

Effective Surgical Management of Vestibulodynia with the Anterior Obturator Artery Perforator (aOAP) Flap

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Abstract

Vestibulodynia, a form of vulvodynia, is defined as a chronic pain disorder of the vestibule, which may lead to symptoms such as dyspareunia and sexual dysfunction in affected women. The anterior obturator artery perforator (aOAP) flap is a pedicled fasciocutaneous perforator flap that represents a safe and effective method for vulvovestibular reconstruction for a variety of indications. This article aims to explore the therapeutic potential of the aOAP-flap in select cases of vestibulodynia unresponsive to other treatment methods. Two young women underwent surgical therapy with the aOAP-flap after having exhausted various unsuccessful conservative, minimally invasive, and surgical treatment options. A summarized overview of surgical technique, treatment course, patient experience, and outcomes is described. A substantial postoperative improvement of pain and sexual function was observed, with no occurrence of complications during a 1-year follow-up. The clinical experience described in this study shows that the applicability of the aOAP-flap may safely and effectively extend to patients suffering from refractory vestibulodynia, as exemplified by these two cases. (J GYNECOL SURG 00:000)

Keywords: vestibulodynia, vulvodynia, aOAP-flap, sexual-dysfunction, surgery, reconstruction

Introduction

Vestibulodynia, a form of vulvodynia, is defined as a chronic pain disorder of the vestibule that arises from a complex etiology that is likely multifactorial and involves both organic and functional components. Epidemiological studies indicate that vestibulodynia has a lifetime prevalence estimated between 7% and 16%.¹ Vestibulodynia is classified as primary or secondary. Primary vestibulodynia causes pain from the first vaginal penetration, whereas secondary vestibulodynia develops after an initial pain-free period.² The psychosocial consequences of vestibulodynia, stemming from disturbed interpersonal relations, interference in daily activities, and sexual dysfunction, may compound its morbidity and further impact quality of life.^{1,3}

Vestibulodynia is a diagnosis of exclusion, requiring comprehensive gynecological evaluation. If suspected, a clinical examination with a cotton swab test is performed to assess superficial vulvovestibular and introital pain and specify which areas are affected.⁴

Topical pharmacotherapy is typically the initial treatment of choice for vestibulodynia. Additional options include oral

pharmacotherapy, pelvic floor physical therapy, and psychological intervention. Surgery can be an effective option in cases of vulvodynia that are refractory to conservative treatment.⁴ A variety of surgical techniques have been proposed and studied, including perineoplasty, vestibuloplasty and several methods for vestibulectomy.⁵

Vestibulectomy entails excision of affected vulvovestibular tissue. The resulting defect may subsequently not be suitable for primary closure, skin grafting, or local flaps.

The anterior obturator artery perforator (aOAP) flap, invented by the first author, presents a safe and effective method for vulvovestibular reconstruction that can be utilized for a variety of indications, including large tissue defects following oncological procedures or symptoms after female genital mutilation/cutting.^{6,7} The aOAP-flap is a pedicled fasciocutaneous perforator flap harvested from the genitofemoral sulcus and tunneled toward the defect site.⁸ The objective of this article is to explore the therapeutic potential of skinning vestibulectomy and single-stage reconstruction with bilateral aOAP-flap transposition in alleviating vulvovestibular pain and improving sexual function in refractory vestibulodynia.

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Case Presentation

Two young women presented themselves for treatment of vestibulodynia due to a worsening burden of disease despite exhaustive previous conservative and invasive treatment.

In both cases various clinical and histopathological examinations had been conducted, ruling out other potential pathologies such as vaginismus and lichen sclerosus et atrophicus.

A detailed medical history was taken, with an assessment of factors such as sexual abuse, which was denied in both cases. This was followed by a standardized physical examination, including a cotton swab test. The patients provided verbal and written consent to the proposed surgical strategy after a comprehensive patient education session covering anatomy, pathoetiology, alternative treatment options, and discussion of patient expectations. Both patients underwent a skinning vestibulectomy with vulvovestibular reconstruction using the aOAP-flaps in a single-stage procedure performed by the first author. Postoperative care included follow-up appointments for up to 1-year, complemented by scar massage and pelvic floor physical therapy to minimize scar contractures and maintain vaginal flexibility. Both patients provided written consent for publication, including images. This case series adheres to the CARE guidelines.⁹ Ethical approval was acquired from the local medical ethics commission.

Surgical Technique

The aOAP-flap is a pedicled fasciocutaneous perforator flap situated in the genitofemoral sulcus, supplied by the cutaneous branch of the obturator artery and vein. The flap is designed in a pointed elliptical shape and then tunneled to the recipient site. Its consistent vascular anatomy, pliability, and easy accessibility enable reliable, tension-free tissue

transfer for reconstruction of extensive defects involving the external female genitalia and vaginal introitus. The donor site can be closed primarily, resulting in minimal morbidity and a concealed scar within the genitofemoral crease. The robust perfusion of the flap supports excellent healing even in irradiated or scarred tissues. During closure of the genitofemoral donor site, securing the fascia lata to the inferior pubic ramus helps prevent lateral tension on the vulva or vaginal introitus when the legs are abducted.

Case 1

A 27-year-old woman sought surgical consultation for primary vestibulodynia, 10 years after initial disease onset. Her medical history included chronic fatigue syndrome and recurrent vaginal candidiasis, with the last episode occurring approximately 11 years ago.

Figure 1 provides a condensed overview of the attempted interventions in relation to age prior to presentation. Despite these interventions, her symptoms had only worsened, leading to persistent vestibular pain exacerbated by slight touch, such as when cycling or wearing jeans. The patient would refrain from sexual intercourse due to this intense pain, describing the sensation of penetration as akin to being “cut by a razor blade.”

Physical examination revealed a painful sensation of the vestibulum. The patient's self-reported pain upon light touch of the vestibular area was 8 out of 10 on the Visual Analog Scale (VAS). Hypertrophic postoperative scarring was noted, with vaginal anatomy being normal otherwise.

Surgery was performed without any complications (see Fig. 2A–F). The patient was discharged in good clinical condition and with an unremarkable wound status following initial bed rest and analgesia.

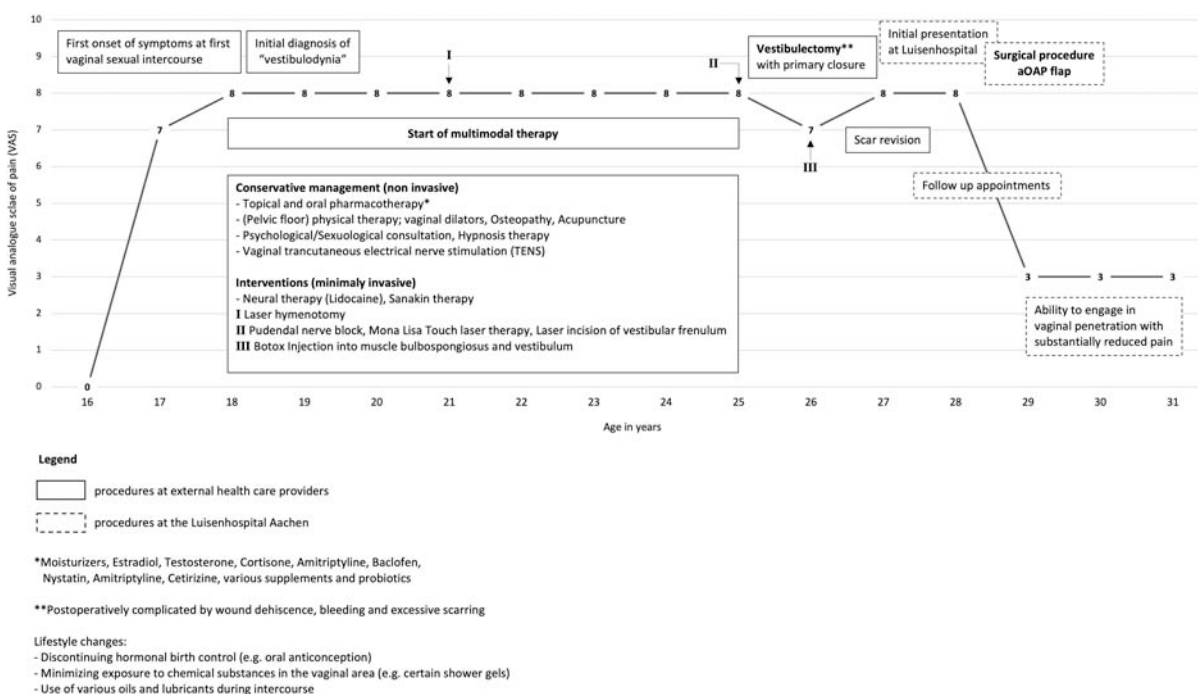


FIG. 1. Attempted therapeutic modalities prior to presentation (summarized). Various conservative and interventional therapy attempts in chronological sequence of a 27-year-old patient with primary therapy-refractory vestibulodynia.



FIG. 2. Twenty-seven-year-old patient with primary, therapy-refractory vestibulodynia, undergoing vestibulectomy and primary reconstruction with bilateral aOAP-flaps. (A) (*top left*): Preoperative findings. (B) (*bottom left*): Intraoperative view after skinning vestibulectomy, planning of the incision for the bilateral aOAP-flaps. (C) (*top center*): Intraoperative view of the left aOAP flap elevated and tunneled under the major labia. Right flap elevated, showing the length of the perforator pedicle. (D) (*bottom center*): Intraoperative with bilateral aOAP-flaps inserted, donor sites primarily closed. (E) (*top right*): 1-year postoperative view demonstrating inconspicuous scar formation. (F) (*bottom right*): 1-year postoperative view with spread vulva showing unremarkable scarring in both the vestibulum and the donor sites.

At the 1-year follow-up, the patient reported substantial symptom improvement, including the ability to engage in sexual intercourse again. There was only residual discomfort around the scar during intercourse, rated three out of 10 on the VAS. Overall, the patient expressed high satisfaction with the surgical outcome.

Case 2

A 24-year-old woman presented with primary vestibulodynia, reporting a 9-year history of progressively severe dyspareunia and inability to engage in sexual intercourse. Her medical history included irritable bowel syndrome. Prior treatments, including lifestyle adjustments, topical application of estradiol, lidocaine, antibiotic and antifungal agents, as well as vaginal TENS therapy, had failed. She had undergone a partial vestibulectomy with closure by local advancement flap 2 years prior. Physical examination revealed generalized vestibular pain.

Subsequent surgery was performed as planned, without any intra- or postoperative complications (see Fig. 3A–F). The patient was discharged in a timely manner and followed up as scheduled. Apart from occasional tenderness at the posterior commissure during intercourse, the patient reported near-complete resolution of vestibular pain at 1-year follow-up. She had become capable of engaging in sexual activity without any difficulty and was pleased with the overall outcome.

Discussion

The clinical experience reported in this case series shows that the applicability of the aOAP-flap may safely extend to patients suffering from refractory vestibulodynia, as exemplified by the described two cases. The pathoetiological mechanism of vestibulodynia is presumed to be associated with excessive neuroproliferation and increased density of pain fibers in the vestibular mucosa.¹⁰ Vestibulectomy, therefore, represents an essential component of surgical therapy.

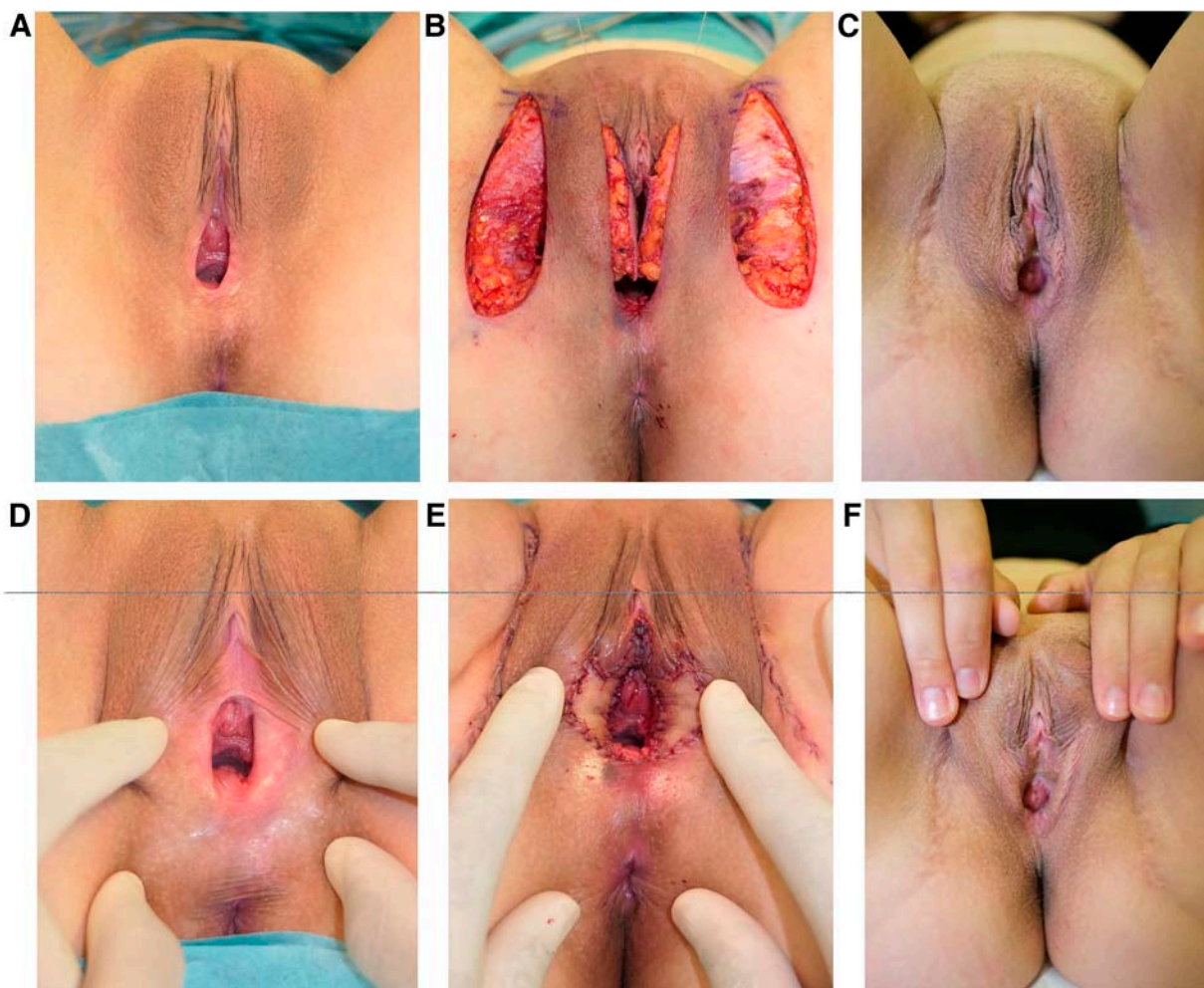


FIG. 3. Twenty-four-year-old patient with progressive vestibulodynia, undergoing secondary vestibulectomy and primary reconstruction with bilateral aOAP-flaps. **(A)** (top left): Preoperative findings. **(B)** (bottom left): Preoperative findings showing scarring of the previous surgery. **(C)** (top center): Intraoperative view following skinning vestibulectomy, both aOAP flaps elevated and tunneled under the major labia. **(D)** (bottom center): Intraoperative view of bilateral aOAP-flaps inserted, donor sites primarily closed. **(E)** (top right): 1-year postoperative follow-up: unremarkable scar formation. **(F)** (bottom right): 1-year postoperative view of the vulva showing inconspicuous, scarring in both vestibulum and donor sites.

Close collaboration with the patient during physical examination, aided by a hand mirror, is necessary for accurate preoperative mapping of the excision zones. A skinning vestibulectomy is indicated when the affected, painful tissue is confined to the vestibule, delineated by the area extending from the anterior to the posterior commissure and laterally by Hart's line. The (remnant of the) hymen is inspected and assessed for pain with a cotton swab test to ascertain the depth of the excision margins. This will determine whether the excision ceases immediately before the hymen or encompasses it.

There is no consensus on the optimal technique for wound closure following excision, although primary closure and local flaps are most cited in the literature.^{5,10,11} Cases of excessive tissue removal may, however, necessitate more complex reconstructive techniques to achieve tension-free wound closure and reduce the risk of complications such as wound dehiscence. The aOAP-flap ensures tension-free tissue transfer while inconspicuously hiding the donor site scars in the genitofemoral sulcus. Furthermore, we hypothesize that

the augmented tissue padding may also obstruct or impede emergence of new pain fibers from the wound bed toward the skin, ultimately diminishing pain sensitivity.

Despite promising results, additional clinical cohort studies and histopathological exams are required to investigate long-term efficacy, safety as well as to elucidate underlying therapeutic mechanisms. Postoperative evaluation was consistently performed by the operating surgeon, which minimized interobserver variability but may have introduced observer bias. Nonetheless, these cases highlight the potential of the aOAP-flap in providing symptom relief and improving sexual function for women suffering from long-standing, difficult-to-manage vestibulodynia. The absence of any complications is further encouraging.

Conclusion

These two cases demonstrate that skinning vestibulectomy combined with single-stage reconstruction using bilateral

aOAP-flaps can offer significant pain relief and improve sexual function in patients with severe, treatment-refractory vestibulodynia. The aOAP-flap provides reliable, tension-free reconstruction with minimal donor site morbidity and excellent aesthetic outcomes. While further studies are needed to confirm these initial findings and assess long-term results, this technique shows promise as a valuable surgical option for selected patients suffering from this debilitating condition.

Authors' Contributions

D.m.O'D. was the lead author and responsible for study conceptualization, methodology and article drafting. M.R. collected the data and contributed to article drafting. W.M. and M.E.-N. provided clinical expertise and article revision. M.K.K. performed the literature review and article drafting. All authors have reviewed and approved the final version of the article and agree to be accountable for the integrity and accuracy of the work.

Author Disclosure Statement

No competing financial interests exist.

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