Review Article

Anatomy of the Clitoris: Revision and Clarifications about the Anatomical Terms for the Clitoris Proposed (without Scientific Bases) by Helen O’Connell, Emmanuele Jannini, and Odile Buisson

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The anatomy of the clitoris is described in human anatomy textbooks. Some researchers have proposed and divulged a new anatomical terminology for the clitoris. This paper is a revision of the anatomical terms proposed by Helen O’Connell, Emmanuele Jannini, and Odile Buisson. Gynecologists, sexual medicine experts, and sexologists should spread certainties for all women, not hypotheses or personal opinions, they should use scientific terminology: clitoral/vaginal/uterine orgasm, G/A/C/U spot orgasm, and female ejaculation, are terms that should not be used by sexologists, women, and mass media. Clitoral bulbs, clitoral or clitoris-urethrovaginal complex, urethrovaginal space, periurethral glans, Halban’s fascia erogenous zone, vaginal anterior fornix erogenous zone, genitosensory component of the vagus nerve, and G-spot, are terms used by some sexologists, but they are not accepted or shared by experts in human anatomy. Sexologists should define have sex, make love, the situation in which the orgasm happens in both partners with or without a vaginal intercourse.

1. Introduction

Findings from the disciplines of embryology, anatomy, and physiology of the clitoris should form the basis of the discourse about the biological basis of the female orgasm. The anatomy of the clitoris is described in human anatomy textbooks, but often it is neglected by sexological textbooks, for this reason some researchers have proposed and divulged a new anatomical terminology for the clitoris. This review is a revision of the anatomical terms proposed by Helen O’Connell, Emmanuele Jannini, and Odile Buisson.

O’Connell et al. in The Anatomy of the Distal Vagina: Towards Unity (Journal of Sexual Medicine, 2008) wrote: “The aim of this presentation is to provide a comprehensive overview of anatomy of the distal vagina.” “This would aid communication between clinicians, researchers, and the nonclinician regarding this anatomy.” “The other components are the walls of the vagina and its associated exocrine glands,” “which will focus instead on the distal vagina, the site of the female sexual response and the area where confusion in terminology most exists” [1].

O’Connell et al. fail to describe the “anatomy of the distal vagina”: for instance in her article nothing is written about the size of the “distal vagina” and of its gross and microscopic anatomical structure. Moreover, the term “distal vagina” is not used in human anatomy and there are no exocrine glands in the walls of the vagina; the focus of the female sexual response is not the “distal vagina,” but the clitoris (with its glans: the female primary erogenous zone, which covers the distal part of the corpora cavernosa of the clitoris from which
The components of the vulva in all human anatomy textbooks [5–7] and in anatomical studies: Grafenberg, in 1950, writes “Analogous to the male urethra, the female urethra also seems to be surrounded by erectile tissues like the corpora cavernosa” [11], Yang et al. in 2006, write “The spongy tissue surrounding the urethral lumen is composed of smooth muscle fibres, with multiple small vessels (Figure 10). Some have termed this the corpus spongiosum, as in the male” [12].

“The labiae, like the clitoris, are derived embryologically from the undifferentiated phallus” [1].

Only the corpora cavernosa of the clitoris and the glans are formed from the phallus. Labia minora, vestibule of the vagina, and vestibular bulbs are formed from the pelvic and phallic parts of the urogenital sinus and from the urogenital folds [2, 5, 6, 13–15].

O’Connell et al. wrote “Clitoral bulbs” [1]. Clitoral bulbs is an incorrect term from an embryological and anatomical viewpoint, in fact the bulbs do not develop from the phallus, and they do not belong to the clitoris: “clitoral bulbs” is not a term used in human anatomy, the correct term is the vestibular bulbs [2–7, 13–17].

“The urethral orifice and distal urethra are surrounded by the erectile tissue of the clitoral bulbs.” “The urethra is encircled by the clitoris to a variable degree” [1].

The external urethral orifice is situated on the vaginal tubercle (i.e., carina urethralis) and it is not surrounded by the erectile tissue of the vestibular bulbs; the female urethra is not encircled by the clitoris, and it is not in related with the crura and body of the clitoris [2–7, 13–15]; the female urethra is only 3–4 cm long and the authors do not clarify the meaning of “distal urethra.”

“The clitoris is composed of the glans, which is its only external manifestation.” “The clitoris itself, in turn, being covered by the vulva” [1].

The clitoris is not “covered by the vulva”: it is a part of the vulva. The whole clitoris (glans, body, roots, or crura) is an external genital organ: the glans and body are visible while the roots are hidden, therefore they are not “internal” [2–7, 13–15].

“The tiny glans clitoris, a component of the clitoris composed primarily of large nerve trunks and sensory receptors, is often referred to as the clitoris.” [1].

In O’Connell et al.’s article there are no references for this assertion, and in the pictures of the vulva in anatomy textbooks always there is the body of the clitoris [2–7].

“This area was emphasized in the descriptions of Kobelt, and more recently by Arien, Sevely, and Douglas.” [1].

The author “Arien” cited by O’Connell et al. does not exist, and Reference 29 is not correct, the authors are not “Arjen A, Turnhout V, Hage J, Diest P,” but Van Turnhout AA, Hage JJ, van Diest PJ [16]. Also in Reference 11 of O’Connell et al.’s article there is an error, the article by Yang C. et al., it is not published in “2005,” but in 2006 [12].

“The interrelationship between the clitoris, urethra, and vagina has been studied by various modalities including ultrasound [34], MRI [35]” [1].

The authors quoted in Reference 35 by O’Connell et al. are Georgiadis et al. [18], also this is an incorrect reference,
this article does not investigate the interrelation between
the clitoris, urethra, and vagina, and MRI was not used,
Georgiadis et al. wrote: “The importance of the clitoris for
female sexual pleasure is undisputed. However, this is the first
account of brain regions involved in the experience of clitoral
stimulation . . . PET was used because it is more robust to
motion artifact than fMRI” [18].

“The clitoral complex, composed of the distal vagina,
urethra, and clitoris, is the location of female sexual activity,
analogous to the penis in men” [1].

This definition has no embryological, anatomical, and
physiological support and in the male penis there is no vagina
[2–7, 13–16, 19]. Dickinson, in 1949, wrote [7]: “The general
homology between the male and female genitalia is too well
know.” Lagueur, in 1990, wrote that how Adam, Renaldus
Columbus baptized (“amoris dulcedo”) in 1559, what he
had found in nature: a female penis [20]. To describe the
cluster of erectile tissues (i.e., clitoris, vestibular bulbs and
pars intermedia, labia minora, and corpus spongiosum of the
female urethra) responsible for female orgasm, the correct
anatomical term should be the female penis [13–15].

In Measurement of the Thickness of the Urethrovagi-
nal Space in Women With or Without Vaginal Orgasm: A Response from the Study Authors (Journal of Sexual
Medicine, 2008), answering to “Rebuttal” of Professor
Vicentini [21], Jannini stated that: “Female sexuality is still
a hidden area of medicine, which needs an honest, expert
scientific approach in order to move forward” [22]. This is
not a very appropriate statement, because there are many
scientific mistakes in the article written by him with Gravina
et al. [23].

Gravina and Jannini et al. wrote: “Grafenberg described
an erogenous zone located in the anterior vaginal wall
and subsequent studies have correlated the focus of female
sensitivity with the external urethral sphincter” [23].

G-spot of Ladas, Whipple, and Perry does not correspond
to the external urethral sphincter but to the intraurethral
glands: Komisaruk et al., in 2006 write “Stimulation of the
pelvic nerve may also occur with stimulation of the area of
the G-spot (the area of the female prostate gland) and may
also account for the reports of orgasm and female ejaculation
from the urethra experienced by some women” (and why in
this book “the science of orgasm” nothing is written about
the clitoris?) [24].

Furthermore the authors also write: “between the
thickness of urethrovaginal space, or G-spot,” “clitoris-
urethrovaginal complex, also known as the G-spot” [23];
therefore in the same article Gravina and Jannini et al. wrote
3 definitions of G-spot and each one of them is incorrect.

Gravina and Jannini et al. write that they made an
echography of the G-Spot [23], but in their article there is
no picture that shows a G-spot!

“Female genital anatomy and the physiology of female
sexual function have been scientifically neglected in the past”
[23].

The female genital anatomy has been described in
Human Anatomy textbooks and the female genital physi-
ology has been described for the first time in Dickinson’s
textbooks in 1949 and subsequently by Masters and Johnson
[2–7, 15, 19, 25].

“The urethrovaginal space (where the Halban’s fascia
runs) seems critical, being constituted of fibroconnective
tissue and large numbers of blood vessels, glands, muscular
fibers, and nerve endings” [23].

Urethrovaginal space is an incorrect term from a sci-
cientific point of view, the anterior vaginal wall is separated
from the posterior urethral wall by the urethrovaginal
septum [2–6]. In addition Halban’s fascia, a layer of dense
connective situated in the bladder-vaginal septum, does
not correspond to the male corpus spongiosum as some
sexologists believe: this assumption has no embryological and
anatomical support [5, 6, 26].

“The most interesting finding of our study is the evidence
that women who experience vaginal orgasm have an
urethrovaginal space thicker than those who do not . . .
The self-reported nature of presence or absence of vaginal
orgasm is another strong limitation of our findings . . .
By vaginal orgasm we mean the orgasm experienced after
direct stimulation of the anterior vaginal wall by penetration” [23].

One vaginal orgasm “at least once in the past month,” in
women that “reported at least two acts of sexual intercourse
per week” [23], is not a meaningful difference with women
without vaginal orgasm, besides authors did not clarify the
measures of this “space” considered as normal, and they do
not specify the position of coitus.

“As there is now evidence that the clitoris is related to
the distal third of the urethra in the perivaginal space . . .
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 . . .
The presence of pseudocavernous tissue (clitoral bulb) in the anterior vaginal
mucosa is a frequent but not universal finding (86%)” [23].

The vagina has not anatomical relation with the clitoris
and in the anterior vaginal mucosa there is no “clitoral bulb”
[2–7]!

“In fact, the anterior vaginal wall is an active organ, trans-
mittting, during intercourse, the effect of penile thrusting in
the vagina to the clitoris, by stretching the two ligaments that
insert around its base” [23].

Gravina and Jannini et al. have quoted a “Current Opin-
ion” of 200 words [27]: this statement is not corroborated by
any anatomical or physiological evidence.

“However, our data cannot directly demonstrate that the
thickness of an anatomical space may generate a mechanism
that can be related to the creation of an orgasm . . .
But, in conclusion, the results here presented allow us to speculate
that there may be a functional correlation between the
thickness of urethrovaginal space, or G-spot, and the ability
to experience the vaginal orgasm” [23].

Sexual medicine experts should spread scientific notions
and not speculations!

G-spot is not a term used in human anatomy: Grafen-
berg, in 1950, describes some cases of female and male
urethral masturbation and the corpus spongiosum of the
female urethra. Grafenberg wrote that the intraurethral
glands could only release fluids that are not urine during
the orgasm: but he did not report an orgasm of intraurethral
In The G-spot and Lack of Female Sexual Medicine (Gynecologie Obstétrique Fertilité 2010), Odile Buisson writes: “G-spot was popularized by sexologist Beverly Whipple in 1980 in honor of the gynecologist Ernst Grafenberg”, “the exact anatomy of the clitoris only recently has been recognized”, “the dynamic study of the clitoris urethra-vaginal complex”, “the vaginal penetration causes a close contact between the inner clitoris and the distal anterior vaginal wall” [29].

G-spot is a hypothesis, and there is no anatomical evidence of the vaginal orgasm which was invented by Freud in 1905, without any scientific basis [11, 13, 19, 20, 28, 30].

Clitoris is localized under the urogenital diaphragm, in front the pubic symphysis and in the anterior perineal region and the roots of the clitoris are located in contact with the ischiopubic ramus, covered by the ischiocavernous muscles: they cannot come into contact with the anterior vaginal wall and the “inner clitoris” does not exist [2–7, 13, 30].

The female perineal urethra, which is located in front of the anterior vaginal wall, is about one centimeter in length and the G-spot is located in the pelvic wall of the urethra, 2-3 cm into the vagina. The male penis cannot come in contact with the venous plexus of Kobelt (situated until the angle of the clitoris) or with the roots of the clitoris (which do not have sensory receptors or erogenous sensitivity) during vaginal intercourse (Figure 2) [2–7, 13, 30].

Buisson stated that the clitoris is composed of two arcs, the first consisting of two corpora cavernosa along the right and left ischiopubic ramus, with a length of 12–15 cm; they join on the summit of the vulva to form a bend 90 degrees forward: the raphe; the raphe ends in the glans clitoris, the visible part of the clitoris. The second arc consists of two bulbs that surround the lateral walls of the vagina [29]. This Buisson’s statement is not corroborated by any embryological, anatomical, or physiological evidence: the clitoris is not composed of “two arcs” [2–7, 12, 13].

In the article by O. Buisson there are only hypotheses to explain others that are conclusions without scientific basis (and she does not write how many women would have the G-spot): the clitoral stimulation is important to have an orgasm and the clitoris exists in all women (i.e., 100%), why not simply stimulate, during intercourse with penetration of the penis, the clitoris with a finger [30]?

3. Conclusions

The meaning of words is important in science, but particularly in the female sexuality: gynecologists, sexual medicine experts, and sexologists should spread certainties for all women not hypotheses or personal opinions, they should use correct scientific terminology: clitoral/vaginal/uterine orgasm, G/A/C/U spot orgasm, female ejaculation, are terms that should not be used by sexologists, women, and mass media; clitoral bulbs, clitoral or clitoris-urethrovaginal complex, urethrovaginal space, periurethral glans, Halban’s fascia erogenous zone, vaginal anterior fornix erogenous zone, genitosensory component of the vagus nerve, and G-spot, are terms used by some sexologists but they are not accepted or shared by experts in human anatomy [13].

Women have the right to feel sexual pleasure [31]: in all healthy women, orgasm is possible, with effective stimulation [13, 19, 25, 32, 33]. Make sex, make love, do not need necessarily to finish with an intercourse, and the female orgasm can be triggered by various noncoital sex play, that is, foreplay, partner masturbation, and cunnilingus [25]. Sexologists should define have sex, make love, the situation in which the orgasm happens in both partners with or without a vaginal intercourse [32–34].

I hope that this review article will give rise to some fruitful discussions on the topic of female sexuality.

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![Figure 2: The male penis cannot come in contact with the venous plexus of Kobelt or with the roots of the clitoris. (A) Modified from [6] (B) Modified from [7].](Image)
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