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Margie Polden Memorial Lecture: "Vaginal rejuvenation" and pseudoscience for sale – a critique

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Abstract
As women go through childbearing, hormonal changes and ageing, they can experience changes in their genitalia. Those that can have an impact on a woman's quality of life include vaginal laxity, stress urinary incontinence, loss of vaginal lubrication, a decrease in erotic sensation and a loss of tone in the labia majora. The phrase "vaginal rejuvenation" was coined to describe all the procedures that address the multitude of problems that can affect the vagina, but this is a marketing term, not a medical one. However, emotionally speaking, "vaginal rejuvenation" means a lot. Very few treatments are as controversial as vaginal aesthetic surgery. This paper presents a critique of "vaginal rejuvenation" and pseudoscience for sale.

Keywords: aesthetic surgery, pseudoscience, vaginal rejuvenation.

Introduction

If there's one word that we're less comfortable saying than "vagina", it's "vulva". For much of human history, the vagina has been, to some extent, a taboo subject – if not entirely unmentionable. There wasn't even a medical term for the female sexual passage until approximately 1680. Prior to this, *vagina* was the Latin word for a scabbard or sheath for a sword. Therefore, it should come as no surprise that the female reproductive parts were long viewed in medicine as mysterious bits of the anatomy.

The ancient Greeks believed that the uterus wandered about the female body "like an animal within an animal" (Adams 1856, p. 286), causing illness as it banged into the spleen or liver. They also believed that the vagina was drawn to fragrant smells, and that a physician could lure it back into place by presenting it with pleasant scents. Fast forward to the second century CE and Roman times when Galen rejected the idea of the wandering uterus, but saw the vagina as literally an inside-out penis. If a man's genitals were everted and extended inward between the rectum and the bladder, then the penis would be the vagina, the scrotum would be the uterus, and the testicles would be the ovaries. No one thought to question, why a scrotum couldn't carry a pregnancy. The clitoris did not feature anywhere in this hypothesis. The assumption was quite simply that the male body was the standard, and a woman was merely an imperfect form of a man.

Female genital cosmetic surgery (FGCS) is a highly controversial area of gynaecology. The term refers to lawful procedures that aim to alter the structure and appearance of the internal and external female genitalia in the absence of a biomedical concern. Several procedures that are intended to change the appearance of female genitalia and/or improve sexual functioning are classified as FGCS. Among these, vaginal rejuvenation is considered to be one of the most contentious genital cosmetic surgical interventions. This involves a range of procedures performed by gynaecologists and plastic surgeons that aim to decrease the average diameter of the vagina, mainly for sexual reasons.

When uptake of a particular procedure increases (e.g. the exponential rise in FGCS), it is important to question why this is the case. Is it the notion that, if something is bothersome, it must be fixable? Is it exposure to social media and aggressive marketing that normalize FGCS and vaginal rejuvenation? Is it because of a desire for self-improvement, or a lack of understanding of its risks? Is it because this cultural practice is being promoted unopposed? Celebrities who endorse the procedure also contribute to marketing

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the product by raising brand awareness and sales. For example, Kim Kardashian, Mel B and Danielle Lloyd are just three of the personalities whose names have been linked to vaginal rejuvenation. In addition, these procedures are increasingly being sold as a safer and less-invasive option, but it is not necessarily true that there is a lack of risk associated with FGCS.

Facts about the vagina

Part of the issue is a lack of understanding of the normal differences between vaginas. Hayes & Temple-Smith (2021) reported significant variations in labial length and width (range = 5–100 mm and 1–60 mm, respectively).

In 2008, British artist Jamie McCartney cast over 400 women's genitalia in plaster of Paris for his artwork *The Great Wall of Vagina* (www.greatwallofvagina.co.uk), and owing to popular demand, he kept going. This is a 9-m-long, multi-panelled artwork. The ages of the women involved ranged from 18 to 76 years, and the participants included mothers, daughters, identical twins, transgender men and women, a pre- and postnatal woman, and another before and after a labiaplasty. McCartney was originally inspired by the rise of cosmetic procedures that dictate how a woman should look – not just in terms of her face or her figure, but even in her most intimate areas – and refers to this trend as "body fascism" (Wyatt 2015). This piece of art beautifully demonstrates how no two labia are alike and every woman is unique. It also shows how the labia changes with time and age. The labia minora are wider in premenopausal women than those who have gone through the menopause and protrude more often than not, and asymmetry between the right and left labium is common. Variations in methods of recruitment, inclusion and exclusion criteria, and measurement did not allow for a summation of the data sets.

In a study by Pendergrass *et al.* (1996), full casts of the vaginas of 39 women were made using vinyl polysiloxone impression material. Thirteen of the participants were nulliparous, 13 uniparous and 13 multiparous. Five shapes were identified (Fig. 1), and there was a huge disparity in length and width (range = 6.86–14.81 cm and 4.80–6.30 cm, respectively). Although there are differences between women, variables such as parity, age and height are positively associated with a diversity of baseline dimensions.

In addition, changes in the size of the vagina happen during arousal: vaginal lengthening occurs as the cervix and uterus lift up and out of the way, which causes the upper two-thirds of the vagina to appear longer. Even the clitoris increases in size when stimulated, albeit not to the extent of the penile enlargement that is seen with an erection. The vagina is the only part of the body that cleans itself automatically, and odour is normal for the vagina. Organisms grow naturally in this environment, and it has an acidic pH because of a naturally occurring genus of bacteria that lives in the vagina called *Lactobacillus*. Contrary to popular belief, douching is actually harmful to the natural flora of the vagina and can affect the normal pH.

Why do women choose female genital cosmetic surgery?

Therefore, the question is: if the above is the case and the facts are widely known, why do women still go on to have FGCS including vaginal rejuvenation? There is evidence that the increasing number of requests for genital cosmetic surgery derive from women's desire for a standardized, prepubescent genital appearance, i.e. the "Barbie doll look", in which the labia minora are narrow and not visible, and the vaginal opening appears very tight (Schick *et al.* 2011). This specific minimalistic ideal of female genitalia is culturally dependent, and at least partly affected by: the development of Internet pornography; the popularity of total pubic hair removal; and the standardized representation of female genitalia in magazines and popular culture, despite the wide range of anatomically normal female external genitalia.

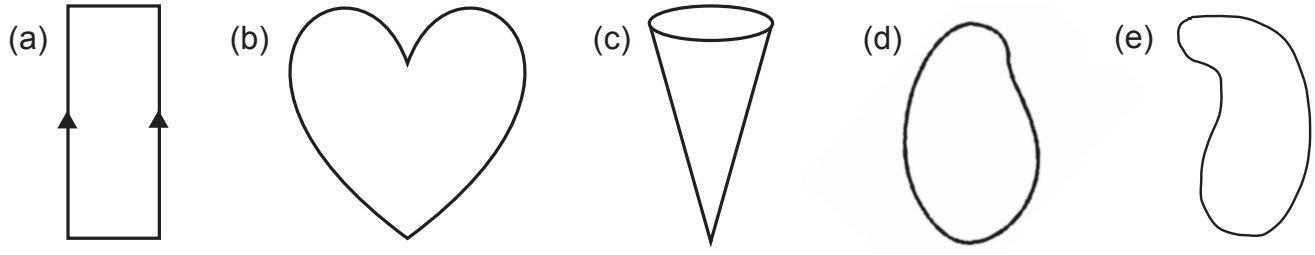

Figure 1. The five different vaginal shapes: (a) parallel-sided; (b) heart-shaped; (c) conical; (d) pumpkin seed; and (e) slug-shaped.

There is also evidence that women's perceptions of normal genitalia can be changed by exposure to different images of female external genitalia. Moran & Lee (2014) reported that pictures of surgically modified vulvas may influence attitudes about what is normal and desirable. Women were randomly assigned to view a series of images of surgically modified or unmodified vulvas. They then viewed and rated 10 target images of surgically modified vulvas and 10 of unmodified vulvas. Women who had first viewed the modified images rated the modified target vulvas as more normal than the unmodified vulvas, and this may explain why some healthy women seek labiaplasty.

Therefore, broadly speaking, there are four reasons why women choose to have FGCS:

- a distorted view of normal genitalia (a distorted body image often plays a key part in the request for FGCS);
- a change in grooming practices (with an increasing prevalence of pubic hair removal, women are more likely to be aware of the appearance of their labia);
- pictures on social media, with plastic surgeons advertising before and after images as a marketing gimmick; and
- an increasing emphasis on athleticism that is attributable to a preoccupation with spin classes and sports.

A worrying trend is the fact that this obsession with altering one's genital appearance appears to affect even young teenagers. As discussed above, this can be ascribed to factors such as the shaving of pubic hair, access to pornography and altered perceptions of normality. Young girls start to emulate what they believe to be more attractive. However, any form of FGCS in the under 18-year-old is viewed as female genital mutilation and is a punishable offence under the law.

Definition of vaginal rejuvenation

In order to give a sense of the frequency with which the terms "vaginal rejuvenation" and "laser labiaplasty" were used, when a Google search was done in September 2021, there were 9 630 000 matches for the former and 485 000 matched for the latter. When the same searches were carried out on PubMed, there were 366 matches for the former and 38 for the latter.

However, it is important to remember that vaginal rejuvenation is not a medical term. In fact, medically speaking, the phrase is meaningless. Nevertheless, emotionally speaking, it means a lot. It's a marketing term that describes the aim of the procedure, which is basically to give the vagina a younger appearance. Several different methods of rejuvenation have been described, and these include both surgical and non-surgical approaches.

However, women's dissatisfaction with their genitalia is not restricted to its appearance. There may be issues with vaginal laxity, or other problems, such as dryness, burning, painful sex, sexual dysfunction and urinary incontinence, all of which prompt them to pursue vaginal rejuvenation.

Vaginal laxity is poorly understood. The term refers to a looseness in the vagina, or a loss of or decrease in tension in the vaginal canal. It is a health and self-esteem issue for many women, although most don't want to talk about it. Individuals with this problem often experience a reduction in sexual satisfaction because there is less vaginal sensation during intercourse. This can sometimes result in women losing confidence because they are concerned that a compromised sex life will have a negative impact on their relationships. In spite of this being a common health issue, many are reluctant to discuss the problem and even fewer seek help for it. The desire for a quick-fix solution sometimes results in women making choices that are not evidence-based and of unproven efficacy, and discounting the tried-and-tested methods of pelvic floor muscle training.

Genitourinary syndrome of menopause, which was previously referred to as simply atrophy, is now recognized as having a global impact on various aspects of pelvic floor health. Its symptoms include vaginal dryness, burning and stinging, painful sex and sexual dysfunction, and also urinary frequency, urgency and incontinence.

The most common causes of vaginal laxity and other vaginal problems are childbirth and the menopause. Ageing independent of oestrogen status can also have an impact by causing progressive weakening of the pelvic floor. Genetic factors and underlying connective tissue disorders such as Ehlers–Danlos syndromes also contribute to pelvic floor dysfunction. Vaginal laxity has been shown to have a significant impact on a woman's sexual health and quality of life (QOL) (Campbell *et al.* 2018).

Most of the specialist obstetrics and gynaecology societies have adopted similar stands on FGCS. In 2007, the American College of Obstetricians

Table 1. Types of vaginal rejuvenation procedures

Procedure	Examples
Reconstructive	Vaginoplasty (posterior colporrhaphy), hymenoplasty, clitoral unhooding, labiaplasty
Cosmetic	Labiaplasty, labia majoraplasty, monsplasty, clitoral unhooding
Functional	G-spot amplification, lipofilling, vaginal laser

and Gynaecologists published a critical position paper on FGCS (CGPACOG 2007). This pointed out that: vaginal rejuvenation and other FGCS procedures are not mainstream surgical practice; there is a paucity of data to support the safety and efficacy of these surgical interventions; and these may result in potential complications, such as infection, dyspareunia, scarring and altered sensation. The Royal College of Obstetricians and Gynaecologists (RCOG 2013) highlighted that it is inappropriate to present FGCS as an unproblematic lifestyle choice because this would misinform women about the actual efficacy of these procedures. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG 2008), and the Society of Obstetricians and Gynaecologists of Canada (Shaw *et al.* 2013) have both taken public stands against FGCS.

Methods of rejuvenation

Broadly speaking, vaginal rejuvenation procedures can be divided into three groups (Table 1).

Reconstruction and cosmetic surgery are intended to improve function and aesthetics, respectively. Some other procedures are neither reconstructive nor cosmetic, and are performed with a purely practical aim. Vaginoplasty is a reconstructive procedure that tightens the vagina following childbirth. Hymenoplasty, also known as hymen restoration surgery, repairs the hymen, returning it to its original intact state in order to give the impression that a woman is still a virgin. The RCOG is lobbying the UK government to ban the clinically unnecessary and harmful practice of hymenoplasty and virginity testing, which has no clinical basis.

Clitoral unhooding involves the reduction and surgical separation of the hood (prepuce). It is designed to give more "exposure" to the clitoral body, theoretically providing improved sexual stimulation and reducing redundant prepuce or frenular folds. It is performed for both cosmetic and reconstructive reasons, and to obtain better function.

Of all the surgical procedures performed as FGCS, the commonest is the labiaplasty. This is also the fourth commonest cosmetic surgical intervention after liposuction, breast augmentation and rhinoplasty. In the UK, there has been a fivefold increase in women undergoing this procedure over the past 10 years. Several techniques have been described for labial reduction, including wedge resections and longitudinal resections.

Other non-surgical techniques include orgasm and G-spot shots (O- and G-shots). The G-spot, which is also known as the Gräfenberg spot, was first described by Dr Beverly Whipple after she discovered that using a "come here" motion inside the vagina produced a physical response in women (Addiego *et al.* 1981). She was of the view that this region could be the key to women achieving orgasm during sex (Fig. 2). However, the G-spot is not a distinct part of a woman's anatomy, but rather, a part of the clitoral network. A study by Herbenick *et al.* (2018) showed that only 18% of women achieve orgasm during penetration alone, which explains why women search for other means of achieving this. In O- and G-shots, the patient's serum is centrifuged to obtain platelet-rich plasma, and this is then injected into specific points in the vagina. This can be done as a one-off or via repeat injections.

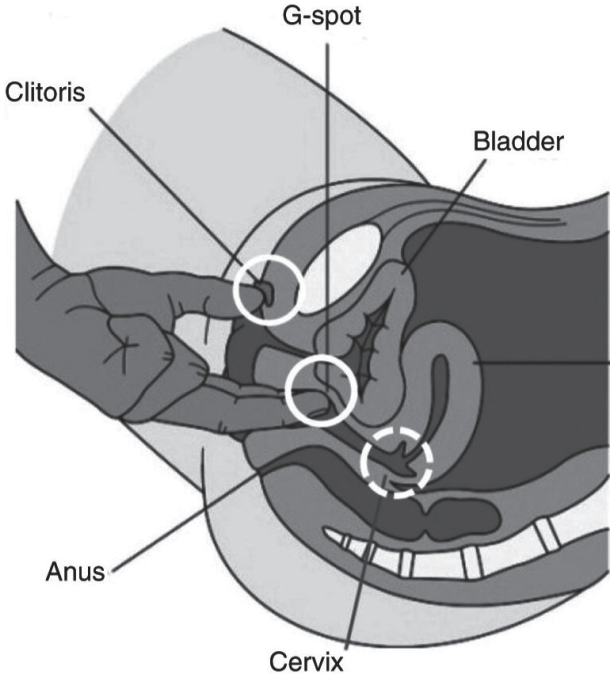

Figure 2. Location of the G-spot. Reprinted from Pfaus *et al.* (2016, Fig. 4b) under the terms of the Creative Commons Attribution 4.0 International license.

Table 2. Types of vaginal energy devices used for vaginal rejuvenation

Device	Examples	Number of treatments
Carbon dioxide laser	MonaLisa Touch (Cynosure, Westford, MA, USA)*	Three at 6-week intervals
	FemiLift (Alma Lasers Inc., Buffalo Grove, IL, USA)*	Three at 4–6-week intervals
Erbium:yttrium aluminium garnet laser	IntimaLaser (Fotona, Dallas, TX, USA)†	Two at 8-week intervals
	Juliet (MCL 31 Dermablate; Asclepion Laser Technologies, Jena, Germany)*	Two at 4-week intervals
	Petit Lady (Action II; Lutronic, Goyang-si, Gyeonggi-do, South Korea)*	Three at 2-week intervals
Radiofrequency-based devices	ThermiVa (Thermi, Laguna Beach, CA, USA)	Three at 4–6-week intervals
	ReVive Fusion (Viora, New York, NY, USA)	Four to six at 2–3-week intervals
	Venus Fiore (Venus Concept, Toronto, ON, Canada)‡	Three at 1-week intervals

*Ablative.
†Non-ablative.
‡Multipolar radiofrequency with pulsed electromagnetic field.

Lipofilling and the injection of hyaluronic acid is a similar procedure.

Another non-surgical vaginal rejuvenation technique uses a range of vaginal laser and radiofrequency devices (Table 2). Broadly speaking and irrespective of the type of apparatus used, the mechanism of action includes neocollagenesis, neovascularization, collagen contraction and the infiltration of growth factors. It is used for a wide range of indications, and within cosmetic gynaecology, employed in the treatment of vaginal laxity and for labial reduction.

The evidence

It is difficult to conduct research into FGCS. The value of the cosmetic surgery market in the UK was estimated to be as much as £3.6 billion in 2015 (Keogh 2013), which creates a significant conflict of interest that mitigates against unbiased research. In addition, the aim of FGCS is to restore perceived normalcy to the genitalia. This means that it is unlikely that women who undergo this form of surgery would want to be constantly reminded of it on an ongoing basis, making long-term studies even more difficult. Another problem with researching this subject is that the term encompasses a very wide range of procedures that are quite diverse, making comparisons difficult. A further issue is the outcomes to be used in research: are these determined by patient satisfaction, or the aesthetics determined by the clinician? To date, there is no consensus about the outcomes that should be used for studies of FGCS.

Pardo *et al.* (2006) reported that vaginoplasty or a colpoperineorrhaphy appeared to improve patients' symptoms and enhance sexual function. However, 4% of patients still expressed regret at having agreed to the procedure, and a further 5% stated that the results of the surgery did not meet their expectations. This study involved 53 women who suffered from vaginal laxity.

In a case series of 163 labial reductions (Rouzier *et al.* 2000), 89% of participants were very satisfied with the cosmetic results and 93% were satisfied with the functional outcome. However, four said they would not have the procedure repeated. Studies have also reported complication in up to 10% of patients (Surroca *et al.* 2018). In addition to functional issues, feelings of emotional and psychosexual distress appear to be important motivators for women who are considering labial reduction surgery (Zwier 2014; Surroca *et al.* 2018). Female genital cosmetic surgery, particularly labiaplasty, appears to have a positive effect on women's self-esteem. However, inconsistencies in the outcome measures and methods used in these studies limit the conclusions that can be drawn.

In a cross-sectional study that included 258 women and encompassing 341 separate FGCS procedures (Goodman *et al.* 2010), 91.6% of the participants were satisfied and complications were described as minor. The reasons for undergoing the procedure and the impact on sexual function were examined, and satisfaction rates were reported. Goodman *et al.* (2010) found that the reasons for undergoing a labiaplasty included improving aesthetic appearance, enhancing self-esteem, and reducing functional problems such as dyspareunia and discomfort. A high overall satisfaction rate of 97.2% was reported. The reasons for choosing a vaginoplasty included a feeling of looseness, and to enhance both the patient's and her partner's sexual pleasure. The overall rate of satisfaction was 83%. These results are similar to those reported by Miklos & Moore (2011).

There is no robust evidence to support the use of the O- and G-shot injectable procedures, which are also very expensive.

Evidence for the use of vaginal energy devices in vaginal rejuvenation is gradually accumulating (Juhász *et al.* 2021; Lauterbach *et al.* 2021; Toplu *et al.* 2021; Wattanakrai *et al.* 2021). However, this is relatively weak because these studies are usually observational, and those that are blinded are small with only a short follow-up period. Despite these limitations, the results do suggest that some benefit is derived from these interventions.

A comparison of surgical and non-surgical procedures (i.e. vaginoplasty and laser therapy, respectively) found that surgery is more suitable in both severe and moderate cases of laxity, but non-surgical treatment is appropriate for treating a light-degree vaginal laxity (Cheng *et al.* 2021).

With the ever-increasing demand for FGCS and vaginal rejuvenation, gynaecologists, plastic surgeons and primary care physicians need to be prepared to respond to questions about the various procedures involved. They should be aware of the evidence that exists and also where it is lacking since patients need to be made aware of this so that they can make informed decisions about their choice of treatment.

The future

The fact remains that women will occasionally elect to have FGCS, and whether we agree or disagree with this choice – whether we undertake the surgery ourselves or not – we need to be able to advise our patients about what they should expect.

There is a dire need for a classification of and accurate terminology for FGCS. Clinicians undertaking these procedures should be adequately educated, and required to demonstrate both competence and training. There is a lack of specific, valid and reliable satisfaction and patient-reported QOL outcomes for FGCS. Going forward, research should involve the development of standardized outcomes measure that accurately assess the impact of these procedures on self-esteem, and more generally, psychological well-being (Sharp *et al.* 2020a, b). Outcome data should include the impact of FGCS on sexual function and adverse events, particularly where energy devices have been used. Further research is urgently needed to identify which procedures have solid evidence for their use and which have no added value. Only then can vaginal rejuvenation procedures and FGCS be introduced into mainstream gynaecology.

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