1 ACKNOWLEDGEMENT

ACKNOWLEDGEMENT

I am grateful to SAURABH SIR for his proficient supervision of the term project BRAIN PROSTHETICS . I am very thankful to you sir for your guidance and support.

Student name : shalai amte Roll no.: 21111054 1st semester BME National institute of technology , Raipur

Date of submission : 06 april 2022

2 abstract

Brain prosthetics or neural prosthetics is basically a discipline related to neuro sciences and biomedical engineering that connects to develop a series a devices that substitutes damaged motors or sensory nerves in the brain with neural protheses. In this project , we aim to study and know about such prosthetics in detail on how they work , what are some widely used protheses and its uses. These implantable devices are commonly used in animal experimentation through with neuroscientists get a better on the functioning of the brain. They accurately probe and record all electrical signals and try to understand specific function being performed inside the brain. These implants are designed to be as small, as possible to reduce damage to brain as minimum as possible. The implants are made so that to be able to communicate wirelessly .

3 INTRODUCTION

Neural prostheses are assistive devices that restore function as a result of neural damage , they are electrically stimulated and implanted in brain . over forty thousand such protheses are implanted and helped in restoring hearing , bladder control and respiration . Neural activity from various arm movement-related brain regions is electronically processed to create control signals for enacting the desired movement. Non invasive sensors can collect neural signals representing the average activity of many neurons. Motor prostheses aim to provide natural control of the paralyzed limb, via functional electrical stimulation of deinnervated muscle, or of a prosthetic replacement limb. In the case of upper-limb prostheses, natural control involves the precise movement of the arm along a desired path and with a desired speed profile. Communication prostheses do not aim to restore the ability to communicate in the form of natural voice or natural typing (i.e., moving the fingers). Instead, they aim to provide a fast and accurate communication mode, such as moving a computer cursor on an onscreen keyboard to type out words.

4 WORKING OF NEUROPROSTHETICS

Neuro prosthetics combines neural processing with prosthetics. Essentially, these devices interface with the human brain to control artificial limbs. It works via a brain computer interface (BCI), or a brain-machine interface. A brain-machine interface relies either on a chip implanted in the user's brain or electrodes placed upon the scalp. That way signals from the brain may be read by the prosthetic device itself. The BCI is an input/output device that bridges the brain and prosthetic devices. The same signals that would control an organic limb fire, and thus perform the desired function. The signals may be sent via electrodes on the scalp, the brain's surface, peripheral nerves, and embedded

materials to design and fabricate devices that allow sustained electronic functioning in the harsh environment of the human body, without causing tissue infection and other serious adverse conditions. Research efforts have focused on enhancing the performance of various types of materials used in neural prosthetics, in addition to developing interface technologies that enable the micro devices to be safely implanted in human tissue for long periods.

7 REFERENCES:

https://www.asme.org/topics-resources/content/next-generation-in-neural-prosthetics: :text=Inhttps://ww
are-neuroprosthetics-and-how-do-they-work: :text=Ashttps://www.sciencedirect.com/topics/medicine-
and-dentistry/neuroprosthetics https://en.wikipedia.org/wiki/Neuroprosthetics: :text=Neural

THE END