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RESEARCH ARTICLE

Ergonomical designing of multifunctional wheel chair for children with cerebral palsy

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ABSTRACT : Cerebral palsy is a term used to describe a group of disorders affecting body movement and muscle co-ordination. Cerebral palsy is not a life threatening condition and in itself, is no barrier to leading a long and productive life. People with cerebral palsy enjoy satisfying careers, university education, social life etc for which wheel chair proves to be the best option. Seating and wheel chair devices like a wheelchair provides a patient with the freedom to accomplish many tasks on his/her own. The present study was designed to develop user compatible design criteria for the wheel chairs based on case analysis and related review and to evolve computer aided design of multifunctional wheel chair which includes features such as easily adjustable, portable and foldable, dynamic seat, 45 degree posterior tilt in space, wheels with easily controllable rakes, adjustable and detachable foot rest, attached commode, straps for arms and legs, lap table, padded arm rest, bag to keep immediate essentials and a bottle holder.

Key words : Cerebral palsy, Multifunctional wheel chair

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INTRODUCTION

Cerebral palsy is a neurological impairment, accompanied with a brain damage syndrome, which includes motor dysfunction, psychological dysfunction, convulsions or behavior disorders due to organic damage. It refers to a condition characterized by paralysis, weakness in coordination and/or other motor dysfunction due to brain damage. Cerebral palsy limits a child's ability to explore which in turn hinders intellectual and social development having significant implications for the child's educational development, independence and quality of life. The use of a mobility appliance like a wheel chair prevents the deformity to interfere with the normal day to day functioning of the child (Crane *et al.*, 2004). The use of a wheel chair is emphasized to improve the physical functioning to lessen the restricted effect of the handicap (Stavness, 2000).

The children with cerebral palsy continuously sits in a wheel chair for long periods, which leads to strain on muscles. This strain may be reduced with the application of ergonomic principles in designing assistive aids. The present study aims at designing multifunctional wheelchair for children with cerebral palsy to fulfill their immediate needs using ergonomic principles.

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EXPERIMENTAL PROCEDURE

The study was conducted at Allahabad city in three phases. In the first phase, to ascertain the availability of different models of wheel chairs, a market survey was conducted in popular shops of Allahabad city dealing with wheel chairs. In the second phase, a sample of ten children with cerebral palsy were randomly selected for case analysis to evolve the design criteria based on the ergonomic principles. In the third phase, from the analysis of results obtained and based on the review