

GUEST COMMENTARY

HUMAN HEAD TRANSPLANTS: WHY IT'S TIME FOR A SERIOUS DEBATE

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In the 1831 edition of her Gothic novel *Frankenstein*, Mary Shelley muses: “Perhaps the component parts of a creature might be manufactured, brought together and endowed with vital warmth.” Here I dispute the wisdom of human head transplants, a contemporary variation of Shelley’s freakish proposal. I argue that, *even if* this procedure were to reach technical and safety feasibility, it’s of paramount importance to demonstrate *now* why human head transplants should *never* be done.

To perform a human head transplant—connecting a transplant recipient’s head to a donor’s body—would represent a grave injustice on several levels—on the medical level, ignoring salient duties and responsibilities of the American medical-research community (Part One); on the sociological level, corrupting the family lineage and marital unity of the head transplant recipient (Part Two); and, on the individual level, annihilating the personal identity and dignity of the head transplantee (Part Three).

Background

The past several decades have been dubbed the golden age of transplant medicine. In addition to hearts, livers, kidneys, and lungs, pioneer transplant surgeons have attached much more delicate organs—voice boxes, uteruses, tongues, penises, hands, and faces—to the bodies of transplant recipients, all involving the connection of a myriad of muscle, skin, bone, tendon, cartilage, nerve, and blood vessels. Concurrently, transplant researchers have developed powerful antirejection drugs that all but eliminate rejection of the transplanted organ.

Investigators Xiaoping Ren,¹ a Chinese orthopedic surgeon at Harbin Medical University, and Sergio Canavero, an Italian neurosurgeon and director of Turin Advanced Neuromodulation Group, regard human head transplants as the next frontier of transplant surgery.² In particular, Ren and Canavero want to advance Robert White’s 1970 primate work to the human level. While Dr. White focused solely on keeping the brains of the transplanted rhesus monkeys alive, Ren and Canavero plan not only to keep the human recipient’s brain alive but also to connect his severed spinal cord to that of the donor, enabling the recipient’s brain to direct his new healthy body.

The goal of Ren and Canavero is to extend the life of persons suffering from lethal bodily diseases that have no cure. They want to attach the healthy head and brain of a person suffering from tetraplegia, whole body-wasting conditions, body-wide malformations, intractable cancers, and progressive muscular dystrophies to the healthy body of a brain-dead donor. The full technical moniker for their proposed surgery explains its two-pronged protocol: HEAVEN (HEAd Anastomosis VENTure) and SCF (GEMINI³ SPINAL CORD FUSION).

Undeterred by refusals from American and European authorities, Ren and Canavero immediately petitioned the Chinese government for approval to perform HEAVEN/SCF on a living patient at Harbin Medical University. Chinese patients suffering from various body-wasting diseases are already signing up for the surgery, even though governmental approval is far from certain. To personalize the following description of HEAVEN and SCF protocols, the first prospective human head transplantee and brain-dead donor are assigned the respective Chinese pseudonyms Zhang Wei (suffering from a body-wasting form of cancer) and Wang Yong (a victim of a catastrophic car accident):

1. Once consent from Yong's family for the whole body transplant is obtained, the surgeons would set up the body of Yong for surgical decapitation;
2. At the same time, Wei would be brought in and another surgical tech would cool his body to 50 degrees Fahrenheit, delaying tissue death in his brain for about an hour;
3. With both recipient and donor in a seated position, the surgeons would simultaneously remove the heads of both Wei and Yong from their bodies, that is, concurrently sever their spinal cords;
4. A custom-made crane would be used to shift Wei's head—hanging by Velcro straps—onto the neck of donor Yong;
5. The two ends of the spinal cord would be bathed in a chemical called polyethylene glycol, or PEG, to promote regrowth of nerve cells that make up the spinal cord—literally fusing the nerve cells together, paying attention to the critically important nerve connections from the brain to the heart and from the brain to the muscles that pump the lungs;
6. The muscles and blood supply from the donor body would then be joined with Wei's head;
7. Machines would breathe for Wei at first while he is kept in a coma for three to four weeks to prevent movement as he heals; and
8. Implanted electrodes would stimulate Wei's spinal cord to strengthen new nerve connections, a negative pressure device would create a vacuum to encourage Wei's nerves to fuse, and powerful antirejection drugs would prevent Yong's body from rejecting Wei's head.

Part One

On the medical-research level, what are the salient objections behind American neuroscientists' rejection of Ren and Canavero's request to perform the first human head transplant in the U.S.?

Future authorization of human head transplants would disregard salient oversight duties and responsibilities of the American medical-research community.⁴

First, the regulatory arm of the U.S. medical-research community, dedicated to protecting human subjects involved in experimental surgical interventions, would only authorize HEAVEN/SCF procedures when they are proven to afford the human head transplantee a reasonable hope of benefit and a minimization of injury and death. This means that, before Ren & Canavero could even begin to recruit prospective head transplantees, they would need to fulfill the following preclinical regulatory

requirements: (1) Carry out more successful clinical experiments on mice and rats and, more importantly, on larger animals—dogs and primates, than they have done to date; (2) Observe post-surgical animals for longer periods of time to determine how long the animal survives and how the animal fares with brain-limb communication; (3) Publish data from these animal studies in peer-reviewed journals and satisfactorily respond in said journals to critiques of their neuro-specialist colleagues;⁵ and (4) successfully execute HEAVEN/SCF numerous times on human cadavers and then on brain-dead mechanically-ventilated donors before they would be given permission to do the procedures on a living recipient. Fulfilling the latter requirement is the nearly impossible equivalent of a figure skater flawlessly executing triple axels followed immediately by a triple toe loop, not once, but every time it's attempted!

Second, the medical-research community would require Ren and Canavero to follow appropriate patient consent requirements. The head transplant recipient must have no other treatment options, must suffer a body-wide condition that is lethal, and must only give consent to transplant procedures that offer a reasonable hope of success and an acceptable minimization of morbidity and death. Consent from the brain-dead donor, victim of some sort of catastrophic event, must be obtained from his family, in accord with the victim's prior donor stipulations.

Third, the medical community has the duty to justly triage scarce medical resources. On the one side, it would need to weigh the prospect of investing millions of dollars plus the time and skill of 80 clinicians in the HEAVEN/SCF procedures with hopes of benefiting one patient. On the other, it would need to balance the possibility of investing comparable financial and personnel resources into perfecting spinal transplants/spinal repair so that the 12,000 people in the U.S. every year who suffer spinal-cord injuries might walk again.

Fourth, the academic publishing arm of the U.S. medical-research community must exercise the democratic duty of journalism: to expose the experimental technologies and interventions of HEAVEN to the light of public and academic scrutiny. Otherwise, as we already see, human head transplants will be imported to countries like China whose medical regulatory requirements are much more lax than those of the U.S. If done in haste—in China, for example, in 2018 as Canavero advocates—with catastrophic or unconscionable results, the entire enterprise of HEAVEN/SCF could fall into disrepute, setting any actual benefits back years if not decades.⁶

Part Two

On the sociological level, what are the salient moral objections substantiating American ethicists' rejection of Ren and Canavero's request to perform the first human head transplant in the U.S.?

Future authorization of human head transplants would disparage the family lineage and marital unity of transplant recipients.

Should recipient Wei survive the head transplant and were he to reproduce with his new body, his child would not have his genetic makeup but the DNA passed on through donor Yong's sperm. Since it's Yong's sperm that would fertilize the egg of Mrs. Wei, what kind of rights would the Wei family have to baby Wei? Would the Yong family have visitation rights or the standing to contest baby Wei's will? What

surname should the child be assigned? A new surname distinct from that of recipient Wei and donor Yong? Or a hyphenated surname consisting of Mrs. Wei's maiden surname, Ying, with that of donor Yong, as in Ying-Yong?

Would the transplantee's spouse, Mrs. Wei, be committing adultery whenever she has intercourse with her transplant recipient husband Zhang? Conversely, would Mrs. Yong long for one last embrace with the body of her donor husband Wang—or would she grow jealous of Mrs. Wei having sex with the body of her spouse?

Part Three

On the individual level, what are the salient moral objections substantiating American philosophical/theological rejection of Ren and Canavero's request to perform the first human head transplant in the U.S.?

Future authorization of human head transplants would disparage the dignity and identity of transplant recipients.

Zhang Wei, like every other human person, is a body-soul unity. He does not merely own or use his body. He is his body. Zhang Wei, a rationally intelligent and free embodied being, does not experience himself in a dualist fashion—a body here and a soul over there—where the two parts are disconnected and unrelated. Rather, he is consciously aware of himself as a unified whole—a single being composed of two inextricably linked dimensions—one bodily, the other spiritual. He is an embodied human being who reveals his spirit or person through his body and bodily actions.

The spiritual principle of Zhang Wei's soul gives unity and life to the many parts of his body. In other words, Wei's unity requires more than his parts to explain that he exists. Even though one part of Wei's body—his brain, the organ of central control—has primacy, his brain is not the source of his unity. The soul of Zhang gives substantial unity to his being and defines his *unique* body-soul identity. The particular body-soul unity of Zhang Wei is alive—functioning as a human organism with the brain as the primary organizer—by virtue of his soul. Zhang Wei, a unique body-soul unit, will die—stop functioning as an integrated organism—when his soul separates from or leaves his body.

Keep in mind that Zhang's surgical decapitation separated his former body and soul, thereby fracturing his substantial unity, the source of his personal identity. It follows that if the head transplant is successful—that is, the body-soul unit of Zhang Wei's head connected to Wang Yong's body survives—we would have to argue that what holds the survivor's bodily parts together and makes them function as an organism is his soul, assisted by his brain, the organ of central control.

William D. Virtue,⁷ STD., explains how the concept of the brain as the organ of central control relates the Thomistic principle of ensoulment to modern genetics:

Benedict Ashley OP and Albert Moraczewski OP demonstrate⁸ that genetic science confirms St. Thomas Aquinas' *principle of hominization: the spiritual soul can only be united to matter—a body—that is proportionate to the powers of the soul for knowing and willing*. At the completion of fertilization—the process of conception—the human soul is united to a complete set of human DNA in the nucleus of the zygote. The zygotic nuclear DNA is the “primary organizer,” the physical instrument through which the soul directs the building of a human body with a brain and organs

needed for acts of knowing and willing. Everything that is needed, and the power to develop the body throughout embryogenesis, is present at the act of conception.

Therefore, genetics proves that the soul, as the form of the body of the zygote, is present; indeed, the soul must be present, because the *order* in the DNA sequence transmits *information* that is immaterial and therefore not reducible to the material-chemical substrate by which it is transmitted. DNA ‘instructions’ are species-specific (human) and unique for each individual (a new set of chromosomes). All of this is present *in act* at the moment of conception by the power of the soul united to *this* body. The soul acts throughout the body as its principle of *unity*; it is united to every cell of the body with its identical DNA. Because of this, a single soul does not and cannot direct two different bodies with different DNA. (Has biology ever found one living body directed by two sets of DNA?)

Furthermore, in typical organ transplants—such as heart, lung, liver—there is substitution of a part. But since the DNA in the nucleus of the zygote is the *primary organizer* from the start and, since that same DNA throughout embryogenesis is in direct continuity with the brain-central nervous system, this one part—the brain—is the “first part,” the “organ of central control.” The brain is not like the other parts—heart, lung, liver—but is the principle instrument through which the soul unites all the parts to form one unique living body. Natural law ethics, related to Aquinas’s hominization principle, is now confirmed by genetics.

Hence, the soul informing the survivor of the prospective human head transplant under discussion here could not be the survivor’s original soul because that spiritual principle does not have the capacity to direct two different sets of DNA, that of his head and that of Yong’s body.⁹ For the same reason, the soul of the survivor could not be that which formally united the body and soul of Wang Yong. Therefore, the head transplant survivor, a human-to-human chimera of sorts, would lose his former identity altogether and take on a new one. Stated differently, were the transplant recipient to live post-HEAVEN/SCF, his survival would signal direct Divine ensoulment. To be ontologically consistent, then, we would have to assign that head transplant survivor a new name.

This assignment demonstrates the errors of the dualist anthropology suffusing the Ren/Canavero discussion of human head transplants. Statements from both clinicians demonstrate a failure to recognize the inextricable link and complete complementarity between body and soul. They fail to understand that human intellect is always *embodied* thinking. Instead, Ren and Canavero define a head transplant recipient as his mind and consign his body to the objective world of Descartes or the phenomenal world of Kant. For them, getting a new body as a head transplant recipient is akin to getting a new wheelchair. Dr. Ren answers his own question about the essence of a person by insisting “the person is the brain not the body. The body is just an organ.”¹⁰

Conclusion

To perform a human head transplant would not only be an injustice on the medical-research and sociological levels, it would also—and most importantly—be an offense against the dignity and integrity of the transplant survivor. Amputating his head from his body—separating his brain, the primary physical instrument of his soul, from his body—wouldn’t save the life of the head transplant recipient, as Ren and Canavero intend, but directly destroy it.

Endnotes

1. After moving to the U.S. in the 1990s, Ren joined the team in Louisville, Kentucky that performed the world's first successful hand transplant and practiced for that procedure by repeatedly switching forelimbs between different animals. He became a naturalized U.S. citizen before returning to China.
2. C-Yoon Kim, Konkuk University School of Medicine, South Korea, has conducted head transplant animal studies with mice and rats. He is an offsite collaborator to the experimental head transplant work of Ren and Canavero taking place in Harbin, China. Kim performed head transplants on dogs and monkeys and, most importantly, collaborated with Canavero and Ren performing an 18-hour surgery that allegedly connected the spine, nerves, and blood vessels of two human cadavers. "First cephalosomatic anastomosis in a human model," *Surgical Neurology International*, 2017; 8:276.
3. Canavero likens the spinal cord fusion procedure between the head of the recipient and the body of the donor to the March 16, 1966 docking of the *Gemini 10* spacecraft with another, using its engines to move both vehicles. In September of 2016, Canavero announced: "Gemini has landed—spinal cord fusion achieved."
4. In addition to the medical regulations listed in the body of this essay, there are two possible downstream events that would also demand oversight. First, should HEAVEN/SCF procedures attain technical feasibility and clinical success, the American medical-research community would have to take every measure to expunge the possibility of black marketing or trafficking of destitute persons for whole body transplants. They would need to exercise the same vigilance against the coercion of prisoners or other disenfranchised individuals to supply their healthy bodies to meet the demands of prospective wealthy recipients suffering from whole-body maladies.
Second, professional medical organizations would have to design protocols to manage post-surgical morally problematic scenarios. For example, should the head recipient survive but experience excruciating pain, should attending surgeons grant his request for assisted suicide? Or, if the patient dies as a result of HEAVEN & SCF procedures, should the surgeons be convicted of murder, given their foreknowledge of the potential serious risks associated with human head transplants?
5. Michael Sarr, co-editor of the academic journal *Surgery*, polled the journal's editorial board before publishing three Ren/Canavero papers on brain preservation and spinal cord fusion. One-third of the board voted to reject the papers; one third wanted to accept them; the final third was neutral. *Surgery* did run the articles in the fall of 2015 but only under the auspices of exploring the involved technologies as potentially applicable to treating traumatic spinal-cord injuries rather than as an endorsement of performing HEAVEN/SCF on a living patient.
6. "It's time for a serious debate about head transplants," *New Scientist*, 20 September 2016 [<https://www.newscientist.com/article/2106525-it's-time-for-a-serious-debate-about-head-transplants>].
7. Content of a phone conversation with Dr. Virtue in December of 2017.
8. Cf. "Is the Biological Subject of Human Rights Present from Conception?" in *The Fetal Tissue Issue*, ed by Peter J. Cataldo, Albert Moraczewski, Braintree, MA: The Pope John XXIII Medical-Ethics Research and Education Center, 1994, 33-59; "A Critique of the Theory of Delayed Hominization," in *An Ethical Evaluation of Fetal Experimentation*, ed by Donald G. McCarthy, Albert Moraczewski, St. Louis: Pope John XXIII Medical-Moral Research and Education Center, 1976, 113-133; "Cloning, Aquinas, and the Embryonic Person," in *The National Catholic Bioethics Quarterly*, Summer, 2001, 190-201.
9. Is there any known living organism whose organ of central control directs two sets of DNA?
10. Alan Martin, "Human head transplant: Controversial procedure successfully carried out on a corpse; live procedure 'imminent,'" *ALPHR*, 17 Nov 2017, p. 10 [<http://www.alphr.com/science/1001145/human-head-transplant>].