

# P / REFERENCES OF DESIGN

## COMFORT, SHAME, AND INNOVATION: THE CHALLENGES OF REINVENTING THE GYNECOLOGICAL SPECULUM IN THE 21<sup>ST</sup> CENTURY: A CONTRIBUTION TO A FEMINIST-INSPIRED REDEFINITION OF MEDTECH.

**Victoria Juretko<sup>\*a</sup>**

a Masterstudio Industrial Design, Academy of Art and Design Basel, Switzerland

\* juretko.victoria@web.de

**DOI: 10.63442/PWDE4227**

**KEYWORDS | SPECULUM, HISTORY, REDESIGN, COMFORT, MEDTECH, FEMINIST DESIGN,  
PERCEPTION**

**ABSTRACT** | The history of the speculum is primarily characterized by the stigmatization of the female body and unethical behavior towards people with vaginas. Despite its long history of use in gynaecology, routine examination with this instrument remains uncomfortable for many patients. This paper takes a feminist perspective to open up new approaches to design in medical settings. It examines the influence of social gender on the perception of individuals and the role of gender stereotypes. Through an analysis of medical, sociological and bioethical texts as well as surveys and interviews with patients and professionals, the need for a redesign of the speculum is highlighted. A market analysis and comparison with other concepts show realistic possibilities for a redesign. The results emphasize the increasing importance of comfort for patients in medical examinations and also show that changes in this area must be achieved not only through new products, but also through structural changes.

## 1. Introduction

The speculum is an instrument that is known and used by almost every person with a vagina. It is used as an examination instrument in gynaecology and is utilized in every routine examination to take a swab of the vaginal tissue as well as that of the cervix (Wright et al., 2004). From the first penetrative sexual intercourse until after menopause, this instrument is typically used once a year for every person with a vagina (Barad, 2021).

The speculum is one of the earliest instruments used in gynaecology and has thus shaped the development of this medical specialty (Baker, 1999). However, the instrument not only reflects developments in medicine but also society's attitudes, values, and perceptions of the female body. In addition to analysing the product, this thesis also considers the speculum as a symbol that reflects and questions social, gender-specific, and cultural dynamics.

The current state of medical research primarily involves identifying issues with the speculum's usage and exploring how these can be addressed by increasing awareness among healthcare providers. This work draws on studies such as “Improving women's experience during speculum examinations at routine gynaecological visits: randomized clinical trial” (Seehusen et al., 2006), and “A comparison of two techniques for vaginal speculum placement to reduce patient pain” (Pérez et al., 2021). Both studies highlight an awareness of the needs of those undergoing examination, yet they also reveal persistent comfort issues. It seems that raising the awareness of those providing treatment is the only way to better meet the needs of the people being treated.

As the speculum is to be analysed from multiple perspectives, contributions from the social sciences, the book “Unbehagen der Geschlechter. Gender Studies” (Butler, 1991) and other contributions to gender studies are consulted. These are essential for understanding the social, societal and cultural background of the instrument. This literature elucidates social constructs and concepts that continue to influence us today. While the speculum has proven its efficacy as a gynaecological instrument, it is noteworthy that there has been surprisingly little innovation in its design, considering its central role in medical examinations.

Papers and articles that reflect a redesign of the instrument, such as “An Innovative Design for the Vaginal Speculum” (Bouquet et al., 2023), are also considered. These show what possibilities exist for a redesign. At the same time, they highlight the limitations of developing a new tool. Those limits are primarily characterized by competition from existing products on the market, due to their price efficiency and longevity.

To clarify the significance of the speculum, it is necessary to analyse its historical evidence and archaeological finds. The historical analysis illustrates the relevance of the topic, but also shows the stigmatization of the speculum by sources such as (Heinesohn, Steiger, 1987). Other historical sources, like (Ojanuga, 1993), delve into the intersection of medicine and the social sciences, examining the ethics of instrument development and questioning its impact on the modern instrument.

Addressing the issue of sensitive design, particularly concerning the speculum, implies an awareness of the needs of the individuals undergoing treatment. A plausible conclusion should be that there is a wide range of different tools available for the treatment. However, this is not the case. That's where this paper picks up by analysing the approaches from different fields, bringing them together and designing an interface where a new instrument can emerge.

In particular, the position of the person undergoing examination hardly seems to be addressed as a factor for a redesign. The following question is therefore used as a guiding research question to identify those aspects that are useful for a redesign:

*How can the need for comfort be reconciled with the practicalities of everyday examinations? Is this even feasible?*

The summary of the state of research places the development and current status of vaginal speculum in the context of gender studies, the social sciences and medicine. A historical analysis clarifies the emergence of the speculum and helps to understand its impact on modern gynaecology. This analysis highlights the urgency of redesigning the instrument to respond to the changing needs of patients.

Another methodological approach is the application of the theory of the symbol (Hülst, 1999), which abstracts the speculum as a symbolic object. It represents both the problems and challenges in the development of the instrument due to historical, cultural and social structures as well as the possibilities for change and redesign.

In addition to these theoretical approaches, practical methods were applied. These include interviews with gynaecologists to gain insights into their perspectives and experiences. Furthermore, surveys were conducted among people with vaginas of different age groups (18- 54) to capture their perceptions of the examination experience and the instrument and to collect potential suggestions for improvement. Moreover, shape analyses are conducted to elucidate the shape and function of both the speculum and the vagina. An integral aspect of the argumentation involves the prototype currently under development. This is aimed at enhancing the examination experience for all patients, with particular emphasis on addressing special needs of patients. Additionally, the prototype should serve educational purposes to bridge the gap between specialists and non-specialists, as well as to combat the stigmatization of the female body.

The aim of the redesign is to develop an instrument that not only enhances comfort for patients but also provides relief for medical personnel. By prioritizing increased comfort, additional specific objectives that cannot be fully achieved with the current state can be pursued. Integration of technologies can facilitate quicker detection and documentation of diseases and abnormalities. Furthermore, the redesign can lead to patients having fewer concerns about the examination, attending appointments more regularly and diseases being diagnosed more efficiently. This contributes to both patient well-being and potential relief for the healthcare system. Through a needs-oriented redesign of the product, accessibility for individuals with specific needs can be enhanced.

This paper is part of my ongoing master's thesis, that's why it's not always mentioned as a paper.

This paper is structured as follows: An excursus into gynaecology and the anatomy of the female body clarifies the topic and locates the speculum as an examination instrument in gynaecology. The design of the current specula is derived from the historical development of this examination instrument.

The following chapter deals with gender-specific perception and the role it plays in the development of specula. The design is strongly influenced by social and cultural dynamics from the time the instrument was created. This imprint still strongly influences the perception of the speculum during the examination. The following section discusses how the speculum's design can influence its perception on a deeper level and how this can be steered in a more positive direction.

Finally, a "requirements profile" is developed through comparisons with new approaches to different specula and other medical fields, which provides a framework for redefining this instrument.

The challenges encountered when redefining and reinterpreting a product in this manner are addressed.

## 2. The Speculum as an Instrument in Gynaecology

The speculum is a medical instrument that provides insight into various body orifices through its spreading function. The vaginal speculum opens the vagina by insertion and provides a view of the cervix (lowest point of the uterus). Vaginal specula are used in gynaecological examinations to take sterile swabs from the vagina and cervical tissue. In some cases, the speculum is used to insert other instruments sterily through the vagina into the uterus (Speculum, n.d.).

Specula are available in metal, which are cleaned and sterilized after use, and plastic, which are designed for single use. The latter are primarily used in hospitals. The speculum is also available in various sizes and designs, depending on the preference of the person performing the procedure and the circumstances in which the speculum is used.

### 2.1 Form and Function

The shape of the speculum has been developed in close relation to the anatomy of the vagina. The vagina is a hollow organ (Jung, 2023). It is a hollow, muscular tube that connects the external genitalia to the uterus. The anatomy of the vagina dictates the construction of the speculum, requiring it to be elongated and narrow to adequately open the entire length of the vagina. Due to the elasticity of the vagina, it can expand and contract to many times its own size, which is necessary for childbirth. In its contracted state, often considered the initial position, the vagina exhibits numerous invaginations and indentations. Certain factors influence the shape of the vagina and the resulting functions of the speculum. Very young patients are often more sensitive to the pressure of the instrument, which is why smaller specula are particularly advantageous. Shortly after giving birth, the tissue is still very stretched, which means that more tissue has to be displaced during subsequent vaginal examinations. As soon as menopause occurs, the vagina changes again and becomes less flexible and therefore more sensitive again due to the absence of oestrogen (Falco, 2021).

The examples of organic changes in the vagina influence both the choice of material and the shape of the speculum.

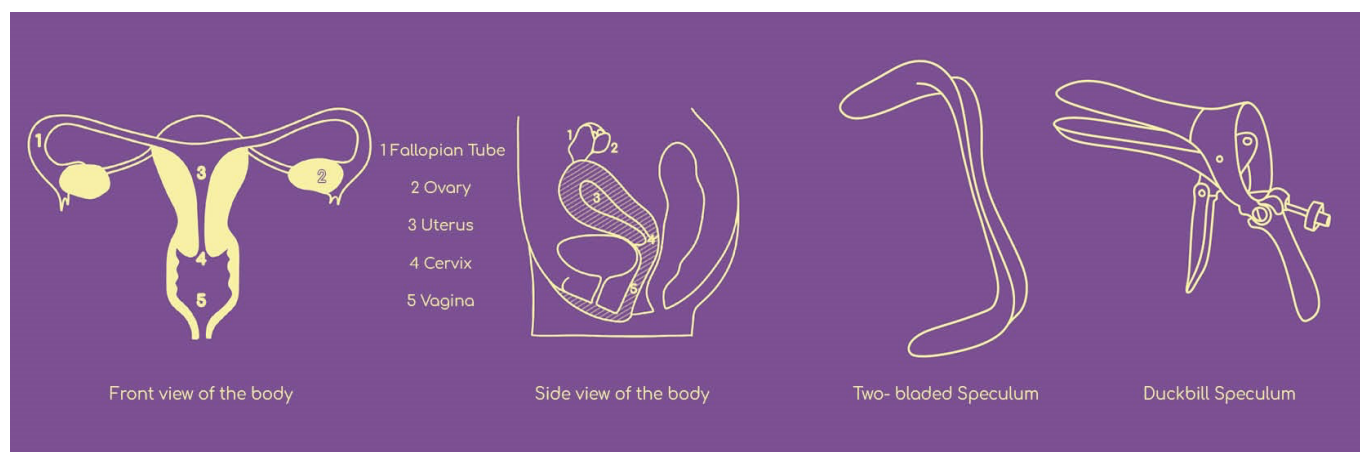


Figure 1. Shows the vaginal structure from the front and side and the gynaecological Speculum in the most common variations nowadays.

The instrument must be able to displace tissue (Pardes, 2017). How much and how strongly depends on the anatomical conditions. For example, obesity exerts particularly high external pressure on the vagina (Palsgaard et al., 2022). This functional requirement, as well as the necessary sterilizability, led to steel being preferred over wood as a material over time (Spekulum aus Holz, n.d.). Steel is not only robust, but it's also easy to clean and, with the right care, durable.

There are different variants of the shape of the speculum (Spekulum aus Holz, n.d.). There are specula with one, two or more blades. Typically, the speculum we are most familiar with is the duckbill speculum, which has two blades (see Illustration). The duckbill speculum is available for one-handed operation, which makes it particularly suitable for use in everyday practice. The instrument can be secured with a screw after opening and sits securely in the vagina so that the practitioner can carry out the examination and swabs. Another variant of the speculum is also used in everyday practice, but more frequently during surgical procedures. This speculum consists of two individual parts (more likely to the two-bladed speculum in the Illustration) and must be held in place throughout the procedure, which requires the presence of another person.

## 2.2 Procedure of Examination with the Speculum

During a gynaecological initial examination, an informative discussion is initially conducted with the patients to inform them about the procedure. Subsequently, the actual examination takes place. Patients are requested to undress from the waist down, which is often feasible in a cubicle or a designated area for this purpose. Following this, patients take a seat on the gynaecological chair, an adjustable chair equipped with footrests to elevate the feet. In this position, the physician explains the procedure of the examination. The speculum is announced and inserted. In some practices, the speculum is stored in a pre-warmed drawer and subsequently lubricated to facilitate insertion and increase comfort. The speculum is inserted in its closed state and then opened within the vagina. During a routine examination, the instrument is utilized to provide a view of the cervix as well as the vaginal walls. The tip of the speculum can be used to stabilize the cervix portio for conducting a cell smear. For this purpose, a swab or brush is guided through the speculum. Following the smear, the vaginal walls are examined to check for any changes. Subsequently, the speculum is carefully removed from the vagina. It's important to mention here that most physicians don't close the speculum inside the vagina completely due to pinching the tissue if they do. Additional palpation examinations may be conducted if necessary, for which the speculum is no longer required. Typically, throughout the entire examination, the patient, the physician, and a medical professional are present in the room (Barad, 2021).

## 2.3 Historical Development of the Speculum up to the Present Day (2024)

Bioethics, medical ethics and archaeology have developed different perspectives on the speculum. Accordingly, the speculum is presented as the most important invention of the time, which had a positive effect on the role of women in society. In other sources, however, nothing good is said about the development of the speculum, especially when it comes to its ethical justifiability (Sardesai, 2023). Depending on whether the first specula, i.e. the finds from Pompeii (Baker, 1999) are analyzed, or the use and significance of the specula in the 19<sup>th</sup> century, when the speculum was invented for the “second time” (Heinsohn, Steiger, 1987), the assessments vary. There are some records from the 19<sup>th</sup> century on the use of the speculum in Great Britain (Kennan, 2019) and on the development of new fields with the instrument in the United States of America (Ojanuga, 1993). The analyses are often related to fields beyond medicine, such as the social sciences, shedding light on the historical context and critically examining it for the reader.





Figure 2. Shows a Vaginal speculum, bronze, said to be from Pompeii, Roman, 199BC-79AD, possibly 20th century copy (<https://collection.sciencemuseumgroup.org.uk/objects/co88417/vaginal-speculum-vaginal-speculum>).



Figure 3. Shows a variation of vaginal specula from around the 14th, 15th and 16th century. Source: <https://theconversation.com/speculum-the-creepy-history-of-this-ancient-gynaecological-device-and-why-its-still-feared-today-196977>.



Figure 4. Shows a wooden speculum, which could have been used as a template, to model metal specula, but also could have been used as a speculum itself. The exact usage is unknown. Source: <https://collection.sciencemuseumgroup.org.uk/objects/co88417/vaginal-speculum-vaginal-speculum>.



Figure 5. Shows Sims speculum from around 1860- 1890. Source: <https://collections.countway.harvard.edu/onview/files/original/a3e1e0d16c537860278047fe44428357.jpg>.

At the beginning of the development and shaping of the speculum at the end of the 19<sup>th</sup> century, pronounced role models and gender stereotypes prevailed. Men had almost the sole privilege of higher education (Heinsohn, 2000). In Germany at this time, women were taught the naturalness of the role of mother and the unnaturalness of girls' education:



“In general, however, it cannot be emphasized strongly enough that nature itself has prescribed to woman her profession as mother and housewife, and that natural laws cannot be ignored under any circumstances without serious damage, which in the present case would be particularly evident in the offspring.” (Kirchhoff 1897, 257, quoted from Heinsohn, 2000, p. 62; translated from German)

“And if the same demands were to be made on girls, in whom female sexual development is added at the age of about 15, they would be brought up as cripples who would be ruined for life. In my opinion, the establishment of female grammar schools should be banned once and for all for health reasons.” (Kirchhoff 1897, 274, quoted from Heinsohn, 2000, p. 55-62; translated from German)

Higher education and the associated opportunities to rethink, develop and invent products were male dominated. The focus was on innovation and convenience for the treating physician. The needs and feelings of the people being treated, especially women, were ignored.

The first clinical specula, developed by Dr. J. Marion Sims in the United States at the end of the 19<sup>th</sup> century, served diagnostic, treatment, and research purposes (Ojanuga, 1993). It should be noted that Sims was not the only one to “rediscover” the speculum. During the period of witch-hunts, all knowledge about female care by midwives (referred to as “witches”) was lost and had to be discovered a second time (Heinsohn, Steiger, 1987).

This work primarily focuses on the redesign and development initiated by Sims. This further or new development of the speculum was experimentally introduced and tested under reprehensible conditions (Sardesai, 2023). Accordingly, the ethical justifiability of Sims' further development must be criticized. Sims used his speculum to perform experimental operations on enslaved African women, without their consent and anaesthesia (Ojanuga, 1993). While many subsequent revisions of the instrument have been made, they often retained the material and basic shape of the original speculum (see Illustration).

The most obvious change over time is the range of applications. Not much is known about the initial use of the speculum, but the design of the form suggests that the female anatomy was explored and there is even evidence that the comfort of the subjects examined played a role (Baker, 1999). Between 1864 and 1869, the speculum came into widespread use in the United Kingdom. There was a surge in syphilis cases at the time, and the speculum was used to screen sex workers - or women who appeared to fit the profile- for venereal disease. Legislation for control purposes was enacted, mandating examination for those who fell within the criteria (Kennan, 2019).

During this period, and likely earlier, the only other patients that got treated with the speculum been among the wealthy classes to monitor pregnancy and childbirth, based on the few archaeological findings. Unlike sex workers, patients in the wealthier classes had the possibility to deny the exam (Baker, 1999). Today, the main field of application of the specula is diagnostics during gynaecological examinations (Schollmeyer, Schollmeyer, n.d.) and is, therefore, part of every check-up. The shape has been revised in certain areas. The design has been refined, with rounded edges and various sizes available to accommodate individual anatomical variations. Medical practices may conduct differing numbers of examinations depending on their size, with the majority of patients visiting for preventive measures, including cervical cancer screenings performed with the speculum (Speculum, n.d.). Depending on the handling, metal or plastic specula are used. Disposable plastic specula are discarded after use, while metal ones may be cleaned on-site or by external providers. In any case, sufficient instruments must be available to prevent bottlenecks (Interview, 28.10.2022). However, hospitals often lack the resources to reprocess all instruments, leading to a shift towards disposable plastic specula (Interview, 28.10.2022).

The time required for reprocessing is eliminated with plastic specula, but so is the longevity, which was once a key feature. It is debatable which is more practical for use. In some cases, it is argued (A better speculum, a better practice, a better world., n.d.) that plastic specula are more comfortable to insert because plastic is warmer than steel at room temperature.

The changes that have taken place in the design (pictures of various specula over the course of time, see above) and use of the speculum have arisen out of necessity, due to medical laws and overall development in the medical field and not out of an orientation towards the needs of the person being treated:

The speculum has rounded edges to avoid bruising the tissue (Palsgaard et al., 2022). In addition, the speculum was developed in different sizes to minimize any discomfort for the person being examined and to adapt to different individual circumstances (see also Chapter 3.1.1). In addition, it is now possible to use disposable specula, which rationalize procedures, especially in everyday clinical practice. These are the most important changes that have taken place historically. These are changes that had to take place in order for the instrument to comply with today's medical guidelines and be used in everyday medical practice. The emphasis on this is important at this point because the changes are so marginal, but there is so much potential for improvement in the design and enhancement. The lack of attention to such a sensitive area over a prolonged period (150-200 years) will be further explored in subsequent chapters (Pardes, 2017).

### 3. Gender-Specific Perception Regarding the Design of the Speculum

The design of medical instruments plays a crucial role in everyday treatment processes, as improvements in efficiency and comfort positively impact care (Bouquet et al., 2023). Specialist areas such as gynaecology in particular benefit from sensitive design. Sensitive design makes the person being examined feel more comfortable, which simplifies the examination for the person providing treatment. However, sensitive design also has effects beyond the actual examination. If the person being treated feels comfortable, they are less reluctant to attend regular appointments and potential illnesses can be detected at an early stage, which reduces the burden on the healthcare system (Bouquet et al., 2023). In addition to the formal aspects of speculum which were highlighted in the previous chapter, other factors such as cultural circumstances, social structures and gender-specific characteristics and traits also play a role.

Considering the social and cultural conditions at the time of its inception (as discussed in Chapter 2.2), it can be inferred that the design of the gynaecological speculum was heavily influenced by male perceptions. In addition to the historically predominantly male power of definition in the medical field of gynaecology (see subchapter 2.3), the parallels between the design and the role models prevalent at the time of development and the associated different perceptions of the sexes must be explained with methodological recourse to gender studies.

#### 3.1 Social Gender and Gender-Specific Perception of Pain

Social gender is part of the sex-gender model. This model states that biological sex and gender identity are to be considered separately. Biological sex is defined by certain anatomical characteristics (Gildemeister, 1992) (Butler, 1991), whereas gender identity is not predetermined but develops through social interactions and is influenced by upbringing and cultural factors (Gildemeister, 1992). According to Butler, no gender identity can be automatically assigned to a biological sex (Butler, 1991).

According to the gender studies explanatory model, the tendency for biologically male individuals to identify as “men” and biologically female individuals as “women” is attributed to societal gender roles imposed from an early age (Blackstone, 2003). Biologically female children are often exposed to caregiving roles, through books or toys while biologically male children are discouraged from certain behaviours deemed unmasculine. Such statements and behavioural patterns shape gender roles and identity formation (Pauli, Hornberg, 2008).

These roles, which are shaped by the social environment, influence individual perception. By favouring or suppressing emotions, the perception of certain feelings, such as pain, can be retrained or expressed less clearly. (Pauli, Hornberg, 2008) The expression of pain has traditionally been stigmatized as stereotypically

female (Pauli, Hornberg, 2008). Gender-specific stigmatization, especially of female socialized persons with vaginas, tends to decrease nowadays.

Sims' first speculum, which was inspired by a tin spoon, was an example of the neglect of the needs of people with vaginas. With this instrument, the gynaecologist performed the first experimental operations on enslaved African women, without anaesthesia (Ojanuga, 1993). The existing disproportionate social power imbalance made it impossible to make room for women's needs.

Studies have shown that empathy for pain is most effective when the other person has experienced the same pain and can empathize by putting themselves in the position of the affected individual (Jackson et al., 2005). In the case of the speculum, the anatomical characteristics of men make this direct empathy impossible. With regard to male-dominated gynaecology (see Chapter 2.2), one could speak of unfortunate factors that have not necessarily had a positive influence on the design and further development of the speculum.

However, as more interest in patients and their comfort in this area has developed over time, research has been and continues to be conducted into ways of making the examination more comfortable for those undergoing treatment and reducing pain (Seehusen et al., 2006).

### 3.2 Impact on the Development of the Specula

The discussion here regarding the impact on development is an interpretation of the preceding analysis of temporal conditions and circumstances.

The one-sided perspective, tied to the stereotypical notion of women, both female and male socialized persons and their roles, are reflected in the form and function of the instrument. Sims did not incorporate the needs of women into his development process of the speculum, and since then, the needs of patients with vagina have not been truly integrated into the product's further development process.

Another point that may have affected the design was the lack of sensitivity to the female gender. As alluded to earlier, this was probably less malicious intent than ignorance and the circumstances that prevailed at the time. Questions that might arise at this point are: "Didn't all instruments originate in such experimental forms? Why is there such an emphasis on the fact that the speculum was designed by men? Does perception have anything at all to do with the design?"

These questions are justified and can now be summarized once again. Most products have an experimental origin. However, it is important to pay attention to the context of these products. Most products are developed either for men as well as women, or only for men. Here, the focus was on the needs of male practitioners, which was difficult to achieve when developing the speculum, or led to an unpleasant design for women.

The emphasis on male design is important because women were strongly underrepresented in decisive and co-determining positions at the end of the 19<sup>th</sup> century. This does not mean that the needs of women were not seen, but that male needs and perceptions were considered decisive.

It is important to draw a connection between design and perception, as these stereotypes and social circumstances have strongly influenced the priorities and decisions of developers. If women are not valued, or less valued, in society, it is very likely that their needs will not be considered in the development process either.

But hasn't our society moved a long way away from this and developed further? Yes, it has, at least that's what one might think. But if one looks at how the speculum developed until today, one cannot be quite so sure.

The factors that play a role in the fact that nothing has really changed regarding the further development of the instrument are analysed and discussed below.

## 4. The Speculum as a Symbol

The previous chapter showed how the social dynamics of the time affected the design of the speculum. These gender-related dynamics continue to shape society and culture to this day. The following chapter addresses the associated issues of stigmatization of the female body and shame. However, it also demonstrates how social upheavals and movements toward a more equal society can open up new paths.

### 4.1 Social Stigmatization of the Female Body and the Resulting Shame

Stigmatization occurs when cultural factors, stereotypes, and prejudices in a society lead to biologically female individuals being associated negatively or inferiorly compared to biologically male individuals, resulting in shame for their biological conditions (Reasons for Stigmatization, n.d.). We find the stigmatization of the female body in everyday situations that have become established and normalized in our society through centuries of tabooing and judging. This normalization implies that the evaluation is accepted and, furthermore, that many individuals socialized as females orient themselves toward and adapt to the lived and demonstrated norms.

The symbolization of the speculum helps to illustrate the complex social dynamics and how these can be perceived in an instrument such as the speculum. The speculum is not only a product of medicine, but also a symbol of the prevailing power structures and gender dynamics, both then and now. The fact that the design of the speculum is almost the same as it was at the time of its development is underpinned by the following readings of the speculum as a symbol.

The power imbalance between the sexes and control over the female body: Because the speculum is inserted into the vagina by a second person, the speculum symbolically becomes an instrument of loss of control, or the relinquishment of control, as the person being examined must completely trust the second person. The person being examined takes on a passive role here - also physically - a role that is reminiscent of social dynamics and power imbalances from the development of the speculum.

The right over one's own body: In many cultures and countries, the development and role of biologically female individuals are determined at birth. Being a woman often means being a mother, staying at home, and caring for children. The right to decide over one's own body, such as whether or not to use contraception, historically falls under the responsibility of men and has long been a taboo subject. The speculum, developed by men to monitor bodily functions, thus symbolizes the ongoing control over the female body and its functions and rights, especially considering the history of the instrument's origins.

### 4.2 Social Upheavals and Enlightenment

The metaphors of the speculum considered in the previous chapter carry a negative connotation. How might the instrument be perceived if designed with feminist approaches and contextualized differently? The speculum could then metaphorically stand for values such as self-determination, enlightenment, inclusion and democratization.

By taking into account the needs of people undergoing treatment in the design process, the self-determination of the people being examined can be improved. The safety and autonomy that such an enlightened and sensitive scenario could foster would lead to an improvement in the examination experience and signify the disruption of historic dynamics.

A redesign can likewise stand for education and enlightenment in the area of gender stigmatization. The redesigned speculum would symbolize and reinforce the growing awareness of the needs and rights of biologically female individuals.

Diversity and inclusion could also be conveyed through the redesign of the instrument. The perception and consideration of diverse groups of people, regardless of age, sexuality and other identity characteristics, can be reflected in the design of the speculum.

Rethinking and redesigning the speculum can also stand for an upheaval and a redefinition of the power relations and dynamics of our society. Old hierarchical structures are broken up and people with vaginas can influence and shape the design themselves.

The following chapter will analyse what such a redefinition of the speculum could entail and explore the realistic possibilities.

## 5. The Speculum from a Design Perspective and in Comparison

During the research on the speculum, one fact stood out: problems in the use of the instrument and their possible origins have been identified. There are studies investigating how the use of the speculum can be improved and how the pain - which a large proportion of women experience - can be minimized (Seehusen et al., 2006). Furthermore, as already discussed in Chapter 2, some studies critically analyse the context of the second invention of the speculum and question its ethical justifiability (Sardesai, 2003).

This reveals the urgency of the redesign, which is discussed in this chapter from a design perspective. This is followed by market analyses, surveys and interviews. It is discussed how realistically a redesign of the speculum would be received and maintained in today's market, with the help of a comparison from another medical field.

### 5.1 Positive and Negative Characteristics of the Speculum in its Current Form

The characteristics of the speculum are better or worse, depending on the perspective from which they are viewed. The perspective that is still in focus today is that of the treating persons. Since this work deals with the perspective of the person being examined, particular attention will be paid to this in the following section.

Positive characteristics in the design are expressed above all in the handling of the specialist staff, as confirmed in the interview conducted with a gynaecologist (Interview, 28.10.2022). The material used, which in many cases is stainless steel, has little to no wear if it is properly cared for. Due to its longevity and the fact that it does not require the installation of special technology, the speculum as it is used today is a cost-effective product, even if it has to be cleaned and sterilised after each use. The handiness of the instrument has improved insofar as the two-bladed speculum, the “duckbill” is used for most examinations. This allows the practitioner to use both hands freely during the examination. There are also some improvements for the person being examined with regard to the perception of the product and the associated pain sensation. These are manifested by rounded edges and improvements to the spreading mechanism. Unfortunately, these upgrades are minimal and are mostly expressed by sensitized staff and less by improvements to the instrument itself (Interview, 28.10.2022).

A clear pattern emerged through discussions with people who have also had the speculum examination experience, as well as an anonymized survey on the topic of the speculum examination with regard to well-being.

Due to the fact that steel was used for the speculum, the temperature of the instrument is always colder than the body temperature of the person being examined, despite prior warming. Little can be done about this, as rapid thermal conductivity is a fixed property of the material. The survey showed that 26 of the 32 people questioned found this property very uncomfortable and tended to cramp up as a result). Before the speculum is inserted for the examination and smear test, the first uncomfortable feeling for some people undergoing



treatment arises as soon as they see the instrument or just think about it. For most people, the instrument does not look like what it is intended for. The feel qualities are described as tool-like, rough and hard. The survey and paper show that there is potential for improvement, particularly in the shape and material.

## 5.2 Realistic Possibilities and Challenges of Redesigning the Speculum

The survey of patients showed that for almost all respondents, adapting the material would significantly improve the examination experience. Accordingly, there is a lot of potential in a redesign.

What was not asked in the survey was whether the current instrument could be used in a different way to create a more pleasant experience. People have already dealt explicitly with these questions before and conducted studies. The result was that the comfort of the person being examined can be increased by offering them the opportunity to insert the speculum themselves. The improvement in the examination experience increased significantly (Wright et al., 2004). That study has shown that it's not just the insertion itself that impacts the overall examination experience; the way the examination is explained is decisive for many patients. For instance, one participant mentioned:

“Everything was explained very well to me... so I understood. I was more involved in the process; it took the mystery out of it for me.” (Wright et al., 2004)

Regarding self-insertion, participants were informed about how the instrument should be inserted, after which they were given a moment to do it themselves. According to Table 9 of the study, 95% (126 out of 132 individuals) of the participants successfully inserted the speculum on their own. Additionally, 54% of them positioned the speculum in such a way that the doctor didn't need to make any adjustments. This aspect is significant as efficient time management is often crucial in medical settings. Concerns from some practices regarding the potential for self-insertion to prolong the examination were alleviated by the evaluation of the collected data post-study (Wright et al., 2004).

Another study examined in detail what constitutes sensitive language in the examination environment. Statements such as “watch out, it might hurt soon” or “it might pinch a little” are familiar to most people during examinations with the speculum. This study investigated what this response and “forewarning” does to the people examined. The conclusion was that the announcement exacerbates the perception and is therefore counterproductive (Carugno et al., 2020). The possibilities for redesigning the speculum seem obvious, but what challenges might be hidden here? The need for more sensitive instruments must be seen by the “right” people, i.e. doctors and the industry. This will only happen if there is an awareness of this issue and it is addressed.

Not only the instrument is supposed to be redesigned, but there also has to be a rethinking and listening process in the specialist areas concerned. Without rethinking and recognizing the need, it will seem unnecessary to many to replace an instrument that works “so well” (for the treating specialist staff).

Factors that also influence a redesign are the cost, the reprocessing of the instrument and the handling for the practitioners, as the current speculum is very efficient in this aspect. In addition, there are strict requirements that must be adhered to and provide a very strong framework for the design.

In order to get an overview of what instruments are currently available and on what is worked on, what competing factors need to be included and what the market has and has not accepted, the following section analyses the market and shows three directions of the market's state of the art.

Some deal with a redesign and reinterpretation of the experience for the person being treated, like Yona Care. They experiment with silicone to cover the metal surface (see table below). In addition to the redesign, Yona Care sets their focus on communication and education. Yona Care, as a comprehensive concept, seeks to enhance the examination experience for both patients and doctors. An accompanying

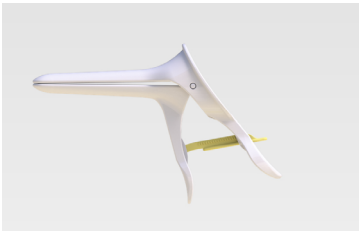


app facilitates preparation for the examination and enables the recording of essential information required beforehand. This data is then transmitted to the attending practice, allowing to increase interpersonal interaction during the examination.

The primary focus lies in adequately preparing patients to ensure their experience is as comfortable as possible. It's worth noting that Yona Care is still in its early stages of development and is not yet available on the market.

Some other speculums are made entirely of plastic. The plastic version is intended as a disposable product, which means lower costs for clinics and large practices, this is what the Orchid Speculum is made for (see table below).

However, these variants are still strongly oriented towards the shape of the speculum. The only new design, by Veda Scope is highly technologized, so the product is still in its infancy, as it is very cost-intensive to manufacture and purchase (see table below).

Table 1. Market Analysis of three different Approaches for a Redesign.

Product	Design/ Look/Source	Improvement (compared to the recently used tool)
Bridea Medical Orchid Speculum	 ( <a href="https://www.brideamedical.com">https://www.brideamedical.com</a> ) (10.01.2024)	Disposable, which leads to cost efficiency compared to the metal speculum, plastic is less cold than metal (more comfortable for patients), rounding edges to not pinch the tissue
Yona Care	 ( <a href="https://yonacare.com/">https://yonacare.com/</a> ) (10.01.2024)	Metal covered with silicone to make it less cold, this product deals more with the education and preparation before the exam happens, an App is available that guides through the exam
Veda Scope	 ( <a href="https://doi.org/10.1111/j.1479-828X.2004.00180.x">https://doi.org/10.1111/j.1479-828X.2004.00180.x</a> ) ( <a href="https://www.vedascope.com.au/">https://www.vedascope.com.au/</a> ) (10.01.2024)	Completely different look, it's supposed to be inflated inside the vagina which makes the spreading mechanism more comfortable, it's made from plastics so it's less cold, it's very cost- intensive, due to the technology

To put the development of the speculum in perspective, we compare its development with that of a medical instrument from another field. The compared instrument originates from dentistry and orthodontics and is used to take imprints of teeth. This instrument was chosen for the comparison because the basic design of the instrument is similarly simple to that of the speculum. A steel splint and alginate impression compound (dough-like mass) are used for the imprint. This method is inexpensive to use and prepare and is also durable and efficient due to the material, similar to the speculum. In contrast to the speculum, this splint is used neutrally for all people; there is no gender-specific design. This neutrality of the instrument and the field of dentistry, in general, means that it is a much less intimate and stigmatized environment in which the instrument is used. Another point of differentiation is that the speculum is used on everyone with a vagina as it is part of the check-up. In contrast, the splint is only used in dentistry when necessary and is not part of the regular examination equipment. The development that has taken place here over the last 10 years is the biggest difference. The instrument has been completely renewed in its design and equipped with new technology to optimize the examination experience for patients. The new instrument, the “3D intraoral scanner,” makes it possible to take images of the teeth directly in the oral cavity and assemble them three-dimensionally on a screen in real time.

A discussion with an orthodontist revealed that the introduction of this scanner was initially associated with some challenges - such as learning how to use it and transfer the images to the corresponding program, as well as the frequent need for replacement parts. Despite this, the feedback was largely positive. The greater complexity and higher acquisition costs compared to the traditional method were justified by the increased comfort for the people examined.

This comparison should make us think. If innovative solutions can be used successfully in other areas, such as dentistry, why are there not similar advances in gynaecology? This question led to a critical reflection on the differences between medical specialties and the underlying social dynamics. The stigmatization and taboo of gynaecological examination were identified as potential barriers to innovation in this field. However, the comparison also encouraged breaking the stigma and developing new solutions that could not only improve comfort but also help to overcome outdated ways of thinking. Given these findings, the aim of this work was more clearly defined: The need to promote innovative solutions in gynaecology that not only improve comfort but could also help to overcome stigma and promote a more sensitive approach to the topic. This could help people with vaginas feel better understood and heard in the healthcare system.

## 6. Conclusion

### 6.1 Summary of the Results

The analysis showed that a redesign of the speculum should be characterized by the need to improve the examination experience, which was elaborated in chapter 5.2 with the help of studies. On the other hand, the design should be characterized by the destigmatization of the female body. This can happen at the level of the examination itself, through sensitization of the staff, but should also be achieved through a new and improved design. This frees itself from its ethically difficult background and thus demonstrates an openness and awareness of the needs of the persons to be treated.

### 6.2 Possible Implications for the Design and Application of the Speculum

These findings should be reflected in some way in the redefinition of the instrument. The form of the speculum should be designed inclusively, drawing inspiration from outside design fields where comfort and people's needs are more central to the design process. In order to improve the comfort of the investigation and to satisfy any autonomy needs, the study: "Speculum 'self-insertion': a pilot study" on the self-insertion of the speculum can be taken into account and elements from it incorporated into the redesign. The redesign should take place as a co-creation and be based heavily on user feedback to meet the needs of the people who will ultimately be affected.

New methods can be devised to eliminate the need for the opening of the instrument. Various technical options, such as cameras, can be included at this point. The materiality of the product should also be reconsidered and, at best, be replaced. There are many aspects that should be emphasized in the design process, but above all, there is still a lot that needs to be researched in this area of the healthcare sector.

### 6.3 Outlook

In the subsequent practical part of the work, a concept will be developed that meets many of the identified needs. There will be further surveys and own studies in which the first prototypes of a new instrument will be tested. The feasibility and regulations for products in the healthcare sector will be addressed and the design of the product will be finalized on this basis. In addition to the tool, a guide to gender-sensitive and gender-specific design will be developed to raise awareness on this topic. This guide is intended to help identify insensitive design more quickly and adapt it efficiently.

## Attachment

Interview (German):



Survey (German):



## References

Baker, P. (1999). Soranus and the Pompeii speculum: The sociology of gynaecology and Roman perceptions of the female body. *Theoretical Roman Archaeology Journal*, 0(1998), 141–150.  
[https://doi.org/10.16995/trac1998\\_141\\_150](https://doi.org/10.16995/trac1998_141_150)

Barad, D. (2021, March). Allgemeine gynäkologische Untersuchung [General gynaecological exams]. MSD Manual Profi-Ausgabe. Retrieved January 20, 2024, from  
<https://www.msdmanuals.com/de/profi/gyn%C3%A4kologie-und-geburtshilfe/untersuchung-der-gyn%C3%A4kologischen-patientin>

Blackstone, A. M. (2003). Gender roles and society. *Human Ecology: An Encyclopedia of Children, Families, Communities, and Environments*, 335–338. [https://digitalcommons.library.umaine.edu/soc\\_facpub](https://digitalcommons.library.umaine.edu/soc_facpub)

Bouquet, J. M., Naji, R., Armas, C., Roldan, V., Selkhi, S., Bentley, C., Zapata, I., & Fisher, J. (2023). An innovative design for the vaginal speculum. *Medical Devices: Evidence and Research*, 16, 211–218.  
<https://doi.org/10.2147/MDER.S415558>

Bridea Medical Orchid Speculum. (n.d.). Bridea Medical. Retrieved from <https://www.orchid-spec.com/>

Butler, J. (1991). *Das Unbehagen der Geschlechter. Gender Studies. Vom Unterschied der Geschlechter* [Gender trouble: Feminism and the subversion of identity]. Suhrkamp.

Carugno, J., Timmons, D., Lederer, M., & Grady, M. M. (2020). Impact of using words with unpleasant emotional connotations on perceived patient discomfort during vaginal speculum examinations: A randomized controlled trial. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, 247, 203–206. <https://doi.org/10.1016/j.ejogrb.2020.02.034>

Falco, L. (2021). *Go figure!: The astonishing science of the female body*. Clink Street Publishing.



Gildemeister, R. (2009). Doing gender: Soziale Praktiken der Geschlechterunterscheidung [Doing gender: Social practices of gender differentiation]. In M. Bauhardt & C. von Braun (Eds.), *Handbuch Frauen- und Geschlechterforschung* (pp. 137–145). VS Verlag für Sozialwissenschaften. <https://doi.org/10.1007/978-3-531-91972-0>

Gründe für Stigmatisierung [Reasons for stigmatization]. (n.d.). Retrieved February 10, 2024, from <https://www.therapie.de/psyche/info/ratgeber/lebenshilfe-artikel/stigmatisierung/ursachen/>

Heinsohn, D. (2000). Thermodynamik und Geschlechterdynamik um 1900 [Thermodynamics and gender dynamics around 1900]. *Feministische Studien*, 18(1), 52–68. <https://doi.org/10.1515/fs-2000-0106>

Heinsohn, G., & Steiger, O. (1987). Warum mußte das Speculum zweimal erfunden werden? [Why did the speculum have to be invented twice?]. *Kritische Justiz*, 20(2), 200–207. <https://www.jstor.org/stable/23996427>

Hülst, D. (1999). Symbol und soziologische Symboltheorie. In *VS Verlag für Sozialwissenschaften eBooks*. <https://doi.org/10.1007/978-3-322-99876-7>

Jackson, P. L., Meltzoff, A. N., & Decety, J. (2005). How do we perceive the pain of others? A window into the neural processes involved in empathy. *NeuroImage*, 24(3), 771–779. <https://doi.org/10.1016/j.neuroimage.2004.09.006>

Jung, L. (2023, October 30). Vagina (Scheide) [Vagina]. Kenhub. Retrieved January 15, 2024, from <https://www.kenhub.com/de/library/anatomie/vagina-scheide>

Kennan, C. (2019, March 14). Mistaken identity: Elizabeth Burley and the Contagious Diseases Acts. *The National Archives Blog*. Retrieved January 5, 2024, from <https://blog.nationalarchives.gov.uk/mistaken-identity-elizabeth-burley-and-the-contagious-diseases-acts/>

Ojanuga, D. (1993). The medical ethics of the “father of gynaecology”, Dr J Marion Sims. *Journal of Medical Ethics*, 19(1), 28–31. <https://doi.org/10.1136/jme.19.1.28>

Palsgaard, P., Yerrabelli, R. S., Hojati, A., & Whitmore, E. (2022). Using a condom or glove to improve pelvic exam visualization: A guide. *SAGE Open Medicine*, 10, 205031212211460. <https://doi.org/10.1177/20503121221146069>

Pardes, A. (2017, October 5). The speculum finally gets a modern redesign. *Wired*. Retrieved January 10, 2024, from <https://www.wired.com/story/the-speculum-finally-gets-a-modern-redesign/>

Pauli, A., & Hornberg, C. (2008). Gesundheit und Krankheit: Ursachen und Erklärungsansätze aus der Gender-Perspektive [Health and illness: Causes and explanations from a gender perspective]. In *VS Verlag für Sozialwissenschaften eBooks* (pp. 623–635). [https://doi.org/10.1007/978-3-531-91972-0\\_73](https://doi.org/10.1007/978-3-531-91972-0_73)

Pérez, R. A. A., Rodríguez, M. F. L., Órtiz, S. R., Reyes, K. A. S., & Acosta, J. M. (2021). A comparison of two techniques for vaginal speculum placement to reduce patient pain. *International Journal of Gynecology & Obstetrics*, 155(1), 158–159. <https://doi.org/10.1002/ijgo.13801>

Sardesai, R. (2023). *An ethical case for a new speculum* (Master's thesis). Johns Hopkins University.

Schollmeyer, T., & Schollmeyer, M. (n.d.). Geschichte der Endoskopie I [History of endoscopy I]. Retrieved January 12, 2024, from <https://www.ag-endoskopie.de/geschichte-der-endoskopie-i>

Seehusen, D. A., Johnson, D. R., Earwood, J. S., Sethuraman, S. N., Cornali, J., Gillespie, K., Doria, M., Farnell, E., & Lanham, J. (2006). Improving women's experience during speculum examinations at routine gynaecological visits: Randomised clinical trial. *BMJ*, 333(7560), 171. <https://doi.org/10.1136/bmj.38888.588519.55>

Spekulum [Speculum]. (n.d.). *Bionity.com*. Retrieved January 20, 2024, from <https://www.bionity.com/de/lexikon/Spekulum>

Spekulum aus Holz [Wooden speculum]. (n.d.). Retrieved January 8, 2024, from <https://muvs.org/de/abbruch/instrumente/spekulum-aus-holz-id3042/>

Wright, D., Fenwick, J., Stephenson, P., & Monterosso, L. (2005). Speculum 'self-insertion': A pilot study. *Journal of Clinical Nursing*, 14(5), 1098–1111. <https://doi.org/10.1111/j.1365-2702.2005.01197.x>

#### About the Author:

**Victoria Juretko** completed her Master's degree in Industrial Design with the development of the product discussed in this paper. The product is intended to be further developed to enhance patient well-being. Her primary interest lies in female healthcare, particularly in stigmatized areas.

# P / REFERENCES OF DESIGN

**This contribution was presented at Cumulus Budapest 2024: P/References of Design conference, hosted by the Moholy-Nagy University of Art and Design Budapest, Hungary between May 15-17, 2024.**

## **Conference Website**

[cumulusbudapest2024.mome.hu](https://cumulusbudapest2024.mome.hu)

## **Conference Tracks**

Centres and Peripheries  
Converging Bodies of Knowledge  
Redefining Data Boundaries  
Bridging Design and Economics  
Speculative Perspectives  
The Power of Immersion  
The Future of Well-being  
Taming Entropy: Systems Design for Climate and Change  
Ways of Living Together  
Cumulus PhD Network

## **Full Conference Proceedings**

<https://cumulusbudapest2024.mome.hu/proceedings>

ISBN Volume 1: 978-952-7549-02-5 (PDF)

ISBN Volume 2: 978-952-7549-03-2 (PDF)

DOI Volume 1: <https://doi.org/10.63442/IZUP8898>

DOI Volume 2: <https://doi.org/10.63442/TADX4016>

## **Conference Organisers**

Moholy-Nagy University of Art and Design Budapest (MOME)

[mome.hu](https://mome.hu)

Cumulus Association

[cumulusassociation.org](https://cumulusassociation.org)