

EP-172

이물질 육아종에 대한 단일 단계 음경 피부 재건술: 피부 대체재를 사용한 간소화된 음압 상처 치료 보조 프로토콜

(Single-Stage Penile Resurfacing for Foreign Body Granuloma: A Simplified NPWT-Assisted Protocol with Dermal Substitute)



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**Purpose:** To present a simplified single-stage protocol using negative pressure wound therapy (NPWT) combined with dermal substitute and split-thickness skin graft (STSG) for penile foreign body granuloma resulting from subcutaneous injection of various substances.

**Methods:** A retrospective review was conducted on 11 consecutive patients who underwent penile resurfacing for foreign body granuloma between March 2018 and June 2025. All patients received complete excision of granulomatous tissue, Matriderm Flex application, STSG, and NPWT (-125 mmHg). Primary outcomes included graft take rate, complications, hospital stay, and patient satisfaction assessed by a 9-item questionnaire.

**Results:** Mean patient age was 55.3 years. Foreign body types included Vaseline alone (n = 6), Vaseline with hyaluronic acid (n = 1), hyaluronic acid alone (n = 1), and unknown fillers (n = 3). The first dressing change was performed on postoperative day 5 with near-complete graft take achieved in 10 of 11 cases (90.9%). Complications included partial graft loss with hematoma requiring evacuation (n = 1) and chronic discharge from remnant filler material (n = 1). Mean satisfaction score was 37.5/45. Mean follow-up was 18.9 months.

**Conclusion:** NPWT-assisted single-stage reconstruction using dermal substitute and STSG provides a simple, reliable, and reproducible option for penile foreign body granuloma, avoiding complex flap surgery while achieving excellent graft take and high patient satisfaction.



Fig. 1. Representative case of penile resurfacing for foreign body granuloma. (A, B) Preoperative appearance demonstrating diffuse penile swelling with characteristic football-shaped deformity. (C, D) Postoperative day 5 showing successful graft take with wellvascularized appearance.

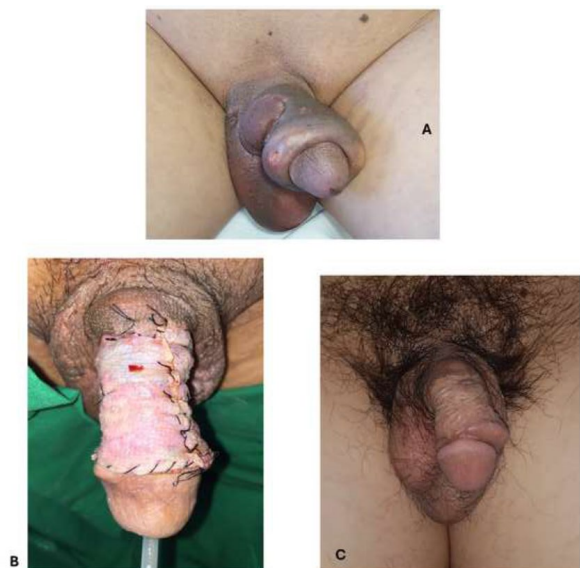


Fig. 2. Long-term outcome of a representative case. (A) Preoperative appearance showing penile foreign body granuloma. (B) Postoperative day 5 demonstrating successful graft take. (C) Eighteen months postoperatively showing durable skin coverage with natural appearance and excellent elasticity.

| Variable   | Value           |
|--|-----------------|
| No. of patients                                      | 11              |
| Sex, male, n (%)                                     | 11 (100)        |
| Age (years), mean $\pm$ SD                           | 55.3 $\pm$ 4.6  |
| Age (years), range                                   | 49-63           |
| Foreign body type, n (%)                             |                 |
| Vaseline   | 6 (54.5)        |
| Vaseline + hyaluronic acid                           | 1 (9.1)         |
| Hyaluronic acid                                      | 1 (9.1)         |
| Unknown filler                                       | 3 (27.3)        |
| Defect location, n (%)                               |                 |
| Penis only   | 8 (72.7)        |
| Penis and scrotum                                    | 3 (27.3)        |
| Penile defect size (cm <sup>2</sup> ), mean $\pm$ SD | 17.4 $\pm$ 16.4 |
| Penile defect size (cm <sup>2</sup> ), range         | 6-56            |
| Reconstruction method, n (%)                         |                 |
| Matriderm Flex + STSG                                | 8 (72.7)        |
| Matriderm Flex + STSG + advancement flap             | 3 (27.3)        |
| Operation time (min), mean $\pm$ SD                  | 63.6 $\pm$ 10.3 |
| Operation time (min), range                          | 50-80           |
| Hospital stay (days), mean $\pm$ SD                  | 5.2 $\pm$ 0.6   |
| Hospital stay (days), range                          | 5-7             |
| Follow-up (months), mean $\pm$ SD                    | 18.9 $\pm$ 7.6  |
| Follow-up (months), range                            | 12-36           |

SD, standard deviation; STSG, split-thickness skin graft.

Table 1. Patient Demographics and Clinical Characteristics

| Technique               | Stage         | Advantages  | Disadvantages   |
|-------------------------|---------------|---|---|
| Scrotal flap            | Single        | Reliable vascularity, single procedure                                | Hair-bearing, bulky, donor morbidity                      |
| STSG alone              | Single        | Technical simplicity  | Poor elasticity, contracture, tethering                   |
| Integra + STSG          | Two           | Good dermal regeneration, elasticity                                  | 2-3 week interval, multiple procedures                    |
| Perforator flap         | Single        | Thin, pliable, hidden donor scar                                      | Doppler required, complex positioning, specialized skills |
| <b>Present protocol</b> | <b>Single</b> | <b>Good elasticity, simple, reproducible, early discharge (POD 5)</b> | <b>Not for extensive defects or poor wound beds</b>       |

STSG, split-thickness skin graft; POD, postoperative day.

Table 2. Comparison with Existing Reconstructive Techniques