

iWalk Inc.-BiOM Personal Bionics



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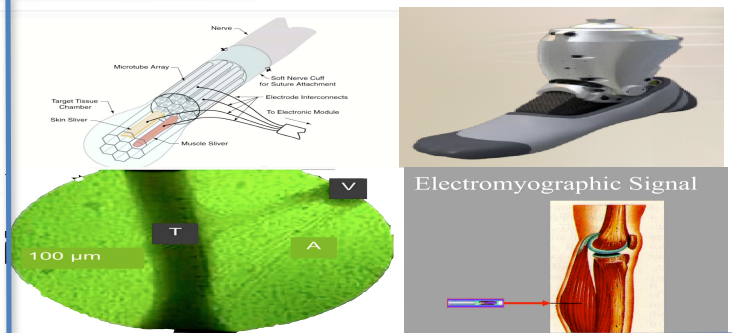
"The World We Dream" -iWalk. Prosthesis of the 21st century, breaking milestones that were once dreamt about. Where biomechanics overrules the natural anatomy's dynamic.

I. INTRODUCTION

Picture a company; sponsored by the U.S. Government to simply create and develop the best prosthetics possible. iWalk Incorporated is the product of this. In 2003 the U.S. department of Veteran Affairs, Army Telemedicine, and Advanced Technology Research Center (TATRC) made the decision to fund many visionaries, manufacturers, and universities. With tens of millions of dollars in government funding, Hugh Herr (bi-lateral amputee), PhD-Director of Biomechanics at MIT developed and commercialized "Personal Bionics". iWalk Inc. was Dr. Herr's prodigy company creating these personal bionic devices. Personal Bionics is a new era of prosthetic technology that enables natural and personalized movements for individuals with lower-limb loss. Prior to iWalk's developments, the world of prosthesis led victims to medical care which barely improved their quality of life, and in some cases restricted them. Previously, prosthesis was restricted to only a horizontal world. Unfortunately, the research, technology, and engineering were not even half as advanced to what iWalk's cutting edge technology includes today. Thus was primarily due to the lack of funding available for these developments until 2003.

II. METHODS

This is where robots, bioengineering, and prosthetics meet. Bionics seeks to advance electromechanical devices that attach to the body, or are implanted inside the body, that emulate, or even extend human physiology functions. Dr. Herr and his collaborators established the "Powered Human Augmentation" project and applied bionic technology to develop the first lower-extremity device, the BiOM Ankle System. It provides power, and enhances mobility. Its construction consists of two interfaces. Dynamic and electrical, which work side by side. The dynamic interface is quite amazing and complex. The BiOM Ankle System has millions of sensors that are connected to (4) microprocessors. These microprocessors comprehend the sensors readings and produce a movement-energy level in correlation to it. The goal was to imbed the intelligence of how humans walk into synthetic structures. Also to control how muscles are controlled neurally, then imbed them into devices fluidly, as if they were made of flesh and bone. A spring is incorporated to represent and emulate the performance of an Achilles's Tendon and calf, for muscle like actuation. These dynamics produce one severely advanced biomedical structure. The Electrical interface is related to how the muscle reacts with the pre-existing nerves. In the picture below with the green background, please identify T= a muscle and V= a nerve. You can clearly see how the nerve is coaxed to attach to the muscle. The nerve noticeably sprouts to the muscle. Researchers have built this interface, allowing it to bond with nerves that have been damaged or cut due to injury.



III. RESULTS

The bionic limb's construction allows for a symbolic relationship between flesh and machine. This ideal concept makes patients feel as if the machine makes up their identity, and does not make the bionic limb emotionally feel as a "tool". The ultimate goal is to integrate technology with nature for one amazing composition.

IV. DISCUSSION

iWalk has set a new standard in the bioengineering-prosthetic world. This is the first product ever to return energy by 100% and mechanical power deliver by 800%. There are no aches nor pains, or fatigue with the system. With the BiOM Ankle System, patients feel as if they have "a new lease on life" It is the first prosthetic invention that syncs fully with an individual and drastically improves their quality of life. None see this system as a handicap; however, most see it as an advanced upgrade. In the last year, the Veteran Affairs facilities alone fitted 6,000 new prosthetic limbs and performed adjustments and repairs on 40,000 of them. More generally speaking, Herr estimated there are about 1 million amputees in the United States alone, and said about 150,000 leg prostheses are sold annually. The closest location to myself would be Next Step Orthotics and Prosthetics in Warwick Rhode Island. I personally visited Biomedical Engineer Dr. Susan De'Andrea at Brown University's Lab for Veterans and Rehabilitation. There, Dr. De'Andrea is in charge of the research and analysis aspect of the iWalk company. She brought me through the laboratory facility and shared her knowledge with me. From this first hand experience, I can fully understand the dynamic of this company and all its components.

<References>

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