ORIGINAL RESEARCH—WOMEN'S SEXUAL HEALTH

Pilot Echographic Study of the Differences in Clitoral Involvement following Clitoral or Vaginal Sexual Stimulation

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ABSTRACT

Introduction. Women describe at least two types of orgasms: clitoral and vaginal. However, the differences, if any, are a matter of controversy. In order to clarify the functional anatomy of this sexual pleasure, most frequently achieved through clitoral stimulation, we used sonography with the aim of visualizing the movements of the clitorourethrovaginal (CUV) complex both during external, direct stimulation of the clitoris and during vaginal stimulation.
Method. The ultrasounds were performed in three healthy volunteers with the General Electric® Voluson® sonography system (General Electric Healthcare, Vélizy, France), using a 12-MHz flat probe and a vaginal probe. We used functional sonography of the stimulated clitoris either during manual self-stimulation of the external clitoris or during vaginal penetration with a wet tampon.
Main Outcome Measures. Functional and anatomic description, based on bidimensional ultrasounds, of the clitoris and CUV complex, as well as color Doppler signal indicating speed of venous blood flow, during arousal obtained by external or internal stimulation.
Results. The sagittal scans obtained during external stimulation and vaginal penetration demonstrated that the root of the clitoris is not involved with external clitoral stimulation. In contrast, during vaginal stimulation, because of the movements and displacements, the whole CUV complex and the clitoral roots in particular are involved, showing functional differences depending on the type of stimulation. The color signal indicating flow speed in the veins mirrored the anatomical changes.
Conclusions. Despite a common assumption that there is only one type of female orgasm, we may infer, on the basis of our findings, that the different reported perceptions from these two types of stimulation can be explained by the different parts of the clitoris (external and internal) and CUV complex that are involved. **Buisson O and Jannini EA. Pilot echographic study of the differences in clitoral involvement following clitoral or vaginal sexual stimulation. J Sex Med 2013;10:2734–2740.**

Key Words. Clitoris; G-Spot; Orgasm; Vagina; Arousal; Echography

Introduction

While the ability of men to achieve orgasm, usually accompanied by ejaculation upon different types of stimulation, has been well described [1–3], the presence of different types of orgasms in women has been, variously, treated as a hypothesis, claimed as fact, and strongly denied [4]. The classic opinion of Masters and Johnson was that all female orgasms are mediated by clitoral stimulation, whether directly or indirectly [5]. Although widely repeated, this opinion was not based on robust results. However, it is a matter of evidence that the easiest and commonest way for a healthy woman to reach climax is the direct stimulation of the external clitoris [6–8]. Moreover, the existence of a "vaginal" orgasm (more correctly named "vaginally activated orgasm," VAO [9]) has often been rejected, more for political than for scientific reasons [10]. However, even if the relative percentage reported in the literature varies considerably, the frequency of women who cannot

experience VAO is around 30–40%, indicating that some 60–70% of women can have VAO (see [11] and references therein). Furthermore, this type of orgasm is sometimes considered to be associated with better psychological health than the orgasm triggered by external stimulation of the clitoris [12–14]. Although this is a matter of debate [15–18], differences in orgasmic typologies could be due to differences in perceptions reported by women and to their ability to distinguish sensations obtained from different stimulations.

Traditional psychoanalytic literature suggested a difference between the two types of orgasm. For instance, Freud implied a link between inability to have a vaginal orgasm and psychosexual immaturity [19]. Since Kinsey, many sexologists have asserted that no such link exists [20]. However, little evidence-based research has been done to try to confirm these hypotheses [21,22].

The postulated clitoral/vaginal sensory arm of the orgasmic reflex [23,24] is due to the stimulation of the multifaceted structure called the clitorourethrovaginal (CUV [10]) complex. The functional anatomy of the CUV complex has been studied in the recent past using echography, an excellent, noninvasive, nonharmful tool [25–30]. Furthermore, echography is ideal for providing dynamic images of the changes in the structures of the CUV complex during penetration [31]. However, echographic comparisons of relative anatomical changes during external or internal stimulation are currently lacking.

Using a sonographic examination of the stimulated clitoris, we wanted to provide functional imaging of two types of sexual stimulation: the direct stimulation of the external clitoris and vaginal penetration. Our purpose was to study in healthy volunteers what changes the external and inner clitoris undergo in response to these different types of stimulation.

Methods

Three healthy normal women aged 27–33, medical doctors, volunteered to take part in this study. Approval for this study was obtained from the Internal Review Board, and informed consent was obtained from the volunteers. The women were heterosexual, sexually active, and engaged in stable relationships. The volunteers were nonparous and had regular menses, no history of gynecologic diseases or surgery, and no medical conditions that might alter sexual function. Clinical history and the abridged Female Sexual Function Index (FSFI-6) questionnaire [32] showed they were sexually healthy. The subjects did not report releasing fluid during their orgasms [33,34], but they claimed to achieve vaginal orgasm during coitus without external clitoral stimulation. As previously described [25], we mean by VAO the orgasm experienced after direct stimulation of the anterior vaginal wall by penetration, without concomitant stimulation of the external clitoris.

The ultrasound studies were performed with the Voluson® sonography system, and a 12-MHz flat probe and a vaginal probe were used. During the experiment, each volunteer was in the gynecologic position. To ensure good skin contact, the vulva was covered with a sufficient quantity of sonographic gel to avoid possible interference from air between the labia. The probe was placed sagittally on the labia majora to obtain a sagittal scan, because when a volunteer's hand is stimulating the genitals it is difficult to obtain coronal or transversal views. Echoscanning visualizes the fine anatomy of the cavernous body, the raphe, and the glans (Figure 1) and has the advantage of visualizing the displacement of the structures during masturbation in real time, something virtually impossible in magnetic resonance studies [35,36]. The sonograph was focused on the clitoris, and each woman was asked to perform external clitoral stimulation on the glans. Then, she was asked to self-provoke sexual stimulation using a wet vaginal tampon, sufficiently rigid to stimulate the vagina. The tampon inside the vagina was constantly visualized to ensure absence of vaginal penetration by the finger. However, the finger, pushing the tampon, could inadvertently have touched and stimulated the clitoris, urethral orifice, and periurethral glans; this could be regarded as a possible limitation of our technique. However, we and the volunteers paid close attention to avoid any contact with the external clitoris and the urethral meatus during the experiment.

As previously described [27], we used a vaginal tampon (Tampax® Super Plus, Procter & Gamble, Csömör, Hungary) instead of a dildo [37] to improve the ultrasound propagation and avoid the shadowing the dildo would have produced. The tampon (cotton and rayon mix, absorbency 12–15 g; 5.0×1.5 cm) was inserted in the vagina with the finger immediately and rapidly when wet (to avoid too much ballooning). Rigidity was achieved by compression of the tampon in the vagina by the finger of the volunteer moving the tampon in order to stimulate the CUV complex. Furthermore, as the hyperechoic thread was well visualized, the wet tampon was also used as a vaginal marker.