

Glad You Came: The History of the Science Concerning the Study of the Female Orgasm

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Summary:

This article covers the history of the science of the female orgasm from the 13th to 21st centuries, focusing on the development of our understanding of topics such as hysteria, female ejaculation, and vaginal vs clitoral orgasms. The study of female sexuality and female orgasms has been convoluted for centuries; as the context with which we view women and sexuality has changed, and technology has improved. In the 21st century we are still in the process of debunking ideas from centuries ago, and with the help of technology and an open discourse we can work towards creating a scientific and societal community free of shame.

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Note on Terminology:

We acknowledge the limitations of the term female in this article as an umbrella term for all female experiences. However, this terminology is what is and has been used in the field of science and sexology. We would like to acknowledge the limitations of the language moving forward.

Introduction

The science surrounding the female orgasm, female sexual behaviour, and female ejaculation has been incredibly controversial throughout its history. Social stigma and morality has shaped and influenced scientific discovery throughout time but has had particular impacts when studying female sexuality. Until very recently there was controversy over the existence of phenomena such as female ejaculation, despite it being documented for over 2000 years and several accounts from women to the contrary. Examining the history behind recent discoveries such as the complexity of the clitoris and the biochemical composition of female ejaculation improves our collective understanding, of how we as a scientific community have come to where we are today. Examining the controversy and multiple perspectives throughout history also provides insight on the history of science and how it has changed through time.

Early beliefs surrounding Hysteria and the Circumstances of female Ejaculation

The scientific analysis of female sexuality dates back to before year 1. Ancient Egyptian and Greek philosophers have speculated on the nature of female ejaculation, female sexual behaviour, and orgasm with varying levels of success. During this early period of discovery and investigation, societal beliefs and social morals shaped the interpretation of observations significantly. Yet despite these limitations initial theories such as those of Aristotle and Hippocrates held sway for hundreds of years following, such as Freud's analyses of hysteria in the early 20th century. With technological advancements and the popularization of the scientific method, our understanding of the female orgasm has endured a tumultuous history.

The concept of hysteria was an early attempt to classify various behaviours in women such as anxiety, depression, and changings in sexual desire (Maines, 1999). It has existed since the ancient world; as early as a 1900 B.C. Egyptian papyrus which described the "wandering womb" theory for hysteria. The "wandering womb" theory states that a woman's uterus moves around her body, causing unwanted symptoms such as anxiety, shortness of breath, muscle spasms, fainting and unusual behaviour (Tasca et al., 2012). In the 5th century B.C. Hippocrates

coined the term hysteria as caused by a restless uterus (Tasca et al., 2012; Maines, 1999). He believed that unlike men's bodies, which are dry and warm, women's cold and wet bodies were more vulnerable to sickness, especially when they were not procreating (Tasca et al., 2012). While Hippocrates' claim has no scientific basis, it alludes to a larger cultural belief that women are lesser beings: weak and whose sexuality is reduced to reproduction. Plato's view is debated based on translations of texts such as *Timaeus*. Many scholars believe that he was in accordance with Hippocrates' view, and described the uterus as an animal within the woman's bodies (Maines, 1999; Science museum, nd.). The uterus would move into the chest and windpipe, causing the symptoms of shortness of breath and panting (Maines, 1999). However, others believe that Plato thought that the cause of hysteria was psychological (Adair, 1995).

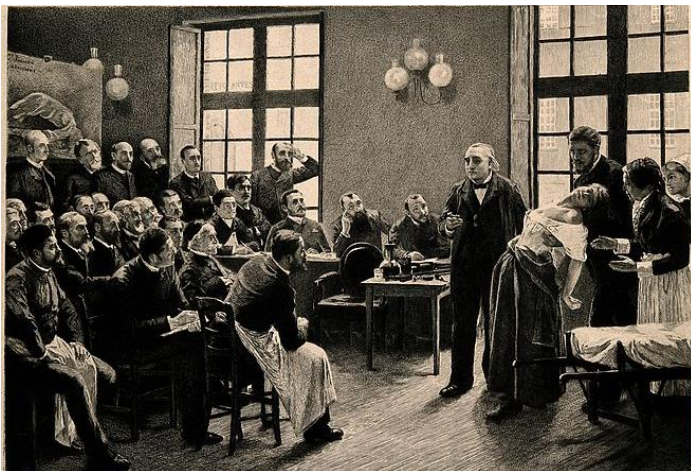


Figure 1: Charcot demonstrating hysteria in a hypnotized patient at the Salpêtrière (Lurat and Brouillet, 1888).

In addition, to theories like hysteria (Figure 1), which focused on orgasmic deficiency, there are also very early mentions of female ejaculate. The existence of female ejaculation has until recently been controversial in the scientific community. We echo Korda, Goldstein and Sommer, 2010 in arguing that not only does this phenomena exist but has been observed and documented since approximately 300 B.C. One of the earliest explicit mentions is from Aristotle, who in response to Hippocrates' claim that both men and women produce sperm (Lonie, 1981), postulated the existence of a seminal fluid in the *History of Animals*. "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" From his text *On the Generation of Animals*. Previously, reference to liquid discharge from "females" had only been in the context of reproduction or menstruation, as such this is one of the earliest references to a liquid discharge during pleasurable intercourse.

Early observations of the physiology of female sexuality were later used as a basis for further study of female ejaculation and orgasm. However these findings were not made through a rigorous scientific process and as a result, beliefs became fact. For example, Aristotle's findings that feminine fair-skinned women were more likely to ejaculate than masculine darker women is likely subject either to a limited sample size or confirmation bias. Health, which likely varied between these women based on the existence of racial and sexual societal barriers, has a direct effect on the ability to ejaculate, and could therefore explain this observation. Societal expectations of femininity and female sexual experience likely also had an effect on early observations like these. As there existed less rigorous criteria for scientific proof, early observations such as those surrounding hysteria and the circumstances of female ejaculation are limited and influenced by societal beliefs.

The Start of Sexology

The next major advancements into the study of sexuality and specifically the female orgasm occurred in the 17th through 20th centuries. Before the 20th century, major advancements were made in the understanding of female sexual anatomy by Regnier de Graaf and Alexander Skene in the 17th and 19th Centuries respectively. Both of these researchers focused on detailed observations that allowed for replicable findings. This more rigorous and scientific model continued to grow into what became the field of clinical sexology in the 20th Century. Sexologists, physicians, and psychologists such as Sigmund Freud, Princess Marie Bonaparte, Alfred Kinsey, Ernst Grafenberg, and Shere Hite began trying to collect, record and explain experiences and phenomena related to female sexuality including the "female'

orgasm". Science moved much faster during this period with conflicting theories and critical discussion occurring in academic circles. Findings and theories proposed by one researcher affected the approach and interpretation of other researchers. During this period the concept of hysteria was re-examined, more comprehensive research methods were utilized, the effects of the Clitoral-Urinary Meatus Distance (CUMD) were postulated, and the gap was bridged between women and scientific community.

The first description of the female prostate and its link to orgasm in a scientific context was in the 1600s by Regnier de Graaf. Physician and anatomist, de Graaf researched "male" and female reproductive anatomy (Dupont, 2008). In addition to creating several anatomically accurate illustrations through the use of dissections, de Graaf provided the first scientific description of female prostate and squirting (Zaviacic and Ablin, 1998; Sevely and Bennett, 1978; Korda, 2010). He described the glands and ducts around the female urethra as the female prostate in 1672, and stated that ejaculate was discharged from the female prostate (Sevely and Bennett, 1978; Zaviacic and Ablin, 1998). Furthermore, he attributed this ejaculation to pleasure, which was radical as this notion has been rare throughout the history of the study of the female orgasm. (Sevely and Bennett, 1978). De Graaf also made significant advances to the context in which individuals study female sexuality scientifically. By creating anatomically accurate illustrations and identifying structures of the female reproductive system, he set the stage for quantitative data in lieu of superstition. In 1880, Alexander Skene built upon this by improving our understanding of the female prostate (Zaviacic and Ablin, 1998). Through post-mortem and histological examinations, he described two periurethral glands, now called "Skene's glands" (Figure 2)(Zaviacic and Ablin, 1998; Sevely and Bennett, 1978). These are now known to be homologous to the male prostate as they produce identical biochemical and immunohistochemical signals (Zaviacic and Ablin, 1998).

The 20th century marked a turning point in the study of female sexuality as throughout the century researchers continued to come to new realizations and conducted new research to refine our understanding. Sigmund Freud, an infamous

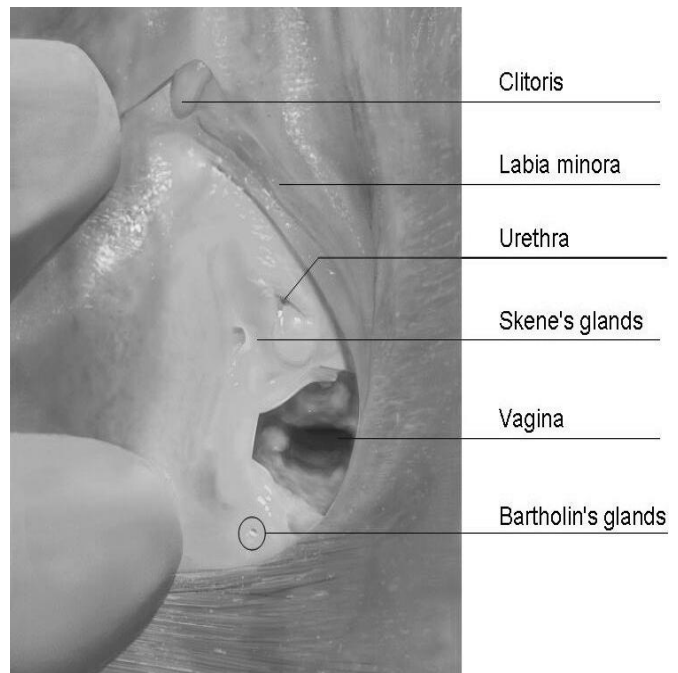


Figure 2: Skene's glands are homologous to the male prostate (Nicholasolan, 2007)

psychoanalyst, was one of the first researchers to receive public attention for his work and many of his theories continued to influence the field of sexuality for decades following. Freud made two significant contributions to the history of the science of female orgasm that are relevant to our analysis. Firstly, he contributed to society's understanding of hysteria. Despite anatomical evidence to the contrary, he believed that the uterus did wander and that the cause was psychological. He postulated that when a woman's sexual desire was frustrated the uterus would be forced to wander, distressing the woman and producing hysterical symptoms such as anxiety, depression, and changings in sexual desire (Adair, 1995). Freud analyzed one case of hysteria with particular detail: that of Dora, an eighteen year old girl. He believed that her symptoms of hysteria were due to repressed desires as well as potentially coitus interruptus (withdrawing the penis from the vagina prior to ejaculation), and psychological estrangement (Freud, 1997). Freud believed that hysteria could be cured by marriage and "normal" sexual intercourse (Freud, 1997). While Freud's research appeared 13 centuries after that of ancient Greek notions of female sexuality the similarities are clear. For example, Freud suggests the same treatment of sexual intercourse and procreation. His findings disproportionately attributed hysterical symptoms to women with a lack of culturally sanctioned sexual expression and furthered the belief

that female sexuality was harmful and required treatment.

Freud's second and equally impactful contribution was the creation of a hierarchy of female orgasms. He believed that different female orgasms were indicative of a woman's maturity and "psychoanalytic development". Freud claimed that when women were immature they experienced clitoral orgasms (analogous to the male orgasm) and when they matured they were able to experience vaginal orgasms during intercourse (Wallen and Lloyd, 2011). As such, vaginal orgasms indicated psychological health, while women who were unable to experience vaginal orgasms were sexually damaged (Wallen and Lloyd, 2011). Contrary to de Graaf's scientific vigour, Freud has no quantitative data or clinical observations to support his claim. Similar to his descriptions of hysteria, his work represents society's beliefs surrounding female sexuality more than the reality of how it functions.

Princess Marie Bonaparte, great-grandniece to Napoleon | of France and close associate of Freud, was concerned about her own difficulty reaching orgasm and unlike Freud focused on the role of clitoris. As such, in 1924 she investigated the relationship between the distance between the clitoral glans and the centre of the urinary meatus (CUMD) and orgasm (Wallen and Lloyd, 2011; De Marino, 2014). She collected and categorized data from 200 women (De Marino, 2014). She found that women with a larger CUMD had more difficulty reaching orgasm. While her findings would prove to be accurate, her methodology lacked statistical rigour. From this, she believed the lack of orgasm was due to the fact that the clitoral region wasn't adequately stimulated by the penis (De Marino, 2014). Her reasoning is reminiscent of the ancient Greek's treatment for hysteria in that it

follows the belief that women's sexuality is inadequate without the inclusion of a penis or penetrative object.

To address her difficulty in reaching orgasm she collaborated with Austrian surgeon Josef Halban to create the Halban-Narjani surgery (Wallen and Lloyd, 2011; De Marino, 2014). This procedure moved the clitoris closer to the vagina in an attempt to allow the women to experience orgasm during penetration. She, herself, had the surgery completed unsuccessfully 3 times. Four other patients also underwent surgery and

were similarly unsuccessful (Wallen and Lloyd, 2011; De Marino, 2014).

In the following decades, two other groups collected data on the topic of CUMD and orgasm. Gynecologist Dickinson amassed information from 200 patients and refuted Bonaparte's claim in his 1933 publication *Atlas of Human Sexuality Anatomy* (Dickinson, 1933). He stated that women with shorter CUMD also had difficulty reaching orgasm and vice versa (Wallen and Lloyd, 2011). In 1940, another researcher Landis published his book *Sex in Development*, which included a physical assessment of 44 married women. Landis found that 81% of "low" placement (CUMD of less than 3.5cm) women reached orgasm during intercourse more than 40% of the time. 50% of "high" placement (CUMD of more than

3.5cm) women reached orgasm during intercourse more than 40% of the time (Landis et. al, 1940). This was concurrent with Bonaparte's findings.

Despite the lack of thorough statistical analysis, the theory that women with shorter CUMD were more likely to experience difficulties achieving orgasm became popular in "sex manuals" (Wallen and Lloyd, 2011). The manual *Ideal Marriage* published in 1930 as well as *A Marriage Manual* (Figure 3) published in 1935 reference the CUMD (Wallen and Lloyd, 2011).

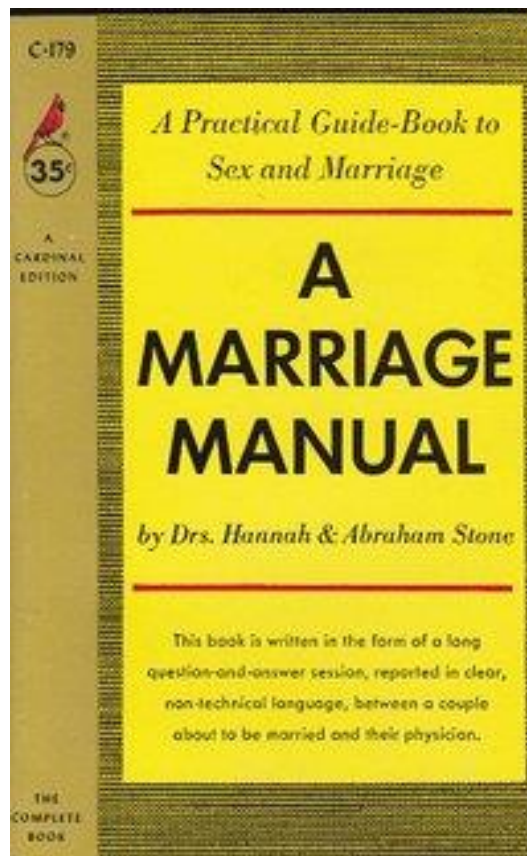


Figure 3: A Marriage Manual published in 1935 included information about the CUMD (Flipkart, 2016).

The concept was further perpetuated by popular culture into the 1950s to 1970s. It was also included in the Hite Report, a survey of female residents of the United States in 1976 (Wallen and Lloyd, 2011).

Alfred Kinsey is a household name in the world of sexology for his research on the topic of the sexual response cycle and sexual physiology. In addition, his research was pivotal in providing contradictory evidence against Freud's postulations.

In 1953, Kinsey published *Sexual Behaviour of the Human Female* (Figure 4), which included 5,940 interviews of white American women and observations from sexual encounters filmed in the lab (Zastrow, 2007; Bancroft, 1998). This was the largest body of data ever collected or used on female sexual physiology until that point. The document presented three main ideas that contradicted society's ideas about female sexuality and orgasm: i) the clitoris is the main focus for female sexuality, ii) the hierarchy of the female orgasm is a myth, and iii) female masturbation is healthy and natural. These three ideas appear again and again in literature over the following decades. Addressing Kinsey's

first main idea, he described the clitoris as a homologue of the male penis, and as such he postulated it was extremely significant to women's sexual pleasure and arousal (Kinsey, 1953). Furthermore, on Kinsey's list of the most important erogenous zones, the vagina is excluded. Instead, he includes clitoris, the labia minora, and the extension of the labia into the vestibule of the vagina (Kinsey, 1953). Kinsey emphasized that comparatively, the vagina is not sensitive. His findings revealed that when stimulated, only 14% of women knew it was being touched (Kinsey, 1953). In addition, he described that only the entrance of the vagina had sensitive nerve endings, with the walls so insensitive that anesthesia was not required for surface operations (Kinsey,

1953). Kinsey revolutionized the field by collecting data to support the fact that the clitoris, among other aspects of the female reproductive anatomy, were much more important to female sexuality than a penis or penetrative object.

Kinsey was one of the many sex researchers who have challenged the orgasm hierarchy. From his extensive interviews and notes from sexual activities performed

in the lab, Kinsey stated that most women didn't involve penetration in their own masturbation (Kinsey, 1953). With this, he discovered that masturbation was the sexual activity that allowed women to achieve orgasm most frequently (Irvine, 2005). This further illustrated that penetration was often irrelevant to female orgasm. In addition to challenging the general concept of a botched hierarchy of female orgasms, Kinsey also directly attacked Freud's "mature" vaginal orgasm. His research indicated that vaginal penetration did not mean longer or better orgasms. Furthermore, all parts of the nervous system are involved in response and orgasm; with longevity and movement during orgasm varying mainly from person to person, not based on the type of stimulation (Kinsey, 1953). Lastly, Kinsey attempted to de-

stigmatize female masturbation. He contradicted Freud, who believed that masturbation could cause psychological damage and was evidence of immature sexuality (Irvine, 2005). To the contrary, Kinsey's data illustrated that women who experienced orgasm regularly before marriage were better sexually adjusted after marriage (Kinsey, 1953). As such, masturbation actually improved marital relations (Kinsey, 1953).

Ernst Grafenberg's, a gynecologist and researcher has become near famous due to the popularization of his finding of the Grafenberg spot, or colloquially the G-spot. In addition his contributions to the study of the female orgasm have been extensively incorporated

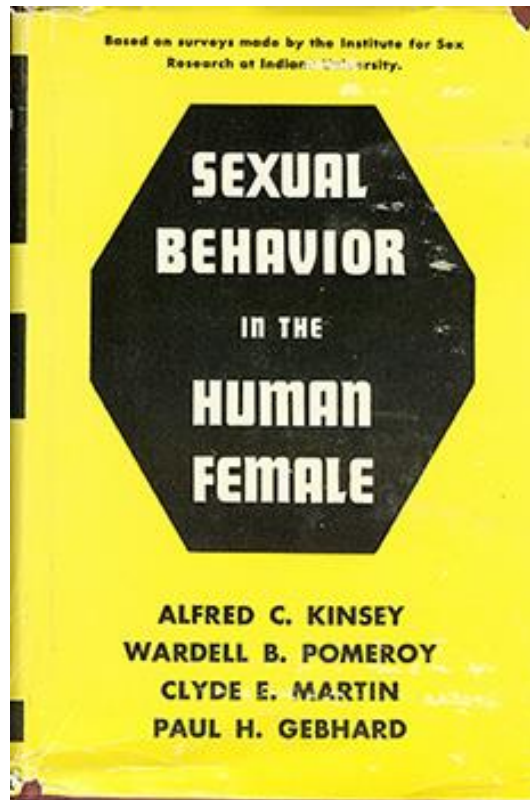


Figure 4: *Sexual Behaviour in the Human Female* published in 1953 followed Alfred Kinsey's book on male sexuality. (Kinsey Institute, 2016)

into conversations concerning sexual pleasure, and he rebutted several ideas surrounding the idea of sexual frigidity in women. In his work, *The Role of the Urethra in Female Orgasm* (1950), Grafenberg outlines the role of erogenous zones, first described by Hardenberg, in the treatment of sexual dysfunction. In this paper Grafenberg contradicts the findings of many other sexologists particularly when examining the idea of sexual frigidity. He brings into question the high figures of frigidity calculated by researchers like Alder, Elkan and Kinsey, as they placed focus on the vaginal orgasm. Grafenberg argued that these measurements were flawed because i) the absence of an orgasm does not correlate with the absence of sexual pleasure and ii) full orgasms may be obtained from other forms of sexual stimulation, both physical and psychological (Grafenberg, 1950). This last argument of sexual multiplicity is particularly revolutionary because it is a direct contradiction to the common and long-held belief that vaginal orgasms were a fuller and more mature orgasm than other orgasms.

Grafenberg's findings are largely consistent with the modern understanding of the female orgasm which illustrates their significance (O. Buisson and P. Foldes, 2010). At the time of his writing his acknowledgement of the psychological basis, the individuality of the female orgasm, and the multiplicity of sexual stimulation were not revolutionary to other sexologists, yet he popularized these ideas within the scientific community through the success of his observations of the Grafenberg-spot. It is also important to note that Grafenberg's description of female ejaculation, as variable and sometimes profuse amounts of fluid produced at the acme of orgasm, are not a large improvement from Aristotle's initial observation. This lack of scientific progress in over 2000 years clearly demonstrates that until recently, female ejaculation has been a taboo subject of research despite increasing focus on the female orgasm.

Up until the 1970s, the field of human sexuality research had been very male-dominated, with little focus being placed on the value of women describing their own experiences with orgasm. The Hite Report (Figure 5), a collection of more than 3,000 responses to an intimate questionnaire about sexual behaviour from women ages fourteen to seventy-eight was a revolutionary contribution to the history of sex research (Hite, 1976). As Shere Hite describes in the introduction, she was motivated by the desire to give women the opportunity to share their stories in their own words, without a scientific intermediary (Hite, 1976). The report was first published in 1976 and was an immediate success, with stories contradicting many of the widely held ideas about female sexuality. One of the most significant claims was related to orgasm:

women who didn't experience orgasms during intercourse (without additional clitoral stimulation) was the norm, not the exception. The results from Hite's survey stated that only 30% of women were able to regularly achieve orgasm during coitus (Hite, 1976). Hite made the radical statement that clitoral stimulation was required for female orgasm, and had thousands of testimonials to prove it.

In addition to showcasing the results of her own questionnaire, the Hite Report includes findings from various sex researchers of the time, to illustrate the larger trend. Seymour Fisher, author of *The Female Orgasm* and *Understanding*

the Female Orgasm, found that 25% of women were capable of regularly reaching orgasm during intercourse without additional manual stimulation (Fisher, 1973). Helen Kaplan, author of *The New Sex Therapy* and experienced sex therapist, challenged the pathology of the clitoral orgasm as well. Kaplan states that less than half of the 90% of women who achieve orgasms regularly do so from penetration (Kaplan, 1974). The Hite Report found that only 1.5% of women masturbate via vaginal entry; a fact which is stated in *The New Sex Therapy* as formidable evidence in favor

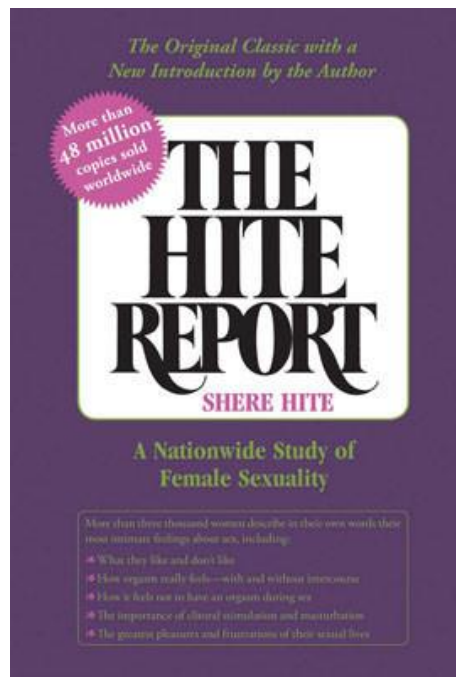


Figure 5: The Hite Report, published in 1976 (The Seven Stories, 2016).

of the normality of clitoral orgasm (Hite, 1976; Kaplan, 1974).

The 17th through 20th centuries were a time of expanding the variety of research methods used to investigate the female orgasm and improving these techniques. While De Graaf and Skene presented hearty scientific rigour in their dissections, Freud's psychoanalysis failed to maintain the same level of objectivity. Marie Bonaparte made advancements by collecting data to test a hypothesis, but her lack of thorough statistical analysis casts doubts on her



Figure 6: 3D imaging of the internal clitoris. The yellow area is the clitoris and the blue depicts the remaining reproductive structures (Foldes and Buisson, 2009).

findings. Still, this did not prevent popular culture from publicizing them in various sex manuals throughout the 20th century. Kinsey and Grafenberg were incredibly influential in their contributions to our understanding of female sexual physiology, and their use of interviews and filmed sex acts in a laboratory setting revolutionized the field. Hite created waves by eliminating the middleman between female experiences and scientists, a methodology which had yet to be used. Overall, significant controversy plagued the 17th-20th centuries, results and findings were not irrefutable but rather suggestive of conclusions. Due to limitations of technology it was very difficult to definitively prove a result.

A 21st Century Understanding: Clarity in the face of Controversy

The 21st century has provided clarity and certainty to many of the ideas and controversy that plagued the study of female sexuality for hundreds and in some cases thousands of years. With the advents of new technology and more rigorous statistical and scientific methodologies, conclusions have been drawn on physiology, the relationship between clitoral and vaginal orgasms, the impacts of CUMD on orgasm, and clarity on the existence and nature of female ejaculate.

As is seemingly categorical with the study of female sexual anatomy, advancements in clitoral physiology are all very recent despite the organ being well documented for centuries. Helen O'Connell et. al. described the clitoris as a multiplanar structure with a broad attachment to the pubic arch and through extensive supporting tissue, an attachment to the mons pubis and labia. Centrally it is attached to the urethra and vagina. Its components include the erectile bodies (paired bulbs and paired corpora, which are continuous with the crura) and the glans clitoris. While previous studies had described the complex nature of the clitoris, it was not until O'Connell's findings were published in the American Journal of Urology in 2005 that this idea gained traction within the scientific community.

This finding led way for many subsequent discoveries that finally answered some of the questions surrounding female sexuality. O. Buisson and P. Foldes examined the clitoral complex via ultrasonography (Figure 6) during non-arousing penetration and voluntary perineal contraction (2009) and during intercourse (2010). From this they concluded that the spot on the anterior wall of the vagina, popularized by Grafenberg, was part of the highly innervated internal clitoris. This result was incredibly significant as it put to rest, discussions of a hierarchy of orgasms and provided new insight to an organ that has been documented for centuries.

Controversy continued to be put to rest as the concept of CUMD resurfaced in the 2011 study completed by Wallen and Lloyd. They performed rigorous statistical analysis of Bonaparte's and Landis' data, separately and combined. Their analysis supported the trend discovered by Bonaparte that women with shorter CUMDs were more likely to achieve orgasm during intercourse (Wallen and Lloyd, 2011). While their

results agree with earlier research the scientific rigour and the separation of their personal opinions shows how far scientific inquiry had come. Instead of interpreting the data in a way that reinforces penetration as the sole function of female sexuality, Wallen and Lloyd investigated the cause of diversity in CUMD values. They suggested that the large variety of CUMD in women is caused prenatal exposure to androgens. They propose that women with minimal exposure to androgens prenatally have a shorter CUMD, while women with increased exposure have a longer CUMD (Wallen and Lloyd, 2011).

Over the past 2000 years researchers studying female sexuality have focused on the existence of female ejaculation rather than its mechanism. While still controversial in some scientific circles it has become generally accepted that female ejaculation exists. Large volume female ejaculation, known as squirting, was recently studied to determine the composition and mechanism of the fluid and its production. S. Salama, F. Boitrelle, A. Gauquelin, et. al., 2014 examined the biochemical composition of the ejaculate as well as ultrasounds of the subject before, during, and after sexual stimulation leading to ejaculation. Their biochemical analysis show that the fluid collected had higher levels of glucose and lower levels of urea, than urine. It also contained prostate-specific antigens. Their ultrasounds showed filling of the bladder during sexual stimulation and the absence of liquid before and after stimulation. Together these two findings strongly suggests that female ejaculate is primarily dilute urine combined with prostatic emissions from periurethral ducts.

Researchers, like O’Connel, Buisson and Foldes, Wallen and Lloyd, and Dalama, Boitrelle, and Gauquelin, worked to advance the study of the female orgasm through comprehensive scientific methodology. These findings include a long overdue and comprehensive description of the clitoris and its relationship to pleasure, a definitive conclusion that a smaller CUMD was correlated with increased sexual pleasure when having penetrative vaginal intercourse, and evidence proving the existence of female ejaculation and it’s its composition. All of these discoveries, are absent from societal biases and are much for definitive than their preceding discoveries.

Conclusion

The history of the scientific investigation of the female orgasm has been convoluted since its beginning. It has been shaped by society’s views of women, sexuality, and how they relate to one another. Through technological advancements and the improvement of the scientific method, scientists have uncovered many of the mysteries of the female orgasm. However, we are still grappling with ideas postulated centuries ago and our societal acceptance of female sexuality is severely lacking. In the 21st century, we hope to continue to work towards creating a scientific community free of shame that will continue to uncover the mysteries of female sexuality.

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