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CASE REPORT

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Full labia minora reconstruction with labia sharing flap: a case report

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ABSTRACT

Full labia minora reconstruction can be necessary due to congenital malformation or genetic syndromes, but more often is required following oncologic excisions, or debridements after vulvar or perineal infections. It is important to note that full labia reconstruction can be needed after genital mutilation, or iatrogenic deformity after previous labia reduction procedure. A 37-year-old female patient, with vulvar necrotizing fasciitis after a marsupialization of the right Bartholin's gland, was referred to the Gynecology and Obstetrics unit. Three surgical debridements were performed, associated with prolonged antibiotic therapy, leading to a total loss of the right labia minora and the clitoris glans, in addition to minimal loss of labia majora. With a two-stage approach on the labia minora, the first procedure allowed to pull the left labia minora as a labia sharing flap, in order to join the remnant scar tissue on the right side, respecting the anterior and posterior leaflets. The second part was performed five weeks later, after autonomization of the new labia minora flap. Once the flap was divided, a perfectly vascularized right neo-labia minora was obtained. The flap healed uneventfully. The patient was asked to complete a questionnaire at six months, which confirmed an excellent aesthetic result with a like with like reconstruction. Eight months later, a final correction was performed to enhance the definitive aesthetic aspect with lipofilling of the right labia majora. Two techniques have been previously published with a two-stage cross-labial transposition flap, one using a top cut leading to a bottom pedicle and another using a bottom cut with an upper pedicle. We proceeded with a one-time edge resection, respecting the full vascular pedicle and transposed the full height of the labia minora. This technique revealed to be extremely effective, guaranteeing a reliable vascularization and decreasing the risk of tearing on the pedicle.

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KEYWORDS
Labia minora reconstruction; sharing flap; full pedicle

Introduction

The labia minora are part of the female external genitalia. They are a mucocutaneous folds containing sebaceous and sweat glands, localized inward to the labia majora, meeting posteriorly at the level of the vulvar fork. Anteriorly, the two anterior edges merge to form the clitoral hood. They are shaped by a double layer of non-keratinized stratified squamous epithelium enclosing a fat-free connective tissue. The labial skin contains sebaceous and sweat glands, it is smooth or mildly rugose and pigmented. The dermis is composed of a thick connective tissue, composed mainly of elastic fibers and small blood vessels [1]. The vascularization of the labia minora is complex, supplied by the internal pudendal artery, a terminal branch of the internal iliac artery. Essential blood supply is located at the posterior border of the labia minora making reconstruction challenging. The role of the labia minora is to guide the urinary flow, prevent vaginal dryness and protect the clitoris, the vaginal entrance, the vestibule and the urethra. The size required to fulfill their role is at least 1 cm [2].

Reconstruction is usually performed after oncologic excision procedure, cutaneous tumors, debrided infection (Bartholinitis, hidradenitis suppurativa), genital mutilation and congenital malformation or genetic syndromes. However, different reconstructive techniques have emerged in the aftermath of labiaplasty in cases of excessive reductions (over-resection below the clitoris, asymmetry and frayed wound edges).

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The appearance of labia minora influences the perception of body image, self-confidence and sexual satisfaction. This translates to the fact that patients affected by labial asymmetry or absence of the labia minora require comprehensive management as the damage to the genitalia affects their sexual and psychological life.

In this paper, we present a case of a patient who was referred for a labia minora reconstruction after aggressive debridement in the setting of necrotizing fasciitis, following the excision of the right Bartholin's gland. Innovative reconstruction technique and long-term outcomes are presented.

Case report

A 37-year-old female patient presented a right Bartholin's cyst of 2 cm × 2 cm with discomfort. She underwent excision and suture of the cystic wall with marsupialization of the right Bartholin's gland under local anesthesia. 48 h postoperatively she consulted to the Accident and Emergency department for pain, edema and skin tension. As an infection was suspected, the patient underwent surgical debridement involving only the labia minora and majora initially.

Giving the worsening of the clinical status post operatively, a thoracic-abdominal-pelvic Computerized Tomography angiogram was performed which revealed diffuse subcutaneous soft tissue infiltration of the right labia majora extending to the right inguinal region with no sign of active bleeding, no organized collection and no visible hematoma. The patient's status continued to deteriorate with extensive necrosis of the right hemi-vulva, including the clitoris glans, with new biological blood flow disorders and a clinical suspicion of necrotizing fasciitis. She therefore underwent a radical excision of the entire right labia minora followed by a further debridement and clitoris glans resection on the following day. Clinical evolution was then slowly favorable, with bacteriological samples revealing an infection by *Streptococcus Pyogenes*. Antibiotics were adapted to the antibiogram with an intensive and prolonged intravenous therapy of three weeks.

Despite the control of the infectious situation, the patient presented relevant aesthetic and functional sequelae, such as the destruction of the clitoral glans, the right labia minora and a minimal loss in volume of the right labia majora. Six months after the acute episode, the patient was therefore referred to our department for genital reconstruction.

Reconstruction of the labia minora was carried out in two stages, under general anesthesia in lithotomy position. In the first operation, we performed the labia minora sharing flap and exploring of eventual remnants of the previously debrided clitoris (Figures 1(A,B) and 2(C,D)). We started by excising the old scar corresponding to the right labia minora up to the cranial part of the clitoris. Then, the subcutaneous tissue was disconnected, creating a vascularized area for resuturing the left labia minora. At the level of the clitoris, inspection revealed important scar tissue and, in-depth, a residue of the proximal part of the clitoris, which was released and resuture to the adjacent skin. The left labia minora was then stretched to make an extended edge incision. Next, the anterior and posterior leaflet were separated with Stevens scissors. The posterior layer was then sutured to the inner margin of the right defect with separate stitches of Vicryl 4/0 followed by an intradermal suture of Monocryl 4/0 (Figure 3(E,F)). The same technique was performed between the anterior layer and the outer margin of the defect to create a bridge with the left labia minora attached to the right side.

Two separate stitches with 2/0 silk were placed cranially and caudally to the clitoris, and a silicone rod was placed behind the labia bridge before applying a padded dressing, to allow easier discharge of secretions (Figure 4(G,H)). The patient was treated postoperatively

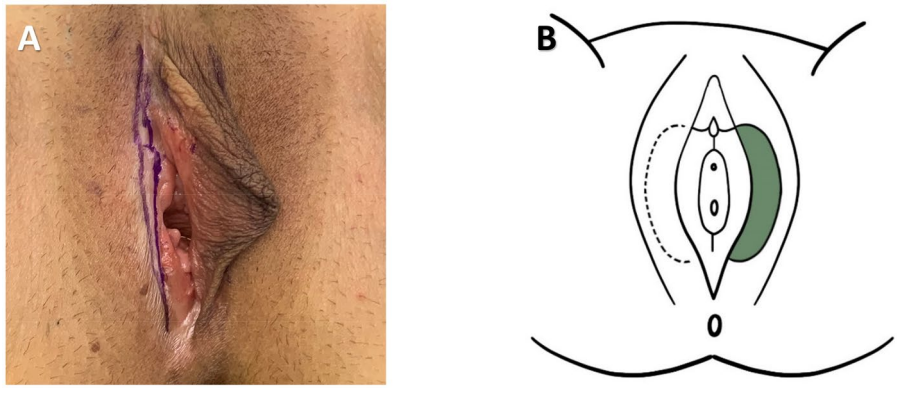

Figure 1. (A) Pre operative vulva's aspect with flap markings. (B) Associated schema : absence of right labia minora.

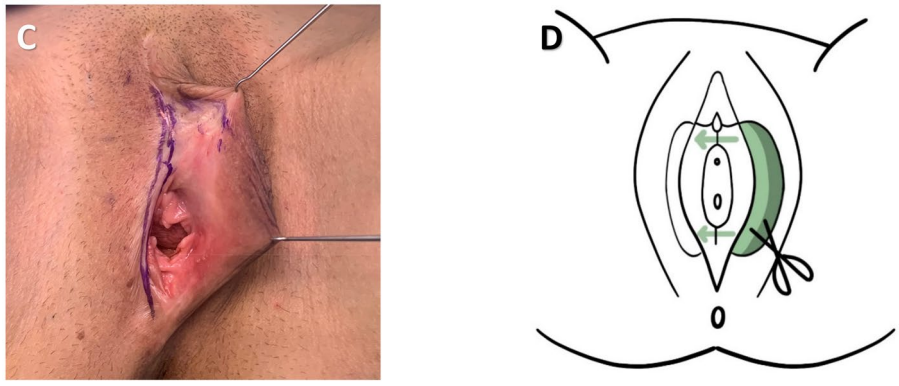

Figure 2. (C) The left labia minora stretched to make an extended edge incision. Anterior and posterior leaflet separated. Posterior layer sutured to the inner margin of the right defect. Same technique between anterior layer and the outer margin. (D) Associated schema.

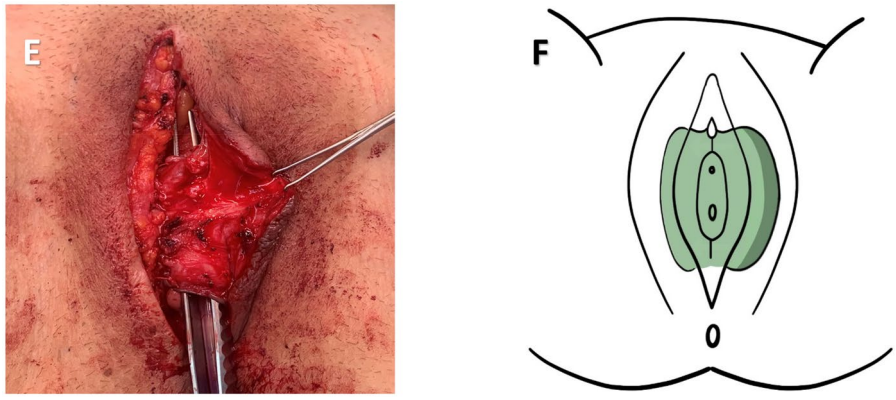

Figure 3. (E) Posterior leaflet. (F) Associated schema: posterior leaflet sutured to inner margin of right defect.

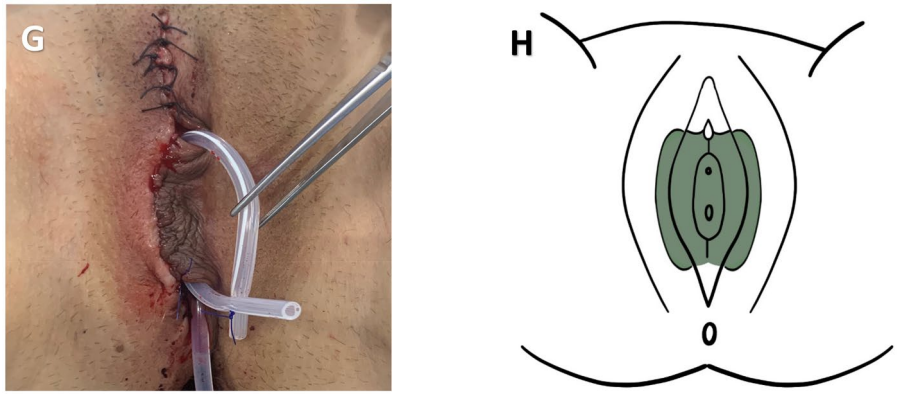

Figure 4. (G) Anterior leaflet. Silicone rod placed behind labia bridge before applying a padded dressing, to allow easier discharge of secretions. Separate stitches with 2/0 silk placed cranially and caudally to the clitoris. (H) Associated schema: anterior leaflet sutured to outer margin of right defect.

with Amoxicillin-Clavulanic acid/1g for two weeks. Postoperative care consisted of daily flushing by the patient, after careful explanation and demonstration by specialist nurses, along the silicone guide rod to keep wounds clean. Additionally showers in the genital region was mandatory after one week when the guide was removed. The patient had no issues nor discomfort with miction and menstruation, which flowed under the bridge. We removed the stiches at two weeks, along with the urinary catheter. Local care focused on the perineal region after each miction were also taught to the patient to ensure optimal local hygiene and healing.

The second part of the reconstruction was performed five weeks later, with the division of the new labia minora. With the patient in lithotomy position, we planned the definitive incision, about 12 mm from the new lateral border to have two labia minora of similar size (between 12 and 14 mm in width) (Figure 5(I–K)). The two separated labia showed to be perfectly vascularized clinically and after indocyanine green fluoroscopy (Figure 6(L,M)). The anterior and posterior leaflets were closed on both sides with several stitches of 4/0 Vicryl followed by an overlock of 5/0 Monocryl. At the level of the scar tissue corresponding to the former clitoris, we placed a suspension stitch pulling upward the deep part of the two leaflet of the labia minora partially recreating the upper hood.

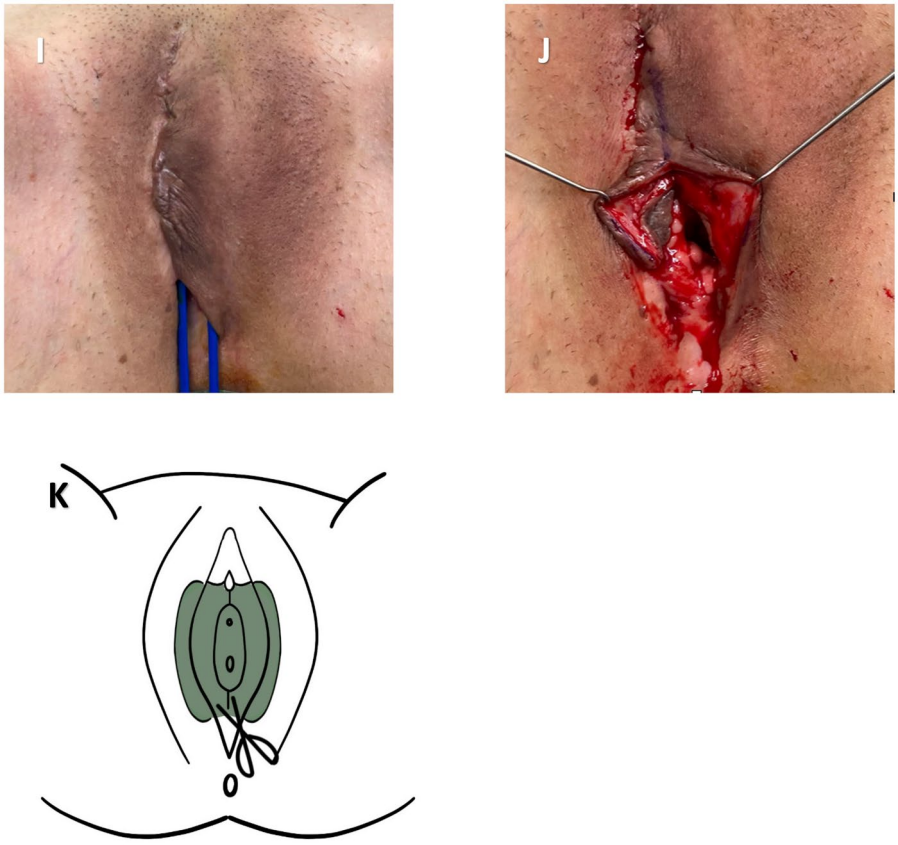

Figure 5. (I) Second Part of the reconstruction with the division of the new labia minora. Pre operative vulva's aspect. (J) Definitive incision from new lateral border to have two labia minora of similar size. (K) Associated schema: definitive incision.

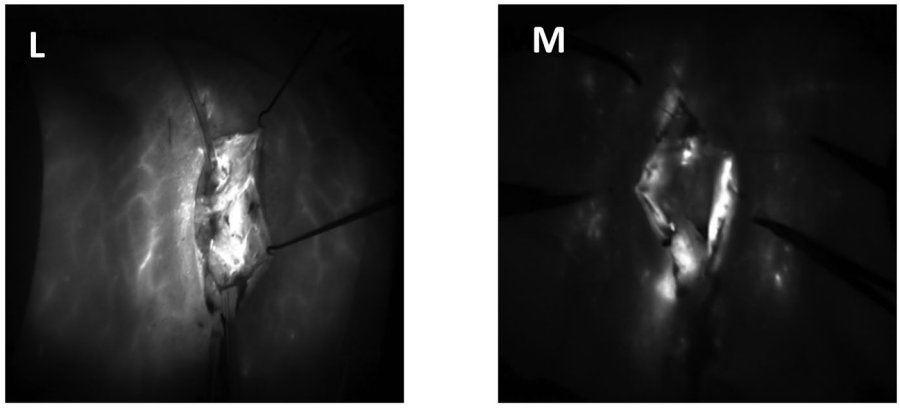

Figure 6. (L,M) The patient received intravenous ICG, and we could evaluate flap perfusion intraoperatively. Such imaging allows for precise vascularization monitoring and could be particularly useful when adopting splitting pedicle techniques, early detecting any potential vascular flap impairment.

Table 1. Satisfaction questionnaire with four structured sections for the purpose of measuring the satisfaction of patient with functional, psychological, sexual and aesthetic questions.

Questionnaire following labia minora reconstruction

A. Functional impairment :

1. I had the following functional problems before the initial procedure:

	No	Yes
Pain (e.g. during sexual intercourse, athletic activities, bicycle riding, etc.,)	◯	◯
Recurring skin irritations on the labia minora	◯	◯
Recurring vaginal or bladder infections	◯	◯
Recurring vaginal yeast infections	◯	◯
Deviation of the urine stream	◯	◯
Diminished response to sexual stimulation	◯	◯
Other problem or symptom		
I was experiencing no functional impairment		

2. Following the initial procedure, the functional problems
worsened ◯ Type of problem:_____
Remained unchanged ◯ Type of problem:_____
Improved ◯ Type of problem:_____
Ceased ◯ Type of problem:_____

3. Following the procedure to reconstruct the labia minora, the functional problems
worsened ◯ Type of problem:_____
Remained unchanged ◯ Type of problem:_____
Improved ◯ Type of problem:_____
Ceased ◯ Type of problem:_____

4. Did you experience any other problems following the procedure to reconstruct the labia minora?
Yes ◯ No ◯ Type of problem:_____

B. Psychological problems

1. Before you underwent the initial procedure, were you experiencing any type of psychological problems, e.g. were you hesitant to appear naked in front of the others?
On occasion ◯
To an average degree ◯
To a great degree ◯

2. Did these issues affect your sex life?
No ◯
On occasion ◯
To an average degree ◯
To a great degree ◯

3. Did you seek professional help as a result, e.g. did you see a psychologist?
Yes ◯ No ◯

4. How did the psychological problems change following the initial procedure?
Worsened ◯
Remained unchanged ◯
Improved ◯
Ceased ◯

5. Did you seek professional help following the initial procedure e.g. did you see a psychologist?
Yes ◯ No ◯

6. How did your psychological problems change following the labia minora reconstruction?
Worsened ◯
Remained unchanged ◯
Improved ◯
Ceased ◯

7. Did you seek professional help following the labia minora reconstruction e.g. did you see a psychologist
Yes ◯ No ◯

C. Sexual impairment
Before surgeries
Sexual Confidence Scale (SCS)©
This questionnaire consists of a number of statements asking about your thoughts and feeling about how confident you feel as a sexual partner. Please rate *each* statement according to how much you agree or disagree with it by ticking *one* of the six categories.

	Strongly agree	Moderately agree	Slightly agree	Slightly disagree	Moderately disagree	Strongly disagree
1. I feel certain that my partner enjoys sex with me						
2. I am a successful lover						
3. I have confidence in myself as a sexual partner						
4. I feel my sexual performance is inadequate						
5. I feel good about myself as a sexual partner						
6. I am confident initiating sex						

(*Continued*)

Table 1. Continued

After surgeries

Sexual Confidence Scale (SCS)©

This questionnaire consists of a number of statements asking about your thoughts and feeling about how confident you feel as a sexual partner. Please rate *each* statement according to how much you agree or disagree with it by ticking *one* of the six categories.

	Strongly agree	Moderately agree	Slightly agree	Slightly disagree	Moderately disagree	Strongly disagree
7. I feel certain that my partner enjoys sex with me						
8. I am a successful lover						
9. I have confidence in myself as a sexual partner						
10. I feel my sexual performance is inadequate						
11. I feel good about myself as a sexual partner						
12. I am confident initiating sex						

D. Aesthetic result

	Missing	Never	Sometimes	Often	Always
1. I feel that my genitals are normal in appearance					
2. I fell that my genitals are unattractive in appearance					
3. I feel that my labia are too large					
4. I am satisfied with the appearance of my genitals					
5. I experience irritation to my labia when exercising/walking					
6. I fell, or have felt, conscious in sexual situations because of the appearance of my genitals					
7. Embarrassment about the appearance of my genitals spoils my enjoyment of sex					
8. I feel discomfort around my genitals when wear tight clothes					

E. Assessment of the result

1) Please mark the result of the labia minora reconstruction on a scale of 1.0 (very poor) to 10.0 (very good)

2) How do you rate the latest result in terms of severity of the deformation caused by the initial procedure?

At three weeks post-operatively, all the sutures had been removed. Scar massages were started at four weeks. The six weeks checkup confirmed excellent healing and aesthetic result.

The patient completed a satisfaction questionnaire at six months postoperatively (Table 1). The questionnaire had four structured sections for the purpose of measuring satisfaction of patient with functional, psychological, sexual and aesthetic questions. A last section measured the overall assessment. According to Gress et al. we used a non-validated questionnaire recording the functional and psychological satisfaction [3]. The validated Sexual Confidence Scale [4,5] was used to assess participant's confidence as a sexual partner. Finally, the aesthetic sub-section was assessed with the 11-item Genital Appearance Satisfaction scale [6], measuring satisfaction with genital appearance (8 out of 10 on a VAS score).

Additionally, we performed eight months later fat grafting of the right labia majora which enhanced the overall vulva's aspect (Figure 7(N,O)).

Discussion

Several labia minora reconstruction techniques have been reported, especially in the case of iatrogenic over-resections [7]. Wedge excisions and labial V-Y advancement are common solutions when sufficient part of labia minora is still present. Similarly, clitoral hood flaps may be ideal for a patient with upper labia minora defect and a sizeable clitoral hood. Our patient presented unfortunately a total loss of the right labia minora and clitoris.

The full cross-labia minora flap reconstruction technique has been previously described in two cases in the literature, performed on cranial or caudal pedicles, differing from our approach.

Zeplin et al. [8] published the two-stage posterior cross-labial transposition flap. He used a top cut leading to a bottom pedicle. The advantage was to use the same tissue for the reconstruction, similarly to our case. In addition, the posterior cross-labial flap did not require a urinary catheter intra or postoperatively as it did not cover the urinary meatus. In our case, the patient kept the urinary catheter for two weeks to ensure a tight seal of the urinary tract and therefore a reduced risk of maceration and infection at the surgical site and better healing of the tissue.

Nguyen also described in 2011 a similar cross-labial flap [9] in two procedures separated by three weeks. In this case, a bottom cut was performed, basing the sharing labia flap on an upper pedicle. The patient also benefited of a urinary catheter for one week.

Our approach differs as we proceeded with a one-time full edge resection, transposing the sharing labia minora flap on the full pedicle including the full height of the labia minora. This technique provides the best possible vascularization to the cross flap and decreases drastically the tearing of the pedicle, guaranteeing an extremely safe perfusion. Moreover, the labia minora is transposed symmetrically above and below. On the other hand, advantages of choosing an

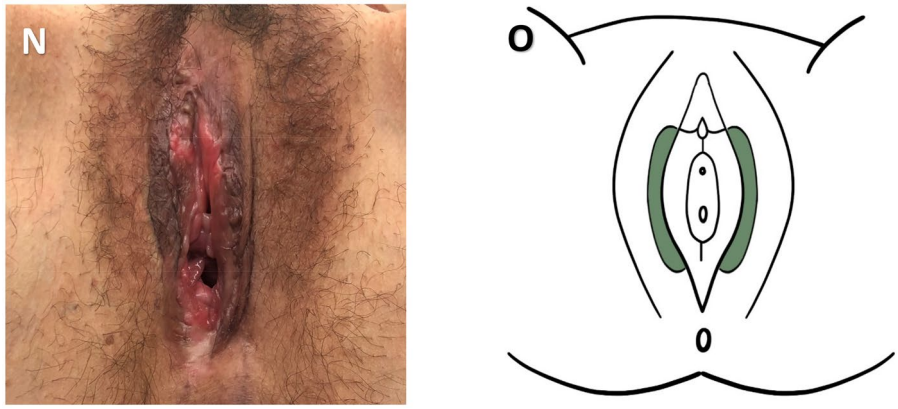

Figure 7. (N) Final result one year post op after labia majora fat grafting. (O) Associated schema: two separated labia minora.

Table 2. Comparison table.

	Our flap	Zeplin et al.'s [8] flap	Nguyen et al.'s [9] flap	Others
Technique	*Resection edge with a full pedicle on the full height of the labia minora*	*Posterior cross-labial transposition flap*	*Cross-labial flap with preservation of the anterior pedicle*	*1. Wedge excision, labial V-Y advancement* *2. Clitoral hood flap* *3. Vaginal skin advancement reconstruction*
Pedicle	Full	Bottom	Top	
Cut	Split	Top	Bottom	
Urinary catheter	2 Weeks	No	1 Week	
Procedures	2	2	2	
Advantages (+) & disadvantages (–)	*+Like with like reconstruction* +Tight seal of urinary tract +Reduced maceration +Extremely solid perfusion +Less risk of pedicle pull out +Improving aesthetic appearance if contralateral labia hypertrophy +Easier secondary cut +More space for catheter +Symmetry –Double operation, impact emotionally fragile patients	*+Like with like reconstruction* +No catheter (do not cover the urinary meatus) –Double operation, impact emotionally fragile patients	*+Like with like reconstruction* –Double operation, impact emotionally fragile patients	–1 Only if consistent part of labia minora is present –2 With upper labia minora defect and sizeable clitoral hood –3 Tissue difference and worse aesthetic outcomes

inferior vs superior pedicles are a potential easier decision on where to divide the labia at the second stage of operation and the potential of leaving more space for the urinary catheter.

The presented technique achieved a satisfactory aesthetic result using the peculiar tissue of the contralateral labia minora, fully respecting a *like with like* reconstruction. In patients with contralateral labia minora hypertrophy, such procedure can even improve the global aesthetic vulvar appearance. Obvious disadvantages of any sharing technique are the need of two operations, which may impact emotionally fragile patients who want to regain sexual activity as quickly as possible (Table 2).

Conclusion

We presented a case of total labia minora reconstruction using a controlateral labia minora transposition flap where the full pedicle height was preserved. Such technique showed extremely solid vascularization, no pedicle tear and excellent aesthetic and functional result in the long term, as confirmed by patient's reported outcomes. Although the results remain subjective and based on a single patient experience, we believe that this technique should be added to the plastic surgeon technique armamentarium, as an effective and extremely safe procedure when dealing with complete absence of labia minora.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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