

Poking, Prodding, and Slicing: Anatomy as We Know It

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Beginning as early as the ancients, humans have held an active interest in the structure and function of the human body. This interest has developed over time into a scientific discipline called anatomy today. Throughout history, the methods of gaining anatomical knowledge have varied widely, including everything from observation, to experimentation, to dissection and vivisection¹. Anatomists have poked, prodded, and sliced the human body in attempts to understand its mysteries – no small task, to be certain. By tracing the progression of anatomical understanding back in time, we can understand how we got to the knowledge we have today.

The issue of how to acquire knowledge of the body is a longstanding one. Depending on the society and its religious and ethical views as a whole, certain restrictions on the use of bodies, whether dead or alive, as objects of experimentation limited the ability of scientists to understand them². For the Greeks, anatomical understanding came from the butchering of animals and treatment of wounds. In their culture, it was completely taboo to dissect a human body³. Not surprisingly, this was also the case in many other cultures. In fact, through the ancient history of anatomy, only once was the dissection of humans acceptable, a period of 100 years in Alexandria. During this time, not only was dissection acceptable, but vivisection as well⁴.

¹ Roy Porter, “The body,” in Roy Porter, *Blood and Guts: A Short History* (New York: Norton, 2003), 53-74.

² Roy Porter, “The body,” 53-74.

³ Professor David Jones, course lecture in STS.003, MIT, 25 October 2010.

⁴ Professor David Jones, course lecture in STS.003, MIT, 25 October 2010.

After the brief period of acceptability in Alexandria, human dissection did not come to play again until the Italian Renaissance. This isn't to say that knowledge of anatomy ceased to progress during this time, though. Galen, a Roman physician, did much to progress the field of anatomy through his work as a physician and surgeon as well as his interest in public animal dissections⁵.

The early dissections in the Renaissance era were very private and informal, often occurring in parlors with a small gathering of observers⁶. Later, Vesalius broadly publicized dissection, bringing it under scrutiny of both those interested in medicine and those common folk simply fascinated by the dissection itself⁷. According to Vesalius, pictures or other representations of the body are insufficient in educating one about anatomy - dissection is necessary in order to gain a complete understanding of the human body⁸.

Anatomy entering the early modern era changed yet again. Dissections became more heavily regulated and cadavers more difficult to come by. This, along with changes in societal views as a whole, led to the retreat of anatomy from public

⁵ Professor David Jones, course lecture in STS.003, MIT, 25 October 2010.

⁶ Katharine Park, "The criminal and the saintly body: Autopsy and dissection in Renaissance Italy," in *The Renaissance: Italy and Abroad, Rewriting Histories*, ed. J. J. Martin (New York: Routledge, 2002), 224-252.

⁷ A. Vesalius, "Title Page to the First Edition of 'De Humani Corporis Fabrica'" in *Vesalius: The Illustrations from His Works* (New York: The World Publishing Company, 1950), 43-45. Katharine Park, "The criminal and the saintly body: Autopsy and dissection in Renaissance Italy," in *The Renaissance: Italy and Abroad, Rewriting Histories*, ed. J. J. Martin (New York: Routledge, 2002), 224-252.

⁸ A. Vesalius, "Preface to *On the Fabric of the Human Body*" [1543], in Charles D. O'Malley, *Andreas Vesalius of Brussels, 1514-64* (Berkeley: University of California Press, 1964), 321-322.

eye into the professional's office⁹. Dissection of the human body became a privilege that only medical students got to experience. For most, this is how anatomy is viewed – something that one only gets limited access to, through diagrams, models and charts. The general public seems to have accepted this as a norm – until now.

In recent years, German scientist Gunther von Hagens has introduced a means of study into the discipline of anatomy that could potentially change the field's accessibility. With this development, von Hagens hopes to broaden the knowledge of anatomy from only the exclusive circle of medical schools and doctors offices and into the hands of the public¹⁰. His technology, called plastination, involves replacing the fluids in the body with plastics such as silicone rubber, epoxy resin, and polyester resin¹¹. The results of this technique are dry, odorless, virtually un-aging, and incredibly accurate specimens that can be used or displayed for years on end. The flexibility of the plastination process allows specimens to be arranged, dissected, and exposed for a variety of studies or, in von Hagens' case, displays.

Von Hagens has taken his technology of plastination and created an entirely new concept; a concept he has called "Body Worlds". Body Worlds is a traveling exhibit of plastinated specimens and gestalt plastinates (whole body specimens positioned in life like poses) intended to educate the public on the inner workings of the human body. Von Hagens says of his exhibit that it is an "aesthetic and

⁹ Douglas Allchin, "'Hands-off' Dissection? What do we seek in alternatives to examining real organisms?," *The American Biology Teacher* 67:6 (2005): 369- 374.

¹⁰ Lawrence Burns, "Gunther von Hagens' BODY WORLDS: Selling beautiful education" *The American Journal of Bioethics* 7:4 (2007): 12–23.

¹¹ G. von Hagens, "Plastinated Specimens and Plastination" in *Body Worlds: The Anatomical Exhibition of Real Human Bodies*, ed. Gunther von Hagens and Angelina Whalley, trans. Francis Kelly (Heidelberg: Institut für Plastination, 2004), 20-37.

instructive presentation of the body's interior"¹². In his opinion, the exhibitions give way to self-awareness even more so than diagrams, drawings or models could have. They give way to greater understanding and appreciation of the body, as well as close the gap between corpses on a dissecting table and "living" or observational anatomy¹³. The exhibit has met a fascinated group of viewers from a wide range of background, allowing it to gain wild popularity.

While all this may be acceptable, there are many controversies surrounding the Body Worlds exhibit – and rightly so. Exhibitions of this type have the potential to revolutionize the way society views anatomy and therefore all of the consequences must be carefully considered. Among the controversies, some of the most pressing and most vital include the legal and ethical concerns revolving around the acquisition, treatment and respect for the bodies used; the concern that the entertainment value of the exhibit overshadows its purpose as something instructional; and the careful balance revolving around the necessity of dissection and how such procedures should be rightfully handled. While each of these concerns hold validity and importance, none are vital enough to warrant the removal of such exhibitions from society. The education and insight received from the Body Worlds exhibit and others like it far exceeds the concerns surrounding it. To prove this, one must not only look at both the arguments and von Hagens' responses, but also the historical background of the anatomy itself.

In order for dissections to occur, corpses must be acquired. Since the Renaissance, methods of acquisition have included donation, trading, theft, grave

¹² Von Hagens, "Plastinated Specimens and Plastination", 31-32.

¹³ Von Hagens, "Plastinated Specimens and Plastination", 32-33.

robbery, and purchase or acquisition of unclaimed corpses and executed criminals¹⁴. Some of these methods were legal, while others were certainly not. Policies regarding corpses varied dramatically from country to country, based on the beliefs of individual societies¹⁵.

Von Hagens began his own highly contested body donor program in order to supply bodies for both his research and his exhibits. This program currently has over 5600 donors on file, and has obtained over 250 individual bodies. Part of the policy of the donation program is absolute anonymity. Von Hagens has implemented this in order to respect the individuals whose bodies have been donated. The identity of a specimen cannot be traced¹⁶. Within these measures lies a source of controversy – if the identity of the specimens cannot be traced, then what proves that the bodies were obtained legitimately? Von Hagens has had to defend himself on multiple accounts, using paper work and his own word to back himself up¹⁷.

Hand in hand with the necessity for proper acquisition of bodies lies the desire for respectful treatment. Von Hagens and the Body Worlds exhibit have been accused of disrespecting the donors through the display of their bodies¹⁸. Von Hagens counters this by reminding accusers that the donors signed up to be

¹⁴ G. V. Hagens, “No Skeletons in the Closet – Facts, Background and Conclusions: A response to the alleged corpse scandals in Novosibirsk, Russia, and Bishkek, Kyrgyzstan, associated with the *Body Worlds* exhibition.” Public statement, distributed online 17 November 2003, [<http://www.bodyworlds.com>], 1.

¹⁵ G.V. Hagens, “No Skeletons in the Closet”, 2.

¹⁶ G.V. Hagens, “No Skeletons in the Closet”, 2-3.

¹⁷ G.V. Hagens, “No Skeletons in the Closet”, 5.

¹⁸ Anita L. Allan, “No dignity in Body Worlds: A silent minority speaks” *The American Journal of Bioethics* 7:4 (2007): 24-25.

plastinated in this such way¹⁹. Von Hagens furthers his argument by very carefully distinguishing between plastinates and corpses. He suggests that plastinates, because of their permanent and unchanging nature, are no longer objects of grief and therefore are exempt from standards placed on corpses. While they still should be treated with respect, they are no longer subject to burial and shouldn't be objects of mourning²⁰. Von Hagens defends himself by showing that the treatment of the bodies is respectful and allows them to retain anatomical identity and a certain amount of dignity²¹.

After visiting the exhibit, skeptics have expressed concern that while von Hagens has an honorable goal of educating the public, he has allowed the entertaining aspect of the exhibit overpower its usefulness as an educational tool²². They base this argument on the grounds that von Hagens' Gestalt plasينات seem more like works of art than tools of science, with their creative and lifelike poses, descriptive titles, and even von Hagens' signature displayed nearby. Their argument is furthered by recognizing the money, marketing, and advertising going into the exhibition. Others take the opposing viewpoint. They say that the artistic elements to the exhibit merely enhance the educative qualities by helping to draw observers in and to remove the qualms they may have regarding the plastinates²³.

Furthermore, von Hagens suggests that the opinion that the exhibits are art is

¹⁹ G. von Hagens, "On Gruesome Corpses, Gestalt Plastinates and Mandatory Interment" in *Body Worlds: The Anatomical Exhibition of Real Human Bodies*, ed. Gunther von Hagens and Angelina Whalley, trans. Francis Kelly (Heidelberg: Institut für Plastination, 2004), 260-282.

²⁰ G. von Hagens, "On Gruesome Corpses," 260-282.

²¹ Von Hagens, "Plastinated Specimens and Plastination", 30-33.

²² Lawrence Burns, "Selling Beautiful Education", 14.

²³ Lawrence Burns, "Selling Beautiful Education", 15-17.

merely that - an opinion. The artistic qualities are in the eye of the beholder and von Hagens' main focus is on the education²⁴. In some respect, as before mentioned, the ability of the exhibit to educate would disintegrate if aesthetics were not placed into consideration²⁵. In addition to these claims, it is also important to note that anatomy is often very closely tied to art – Vesalius with his anatomical drawings, Michelangelo with his anatomically demonstrative sculptures, and modern uses of diagrams, charts, drawings, and models.

Traditionally, part of every medical students' education includes work on a human cadaver. This critical part of the education is deemed necessary because it gives the student hands on work with a body – something very different than models or even virtual representations. There has been a longstanding struggle to balance respect for life with the necessity to dissect. In an attempt to mediate this situation, scientists have developed alternate tools such as virtual dissections. The problem with these alternatives is first, that they do not fully show the complexity of the body and second, that they still promote the destructive part of dissecting, namely the piece-by-piece removal and discard of organs²⁶. Von Hagens' plastination exhibits more successfully tackle this struggle for balance by maintaining respect for the body, lessening destructive procedures, and fully showing the complexity of the body to viewers. The practicality of using plastinates as a tool for educating medical students lies in the longevity of the specimens, the

²⁴ Von Hagens, "On Gruesome Corpses", 260-262.

²⁵ Von Hagens, "On Gruesome Corpses", 261.

²⁶ Douglas Allchin, "Hands-off Dissections?" 369-370.

ability for specimens to be manipulated into poses that wouldn't be possible with traditional cadavers, and that there is no loss in authenticity or detail²⁷.

Although controversies surrounding the Body Worlds exhibit do express valid concerns, they are easily broken down both by further understanding the exhibit and by realizing the benefits of the exhibit far outweigh any consequences. Through this exhibit and others like it, knowledge of anatomy can be brought out of the doctor's offices and medical schools and shared with the general public. Such an increase in awareness of oneself has very positive consequences. For example, visitors to the Body Worlds exhibit have expressed that they have felt motivated or encouraged by the exhibition to take better care of their bodies and have gained a greater understanding and appreciation for the human body²⁸. Furthermore, it is interesting to speculate as to the long term effects of exhibits such as these on society and the discipline of anatomy as a whole. Will anatomical displays become commonplace in museums or other venues? Will the general public be highly educated as to the structure of their bodies? What about the views of society towards dissection and anatomical research? It is very possible that as exhibits such as these become more acceptable, the study of anatomy will be democratized, changing into something entirely different than what we have today.

²⁷ Von Hagens, "Plastinated Specimens and Plastination", 20.

²⁸ Penny Herscovitch, "Rest in plastic: Review of 'Body Worlds, The Anatomical Exhibition of Real Human Bodies' by Gunther von Hagens," *Science* 299 (Feb. 7, 2003): 828-829.

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