

CEREBRAL PALSY IN CHILDREN: NEUROLOGICAL ISSUES AND A COMPREHENSIVE APPROACH TO REHABILITATION

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Abstract

Cerebral Palsy (CP) is one of the most complex neurological disorders in children, arising from brain damage before birth, during delivery, or in early childhood. This condition is characterized not only by motor and muscle function impairments but also by dysfunctions in cognitive, emotional, and sensory systems. A thorough analysis of the causes, neurological features, and rehabilitation methods for CP is crucial for improving patients' quality of life.

Keywords: CP, rehabilitation, atrophy, delayed speech development (DSD), physiotherapy, therapeutic exercise (TE).

Introduction

Causes and Pathogenesis of CP

1. Prenatal Factors (During Pregnancy):

Brain Hypoxia: Oxygen deprivation to the fetus, leading to brain cell death.

Infections: Maternal infections such as rubella and toxoplasmosis negatively affect brain development.

Genetic Disorders: Mutations in some cases lead to defects in the central nervous system (CNS) development.

2. Birth-Related Factors:

Complicated Deliveries: A significant cause of CP.

Head injuries during delivery.

Oxygen deprivation (asphyxia).

Premature birth and low birth weight.

3. Postnatal Factors (After Birth):

Neuroinfections: Such as meningitis and encephalitis.

Severe Head Trauma: Leading to brain injuries.

Cerebral Circulation Disorders: Including acute hemorrhages.

The pathogenesis of CP involves disrupted brain development, including:

Dysfunction of brain neurons and impaired signal transmission between them.

Pathological muscle tone increase (spasticity).



Impaired movement control and balance.

Neurological Signs of CP

1. Muscle and Motor System Impairments:

Spastic Form: Increased muscle tone limits movement.

Ataxic Form: Balance and coordination difficulties.

Dyskinetic Form: Involuntary, uncontrollable muscle movements.

Mixed Form: Symptoms of multiple forms coexist.

2. Sensory System Impairments:

Vision problems (e.g., astigmatism, optic nerve atrophy).

Hearing loss or impairment.

3. Speech and Communication Disorders:

Delayed speech development, difficulty pronouncing words.

Dysfunction of speech-related muscles.

4. Cognitive and Psychological Issues:

Learning and thinking difficulties.

Attention and memory challenges.

Social adaptation problems, including anxiety and depression.

Rehabilitation

Rehabilitation is key to improving the quality of life for children with CP. Major components include:

1. Physiotherapy and Orthopedics:

Special exercises to improve muscle mobility and reduce spasticity.

Orthopedic devices (supports, braces) to correct movements and prevent deformities.

2. Speech Therapy:

Developing speech, improving pronunciation, and building communication skills.

Use of assistive communication tools (cards, technological devices).

3. Psychological Support:

Group therapy for social adaptation.

Counseling and support programs for parents.

4. Physical Activity:

Hippotherapy: Horseback riding to strengthen muscles.

Aquatherapy: Water exercises for better movement control.

Specialized sports to improve balance and coordination.



5. Medication:

Muscle relaxants (e.g., botulinum toxin, baclofen) to reduce spasms.

Neuroprotective drugs and metabolism enhancers.

6. Innovative Methods:

Robotic physiotherapy.

Neurofeedback therapy and brain stimulation technologies.

Special programs to enhance academic skills like mathematics.

Living with CP and Social Integration

CP is not just a medical issue but also a social one. It is essential to create inclusive education programs, specialized schools, and social services for children with CP.

Inclusive Education: Helps children actively participate in society.

Social Adaptation Centers: Programs to develop skills and organize social activities.

Parental Support: Raising awareness about the needs of children with CP and ensuring community support.

Conclusion

Cerebral palsy is a multifaceted condition involving neurological, social, and psychological aspects. Early diagnosis and individualized treatment approaches significantly enhance the potential of such children. Rehabilitation should include physiotherapy, psychological support, medication, and innovative techniques. Providing the right environment and support for children with CP promotes their successful integration into society.

References

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