Engineering a Rehabilitation Prototype to Restore Mobility in Individuals With Severe Walking Impairments

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Assistive mobility devices are important for improving balance, stability, and independence in individuals undergoing motor rehabilitation. In Puerto Rico, many people experience difficulty with walking due to chronic conditions and limited access to rehabilitation services. This often affects quality of life and can lead to additional physical and psychological challenges. Data from the Puerto Rico Department of Health (2019) shows that a considerable number of older adults report difficulty with ambulation and stair use, highlighting the need for more accessible solutions. This project focused on designing and building a walker prototype intended for individuals with severe mobility impairments, followed by an evaluation of its performance. The design process began by identifying user needs, then developing possible design features, selecting materials, and constructing the structure. Special attention was given to load support, posture alignment, balance assistance, and overall comfort during use. The prototype was evaluated through functional observations during assisted walking. During testing, users showed more stable movement, improved coordination, and greater muscle engagement compared to initial performance. Overall, the walker demonstrates potential as a low-cost assistive device that could be used in rehabilitation settings. Its design allows for adaptability and includes features that support user safety. Future work will include more detailed quantitative testing, additional user trials, and further design improvements to increase its effectiveness and broader applicability.

Awards Won: