

SEXUAL MEDICINE HISTORY

The History of Female Ejaculation

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ABSTRACT

Introduction. The existence of female ejaculation and the female prostate is controversial; however, most scientists are not aware that historians of medicine and psychology described the phenomenon of female ejaculation approximately 2,000 years ago.

Aim. To review historical literature in which female ejaculation is described.

Methods. A comprehensive systematic literature review.

Main Outcome Measure. Emission of fluid at the acme of orgasm and/or sexual pleasure in females was considered as a description of female ejaculation and therefore all documents referring to this phenomenon are included.

Results. Physicians, anatomists, and psychologists in both eastern and western culture have described intellectual concepts of female ejaculation during orgasm. In ancient Asia female ejaculation was very well known and mentioned in several Chinese Taoist texts starting in the 4th century. The ancient Chinese concept of female ejaculation as independent of reproduction was supported by ancient Indian writings. First mentioned in a 7th century poem, female ejaculation and the Gräfenberg spot (G-spot) are described in detail in most works of the Kāmasāstra. In ancient Western writings the emission of female fluid is mentioned even earlier, depicted about 300 B.C. by Aristotle and in the 2nd century by Galen. Reinjier De Graaf in the 16th century provided the first scientific description of female ejaculation and was the first to refer to the periurethral glands as the female prostate. This concept was held by other scientists during the following centuries through 1952 A.D. when Ernst Gräfenberg reported on "The role of the urethra in female orgasm. Current research provides insight into the anatomy of the female prostate and describes female ejaculation as one of its functions.

Conclusions. Credible evidence exists among different cultures that the female prostate and female ejaculation have been discovered, described and then forgotten over the last 2,000 years. **Korda JB, Goldstein SW, and Sommer F. The history of female ejaculation. J Sex Med 2010;7:1965–1975.**

Key Words. Female Ejaculation; G-Spot; Female Prostate; History

Introduction

Female ejaculation provokes controversy in the scientific literature as well as the lay media. The authors, as women and/or urologists, have no doubt that female ejaculation exists. Thus, we have chosen to educate the reader about the history of female ejaculation. Although emission of female Yin-Chi essence during orgasm is a philosophical concept, we provide justification that female ejacu-

lation, defined as expulsion of a significant amount of fluid during orgasm, has been known and described in important documents by intellectual leaders of both eastern and western cultures for more than 2,000 years. We demonstrate intellectual concepts about female ejaculaton during orgasm in different cultures from approximately 300 B.C. to 1952 A.D., when Dr. Ernst Gräfenberg wrote an article titled "The role of the urethra in female orgasm."

Eastern Ancient World

China

Ancient Chinese writers wrote openly and in great detail about sex, believing sexual intercourse to be the foundation of life. The concept of Yin 阴 and Yang 陽 embodies a philosophical perspective of all existence, that heaven, earth, creatures, and forces of nature are all determined by these contrasting but interconnected and interdependent forces that are constantly in motion [1]. Together they are considered to embody Chi 氣, the universal energy [2]. Yin, the female force, is thought to be negative, evil, and passive, while Yang, the male force, is considered to be superior, positive, and active [3,4]. The purest and most concentrated form, Ching is released in women and men at the moment of orgasm [2]. Women were said to have an inexhaustible supply of Yin essence while men had a limited supply of Yang. Before a man was allowed to ejaculate, he had to prolong sexual intercourse making a woman orgasm several times to acquire her Ching (Yin) essence [5]. If a man ejaculated or used up his Yang essence without taking any Yin essence it was said to cause him health problems and even death. Some Taoists believed a man should never ejaculate while others invented a formula to determine the maximum number of ejaculations allowed for maintenance of health. In "Prescriptions Worth a Thousand Pieces of Gold," a classical 30-volume book written in 652 A.D. by Sun Si Miao, this legendary Asian physician promises: "What the man loses through the sexual act will not be compensated by what he gains. If one can copulate with twelve women without once emitting semen, one will remain young and handsome forever. If a man can copulate with 93 women and still control himself, he will attain immortality" [5].

While the emission of Yin and Yang essence during orgasm embodied a philosophical concept, the emission of fluid during orgasm in women was described for the first time to the best of our knowledge in the 4th century. The classical Taoist text, "Secret Instructions Concerning the Jade Chamber," provides information concerning the selection of romantic and sexual partners as well as the sexual act itself. The physician authors were careful observers and described the phases of female sexual arousal in great detail. The so-called "five signs, five desires and ten movements" indicated that the female was experiencing joyfulness during sex [5]. The five signs were (i) "reddened face," (ii) "breasts hard and nose perspiring," (iii)

"throat dry and saliva blocked," (iv) "slippery vagina," and (v) "the genitals transmit fluid." The "five desires" relayed information about the woman's response or desires; they were (i) "she wants to make love with you," (ii) "she wants you to insert your penis," (iii) "she is very stimulated and excited," (iv) "she wants to have her orgasm soon," and (v) "she has already been satisfied." This description of the stages of sexual response offers sensitive insight into a woman's sexual reaction with the fifth sign ("the genitals transmit fluid" during orgasm) being clearly distinguished from the fourth sign ("slippery vagina" during sexual arousal). The fifth sign can clearly be interpreted as female ejaculation during orgasm.

In another chapter of this Taoist text, the method by which a woman may gather a man's Yang is described, and it again alludes to female ejaculation: "If, for example, the male is not yet excited, you must wait till he becomes agitated. Therefore, control your feelings somewhat so as to respond in concert with him. In any event, you must not shake and dance about, causing your female fluid to be exhausted first" [5]. The author uses the term "female fluid" that can be interpreted as a reference to female ejaculate. He does not speak of essence, energy or other terms used as a description of Ying energy. This interpretation is supported by the author's specification of exhaustion of fluid, which is not applicable to Ying essence, believed to be inexhaustible.

In "A Popular Exposition of the Methods of Regenerating the Primary Vitalities," "three peaks" of a woman are described as being beneficial medicines. The upper peak refers to a gray medicine emanating from two sublingual cavities while the middle peak refers to a white medicine emanating from the woman's breast. The lower peak comes from the vagina and is called the peak of the purple agaric, the grotto of the white tiger or the mysterious gateway. Its medicine is called Black Lead, or Moon Flower. Located in the vagina, it does not usually flow out except when it is secreted during coitus. It is very good for the "original yang" and spirit. "This is the Great Medicine of the Three Peaks. Only the man who can control his passion and sexual excitement in coitus can obtain this medicine and achieve longevity" [5,6]. The "purple agaric" may symbolize the clitoris and/or the vagina. In ancient China, the "white tiger" symbolized men while the green dragon symbolized women. The term "Grotto of the White Tiger" refers to the vagina, while "Black Lead" and "Moon Flower" refer to medicine

secreted during coitus. This medicine secreted out of the vagina during coitus, called Moon Flower, might be interpreted as vaginal lubrication. However, interpreted in the context of the ancient Chinese believe that obtaining a woman's Chi, which is released only during her orgasm, provides longevity to the male, this aforementioned medicine of the lower peak may symbolize indeed female ejaculate.

"Secret Methods of the Plain Girl" is a compendium of sexual practices from the time of the Yellow Emperor, written sometime between 590 and 618 A.D. by Su Nu Ching. In it, female ejaculation is described as "copious emissions" as follows, "Her Jade Gate becomes moist and slippery; then the man should plunge into her very deeply. Finally copious emissions from her Inner Heart begin to exude outward" [7].

An old Chinese prose poem "Amusement of heaven and earth," written by Bai Xingjian (775–826 A.D.), mentions an area located at the anterior vaginal wall that is referred to as "milk fruit." According to his translation, Pfister explains the meaning of the name "milk fruit" as the orange-red fruit of the female paper mulberry (the male paper mulberry does not produce these fruits), which produces whitish fluid [8]. We believe that the red color of the female paper mulberry fruit was the reason the author named this vaginal area (Gräfenberg spot [G-spot]), which produces whitish "milky" fluid (female ejaculate). Pfister also refers to a medieval Chinese writing, the "Master of the grotto darkness," in which the male is told to first rock the woman and then work her "milk fruit" (G-spot) with his Yang tip (penis) [8]. In "Wondrous essays of the bare woman" by Su Nü Miao Lun (13th–14th century, A.D.), female ejaculation and the enlargement of the G-spot because of stimulation are explained [8].

Compared with contemporary western texts, these ancient Chinese philosophic and medical theories on human sexuality and eroticism focus on sexuality as an essential part of human life from a medical point of view. The ancient Chinese physicians and philosophers interpreted sexuality as a method to stay physically and mentally healthy and extend one's lifespan. Their concept of health as a comprehensive balance of the humors was also part of the ancient Greek belief system [9]. The intriguing Chinese tradition of describing female ejaculation, independent of fertilization and reproduction, is similar to ancient Indian illustrations and writings on sexuality and the art of love-making.

India

Her breasts were compressed in close embracement,
frisson of excitement apprehended her torso,
smooth love juice overflowed abundantly the garment,
right there where her girdle was located;
"Don't!, don't!, wrecker of my pride, back off, this is
enough for me"
so she moaned, to obtain mercy. Did she sleep, did she
die then?
Sink into my heart
["Amarushataka", stave 35] [10]

In this poem of the "Amarushataka," believed to have been compiled in the 7th century A.D. by Amaru, a king and warlord [11], the oldest documentation of female ejaculation in ancient Indian literature can be found [10]. Syed, a German Indologist, emphasizes the overflow of love juice as described by Amaru and compares it to Gräfenberg's statement that "Occasionally the production of fluids is so profuse that a large towel has to be spread under the woman to prevent the bed sheets getting soiled" [12]. Syed explains female ejaculation as being more than just scientific fact from ancient India, but also as a part of erotic literature [10]. According to Syed, even the descriptions of the anatomy and function of the genitals were independent of a reproductive context and focused solely on lust [10].

The oldest and best-known scientific standard work on human sexual behavior in ancient India is the "Kāmasūtra" (Aphorisms on Love), written in Sanskrit by the Indian scholar Mallanāga Vātsyāyana around 200–400 A.D. [13]. The "Kāmasūtra" educates about the art of living, love relations, and sexuality [14]. It contains a detailed description of the female and male genital anatomy and their function for sexual pleasure, with philosophical writings about passion and sexual union [13]. According to one text passage, "The fall of the semen of the man takes place only at the end of coition, while the semen of the woman falls continually, and after the semen of both has all fallen away then the wish for discontinuance of coition" [13]. To the best of our knowledge, this seems to be the earliest reference in ancient Indian literature to the existence of semen in females and the equality of female and male semen. The female is described as emitting her semen steadily unlike the male's single discharge. This is according to Das' translation and interpretation of Vātsyāyana's work [15]. Das refers to Yaśodhara, the author of the "Jayamaṅgalā" (~1300 A.D.), the most authentic commentary on Vātsyāyana's interpretation of the "Kāmasūtra." Yaśodhara wrote, "That both male and female experience the delight of emission (visrsti-), the

woman, however, from the beginning of intercourse, for she gradually becomes, as can be perceived, wet like a broken water vessel. Her delight is conjoined with an emission (visrsti-) like that of the man, accompanied by bhāva-, from the beginning, while the man's bhāva- is obtained at the end, because of the voiding (visarga-) of semen (sukra-). Their delight of emission (visrsti-) is the same, though not the time" [15]. In his commentary, Yaśodhara distinguishes between lubrication during foreplay and female emission during orgasm, which strongly supports his knowledge of female ejaculation. According to several translators of these scripts, Yaśodhara's commentary on Vātsyāyana's interpretation is that female ejaculation and female semen were described [10,15]. Others, however, believe that since it is mentioned in the context of coition and fertilization, there is no clear consensus regarding whether or not female ejaculation was described in the "Kāmasūtra" [10]. After "Kāmasūtra," numerous related works were written (Ratirahasya, Anaṅgaraṅga, and Pañcasāyaka); in some of these female ejaculation was described in great detail [10].

The "Ratirahasya" is perhaps the earliest such work after "Kāmasūtra" written by the poet Kukkoka (12th century A.D.) [16]. According to Syed's translation, Kukkoka mentions the existence of "the shield of the love god which equates a nose" [the clitoris, which is called "manmathachchakra"] that is located upside the "crevice of the place of the love god" (vagina/vulva) and is endowed with numerous love water veins [10]. Sexual arousal in the female originates in the vagina. It is described pictographically as an itching ("kaṇḍutī") that can be eliminated by vigorous rubbing of the penis ("caṇḍadhvaḥ" or hot bar). This rubbing creates the flow of vaginal fluid ("kṣaraṇa") followed by the orgasm ("sukha") [10]. "The woman who has emitted the water of the one whose arrow is of flowers at the end of coitus dances with much jumping and crying" [15]. "Now because of the removal of itching through the impetuous striking of the penis and because of the streaming they [feminine form] have delight: from emission whose nature is flowing. From the beginning [of coitus] onward the flow is moist, giving [only] a small portion of [the ultimate] delight, but at the end they [the females] have like men, the delight, causing, swooning of emission" [15]. We believe there is no doubt that an external emission during orgasm, of the same nature as ejaculation, is described here.

"Pañcasāyaka" (Five Arrows of the Love-god) by Maithila Jyotrishvara Kavishekhara was composed in the first half of the 13th Century [17]. If the "madanagamanadolā" (swing for the way of the love god/lust), a special "nādikā" (tube) similar to the male penis located in the middle of the vagina, is agitated with two fingers, a storm of love water is spilled [10]. "The swollen tube [G-spot] should be agitated with the fore and middle finger various times, the penetration should not follow until further endearment with nails and teeth, kissing, embracing and other secret practices" [10]. This passage can be interpreted as a description of manual stimulation of the G-spot ("madanagamanadolā"), comparing it to the penis that can become erect, hard and swollen, and ejaculates fluid when stimulated to orgasm.

The poet Kalyāṇamalla (16th century A.D.) distinguished women by their characteristic physical appearance including their sexual organs, with a detailed description of vaginal anatomy and vaginal lubrication. He elucidated the four orders of women: Padmini, Chatrini, Shankhini, and Hastini. For Padmini (or Lotus-woman), her "Yoni resembles the open lotus-bud, and her Love-seed (Kama-salila, the water of life) is perfumed like the lily, which has newly burst." Chitrini (or Art-woman), has "Kama-salila (love seed) that is hot and has the perfume of honey, producing from its abundance a sound during the venereal rite." For Shankhini (or Conch-woman), her "Yoni is ever moist with Kama-salila, which is distinctly salt, and the cleft is covered with thick hair." The Hastini has "Kama-salila that has the savour of the juice, which flows in the spring from the elephant's temples" [18]. Kalyāṇamalla clearly details for each type of woman a characteristic love juice ("kama salila"), each with a different taste. The characteristic physiognomy of the vagina ("yoni") is also described, divided into four categories based on the depth of the vagina. The Mrigi has a "Yoni (vagina) six fingers deep with Kama-salila that has the pleasant perfume of the lotus-flower." The vagina of the Vadava or Ashvini "numbers nine fingers depth and her Kama-salila is perfumed like the lotus." The Karini has a "Yoni twelve fingers in depth. Not easily satisfied, her Kama-salila is very abundant, and it suggests the juice, which flows from the elephant's temples" [18]. It is important to acknowledge that the word used for love juice ("Kama salila" [ejaculate]) of women is the same as that used for men. The Sanskrit term visrsti is used to describe emission of semen [10,13,15]. The term visrṣṭakāmasalila is,

however, subject to different interpretations by Syed, Burton, and Das. The latter term is used in the *Ananaranga* to describe the woman's sexual reaction, implicating the emission of fluid (Kama salila = love fluid = female ejaculate) as a result of orgasm [18].

Syed translates a very similar description of female ejaculation in the *Anaṅgaraṅga* as mentioned previously in *Kukkukas Ratirahasya*: "When at the end of the love act the water of the love god gushes out, the woman performs a dance, which is accompanied by blurbs . . ." [10]. There is a very detailed description of an erogenous zone within the yoni (vagina) that matches Gräfenberg's description of this particular region, referred to as the G-spot. "Moreover, in the Yoni there is an artery called sasyanda . . . which when excited . . . causes Kama-salila to flow" [18]. The stimulation of an area within the vagina that leads to emission (ejaculation) of fluid might be interpreted either as vaginal lubrication or as female ejaculation. Regarding the use of the same term in men for their ejaculate, we believe this passage refers to the equivalent female ejaculate. Another detailed description of female ejaculation can be found in *Revanārādhyā's "Smaratattvaprakāsikā"* or "Illumination of the nature of love" (16th century). Within the vagina, "there dwells a [small] tube comparable to the penis, the madanagamanadolā. Excited by two fingers it gives forth a flood of passion-water . . ." [15]. The text goes on to suggest stimulation of the triad of organs with the use of the fingers. The comparison of the vaginal area to the penis may be a result of the similar anatomic features, as the clitoris engorges during sexual excitation appearing almost like a small phallus.

The ancient descriptions of the erogenous zone found in these *Kāmasāstra* lyrics (*Kāmasūtra*, *Ratirahasya*, *Pancasāyaka*, *Smaratattvaprakāsikā*, and *Anaṅgaraṅga*) are similar to the one by Gräfenberg: "An erotic zone always could be demonstrated on the anterior wall of the vagina along the course of the urethra" [12]. The *Kāmasāstra* describes a sensitive area in the middle of the vagina that can be reached and stimulated manually just like Gräfenberg's "erotic zone." The "flood of passion-water" elicited by manual stimulation of this particular area identifies it clearly as the source of female ejaculation. This interpretation is supported by modern day knowledge that stimulation of the Gräfenberg spot (G-spot) leads to ejaculation in women. Further endorsement of the knowledge of female ejaculation in ancient Indian culture can

be found in the *Upaniṣad*, a secret doctrine found in the *Kāmasāstra* lyrics (*Anaṅgaraṅga*, *Ratirahasya*, and *Pancasāyaka*), in which charms, magic practices, and recipes for sexual problems are mentioned. In the "*Anaṅgaraṅga*" it is written that, "As long as the woman doesn't flow during the love act before the man does, there is no successful enjoyment. Because of that, wise men who are experienced in the art of love try hard to make a woman flow (prior to male ejaculation)" [10]. *Drāvana* (flowing) is interpreted as orgasmic ejaculation in the several *kāmasāstric* lyrics (*Anaṅgaraṅga*, *Ratirahasya*, *Smaratattvaprakāsikā*, and *Pancasāyaka*) with regard to both men and women [10], re-emphasizing the assumption that the early writers believed ejaculation was the same in men and women.

Western Ancient World

The "father of medicine," Hippocrates of Cos (460–375 B.C.), and his students contributed to the field of medicine with debates on the nature of medicine itself [19]. Although female semen was mentioned earlier in time by ancient Greek philosophers including Pythagoras (570–510 B.C.) and Empedocles (490–430 B.C.) [20,21], it was done so only in a reproductive context. The subject of female ejaculation was more controversial for Hippocrates. He believed in female semen as being necessary for contraception. He believed the sex of the child was based on the strength and volume of the ejaculate, more specifically the sperm that eventually fertilizes the egg. The proof of women emitting sperm, according to Hippocrates, was as follows: "Now that both male and female sperm exist in both partners in an inference which can be drawn from observation. Many women have borne daughters to their husbands and then, going with other men, have produced sons . . . Now this consideration shows that both the man and the woman have male and female sperm" [22].

The production of pleasure, as mentioned in Hippocrates' treatises *On Generation*, may describe the orgasm of the woman: "A woman also emits something from her body, sometimes into the womb, which then becomes moist, and sometimes externally as well . . . If her desire for intercourse is excited, she emits before the man" [22]. While Hippocrates identifies the emission of something (semen) into the female womb that supports reproduction, he does not refer to the female emission of fluid as ejaculation, as does for the

male. The reference to an external emission is, however, vague yet interesting.

Aristotle's (384–322 B.C.) beliefs (put forth in "History of Animals," "Parts of Animals," and "On the Generation of Animals") are quite different from his predecessor and had a major influence on Western sexology [23]. In his "On the Generation of Animals," Aristotle provided an *fortiori* explanation regarding female discharge during intercourse. He did not think that the discharge was semen, despite the pleasurable experience and the similarity to a man's liquid discharge. In addition, he provided a unique perspective regarding the source of differences in female discharge during intercourse: "There is a discharge from the uterus which occurs in some women but not in others. It is found in those who are fair-skinned and of a feminine type generally, but not in those who are dark and of masculine appearance. The amount of this discharge when it occurs is sometimes on a different scale from the emission of semen and far exceeds it" [24]. Whether he was referring to vaginal lubrication or female ejaculation is difficult to distinguish, in particular because he did not explain this phenomenon in the context of orgasm. On the other hand, given that the amount of discharge he described exceeds that of male ejaculate, Aristotle may have been referring to female ejaculate. This is the first reference to a liquid discharge during pleasurable intercourse that does not refer to female semen in the context of reproduction or menstruation. Gräfenberg elucidated this discharge centuries later: "Occasionally the production of fluids is so profuse that a large towel has to be spread under the woman to prevent the bed sheets getting soiled. This convulsory expulsion of fluids occurs always at the acme of the orgasm and simultaneously with it" [12].

In his writing, "History of Animals," Aristotle discussed female seminal fluid, which is discharged via a small tube into the uterus: "The female also projects her semen into the os uteri, where the man also emits his . . . There is a tube enclosed in the body like the penis of the male . . . When therefore they desire sexual intercourse, this part is not in the same condition as it was before . . . Whatever conjecture is formed concerning these affections, it makes to the same conclusion, that woman also emits a seminal fluid" [24,25]. The reference of a tube in the female similar to the male penis appears to be logical regarding the emission of semen. The tube is somewhere above the urethra, in the vicinity of the ejaculatory ducts. Aristotle elaborated with regard to nocturnal emissions in women having

lustful dreams: "If they appear to have emitted a seminal fluid in their dream, they will then conjecture that after their dream the same place will become moist, and they will be obliged to bestow the same attention upon themselves as if they had had sexual intercourse. So that it is evident that there must be an emission of semen from both if it is to be productive. But the uterus does not emit its semen into itself, but on the outside, into the place where that of the male also is received, and then draws it into itself" [24,25]. Cresswell, whose translation is referred to herein, hypothesizes that the tenth book of History of Animals from which these text passages are taken, is erroneously ascribed to Aristotle [25]. If that is in fact true, then it is questionable whether Aristotle was aware of female ejaculation during orgasm.

Claudius Galenus of Pergamum (129–200 A.D.) is considered to have been the last great doctor of antiquity, with more anatomical knowledge than the philosopher Aristotle. He disseminated the doctrine that women were a replica of men, with genitalia similar to that of males but with the organs essentially turned inside out [26]. Based on his observation of testes (which were actually ovaries) and thick seminal fluid in female animals, Galen asserted that he had proof of semen being produced in females [27]. Galen offered the first characterization of nonsex induced female ejaculation in the Western ancient literature. He detailed his observation of semen accumulating in women and being released and ejaculated via spasm in this passage: "[I]n the case of a woman suffering from hysterical diseases, very abundant and very thick semen was discharged first to the uterus, and from it to the outside; a widow for a long time, she had collected it in that amount and of that kind. But then certain tensions seized her in her loins and hands and feet, so that she seemed convulsed ('spasthenai'), and at these tensions the semen was discharged ('exekrithe'), and she said that the pleasure of it gave her was like that of sexual intercourse" [27]. Within the scope of theory of homology of men and women, Galen made the conclusion that women, like men, need to release their semen at regular intervals to avoid accumulation-induced pain, as he observed in widows or other nonsexually-active women at the time [27]. The Galenic egalitarian homology of male and female anatomic genital structures was held for centuries and spread even through the Persian empire.

Ibn Sinā (Latin: Avicenna, 980–1037 A.D.), an 11th century Persian physician and philosopher, is considered the most influential Middle Eastern

physician whose work is considered equal to the major writings of Hippocrates, Galen, and other great scientists [28]. Ibn Sīnā acknowledged in “*l-qanun fi at-tibb*” (Latin: “*Canon medicinae*”), his main work, that women ejaculate some kind of liquid with pleasure either during coitus or without any coitus. However, he believed that female ejaculate was hardly perceptible since the semen was sucked in by the womb’s orifice (for contraceptive purposes) [29–31]. He stated, “according to his Master, women ejaculate their sperm in the neighbourhood of the urethra” [29]. It is not clear whether he described female ejaculate being expelled out of the ejaculatory ducts which are located next to the urethra as described by Alexander Skene [32], or if he referred to fluid originating from the Bartholin glands which are located near the urethra. However, describing the sexual act between man and woman in great detail, Ibn Sīnā did not mention female ejaculation [33,34]. A striking comment in Book IX of Ibn Sīnā’s work (“*De animalibus delectis*”) casts doubt, as he emphasized the finality of male ejaculation that he believed was not the case in women [29]. We were unable to find evidence supporting the description or knowledge of female ejaculation in the ancient and medieval Islamic world.

The ancient Galenic doctrine, the necessity of female sexual pleasure for conception, the egalitarian view on the anatomy and physiology of male and female genitals, and Galen’s anatomical legacy were not challenged for a period of time lasting more than 1,000 years [35]. Andreas Vesalius (1514–1564), a Flemish anatomist, was the first to challenge the Galenic doctrine and is said to be the founder of modern anatomy as well as morphological thought in medicine. In his 639-page opus (“*De humani corporis fabrica*”), he describes female genital organs in great detail. Although Vesalius acknowledged that females produce semen or liquid during coition and ejaculate like men, he did not mention it in the context of pleasure or orgasm but solely in the reproductive context comparing the function and activity of the female sexual organs to that of males [36]. It remains unclear whether he was aware of female ejaculation as equivalent to that observed in males. Ambroise Paré (1510–1590), a French surgeon [34], also illustrated the emission of seed from the woman’s womb during sexual caressing and pleasure. Female ejaculation of orgasmic fluid was, as demonstrated earlier, seen mostly in the context of fertilization and reproduction, which hinders reliable interpretation.

The first truly scientific insight into the profound mystery of female ejaculation was provided by a Dutch gynecologist, Reinjier De Graaf (1641–1673 A.D.). As the first scientist to depict in detail the morphology of the ovaries, his name is now remembered in the term Graafian follicles [37]. He described the female genital organs and the course of ovulation in his treatise “*Tractatus de Virorum Organis Generationi Inservientibus*.” In his description of female genital anatomy and in particular the periurethral glands in his treatise on the urinary passage, he suggested they were equivalent to the male prostate. De Graaf named them the “female prostatae” describing the urethra surrounded by a membranous substance and referring to the function producing a serous matter expelled from ducts located at the outlet of the urethra. De Graaf used exquisite anatomic precision in his description: “. . . along the whole duct of the urethra, a whitish membranous substance about one finger-breadth thick which completely surrounds the urethral canal . . . The substance could be called quite aptly the female prostatae or corpus glandulosum glandulous body . . . The function of the prostatae is to generate a pituito-serous juice which makes women more libidinous with its pungency and saltiness and lubricates their sexual parts in agreeable fashion during coitus. This liquid was clearly not designed by Nature to moisten the urethra (as some people think). The ducts are so placed at the outlet of the urethra that the liquid does not touch it as it rushes out . . .” [38].

In addition to this description of the female prostate, De Graaf illustrated in great detail vaginal lubrication and female ejaculation during coition, precisely distinguishing between them. He was aware of the numerous vaginal glands and ducts functioning to moisten the female genitalia. He differentiated between the discharge of serous fluid from what he called the female prostatae and the pleasurable discharge from the male prostate: “During the sexual act it discharges to lubricate the track so copiously that it even flows outside the pudenda. This is the matter which many have taken to be actual female semen. Here too it should be noted that the discharge from the female prostatae causes as much pleasure as does from the male prostatae. It does not therefore seem very unreasonable to call this efflux women’s pollution. Although what they release is not in fact semen . . . but anyone who investigates the branches of the ducts in the female prostatae surrounding the urethra will find that most of it discharges from there” [38].

De Graaf removes any doubt by defining the origin of the ejaculate as the female prostate surrounding the urethra: "There will doubtless be critics who, believing that the liquid which rushes out with such impetus during veneral combat or libidinous imaging is semen, will enquire whence this liquid comes and for what purpose it is designed. We think that it comes primarily from the lacunae in the orifices of the vagina and the urinary tract . . . The first-mentioned ducts, namely those which are visible around the orifice of the neck of the vagina and the outlet of the urinary passage receive their fluid from the female parastatae, or rather the thick membranous body around the urinary passage" [38]. De Graaf developed a precise description of the anatomical structures and mechanism by which women ejaculate and is the first physician and scientist to use the term "female prostate."

William Smellie (1697–1763 A.D.), a scientist and the greatest figure in English obstetrics, referred to female ejaculation during coition, naming the female prostate as a source for this ejaculate: "a fluid ejected from the prostate or analogous glands" [39]. The term "female prostate" was also used in the detailed anatomical descriptions of the human body made by William E. Horner (1793–1853 A.D.), an anatomist at the University of Pennsylvania who wrote the first textbook on pathological anatomy in the United States [40]. His description, however, differs considerably from that of De Graaf and raises the question of whether he was aware of the function of prostatic tissue and the possibility of emission of female ejaculate [41]. Rudolf Virchow (1821–1902 A.D.), one of the most famous German physicians and a founder of modern pathology, wrote of the female prostate as paraurethral glands in his treatise on human pathology, referencing De Graaf's work [42]. Surprisingly, the Scottish gynecologist Alexander Skene (1837–1900 A.D.) is credited as the first to describe what are now called Skene's glands. Skene identified small mucous glands located at and extending from the urethral meatus in an upward fashion beneath the mucous membrane in the muscular walls of the urethra. He precisely located the opening of their ducts on each side of the urethral meatus [32]. Both De Graaf and Skene mentioned ducts visible at the outlet of the urinary passage. Compared with the earlier descriptions of De Graaf of a "thick membranous body around the urinary passage which generates and discharges a pituitous-serous juice," Skene's description of the tubules that terminate

next to the urethral meatus seems to match and complete De Graaf's depiction of the female prostate. Skene, however, did not seem to be aware of the parallels to male morphology as he did not address similarities between male and female anatomy and function (e.g., ejaculation), discussed earlier by De Graaf. Two hundred years after De Graaf, Skene seemed to be unaware of the glands' function within female sexuality; moreover, he did not mention any function of these glands.

Present

The Psychologist Havelock Ellis (1859–1939 A.D.) believed that sexual excitement resulting in female ejaculation derived from the Bartholin glands and referred to the former belief that this female mucous ejaculation was analogous to male ejaculation: ". . . a real ejaculation of the fluid, which . . . comes largely from the glands of Bartholin . . . being emitted in a jet which is thrown to a distance." [43]. In 1952, Ernest Gräfenberg (1881–1957 A.D.), a German gynecologist who had emigrated to the United States and in 1940, published his well-known article "The role of urethra in female orgasm" [12]. Gräfenberg discovered an erotic zone located on the anterior wall of the vagina following the course of the urethra. Having observed women masturbating to orgasm he noticed expulsion of fluids with orgasm out of the urethra "in gushes" and concluded this phenomenon had no lubricating significance since it appeared at the acme of orgasm and not at the beginning of sexual stimulation. According to Gräfenberg, "In the cases observed by us, the fluid was examined and it had no urinary character. I am inclined to believe that 'urine' reported to be expelled during female orgasm is not urine, but only secretions of the intraurethral glands correlated with the erotogenic zone along the urethra in the anterior vaginal wall" [12]. Without a doubt, Gräfenberg's depiction of the erotic zone "along the course of the urethra" [12] corresponds to Skene's description of "tubules run parallel with the long axis of the urethra" [32] and de Graaf's "female parastatae, or rather the thick membranous body around the urinary passage" [38].

Gräfenberg's observations of female ejaculation provided a breakthrough in the understanding of functional anatomy of female sexual organs. Although Masters and Johnson, regarded as the pioneers in modern sexual medicine, considered female ejaculation a widespread myth [44], but



Figure 1 Huffman's wax model of the female prostate, longitudinal aspect [49].

their view was not held by other scientists. In 1982, Addiego and colleagues were the first to analyze ejaculate from a woman and found a significant chemical dissimilarity (prostatic acid phosphatase, urea and creatinine) between urine and ejaculate [45]. Several additional studies confirmed this phenomenon [46,47], reporting that components found in the ejaculate were similar and comparable with male ejaculate [47–49]. Current research strongly indicates that the paraurethral ducts described by Skene are in fact the female prostate as proposed by de Graaf [48,50]. During the last 30 years the most profound and extensive research on the female prostate has been conducted by Zaviacic and his group providing significant anatomical, histopathological, and functional insights. They showed the differences between the male and female prostate, as they described the prostate of females being significantly smaller than the male prostate and lying within the wall of the urethra, while the male prostate surrounds the

urethra. Functionally, Zaviacic et al. demonstrated a neuroendocrine and exocrine function of the female prostate [51–56]. There is enormous scientific evidence for embryological and anatomical homology of the prostate in the male and female [47,57–59]. Ogiwara et al. observed that the proximal paraurethral ducts near the urethral mucosa, whose epithelial morphology is similar to urethral tissue and stains positive for carcinoembryonic antigen gradually transit to the smaller distal ducts, which are morphologically like male prostatic ducts and stain for prostate-specific antigen [59]. Despite this persuasive data there is still controversial discussion. While some scientists still question the existence of this sensitive and erogenous area being synonymous with the female prostate (G-spot) [60,61], modern technology allows visualization of the female prostate, such as the ultrasound and MRI study of the anatomy of the female prostate recently performed by Wimpfissinger et al. [62] (Figures 1–3).

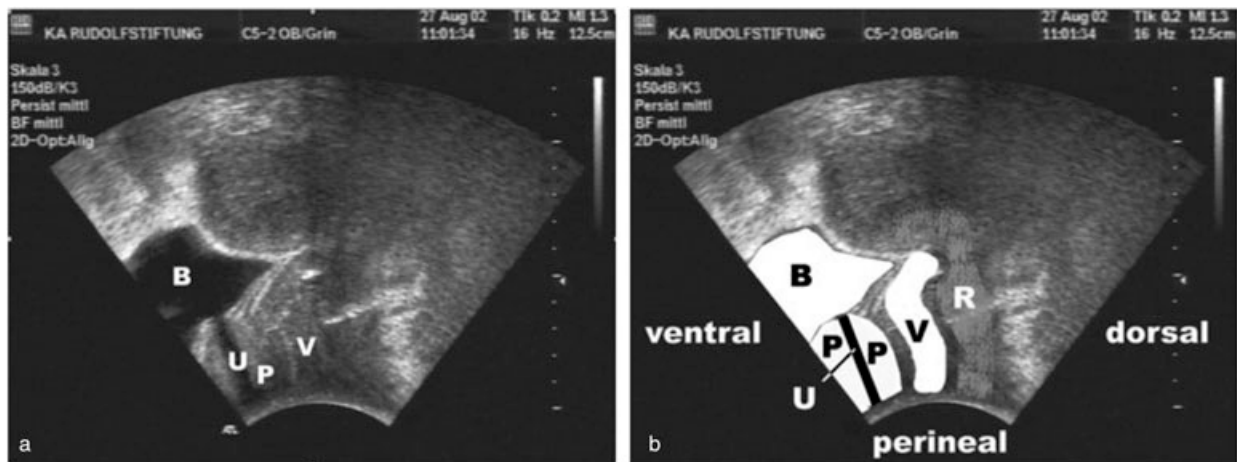


Figure 2 Perineal ultrasound of the female prostate. (a) median aspect (b) sagittal aspect. B = bladder; U = urethra; P = prostate; V = vagina [49].

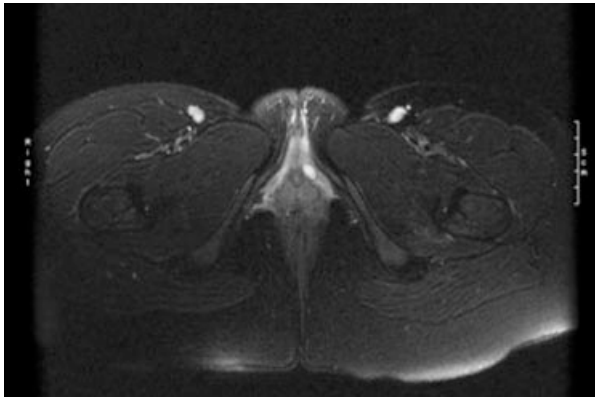


Figure 3 Axial section MRI of patient no. 2 with the oval glandular tissue at the left side of the middle urethra (anterior) [60].

Conclusion

Despite the recognition of the female prostate and its function in the female sexual response throughout history, female ejaculation is still questioned by researchers. This article aims to demonstrate that the phenomenon of female ejaculation has been discovered, described and forgotten in eastern and western culture repeatedly over the last 2,000 years. Today the phenomenon of the female prostate producing female ejaculate is beyond debate, however, future studies are needed to further our knowledge of female ejaculation.

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