

NEUWalk: Spinal Cord Stimulation

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Abstract—Scientists at Ecole Polytechnique Fédérale de Lausanne (EPFL) in Switzerland are part of a project called NEUWalk, whose goal is to revolutionize the treatment of spinal cord injuries.

I. INTRODUCTION

THE spinal cord is an essential component to the human body as it carries electrical signals from the brain down the spinal column which allow for communication within the body. Injuries to the spinal cord can cause a temporary or permanent disruption of the cord's communication mechanism, resulting in paralysis.

II. NEUWALK

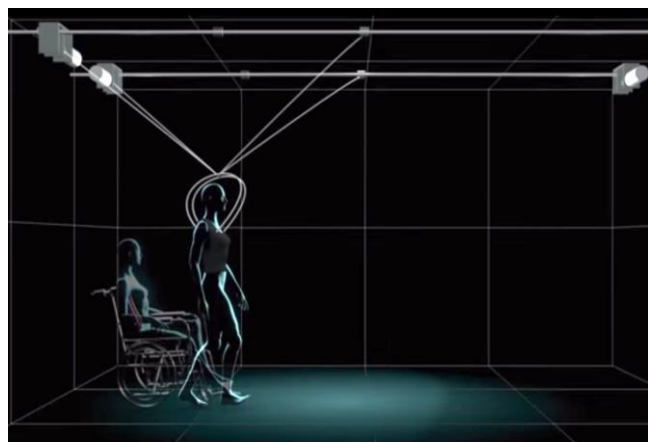
EPFL scientists have developed a method to control the limbs of a mouse with a completely severed spinal cord. The scientists first injected the mouse with a “chemical cocktail,” then surgically placed flexible electrodes into the mouse's back where its spinal cord was severed. They then placed a current through the electrodes, which stimulated the brain's electrical system, thus giving them complete control over the mouse's limbs. Varying frequencies of the stimulation had varying impacts on the limbs' movement. This led to the development of complex algorithms to automatically adjust the amplitude and frequency of the electrical pulses



EPFL scientists are collaborating with other scientists in a project called NEUWalk to bridge this technology with current rehabilitation methods to create an applicable neuro-prosthetic and rehabilitation system to help spinal cord injury patients walk again.

III. TRIALS AND FUTURE

With EPFL being able to successfully control the limbs of paralyzed animals, they hope to put the project NEUWalk into motion with human trials “hopeful” for the summer of 2015.



If NEUWalk successfully completes human trials, the impact on spinal cord injury treatment could be enormous. Patients will be able to use the NEUWalk system as a physical therapy. Although they are aware that this is not a cure for a damaged spinal cord, the research done and knowledge gained is invaluable to all future treatments of spinal injuries.

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