The Fabric of the Body: Textile in Anatomical Models and Preparations, ca. 1700-1900

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Numerous anatomical preparations, models, and medical moulages from the eighteenth and nineteenth centuries are dressed with textile bandages, but sometimes also with real sleeves, pants, collars and hats, or they rest on cushions. Some of these textiles are no more than a rough piece of linen, others are elaborately decorated with lace and ruffles. In waxes, the “textile” sometimes is not real textile, but a representation in wax. These additions raise questions about why anatomists started adding textiles or representations thereof to preparations and models, and why this habit seems to have largely disappeared in the course of the nineteenth century. I argue that although all use of textiles in eighteenth- and nineteenth-century anatomy basically stems from the same strategic consideration, the aim of these textile-clad objects changed in the course of this period, and the textiles employed changed accordingly. Moreover, I will show how changing local fashions influenced the use of textile in anatomy. After an initial note on the ontology of anatomical models and preparations, I will outline the use of textiles in anatomical preparations and anatomical models from the eighteenth century. Subsequently I will discuss the developments in anatomical practice that led to the changes and eventual disappearance of textiles in anatomy.

A note on models and preparations
At first sight, it may seem strange to compare anatomical preparations to anatomical models, as the former are human bodies, whereas the latter represent them. However, we should keep in mind that anatomical preparations are never just bodies; there is no such thing as an unadorned anatomical preparation. A preparation
– or any other man-made or object adapted by humans – always reflects cultural assumptions, and is thus inextricably connected to particular people and places. As Rheinberger pointed out, an anatomical preparation is a very particular object because it simultaneously is what it represents; its meaning thus stems from, and transcends, its materiality. Take a preparation of an arm versus an anatomical model of an arm. Although both represent an arm, only the preparation actually is an arm. In the case of the preparation, its meaning both stems from and transcends its materiality, whereas in the case of the model, its meaning does not stem from its materiality, but from its form. Anatomical preparations, as the name implies, have been carefully selected and prepared; they have been cleaned, crafted, framed. They are the pars pro toto, a selected specimen that represents a category – in this sense, they are models. Especially eighteenth-century anatomical preparations, which are often of normal human anatomy, selected because they were thought to represent the ideal human body, can be said to be models. Anatomical preparations are things that accurately resemble or represent something else, or things that are the likeness of something else; namely dead bodies and body parts that resemble, represent, are the likeness of healthy bodies and body parts. As I will show in this paper, the use of textiles in both anatomical preparations and models plays an important role in realising this resemblance and representation. Yet there is more to textiles in anatomy than that.

**Textiles in preparations**

From the sixteenth century, research and teaching of human anatomy became increasingly important in European universities. As human bodies for dissection were scarce and human tissue perishes quickly, this led to a search for methods to preserve human bodies so they could be used to demonstrate discoveries and as teaching aids. By the late seventeenth century, a group of learned men from the northern Netherlands had developed a number of techniques to make lasting wet preparations of human anatomy: injections of wax mixtures and preservation fluids.

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3 OED online, 2012: Model: “Something which accurately resembles or represents something else, esp. on a small scale; a person or thing that is the likeness of another”.

The man who employed these techniques most successfully was probably the Amsterdam apothecary and anatomist Frederik Ruysch (1638-1731). Ruysch frequently decorated his preparations with textiles, such as this lower leg of a child stepping on a scorpion.

As virtually all seventeenth-century anatomical collections, theatres and illustrations, Ruysch’s collection not only served to teach human anatomy, it was full of allegorical references to the greatness of God and his creations, and to the transience of human life. Seventeenth-century anatomical theatres, demonstrations, handbooks and preparations were simultaneously moral lessons about the mortality of man. Even textile in anatomical preparations occasionally served a moral purpose, as Gijsbert de Roemer pointed out in a 2009 article. De Roemer shows that a reference by Ruysch to Psalm 139 indicates that he thought of his preparations as combinations of man-made and God-made fabric. In the Dutch standard protestant Bible translation of 1637, Psalm 139, verse 15 reads: “My bones were not hidden from you, when I was made in hidden places, and was wrought as embroidery in the depths of the earth”.

Ruysch indeed created a number of preparations in which pieces of preserved human tissue are clear stand-ins for embroidery, such as when he puts a square of it in the hand of the skeleton of a fœtus that holds it up to its eyes as a handkerchief. In the accompanying catalogue text, he only referred to the Psalm number, taking it to be common knowledge among his audience. Yet the iconographic function of the handkerchiefs held by the skeletons is different from that of lace-rimmed sleeves and collars covering stumps. Whereas the “handkerchiefs” are human tissue referring to, or representing man-made tissue, the latter are artificial textiles not representing or referring to human tissue. These covers are what they represent: textile, clothing. This is confirmed by the fact that they only occur in “natural” places, such as around

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6 For textile-clad preparations by Ruysch, see: http://www.kunstkamera.ru/kunstcatalogue/index.seam;jsessionid=D4530F1882A8703194D5335D371B87CB?c=RUYSH&page=1
9 “Mijn gebeente en was voor u niet verhole, als ick in “t verborgene gemaekt ben, [ende] als een borduersel gewrocht ben, in de nederste deelen der aerde”, http://www.bijbelsdigitaal.nl/view/?mode=1&bible=sv1637&page=619&sub=1-2
wrists, ankles, and necks. Preparations of genitals or internal organs in Ruysch’s collection are sometimes suspended from, but never decorated with lace.

Lace and embroidery are two different things, and the sleeves and trouser legs in Ruysch’s preparations are not embroidered, but rimmed with strips of lace. However, like the embroidery references, the lace-rimmed covers in Ruysch’s preparations also have a layered meaning. The textiles on these preparations are actually a kind of napkin bandage; wrapped around the part where the hand or arm has been severed from the rest of the body, thus covering up a probably rather unsightly stump. Hence they fulfil a practical purpose: they regulate the core disgust evoked by the sight of severed body parts by covering up the most vivid reminder of that separation.\textsuperscript{10} Ruysch readily admitted that he did not only use textiles to show his devoutness, but also for a practical reason: to make them more attractive. His cabinet was open to paying visitors, and in his catalogue, Ruysch wrote that he had tried “to improve the horrible sight of dissected and severed parts with adequate decorations to such an extent that they would not discomfort the eyes, nor cause any scares or disgust”\textsuperscript{11} and that he did so “to take away the disgust, as man is naturally afraid of dead bodies and their parts”.\textsuperscript{12}

Yet if Ruysch’s only aim was to avoid scaring or disgusting his visitors, why were his textile decorations so elaborate? After all, simple muslin wraps would have had pretty much the same effect, and in the course of the eighteenth century, we see that anatomist did just that: one of Ruysch’s students, Bernard Siegfried Albinus (1692-1770), made only one preparation with a lace-rimmed sleeve as a reference to Ruysch’s work, and his students, in their turn, exclusively used simple, undecorated wraps if they wanted to cover an unsightly part of a preparation.\textsuperscript{13} The answer lies in the symbolism and the \textit{vanitas} character of the Ruysch collection as well as in contemporary fashion.

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\textsuperscript{11} RUYSCH Frederik, \textit{Alle De Ontled- Genees- En Heelkundige Werken Van Frederik Ruysch}, 3 vols. Amsterdam, Janssoons van Waesbergh, 1744, p. 1000: “…om “t afschuwelijk gezicht der ontlede en afgesnede delen met welgepaste cierzelen zodanig te verbeteren, dat het de ogen niet mishage, nog enige schrik en walging veroorzaken zal [...]”.

\textsuperscript{12} Ruysch quoted in Jozien J. DRIESEN VAN HET REVE and KOOIJMANS Luue, “Geloof Alleen Je Eigen Ogen: Frederik Ruysch (1638-1731) Held Van De Nieuwe Wetenschap”, Amsterdam, Universiteitsbibliotheek Amsterdam, 2004, p. 127: “… om den mensch alle afkeer te benemen, die dog van nature anders gewoon is een schrik te hebben voor dode menschen, en hare delen”.

\textsuperscript{13} On this preparation, see HENDRIKSEN, \textit{Elegant Anatomy, op. cit.}, chapter 4.
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The production of lace, a fairly common activity in an early eighteenth-century household, requires precision and refinement, just like the creation of the injected anatomical preparations these laces are rimming. Hence the cloths are not simply covering up the stumps of severed limbs, but are also a reference to the refined skill of their creator – Ruysch famously nicknamed himself the “doodskunstenaar”: “death’s artist”. Moreover, everyone – men and children as well as women – wore profuse lace adornments on the dark, gloomy clothing that was fashionable in the late seventeenth century. In some areas, lace was even primarily a sign of masculinity. This partly explains the profuse lace decorations on Ruysch’s preparations: they do not just cover up unsightly stumps, they also commodify the preparations into fashionable, desirable objects – people were willing to pay to view them, and the Russian emperor Peter the Great eventually paid a substantial price for the entire collection.

Finally, the lace-rimmed covers on Ruysch’s preparations stress the moral lesson that many of the preparations are intended to convey. They suggest that the lifelike yet undeniably dead preparations were once (part of) a living, breathing human being like you and me, who, either through their questionable character or unfortunate fate were snatched from life, like the child who steps on a poisonous scorpion. The lace rims are decidedly that of clothing of the living and not the death – well into the twentieth century, most people in the Netherlands were buried in designated shrouds; plain white ankle-length shirts with little or no decoration.

Changes in fashion in both clothing and anatomy are reflected in Albinus’s anatomical preparations, in which we also find textile covers of stumps, but of which only one was dressed in a lace-decorated sleeve. Around 1720, exactly when Albinus was coming of age, fashion started to change. Although men would continue to wear lace cravats and cuffs for much of the eighteenth century, they were much more subdued and a far cry from the elaborate adornments of the seventeenth century – and that is reflected in anatomical preparations, where we find no lace decorations whatsoever after the 1720s. Now it were the women who wore much more lace than men, as its qualities, such as suppleness and softness, became more and more associated with femininity. The reason Albinus still dressed one preparation with a lace-rimmed sleeve was that this particular preparation referred to a theory of Ruysch about the structure of the eye membranes: Ruysch argued he had identified a previously undescribed membrane which he called Tunica Ruyschiana, but

Albinus noted that this was simply a section of an already known part of the eye; the choroid membrane. Albinus with this preparation wanted to prove Ruysch wrong, and by adorning it with a by then old-fashioned, lace-rimmed sleeve, the informed observer would immediately have understood what he meant.

Moreover, whereas Ruysch’s motives in creating his anatomical preparations included the display of devoutness and the demonstration of moral lessons, Albinus and his generation were seeking to display something else in their anatomical preparations and illustrations: perfect anatomy. Albinus, in particular, was somewhat obsessed with what he called the Homo perfectus – the perfect man. In both his anatomical preparations and his monumental atlas of the human body, the Tabulae Sceleti Et Musculorum Corporis Humani, Albinus aimed to represent the ideal human body.  

18 For his anatomical atlas, he therefore sought a body that was of the male sex, of a middle stature, and very well proportioned; of the most perfect kind, without any blemish or deformity, either as to the bones themselves, or their connexions with one another. And as skeletons differ from one another, not only as to age, sex, stature, and perfection of the bones, but likewise in the marks of strength, beauty, and the make of the whole; I made choice of one that might discover signs both of strength and agility; the whole of it elegant, and at the same time not too delicate; so as neither to shew a juvenile or feminine roundness and slenderness, nor on the contrary an unpolished roughness and clumsiness; in short, all the parts of it beautiful and pleasing to the eye. 19

If it had been up to Albinus, he would not even had the decorative Arcadic landscapes as backgrounds in his atlas; it was his draftsman Jan Wandelaar who persuaded him to include them as he felt they would improve the sense of proportion. 20 Textiles therefore had no place in Albinus’s illustrations and preparations, apart from the occasional bandaging of an unsightly stump.

From this we can conclude that the use of textiles in seventeenth- and eighteenth-century anatomical preparations, although continuously aiming to avoid arousing disgust in the viewer, changed under the influence of both fashion and


These was established in London in 1833 by Madame Tussaud, née Maria Anna Grosholtz (1761-1850). Ulrich-Museum, 2002, p. 13. Today we still have such cabinets, such as Madame Tussaud’s. The first of Sammlungskataloge des Herzog Anton Ulrich-Museums Braunschweig 9, Braunschweig, Herzog Anton Ulrich-Museum, 2002, p. 13. Today we still have such cabinets, such as Madame Tussaud’s. The first of these was established in London in 1833 by Madame Tussaud, née Maria Anna Grosholtz (1761-1850).

Textiles in models

As mentioned previously, creating lasting anatomical preparations was extremely difficult and only very few anatomists succeeded in making them. Therefore, from the late seventeenth century, anatomical wax models were produced, primarily in Italy, in an attempt to provide more durable learning aids.²¹ Both the choice for wax and the combination with textile in anatomical models is not surprising given the qualities of wax and the history of wax works. Wax is relatively easy to mould compared to other materials such as stone, clay or papier-mâché, and colouring can give it a very lifelike quality. Moreover, by the late seventeenth century, there was a recurrent history of the creation of life-sized effigies; sculptures of saints and other deceased people in which the head and hands were shaped in wax and attached to a fully clothed body made from other materials. From the second half of the seventeenth century, living people too were sometimes sculpted in wax, also primarily for representative purposes, and by the eighteenth century, Europe had some very popular cabinets with wax figures of famous people.²² From this it becomes instantly clear that there must have been a technical overlap, and as will soon appear also an iconographic overlap, between the creation of wax figures for memorial purposes and the creation of anatomical wax models.

This overlap shows in some of the most famous eighteenth-century anatomical wax models, those produced mid-eighteenth century by Anna Morandi Manzolini and her husband, Giovanni Manzolini, in Bologna, and in the last decades of the century, inspired by Anna Morandi’s models, by the Fontana studio in Florence. In some of these models too textiles were used, either real or shaped in

²² LESSMANN Johanna and KÖNIG-LEIN Susanne, Wachsarbeiten des 16. bis 20. Jahrhunderts. Sammlungskataloge des Herzog Anton Ulrich-Museums Braunschweig 9, Braunschweig, Herzog Anton Ulrich-Museum, 2002, p. 13. Today we still have such cabinets, such as Madame Tussaud’s. The first of these was established in London in 1833 by Madame Tussaud, née Maria Anna Grosholtz (1761-1850).
wax. If we look at the models produced by Anna Morandi, all of human anatomy, we can see that she, like Frederik Ruysch in his preparations, used textile or representations of textile only in models of entire limbs and external organs or body parts. Although resembling wraps and shrouds more than actual pieces of clothing, these representations of textiles give the models a certain humanity. Models of dissected organs on the other hand, like the components of the eye, have been pinned onto display planks without the suggestion of textile.

Anna Morandi never wrote anything about her use of textile representations in her waxes, but as Messbarger pointed out, she used atlases and anatomical studies by Cowper, Bidloo, Vesalius, Casserio, Morgagni and others as starting points for her own work. In these books, textile wraps and shrouds are also frequently used to frame partly dissected bodies. It is to this iconography rather than contemporary fashion that Anna Morandi seems to refer in her waxes, as her self-portrait in wax shows quite elaborately embroidered sleeves and a frilly dress that are a far cry from the rather plain textiles represented in the models. The only exception to this appears to be her model of “feeling hands,” in which the left hand, as Morandi herself described it “comes to rest upon a surface that it finds soft and tender, and to which it suavely adapts itself, compressing it with delight”. Anna Morandi, like Frederik Ruysch, was an artisan turned scholar, but unlike Ruysch she only used representations of textiles in her anatomical models if there was a very concrete reason to do so, namely to convey a concept (as in the case of touch), or to suggest lifelikeness in the same vein as the anatomical atlases she used as reference works.

In the waxes made by the Fontana studio in Florence for La Specola in the 1770s, as well as in the waxes produced by the same studio in the 1780s for the Josephinum in Vienna, we see an altogether different use of textiles. Here no suggestion of clothing is made, yet virtually every wax model, except for the upright full body models and some foetuses, has been positioned on a satin-like off-white piece of textile, often decorated with gold and blue trimmings and tassels. The full body models in lying positions have been provided with additional pink cushions. These colours have no connection to either the coat of arms of the founder of La Specola, the archduke Pietro Leopold, or that of the De Medici’s, the old regime whose cultural patronage he admired. However, if we look at a painting of Pietro Leopold and his family from approximately the same year as many of the anatomical waxes for La Specola were made, it does at once become clear that clothing of satin

24 Ibid., p. 129.
25 The Habsburgs had a wide variety of coats of arms, and the De Medici coat was a gold shield with red balls on it.
in light and bright colours with few frills and decorations was indeed the fashion of the day in Florence.

Moreover, the waxes of La Specola came from a studio headed by Felice Fontana, physician to the grand duke, but were made by a team of physicians and artisan wax modellers. Although the lines between professions could be very vague in the late eighteenth century, the latter had often started their career creating portraits and effigies, and continued to do so after they had taken up a position at La Specola. This connection ensured that fine art conventions were inevitably reflected in the anatomical models too. For example, the anatomical Venuses definitely have an erotic undertone, and show an almost uncanny resemblance to contemporary decorative wax sculptures of Venus. Although the position of the arms is somewhat different, both are draped sensuously on luscious, coloured fabrics, have luxuriant hairdos and wear a string of pearls around their necks.

The references to contemporary art and fashion through textiles in the La Specola waxes may even have been an explicit idea of Pietro Leopold, as one of his primary aims with this collection was to attract and educate the citizens of Tuscany. The same textile use is found in the waxes in the Josephinum in Vienna, ordered by Pietro Leopold’s brother and produced by the La Specola workshop in the 1790s. The coloured silks and gold embroidered fringes of the pillows and drapes on which both the Florentine and Viennese waxes are lying are part of an overall fashionable presentation including gold plated rosewood and Venetian glass showcases on revolving pedestals. However, the Vienna collection was not primarily meant for the education of citizens, but to train surgeons and physicians. As Anna Maerker has vividly described, the iconography of the waxes backfired in this context; as the envisioned users of the models condemned them as luxury toys, unsuitable for medical training.

From the late eighteenth century, pathology started to develop as a distinct sub discipline of anatomy. Probably not coincidental, from this period, some collections of anatomical preparations and waxes that were created in a medical context but accessible to a broad audience started to merge into collections that were primarily and often exclusively aimed at a specialist audience instead of a general one, and distinct collections aimed at the general public were developed. The study of pathology also necessitated the creation of moulages; wax models made from plaster

27 Eighteenth-century decorative wax Venuses can, amongst others, be found in the collection of the Herzog Anton Ulrich-Museum in Braunschweig, Germany.
29 MAERKER Anna, Model Experts, op. cit.
30 HUISTRA Hieke, Preparations on the move, PhD thesis, Leiden University, 2013, Chapter 3.
casts of body parts affected by disease. In most moulages, the only textiles are bandage-like strips that cover the rough edges. Only occasionally, as in a wax model from the Parisian Musée Dupuytren, fabrics in moulages do represent clothing. However, this seems to be an exception, as the other moulages have no textile “framing” of any kind.

One can wonder why a moulage needs textile framing anyway, especially as many nineteenth-century wax models aimed at a professional audience, such as those made by the Dutch model maker Petrus Koning (1787-1834), lack any form of textile framing. Yet the habit of framing moulages in textiles (either real or wax representations) seems to have persisted until the early twentieth century, after which wax moulages were slowly displaced by colour photography. Literature on moulages tends to focus on creation and restoration techniques, rather than the history of presentation. It is most likely that the use of textiles in medical moulages was originally literally meant as a frame, suggesting bandaging or sheets, and thus distracting the viewer from the fact that this is not the patient himself, but a representation of part of the patient in wax.

It can be concluded from the above that whereas Anna Morandi’s restrained use of textiles still fitted in with the iconography of the great anatomical atlasses by the mid-eighteenth century, by the 1790s many medical men started to reject wax models decorated with lush textiles, such as the Florentine and Viennese anatomical Venuses, as impractical and frivolous. Wax models were increasingly replaced by models made from less vulnerable materials (such as the papier-mâché models made by the Auzoux workshop) that were less idealized, and mostly lacked textile dressings or framings. It is not clear why the use of textile framings persisted in wax moulages. However, it makes sense that this use stems from the same basic consideration that underlay the use of textiles in the anatomical preparations of Frederik Ruysch: the avoidance, or at least lessening of the disgust induced by the sight of (representations of) maimed human bodies.

31 The Musée Dupuytren was established in 1835 with the legacy of Guillaume Dupuytren (1777-1835), professor of anatomy. This moulage is probably a later addition.
32 A good example of the persistent use of fabric “framing” of wax moulages can be seen in the moulage collection of the university of Bonn, created between 1913 and 1937. For more on the Bonn collection, see BIEBER Béatrice and BIEBER Thomas, “The 100-year old collection of wax moulages at the Department of Dermatology of the University of Bonn”, European Journal of Dermatology 23/4 (2013 Jul-Aug): 443-8.
Conclusion

The use of textiles or representations of textiles in eighteenth-century anatomical wax models was, like the use of textiles in anatomical preparations, influenced by fashion and visual arts. Moreover, textiles were more prominently present in collections aimed at a broad audience, and the almost complete disappearance of textiles from preparations and models by the early nineteenth century can be explained from both changes in fashion and changing epistemic conventions in the field of anatomy. Although textiles in both anatomical preparations and anatomical wax models were primarily added to make them more human, and the (representations of) dissected body parts less repulsive. This is stressed by the fact that in both preparations and models, textiles are only used for humans, never for animals or plants, and only in conventional ways: they are pillows or wraps, sleeves or collars, or resemble the dressings of a wound. Hardly ever is an internal organ combined with textiles or a representation of textile – textiles serve to humanize preparations and models, to suggest a familiarity and a likeness.

We have seen that although the use of textiles or representations of textiles in anatomical waxes may seem remarkable, as waxes do not remind us of the violation of the body as preparations do, in a way both preparations and waxes were models, and textiles to a certain extent served the same purpose in waxes as they did in preparations: they humanized them. Like the textiles used in anatomical preparations, textiles in anatomical waxes were influenced by popular fashion and the visual arts, and this combination of aesthetic and epistemic ambitions of eighteenth-century anatomists and wax modellers stresses the intertwining of art and science. Yet there were differences too. Although all these anatomical objects had educational purposes, they were part of different epistemic cultures, which is reflected in their iconography. Whereas the seventeenth-century preparations made by Frederik Ruysch were part of a moralized, teleological anatomy, Anna Morandi’s waxes and the anatomical Venuses represented an idealized, sometimes almost erotic anatomy. Wax moulages of pathologies, in contrast, were created in order to understand and communicate knowledge about disease.

Finally, this brief comparative survey of textiles in eighteenth-century anatomical preparations and wax models shows that the apparently obscure details of the materiality of historical objects can give a unique perspective on an epistemic culture. Moreover, looking at historical scientific objects like these preparations and models from a different perspective transcends classic historiographies like bibliographies and institutional histories, enabling their keepers and audiences to understand and present them in new ways.