

Measurement of the Thickness of the Urethrovaginal Space in Women with or without Vaginal Orgasm

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ABSTRACT

Introduction. The physiology and anatomy of female sexual function are poorly understood. The differences in sexual function among women may be partly attributed to anatomical factors.

Aim. The purpose of this study was to use ultrasonography to evaluate the anatomical variability of the urethrovaginal space in women with and without vaginal orgasm.

Methods. Twenty healthy, neurologically intact volunteers were recruited from a population of women who were a part of a previous published study. All women underwent a complete urodynamic evaluation and those with clinical and urodynamic urinary incontinence, idiopathic detrusor overactivity, or micturition disorders, as well as postmenopausal women and those with sexual dysfunction were excluded. The reported experience of vaginal orgasm was investigated.

Main Outcome Measure. The urethrovaginal space thickness as measured by ultrasound was chosen as the indicator of urogenital anatomical variability. Designated evaluators carried out the measurements in a blinded fashion.

Results. The urethrovaginal space and distal, middle, and proximal urethrovaginal segments were thinner in women without vaginal orgasm. A direct correlation between the presence of vaginal orgasm and the thickness of urethrovaginal space was found. Women with a thicker urethrovaginal space were more likely to experience vaginal orgasm ($r = 0.884$; $P = 0.015$). A direct and significant correlation between the thickness of each urethrovaginal segment and the presence of vaginal orgasm was found, with the best correlation observed for the distal segment ($r = 0.863$; $P < 0.0001$). Interobserver agreement between the designated evaluators was excellent ($r = 0.87$; $P < 0.001$).

Conclusions. The measurement of the space within the anterior vaginal wall by ultrasonography is a simple tool to explore anatomical variability of the human clitoris-urethrovaginal complex, also known as the G-spot, which can be correlated to the ability to experience the vaginally activated orgasm. **Gravina GL, Brandetti F, Martini P, Carosa E, Di Stasi SM, Morano S, Lenzi A, and Jannini EA. Measurement of the thickness of the urethrovaginal space in women with or without vaginal orgasm. J Sex Med 2008;5:610–618.**

Key Words. Echography; Female Ejaculation; G-Spot; Skene's Glands; Female Prostate

Introduction

Female genital anatomy and the physiology of female sexual function have been scientifically neglected in the past [1]. This is particularly true for orgasm, which has been described much more from a political or philosophical perspective [2] than by using scientific tools.

Female orgasm is a complex function not perfectly understood where intrapsychic, cognitive, relational, neurohormonal, vascular and anatomical factors play roles. Although literature abounds with descriptions and discussions of vaginal as opposed to clitoral orgasm [3,4] and only few studies map genital erotic sensitivity to tactile stimulation in healthy females [5], it is evident that

some women need direct, external, clitoral stimulation whereas others may reach orgasm also by penetration and thrusting that directly stimulate the internal clitoris and vaginal wall structures and indirectly the external part of the same organ [5]. Interestingly, a study of 200 women revealed that external clitoris length varies by more than 25%, demonstrating that individual differences are macroanatomic [6]. Furthermore, in cadaver studies, the internal clitoris may have individual differences bigger than 100% [7]. Whether these differences are correlated with ability to reach orgasm is not yet established.

Other areas have been involved in the mechanism of orgasm (urethra, labia minora, Halban's fascia, periurethral glans; see [4] and references therein). On the basis of its supposedly low presence of sensory receptors, the vagina was considered as poorly responsive by Kinsey [8], and Masters and Johnson [9]. However, Gräfenberg [10], as subsequently reviewed and popularized by Ladas, Whipple, and Perry [11] (but disputed by others [12,13]), suggested a variable area of increased sensitivity over the urethra on the anterior vaginal wall. The urethrovaginal space (where the Halban's fascia runs [14]) seems critical, being constituted of fibro-connective tissue and large numbers of blood vessels, glands, muscular fibers, and nerve endings. The close physical proximity of the urethra and the clitoris to the anterior vaginal wall suggests an association between these anatomical structures and sexual function [15,16]. In fact, the anterior vaginal wall is an active organ, transmitting, during intercourse, the effect of penile thrusting in the vagina to the clitoris, by stretching the two ligaments that insert around its base [17]. As for the clitoris, microscopic examination reveals that the human vagina's anterosuperior wall differs from one subject to another [18]. The presence of pseudocavernous tissue (clitoral bulb) in the anterior vaginal mucosa is a frequent but not universal finding (86%) [19]. Around the urethra, the existence of the prostatic embryological remnant—Skene's glands [20]—is also an anatomical variant and not a constant.

Aims

Differences in women's sexual function obviously exist and although they have been largely attributed to cultural, religious, intrapsychic and, above all, relational factors [21], it is possible that anatomical factors might be partly responsible. Thus, if "anatomy is destiny" [22], physical differences

should be taken into account as a source of physiological variability in female sexual response. With these concepts in mind, the purpose of this study was to use introital ultrasonography to evaluate anatomical variability, measured as the difference in thickness of the urethrovaginal space and to correlate this variability with the presence vaginally activated orgasm.

Methods

Patient Recruitment

A cohort of 37 healthy, neurologically intact, consecutive volunteers were recruited from the normal controls of a population of women who were a part of a previously published study [23]. Approval for this study was obtained from the Internal Review Board. The women underwent physical and neurological examination (including perineal/genital inspection, vaginal, pelvic floor muscle strength, assessment of reflexes such as anal wink, bulbocavernosus and perineal-perianal sensation) and urodynamic study (UDS). All women underwent a nonstructured clinical interview at our Medical Sexology Service. The sexual history interview was conducted with each woman in a private room alone with a sexologist. Exclusion criteria consisted of drug or alcohol abuse, medications or medical conditions that might alter sexual function (e.g. diabetes), previous anti-incontinence surgery or any stage of vaginal prolapse (Pelvic Organ Prolapse Quantification System, POP-Q). Subjects with sexual dysfunction were also excluded. For this purpose, a female sexual function index (FSFI) [24] total score of less than 26.55 was considered suggestive of female sexual dysfunction [25]. Specifically, only women with high scores (4 or 5) for Q.11 (*how often did you reach orgasm*), Q.12 (*how difficult was it for you to reach orgasm*), and Q.13 (*how satisfied were you with your ability to reach orgasm*) were selected. It should be noted that these questions do not distinguish vaginal from clitoral orgasm. All subjects were exclusively heterosexual, had stable relationships (median value of 19 months [interquartile range {IQR} 13.5–23 months]) and reported at least two acts of sexual intercourse per week, a regular menstrual cycle and that they had been sexually active within the past 6 months.

The presence of vaginal orgasm was then investigated by the same male investigator (E.A.J.) who collected the sexological history, in a separate setting. Vaginal orgasm was ascertained by the following question: "Have you ever experienced a

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