The Sex of Knowledge: Sexuated and Gendered Anatomy[1]

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Summary

This contribution explores the question whether the human body, such as it is currently taught in anatomy in France, should be regarded as sexuated and gendered. The author works as an ophthalmologist and teaches general anatomy at the University Paris Diderot – Paris VII, and in that capacity her purview is the science of the body, from tip to toe, a constellation which in this form is not very common in France. The article's point of departure is an US-American study by Lawrence and Bendixen (1992) 'His and Hers: Male and Female Anatomy in Anatomy Texts for U.S. Medical Students, 1890-1989'. This study primarily serves to raise the question which body is seen as reference for anatomy as taught in France today. The current teaching situation is discussed in the second part of the contribution.[2]

Results of the Study by Lawrence & Bendixen (1992) on Female and Male Anatomy

The conclusions of this article are clear: the human body is male. The female body is discovered via an opposition, in most cases to the its disadvantage. This contribution critically assesses the standard anatomy textbooks usually used in medical studies in France. Like many of the author's colleagues (with very few female colleagues among them), she also had no choice:

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1 | Original version in French.

2 | For technical reasons of reproduction, the illustrations in the present contribution were partly selected from German sources, since the originals presented in the paper were not reproducible. The new selection closely follows the original material in consultation with the author and underscores the statements of the text. Also note that the contribution follows the paper 'The sex of knowledge' ('Geschlecht des Wissens') presented by the author at the conference "Gender Normativity and its Effects on Childhood and Adolescence" ('Geschlechternormativität und Effekte für Kindheit und Adoleszenz') held in Luxembourg on 28 September 2012 and therefore dispenses with a detailed indication of sources.

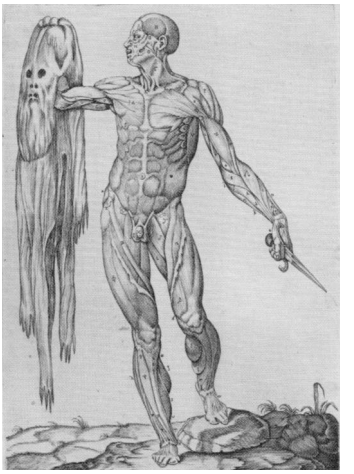

Figure 1: Hierarchization of the sexes from: Hier freut sich der Tod, dem Leben zu helfen. Anatomie in Heidelberg gestern und heute. In: Schriften der Universitätsbibliothek Heidelberg, vol. 13. Effinger/Kirsch (Eds.) (2013), Heidelberg: Universitätsverlag Winter, p. 139.

The basic model of the human body that she could present to the future doctors was inevitably male. This contribution will first give a brief historical overview of the modalities of the study of anatomy, followed by a number of examples from the textbooks used in teaching, first dealing with the representation of non-sexuated/non-gendered parts of the body like the head or limbs and subsequently with clearly sexuated/gendered parts of the body such as chest and perineum. The article, which was written by a curious anatomist, concludes with a number of practical applications.

The study by Lawrence & Bendixen (1992) analyzed a total of 31 books.

Title	Year of publication	Author	Edition
Gray's Anatomy	1893	Pick	13.
Morris's Human Anatomy	1907	Morris et al.	4.
Quain's Elements of Anatoy	1908	Schäfer et al.	11.
Human Anatomy	1923	Piersol	8.
Cunningham's Textbook of Anatomy	1937	Brash et al.	7.
A Method of Anatomy	1948	Grant	4.
A Method of Anatomy	1952	Grant	5.
Morris's Human Anatomy	1953	Schaeffer	11.
Gray's Anatomy	1954	Goss	26.
Concise Anatomy	1956	Edwards	2.
Anatomy of the Human Body	1959	Lockhart et al.	1.

Title	Year of publication	Author	Edition
Anatomy: A regional Study	1960	Gardner et al.	1.
Essentials of Human Anatomy	1961	Woodburne	2.
Anatomy: A regional Study	1963	Gardner et al.	2.
Grant's Method of Anatomy	1965	Grant, Basmajian	7.
A Textbook of Human Anatomy	1966	Crafts	1.
Reconstructive Anatomy	1968	Arnold	1
Essentials of Human Anatomy	1969	Woodburne	4.
Basic Human Anatomy	1972	Tobin	1.
Synopsis of Gross Anatomy	1972	Christiansen	2.
Clinical Anatomy for Medical Students	1973	Snell	1.
Textbook of Anatomy	1974	Hollinshead	3.
A Textbook of Human Anatomy	1979	Crafts	1.
Clinical Anatomy for Medical Students	1981	Snell	2.
An Introduction for Human Anatomy	1981	Green, Silver	1.
Anatomy as a Basis for Clinical Medicine	1985	Hall-Craggs	1.
Clinical orientated Anatomy	1985	Moore	2.
Essential Anatomy	1987	Lumly et al.	4.
Clinical Anatomy	1989	Lindner	1.

Table 1: Overview of the anatomy textbooks reviewed by Lawrence & Bendixen; information on the edition refers to the one analyzed in the study.

The selected chapters from each of the textbooks discuss parts of the body which are regarded as relevant for a sex/gender-related analysis, such as thorax, pelvis or the perineum. The analysis shows the following:

1. The sex depicted in the illustrations is male twice as often as it is female. Gender-neutral figures (in French: 'représentations asexuées' are also depicted.
2. A comparison shows that the descriptions of the male anatomy occupy twice as much space as those of the female. For example, the description of the dorsal nerve of the penis comprises ten lines, while the dorsal nerve of the clitoris is given two lines.
3. The oppositions are always made from the man to the woman, or the woman is added in parentheses. For instance, in the homology of penis and clitoris or scrotum and external labia, a detailed description of the external labia is eschewed. The two body parts are thus ultimately regarded as the

same. In another homology the woman is presented as an inferior man: "Imagine that [...] the male perineum is divided longitudinally." The student is expected to discover the female perineum on the basis of a male body with "slight changes".

4. The terms used are likewise not neutral: the descriptions are generically masculine, the female terms are added in parentheses. Thus, we find the term 'testicles' in the continuous text and 'ovaries' in parentheses. The adjectives used towards the end of the oppositions always describe the parts of the female anatomy as comparable to the male ones, but also always as less: less big, less developed etc.
5. In addition, there are almost absurd phrasings using supposedly unisex terms: In newborns, the peritoneum supposedly extends to the base of the prostate. The peritoneum is a serous membrane that covers the organs inside the abdomen and the pelvis. It is evident that the peritoneum of the woman does not extend to the prostate. A further example is that of the inguinal canal which leads to the external sexual organs, and which is depicted as the result of the descent of the testes. This is wrong in 50% of the cases. It is nevertheless the accepted definition.

In summary one can say that

- in comparisons the male occurs significantly more frequently than the female;
- this conclusion holds true regardless of the historical periods under review;
- in illustrations the ratio male to female is 2:1;
- male linguistic forms dominate in the text;
- the depiction of gender-neutral facts such as muscles or nerves are embedded in male silhouettes and are fashioned with a penis as well.

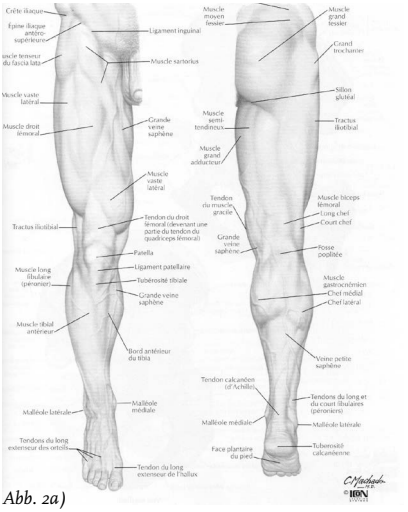

Abb. 2a)

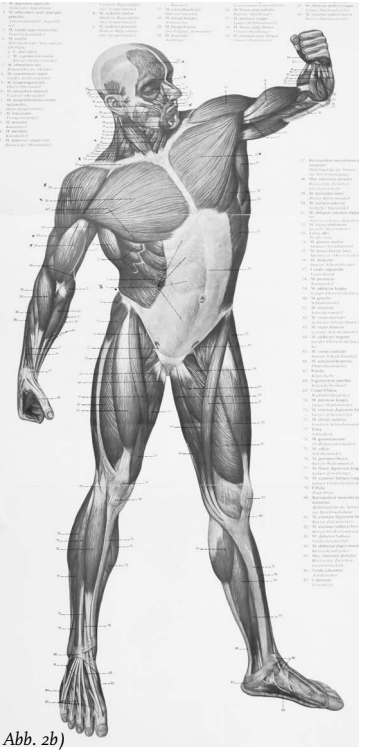

Abb. 2b)

Figure 2: Examples from the surface anatomy: lower leg (2a) Netter (2004: 467) and muscular system, frontal view (2b) Schadé (1973: 54-56).

Concepts of the male and female body in anatomy textbooks

Two standard models dominate the scientific canon. On the one hand, until the 17th century we can find a hierarchized, very classical model with a generally similar anatomical and physiological structure. The human body however is male, the woman is depicted as an incomplete, vestigial man. The reference is the male body, this is not even a point of debate. The woman is depicted in a negative comparison to the man. This notion is considered absolutely natural. The woman as a man whose organs lie inside the body: the vagina is the penis, the uterus the scrotum. The clitoris is not mentioned, since it supposedly has no function. An explanation could be that the study of anatomy was primarily conducted on the male body and that it was and still is a strongly male-dominated discipline. On the other hand, we can distinguish from the late 17th century onwards a more differentiated model in which the female body appears even though it is still represented as being of a different kind of essence. From these anatomical models, other functions are deduced. The male body, equipped for

social life, art and science, is contrasted with the female body, soft, sensitive and adjusted to domestic life and family. The only area in which the woman for a long time occupied the first place is the size of the pelvis, although this notion has by now been disproved by current studies (Peyre 2012). These observations are based on the author's review of the following anatomy textbooks used in France:

Title	Year of publication	Author
Anatomie artistique de l'homme	1973	Barcsay, J.
Anatomie	1979	Gardner, E., Gray, D. J., O'Rahilly, R.
An introduction to human anatomy	1981	Green, J. H., Silver, P. H. S.
Anatomie humaine en fiches	1985	Cabrol, C.
Répertoire illustré d'anatomie humaine	1986	Feineis, H.
Traité d'anatomie artistique	1988	Richter, P.
Anatomie parle mouvement	1989	Calais-Germain, B.
Atlas of Human Cross-Sectionnal Anatomy	1990	Cahill, D. R., Orland, M. J., Reading, C. C.
Anatomie topographique, descriptive et fonctionnelle	1991	Bouchet, A., Cuilleret, J.
Anatomie et physiologie humaine	1993	Marieb, E. N.
Human Anatomy	1994	Rohen, J. W., Yokochi, C.
Atlas anatomique Sandoz : tête et cou, tronc, membres	1994	Sandoz
Anatomie générale	1995	Chevrel, J. P.
Gray's Anatomy	1995	Gray, H. u.a.
Grand cours d'anatomie artistique	1996	Szunyoghy, A., Feher, G.
Photographic atlas of practical anatomy	1997	Thiel, W.
Atlas en couleur d'anatomie humaine	1998	Abrahams, P. H. et al.
Petit atlas d'anatomie	1999	Kamina, P.
Nomenclature anatomique illustrée	1999	Delmas, V.
Anatomie humaine	2002	Rouvière, H., Delmas, A.
Surface anatomy	2002	Lumley, J. S. P.
Atlas de neuroscience humaines de Netter	2003	Felten, D.
Biomécanique fonctionnelle. Membres – Tête – Tronc	2005	Dufour, M., Pillu, M.
Atlas de poche d'anatomie	2007	Platzer, W.
Atlas of human anatomy and surgery	2007	Bougery, J. M.
Anatomie générale PCEM 1	2008	Delmas, V.

Table 2: Overview of the textbooks reviewed by the author.

In the following, some examples that illustrate the different perspective on bodies attributed as female or male will be discussed:

The male pelvis is usually depicted as smaller than the female one, connecting the latter to the childbearing function of the female body. The vascularization of the organs on the other hand is explained systematically using the male body. In a classical American atlas of neuroscience by Netter (Felten 2003), the innervation of the pelvis through the hypogastric plexus is also explained using the male body, while the pelvis of the woman is depicted as a deviation. The urethra is first depicted in the male and then in the female body. The same applies for the bladder.

To which degree this gender-discriminating visual representation is also reflected in the area of language will be discussed briefly using a number of examples: The abdominal cavity is considered completely separated from its external environment, except for in the female body. Actually, 50% of the ovaries are located inside the abdominal cavity, which is of particular significance for certain diseases such as ovarian cancer which can metastasize in the abdominal cavity. The expression except for is therefore misplaced. "Regarding the gonads the peritoneum displays a very different behavior. During its movement through the inguinal canal the testes remain surrounded by the peritoneum. The process that can be observed in the female gonads is completely different." The reference here are the testes which indeed move, while the ovary remains inside the abdomen and is regarded as completely different. "[...] the pelvis, due to the reproductive function attributed to it, [...]". What kind of determinism is attributed to the female pelvis? What function does the female pelvis serve? The hypothesis that it serves childbirth has been disproven by current studies on the size of the female pelvis. In an anatomy atlas with illustrations of anatomical cross-sections, a sagittal section of the female pelvis is accompanied by the comment: "The small pelvis [supposedly contains] the anatomical symbols of life and of death." The chapter entitled 'The Perineum' of an atlas of descriptive topography by Bouchet und Cuilleret (1991) features a male perineum with the description "region where the scrotum is located", without mentioning or describing the female perineum. Elsewhere in the volume, the upper part of the page shows a male perineum, the lower part a female perineum. In the introduction to the anatomy atlas Gray's Anatomy it says: "The perineum contains the external genitalia and external openings of the genitourinary and gastrointestinal systems."[3] The female urogenital region is displayed first, while in the text the penis is

3 | Drake, R. L., Vogl, A. W., Mitchell, A. W. M. (2015): Gray's Anatomy for Students. Third Edition. Pelvis and Perineum. Oxford: Churchill Livingstone/Elsevier. URL: http://www.hopkinsmedicine.org/mcp/Education/300.713%20Lectures/2014/Byung_Kang_Pelvis_09.15.2014.pdf [16.07.2015].

discussed before the clitoris. Frequently the male urinary tract is depicted before the female one. Only a few works maintain the equality of women and men by showing a bisected perineum, one side representing the male, the other the female. Highly illustrated works covering the complete male and female anatomy also only rarely feature illustrations of the female perineum or the female breast. Kamina (1999) shows only patterns of male body hair. According to a definition from Le Tronc (the abdomen) by J. P. Chevrel et al. (1995), the mammary gland and the breast are "the most-studied parts of the female body." The description however begins with the man and the child, accompanied by adjectival connotations regarding the description of the different shapes of the female breast: "pointed, conic, pear-shaped, sagging."

What is the purpose of these differences in the observation and description of physical features that are connoted as female or male? It seems that this is not discussed, as if it were normal. Let us take a look at embryology: in the embryology of the exterior sex-related organs the development of female organs occurs for all embryos in the course of the third month. The clitoris develops from the genital tubercle, the urogenital tract remains open, and the labia majora develop from the genital swellings. In the then possibly developing male sex-related organs the genital tubercle elongates, the genital swellings condense and the structures grow together to the scrotal raphe. The female phenotype thus precedes the male.

The circumference of the waist is understood as a secondary sex-related feature and is also used to identify overweight. In a textbook on functional bio-mechanics (Dufour/Pillu 2005) the waist circumference or the waist has become a psychologized separation between top and bottom. In Georges Brassens' song Venus Callipyge,[4] the waist even becomes the neck of the pelvis, whose measures constitute an identity feature that is sufficiently discussed in women's magazines: "Your back loses its name with such good grace / that one can't help agreeing with it." (in French: "Votre dos perd son nom avec si bonne grâce // Qu'on ne peut s'empêcher de lui donner raison.") Fat and fatty tissue is generally not sufficiently considered. As a rule, only its hormonal significance in the context of some disorders such as HIV is mentioned. It is not until their first dissections that medical students discover how ubiquitous fat is in the human body.

It remains to be considered whether there is such a thing as the perfect body. We are led to believe it when we think of the drawings of Leonardo da Vinci. In anatomy, points of reference, perfect proportions continue to be studied and measured on the male body.

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4 | Brassens, G. (2012): Venus Callipyge. URL: http://www.youtube.com/watch?v=vZM7WiW9WBo [19.12.2013].

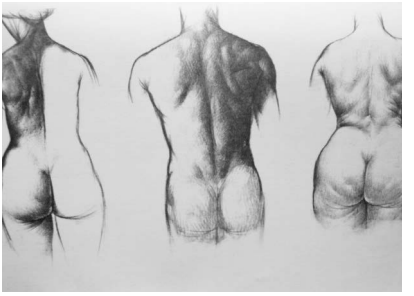


Figure 3: Male torso as reference. In: Barcsay, J. (1973): Anatomie artistique de l'homme.

In anatomical art books, for instance, beauty ideals are placed in an androcentric focus. Often the male torso is depicted between two female ones as if it were the model torso shown between two others, who have attractive, but apparently less significant features (Barcsay 1963).

In a textbook on functional bio-mechanics (Dufour/Pillu 2005), body posture is sexed/gendered through depiction and description. The functional bio-mechanics point to a self-assured posture in the man.

A male back also serves for the depiction of epidural anesthesia, where the nerve endings in the lumbar region are anesthetized. What is not mentioned is that this anesthetic method is common practice for pain relief during labor.

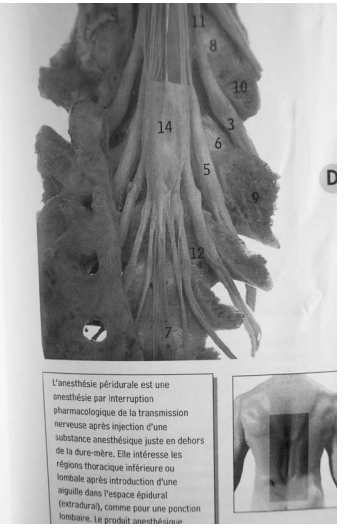


Figure 4: Explanation of epidural anesthesia using a male torso.

If, as mentioned above, there is a link between the waist and the measurement of overweight, then we find a further gendering of the issue of overweight in connection with the circumference of the thorax. "A too large circumference of the thorax can lead to a thoracic kyphosis."[5] "There are two forms of hernia,[6] minor hernias in younger people and major hernias in older, overweight or multiparous women." When the inguinal region is described using the male anatomy, the following comment clearly reflects a discrimination of the female body: "[...], in the woman it (the inguinal region) is a source of malformations, hernias etc." Aging is also represented in a gender-discriminating way when we read: "The first phase is marked by falling hor-

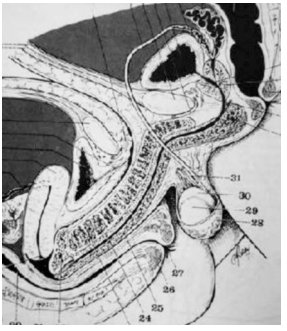
5 | An outward (convex) curvature of the spine.

6 | A hernia is the exit of an organ, such as the bowel, through the wall of the cavity in which it normally resides.

mone levels and proceeds in the man without any serious changes, while the woman suffers from osteoporosis, overweight as well as physical and psychological adynamia." Contrary to a 19th century study according to which the female brain weighs 150 grams less than the male owing to the weak development of its frontal, parietal and occipital lobes and the cerebral cortex, there are no current studies that could prove a gender-specific difference of the brain that can be considered beyond doubt as predetermined by nature. (Vidal/Benoit-Browaeys 2005: 15).

Conclusion

If this brief overview has shown to what extent sex/gender stereotypes are still present in anatomy, then let me conclude with a last example that illustrates how much this discipline, which primarily works with descriptive techniques, serves as a projection surface for gender models.



In Bouchet and Cuilleret (1991) we find the following depiction of a "cross-section of the pelvis and the perineum of the man and the woman during sexual intercourse". As a rule, however, anatomical depictions are based on cross-sections of frozen and dissected tissue. This representation is therefore the depiction of an imagined cross-section.

Figure 5: Drawn cross-section of the pelvis and the perineum of the man and the woman during sexual intercourse (from Bouchet/Cuilleret 1991).

In conclusion I should point out that this article is the result of a self-critical reflection of an anatomy lecturer. In studying the issue, the author became aware of the problem and of the fact that for a long time in the course of her medical teaching, she completely unconsciously and inadvertently transmitted stereotype gender models and thus also the still predominant gender hierarchy. After detailed debates with colleagues, this paper aims to sensitize lecturers, students and the editors of medical textbooks for recognizing the naturalizing conformism of this stereotype representation of anatomy and for ultimately avoiding it.

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