Review Article

Cerebral palsy in children: a clinical overview

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Abstract: Cerebral palsy (CP) is a disorder characterized by abnormal tone, posture and movement and clinically classified based on the predominant motor syndrome—spastic hemiplegia, spastic diplegia, spastic quadriplegia, and extrapyramidal or dyskinetic. The incidence of CP is 2–3 per 1,000 live births. Prematurity and low birthweight are important risk factors for CP; however, multiple other factors have been associated with an increased risk for CP, including maternal infections, and multiple gestation. In most cases of CP the initial injury to the brain occurs during early fetal brain development; intracerebral hemorrhage and periventricular leukomalacia are the main pathologic findings found in preterm infants who develop CP. The diagnosis of CP is primarily based on clinical findings. Early diagnosis is possible based on a combination of clinical history, use of standardized neuromotor assessment and findings on magnetic resonance imaging (MRI); however, in most clinical settings CP is more reliably recognized by 2 years of age. MRI scan is indicated to delineate the extent of brain lesions and to identify congenital brain malformations. Genetic tests and tests for inborn errors of metabolism are indicated based on clinical findings to identify specific disorders. Because CP is associated with multiple associated and secondary medical conditions, its management requires a multidisciplinary team approach. Most children with CP grow up to be productive adults.

Keywords: Cerebral palsy (CP); spastic diplegia; spastic hemiplegia; spastic quadriplegia; extrapyramidal; spasticity; physiotherapy

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Introduction

Cerebral palsy (CP) is primarily a neuromotor disorder that affects the development of movement, muscle tone and posture (1-3). The underlying pathophysiology is an injury to the developing brain in the prenatal through neonatal period (1-3). Although the initial neuropathologic lesion is non-progressive, children with CP may develop a range of secondary conditions over time that will variably affect their functional abilities (4,5).

Based on an international consensus, a generally agreed upon definition of CP is as follows:

CP describes a group of permanent disorders of movement and posture, causing activity limitation, that are attributed to nonprogressive disturbances that occurred in the developing fetal or immature brain. The motor disorders of CP are often accompanied by disturbances of sensation, perception, cognition, communication, and behavior, by epilepsy, and by secondary musculoskeletal problems (1).

CP is characterized by heterogeneity in risk factors, underlying specific etiology, clinical features, severity of functional limitations, associated and secondary conditions,

Table 1 Factors associated with a higher risk for CP

Congenital brain malformations
Genetic susceptibility
Hypoxic-ischemic encephalopathy
In utero or perinatal stroke
In vitro fertilization or use of assisted reproductive technology
Kernicterus
Low birthweight
Maternal disorders of clotting
Maternal-fetal infections
Multiple gestation
Neonatal seizures
Neonatal sepsis or meningitis
Postneonatal meningitis
Postneonatal traumatic brain injury
Pre-pregnancy obesity
Preterm birth

CP, cerebral palsy.

treatment options, and evolution of the condition over the lifespan of the individual (6-8). Shevell [2019], has explored the argument for a consideration to view CP as a spectrum disorder rather than a discrete unitary clinical condition (9).

The prevalence of CP for all live births ranges from 1.5 to 3 per 1,000 live births, with variation between high income and low to middle income countries and geographic region (2-5,7,10-12). Because, in many infants and children, abnormal neuromotor findings tend to resolve within the first few years, especially during the first 2–5 years, of life, the reported prevalence of CP tends to be higher during infancy. Although prematurity and low birthweight are main risk factors for CP, multiple other factors are also associated with or potentially increase the risk for CP (*Table 1*) (2-5,7,11,13-15). Multiple epidemiological studies report that half of the children who develop CP were born at term without any identified risk factor (3,7,8,11,12,15). Although in most cases, CP is a result of an injury to the fetal or neonatal brain, post-neonatal onset CP has been recognized. Postneonatal CP results from an injury to the brain after neonatal period and before 5 years of age (5,11,12,15). The most common causes of postneonatal CP are traumatic brain injury, near-drowning, and meningitis (11).

Diagnosis

Novak *et al.* [2017], based on their systematic review of literature published between 1988 and 2016, contend that it is possible to accurately diagnose CP in early infancy (8). They emphasized early diagnosis to optimize long term functional outcomes on the basis of positively modulating their impact on neuroplasticity. Novak *et al.* [2017] reported that early and accurate diagnosis of CP is possible based on a combination of findings from medical history, neuroimaging, and standardized individually administered neurological and motor assessment tools (8). Standardized tools should be administered and interpreted by medical professionals with specific training and experience in their use. Based on their review, Novak *et al.* found that:

- For infants ≤5 months corrected age, the most predictive tools for detecting risk for CP are term-age magnetic resonance imaging (MRI) (86–89% sensitivity), the Prechtl Qualitative Assessment of General Movements (98% sensitivity), and the Hammersmith Infant Neurological Examination (90% sensitivity) (8).
- For infants ≥6 months corrected age, the most predictive tools for detecting CP risk are MRI (86–89% sensitivity), the Hammersmith Infant Neurological Examination (90% sensitivity), and the Developmental Assessment of Young Children (83% C index) (8).

Novak *et al.* [2017] proposed that when a diagnosis of CP cannot be made with certainty in young infants, an interim clinical diagnosis of 'high risk of CP' should be made, so that CP specific early interventions can be initiated (8). A diagnosis of high risk for CP requires motor dysfunction and either an abnormality on MRI scan and/ or a clinical history indicating risk for CP (8).

Although it is likely that based on a meticulous clinical history, findings on MRI scan and standardized neuromotor assessment, CP can be accurately diagnosed in early infancy by those specifically trained and experienced in using the tools, a specific diagnosis of CP in most primary care or pediatric practice settings is difficult to make with certainty during first 1–2 years of life (1-3,5,6,11,16). Approximately half of the infants who develop CP have identifiable high-risk factors, which allows for early screening and early diagnosis (8). Those infants without any known risk factor at birth first come to medical attention when parents notice delayed or atypical neuromotor developmental progression, when CP is suspected (8). A diagnosis of CP is primarily

Table 2 Early signs of CP (4)

In a baby 3 to 6 months of age:
Head falls back when picked up while lying on back
Feels stiff
Feels floppy
Seems to overextend back and neck when cradled in someone's arms
Legs get stiff and cross or scissor when picked up
In a baby older than 6 months of age:
Doesn't roll over in either direction
Cannot bring hands together
Has difficulty bringing hands to mouth
Reaches out with only one hand while keeping the other fisted
In a baby older than 10 months of age:
Crawls in a lopsided manner, pushing off with one hand and leg while dragging the opposite hand and leg
Scoots around on buttocks or hops on knees, but does not crawl on all fours

CP, cerebral palsy.

based on clinical findings and is generally more reliable after 2 years of age, because early signs and symptoms suggestive of CP may in fact be a normal variation or developmental lag and tend to resolve in many infants (1-6,11,16,17). In some children, clinical findings suggestive of CP may continue to evolve up to 4–5 years of age (1-6,11,16,17).

Persistence of primitive reflexes or primary motor pattern beyond the expected age is a key clinical characteristic of CP (11-14,16). Persistence of primitive reflexes prevents or delays typical progression of motor development and sequential acquisition of higher level neuromotor skills. A diagnosis of CP is first suspected when there is a failure to attain certain key milestones at expected age (*Table 2*) (4).

The neurologic impairment of motor system in children who have CP is characterized, in order of frequency, by spasticity, dyskinesia, hypotonia, and ataxia (4,6,12,13). Mixed presentations are not uncommon. Hypotonia, with or without associated spasticity—generally truncal hypotonia and spasticity of extremities, are also seen. Based on clinical findings, CP is generally classified as spastic, dyskinetic, and hypotonic or mixed (3,12-14,16).

Thirty-five percent of children with CP have spastic diplegia, which is the most common clinical phenotype of CP (3,4,11,12,15). Spastic diplegia is due to damage to the immature oligodendroglia between 20 and 34 weeks of gestation (2,3,15). The most common neuropathologic finding seen on neuroimaging is periventricular leukomalacia (2,3,15). In spastic diplegia, both the motor corticospinal and the thalamocortical pathways are affected (2,3). Most children with spastic diplegia have normal cognitive function and good prognosis for independent ambulation. Spastic quadriplegia comprises 20% of children with CP and this clinical phenotype is associated with premature birth and neuroimaging shows severe periventricular leukomalacia and multicystic cortical encephalomalacia (3,4,11,12,15). Spastic quadriplegia is associated with significant functional limitations, cognitive deficit, epilepsy, visual impairment and other associated conditions (2,3,12-14). Children with spastic quadriplegia have poor prognosis for independent ambulation. Twenty-five percent of children with CP have spastic hemiplegia (3,4,11,12,15). Spastic hemiplegia is most commonly seen in infants born at term and most cases are due to in utero or perinatal stroke (15). Most children with spastic hemiplegia have normal cognitive abilities, are able to maintain independent ambulation and a high level of functional abilities (2,3,10,14,16). Extrapyramidal CP comprises choreoathetotic, dystonic or dyskinetic clinical phenotypes and comprises 15% cases of CP (3,4,11,12,15). Most cases are seen in infants born at term and associated with hypoxic-ischemic encephalopathy, kernicterus, neurometabolic or neurogenetic disorder (2,3,15). Children with extrapyramidal CP have a higher incidence of associated conditions—cognitive deficit, seizures, behavioral problems, sleep disturbances, visual impairment or hearing impairment (3,4,10,12,13,16).

Four functional classification systems (*Table 3*) are used in persons with CP to allow for a standardized way to assess support and therapy needs of the individual (18-23). The Gross Motor Function Classification System (GMFCS) is used to describe gross motor function, especially the ability to walk, for children from 2 to 18 years of age (19,20). GMFCS is used to describe self-initiated movements as well as movements assisted by devices such as walkers, crutches, canes or wheelchairs (19,20). The Manual Ability Classification System (MACS) is used to describe the typical use of both hands and upper extremities for children from 4 to 18 years of age (21). The Communication Function Classification System (CFCS) is used to describe the ability of persons with CP for daily routine communication (sending or receiving a message) (22). The CFCS considers all methods of communication including vocalizations, manual

Table 3 Classification levels for CP (18)

Level	GMFCS	MACS	CFCS	EDACS
I	Walks without limitation	Handles objects easily and successfully	Effective sender and receiver	Eats and drinks safely and efficiently
II	Walks with limitations (no mobility aid by 4 years)	Handles most objects with reduced speed/quality	Effective but slow-paced sender and receiver	Eats and drinks safely but with some limitations to efficiency
III	Walks with hand-held mobility device	Handles objects with difficulty, help to prepare or modify activity	Effective sender and receiver with familiar partners	Eats and drinks with some limitations to safely; there may also be limitations to efficiency
IV	Self-mobility with limitations, may use power	Handles limited number of objects in adapted setting	Inconsistent sender and receiver with familiar partners	Eats and drinks with significant limitations to safety
V	Transported in manual wheelchair	Does not handle objects	Seldom effective sender and receiver with familiar partners	Unable to eat or drink safely; consider feeding tube

CP, cerebral palsy; GMFCS, Gross Motor Function Classification System; MACS, Manual Ability Classification System; CFCS, Communication Function Classification System; EDACS, Eating and Drinking Ability Classification System.

signs, eye gaze, pictures, communication boards or speech generating devices (22). The Eating and Drinking Ability Classification System (EDACS) is used to describe the eating and drinking function for children 3 years and older (23). The EDACS assesses the eating and drinking safety (risk for aspiration or chocking), and eating and drinking efficiency (the amount food lost and the time taken to eat) (23).

Although, in most cases of CP, no treatable underlying etiology is identified, an etiological evaluation should be considered to identify certain treatable conditions associated with disturbances of neuromotor development. MRI scan is recommended when CP is suspected and in 90% of cases of CP, MRI scan of brain shows abnormal findings, which include a range of brain malformations, in utero stroke, or white matter loss (3,7,8,11,14,15,17). Abnormal neuromotor development, loss of motor skills, unexplained hypoglycemia, recurrent vomiting or seizures should prompt consideration of an inborn error of metabolism (14,15,17). A family history of unexplained neurologic symptoms or infant deaths may also suggest possibility of neurometabolic disorder (11,14,15,17). Laboratory investigations for possible inborn errors of metabolism and neurogenetic disorders should be considered in consultation with specialists in neurometabolic and neurogenetic disorders.

Prevention and treatment interventions

Prevention of premature and low birthweight births is the most significant consideration in reducing the overall incidence of CP. Antenatal administration of magnesium sulfate, when premature birth is imminent before 32 weeks of gestation, has been shown to confer neuroprotection and reduce the risk of CP development in neonates (11,24). Therapeutic hypothermia has been shown to reduce the risk of CP in term and late preterm infants with hypoxic-ischemic encephalopathy (11,25,26). Therapeutic hypothermia is initiated within 6 hours after birth with the aim of lowering the body and/or head temperature by 2 ℃ for 48 hours (11,25,26).

Novak *et al.* [2017], based on their systematic review have emphasized the importance of early diagnosis so that CP specific interventions can be initiated early to optimize their impact on the developing brain's neuroplasticity (8). Examples of CP specific early interventions found to be effective in improving neuromotor function include the use of constraint-induced movement therapy in hemiplegic CP, and early, intense, enriched, task-specific training-based interventions at home (8).

A multidisciplinary team (*Table 4*) approach provides the best model for medical care of children and adults with CP across their lifespan to manage various associated and secondary conditions as well as address support system and psychosocial needs (6,10,12-14). It is not within the scope of this review to describe management of all conditions in detail; this section provides an overview of selected interventions used in the management of CP.

General medical conditions

Children with CP also have many associated conditions (*Table 5*) that require general medical care and are best managed in the primary care setting based on standard

Table 4 Multidisciplinary team members involved in care for children with CP

Audiologist
Medical social worker
Nursing
Nutritionist
Occupational therapist
Pediatric gastroenterologist
Pediatric neurologist
Pediatric orthopedic surgeon
Pediatric pulmonologist
Pediatric surgeon
Pediatrician
Physiatrist
Physiotherapist
Psychologist
Speech-language therapist

CP, cerebral palsy.

practice guidelines (6,10,12-14,27).

Treatment of spasticity

The degree or severity of spasticity in CP varies depending upon the stage of arousal of the child at the time and the duration since the inciting event that lead to spasticity (11,16,28-32). Muscle spasticity in a child with CP may interfere with certain functions as well as may serve to facilitate certain functions. Therefore, reduction of spasticity should be considered within the context of its functional impact and multiple factors (*Table 7*) need careful consideration (11,16,28-32).

Different treatment interventions (*Table 8*) have been used to treat spasticity in children with CP (11,16,28-32). The decision to use any particular treatment intervention is guided by the goal of the treatment. In some cases, the goal may be to reduce focal spasticity, whereas in others it may be to reduce generalized spasticity. Also, the risks and benefits of any particular intervention should be carefully considered. Physiotherapy and occupational therapy by age 4–5 years of age have been shown to be relatively more effective than if started at a later age (33,34). Botulinum toxin injection is used to treat focal spasticity

Table 5 Conditions associated with CP

System	Conditions
Neurologic	Seizures
Pulmonary	Restrictive lung disease (secondary to progressive kyphoscoliosis)
	Chronic lung disease of infancy
	Dysphagia
	Obstructive sleep apnea
	Recurrent aspiration
Gastrointestinal	Oral motor dysfunction and feeding difficulty
	Drooling
	Poor nutritional status and growth
	Gastroesophageal reflux
	Constipation
	Bowel incontinence
Genitourinary	Bladder incontinence
	Recurrent urinary tract infections
Skin	Decubitus ulcers
Vision	Refractive errors; myopia
	Strabismus, amblyopia, cataract
	Nystagmus, optic atrophy
	Cortical visual impairment
Hearing	Hearing impairment
Dental	Poor hygiene
	Malocclusion
	Caries
Communication	Speech and language impairment
	Dysarthria
Pain from multiple sources	Migraine, corneal abrasions, temporomandibular joint dysfunction
	Gastroesophageal reflux, constipation
	Hip dislocation, muscle spasms
	Progressive scoliosis
Sleep	Sleep disturbances
Endocrine	Delayed or precocious puberty
Psychosocial, behavioral, cognitive	Attention deficit hyperactivity disorder
	Self-injurious behavior
	Depression
	Cognitive deficit
	Learning difficulties
Musculoskeletal	See *Table 6*

CP, cerebral palsy.

Table 6 Examples of orthoses, adaptive equipment and assistive technology devices

Category	Examples
Daily living activities	Assistance for activities of hygiene, housekeeping and all other activities
Building structure	Lifts and elevators, special ramps, special devices for doors
Communication	Various types of augmentative and alternative communication devices, communication boards, talking books
Computers	Hardware, software, accessories, other modifications and related special devices
Ambulation and transportation	Walking or standing aids, wheelchairs, vehicle lifts
Living conditions	Accessible and modified furniture
Orthotics and prosthetics	Various types of braces, artificial limbs, other prosthesis
Leisure activities	Modified sport equipment, accessible toys
Hearing aids	Hearing aids, assistive listening devices, aids for deaf-blind
Vision	Vision aids, Braille note takers
Orthoses	Ankle-foot, ankle-foot-knee, ankle-foot-knee-hip, lumbar, thoraco-lumbo-sacral, hand splints, shoe inserts

Table 7 Factors considered in decision to treat spasticity

Acute or chronic nature of spasticity
Age of the child at the time of intervention
Cognitive and emotional maturity of the child
Distribution of spasticity
Functional impact of reducing spasticity
Growth potential
Objective assessment of severity (such as Ashworth Scale)
Presence or absence of positive and negative upper motor neuron signs
Psychosocial factors and support system
Static or progressive nature of spasticity
Type of intervention being considered to reduce spasticity

with optimal effectiveness between 1 and 6 years of age for the treatment of lower extremity spasticity and between 5 and 15 years of age for spastic hemiplegia (11,16,28-32).

Table 8 Interventions to treat spasticity

Category	Intervention
Pharmacologic	Baclofen: oral and intrathecal pump
	Phenol intramuscular injection
	Botulinum toxin intramuscular injection
	Valium and clonazepam oral
	Tizanidine and clonidine oral
	Dantrolene oral
Non-pharmacologic	Physiotherapy
	Occupational therapy
	Use of adaptive equipment and orthoses
	Orthopedic surgical procedures
	Selective dorsal rhizotomy

Spasticity management is best guided by a physician with expertise and experience with the use of different treatment interventions.

Orthopedic surgical procedures

Children with CP develop multiple secondary, often progressive, musculoskeletal conditions (*Table 9*) that may require orthopedic surgical interventions that are best managed by orthopedic surgeons with experience and expertise in these surgical procedures (6,10,13,16,33,34). The type and severity of these conditions vary depending upon the type and severity of CP. A number of factors are considered in planning any of these surgical interventions that include the age of the child, severity and progressive or nonprogressive nature of the condition, support system for post-operative and long term follow-up and care, potential for functional improvement, and potential for amelioration or prevention of complications. A common practice consideration is to perform most procedures as a single event multiple level surgery (SEMLS) to avoid multiple exposure to anesthesia risk and other operative risks (16,33). Also, this approach allows for a planned course of post-operative rehabilitation.

Physiotherapy

Physiotherapy has been shown to improve muscle strength, local muscular endurance and joint range of movement in children with CP (35,36). Physiotherapy exercises are used

to prevent or reduce joint contractures; this is achieved by passive gentle range of motion exercises and stretches across major joints. Increased muscle strength is achieved by performing regularly scheduled progressively increasing resistive exercises involving all major muscle groups. Low resistance, high repetition exercises of major muscle groups improve local muscular endurance. Specific physiotherapy exercises are designed to improve balance, postural control, gait, and assist with mobility and transfers (for example from bed to wheelchair).

Functional strength training combined with plyometric exercises and balance training have been used to improve function in individuals with CP (31,35-38). Plyometric exercise improves muscle power, which includes strength and speed (35,36). In regards to functional strength training, studies have shown that targeting specific muscles is most effective in muscle activation (35,36,38). A study has shown that 12 weeks of an adaptive bungee trampoline program improved lower limb muscle strength (39). This bungee trampoline program included bouncing, hopping, heel jumps, jumping with eyes closed, practicing a sequence of jumps, and games such as dodgeball.

The use of constraint-induced therapy centers on the idea of selective upper extremity strengthening in children with CP (8,12-14,40,41). The intervention focuses on having the child use the affected limb, while simultaneously restraining the use of normally functioning limb. Prolonged restraint and disuse of the normally functioning upper limb may result in disuse weakness.

The application of conductive education based on the concept that children with or without motor deficits learn the same way (14,30,31,35,42). The conductive education specialist attempts to unify developmental areas including emotional, cognitive, motor and communicative domains in order to improve integration and global functionality in participants (14,30,31,35,42). The effectiveness of conductive education (CE) in improving functional capabilities of children with CP has not been clearly established (14,30,31,35,42).

Treadmill training

Treadmill training as an intervention for children with CP aims at improving balance as well as lower extremity symmetry (10,30,31,35,43-46). It provides important measures in developing an understanding of how to walk independently. Specific methods of treadmill training vary, with protocols demonstrating differences in training speeds (varied based on age at intervention), use of or lack of body weight support techniques (support under the arms or with utilization of a harness on the patient while on the treadmill), and frequency or duration of the training (10,30,31,35,43-46). Studies have demonstrated that 3–4 sessions per week over a period of 3–4 months of treadmill training in children under 6 years of age with ambulatory capability have led to improvement in gait velocity and enhancement of stepping movements, as well as independence with walking (10,30,31,35,43-46).

Treadmill training is time and labor intensive. Robotic gait training has been shown to reduce the time and labor burden associated with traditional treadmill training (47). Robotic assisted device can harness the child appropriately and can be programmed to simulate normal gait. Studies have shown increased walking speed and endurance with the use of robotic gait training. Randomized controlled trials have shown effectiveness of robot assisted gait training in improving gait velocity, spatiotemporal station, and endurance in children with CP (47).

Occupational therapy

Occupational therapy is an integral component in the interdisciplinary treatment of individuals with CP, with various studies demonstrating its long-term effects on promoting improvement in fine motor functionality (35). A major focus of occupational therapy is to improve fine motor function of upper extremities to assist the child in performing activities of daily living more efficiently. Occupational therapist also works in organization of child's play areas, providing adaptive equipment for self-care and learning and to modify child's learning environment to facilitate attention and information processing (35).

Orthotics, adaptive equipment, and assistive technology

In the long-term management of children with CP, it is important to determine how much assistance is required on a daily basis for optimal functioning. Orthoses, adaptive equipment and assistive technology devices (*Table 6*) are used to improve child's functional abilities and facilitate activities of daily living (13,14,32-34,48-50).

Assistive technology plays an important role in the management of persons who have CP and other developmental disorders. According to the United States Individuals with Disabilities Education Act (IDEA), the term "assistive technology device" means any item,

Table 9 Orthopedic conditions in CP

Affected area	Condition or deformity
Foot and ankle	Equinus, equinovarus, calcaneous deformity, valgus deformity of ankle
Lower extremities	Rotational deformities
Knee	Congenital knee flexion contractures, congenital knee hyperextension or dislocation, developmental knee flexion contracture, knee extension contractures, knee instability, internal derangements, crouch gait, knee dislocation, genu varum, genu valgum, genu recurvatum, patellar subluxation and dislocation, knee instability
Hips and pelvis	Abduction external rotation contracture, hip flexion deformity, hip subluxation and dislocation, wind-swept pelvis, pelvic obliquity
Spine	Kyphosis, scoliosis, hyperlordosis
Upper extremities	Shoulder contracture and instability, flexion contractures of wrist and fingers, thumb-in-palm deformity, elbow flexion contracture

CP, cerebral palsy.

piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of a child with a disability (48). The term does not include a medical device that is surgically implanted, or the replacement of such device. The term "assistive technology service" means any service that directly assists a child with a disability in the selection, acquisition, or use of an assistive technology device. A significant amount of variability exists within adaptive technology for children with CP, as these devices are ideally tailored to the individual's existing muscle constraints.

Other interventions

Many other specific interventions or intervention approaches have been used in the treatment of CP; however, the evidence for effectiveness and recommendation for routine use of such interventions is equivocal and limited. Some of these interventions or approaches include acupuncture, neurodevelopmental training, sensory integration, electrical stimulation, suit therapy, hippotherapy, music therapy, video game therapy, and stem cell therapy (51-66).

Outcomes

With early intervention and appropriate medical care and ongoing support services, most children with CP grow up to be adults; overall survival of all children with CP until the age of 20 years is 90% (2,3,5-7,14,67-69). It is important to recognize that many age-related changes and diseases occur earlier in persons with CP. Of adults who have CP, most are over the age of 45; deaths attributed to CP per se are rare; 95% of children with diplegia and 75% of children with quadriplegia survive until the age of 30 years; and 95%of children who have CP with mild cognitive deficit and 65% of children with severe cognitive deficit survive until the age of 38 years (2,3,6,10,67-69). With appropriate support and intervention, 2 our of 3 individuals with CP are ambulatory with or without assistance, 3 out of 4 have ability to speak, and 1 out of 2 have normal cognitive abilities (2,3,6,10,67-69).

Conclusions

CP is the most common cause of motor abnormalities seen in infants and children. The reported incidence of CP has remained steady over past several decades. Although prematurity and low birthweight are important risk factors, about half of all children who develop CP were born at term, normal birthweight, with no identified risk factors. A specific underlying etiology can be identified only in a very small percentage of cases. The diagnosis of CP is based mainly on findings on history and physical examination. Most children with CP live to be adults. Because of multiple associated conditions and complexities of support needed, management of CP is best done by a multidisciplinary team.

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