

A Review of Brain Implant Device: Current Developments and Applications

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Abstract : The burden of brain-related disease is very high. There are a lot of brain-related diseases with limited treatment result and thus raise the burden more. The Parkinson Disease (PD), Mental Health Problem, or Paralysis of extremities treatments had risen concern, as the patients for those diseases usually had a low quality of life and low chance to recover fully. There are also many other brain or related neural diseases with the similar condition, mainly the treatments for those conditions are still limited as our understanding of the brain function is insufficient. Brain Implant Technology had given hope to help in treating this condition. In this paper, we examine the current update of the brain implant technology. Neurotechnology is growing very rapidly worldwide. The United States Food and Drug Administration (FDA) has approved the use of Deep Brain Stimulation (DBS) as a brain implant in humans. As for neural implant both the cochlear implant and retinal implant are approved by FDA too. All of them had shown a promising result. DBS worked by stimulating a specific region in the brain with electricity. This device is planted surgically into a very specific region of the brain. This device consists of 3 main parts: Lead (thin wire inserted into the brain), neurostimulator (pacemaker-like device, planted surgically in the chest) and an external controller (to turn on/off the device by patient/programmer). FDA had approved DBS for the treatment of PD, Pain Management, Epilepsy and Obsessive Compulsive Disorder (OCD). The target treatment of DBS in PD is to reduce the tremor and dystonia symptoms. DBS has been showing the promising result in animal and limited human trial for other conditions such as Alzheimer, Mental Health Problem (Major Depression, Tourette Syndrome), etc. Every surgery has risks of complications, although in DBS the chance is very low. DBS itself had a very satisfying result as long as the subject criteria to be implanted this device based on indication and strictly selection. Other than DBS, there are several brain implant devices that still under development. It was included (not limited to) implant to treat paralysis (In Spinal Cord Injury/Amyotrophic Lateral Sclerosis), enhance brain memory, reduce obesity, treat mental health problem and treat epilepsy. The potential of neurotechnology is unlimited. When brain function and brain implant were fully developed, it may be one of the major breakthroughs in human history like when human find 'fire' for the first time. Support from every sector for further research is very needed to develop and unveil the true potential of this technology.

Keywords : brain implant, deep brain stimulation (DBS), deep brain stimulation, Parkinson

Conference Title : ICSN 2018 : International Conference on Spine and Neurosurgery

Conference Location : Bali, Indonesia

Conference Dates : October 22-23, 2018