POWERED MOBILITY IN REHABILITATION

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A man who can’t move or talk, but can make wonders and also lead a family life with his children
POWERED MOBILITY IN REHABILITATION

- Introduction
- History
- Advances in Powered Mobility
- Powered Mobility in Pediatrics
- Challenges in Powered Mobility
- Accessibility in Western Countries
- Accessibility in India
INTRODUCTION

DISABILITY–STATISTICAL DATA

• WHO reported that 15% of world’s population lives with some form of disability

• 2-4% experience significant difficulties in functioning and mobility

• Disability population in India is about 26.8 million, which is 2.21% of total population (NSSO)

• Rates of disability are increasing due to aging, increase in chronic health conditions and accidents
PROBLEMS – DISABLED PERSONS

• Lack of independent mobility
• Activity limitation
• Restricted participation
• Difficulty in exploring the environment
• Denied access to health, rehabilitation, support, education, employment and entertainment
POWERED MOBILITY

• Power mobility refers to power wheel chairs, scooters and modified toy cars

• Powered mobility devices propelled by means of an electric motor rather than manual power

• Allows people to move within their home and community
POWERED MOBILITY DEVICES

Powered Wheel Chair

Powered Scooter
- **Powered mobility devices provides independent mobility**
- **Empower the disabled person to perform ADL**
- **Decrease pain and discomfort**
- **Improves health related quality of life**
SUITABLE POPULATION

• People will never walk

• Cannot efficiently move in a walker or manual wheel chair

• Lost their mobility resulting from Progressive neuro-muscular disorders and Traumatic injury

• Temporary assistance for mobility commonly due to surgical intervention
POWER SCOOTER

- Electronic transport vehicle operated by batteries
- Minimize discomfort
- Extend the duration of participation
- Improve function without fatigue
- Suitable for people who find difficulty in walking for long time
- People able to walk and manipulate themselves on and off
HISTORY

Manual Wheel Chair  Powered Wheel Chair  Smart Wheel Chair
ADVANCES

Electric powered wheel chair with a

- Powered seat recline
- Powered seat tilt function
- Powered seat elevation function
- Powered standup wheel chair
- Motorized beach wheel chair
Powered Wheel Chair - Recline

Powered Wheel Chair - Tilt
Powered Wheel Chair - Seat Elevation

Powered Wheel Chair - Standup
Powered Wheel Chairs - Stairs
Powered Wheel Chair - An IBOT

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POWERED MOBILITY IN REHABILITATION
SMART WORLD
SMART WHEELCHAIR

Reduce user’s responsibility to drive wheelchair

suitable for disabled people with

- Blindness
- Lack of motor skills
- Lack of strength
- Difficult to use power wheelchair

Techniques

- Robotics and artificial intelligence
CLASSIFICATION OF SMART WHEEL CHAIR

- Sensing devices
- Functionality
- User interface
- Form factor
- Level of autonomy
SENSING DEVICES

- Standard Wheel Chair – Joystick
- Speech based control
- Facial expression
- Gaze control
- Sensors
- Ultrasound
- Infra-red
- Laser
- Contact
- Camera
FUNCTIONALITY

• Collision avoidance
• Map based navigation to location
• Wall following
• Virtual path following

USER INTERFACE

• Vision based interface system
• Voice recognition system
• Facial expressions
• Gaze control
FORM FACTOR

• Add on approach

• Smart system can be attached to different powered wheel chairs

LEVEL OF AUTONOMY

• Complete autonomy

• Partial autonomy
• Statistical data shows that 12 million children living with disabilities in India.

• It is about 1.67% of total population

• Denied from education, play, social interaction.

• 1% of children have access to school
POWERED MOBILITY - PEDIATRICS
BENEFITS OF POWERED MOBILITY IN PEDIATRICS

• Independent mobility

• Environmental exploration

• Participation in social and educational activities

• Helps to develop cognitive skills, confidence, Communication, social skills

• Ability to handle objects

• Less care giver assistance with mobility and self care
FACTORS INFLUENCING THE LEVEL OF INDEPENDENCE IN POWERED MOBILITY

• Child’s motivation

• Intellectual ability

• Physical environment

• Amount of support
Powered Mobility in Western Countries

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Powered Mobility in Western Countries
Powered mobility – Accessibility in western countries
Powered Wheel Chair- Accessibility
Powered mobility - Public Places
POWERED MOBILITY-ACCESSIBILITY IN INDIA

- Meru taxi service in Mumbai introduced transportation for disable persons with powered mobility
POWERED MOBILITY-ACCESSIBILITY IN INDIA

• Uber India launches the new transport for disabled persons in wheelchair and powered mobility
ADDED FACILITIES

• Heightened roof
• Hydraulic wheelchair lift
• Four point tie down strap
• Secure wheelchair to the floor
• Forward facing seat arrangement
• UBER ACCESS, UBER ASSIST, UBER WAV
POWERED MOBILITY - ACCESSIBILITY IN INDIA
POWERED MOBILITY - ACCESSIBILITY IN INDIA (NIEPMD)
CHALLENGES IN POWERED MOBILITY

GENERAL CONTEXT

- Environmental barriers
- Avoiding obstacles
- Controlling joystick
- Risk of accidents
- Cost
- Accessibility in outdoor

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CHALLENGES IN POWERED MOBILITY

SPECIFIC CONTEXT

• Accessibility in indoor
• Difficulties in accessing and using public buildings
• Going through small door ways
• Problems in performing specific wheelchair mobility tasks or backward maneuvers
• Barriers and circumstances that are temporary, unforeseen specific to particular context
“Black holes are not as black as they are painted…it is possible to escape from a black hole of despair…..so if you feel you are in a black hole, don't give up - there's a way out”
Thank you

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