Pediatric Exoskeletons: The Technology Transforming Lives

Dr. Elena García-Armada (PhD)

CEO Marsi Bionics, Rivas-Vaciamadrid, SPAIN

Full Academician, Spanish Royal Academy of Engineering

Abstract:

About two decades ago, clinicians hypothesised that gait training could prevent or at least delay the serious complications in health of gait impaired children affected by neurological diseases such as cerebral palsy and neuromuscular diseases. The permanent sitting position causes very serious complications in the health of these children. Joint deformities, atrophies and circulatory and respiratory problems are common in all these diseases. A robot-aided gait therapy could strengthen or maintain the tone in the muscles that support the back, and ultimately, improve their health status and life expectancy.

The ATLAS 2030 pediatric exoskeleton, developed by Marsi Bionics is, technically, a compliant gait exoskeleton, and its joint compliance helps to adapt to the complex muskuloskeletal symptoms of neurological diseases in childhood, which vary strongly from one patient to another, while it provides the kids with the capability of exploring their environment. So that children that where avocated to a wheelchar can now stand up and play. The feeling of being like their peers causes a huge motivation on them, that yield a more effective physical rehabilitation, and feedsback the autoperception of being able.

These effects have been demonstrated after Clinical trials with the ATLAS exoskeleton in a total of 45 kids affected by Cerebral Palsy and Neuromuscular diseases, covering the full spectrum of symptomathology. The trials analyse safety, usability, efficacy and the impact on quality of life and psychological impact.

Since 2021 the ATLAS exoskeleton in commercialy available and actually installed in Clinical settings in 7 countries, contributing to the personal development of thousands of children that were up to now left aside. Our hope is to bring ATLAS to all children who need it, so that no child misses the opportunity to develop personally.

Short abstract:

Wearable gait exoskeletons, allow spatial mobility and gait training, and are applied to the neurorehabilitation of children affected by neurological deseases with impressive results. Example devices and clinical cases are presented that show an impact on children physical and congnitive improvements, social integration and self esteem. This is an example of how robotics for health has an impact on these children's lives.