

Ultra-Portable Interactive Hand Cycle Rehabilitation System

Abstract

Cerebral palsy (CP) is one of the common chronic disabling conditions that appear in early childhood. According to Malaysia Department of Social Welfare statistics for year 2012 (UNICEF, 2014), there are 1.5% population is with disability, which is equivalent to 445,006 persons with disabilities. Out of 445,006 persons with disabilities, there are 25% CP children, which is equivalent to 111,251. Hemiplegia and Diplegia are the most common cerebral palsy in Malaysia. However, there are only three main spastic rehabilitation centers in Malaysia: Spastic Children's Association of Selangor & Federal Territory, Spastic Children's Association Johor and The Cerebral Palsy Children's Association of Penang. Improving quality of life (QOL) for individual with physical disability is gaining interest among citizen of Malaysia as disabilities significantly affect the independences, societal attitude and participation of QOL activities of the children and consequently affect the lives of their caregiver.

The aim of this project is to improve the QOL in children who has cerebral palsy via physical therapy. Spastic center and special children's center maintained by either non-profit organization (NGO) or government agencies are very limited and unable to cater for every child within its region. Moreover there are some parents purposely commute from other state via personal transport or public transport for professional provision of their children. Their children undergo routine exercise once every two to three weeks, which the exercise may only last from 20 to 30 minutes for each session. This inaccessibility to proper or even frequent update of the exercise and information of the patient, gives little to no improvement for the children and inconvenient for parents as they have to take personal leave for their work just to attend their children's matter. Once the child is recovered from CP, the child can live a near-normal life such as attending college, participate in sports and activities, excelled in their careers and have married (Stern Law, 2016). At the same time, raising a CP child becomes less labour intensive.

Due to this reason we proposed "Ultra-Portable Interactive Hand Cycle Rehabilitation System". The proposed system can be used in personal vehicle as Malaysian waste a lot of time being in a car due to commuting distance or traffic congestions. The proposed system also greatly helps to reduce the necessity to travel long distance to the center and with the help of Internet of Things (IOT), parents are able to save the trip to have a consultation hour with the doctor that attend their child and is able to get answers directly based on the statistic provided. With most of the household of Malaysia are having lower income and inconvenient circumstances, family with lower household incomes will tend to ignore the necessary care for the child at early age and being oblivious over the consequences where early intervention helps in the improvement of cerebral palsy (Anna Purna Basu, 2014). The proposed system is aim to produce cost effective products which can cater to all walks of life, so that not only the low income household are able to afford this product but also that the community or

government itself is able to provide healthcare at lower cost to household under poverty where their children has cerebral palsy without penalizing and giving everyone equal attention.

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