

VispalExo Inc. is a biomedical device company. The experimental core technology offered by VispalExo integrates natural intelligence (NI) with Artificial intelligence (AI) to develop low-cost Exoskeletal products that are designed to provide mobility to limbs affected by trauma or other neuromuscular disorders.

- We believe the brain is an untapped organ that is able to create many avenues to help overcome medical injuries especially in paralysis of arms.
- Developed a technology based on the idea that the mind has the ability to control external environmental devices in medicine to help patients with disability.
- Currently conducting completely non-invasive research trials with no implantable devices to help individuals with disabilities of upper extremities.
- Basic Principle followed: "DO NOT ALLOW THE COMPUTER TO CONTROL THE HUMAN, RATHER ALLOW THE HUMAN TO CONTROL THE COMPUTER".

ARTIFICIAL COMBINATION WITH NATURAL INTELLIGENCE: The main focus of the company has centered around the concept of utilizing the human natural intelligence to help control external device and surroundings to help individuals with paralysis. Our concept is that computers should not control the brain, the brain should control the computer.

CONCEPT OF UTILIZING AN EXOSKELETON TO HELP PATIENTS WITH UPPER EXTREMITY PARALYSIS
WHAT IS THE NEED WE ARE TRYING TO SOLVE: Being an Orthopaedic Surgeon, I saw the need for a low-cost, low-profile device that could aid my patients with paralysis of the arm without the need for surgery.

Realized: Currently, there is a lack of noninvasive technology for helping individuals with upper extremity paralysis regain motion for daily activities Current options involve implanted devices which are not cost effective for majority of the population and involves surgery to accomplish the goal. Majority are still in the testing phase. The only exoskeletal on the market that is noninvasive can only be used on a partially paralyzed individual not confined to a wheelchair.

DEMOGRAPHICS

1. Stroke is the leading cause along with spinal cord injury, multiple sclerosis and ALS (American Journal of public health October 2016)
2. 2.5 million people currently live with moderate to severe mobility impairments of their arms
3. Each year an additional 318,000 people will have strokes in which they will have persistent moderate to severe impairment paralysis
4. The cost involved in every day care is estimated at approximately USD 68,000 per year for an individual with paralysis. Based average on hemi paresis and complete paralysis

WHAT WAS MY SOLUTION

1. A cost effective, light weight, low-profile, non-invasive exoskeletal brace to allow movement of a paralyzed arm.
2. Utilizes a patients remaining muscle they have voluntary control over to activate the exoskeletal arm brace. This is accomplished through the combination of Natural Intelligence with Artificial Intelligence.
3. Allows for independent motion of the upper extremity for activities of daily living
4. The brace will also be able to be utilized by patients on the first day of application training
5. The brace will also be used via telemedicine to allow for feedback to physicians, aid in recovery / rehabilitation and training all from the patient's home.

PROOF OF CONCEPT TO MARKETIZATION STEPS TAKEN TO REACH END GOAL: Realized that patients with arm paralysis have muscles that they still have voluntary control over. If a patient contracted this voluntary muscle, we could then pick up the electrical signal (the action potential) to relay that to a motorized exoskeleton brace that completely mimics the human arm thereby allowing the arm to flex and extend and rotate the wrist in pronation and supination.

BEGAN WITH MARKET VALIDATION: From studying the disabled population with arm paralysis, it was determined there was a need for a low-cost non-surgical device to provide the ability for them to be able to regain function of the arm. The market presently has one company with the claim to have the only robotic arm to move a paralyzed arm. Studied their concept and saw how their brace compared to reaching our goal.

VISPALEXO NEXT PHASE FOR THE BRACE: Design modifications to Generation 1 Brace Took patient feedback after using the device to see how brace could be changed

- a. The brace was one size fits all –difficult to keep brace on
- b. Hand was not supported so couldn't bring properly toward mouth
- c. Wanted the wrist to rotate. Allowing a second servo to be placed on the brace.
- d. Wanted the arm to flex fully and not stop at about 110 degrees which was secondary to the brace configuration
- e. More comfortable fit
- f. Utilize wi-fi to remotely monitor the brace and allow for activation from their home.