

The Ethics of Animal Research and Uncertainty in Human Head Transplantation

Introduction

Philosophers and dystopian science fiction writers are quite fond of creating fantastical stories of strange medical procedures physicians could hardly dream of, both in the past and in our present day. As medical technology advances, however, those fantasies slowly become somewhat realistic possibilities. In September 2015, stories surfaced that an Italian doctor named Sergio Canavero intends to perform the first human head transplant as early as December 2017.¹ The intended volunteer patient, Valery Sprinidov, suffers from Werdnig-Hoffmann disease, a condition that has left him largely paralyzed and confined to a wheel chair. The condition consists of “degeneration of nerve cells (motor nuclei) within the lowest region of the brain (lower brainstem) and certain motor neurons in the spinal cord (anterior horn cells) leading to muscle weakness of the truncal, and extremity muscles initially, followed by chewing, swallowing and breathing difficulties.”² Transplanting the patient’s head from his current body to a donor body might theoretically improve his quality of life by once again giving him free control of his body and bodily functions.

Naturally, the case has garnered significant media attention, as well as the concerns of many physicians and bioethicists. Whether or not experimental treatments and surgeries are morally permissible has been a hot topic in bioethics in recent years, especially with the advent of social media campaigns to facilitate compassionate use requests.³ Naturally, head transplant cases present one of the most controversial instances of this issue, pushing us to the very limit of medical ethics. Recent research in the subject also seems to be somewhat suspect: can we know enough information about a potential human head transplant surgery based on results gleaned through animal testing? Are the procedures done during the animal testing itself morally permissible? On the individual level, is a surgeon who performs a head transplant procedure in breach of the Hippocratic Oath, given the current and projected state of our knowledge of the nature and consequences of the surgery?

This paper will analyze the various ethical and practical challenges associated with the prospect of head transplant surgery. I will first address some of the arguments in favor of the technique and some of the medical and social benefits it might create. However, given several other considerations, I do not believe we have enough scientific

¹ He has since found a second surgeon, Dr. Xiaoping Ren, to assist him. See Ashley Welch, “Russian Man Volunteers For First Human Head Transplant” via *CBS News*, August 29, 2016.

² Description gained from the National Organization for Rare Disorders, accessed via [/rarediseases.org/rare-diseases/werdnig-hoffmann-disease/](http://rarediseases.org/rare-diseases/werdnig-hoffmann-disease/).

³ See Elizabeth Cohen, “Company Denies Drug to Dying Child,” accessed via www.cnn.com/2014/03/10/health/cohen-josh/; and David Kroll, “Joshua Hardy Going Home After Getting Chimerix Anti-Viral Drug,” accessed via www.forbes.com/sites/davidkroll/2014/07/17/josh-hardy-going-home-after-getting-chimerix-anti-viral-drug/#272d9f5879b5;

knowledge to morally justify the human trial. To show this, I will offer several arguments. The first addresses the specific case of Mr. Sprinidov and his condition, Werdnig-Hoffmann disease. Although I am not a doctor, I do not believe there is or can be a sufficient, good faith medical basis for believing a head transplant procedure would help him. Second, I analyze the animal testing procedures and results that have gone into researching head transplantation so far. I do not believe the testing itself passes ethical guidelines. Third, I argue that insufficient information has been gained from the limited and flawed animal testing completed thus far, making an actual human head transplant procedure an irrational and unethical risk. In the final section of the paper, I consider a possible contradiction: many clinicians might think physician-assisted suicide is permissible, but not head transplantation. I explore whether or not this presents a contradiction, and ultimately conclude that further ethical issues arise in head transplantation cases because of the wide range of unknown side effects and concerns over whether or not advanced directives could hold any force in such cases. I conclude that although a patient might be within his rights to ask a clinician to perform a head transplant operation, it is ethically impermissible for any clinician to actually perform the procedure.

The Case For Head Transplantation and Changes in Personal Identity

The case for head transplantation is fairly straightforward, at least in the abstract. Many patients suffer from debilitating conditions or disabilities that greatly reduce their self-reported quality of life.⁴ It is crucial here to emphasize the patient's self-reported unhappiness. Many writers implicitly assume that disabled people are worse-off than non-disabled people,⁵ while many disabled people report being perfectly happy with their quality of life.⁶ There are many patients, however, who are unhappy with their quality of life, and wish to explore possible attempts at improvement. The motivation behind head transplantation procedures is the possibility that moving a person's head from a disabled body to a non-disabled body will enable them to regain some of their capacities, and thus improve his or her quality of life.

There are many assumptions at work in this argument. By far the biggest assumption is that personal identity is tied to the brain matter, its activities, or a combination of both: if this were not the case, a head transplant would not accomplish

⁴ Quality of life determinations are highly subjective, though attempts have been made to come up with a generalized system for comparing the wellbeing of different people. For one prominent example, see John Harris (1987). "QALYfying the value of life." *Journal of Medical Ethics* 13: 117-123; for a critique of Harris's model, see Anne Haydock. (1992). 'QALYs – A threat to our quality of life?.' *Journal of Applied Philosophy* 9(2): 183-188.

⁵ For a first-person account of this experience, see Harriet McBryde Johnson, "Unspeakable Conversations," *New York Times* February 16, 2003. For an overview of disability and valuing, see Janet Malek (2010). "Deciding against disability: does the use of reproductive genetic technologies express disvalue for people with disabilities?" *Journal of Medical Ethics* 36:217-221; Elizabeth Barnes (2014). 'Valuing Disability, Causing Disability'. *Ethics* 125(1): 88-113.

⁶ Again, see Harriet McBryde Johnson, "Unspeakable Conversations," *New York Times* February 16, 2003.

⁷ This assumption is, in one sense, quite flexible, since it presumably favors the preliminary argument for head transplantation regardless of if one favors materialism, the psychological view, or a hybrid of the

anything on behalf of the patient. This assumption is highly contentious. There are many theories of personal identity, each with its own implications on head transplantation. I will briefly sketch a few popular theories, and then argue that most have negative implications on the ethics of head transplantation. I will argue that the only theory that makes head transplantation permissible is some type of materialism about personal identity⁹, but I argue in subsequent sections that head transplantation may be unethical for other reasons.

The first theory to consider is materialism about personal identity.⁹ Materialists think that personal identity is intimately connected to the material that constitutes the entity in question. In this case, the relevant material is the material that composes the patient, Mr. Sprinidov. There are two kinds of materialism that are important for our discussion. The first we'll call *strict materialism*, which asserts that personal identity lies in the material itself. While philosophers may disagree about the specific matter we should consider, we can content ourselves to note that many refer specifically to the brain matter as the relevant material. I will not defend the particulars of their arguments here, other than to note that many philosophers and clinicians have argued that the activity of the brain matter is essential to sustaining the activities we traditionally associate with human personhood. While some might argue that any change in the material of the body at all constitutes a change in identity, this account is harder to defend.¹⁰ Alternatively, one might be an *indirect materialist*, in which case one believes that the brain matter itself is not the true point of focus, but the activity that the brain matter generates. The activities associated with personhood *supervene* on the activity and composition of the brain matter. In either case, a change in the brain matter may indicate a change in personal identity.

I'd also like to consider a special case of materialism, the Organism view¹¹, defended by Eric Olson, S. Matthew Liao, and others. The organism view holds that an entity, X, is an organism with a distinct personal identity when the following criteria are met:

two. As we shall see, however, I believe each view creates problems for head transplantation at a deeper level.

⁹ I claim that "some sort of materialism" is required in order to explain cases in which one holds a combination of views, such as a psychological account of personal identity that is grounded in the activity of the brain matter.

⁹ There are many materialist views, each with its own nuances. For examples, see Mackie, D., 1999, 'Personal Identity and Dead People', *Philosophical Studies*, 95: 219–242; van Inwagen, P., 1990, *Material Beings*, Ithaca: Cornell University Press; and Olson, E., 1997. *The Human Animal: Personal Identity Without Psychology*, New York: Oxford University Press.

¹⁰ As you read this sentence, millions of the particles that theoretically compose your body are exchanged with others and engage in transformative reactions, such that your body is effectively different from one moment to the next. This makes it very hard for strict materialists to account for personal identity through time without being self-effacing.

¹¹ See Olson, E., 1997. *The Human Animal: Personal Identity Without Psychology*, New York: Oxford University Press, and S. Matthew Liao, "The Organism View Defended," *The Monist* (2006), and "Twinning, Inorganic Replacement, and the Organism View," *Ratio*, (2009), p. 6.

a) X begins to exist when the capacity to regulate and coordinate its metabolic and other life processes is there; b) X persists as long as there is what may be called 'organismic continuity,' which is the continuing ability to regulate and coordinate its metabolic and other life processes; and c) X ceases to exist when the capacity to regulate and coordinate its metabolic and other life processes is permanently gone.¹²

The key concepts here are "organismic continuity" and death. According to Liao, organismic continuity refers to "contain[ing] the same constituent matter or if there is the gradual, incremental replacement of the constituent matter over time."¹³ It is unclear how "gradual" a change must be in order to maintain organismic continuity: my suspicion is that changing an entire body at once would violate this principle, though the matter is not exactly clear.¹⁴ On the Organism view, death refers to the permanent loss of an organism's regulatory capacities.¹⁵ If these capacities are permanently lost or if the continuity of the organism is significantly altered, head transplantation creates a different person, assuming that personal identity and numerical identity (here, the identity of the organism) are identical.

A second prominent view is the Psychological View¹⁶, which asserts that a person's identity remains the same as long as their mental contents and activities are continuous. On the Psychological View, a different person would be created if there were some permanent breach of the patient's mental content, which may include the patient's behavioral tendencies, desires, likes, dislikes, knowledge, memories, stream of consciousness, etc. So long as these qualities are preserved, head transplantation would not alter the patient's personal identity. It is crucial to note that the Psychological View can be combined with several other theories of personal identity. For example, materialists might champion the brain matter specifically for its relationship to psychological continuity. As mentioned above, I do not defend a specific theory of personal identity in this paper, so my argument need not depend on any one theory

¹² S. Matthew Liao, "The Organism View Defended," *The Monist* (2006), and "Twinning, Inorganic Replacement, and the Organism View," *Ratio*, (2009), p. 6.

¹³ Ibid.

¹⁴ This problem may generate a Sorities Paradox. For a good summary of the sorites paradox and its application in vagueness, as well as different theories of vagueness, see Williamson, Timothy. *Vagueness*. Routledge, 2002. In this case, the distinction required would be a determination of how much material must be altered such that the patient after the procedure should be considered a different person than the one before the procedure.

¹⁵ It is possible that the concept of death is completely nonsensical. See Rosenkrantz, Gary S. "Life and Death." *The Monist* 98, no. 3 (2015): 303. For the sake of argument, I assume that death is, in fact, a coherent concept.

¹⁶ For a sampling of different psychological accounts of personal identity, see Shoemaker, S. 1984, 'Personal Identity: A Materialist's Account', in Shoemaker and Swinburne, *Personal Identity*, Oxford: Blackwell; Parfit, D. 1984, *Reasons and Persons*. Oxford: Oxford University Press; Unger, P. 1990, *Identity, Consciousness, and Value*, Oxford: Oxford University Press; and Garrett, B., 1998, *Personal Identity and Self-Consciousness*, London: Routledge.

being correct or any one conception of the relationship between the Psychological View and other, more robust theories.¹⁷

A third view to consider is some sort of immaterial¹⁸ or theological¹⁹ conception of personal identity, in which the presence of a human soul or other immaterial entity is necessary to form a person's identity. In order to remain the same person, one's soul would need to remain in the body (or at least in control of a body). The body itself is not what ultimately matters, but rather the invisible entity that controls it. If the process of separating the patient's head and relocating it to the donor body either destroys the soul or causes it to "leave," a different person, head transplantation creates a different person.

The final view we can consider is a genetic view of personal identity, which I have previously defended elsewhere.²⁰ A special case of materialism, according to the genetic view, the locus of personal identity lies in the nature and activity of genetic material. In the same manner as materialists about brain matter assert that the activities of the brain supervene on the activities and composition of the brain matter, the activities and composition of the brain matter supervene on the activities, composition, and overall continuity of the genetic material. Genetic material is responsible for determining the form of brain cells and determines what proteins a cell produces. By transitivity, a large-scale change in the genetic material of the brain matter affects the nature of a person's identity. Not every gene affects traits one might normally associate with personal identity (consciousness, intelligence, emotional and behavioral tendencies, likes, dislikes, etc.), however, and so only changes to genes affecting relevant genes constitute changes in personal identity.

What do these accounts have to say about head transplantation? If one is a materialist about identity, the matter can be complicated. Strict materialists that believe identity is linked to the material of the whole body would insist that the patient would be numerically and personally distinct from the original patient after head transplantation because the resultant patient is made of material from both the donor and the recipient. Strict materialists and indirect materialists that concern themselves with the brain matter may think that the patient after the procedure is numerically and personally the same as the patient before the procedure, though it is crucial to note that that verdict depends on whether or not the procedure itself changes the brain matter in any significant way. Defenders of the genetic view of personal identity will yield similar

¹⁷ The psychological view itself is certainly a robust theory. What I mean here are theories that also adequately account for the intuitive significance of the body, even if psychological content bears most of the burden.

¹⁸ See Swinburne, R., 1984, 'Personal Identity: The Dualist Theory', in Shoemaker and Swinburne, *Personal Identity*, Oxford: Blackwell.

¹⁹ This characterization can be found in most prominent world religions, characterized by the common statement that the body is a vehicle for the soul. For a summary of one prominent example, Aquinas's conception of death, see Eberl, Jason T. "A Thomistic Understanding of Human Death." *Bioethics* 19, no. 1 (2005): 29-48.

²⁰ Michael S. Dauber, "The Ethics of Mitochondrial Replacement Techniques: Three-Parent Babies and the Non-Identity Problem," presented at the Bowling Green State University Conference on the Ethics of Emerging Technologies, November 2016.

conclusions, though it is important to note that they will also only concern themselves with changes to the genetic material in the brain matter, and its subsequent ability to control the rest of the body.

On the Organism view, head transplantation may create a person numerically distinct from the original patients. Defenders of the organism view might argue that head transplantation constitutes a change in personal identity because the patient's original body loses its ability to regulate itself without a functioning head, and the donor body loses its "organismic continuity" when given a new head. Specifically, although it might be the case that one can become a different organism (i.e. a different massing of regulatory capacities and parts) while remaining the same person, some defenders of the Organism view think that a person is identical with his or her organism, such that a change in organismic continuity produces an associated change in personal identity. If this is the case, head transplantation creates a new person, and is thus morally problematic in terms of professional medical ethics.

Defenders of the Psychological View may find head transplantation acceptable so long as no significant changes to the patient's mental content, personality traits, etc. have occurred.²¹ As we shall see in subsequent sections, it is unclear how the procedure itself will impact these qualities, so it is unclear whether or not proponents of the Psychological View will indeed accept head transplantation. If one wishes to proceed cautiously, however, one might reject the procedure to prevent any accidental changes from occurring.

Defenders of a theological conception of personal identity in which the soul must remain in the body and must not be altered will need to answer several questions in order to determine whether or not head transplantation affects personal identity: Is the soul destroyed when the patient's head is removed? If it isn't destroyed, does it leave the body when the patient's head is removed? What happens to the donor's soul? If the soul leaves upon "death," and the resultant patient were to awaken, does that mean that the soul returned? Or would such a person be something akin to Chalmers' zombies? Is death even a cogent concept if head transplantation can alter the ordinary processes one believes occurs on a theological account? I cannot answer all of these questions here. I will suggest, however, that I am skeptical that a defender of a theological account of personal identity will think head transplantation does not alter personal identity.

According to the picture I've given, we have reason to think that head transplantation is problematic according to many theories of personal identity. The only theory that we have reason to think would consistently allow head transplantation is some sort of materialism about personal identity, specific one that emphasizes the brain matter. However, I argue in subsequent sections that even if materialism is true, head transplantation is unethical on other grounds.

²¹ Dr. Canavero notes that, as with patients who undergo facial transplants, psychological therapy will be required to help the patient overcome the psychological trauma that comes with controlling a new body. See Canavero, Sergio. "HEAVEN: The head anastomosis venture Project outline for the first human head transplantation with spinal linkage (GEMINI)." *Surgical neurology international* 4 (2013): 335. Anto Cartolovini and Antonio Spagnolo have suggested that because who we are is grounded in a sense of our whole body, successfully integrating a new body with one's previous identity may be very difficult and may alter one's identity. See Ashley Welch, "Russian Man Volunteers For First Human Head Transplant" via *CBS News*, August 29, 2016.

Werdnig-Hoffmann Disease and Head Transplantation

Doctors have a duty to benefit their patients and offer therapies that will ease their suffering and improve their conditions.²² Whether or not a head transplant would be appropriate in any particular case depends on the patient's condition. In this case, the patient that has agreed to undergo the first attempt at human head transplantation suffers from Werdnig-Hoffmann Disease, a neurodegenerative condition that affects motor functions. The patient is paralyzed and will eventually experience difficulty chewing, swallowing, and talking. He has claimed that he does not wish to continue in his current state, and is fine with taking the risk of dying in an attempt at improvement.

The central issue at stake in evaluating the beneficence of any treatment is the pathology of the condition itself. There are many interventions clinicians can administer for any given problem, but not all of them will be effective given the nature of the condition in question. In this case, the patient suffers from a neurodegenerative condition that affects the central nervous system. Specifically, the condition causes problems with the patient's neurotransmitters, such that signals from the brain do not reach their intended destination effectively. The goal of head transplantation is to move the "person" to a body that does not suffer from Werdnig-Hoffman Syndrome, and thus does not have issues with the neurotransmitters throughout the body responsible for supporting motor skills.

The procedure²³ itself will be rather complicated. Surgeons will need to cool Sprinidov's body to prevent brain damage, and then simultaneously decapitate both bodies to make the switch as quick as possible.²⁴ Next, "the two ends of the spinal cord would then be fused together with a chemical called polyethylene glycol, or PEG, which has been shown to promote regrowth of cells that make up the spinal cord."²⁵ After connecting his muscles and vasculature to the new body, the patient will be kept in a medically induced coma while the chemicals do their work.

Unfortunately, we have reason to be skeptical that such a procedure is medically indicated in this case. Assuming for the sake of argument that the procedure could be done successfully, it is unclear that head transplantation is appropriate for this specific condition. It is true that Werdnig-Hoffman Syndrome affects neurotransmitters throughout the spinal chord, and a head transplant might bypass this issue so long as the defective neurotransmitters were below the site of the new head. However, the patient's condition may also affect neurotransmitters in the brain, where locomotive signal pathways originate. If this patient has defective neurotransmitters in his brain, then the initial problem lies in the brain: the signals cannot even start down the correct

²² For a full outline of these and other considerations involved in medical ethics, see Beauchamp, Tom L., and James F. Childress. *Principles of biomedical ethics*. Oxford University Press, USA, 2001, and Jonsen, Albert R., Siegler, Mark, and Winslade, William J. *Clinical Ethics: A Practical Approach to Ethical Decisions in Clinical Medicine, 8th Edition*. McGraw Hill Education, 2015.

²³ For Canavero's full proposal, see Canavero, Sergio. "HEAVEN: The head anastomosis venture Project outline for the first human head transplantation with spinal linkage (GEMINI)." *Surgical neurology international* 4 (2013): 335.

²⁴ See Ashley Welch, "Russian Man Volunteers For First Human Head Transplant" via *CBS News*, August 29, 2016.

²⁵ Ibid.

paths. Any procedure to give the patient a new body would likely be ineffective, because the problem originates in the head itself. It seems plausible to assume that head transplantation would not adequately benefit the patient, and thus it is not a medically appropriate intervention.

A further complication arises given the nature of the human immune system. The human immune system responds to foreign material it does not recognize by attacking it.²⁶ While we can minimize this reaction by finding donors that are close in blood type and other factors to the eventual recipient, this response is never completely eliminated: those who receive donor organs must take anti-rejection medications for the rest of their lives. These medications, assuming they work as intended, suppress the immune system, compromising one's ability to fight off viruses, infections, and other contaminants. In the case of human head transplantation, the problem is even more confusing, as it is unclear which would be the target of rejection: would the body automatically reject the new head and the organs it contains? Or would the body's immune system listen to the brain and reject the entire body? In either case, the rejection reaction would be on a larger scale than is likely to be medically manageable, meaning head transplantation procedures would do significant damage to the patient, and thus would not be medically indicated.

Animal Testing and Uncertainty

Whether or not a clinician can form a good-faith-basis for offering a treatment largely depends on the results of animal testing. Medicines and medical procedures are tested on non-human animals extensively in order to discover their potential side-effects, both positive and negative. If a potential treatment carries too many negative or unacceptable side-effects, the treatment never receives approval (either from the FDA, for Americans, or within the medical community itself), and researchers must explore alternatives. Thus the permissibility of head transplantation, at least in our current system, relies on the information gleaned through animal testing.

At the outset, it is unclear if animal testing will give us the knowledge necessary to determine whether or not head transplantation is safe for patients. While researchers have successfully attached separated heads to "donor" bodies, and have demonstrated the possibility of regaining blood flow and retaining some level of brain function, no other knowledge has been gained.²⁷ Some animals have reportedly regained awareness but did not live very long, so it is difficult to assess long term side effects the impact the

²⁶ For an overview of organ rejection, see "Transplant Rejection," accessible through the NIH National Library of Medicine at <https://medlineplus.gov/ency/article/000815.htm>

²⁷ Dr. Canavero insists that no episodes of rejection occurred in an experimental case. However, the subject did not live very long, so this information is questionable. See Canavero, Sergio. "HEAVEN: The head anastomosis venture Project outline for the first human head transplantation with spinal linkage (GEMINI)." *Surgical neurology international* 4 (2013): 335, p. S341.

²⁸ See White, R. J., L. R. Wolin, L. C. Massopust Jr, N. Taslitz, and J. Verdura. "Primate cephalic transplantation: neurogenic separation, vascular association." In *Transplantation proceedings*, vol. 3, no. 1, p. 602. 1971, and Canavero, Sergio. "HEAVEN: The head anastomosis venture Project outline for the first human head transplantation with spinal linkage (GEMINI)." *Surgical neurology international* 4 (2013). While Canavero claims he was able to restore motor function in a dog whose neck had been partially severed, this may be drastically different in human cases.

procedure might have on one's personal identity or conscious faculties.²⁹ While brain function may have been preserved at some level, it is impossible to fully evaluate the implications on a highly developed human brain. We return to this problem below.

Aside from uniform concerns that the patient will biologically survive the surgery, animal tests must provide the answers to three questions in this case. First, animal testing must confirm that the patient's spinal chord can be fused, which will determine whether or not the patient will have control over his new body. If he does not gain control of the body, he has not received any benefit (in fact, his condition will have been worsened to some extent). Additionally, the patient may require life support because the brain stem would not be able to control the involuntary metabolic functions necessary for survival. To this point, no successful attempt to fuse a human spinal chord has been made, and it is unclear whether animal trials have been successful enough to give us a good faith basis that an attempt can be successful.³⁰

Second, animal testing must determine whether or not the patient would be able to regain consciousness, or "wake up." According to Canavero, White, Wolin, Massopust Jr., and Verdura, monkeys have previously awoken and regained "awareness" within 3-4 hours.³¹ However, it is unclear to what extent animals in trials regain awareness, as 1) we cannot communicate with them in a manner comparable to human ability, and 2) the animals may not live long enough to give adequate information. To the extent of our medical knowledge and based on what we can assess in animals, it is very possible that the patient will not wake up, and it is unclear what kind of cognitive deficits he might suffer or "who he might be" if he did. It was similarly unclear from the literature what the extent of the subject's "awareness" was. Insofar as treatments are evaluated by whether or not they satisfy their goals, and that physicians must strive to improve their patients' conditions, it seems we lack the techniques to make head transplantation permissible in this sense, at least at the present time.³²

²⁹ This excludes premature death.

³⁰ In a BBC article on Dr. Canavero, Lindsay Brown reports the former's claim that he tried fusing the spinal chord of a dog that was 90% disconnected; according to Dr. Canavero, the dog regained motor function. Others in the scientific community remain skeptical that fusing the spinal column and regaining significant function is possible. Additionally, since previous subjects have died within a relatively short time after the procedure, it is impossible to gauge long-term effects. See Lindsay Brown, "The surgeon who wants to perform a head transplant by 2017" via *BBC (Life)*, September 20th, 2016. This skepticism and the lack of wide-spread acknowledgment of these results gives us reason to be hesitant to endorse human head transplantation before definitive studies have been completed.

³¹ See Canavero, Sergio. "HEAVEN: The head anastomosis venture Project outline for the first human head transplantation with spinal linkage (GEMINI)." *Surgical neurology international* 4 (2013): 335, p. S338.

³² It is certainly plausible that there might be ways around these issues in further studies. We might, for example, take a monkey that has been taught to communicate at a basic level, and assess its communication skills before and after the procedure to determine its cognitive abilities. One might also object that we can never gain comparable information of the sort I suggest is required from animal testing since humans are different in many areas, rendering many studies we may have already deemed permissible unethical. While this objection does have a strong basis, I believe the difference in this case lies in the significant jump in non-human and human cognitive intelligence (as opposed to chimp and human liver function, for example), and the fact that here would be no way to assess changes in personal identity without some robust form of communication, assuming we could determine which theory we ought to favor in the first place.

The third and final question animal testing would need to answer is a philosophical one: would the patient be the same person? As mentioned above, the answer to this question largely depends on forming an accurate account of personal identity: it might be the case that no significant issues arise, assuming one is a strict neuro-materialist about personal identity and no mental content has changed. If one holds any other theory, however, we have reason to believe the patient might not be the same person. Take a religious conception: if one believes one has a soul that leaves the body upon presumptive death, then the patient might not be the same person should he regain consciousness (in fact, if this is correct, he might not be a *person* at all, if a soul is required). Turning to non-theological accounts, people who hold the organism view might argue that the constituents of the patient's regulatory capacities have been fundamentally altered, such that the patient is now a new person. As long as one thinks consciousness is one fundamental component of personal identity, we might still question whether or not the procedure altered the patient's identity because we still lack a firm grasp on the nature and generation of consciousness.³³

One might object that none of these concerns ultimately matter: why should we care if the resultant person is a different person than the initial patient? This concern lies in the nature of medical treatments and of the benefits treatments may have on patients. The very nature of professional medical ethics, wherein clinicians are bound by specific ethical codes and principles, requires that treatments be beneficial. In metaphysical terms, a treatment must be beneficial to *someone*, namely, the patient. This means that a treatment must improve a specific patient's condition. If head transplantation results in a numerically different person, that person has not *benefited* from a specific person, since the new person created has just come into existence. The person before the head transplantation has not been benefited because they have ceased to exist in favor of the numerically distinct, new person.³⁴

We thus have two reasons to concern ourselves with this question. The first, naturally, is for philosophical and epistemic clarity. The second, more pressing concern in terms of professional medical ethics, is that clinicians are not usually encouraged to go about making new people with their therapies, bracketing cases in which a patient undergoes in-vitro fertilization or other fertility treatments. If a clinician sets out to treat a specific patient, but knows that the treatment will create a different person, that treatment would not be ethically appropriate. If we have reason to think that head transplantation would create a new person, or even if we suspect it might, we have reason to believe it is an impermissible technique.

³³ Here, the key distinction is between simple awareness and consciousness. Many writers believe consciousness involves a more robust sense of oneself as a subject with a practical identity, as opposed to merely being able to respond to stimuli. For different accounts of consciousness and the distinction between awareness and consciousness, see Sartre, Jean-Paul. *Being and nothingness*. Open Road Media, 2012; Chalmers, David J. *The conscious mind: In search of a fundamental theory*. Oxford University Press, 1996; and Van Gulick, Robert, "Consciousness," *The Stanford Encyclopedia of Philosophy* (Winter 2016 Edition), Edward N. Zalta (ed.).

³⁴ This is essentially the inverse of the non-identity problem, which normally refers to harms people have suffered or the ways in which they may have been better off if things had been different. For a discussion of the non-identity problem, see Parfit, Derek. *Reasons and persons*. OUP Oxford, 1984, and Roberts, M. A., "The Nonidentity Problem," *The Stanford Encyclopedia of Philosophy* (Winter 2015 Edition), Edward N. Zalta (ed.).

Animal Testing and Ethics

Another issue confronts us in whether or not testing out head transplantation techniques on animals is morally permissible in the first place. As mentioned above, before a treatment reaches a patient, it must pass rigorous animal testing. If a treatment will ever be determined to be morally permissible, then, it must be considered morally permissible to test that treatment on animals. If it is not even morally permissible to test a treatment on non-human animals, who may have at least slightly lower moral status than humans³⁵, it would not be morally permissible to use that treatment on human beings. Determining whether or not head transplantation is morally permissible on humans, then, requires determining that it is morally permissible to try the technique on animals. Unfortunately for proponents of head transplantation, I do not believe this claim is defensible.

There are several tests one might employ to determine whether or not animal testing is permissible in any given case. Generally speaking, most people claim that testing should be conducted in a “humane” way, meaning that the experimental protocol must not be conducted cruelly, and that the subjects should not be exposed to excessive, needless suffering. It is also reasonable to think that there must be some kind of value or purpose for the results of studies using animal testing, given the fact that we have strong reasons to think animals have at least some degree of moral status. If there were no positive benefits to a study, we would be infringing on beings with moral status for no reason. In line with both of these claims, we might also think that animal testing should be avoided when possible, in order to minimize the number of beings with moral status who suffer. To capture these three intuitions, I previously proposed the following test to determine the permissibility of experimenting on animals:

Permissible Research: A research project is morally permissible if (1) there is a compelling reason to undertake the project, (2) there is a high probability of successfully completing the project and gaining positive or negative results, and (3) one had no other options.³⁶

In retrospect, (1) is somewhat vague: a “compelling reason” is an ambiguous criterion, and fails to capture what I had in mind when considering animal research ethics. In general, there seem to be two kinds of reasons for conducting scientific studies: 1) in order to expand our knowledge for the sake of knowledge itself, and 2) in order to expand our knowledge to bring about some sort of benefit. All studies presumably satisfy one purpose, and possibly even both. While knowledge in itself is certainly valuable, one must tread carefully when beings with moral status must front the cost of that knowledge. If nobody would ever benefit from a certain study in which animals suffered, it seems wrong to conduct that study. And since many animals may suffer in even a single, brief experiment, it seems reasonable to think that benefit must be significant. We might say that the study should benefit, or contribute to efforts that

³⁵ For a thought experiment that demonstrates this intuition, see Liao, S. Matthew. *The right to be loved*. Oxford University Press, 2015, pp. 16-17.

³⁶ Michael S. Dauber, “Criminology and Research Ethics,” published via *Ethics and Society*, Fordham University, 2015.

will benefit, society as a whole. We will thus examine head transplantation through the following test:

Permissible Research 2.0: A research project is morally permissible if (1) there is a reasonable possibility that the project will benefit society, (2) there is a high probability of successfully completing the project and gaining positive or negative results, and (3) one had no other options.

To claim that head transplantation experiments are permissible on animals, then, we must prove a high likelihood of successfully gaining useful results relevant to determining the prospect of benefiting society, and it must be clear that there are no other viable means of conducting the study than to use animals. Given the discussion of consciousness and personal identity above, it seems reasonable that we can satisfy (3), since non-human animals provide the closest possible comparison to human subjects. The bulk of the analysis focuses on (1) and (2).

We begin with (2), the possibility of gaining positive or negative results. While it is true that researchers have already gained results from completed trials, it is unclear whether or not they could answer questions about personal identity shifts or the return of human-level consciousness with these studies. The point here is not that the studies might simply prove that successful head transplantation is not possible: that would still be a valuable outcome. The problem is that it may be impossible to determine changes in personal identity, and it would be impossible to evaluate changes in human-level consciousness and cognitive faculties in animals, who do not possess these traits to the extent that humans do. Because we lack a reasonable expectation of definitive answers to these questions in either direction, we have reason to suspect testing head transplantation out on non-human animals would be impermissible.

The most complicated criterion to evaluate is (1), having a reasonable possibility that the project will benefit society. It may seem obvious that the ability to “save” people by relocating them to new bodies (assuming personal identity is, in fact, “in the head”) would save many people from death or disability. While that might theoretically be possible, it is unclear whether or not such measures would be feasible in the real world. The costs of even minor surgeries can be extraordinarily high. Presumably the cost of severing a spinal chord and keeping a separated head and body “alive” long enough to fuse them together would be quite expensive, not to mention the subsequent cost of rehabilitation.³⁷ I do not claim that this cost would need to be born by the public itself: it is possible that some people might possess the means to pay for such interventions themselves. However, it is unlikely that there would be a large number of people that could pay for these interventions themselves, and societies with limited resources must be wary of spending money and supplies on endeavors that are high in cost and low in quantitative reward. Additionally, we would face significant technical problems in making head transplantation possible on a large scale: where would the bodies come from? Keep in mind, the bodies would need to have died from causes “above the neck,” otherwise it is unlikely that the body could be resuscitated even a

³⁷ Welch’s article suggests that the procedure “would require 80 surgeons and cost tens of millions of dollars if approved.” See Ashley Welch, “Russian Man Volunteers For First Human Head Transplant” via *CBS News*, August 29, 2016.

patient's head were successfully attached. Because of these practical difficulties, it seems that testing head transplantation on animals would be morally wrong.

It is helpful to pause here and say a few words about a possible objection. In other works, I have previously argued using a strategy employed by Derek Parfit in *Reasons and Persons*³⁸ to defend against objections grounded in practical considerations: I have argued that the mere fact that something might in fact be practically impossible does not mean that it might not be intrinsically or theoretically morally permissible or encouraged. In this case, the claim would be that the mere fact that we cannot *yet* implement head transplantation on a sufficient scale to render the technique sufficiently beneficial does not mean that head transplantation is morally wrong *prima facie*. I certainly agree with this claim. However, for the purposes of this paper I am concerned only with the permissibility of head transplantation and the associated animal testing required to explore the technique in our current world, given our current level of technological ability. While it might be the case that our technology and knowledge improve in the future, there is no way to perform ethically appropriate animal testing as it currently stands given our failure to answer vital questions and to create a system in which head transplantation could provide a reasonable benefit to society. As long as one maintains that morally permissible animal tests would need to be completed before head transplantation could be performed on human beings, head transplantation is not morally permissible.

Caveat: Are We Hypocrites?

Before concluding, we must confront a potentially damaging objection. Many writers might think that physician-assisted suicide (or, to use its negative connotation, "euthanasia") is morally permissible in cases in which a patient has a terminal or chronic condition and would rather not continue to live.³⁹ However, based on the above considerations, I have argued that attempting human head transplantation is impermissible, despite the fact that the patient has stated he wishes to give the technique a try, even if it means his death. This creates a tension: on the one hand, we might think it is permissible for clinicians to help their patients kill themselves in certain situations, while on the other hand we might not think it is morally permissible for a clinician to offer a technique that is likely to kill the patient but may actually bring about significant benefit, even though the patient has said he is willing to take the risk. Why should we accept certain death in some situations, but think it is wrong to give the patient a chance in others?

The problem with head transplantation is that, absent the results of successful animal testing, there are an extraordinarily wide range of potential outcomes and side effects for the patient. Traditionally, patients are given a range of potential benefits, side effects, complications, and risks for surgical procedures. Death is often a potential side effect. In cases of physician-assisted suicide, death is acknowledged and intended as the final outcome. In head transplantation, patients may receive some benefit, they may die, or they may experience a whole range of unknown side effects. It might be the case that

³⁸ Parfit, Derek. *Reasons and persons*. OUP Oxford, 1984.

³⁹ See Rachels, James. "Active and passive euthanasia." *Bioethics: An Introduction to the History, Methods, and Practice* (1975): 77-82, and

the patient might even find some of these side effects worse than death itself. Without knowing the full range of possible outcomes⁴⁰, it seems impossible for the patient to truly make an informed decision, and therefore head transplantation cases are fundamentally different from instances of physician-assisted suicide.

One might object that patients wishing undergo attempted head transplantation have one solution available to them: patients could write advanced directives indicating their wishes for specific side effects, and even for side effects nobody could anticipated. For example, one might write an advanced directive indicated one's wish to be euthanized if one were in a "locked-in" state, or if one incurred profound cognitive impairments. There are several problems with this solution however. First, advanced directives are not currently used to allow clinicians to kill the patients about whom they are written, even if the patient would not wish to be kept alive. Whether or not the distinction between killing someone and letting them die is philosophically defensible, the distinction is regarded as true in clinical practice in many cases, and thus would apply to current cases of head transplantation. This is especially true from the perspective of the medical profession, which adopts standards somewhat independent of the counsel of other entities (i.e. if philosophers or religious figures claim something should be the case, it is a separate matter as to whether or not the medical profession accepts it).

Second, the thinking behind advanced directives is shaky at best, and could be outright damning in this case. Advanced directives build on the idea that decisions should be made using diachronic principles, meaning one takes one's past, present, and future states into account. More often than not, this is a reliable method for decision-making. However, this heuristic sometimes fails us: diachronic principles can lead us toward undesirable paths, and depending on the majority of one's experience runs the risk of discounting one's current state when making life-altering decisions.⁴¹ This is especially prudent in cases like head transplantation and other life-or-death decisions: if one decides, for example, that one would rather be killed than suffer a certain disability, but then discovers they would wish to continue to live after experiencing the disability itself, the diachronic principles behind advanced directives would indicate that one's current preferences should be discounted. Suppose further that one experiences locked-in syndrome, and cannot communicate one's change of heart: one would have no way of persuading one's guarantors that one had changed one's mind.

In practice, advanced directives are not used to actively kill a patient, and clinicians always err on the side of caution when patients suddenly change their minds and embrace life rather than death. It is unlikely that any head transplant patients would be killed in the manner suggested above. The point is merely that turning to advanced directives as a solution to the dilemmas posed by head transplantation procedures is not an adequate response.

Conclusion

⁴⁰ This is true in any experimental study in human trials. However, this case is significantly different given the nature of the questions that must be answered and the fact that we have strong reasons to suspect that there is no way for a medical team to have a good faith basis for offering the treatment. These variables make the bar for consenting to the procedure on the basis of unknown side effects much higher.

⁴¹ See Hedden, Brian. *Reasons without persons: rationality, identity, and time*. OUP Oxford, 2015.

I have argued that head transplantation is morally impermissible on a number of grounds. The strikes against the technique have a progressive layering effect: if one assumes, for the sake of argument, that a preliminary objection can be avoided, another, deeper problem arises. In the first place, testing out head transplantation on animals seems to be *prima facie* unethical, as it is unclear that the technique could sufficiently benefit society or that researchers could gain the knowledge required to approve the technique for use in humans. Assuming that testing were permissible, one would still face issues with the actual results of studies completed thus far: current animal testing has not given the knowledge required to deem the technique safe for human testing. This is especially troublesome given the fact that it is unclear whether or not Dr. Canavero's preliminary results have been accepted by the scientific community as a whole. Assuming that the current tests had given the requisite information, however, it would still be morally wrong for a clinician to perform head transplantation on this patient because it is unlikely that head transplantation could be medically indicated for a patient with Werdnig-Hoffman Syndrome. In light of these considerations, head transplantation seems morally impermissible on multiple fronts.