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"The tremendous media interest, fuelled by television programs such as 'Designer Vaginas' and 'the Perfect Vagina', have encouraged women to seek help for their 'problem'."

Female cosmetic genital surgery has evoked considerable media and public interest in recent years. The huge increase in the number of cosmetic surgical clinics, combined with increased awareness, accessibility and affordability, has also made this area of gynecological surgery a popular topic for critics. The tremendous media interest, fuelled by television programs such as 'Designer Vaginas' and 'the Perfect Vagina', have encouraged women to seek help for their 'problem'. Aggressive marketing has increased the demand for these procedures and enabled them to flourish despite the paucity of evidence. Labial reduction surgery almost doubled in the UK's National Health Service (NHS) in the 5-year period between 1999 and 2005 [101], and cosmetic surgery in general has increased by 31% [102]. In the absence of randomized, controlled trials and robust research, the onus of responsibility falls on the surgeons performing these procedures.

Depictions of female nudity have been the focus of attention in ancient art. These works of art lack anatomic precision and depict female genitalia lacking any imperfection. Bramwell *et al.* studied the representation of female external genitals in glossy women's magazines. They found that the pictures of naked women or women in tight clothes obscured the pubic area in some way or represented them as smooth curves between the thighs as though they were invisible [1]. One of the cosmetic surgery clinics has quoted their patients' choice of an esthetically pleasing vagina as that of the playmates in playboy magazines [103]. Health professionals and beauty therapists may be aware of the great diversity in the length, size, shape, color, position and appearance of the vulva, vagina, labia and clitoris, but to the lay public, these images of the perfect female genitalia compare unfavorably to their own 'faulty' or 'defective' anatomy.

Studies have shown considerable variation in the size of the genital organs in women who do not consider their genitals abnormal. Previous work by Radman has classified hypertrophy of the labia minora as more than 5 cm whereas Rouzier and colleagues consider 4 cm as their cut-off [2,3]. In a study of 50 women, who attended for various other gynecological procedures, wide variations were found in the dimensions of the labia minora [4]. No statistically significant association was found with age, parity, ethnicity, hormonal use or sexual activity. Pardo *et al.* have performed labiaplasty for asymmetry in women whose labium was less than 4 cm [5]. Therefore, the size of the labia is irrelevant to some women who request labiaplasty.

"Cosmetic surgery is no longer exclusive to the rich and famous, movie stars and models. It has become readily accessible to the general public."

The dimensions of the clitoris in normal women measured by Verkauf and colleagues in a gynecological office setting showed variations [6]. The mean transverse diameter of the glans clitoris was 3.4 ± 1.0 mm and the longitudinal diameter was 5.1 ± 1.4 mm. The total clitoral length including glans and body was 16.0 ± 4.3mm [6]. Vaginal casts made of dental putty and acrylic rods were used to explore the shape and length of the vagina, as well as the diameter of the introitus. Distinct vaginal shapes were classified as 'conical-', 'parallel-sided-', 'heart-' and 'slug-shaped'. Wide variations were noted in all the dimensions and no significant differences were found with parity or shape [7].

Cosmetic surgery is no longer exclusive to the rich and famous, movie stars and models. It has become readily accessible

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to the general public. In the UK, the NHS does not offer esthetic cosmetic genital surgery. The majority of these procedures are, therefore, performed in the private sector. This may, to some extent, explain the lack of good-quality research in this area. The limited available literature focuses on the technique and immediate surgical complications [8–13]. The results are based on retrospective analysis of case notes, local audits or data collected from unvalidated questionnaires [14].

The performance of a procedure for a non-life-threatening condition, with minimal evidence to support it, is likely to pose a moral and ethical dilemma. While a proportion of women do need procedures such as reduction labiaplasty for reasons other than cosmetic appearance, studies have failed to reach a consensus regarding the actual indication. The long-term anatomical, functional and psychological outcomes are also poorly understood. A qualitative study with a sample size of six concluded that women presenting for labial reduction may have unrealistic expectations of surgery, but their perceptions and expectations seemed to be based on strong, long-standing cultural beliefs. The authors believe that there is potential value in providing psychosocial interventions [15].

The procedures described under female esthetic genital surgery are reduction labiaplasty, vaginaplasty, liposuction to mons pubis, fat injections to labia majora or mons, clitoral hoodectomy, hymenorrhaphy, 'G-spot amplification', and the use of a surgical laser in 'vaginal rejuvenation' [104]. This article will briefly outline some of these procedures, analyze the available evidence and explore the deficiencies in the literature.

Anterior or posterior perineorrhaphy, performed for prolapse of the anterior (i.e., cystocele and urethrocele) or posterior (i.e., rectocele and enterocele) vaginal wall is often undertaken by a gynecological surgeon. These conditions are usually associated with uterine prolapse or urinary incontinence and are not generally considered as cosmetic surgery. These will not be discussed in this editorial. Surgeries performed for developmental sex disorders and procedures related to female genital mutilation are also out of the scope of this editorial.

Reduction labiaplasty or labioplasty is the most established cosmetic genital procedure in females. There are many articles discussing the various procedures, with surgeons advocating their own technique. The technique of simple trimming and oversewing the edges is probably the widely practiced method. Wedge resections, Z-plasty, w-incision, medial wedge, posterior wedge and central de-epithelialization are some of the other methods used. The surgeons claim that preservation of the neurovascular bundle and reduced incidence of hypopigmentation are advantages of their preferred method [8–13]. As is common in this area of medicine, there is no published evidence to recommend one over the other.

Liposuction or 'liposculpture' of the mons pubis or labia majora may be performed as an isolated procedure or in conjunction with liposuction of the abdomen or thighs. Conversely, fat injections to the mons pubis or labia majora are performed in order to plump out these structures and give them a more youthful appearance. Laser therapy for the removal of labial wrinkles and hair transplantation for hypotrichosis of the mons pubis are other procedures described. Hoodectomy, or removal of the fold of skin around the clitoris, is performed to expose the clitoris and make it more sensitive. However, there is little information regarding the outcomes, other than anecdotal.

"The performance of a procedure for a non-life-threatening condition, with minimal evidence to support it, is likely to pose a moral and ethical dilemma."

Vaginal laxity, despite the absence of symptomatic prolapse, is a common complaint amongst parous women. Although reduced sexual sensation is the most common specific symptom, it is not clear whether laxity is directly related to sexual dysfunction. Other symptoms include pelvic discomfort, an inability to retain tampons, vaginal wind and entrapment of bathwater. There is very limited evidence that surgical repair improves any of these symptoms of laxity. In the absence of objective prolapse, 'vaginal rejuvenation' procedures may include posterior colporrhaphy or perineorrhaphy, either of which may risk bowel symptoms and dyspareunia. Few series of such procedures have reported outcomes related to laxity. In one series, a 5-year follow-up of 80 women having combined posterior colporrhaphy and perineorrhaphy for symptomatic prolapse found that the incidence of symptomatic vaginal laxity had significantly decreased from 25 to 8% [16]. In another series, a 6-month follow-up of 53 women having the same procedure specifically for vaginal laxity and reduced sexual function found that 94% of patients reported greater vaginal tightness, with 74% having their expectations for the procedure fully met [17].

Some cultures ostracize premarital sexual activity and stress the importance of virginity on the wedding night. Restoration of the hymen or hymenorrhaphy is performed by approximating the free borders of the remnants, using fine, absorbable sutures to achieve partial occlusion of the introitus. If hymenal remnants are inadequate, a small flap of vaginal skin is reflected from the posterior vaginal wall and approximated to the anterior wall as a band across the hymenal ring. Incorporation of a gelatine capsule containing a blood-like substance simulates postcoital bleeding. In the only reported case series, 50% of the women were followed-up after the wedding night and all reported a satisfactory outcome [18].

The majority of the women who seek cosmetic vaginal surgery do so for esthetic reasons. Some, however, have discomfort wearing clothes, playing sport or during sexual intercourse. Sometimes, unequal size and appearance of genital parts can show through swimming costumes or interfere with insertion of tampons. Women may use physical discomfort and other medical indications to 'legitimize' a request for cosmetic surgery that is solely or mainly for esthetic reasons. A desire to explore cosmetic surgical options may also be based on the conflicting remarks they receive from partners during sexual intercourse and health professionals during procedures such as the cervical smear test [15].

Miklos and Moore investigated patients' indications for seeking labiaplasty surgery. Retrospective analysis of 131 case notes, based on questionnaires completed during the initial visit, showed that only 37% received surgery solely for esthetic reasons. They also indicated that the decision was not influenced by anybody other than themselves. A total of 32% sought surgery for functional reasons and the remaining 31% for both functional and asthetic reasons [14].

Some women believe that sexual satisfaction depends on the anatomical appearance of the genital organs and, hence, have low self esteem after childbirth and with advancing age. They feel less sexually attractive after childbirth and feel that their vagina is too baggy and, therefore, seek surgical help. However, there is no evidence to suggest that vaginal anatomy is related to sexual function. Weber *et al.* found that vaginal anatomy measured by introital caliber and length did not correlate with sexual function [19]; however, there is some evidence to suggest the contrary. Operations on genital areas such as the clitoris may cause damage to the vascular and nerve supply. This can have a negative impact on sexual satisfaction and pleasure [20]. Unrealistic expectations that genital surgery will have a positive impact on their failing sexual or emotional relationship may drive women to seek a surgical solution. Unsurprisingly, these women may be disgruntled if the surgery fails to create the impact they expected. In these circumstances, simple refusal to operate or referral to a psychosexual counselor may be more appropriate. This is, however, limited by the availability of such services or resistance on the part of the patient to accept alternate solutions for their 'medical' problem.

Dyspareunia or apareunia following vaginal surgery, especially posterior repair, was reported as 20% by Francis and Jeffcoate in 1961 [21]. Following this, recent studies have reported dyspareunia rates to be between 13 and 20% [22,23]. Coversely, some authors have reported an improvement in the sexual satisfaction and a decrease in sexual problems following pelvic organ prolapse surgery [24]. In one study, sexual function and satisfaction improved or did not change in most women after surgery for either prolapse or urinary incontinence, or both [25]. It is natural to assume that vaginoplasty performed in the absence of objective prolapse may result in excessive tightening and cause dyspareunia; however, no data could be found to refute or confirm this.

Feminizing genitoplasty and other similar procedures undertaken for ambiguous genitalia is an area of cosmetic surgery that has some data regarding the long-term outcomes. A retrospective study of such long-term outcomes found that the cosmetic result was judged as poor by the patients, with up to 80% requiring further reconstructive surgery [26]. Conflicting results were produced by a mailed, questionnaire-based survey in patients who underwent surgical reduction of the labia minora for hypertrophy over a 9-year period. The results showed that 89% of the women were satisfied with the esthetic result and 93% with the functional result. From this survey, the surgeons concluded that labia minora reduction is a simple surgical procedure associated with a high degree of patient satisfaction [3].

The decision to undergo cosmetic genital surgery invariably has a strong psychological basis. Therefore, even if the physician is in agreement that surgery is indicated for an anatomical abnormality, the psychosocial effects must be thoroughly investigated. Cano *et al.* reported that there is a lack of psychometrically sound measures and scope for improvement in the methodology used in plastic surgery research [27]. Given the psychosocial and clinical impact of plastic surgery, extreme caution should be exercised by the surgeons performing cosmetic genital surgery. The few reports that exist regarding patient satisfaction with labial reduction show positive results; however, the studies lack methodological rigor and follow-up was always short [3,5].

Both in the USA and the UK, regulatory bodies have advised patients and physicians to carefully consider the options. The American College of Obstetricians and Gynecologists has reiterated that procedures such as vaginal rejuvenation, designer vaginoplasty, revirgination and G-spot amplification are not medically indicated. There is insufficient documentation of the safety and effectiveness of these procedures. They warn that clinicians should evaluate the need for surgical intervention and inform the women about the lack of adequate data supporting the efficacy of these procedures. In addition to this, the potential complications, including infection, altered sensation, dyspareunia, adhesions and scarring, should be explained [28]. The Department of Health in the UK advises patients not to undergo cosmetic surgery lightly, as the results may not always meet their expectations. It also urges them to consider other options and to discuss them with a health professional, such as a general practitioner, counselor or pychologist, if concerns regarding their appearance result from other anxieties [105].

The recent boom in the number of articles on cosmetic genital surgery in the lay press has been followed by a similar increase of articles in the medical literature [29,30]. Although there is, generally, an antipathy and disfavor towards esthetic genital surgery, it has to be borne in mind that refusal to undertake cosmetic surgery should involve careful consideration. Although there is a dearth of evidence regarding their efficacy and safety, recent publications have begun to explore patient-centered psychosocial outcomes for these procedures. However, the available evidence is still insufficient to counsel the patients regarding the advantages and complications of cosmetic genital surgery. High-quality, robust research focusing on long-term outcomes, effect on quality of life, sexual function and patient-centered outcomes is needed for all esthetic gynecological procedures. Until such evidence is available, the operating surgeon has the responsibility to provide adequate care for the patient, guided by appropriate ethical and moral standards.

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