Mini-Review

Cosmetic Labiaplasty in an Adolescent Population

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A B S T R A C T

Labiaplasty (defined as the surgical reduction of the labia minora) is the most common procedure under the umbrella of female genital cosmetic surgery with the prevalence increasing over the past 10-15 years. However, the concept of labial hypertrophy holds an arbitrary definition, with no research into labial size undertaken within the pediatric and adolescent populations. Under the tenets of medical ethics there is acceptance of the need to avoid harm and so, for reasons to be outlined, performance of labiaplasty in children and adolescents should be avoided. This Mini-Review does not extend to pathological conditions that affect the labia minora.
Key Words: Labia minora, Labial hypertrophy, Labiaplasty, Female adolescent, Surgery: Cosmetic, Vulva

The Size of the Problem

The prevalence of labiaplasty is increasing globally. Australian statistics demonstrate a 2.5-fold increase in the 10 years to 2010,[1] and the United Kingdom has seen a fivefold increase over the same period.[2] These figures include 297 labial reductions carried out by the National Health Service in the United Kingdom between 2008 and 2012 in children younger than the age of 14 years for unknown reasons and with unknown outcomes.[3] Because these statistics arise from the relevant Australian and United Kingdom public health system records they do not include surgery carried out privately. Within North America there are no mechanisms to collate surgical data. Therefore, the true number of labiaplasties being carried out is unknown. Suffice it to say that the disturbing trend within the public health systems serves as a baseline depicting the recent increase in surgical intervention. This trend is noted in an environment lacking evidence of new or increasing labia minora pathology.

Labiaplasty surgery is essentially a lifestyle choice in the absence of labial disease or structural anomaly. When considering the marketing for such surgery, Liao et al[4] concluded that little information is given on short-term or long-term surgical risks and further stated that unsubstantiated claims of physical, psychological, and sexual benefits were present on every Web site. This is despite limited robust data on surgical outcomes. It should be noted that no independent or prospective audit either into outcomes or the long-term effect of labiaplasty has been found.

The British Association of Plastic Reconstructive and Aesthetic Surgeons recently surveyed patient attitudes and approaches to cosmetic surgery[5] and reported how 24% of patients do not check the surgeon's credentials and 21% are unaware of the risks of surgery.

Development

Embryological development of the external genitalia is the same for both sexes until approximately week 9: three distinct external genital structures develop; the genital tubercle, 2 urogenital folds, each lateral to the tubercle, and finally, 2 labioscrotal swellings, in turn lateral to the urogenital folds.

During the sexual differentiation stage and in the absence of dihydrotestosterone the urogenital folds develop into the labia minora. In the male, these form the dorsal aspect of the penis and penile raphe.[6,7]

Little is known specifically about labia minora development during puberty other than they do become thicker and longer, often being initially asymmetrical.[2] No definition of size or range has been formally established, nor has the expected end point of growth. However, when a woman is menopausal, the labia minora regress.

Structure and Function

The labia minora are 2 folds of hairless skin that border the vaginal vestibule and define the lateral limits of the vagina. They lie within the labia majora and fuse together posteriorly to form the posterior commissure. Anteriorly, the labia minora divide into posterior and anterior divisions around the glans clitoris, creating the clitoral frenulum and hood, respectively, and end at the apex of the clitoral hood.[8]

Lined by a stratified squamous epithelium[9] that is thinly keratinized and hairless,[10] the labia minora contain numerous sebaceous and eccrine sweat glands that open directly onto the surface of the skin.[9] Anteriorly, the labia are innervated by branches of the ilioinguinal and the genital nerve (L1-2), and the posterior supply is from the

The authors indicate no conflict of interest.

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http://dx.doi.org/10.1016/j.jpag.2015.09.010

pudendal branches (S2-4).[11] In 2010, Schober et al[9] examined labial tissue harvested from girls aged 2-9 years who had undergone labial surgery. They demonstrated that the labia minora are highly innervated along the entire free edge and are involved in the process of engorgement during sexual arousal. It follows that labiaplasty therefore has the potential to remove tissue that contributes to sensory sexual arousal.

Yang et al showed that the labia minora responded to sexual stimulation with an increase in width and enhancement in both pre- and postmenopausal women,[10] and Schober et al[12] identified that women who judged their own labia minora to be large (11% of the women sampled), reported higher ratings of sexual pleasure, higher than those who reported average-sized or small labia. In fact the labia minora are second only to the clitoris for sensation and sensitivity and are more sensitive than the vaginal introitus.[13,14]

Defining Normality

A literature review into the size of the labia minora and/or labial hypertrophy identified 400 articles.[15] Of these, 47 articles attempted to define or referred to a definition of labial hypertrophy. In total only 3 original research papers defined labia minora size: Lloyd et al,[16] Basaran et al,[17] and Murariu et al.[18] Subsequent to the literature review, a further piece of original research has come to light, from Cao et al.[19]

Lloyd et al assessed 50 pre-menopausal women aged 18-50 years (mean age, 35.6; SD, 8.7 years), of varying ethnic and parity status. Labial measurements were noted to have no statistically significant association with age, parity, sexual activity, ethnicity, or systemic hormonal medication use. Labia minora width was assessed between 7 and 50 mm (mean, 21.8 mm; SD, 9.4 mm).[16]

Basaran et al assessed 50 pre- and 50 post-menopausal women aged 22-39 years (mean, 30.2 years; SD, 4.2 years) and 47-60 years (mean age, 55.1 years; SD, 3.1), respectively. They noted that the pre-menopausal labia minora widths were 11-30 mm (mean 17.9 mm; SD, 4.1 mm) and postmenopausal widths were 8-27 mm (mean, 15.4 mm; SD, 4.7 mm).[17]

Murariu et al, in a brief letter to the editor, assessed 24 patients who requested labiaplasty over a 21-year period (mean age 36 years; no SD given). They noted a mean labial width of 35.2 mm (SD 7.1 mm; no range given). These cases were compared with 15 controls (mean age 18 years; no SD given) with a noted labial width of 15.4 mm (no range given; SD, 3.4 mm). This article provided limited methodology, inappropriate controls, and did not hold up to peer-reviewed scrutiny.[18]

Last, Cao et al undertook measurements of 319 Chinese women who sought female genital cosmetic surgery (FGCS) of ages 18-64 (mean, 31.3 years; SD 7.1) years. The range of labia minora width was 3-45 mm (for left and right). Means were calculated for each side (left: 19.92 mm; SD, 8.462 mm; right, 21.26 mm; 8.709 mm).[19]

From the available evidence it appears that it is reasonable to consider the range of labial width as being on the order of 3-50 mm for an adult population.

There is no clear definition of labial hypertrophy within the literature. Rouzier et al conducted a review of 163 labiaplasties over a 9-year period. Even with no evidence to define labial hypertrophy, a labia minora measurement of 4 cm from the base to the free edge was adopted. Despite this, Rouzier et al noted that labial hypertrophy was not a pathological condition and that patients were counseled against reduction surgery if the labia measured 4 cm or less.[20]

There is no specific research base conducted on adolescent populations.

Management Strategies

Education is paramount in managing concerns over labial appearances. Although considerable variation in the appearance of labia minora among women has been documented,[16,17,19,21] a highly restricted range of labia minora appearances is seen in the images presented by adult magazines.[22] Further, content analysis of online advertisements for FGCS by Liao et al[4] demonstrated that the Web sites explored presented FGCS as an effective therapy for genital appearance concerns with no explanation for the presenting clinical complaints. There were scanty references to the vulval appearance with limited diversity. Minimal scientific information on the outcomes or risks was discussed and there were no alternative ways to manage appearance concerns or body dissatisfaction. The authors concluded that the quality and quantity of clinical information in FGCS provider sites is poor and in some cases contained erroneous information.

Depending on the cause for concern, conservative measures include:

- Reassurance of normality for the individual, presentation of the concept of diversity, and referral to social media to demonstrate the range of normality (eg, *101 Vagina*,[23] *Petals*,[24] The Labia Library (www.labialibrary.org.au), Great Wall of Vagina (www.greatwallofvagina.co.uk), etc.
- Steps to reduce discomfort and irritation such as the use of simple soaps, the avoidance of scented gels, and the use of emollients.
- Use of comfortable, natural fiber underwear.
- Discouragement of vulval hair removal as this increases visibility and irritation to the vulva.
- Counseling or psychological support might also aid the adolescent if significant distress is present.

Surgical Techniques

The surgical techniques for labiaplasty can be divided into 2 main approaches:

- Amputation, in which the free edge of the labia is “trimmed” down to an acceptable size and oversewn. This approach results in scarring of the free edge of the revised labia minora.
- The removal of a section of labial tissue either using a wedge resection or de-epithelization. This technique