The Ethical Concerns of Deep Brain Stimulation

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Kellogg Honors College Capstone Project
RSCA Conference 2023

Abstract

Within the field of medicine, there have been many noteworthy innovations that have helped fulfill the promises of the Hippocratic oath, however, none quite as extraordinary and complex as Deep Brain Stimulation (DBS). DBS is a surgical treatment that implants electrodes within targeted areas of the brain that when activated by a neuro-pacemaker delivers electric shocks to inhibit neurons in those hyperactive parts of the brain. DBS is primarily used to treat motor disorders like Parkinson's disease, essential tremors, medication-resistant epilepsy, dystonia etc. Although this treatment is unable to cure these motor-related diseases, the potential to relieve one or several impairing symptoms has proven to be a worthy treatment to pursue. After receiving FDA-approval in 2002, DBS is concurrently being used to treat mood disorders and psychiatric disorders such as treatment refractory depression and obsessive-compulsive disorder respectively. Although this treatment provides symptomatic relief it is clear that there are certain side effects and potential risks that may arise and cause more harm than good. Moreover, there is a general ethical concern regarding psychological discontinuity, mental competence, responsibility for action and identity crises in patients who undergo this procedure.

Case Study

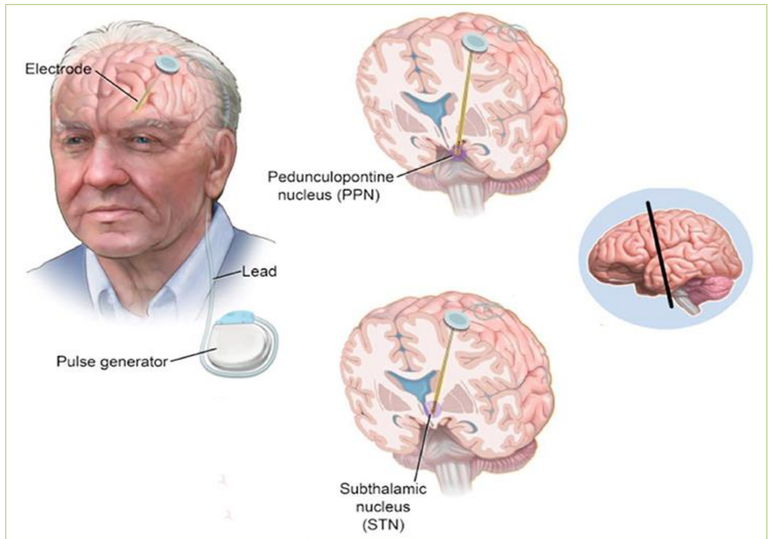
In regards to mental competence and personal identity a study indicated that an increase in stimulation created a disruption of psychological continuity. A 43-year-old patient was offered DBS treatment to combat the debilitating symptoms of Tourette's Syndrome. He was faring well and was able to appropriately adjust the stimulation in response to his tics. However after 12 months he was found in a dissociative state where he was crouched in a corner unable to form complete sentences. Once the doctors decreased the stimulation he returned to his normal state almost immediately. Although he recalls having a bad childhood dream, it is unclear whether or not he fully remembers what had occurred.

Discussion

Therefore this case may indicate psychological discontinuity. The problem with this issue is that one may therefore lack "the capacity necessary to obtain informed consent to start, continue, or stop treatment". Moreover, the fact that this patient's dissociative state occurred 12 months post implantation raises certain questions – researchers are trying to understand the "timescale involved in DBS induced personality changes." The first concern is the fact that time may only increase and make adaptations to the brain irreversible due to prolonged stimulation. This would suggest that patients who decline further treatment will still endure the effects of personality changes. Secondly if the effects of DBS on personality are not understood, over time, it will grow increasingly difficult to assess the changes and solely attribute those to DBS.

Patient Testimony

I was at the end of the line. I was severely depressed. I could not see myself continuing if this was all I'd be able to do, if I could never move beyond this. It was not a life worth living.
In the early few months, the lessening of the depression was so abrupt, and I wasn't sure if it would last," she said. "But it has lasted. And I've come to realize that the device really augments the therapy and self-care I've learned while being a patient here at UCSF.
Sarah, Patient–



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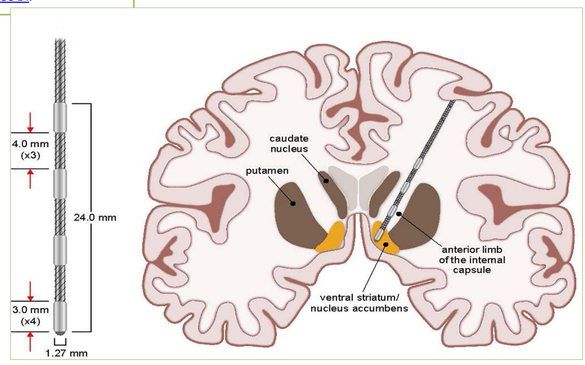

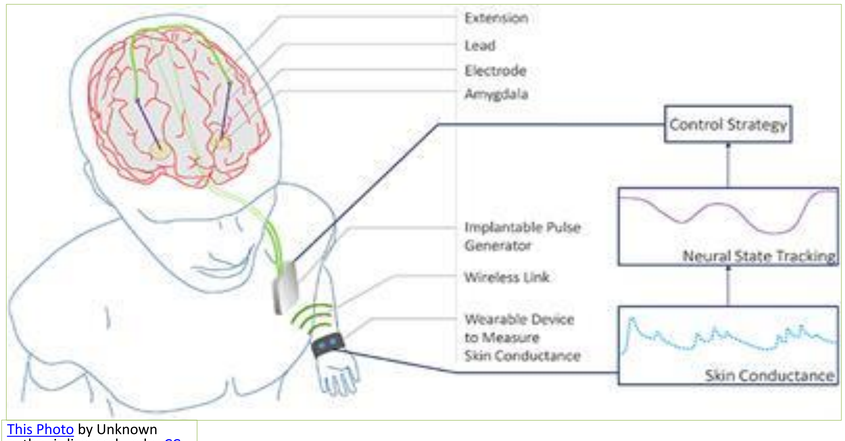

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Conclusion

DBS appears to be a popular topic not only within the scientific community but within the field of ethics. The realm of humans vs machines and one's autonomy or lack thereof is something that science cannot fully answer nor accurately account for. There seems to be a lack of discussion surrounding personhood and identity and whether or not people who undergo such treatments are still considered fully person. One article defines a person as "any entity that has the moral right of self-determination." Yet even this definition seems to make it difficult to determine whether patients with DBS have personhood. It is well established that "DBS may impact cognitive, emotional, behavioral, and neuropsychiatric networks because these functional networks are adjacent to the motor Fronto-subcortical networks targeted by DBS." The question remains then, do persons with machines implanted in them have the ability to make informed decisions if they are continually being altered by impulse stimulation? Their lack of psychological continuity plays an important role in self-determination. Although there is an overwhelming amount of evidence to suggest that DBS is an excellent and innovative tool that produces desirable outcomes for the patients if all goes well. However, when it doesn't, is it still worth the reverence? Yes, DBS has had a lieu of successful stories and outcomes. It has given patients a newfound sense of confidence and contentment. It has alleviated a whole range of debilitating symptoms associated with their disorders. It has drastically improved their quality of life allowing them to take part in meaningful activities and return to work. It has led to decreased or ceased medication intake thus creating a side effect free lifestyle. It has done wonders for many patients and will undoubtedly do wonders more.

Future Considerations

Yet the ethical concerns regarding the capacity to consent must continue to be carefully considered. If you strip someone of their ability to make their own choices you deny that someone their human rights. It is a difficult subject to consider given that DBS is becoming more popular in treating neuropsychological disorders. In these cases some patients are not competent enough to choose treatment, so should they be denied treatment? In psychiatric institutions there are certain occasions where medication is forcefully given to individuals who have raging fits or other bursts of emotions that may put themselves or others in harm's way – so if DBS were to eliminate these issues altogether should we not forcefully apply DBS to these certain individuals? It seems impermissible. However, if a person does not understand the results of such a treatment should we just give up on them and their future of a life free of suicidal thoughts and tendencies or life-impairing symptoms? Then what? Depression is on the rise, soon DBS technology will progress and become more efficacious in psychiatric disorders – how will the definition of personhood change? The line between humans and machines will slowly and surely start to blur. What will that mean for the criminal justice system? People will no longer plead not guilty by reason of insanity but rather not guilty by reason of technological influence – my machine brain made me do it. I doubt we are ready to unveil what lies beneath the repercussions of cyborgs made true.

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