

Female genital appearance: 'normality' unfolds*

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Objective To describe variations in genital dimensions of normal women.

Design Observational cross-sectional study.

Setting Elizabeth Garrett Anderson Hospital, University College Hospital NHS Trust, London, UK.

Population Fifty premenopausal women having gynaecological procedures not involving the external genitalia under general anaesthetic.

Methods A cross sectional study using digital photography and measurements of the external genitalia.

Main outcome measures Clitoral size, labial length and width, colour and rugosity, vaginal length, distance from clitoris to urethral orifice, distance from posterior fourchette to anterior anal margin.

Results A wide range of values were noted for each measurement. There was no statistically significant association with age, parity, ethnicity, hormonal use or history of sexual activity.

Conclusion Women vary widely in genital dimensions. This information should be made available to women when considering surgical procedures on the genitals, decisions for which must be carefully considered between surgeon and woman.

INTRODUCTION

Although representations of female nudity are common, detailed accurate representations of female genitals are rare. In the popular press, publications such as 'Femalia' address such a gap and have contributed to awareness of the diversity of female genital appearance.^{1,2} Although lay representations vary according to historical and cultural conditions, scientific work is supposedly screened of such influence. There are demonstrable shifts in the scientific representation of female anatomy^{3,4} and it is notable that even some recent text books of anatomy do not include the clitoris on diagrams of the female pelvis.^{5,6}

Women who seek cosmetic genital surgery fall into two main categories. Firstly, women with congenital conditions such as intersex for which current standard practice advises feminising genitoplasty procedures, with the objective of reducing clitoral size and opening the vaginal

introitus.^{7,8} Recent work has demonstrated that the cosmetic outcome of surgical attempts to create normative feminine genital appearance tends to be poor, with up to 80% requiring further reconstructive surgery.⁹

Secondly, some women with no underlying condition affecting their genital development also seek surgery to alter the appearance of their genitals, for example, labial or clitoral reduction.^{10,11} Reasons for such requests are far from understood. But implicit in a woman's desire to alter genital appearance may be the belief that her genitals are not normal, that there is such a thing as normal female genital appearance, that the operating surgeon will know what this is, that he or she will be able to achieve this for her and that this would somehow improve her wellbeing or relationships with others.

There are few reports in the literature regarding overall 'normal' female genital appearance or 'normal' dimensions and exact positioning of the vagina, clitoris, labia and urethra.^{12–15} Yet this information is crucial for surgeons and patients in planning for and assessing the cosmetic outcome of genital surgery. The current study aims to address this gap in our knowledge by providing data on the anatomical dimensions and configuration of adult female genitalia.

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* What is already known on this subject:

Very few studies are available in the literature on the range of measurements of female genitalia. Recent studies have found that the clitoris is more extensive than previously thought. Genital surgery is known to cause problems with sexual function.

What this study adds:

This study illustrates the wide range of genital dimensions in normal women. This information can be considered by women and doctors when making the decision to have genital surgery.

METHODS

Study participants were recruited from gynaecology operating lists at a central London teaching hospital. Ethical approval for the study was obtained from the Joint Hospital and University Ethics Committee. Women having routine procedures, such as hysteroscopy or diagnostic

laparoscopy, were given an information leaflet, and written consent was then obtained from the 50 women who chose to take part. Age, parity, ethnicity, use of systemic hormones and sexual activity history were recorded.

Participants were excluded if they were non-English speakers without an interpreter present, were under the age of 18, were postmenopausal or if they had previously undergone any surgery to the external genitalia. Women who had undergone female genital mutilation/cutting were also excluded.

Once anaesthetised, women were placed in the lithotomy position. Measurements were taken directly from the woman in accordance with the diagram in Fig. 1. A disposable tape measure was used for all measurements other than vaginal length, for which a vaginal swab was used to measure from the posterior vaginal fornix to the introitus. Clitoral body length, clitoral glans width and distance from the base of the glans to the urethral orifice were recorded. Measurements were also taken of labia majora (length), labia minora (length and width) and distance from posterior fourchette to anterior anal margin (perineum). Rugosity and skin tone of the labia majora and hair distribution according to Tanner's stages were noted.¹⁶ A digital photograph of the external genitalia was taken prior to skin preparation and draping for surgery. All examinations and photographs were taken by one of two gynaecology registrars (JL or NSC) in order to minimise inter-observer variability. The first two women were examined under the direct supervision of a consultant

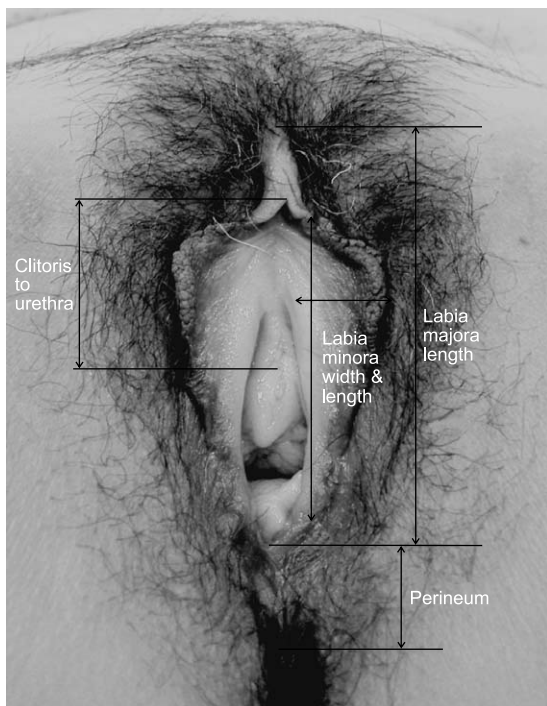


Fig. 1. Picture showing location of measurements taken from female perineum.

Table 1. Measurements of genitalia.

	Range	Mean [SD]
Clitoral length (mm)	5–35	19.1 [8.7]
Clitoral glans width (mm)	3–10	5.5 [1.7]
Clitoris to urethra (mm)	16–45	28.5 [7.1]
Labia majora length (cm)	7.0–12.0	9.3 [1.3]
Labia minora length (mm)	20–100	60.6 [17.2]
Labia minora width (mm)	7–50	21.8 [9.4]
Perineum length (mm)	15–55	31.3 [8.5]
Vaginal length (cm)	6.5–12.5	9.6 [1.5]
Tanner stage (<i>n</i>)	IV	4
	V	46
Colour of genital area compared with surrounding skin (<i>n</i>)	Same	9
	Darker	41
Rugosity of labia (<i>n</i>)	Smooth	14
	Moderate	34
	Marked	2

gynaecologist (SMC) in order to clarify exact dimensions to be measured. The subsequent 20 women were examined with both registrars present in order to ensure consistency in measuring. After this time, measurements were undertaken independently.

Analysis of data was performed using SPSS (version 11.5), with Spearman's correlation and descriptive statistics as appropriate. A *P* value of <0.05 was deemed significant.

RESULTS

Over an eight-month period, 58 women were invited to take part and 50 agreed giving an 86% acceptance rate. The most common reasons for declining were embarrassment, or concern about a partner's reaction.

All women were premenopausal, and aged between 18 and 50, with a mean of 35.6 [8.7]. The majority of women were white (*n* = 37), with five Asian women, six black women, one Latin American woman and one woman who was mixed race. Three women had never been sexually active. Twenty-nine women were nulliparous and 18 were parous. Parity ranged from 1 to 8, with a mean of 2.5 [1.5]. Eleven women were taking systemic hormones, such as oral progestogens or the combined oral contraceptive pill. The range, mean and standard deviation for all measurements are displayed in Table 1. There was no statistically significant association between any of the different genital measurements and age, parity, ethnicity, hormonal use or history of sexual activity.

DISCUSSION

In general, there are surprisingly few descriptions of normal female genitalia in the medical literature. In contrast, measurements for male genitalia are widely available and were published as early as 1899.¹⁷ There have been a

few reports on clitoral size^{12,13} and vaginal length,¹⁴ but very little information on labial size or other aspects such as genitalia colour and rugosity. Recent important work has focussed upon the internal size, position and relationships to surrounding structures of the clitoris following post-mortem dissections of external female genitalia rather than upon the external appearance.¹⁵

The current study demonstrates wide variations in all the parameters assessed. The mean vaginal length was at 9.6 [1.5] cm with a wide range varying from 6.5 to 12.5 cm. This is slightly shorter than has previously been described.¹⁴ It also suggests that sexual function may not be related to absolute vaginal length as measured in a clinical setting, although this does not take into account the marked changes in dimensions that may occur during arousal and penetrative intercourse. Such information may be significant for women with vaginal agenesis or hypoplasia who are undergoing treatment to increase the size of the vagina. No difference was seen in vaginal length when comparing parous and nulliparous women. We estimate that for a study with a power of 90%, 109 women would be needed in each of two groups in order to conclude that no difference exists. Wide variations were also noted in the dimensions of the labia minora. Previous work has defined the labia minora as hypertrophic and thus deserving of corrective surgery if the maximum distance from the base to edge was greater than 4 cm.¹⁸ However, we found that labia minora dimensions displayed much greater variation (Fig. 2). None of the women in our study had expressed any personal difficulty or sought cosmetic surgical alteration.

This current report has important implications for several populations. Great importance has been placed on achieving a normal appearance via surgical means for children born with conditions that affect genital development.⁷ This is thought to normalise the psychological development of these children,¹⁹ although evidence for such an

association is conspicuous by its absence.²⁰ Moreover, given the variety of normal female genital appearance and lack of normative data, it can be surmised that decisions regarding the amount of reconstruction needed are entirely subjective. It is therefore surprising that surgeons feel confident that surgery has the potential to achieve a 'normal' female genital appearance. Parents should be educated about the wide variations in both the appearance and dimensions of female genitalia, as part of the counselling process before a decision is made on infant feminising genital surgery.²¹

Genital surgery risks disruption of nerves and blood vessels, which may impair sensation to the genital area and affect future capacity for sexual pleasure.^{22,23} Surgery should only be undertaken with a clear understanding of the variation in normal appearance and in cases which differ markedly from normal.

There has been a relatively small but steady demand for cosmetic surgery to the female genitalia such as labial reduction procedures (E. Scholten, personal communication). With conspicuous availability of pornography in everyday life, women and their sexual partners are increasingly exposed to idealised, highly selective images of the female genital anatomy.²⁴ Thus, in the future, more women may request genital surgery because a solution involving experts with minimal personal responsibility is more appealing than a personal commitment to problem solving. Surgeons need to communicate information regarding the normal range of female genital appearance. It must be made explicit that there is currently no evidence that such procedures *per se* enhance psychological or relationship wellbeing for any female population. Rather, evidence-based methods for alleviating psychological or relationship distress in the general population do not involve surgery. However, as long as surgery is offered, even meticulous consultation skills may not alter women's desire for risky cosmetic procedures. Thus, a wider scale professional discussion will be needed to consider guidelines for circumstances where cosmetic surgery to the genitals or other parts of the anatomy is not recommended.



Fig. 2. Variation in appearance of labia minora.

CONCLUSIONS

We have examined the normal ranges of genital measurements in women and demonstrated that there is far greater diversity than previously documented relating to labial and clitoral size, colour and rugosity, vaginal length and urethral position. Future studies would be useful to clarify if such wide variation is displayed in more homogenous ethnic groups. This information should be considered in the decision and planning of any reconstructive genital surgery. Many options exist in the health services and the community at large for resolving personal or relationship dissatisfaction and distress other than surgery.

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