



## The Question of Identity between the Restorative and Regenerative Organ Transplantations

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### Abstract

This paper explores implications of organ transplantation on *identity* and body integrity. It investigates how advancements in transplant technologies can affect and reshape our conception of identity at individual and social levels. The question of identity as a distinctive code for every organism is increasingly becoming important due to the advanced biomedical technologies and its legal, ethical, and social implications. Modes of organ transplantation, in this paper are divided into two major types (i) restorative and (ii) regenerative. Both types have important implications on conception of identity, at various levels, from both biological and social perspectives. While highlighting all these dimensions, this article focuses on implications of restorative organ transplantation on identity based on four specific cases, which are: (i) hand transplantation, (ii) facial transplantation, (iii) reproductive organ transplantation, and (iv) head / body transplantation. Investigating all these cases, the paper has concluded that while the advanced biomedical technology is essential for survival of many lives, application of such technologies must be consistent with moral values and the universal principles for human dignity and body integrity.

**Keyword:** *Organ transplantation, loss of personal identity, cyborg, body transplant, ethical questions.*

### Abstrak

Artikel ini menerangkan implikasi pemindahan organ ke atas identiti dan integriti tubuh. Ia menyiasat mengenai kemajuan dalam teknologi pemindahan boleh mempengaruhi dan membentuk semula konsepsi identiti di peringkat individu dan sosial. Persoalan identiti sebagai kod tersendiri untuk setiap organisma semakin penting kerana teknologi biomedikal yang canggih dan perundangan, etika, dan implikasi sosialnya. Mod pemindahan organ dalam artikel ini dibahagikan kepada dua jenis utama (i) restoratif dan (ii) regeneratif. Kedua-dua jenis ini mempunyai implikasi penting mengenai konsep identiti, di pelbagai peringkat perspektif biologi dan sosial. Artikel ini memfokuskan kepada implikasi pemindahan organ restoratif terhadap identiti berdasarkan empat kes tertentu iaitu: (i) transplantasi tangan, (ii) transplantasi wajah, (iii) transplantasi organ pembiakan, dan (iv) transplantasi kepala/tubuh. Kesimpulan daripada artikel ini dapat menyatakan walaupun kemajuan teknologi bioperubatan adalah penting untuk kemandirian bagi kebanyakan kehidupan, penerapan teknologi tersebut mestilah selaras dengan nilai-nilai moral dan prinsip-prinsip sejagat untuk martabat manusia dan integriti tubuh.

**Kata kunci:** *Transplantasi organ, hilang identiti peribadian, "cyborg", transplantasi tubuh, persoalan etika*

### Introduction

The advanced biomedical engineering, especially the regenerative organ transplantation technology, has critical impacts on identity from both biological and

social perspectives. The question of 'identity' historically has been an important field of interest for various disciplines, especially psychology, philosophy, forensic science; and recently it has become an important research field for genetics and molecular biology. Philosophers have been attempting to distinguish between numerical and qualitative conceptions of identity. They ask what does it takes to persist as the same person over time. In other words, they attempt to answer the question do our personal identity is determined by body, or mind, or soul?

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Understanding the distinctive nature of every creature and personal identity of individuals is extremely important for legal, social, cultural, and religious factors. Everything in different categories of biological species has its own code of identity which determines its uniqueness and determines its own form of being. However, with recent advancements in biomedical engineering and its complex applications, the reality of distinctive identity is totally challenged from both biological and social perspectives.

While acknowledging the crucial role of the emerging transplant technologies and appreciating its life-saving potentials, the critical questions that arise from biomedical research and its practices can be extended to how such technologies may affect human dignity in one hand and concept of personal identity in the other. Many biologists and biomedical theorists have expressed their deep concerns on negative impacts of the emerging transplant technologies. They believe that the advanced biomedical technologies may alienate the organic body of mankind as it rooted in humanity and subsequently may lead to commodification of human body which opens up the 'market' of body parts. (Hogle, 2005; Bowring, 2003). They, especially, emphasise that advancements in regenerative transplant engineering will eliminate the concept of integrated human body and potentially erase its personal identity. (Haraway, 1991; Ai-Ling Lai, 2012).

Williams (1997), citing Shilling, 1993, holds that the more control we have over our bodies, the less certain they become. He specifically notes that the proliferation of new technologies designed to control, reshape, and mediate our corporeal relations with others, have all meant that our sense of what precisely the body *is* and what it might *become* is increasingly uncertain. Williams further explains that the body has become a "project", one which is reflexively open to control amidst a puzzling diversity of imperatives, choices and options. This, in turn, according to Williams, sets up something of a paradox which is the more control we have over our bodies, the less certain they become. (Williams, 1997).

The question of identity, as related to organ transplantation, can be looked from various dimensions. For instance, the 'identity' can be conceptualized in different contexts, such as biological, social, and philosophical. Technologies and modes of organ transplantation, on the other hand, can be divided into various types, such as restorative and regenerative. Both types have important implications on conceptualization of identity at different levels. Highlighting all these dimensions, this article aims to investigate the basic issues of biomedical technology, especially the impact

of restorative organ transplantation on conceptualization of identity, from both biological and social perspectives. The article investigates implications of organ transplantation on identity based on four specific cases, which are: (i) hand transplantation, (ii) facial transplantation, (iii) reproductive organ transplantation, and (iv) head / body transplantation.

## **Restorative and Regenerative Organ Transplantations**

Dumit and Davis-Floyd (1998) describe the paradoxical nature of biomedical technologies as an *enhancer* as well as a *mutilator*. They note that as these technologies are aiming at enhancing human health (it gives great promises for better life), at the same time it potentially threatens human identity. Biomedical technologies on organ transplantation can generally be divided into two basic types, which are: (i) restorative (organic), and (ii) regenerative (cyborg). The first type, also known as "*organic*" is the classical method of transplantation which aims at rejuvenating the lost bodily functions through organ replacement that depends, mainly, on natural organs from the same species. The regenerative method, on the other hand, is based on advanced biomedical technologies which aim at, not only to restoring the problem of organ failure but also, regenerating organs based on biotechnologies, such as cloning stem cell engineering, to produce organs, such as artificial heart, kidney, and other body parts to restore the problem. The term "cyborg" is sometimes used for the regenerative organ transplantation, which summarizes the whole idea behind the hybrid organisms and artificial organ technologies. Both types have important implications on concept of identity at various levels, but the later types, i.e. regenerative organ transplantation, posts more critical questions on meaning and nature of human body (Haraway, 1991).

## **Restorative Organ Transplantation**

Restorative organ transplantation, in this context, indicates the method of organ transplantation which based on technics of transplanting an organic (natural) organ from the donor to the recipient among the same species. This is the classical technic of the prevailing method of transplantation, which aims at resorting the problem of organ failure. It presents the real story of the success in biomedical technology which has brought great hope for new life to many patients across the globe. Beside some ethical questions, the major challenges of this method are (i) the problem of increasingly scaring donors, as associated with cultural, ethnic, and religious obstacles; and (ii) the

question of identity in specific cases, such as reproductive organ transplantation, as will be elaborated in the proceeding sections of this article. Problems of identity that posted by this mode of transplantation can be divided into internal and external which may lead to biological and social confusion of identity.

### Regenerative Organ Transplantation (Cyborg)

Regenerative method depends mainly on engineered organs through stem cell technology and cloning, which guided by principles of “Cybernetics”. Aiming at controlling and redesigning of physiological and psychological regulatory systems, the term “cyborg” has been applied to both mechanic and organic processes. Chris Hables-Gray in his “*Cyborg Handbook*” holds that the use of the term “cyborg” is relatively a new phenomenon which constitutes a new stage in which human/machine coevolution are managed by *Cybernetics*, the science that outlined by Norbert Weiner, which enables to interpret both the mechanic and organic processes as parts of informational systems. Practical applications of Cybernetics are reflected within biomedical technology in different forms, such as cyborg and xenotransplantation, all of which are ethically controversial.

### Xenotransplantation

Some theorists are advocating the need to close the gap in organ shortages by moving towards the ‘manufacturing’ of organs. (Langer and Vacanti, 1995). This kind of biomedical technological application is occasionally referred as ‘xenotransplantation’ which involves the incorporation of living organs and tissues from different species. The recent breakthroughs in genetic engineering has enabled biomedical engineers to ‘manufacture’ body parts through organ ‘harvesting’, which involves transferring human genes into animal DNA to produce medically desirable substances (Bowring 2003). Heart valves, artificial hip joints, prosthetic arms and legs, and synthetic lenses are now regularly implanted in human bodies. Some theorists are even postulating that there will be a shift from cadaveric transplantation towards ‘growing your own organs’ (Sharp, 2000). Some biotechnologists have expressed their concern that as genetic engineering and nanotechnology become routinized, the next generation could very well be the last ‘pure’ human. (Williams, 1997)

Xenotransplantation, however, is controversial due to its ethical and religious implications and because it destabilizes our conception of ‘what is natural’.

Williams (1997) and Clark (1999) warn that xenotransplantation can potentially lead to the production of organs on an industrial scale. As it has the potential to reduce organ shortages by turning transgenic animals into a ‘bioreactor’ and ‘pharmaceutical factory’ of organs. According to Haraway (1991) the transgenic border-crossing signifies serious challenges to the sanctity of life. Douglas (1966) argues that the solidarity of human society is modelled on corporeal solidarity and purity, which is impermeable by ‘others’. Consequently, the violation of body boundaries signifies ‘danger’ of transgressing the symbolic boundaries of the body politic.

### The Cyborgs and the Loss of Human Identity

Biomedical theorists observe that within the context of emerging transplant technology, the commodification of the body takes different forms, such as artificial organs and regenerative transplantation. (Bowring, 2003). As biomedical technologies are gradually shifting from restorative (organic) transplantation method, as derived from xenotransplantation and artificial organs, to regenerative transplant technology (cyborg), i.e. engineering organs through stem cell technology and cloning, human body is increasingly becoming plastic, bionic and engineered. Consequently, meaning of body integrity and human dignity might be undermined and we will be thrown into, what is called by (Williams, 1997) as “radical doubt what humanity means?” (Shilling, 1993).

Biomedical theorists hold that the increasing trend of organization, procurement and delivery of human organs has transformed the classical idea of organ transplantation from an altruist patient-centred enterprise to an international profit making enterprise that is based on biomedical industry. (Hogle, 1995; Williams, 1997). Stem cell research has created possibility for cultivating tissues and organs from embryonic stem cells to be used for organ transplantation. More controversially, the propagation of embryonic stem cells may potentially lead to the cloning of human embryos for medical purposes. In his “*The Human Body Shop*”, Kimbrell (1993) explains how the growing market for human products, including blood, organs, tissues and reproductive cells, are alienating individuals from their bodies and from others, leading to disputes over ownership, distribution of profits and exploitations of the disenfranchised. Accordingly, the new concepts pertaining to the new biomedical technologies, such as *body shop*, *mechanization of the body*, and *factory farming of spare parts*, are emerging and dominating the modern medical discourse. From legal and social

perspectives, the emerging transplant technologies challenge the question about what it means to be human, which is grounded in *having* and *being* a bounded body (Seale et al 2006; Douglas 1996).

### **The Identity Within the Culture of Advanced Biomedical Technology**

the emerging transplant technologies challenges the conventional understanding of personality and the true meaning of humanity which centred on integrated self, which is predicated on the ideal of the 'bounded body'. This is what emphasized by Haraway (1991), who suggests that for individuals to accept emerging transplant technologies as a legitimate practice in biomedicine, they need to come to terms with their joint kinship with machines, animals and their clones, and be comfortable with embracing the partiality of '*fractured identities*'. Haraway further elaborates that individuals must contemplate embodying a *permeable* body, where boundaries are continuously shifting, collapsing, regenerating and fusing with collective 'others' (Haraway, 1997).

Gray (2002) argues that this calls for a 'democratic technological order' where cyborg citizens are empowered through freedom in accessing knowledge and technologies. The conceptualization of identity and citizenship, according to Gray, are grounded in our embodiment and the ability to exercise constructive power, which enables individuals to control technologies for their own cyborgization. The key issue in conceptualizing human body and self-identity, within the culture of advanced biomedical technology, is preservation of human dignity and personal identity. However, Haraway (1991) postulates that the sanctity of human purity and the sacred division between nature and culture will continue to dominate socio-cultural discourse.

### **Implications of Restorative Transplantation on Identity**

Organ transplantation is one of major breakthroughs of modern science in the field of biomedical engineering. It has brought great hope for new life to many helpless patients across the globe. The movement of organs from donors to recipients has played a crucial role in extending lives of many all over the world, but some authors observe that lives so extended are radically altered in the process. (Kierans, 2011). It is obvious from practical examples that the procedure of a transplant itself may be repetitive, but the outcomes of changes in emotions and social constructs that follow differ dramatically when considered globally and cross-culturally (Kierans, 2011).

The restorative (conventional) transplantation which based on organ donation has become a major part of the course of organ and tissue disease (Kirsten Bruce, 2014). It includes transplantation of all types of organs, such as kidneys, hand, liver, heart, lungs, and pancreas from a donor to a recipient. Techniques of restorative organ transplant are mainly based on classical methods which depend on natural organs donated by other animals. Since the first live kidney transplant in the Nineteen Fifties and the first heart transplant in the Nineteen Sixties, this mode of transplantation has provoked ethical questions that related to both the donor and the recipient. In the current context, however, this article focuses on the question of identity as a major implication of organ transplantation in specific cases, namely (i) hand transplantation, (ii) facial transplantation, (iii) reproductive organ transplantation, and (iv) head / body transplantation.

With regard to the question of identity, some researchers divide organ transplantations into two basic types: (i) internal and (ii) external. They give kidney and heart transplantation as examples for internal organ transplantation; while hand and facial transplantation are examples of external transplantations. This group believes that the external organ transplantation is more relevant to post the question of identity and others related to ethical questions. Further studies, however, have concluded that, above description might not be precise, because even the internal organ transplantation can post the question of identity, such as kidney transplantation which indicate identity of the donor in case of DNA analysis. However, transplantation of external organs such as face and hand may post major questions on social conception of identity.

### **Hand Transplantation and its implications on identity**

The issue of hand transplantation is importantly related to the question of identity, because hand as organ contains personal identity code of the donor as fingerprint. This fact posts many ethical, legal and social questions on the real identity of the recipient. It is reported that the first hand transplant surgery was conducted in 1964 in Ecuador, South America, but it was rejected after two weeks because of the lack of immune-suppressing medications at that time (Wascher, 2010; Stein, 2015). Since then, many series of hand transplant surgery were conducted. According to MacKay et al., 2014, China successfully carried out two hand transplant operations simultaneously in 1999 and their post psychological effects were studied between the two patients. The doctors stated that after

the surgery, the two recipients were shocked and unwilling to accept the hand. (MacKay et al., 2014; Swindell, 2006).

There are growing issues among researchers about the ethical, financial, psychological and identity questions regarding hand transplantation. Some studies reported that hand transplants give much identity issues as compared to other general organ transplantation such as heart and kidney (Swindell, 2006; Wascher, 2010). In fact, the major problem that may arise from hand transplantation is the question of identity because it extends the personal identity of the donor to the recipient through fingerprint. Therefore, there will be critical implications in many cases. For instance, if the original donor or recipient was criminal how would be the case? In fact, integration of the fingerprint into the recipient will involve merging of previous personal documentation such as bank details, passport validation and driving license.

### **Facial Transplantation**

The major problem of facial transplantation is the problem of external appearance which may create many problems about social identity of the person. Based on the functional anatomy of the face, it has been proposed that face can be accepted as an organ, like other solid organs such as kidney, liver and heart (Siemionow & Sonmez, 2011). According to Theodorakopoulou et al. (2017), the first partial facial transplant in 2005 sparked fierce ethical debates, moral arguments and strong opinions, both within the medical community as well as the general public and mass media. Although not regarded as life-essential transplant, facial transplantation can improve the quality of life and restore the normal social function of the face for severely deformed patients (Garrett, Beegun, & D'souza, 2015). However, the use of autologous tissues in conventional facial reconstructive techniques has its limitations such as inability to restore morphological identity, cosmetic appearance and the expression of the face (Duisit et al., 2017). The process may involve the removal of partial or full facial tissue of a donor, which usually taken from a cadaver and transferred to a patient.

It is reported that the first partial facial transplantation was successfully conducted in 2005 in France (Devauchelle et al., 2017). Since then, many similar procedures had taken place in several other countries. (Garrett et al., 2015). In 2010, full face transplant took place in Spain, when a man received completely new set of face after his face was disfigured by gunshot injury (Barret et al., 2011). The major problems of facial transplantation, with regard to the question of identity, are social and legal implications. While evaluating outcomes associated

with the physical and psycho-emotional risks linked to this procedure, all ethical challenges of facial transplantation are more related to external appearance; therefore, it can create many problems about the social identity of the person, especially with family of the donor.

### **Reproductive Organ Transplantation**

Considerable advancements in transplantation of gynaecological organs have been made during the last few decades. There are two procedures that need to be clearly differentiated with regard to this matter, which are: (i) the reproductive organ transplantation, such as ovary and penile, which may transmit the reproductive genes of the donor to the recipient, and (ii) sex reassignment surgery which concerns with the gender identity. These two issues are different, but in some cases they are confused. The proceeding discussion concerns only with the first type, that is transplantation of reproductive organ from the donor to the recipient, due to total loss of such organ or loss of its function. This type, in fact, has critical implications on the issue of identity. The successful cases of reproductive organ transplantation include both genders, i.e. ovarian and penile transplantation.

Reproductive organ transplantation is a new successful story of the advanced biomedical technology. Early attempts for solid organ transplantation were met with graft rejection, as knowledge of immunology was still rudimentary. In their article "*Ushering in the Era of Penile Transplantation*", Alison M. Rasper and Ryan P. Terlecki (2016) have presented a brief history of penile transplantation. They mentioned that Guangzhou General Hospital in China reported the first human penile transplantation in 2006. The recipient was a 44-year-old male with a history of traumatic penile amputation eight months prior, and the organ was from a 22-year-old brain-dead donor. Panel reactive antibodies and blood type, and approval were obtained from the hospital's ethical committee. Another case of human penile transplantation was performed in December 2014 at Tygerberg Hospital in South Africa. The patient was a 21-year-old male with penile loss due to complications from ritual circumcision. In May 2016, surgeons at Massachusetts General Hospital in Boston reported success penile transplantation in a 64-year-old patient who previously underwent penectomy for penile cancer. Sexual function was not determined, but normal voiding was confirmed upon removal of catheter three months postoperatively (Alison M. et al., 2016).

Medical doctors note that penile transplantation is a quality-of-life, rather than a life-saving procedure.

Major implications of reproductive organ transplantation, such as penile and ovary, are include medical, cultural, emotional, and even religious concerns. Medical considerations involve the screening and immunosuppression. Emotional concerns involve not only the recipient and his partner, but also others, such as the family of the donor. Detailed psychosocial assessment of potential recipients and their respective partners appears to be essential. According to medical doctors, patients are likely to require social support and should be assessed for the ability to cope with the possible stigma and even publicity. Religion and culture especially play an important role in penile transplantation for donors and recipients. (Alison M., et al. (2016)

The most serious problem of reproductive organ transplantation, however, is that which related to the question of identity. Gonads and organs are connected to personal and procreative identity of the donor that can be transmitted to the recipient. Therefore, religious scholars are generally not in favour of reproductive organ transplantation. Alison M. R., et al. (2016) have reported that in 2009, Pope Benedict XVI wrote an open letter that included the prohibition of transplantation of gonads and organs connected to personal and procreative identity. The Islamic position is that organs that are responsible for fertilization and satisfying sexual desire should not be transferred from one human to another. As noted by many authors, application of reproductive organ transplantation is every controversial and raises critical questions from ethical, religious, and social perspectives.

### **Head/Body Transplantation**

Head transplantation is equal to body transplantation, thus, it sometimes known as body transplant. It is a process of transferring a head from an organism to the body of another organism through surgery. The idea of head or body transplant has really changed the view of scientists as well as global community in medical field. It also has posted many serious questions on the matter of identity. Who is the donor and who is the recipient, the head or the body? It is ethically sound to transplant man's head to woman? How the survival will lead and practice his/her social life in such cases?

So far, reports on successful human head transplant surgery are very rare, but head transplantation on other animals (dog) was carried out early, since 1908, by Alexis Carrel and Charles Guthrie. However, the experiment ended to failure due to some technical factors. There are many other attempts, some of which were successful. With the advanced biomedical technology today, conducting such complex surgery is

highly possible. The critical questions that will be posted by such complicated organ transplantation are mostly legal and social, which arise around the identity. Who is the owner of the survived person? Is identity provided by psychological continuity alone or does it depends on bodily continuity as well? Contributions of religion, culture, and social psychology are necessary to deal successfully with all such questions.

Opposite to the animal surgery, the psychological question is crucial in the case of human head/body transplant. Some philosophers believe that psychological state of human is more important than the body itself in personal identity matter. They believed that the mind is lodged in the brain and does not significantly involve in the proper body, thus the resulting person from the head transplant surgery would be the head donor. Mori (2016) in his review article on "*Head Transplants and Personal Identity*", and Avvenuti (2017) in her "*Personal Identity and Head Transplant*" have highlighted the major questions on this matter from both philosophical psychological perspectives.

### **Conclusion**

The recent advancements in biomedical engineering have provided a viable chance with fruitful opportunities for mankind to fulfil his dreams and materialize his hopes for better life. Beside its potentials for better healthcare, the advancement in organ transplant biomedical engineering, have shifted the attention not only to human dignity and body integrity, but also to personal identity with its social, legal and ethical impacts. The question of identity in organ transplantation is one of the major implications of the advanced biomedical engineering technology. Although the regenerative organ transplant (cyborgic) technology is more serious in the term of ethical questions, however, the restorative transplant technology is more critical with regard to its practical implications on the question of identity from biological, legal, and social perspectives.

With brief reflection on impacts of regenerative transplant technology on question of identity, this article has highlighted implications of the four major forms of restorative transplant technology on identity; namely, (i) hand transplantation, (ii) facial transplantation, (iii) reproductive organ transplantation, and (iv) head / body transplantation. The article has concluded that while development of the advanced biomedical technology is necessary for survival of many lives, the application of such technologies must be consistent with moral values and the universal principles of human dignity and body integrity. Contributions of religion, culture, and social

psychology are necessary to deal successfully with ethical, legal and social questions posted by both the restorative and regenerative biomedical technologies. From Islamic perspective, the entire issue of organ transplantation research and its applications must be guided by principle objectives of Islamic Law (*Maqasid al-Shariah*), which aim to protect human life and dignity, protection of mind, progeny and distinctive personality, property, and freedom of thought.

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### References

- Ai-Ling Lai (2012). Cyborg as Commodity: Exploring Conceptions of Self-Identity, Body and Citizenship Within the Context of Emerging Transplant Technologies. In Z. Gürhan-Canli, C. Otnes, R. Zhu & M. N. Duluth (Eds.), *NA - Advances in Consumer Research* (vol 40). Association for Consumer Research, pp. 386-394.
- Avvenuti, G. (2017). Personal Identity and Head Transplant: A Psychological Analysis. *AJOB Neuroscience*, 8(4), 232-234. DOI: 10.1080/21507740.2017.1392379
- Bakari, A. A., Abubakar, M. A., Alhasan, S. U. & Nwankwo, E. A. (2012). Organ Transplantation: Legal, Ethical and Islamic Perspective in Nigeria. *Nigerian Journal of Surgery*, 18(2): 53-60.
- Benedict, J. L. (2017). *A Revised Consent Model for the Transplantation of Face and Upper Limbs: Covenant Consent*. International Library of Ethics, Laws, and the New Medicine. Springer International Publishing AG.
- Boas, Hagai (2011). Where do human organs come from? Trends of generalization and restricted altruism in organ donation. *Social Science & Medicine*, 73, 1378-1385.
- Bowring, F. (2003), *Science, Seeds and Cyborgs: Biotechnology and The Appropriation of Life*. London: Verso.
- Bruce, K. (2014). The “Ins” and “Outs” of Organ Transplantations: Their Influence on Concepts of Personhood. *UMASA Journal*, 32, 1-10.
- Buchanan-Oliver, M., Cruz, A. & Schroeder, J. (2008). Shaping the body and technology: discursive implications for the strategic communication of technological brands. *European Journal of Marketing*, 44(5), 635-652.
- Clark, M. A. (1999). This Little Piggy Went to Market: The Xenotransplantation and Xenozoonose Debate. *The Journal of Law, Medicine and Ethics*, 27(2), 137-152.
- Douglas, M. (1966). *Purity and Danger: An Analysis of Concepts of Pollution and Taboo*. London: Routledge and Keegan Paul.
- Dumit, J. & Davis-Floyd, R. (1998). Introduction: Cyborg Babies Children of the Millennium’, in R. Davis-Floyd and J. Dumit (Eds.), *Cyborg Babies: From Techno-Sex to Techno-Tots*. New York: Routledge.
- Errico, M., Metcalfe, N. H. & Platt, A. (2012). History and Ethics of Hand Transplant. *Journal of The Royal Society of Medicine*, 3(10): 74-81.
- Gray, C. H. (2002). *Cyborg Citizen: Politics in the Posthuman Age*. New York: Routledge.
- Hogle, L. F. (2005). Enhancement Technologies and the Body. *Annual Review of anthropology*, 34(1), 695 -716.
- Kierans, C. (2011). Anthropology, organ transplantation and the immune system: Resituating commodity and gift exchange. *Social Science & Medicine*, 73, 1469-1476.
- Kimbrell, A. (1993), *The Human Body Shop: The Engineering and Marketing of Life*. San Francisco: Harper San Francisco.
- Langer, R. & Vacanti, J. P. (1995). Artificial Organs. *Scientific American*, September, 100-103.
- Mori, G. (2016). Head Transplants and Personal Identity: A Philosophical and Literary Survey. *CNS neuroscience & therapeutics*, 22(4), 275-279.
- Nahai, F. (2013). Plastic Surgery’s Identity Crisis. *Aesthetic Surgery Journal*, 33(4): 609-611.
- Pasclev, A., Pasclev, M., & Giordano, J. (2016). Head transplants, personal identity and neuroethics. *Neuroethics*, 9(1), 15-22.
- Rady, M. Y., Verheijde, J. L. & Ali, M. S. (2009). Islam and End-of-Life Practices in Organ Donation for Transplantation: New Question and Serious Sociocultural Consequences. *HEC Forum*, 21(2), 175-205.

- Rasper, A. M. & Terlecki, R. P. (2016). Ushering in the Era of Penile Transplantation. Retrieved from <http://dx.doi.org/10.21037/tau.2016.11.02>.
- Romain, T. (2010). Extreme Life Extension: Investing in Cryonics for the Long, Long Term. *Medical Anthropology*, 29 (2), 194-215.
- Seale, C., Carvers, D. & Dixon-Woods, M. (2006). Commodification of Body Parts: By Medicine or by Media? *Body and Society*, 12(1), 25-42.
- Sharp, L. A. (2000). The Commodification of the Body and Its Parts. *Annual Review in Anthropology*, 29, 287-328.
- Swindell, J. S. (2006). Facial Allograft Transplantation, Personal Identity and Subjectivity. *Journals of Medical Ethics*, 33(8), 449-453
- Theodorakopoulou, E., Meghji, S. Pafitanis, G., & Mason, K. A. (2017). A Review of the World's Published Face Transplant Cases: Ethical Perspectives. *Scars, Burns & Healing*, 3, 1-10.
- Williams, S. J. (1997). Modern Medicine and The "Uncertain Body": From Corporeality to Hyperreality?. *Social Science and Medicine*, 45(7), 1041-1049).

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