Head Transplants

By: Emily Jenson and Brooke Bowen

Overview

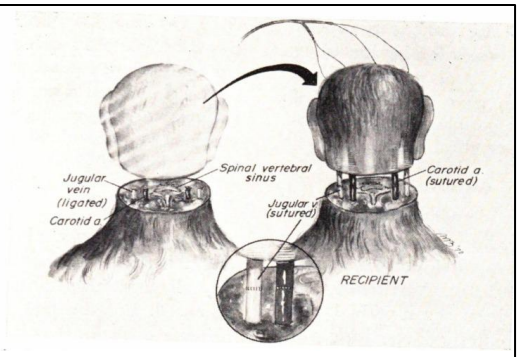
History

- In the early 1900s, this concept was introduced.
- Dr. Alexis Carrel created a successful technique.
- In 1908, the first head transplant was performed on a dog.

Early 1900s the idea of head transplants was introduced- At the time, this surgery faced many challenges that did not yet have solutions. One of the main problems was reliable vessel anastomosis. Put simply, vessel anastomosis is the ability to connect or put vessels together while still maintaining blood flow.
Technique- created by Dr. Alexis Carrel was successful, and was implemented in both vessel reconstruction and whole organ transplantation.
1908- Performed by Dr. Carrel and Dr. Charles, they attached one dog's head to another dog's neck. This was not successful, and soon after the animal was euthanized.

History continued...

- In 1954, a canine head transplant was attempted by Dr. Vladimir Demikhov.
- In 1970, Dr. Robert White performed the first cephalic exchange in primates.



1954-After this surgery, the dogs demonstrated the ability to move, see, and drink water. Sadly, the longest that any dog survived this procedure was 29 days, the majority of them dying within the first few days.
1970- He did this by using four isolated monkey heads and four isolated monkey bodys. 3 to 4 hours after the surgery, each subject was able to chew, swallow food, track with their eyes, and bite down if orally simulation. Despite these accomplishments, the monkeys only lived around 6 - 36 hours.

Plan and Implementation

- Will change the medical field
- Save patients who are terminal in the body, but not in the brain
- Would need to rebuild connections between the brain and body
- Couldn't save patients from old age
- Last resort treatment

- Head transplants used to only be in the imagination, but now with the technology and knowledge, Canavero has advanced in knowledge with now a possibility this surgery could work.
- The goal of this procedure is to help save terminal patients that aren't terminal in the brain, but in the body.
- Subsequent spinal surgery and conceivably extensive physical therapy could ideally recover both sensation and motor function. However, functions like breathing and eating would need to be transiently supported by a ventilator and feeding tube before the connections between the brain and body are adequately restored.
- It would not be used to extend someone's life when the body fails from natural aging processes.
- Head transplant would be used as a last-line treatment when other medical interventions have failed. It would be limited by the availability of donors.

Positives

- Life saving for recipients with terminal conditions.
- Recipients would view the procedure as “ a gift of life”.
- Relief that their life-threatening illness has ended.

"FOR THE FIRST TIME IN THE HISTORY OF MEDICINE," WHITE RECALLS, "WE PROVED THAT THE BODY WAS NOTHING MORE THAN A POWER PACK."

Life saving- When performed on patients with terminal conditions but intact brain function, this procedure would be life saving
GIft of life- Based on other transplant recipients , it is predicted that recipients would view the procedure as “ a gift of life”. Concerns of identity crisis have been refuted using reports from face transplant data, which has shown boosted self esteem and overall mental health. Although these are not the same procedure, successful results can compared due to their similar nature.
Relief- surviving patients would experience relief from their life threatening illness and get a second chance at life.

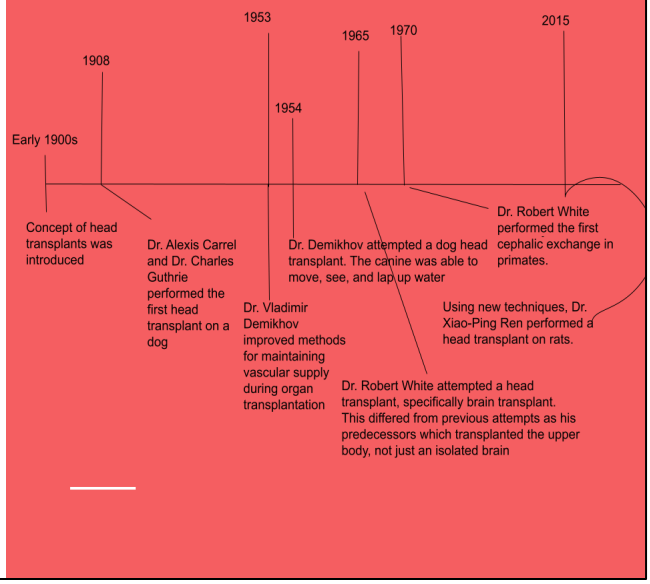
Negatives

- Neuropathic pain
- Rejection of the donor body
- Limited success in ones done on animals
- Moral and ethical issues
- Using one donor body for one recipient instead of multiple
- Needed medical care for years

- there are also likely risks associated with the procedure, including chronic neuropathic pain, rejection of the donor body, and organ toxicity of immunosuppressants.
- There has been limited success in head transplant procedures performed on mice, dogs, and monkeys.
- Moreover, the medical community has questioned whether the techniques are developed enough to practically or ethically perform a head transplant on a human subject.
- The efficacy of using a donor body for one recipient rather than multiple organ transplants has also been disputed.
- great deal of social support, including continuous medical care and assistance with activities of daily living, for months if not years
- The most likely complication related to a head transplant would be failure of the procedure to establish the required connections to preserve normal bodily functions.
- This may manifest in loss of cerebral blood flow leading to ischemia and brain damage, stroke , or brain death. A loss of oxygen supply to the brain could be similarly injurious.

- Disruption of the blood-brain barrier may lead to infection or injury to the brain's tissues.
- If the nervous system fails to reconnect, this may affect movement, sensation, and the function of organs

Chart


Early 1900s
1908
1953
1954
1965
1970
2015
Concept of head transplants was introduced
Dr. Alexis Carrel and Dr. Charles Guthrie performed the first head transplant on a dog
Dr. Vladimir Demikhov improved methods for maintaining vascular supply during organ transplantation
Dr. Demikhov attempted a dog head transplant. The canine was able to move, see, and lap up water
Dr. Robert White attempted a head transplant, specifically brain transplant. This differed from previous attempts as his predecessors which transplanted the upper body, not just an isolated brain
Dr. Robert White performed the first cephalic exchange in primates.
Using new techniques, Dr. Xiao-Ping Ren performed a head transplant on rats.

Summary

Emily Jenson:

Although I find this concept interesting, I do not support the advancement of this. Even if done successfully, the outcome does not result in a good quality of life for the recipient. Not only is it painful, but there is the chance of mental health problems. Another issue that I have with this procedure is that a body is being used to save one person, instead of organ donation which can help up to 15 people.

Brooke Bowen:

I am against the advancement of this technology because there is a big chance the donor body will be rejected. But it will also take years to reestablish the connection between the body and the brain which can lead to poor living conditions. I also believe that one donor body should be used to help multiple people, instead of one procedure that will most likely be unsuccessful.

References

Surgical, ethical, and psychosocial considerations in human head transplantation - Published Jan 19, 2017

The Mind is a Terrible Thing to Waste- Published 1997

The History of Head Transplantation: A Review - Published Oct. 14, 2016

What to expect from a head transplant- Brandon Peters, Updated on August 04, 2020