, color Doppler sonography was performed to map the branches of the superficial circumflex iliac artery (SCIA). Reconstruction was performed under general anesthesia in supine position on day 27 after disease onset. Based on the preoperative markings, we designed bilateral SCIP flaps with dimensions of 11 cm × 6 cm on the left side and 13 cm × 8 cm on the right side (Fig. 2). After identifying the superficial branch of the SCIA from the proximal small skin incision, we elevated a thin skin flap on the fascia from the peripheral part of the skin island and transferred the SCIA branch through the subcutaneous tunnel to the scrotum, and the skin flaps from both sides were sutured in the midline. (**See Supplemental Digital Content 1**, which shows the thickness of the elevated SCIP flap. In this case, we have elevated the flap on the layer of superficial fascia, **http://links.lww.com/PRSGO/C573**.)

**Fig. 2.** Flap design. The flap is designed based on color Doppler sonography findings.

**Fig. 3.** Six months after surgery. The reconstructed scrotum is in good shape, and the patient does not have problems with sexual performance.

Using the two small thin flaps from bilateral donor sites, it was possible to encircle the testes and spermatic cords with no dead space and to create a symmetrical scrotal morphology. In the postoperative period, no complications were observed, and the skin flaps completely survived. With respect to sexual function, there were no problems with erection or ejaculation, and good scrotal morphology was maintained with no contracture (Fig. 3).

The patient insisted on semen analysis when he was informed about the damage caused to the testes by Fournier gangrene. The findings of semen analysis performed 3 months and 9 months after surgery are shown in Figure 4. Three months after surgery, semen volume was 1.5 mL, and sperm count after centrifugation was eight. Based on the semen findings, fertility specialists diagnosed the patient with extremely low fertility. Nine months after surgery, semen volume was 2.2 mL, sperm density was $2.7 \times 10^6$/mL, sperm motility was 64%, and normal sperm morphology was 54%. These semen findings indicated significant improvement, and the fertility specialists diagnosed the patient as fertile. The patient does not have a partner; therefore, his ability to cause pregnancy could not be confirmed. However, he is willing to get married and will continue to be followed up.

## DISCUSSION

To this day, controversy remains as to which skin grafts or skin flaps are more suitable for the reconstruction of extensive scrotal defects due to Fournier gangrene or trauma.[1–4] Although skin grafts are thin, if complete survival is not achieved because of the complex structures of the testis and spermatic cord, severe contractures may result in poor cosmetic outcome or loss of sexual performance.[5] Furthermore, although skin flaps are flexible, well-designed, and not constrictive, it is thought that the thickness of skin flaps increases testicular temperature and adversely affects fertility.[5] In 2003, Wang et al reported a reduction in spermatogenesis over time after scrotal reconstruction with a thick groin flap and concluded that skin grafts should be used to prevent increase in

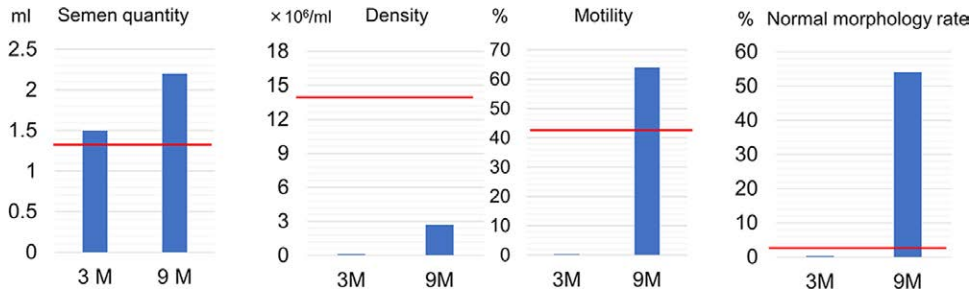


**Fig. 4.** Postoperative semen analysis. All semen parameters improved 3–9 months after surgery.

testicular temperature.[9] Moreover, in 2009, they reported that multiple defatting procedures following thick groin flap reconstruction were useful to restore spermatogenesis, although the improvement level of the semen findings was not satisfactory.[10] Since then, it has generally been accepted that scrotal reconstruction should be performed with skin grafts to avoid spermatogenesis dysfunction.

Several recent studies have reported cases of scrotal reconstruction with SCIP flaps because SCIP flaps are thinner than axial pattern flaps.[6–8] However, there are no reports of spermatogenesis in cases such as that of our patient, and to date, preservation of spermatogenesis after scrotal reconstruction with a thinned perforator flap has not been verified.

The case of our patient is the first confirmed case of spermatogenesis after scrotal reconstruction with a single-stage SCIP flap, as we observed improvement of spermatogenesis over time. The recovery of postoperative spermatogenic potential in our patient suggests that a thin SCIP flap can be safely used for scrotal reconstruction. Due to their thin and flexible nature, SCIP flaps do not cause contracture, and they are a cosmetically pleasing material that reproduces scrotal morphology.

The first limitation of this report is that the preoperative spermatogenesis was unknown because the urologist had not performed a semen analysis before reconstruction. It is assumed that spermatogenesis was temporarily impaired at the acute phase of Fournier gangrene. In this case report, recovery of spermatogenesis was observed from 3 to 9 months after the acute phase had passed because it generally takes more than 3 months for the recovery of temporarily damaged spermatogenesis even in a healthy adult. Therefore, we checked the spermatogenesis at 3 months after reconstruction. The second limitation of this study is its case report design. It is necessary to accumulate cases in which semen parameters were measured. To clearly determine the postoperative fertility associated with the reconstructive methods, future studies should compare the results of patients who underwent scrotal defect reconstruction with skin grafts to those of patients who underwent scrotal defect reconstruction with thin skin flaps. The third limitation is that the patient does not have a partner; therefore, his ability to cause pregnancy was not confirmed, and long-term follow-up of the patient is necessary.

## CONCLUSIONS

We reported the case of a patient with an extensive scrotal defect who underwent reconstruction with bilateral SCIP flaps and showed restoration of spermatogenesis in the postoperative period. Reconstruction with SCIP flaps can become the optimal method of scrotal reconstruction for patients with extensive scrotal defects.

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## DISCLOSURE

*The authors have no financial interest to declare in relation to the content of this article.*

## ACKNOWLEDGMENT

*All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional committee and with the ethical principles stated in the Declaration of Helsinki.*

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