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REFERENCE POINTS AND ANATOMY OF THE VULVA

Let's start this discussion by focusing on the alphabet, that is, the notions of vulvar anatomy, which are certainly familiar to us but, in our opinion, need to be reiterated both to approach functional and aesthetic surgery of this complex organ confidently and effectively, and to allow for the use of common language in the always desirable exchange between specialists. In the classic anatomical description, the subject taken as a reference is placed in an upright position, with the consequent classic indications: anterior-posterior, lateral, and cranial-caudal.

However, the usual view of those approaching female genital organs typically derives from the patient being in the lithotomy position, and therefore the anterior references will become superior, the posterior ones inferior, and so on. Despite this, we have chosen to maintain the classic definition in our descriptions, to further emphasize the importance of reviewing the basic notions of anatomy, an essential starting point in our daily activities.

The vulva:

- it is an ovoid prominence with a major antero-posterior axis, according to the classic view of the subject in an upright position (which becomes superior-inferior in the lithotomy position);
- it has anterior-superior margins consisting of the abdominal wall (hypogastric region), and



FIGURE 1
Gynecological position

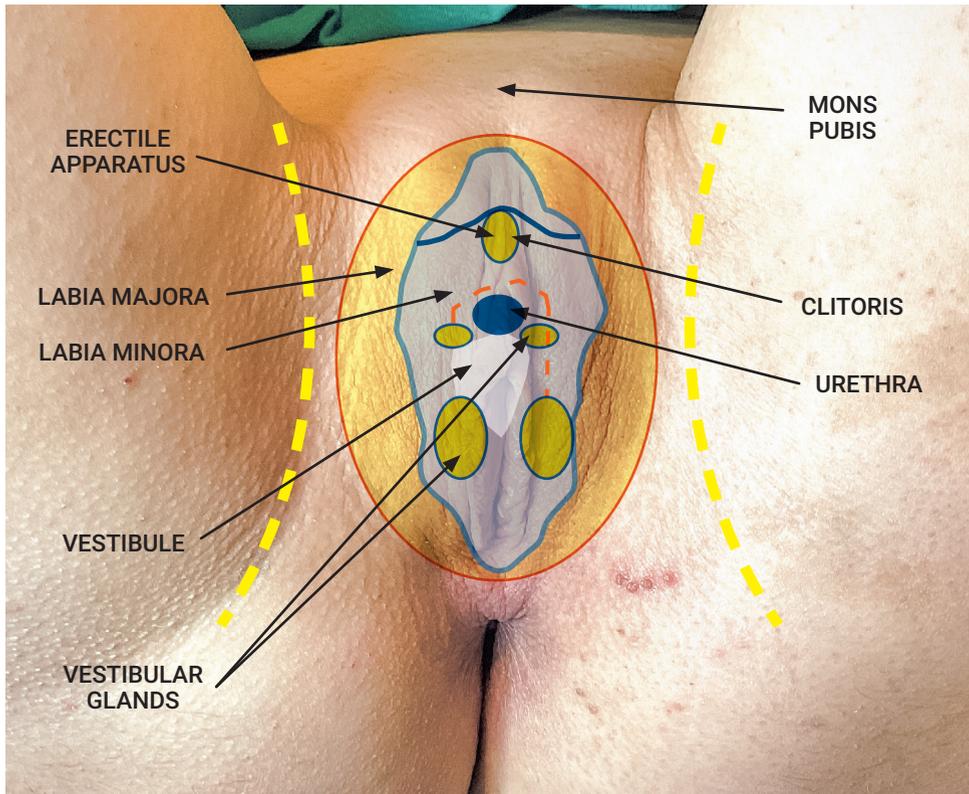


FIGURE 3
Diagram of vulvar
anatomy

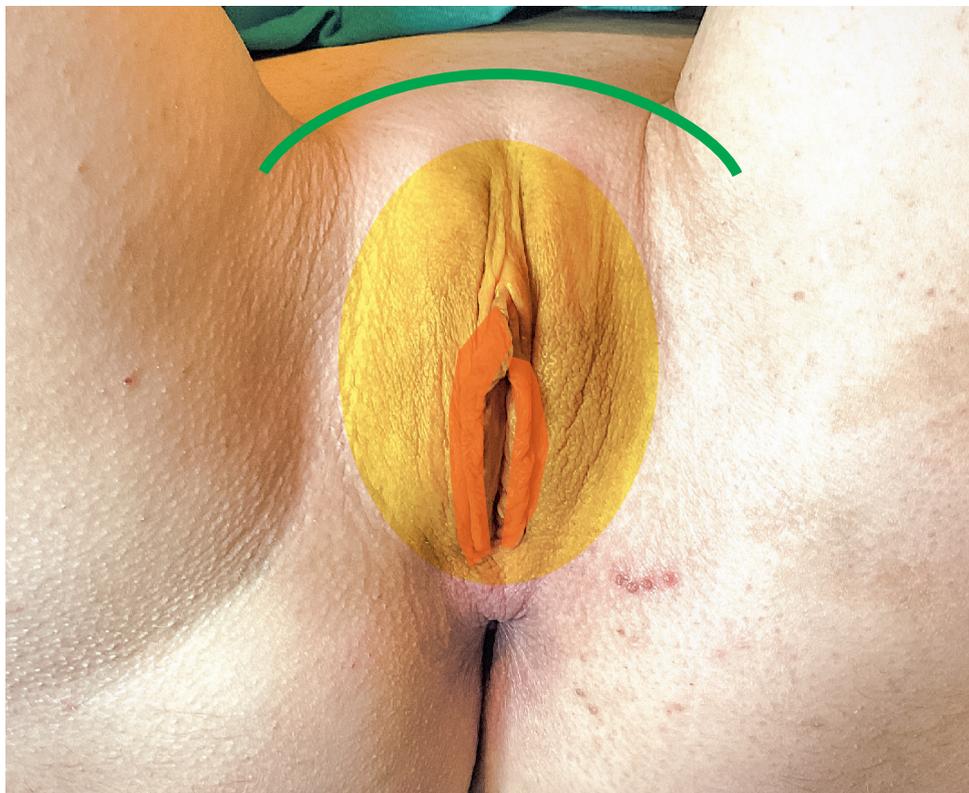


FIGURE 4
Vulvar lips, with emphasis
on their anatomical
position

- Mons pubis
- Labia majora
- Labia minora

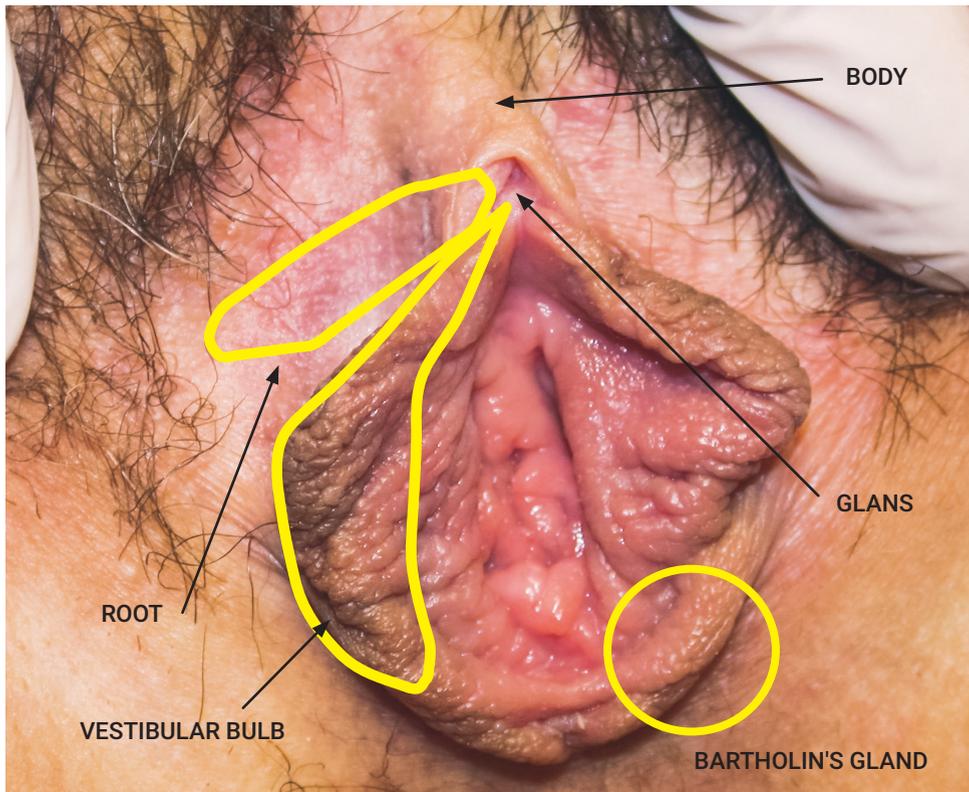


FIGURE 42
Schematic representation
of the erectile apparatus,
with main structures
attached

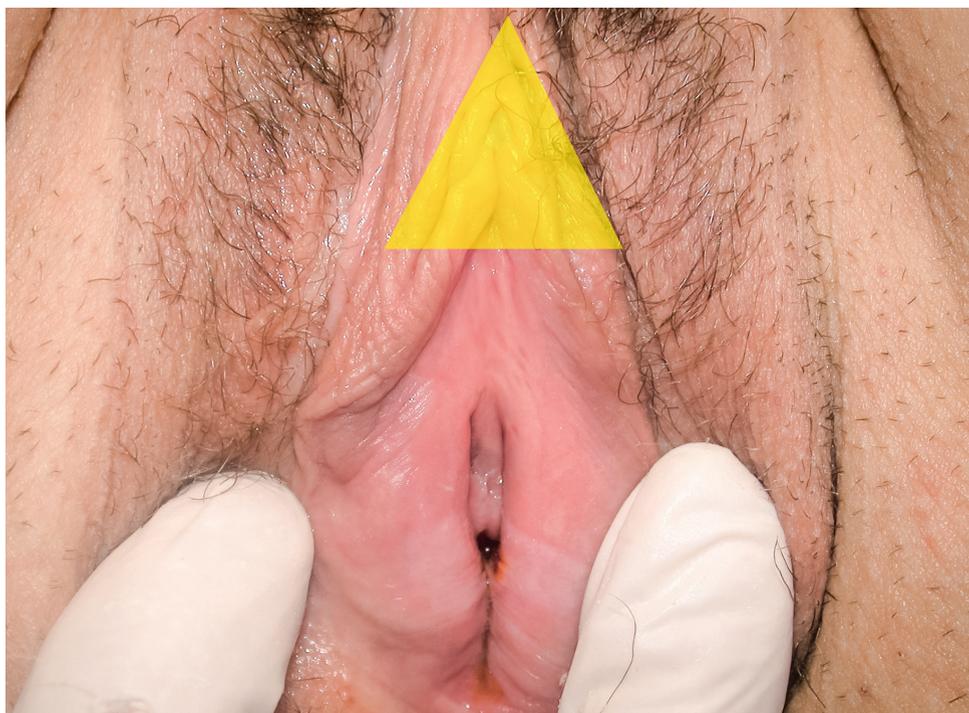


FIGURE 43
Detail of the prepuce, also
known as the clitoral hood

AESTHETIC AND FUNCTIONAL STANDARDS

The vulva is a complex organ both aesthetically and functionally. When approaching surgery in this area, it is crucial to consider the unique characteristics of this region, where aesthetic and functional parameters represent an inseparable continuum.

In the following chapters, we will describe surgical and non-surgical techniques that can be used in various vulvar districts for functional and/or aesthetic purposes.

The typical structures of each district exhibit specific functions that must be understood and respected.

Below are some examples of these functions.

- The clitoral hood protects the clitoris itself from excessive friction and retains smegma, which, in contact with the mucous membranes, provides insulation and lubrication. During procedures such as clitoral hood lifting or reduction, it is important to avoid exposing the clitoral glans too much to prevent irritation and hypersensitivity of this structure.
- The function of the labia minora, like that of door flaps, is to protect the vestibule and

prevent the ascent of bacteria and fungi towards the vagina and urethra, while still allowing the vaginal discharge (fluor vaginalis) to exit. Additionally, the sebaceous glands, mainly located on the medial surface of the labia minora, protect the transition epithelium and vestibular mucosa through the secretion of sebum. Excessive reduction of the labia minora could lead to an increased frequency of vaginitis and cystitis.

- The labia majora are rich in hair follicles. The hairs serve to trap air in contact with the hydro-lipid mantle, which protects the skin and maintains its pH balance. When these protective mechanisms are compromised, the vulva becomes particularly susceptible to infections due to its proximity to the rectum and pubic folds.
- The vestibule, as implied by its name, is an anatomical area of transition between the external surface of the vulva and the internal vaginal cavity and lower urinary tract. It is associated with sexual function, which can be hindered or completely compromised in cases of stenosis resulting from androgen

For this reason, we introduce the concept of the Fibonacci numerical sequence.

In this numerical sequence, each number is equal to the sum of the two numbers preceding it (1-2-3-5-8...).

By convention, we assign a value of 8 to segment CD. Dividing CD by 8, we obtain a segment to which we assign a value of 1.

We draw perpendicularly 4 segments starting from segment ED and directing towards the posterior margin of the labia minora, which

will have lengths equal to 1, 2, 3, and 5 (latero-medially). The shape of the posterior two-thirds (or inferior) of the labia minora will be calculated in this way (fig. 3). To define the shape of the anterior one-third (superior) of the labia minora, we draw segment AE. The incision line should be located externally to this segment to avoid excessive reduction (fig. 4). If the chosen technique for labia minora reduction is wedge incision, considering the variability in shape and size, we recommend

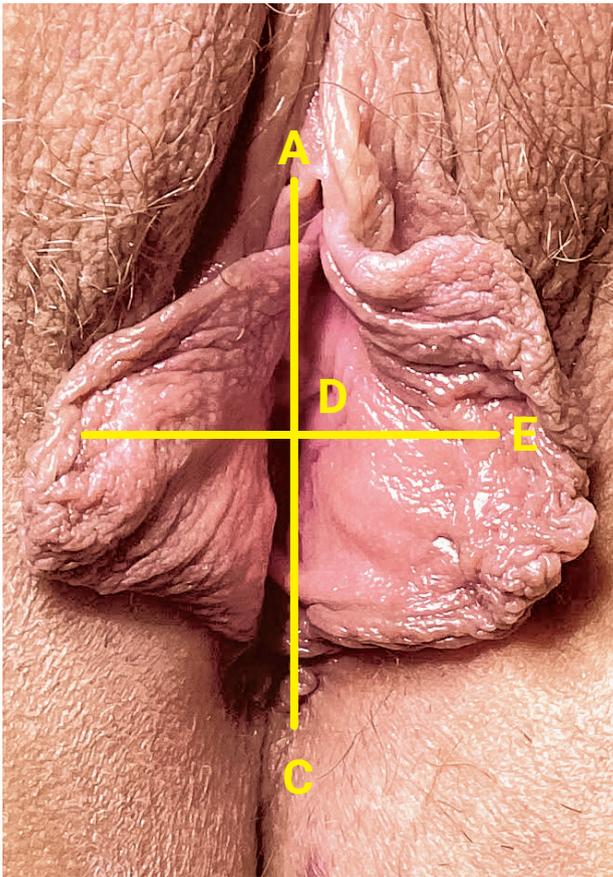


FIGURE 2
Point E represents the lateral limit of the new labia minora

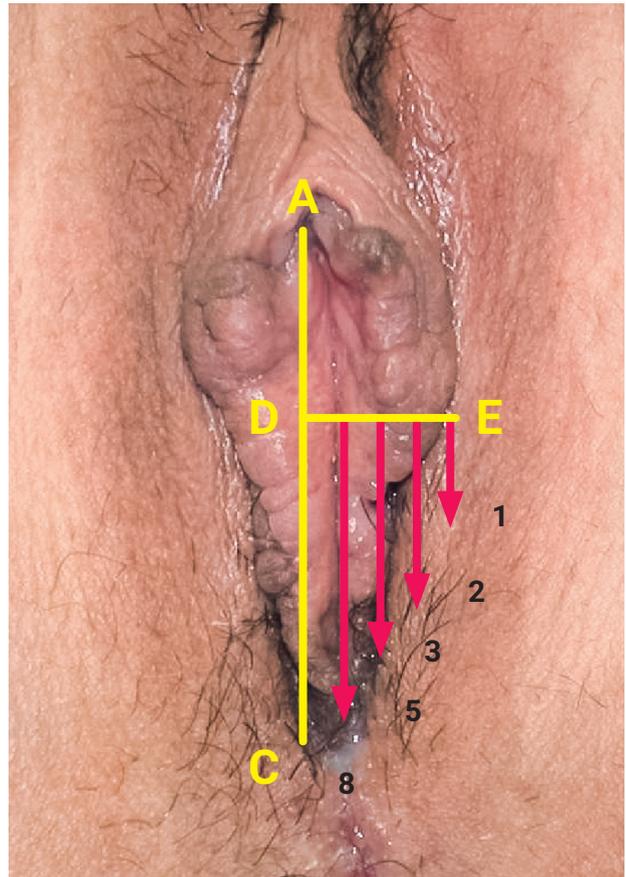


FIGURE 3
The Fibonacci sequence allows us to harmoniously define the shape of the posterior (inferior) portion of the labia minora

the following procedure: the wedge can be constituted by a golden isosceles triangle, constructed with the apex at point D and the base at point E. The base of the triangle (e'-e'') will have the same length as segment DE (fig. 5). In case an aesthetic correction of the posterior commissure is also performed (because it is redundant or has lost the characteristic V-shape), the rules of the golden ratio can be applied in this area as well, to achieve a harmonious appearance.

In particular, the height of the perineum should, as far as possible, be calculated considering the golden ratio with distance AB, where segment CB is given by $AB - AC$ and AC is calculated according to the proportion $AB:AC = \phi$.

A tolerance can be anticipated for surgical needs regarding these parameters, but a fixed principle should be maintained: CB should never exceed one-third and should be less than one-fourth of AB.

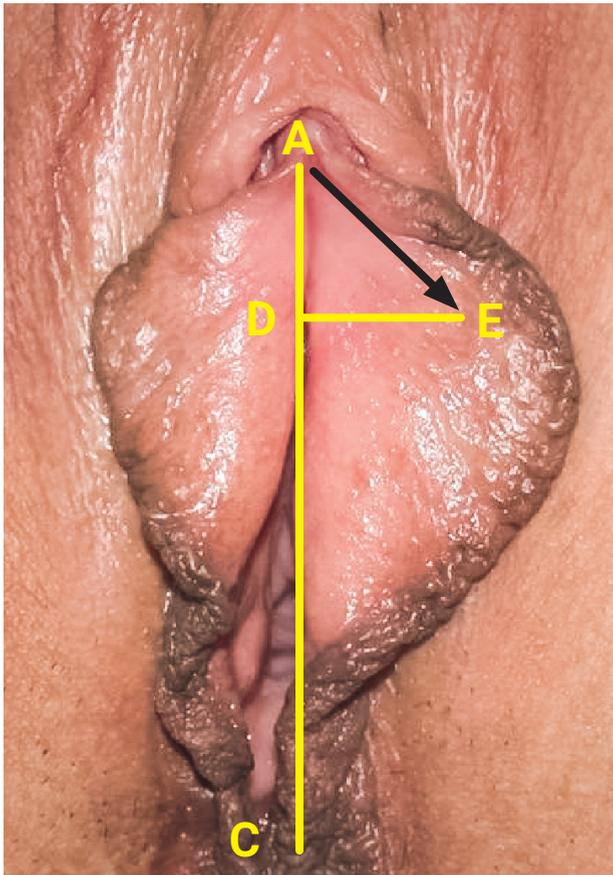


FIGURE 4
The incision line on the anterior (superior) third of the labia minora should be positioned outside line AE

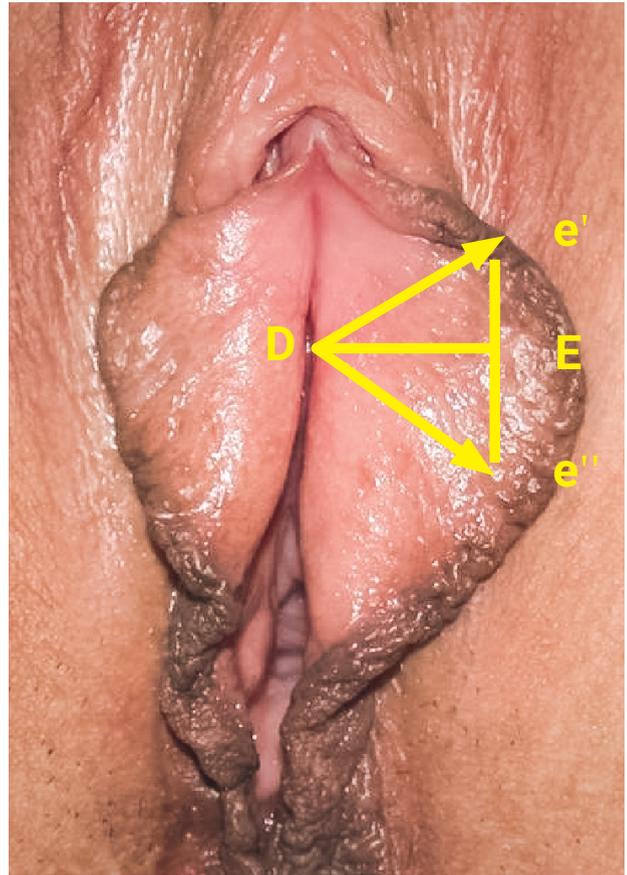


FIGURE 5
Even in labia minora reduction using a wedge, the dimensions of the triangle to be excised can be obtained following the golden ratio

SURGERY IN SPECIFIC AREAS

Labia majora

Surgical interventions on the labia majora involve techniques aimed at correcting excessive skin relaxation and/or flattening of the contours, phenomena observed particularly during the post-menopausal period.

Labia majora lifting

The purpose of this procedure is to correct excessive skin relaxation by removing an excess diamond-shaped area of skin.

The surgical technique involves several steps:

- incision in the form of a longitudinal diamond shape that involves the entire prominent skin portion of the labia majora, from the anterior to the posterior commissure, of variable dimensions depending on the amount of skin to be removed, while preserving the inter labial groove;
- excision of the flap of skin and subcutaneous tissue, exposing the underlying Colles' fascia;
- repair with interrupted sutures using absorbable 4-0 thread for stretch marks or lesions of Colles' fascia;

- medial approximation of subcutaneous margins with interrupted sutures using absorbable 4-0 thread, including the subcutaneous fascia;
- suturing of the skin using absorbable 3-0 thread.

In video 5.1, the complete labia majora plastic surgery procedure is demonstrated, from preoperative planning with drawing of the portions of skin to be removed using a dermatographic pen, to the final suturing. Notice the technique used to separate the skin from the subcutaneous tissue, preserving the Colles' fascia. A no. 10 scalpel blade is used for precise dissection of the skin, which is particularly adherent to the subcutaneous tissue. Additionally, observe that the skin suturing is performed using mattress sutures, reducing tension on the skin margins. In most cases, this procedure is associated with volumetric enlargement techniques of the labia majora using fillers or, alternatively, complex surgical techniques. Video 5.2 showcases a procedure performed in a case of lichen sclerosis that resulted in

to Ellsworth, fig. 28) of the epithelium only, preserving the underlying connective tissue.

- corresponding incision on the lateral surface of the labia minora.
- suturing of the mucosal margins.

Central posterior disepithelization

The surgical technique involves two steps:

- triangular mucosal incision, similar to central resection, with extension to the Hart's line up to the free margin of the labia minora (fig. 28).
- subsequent steps identical to the previous ones.

In video 5.8, the posterior disepithelization technique is demonstrated. Only the mucosa of the labia minora is removed using a radiofrequency scalpel incision, preserving the submucosal layer.

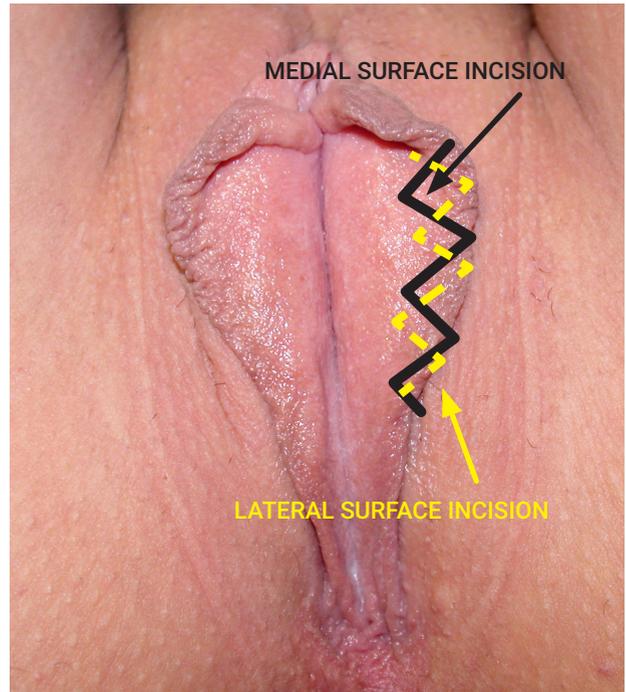


FIGURE 26
Incision lines that will have complementary courses on the two faces of the labia minora

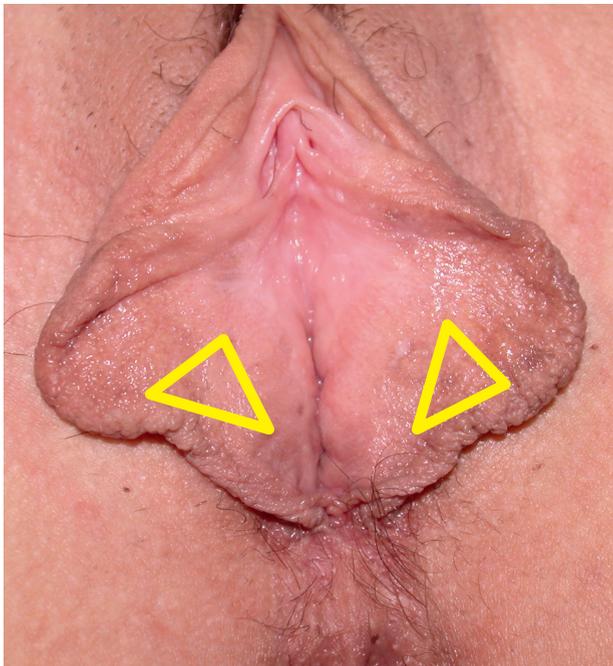


FIGURE 27a
Mucosal excision area in the shape of a triangle with the base on the Hart line and the apex inside the hyperchromatic margin of the labia minora

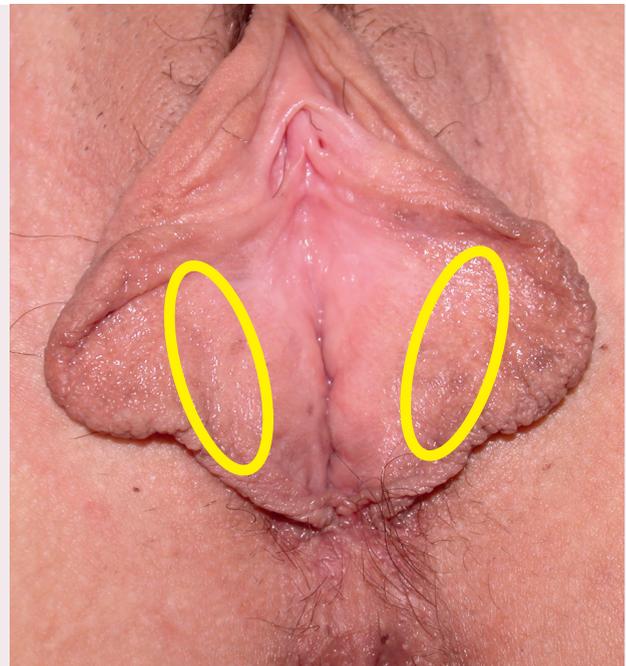


FIGURE 27b
Mucosal excision area in the shape of an oval

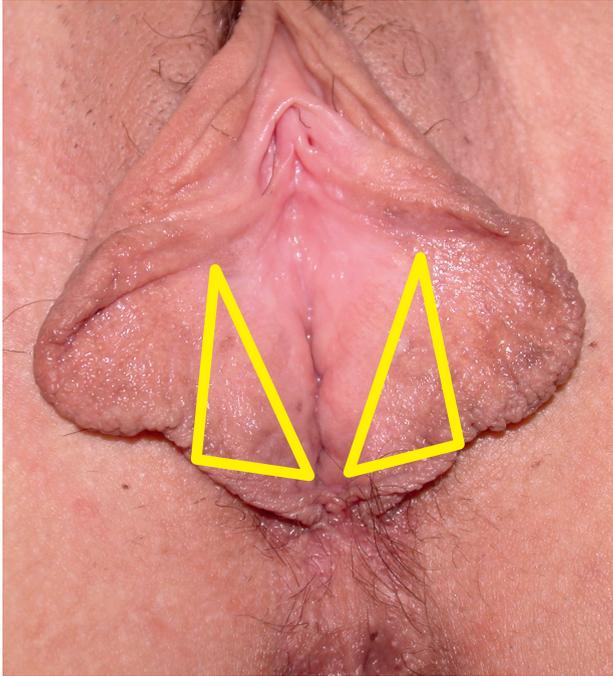


FIGURE 28
In posterior central de-epithelialization, the triangular area extends to reach the free margin of the labia minora

ADVANTAGES
Conserves the vascularity and innervation of the labia minora
Appropriate for minimal excisions
Preserves morphology
DISADVANTAGES
Redundant free margin (poor aesthetic outcome)
Unnatural thickness of the base of the labia minora
Abrupt color change at the suture line

TABLE 4
Advantages and disadvantages of de-epithelialization techniques

ADVANTAGES
Reduction in both length and height
Preserved vascularization and innervation
Absence of tension and distortion
Maintenance of skin texture and color in its anatomical position
DISADVANTAGES
Possible excessive reduction

TABLE 5
Advantages and disadvantages of the flask resection technique

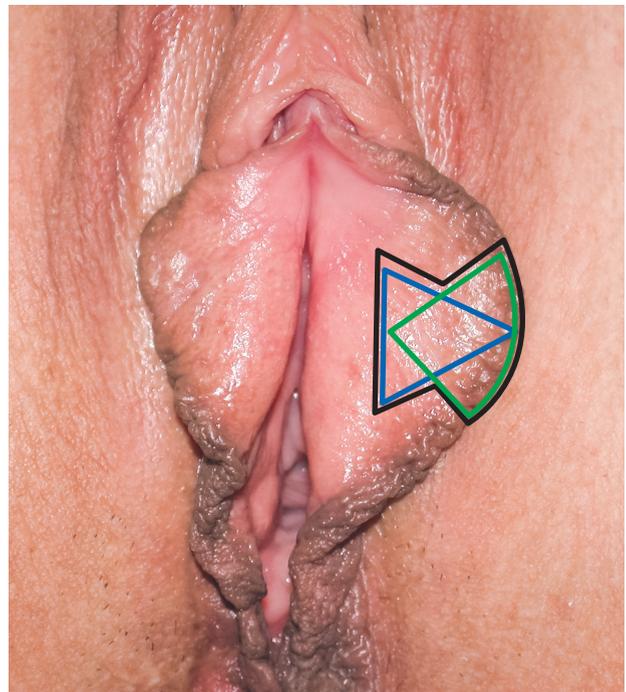


FIGURE 29
Flask-shaped incision obtained by combining two overlapping triangular incisions

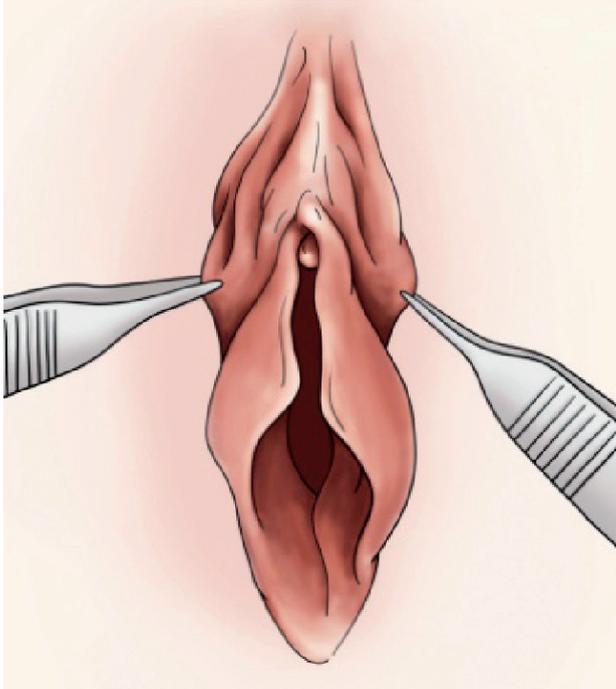


FIGURE 52a
Lateral redundancy of the clitoral hood without ptosis



FIGURE 52b
Lateral redundancy of the clitoral hood without ptosis



FIGURE 53a
Lateral redundancy of the clitoral hood with ptosis

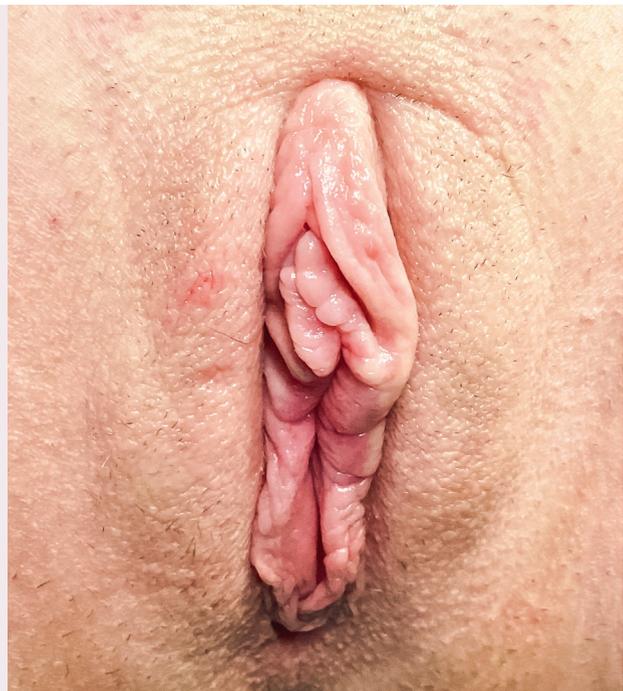


FIGURE 53b
Lateral redundancy of the clitoral hood with ptosis

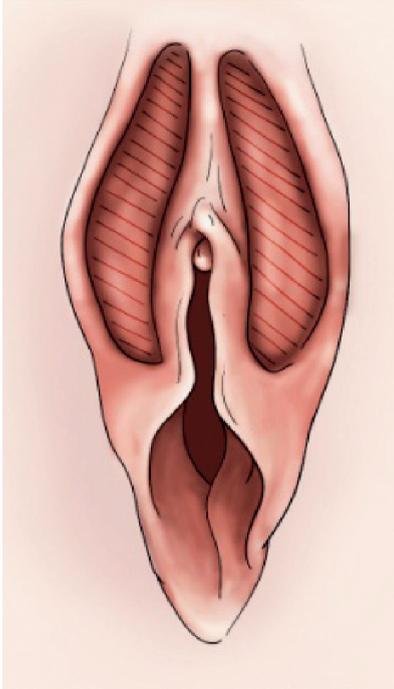


FIGURE 56
Lateral redundancy without ptosis (type 2a). Two paramedian fusiform excisions; the remaining median bridge of skin should not be less than 4 mm wide

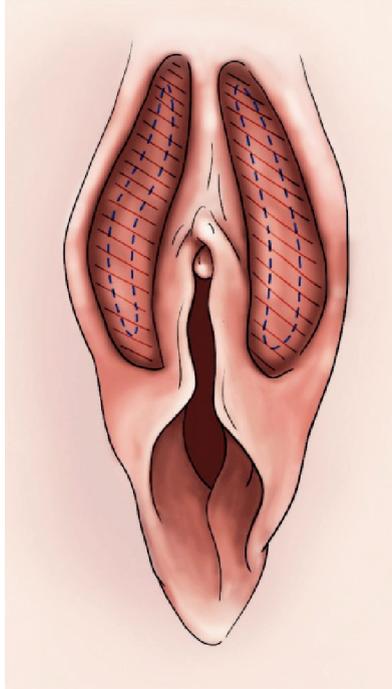


FIGURE 57
Lateral redundancy without ptosis (type 2a). It may be necessary in some cases to incise the superficial fascia to remove the underlying excessive tissue

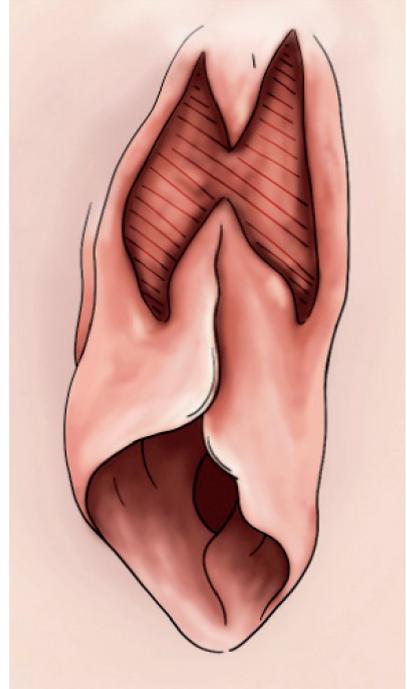


FIGURE 58
Lateral redundancy with ptosis (type 2b). Butterfly incision



Clitoral hood lifting procedure. Surgical planning



CLINICAL CASE

The 48-year-old patient shows a condition of duplication of the labia minora in their anterior and middle portions. The labia minora also appear protruding from the vulvar plane, both due to hypertrophy of the labia minora and due to cutaneous-adipose atrophy of the labia majora, which accentuates the ptotic appearance.

In addition to aesthetic discomfort, the patient complains of friction-related discomfort and dyspareunia (A). A trimming intervention is scheduled with an incision line that includes the margins of both duplications (medial and lateral) and extends to the clitoral hood at an acute angle (B). The incision is made with a radiofrequency scalpel, allowing for clear and bloodless margins (C). The suturing is performed continuously with absorbable monofilament 5-0 (D). The surgical specimens are photographed for medical-legal purposes (E). Postoperatively, the patient is medicated with gentamicin ointment, gauze, and an ice pack held in place by underwear (F).



A

Preoperative condition. Note the ptotic appearance of the labia minora, which show duplication in their anterior and middle portions



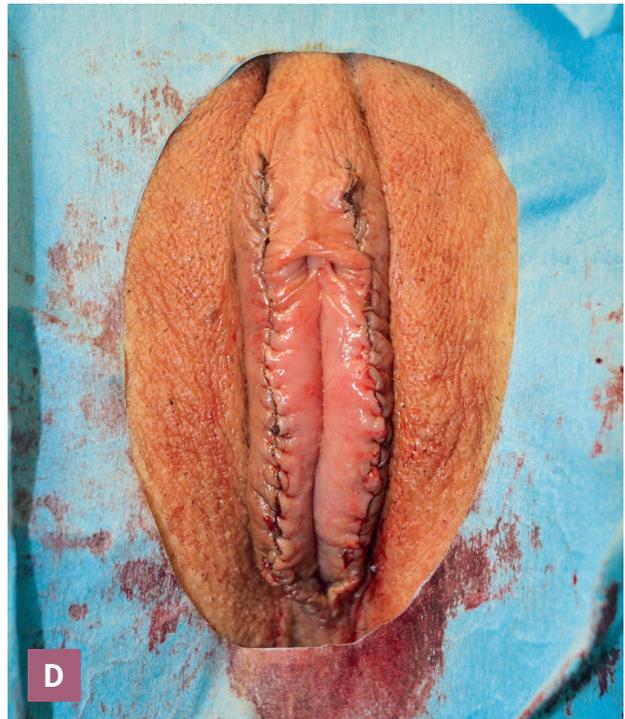
B

Surgical planning. Special attention should be paid to symmetrically tracing the incision lines. At the anterior margin, the lines define an acute angle that allows for a flat suture of the margins without puckering

LABIA MINORA



Clear and bloodless margins obtained with a radiofrequency scalpel are visible



Post-operative condition. The vulva has regained a harmonious appearance, respecting normal proportions



Surgical specimens. Note the asymmetry of the excised labia minora portions



Post-operative dressing with ice



CLINICAL CASE

Hypertrophy of the labia minora and grade II cutaneous-mucosal atrophy of the labia majora in a 54-year-old patient. The patient complains of functional discomfort due to the extreme protrusion of the labia minora, along with aesthetic discomfort due to the "aging" appearance of the vulva (A).

A combined procedure of labia minora reduction using a wedge technique and surgical lifting of the labia majora is planned.

At the Post-operative check-up, one week after the intervention, satisfactory surgical healing is observed with evidence of some ecchymotic areas on the labia majora and perineum (B). Treatment with oral bromelain and local application of cream containing hyaluronic acid and polynucleotides is prescribed.

After an additional two weeks, at the follow-up, the ecchymoses have disappeared, but mild edema persists throughout the surgical area. The sutures appear well-adhered (C).

Two months after the intervention, healing is complete, and the vulva has regained harmonious proportions (D).



A

Preoperative condition. Significant hypertrophy of the labia minora is noted, accentuated by marked atrophy of the labia majora



B

One week after the intervention, initial healing is present with relative ecchymosis



C

After two additional weeks, edema persists, but the ecchymoses appear to be absorbed



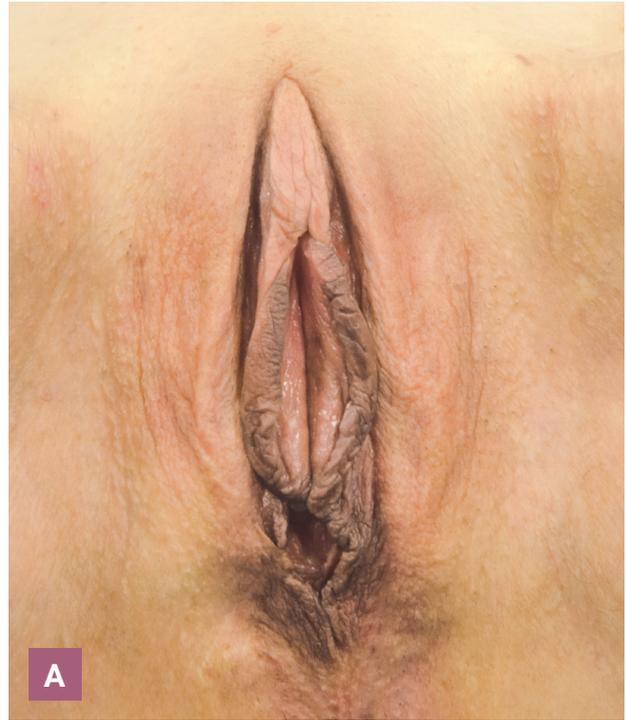
D

Post-operative condition, proportions have been restored

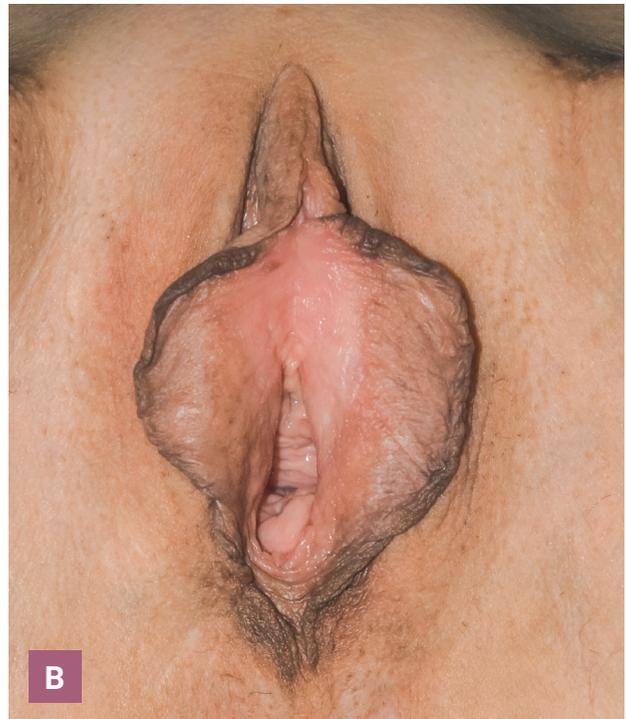


CLINICAL CASE

The patient shows laxity of the labia majora (A) associated with hypertrophy of the labia minora (B). The chosen procedure is a posterior lift of the labia majora associated with reduction of protruding labia minora. Two preoperative drawings are executed for the reduction of the labia minora (C) and for the posterior lift of the labia majora (D). Following the intervention, the post-operative result highlights the resolution of the issues (E). Even at the subsequent follow-up, one and a half months later, the condition appears unchanged (F).



Preoperative condition. Note the laxity of the labia majora



Preoperative condition. Note the hypertrophy of the labia minora



Preoperative drawings for the reduction of the labia minora



Preoperative drawings for the posterior lift of the labia majora



Immediate post-operative result



Condition after one and a half months