

Cerebral palsy

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Cerebral palsy (CP) is caused by a non-progressive insult to the developing brain in the perinatal period; in most cases only risk factors, such as prematurity, rather than specific causes, such as hypoxia (hypoxic ischaemic encephalopathy [HIE]), can be identified. The effects of CP may only become apparent as the child grows and fails to reach developmental milestones. Investigations may identify the aetiology and predict the pattern of the CP: premature babies may show evidence of periventricular leukomalacia (PVL) on MRI, associated with a spastic diplegia and relative preservation of intellectual function. , 1806–1875, neurologist, worked successively in Boulogne and Paris, France, but never

Aim of treatment Restores joint range (but results in relative muscle weakness) correction of fixed deformity Restores mechanical alignment and allows muscles to work in a more efficient manner Improves posture/function; reduces pain Reduce spasticity – not useful in dystonia Improve lower limb mechanics

In general, the pattern of involvement can be classified according to the anatomical site involved and the effect on muscle tone (Table 44.16). The prognosis for walking can be predicted by identifying evidence of neurological development, i.e. gaining motor skills and losing primitive reflexes. The age-related Gross Motor Function Classification System (GMFCS) has five categories that relate to mobility and prognosis (GMFCS I – near-normal versus GMFCS V – wheel chair based). Many children with GMFCS V CP have multiple associated problems and a short life expectancy . An important aspect of management is the control of high tone. Tone can be reduced with drugs (e.g. diazepam and baclofen). Alternatively, neuromuscular blockers such as botulinum toxin allow a focal reduction in tone by preventing acetylcholine release at the neuromuscular junction. The effect is temporary, giving a ‘window’ during which the physiotherapists can stretch agonists and strengthen antagonists. It is important to differentiate between dynamic and fixed contractures; the latter will not respond to tone management or splinting. The classic CP gait patterns demonstrate flexor spasticity The child with spastic diplegia has problems at all levels of the lower limb. Single-event multilevel surgery (SEMLS) is popular, and gait analysis (both observational and computerised) contributes to the selection of an appropriate management plan for an individual patient. Computerised analysis provides objective evidence of joint movement and mechanics in multiple planes (Figure 44.37). Appropriate bone and soft-tissue procedures can then be planned. Botulinum toxin helps with postoperative pain and spasm. In the child with total body involvement (TBI) and high muscle tone, hip subluxation leading to dislocation is common (Figure 44.38). Current thinking is that symmetry and pelvic position are important so the hips should be kept in joint with early surgical intervention if necessary . Aggressive management of a spinal deformity initially concentrates on seating position and subsequently emphasises spinal bracing or surgery .

Overall, it is important to remember that, in adulthood, independent mobility, even if in a wheelchair, and effective communication are the most important requirements. - Summary box 44.20 - - Cerebral palsy

Characteristics Tone Commonest type of abnormality; due to pyramidal system damage Spastic ('high') Velocity-dependent increased muscle tone and brisk reflexes Dyskinetic Dystonic Increased tone but reduced activity – stiff movements Choreoathetoid Low tone but increased activity – uncoordinated jerky movements Due to damage in the extrapyramidal system Generalised low tone, loss of muscle coordination Ataxia Due to cerebellar damage No one tone/movement disorder predominatesw Mixed Combination of spasticity and dystonia is common Hypotonia Usually a phase (which may last years) before the features of spasticity develop Site Unilateral Hemiplegia Arm more affected than leg Bilateral Diplegia Legs more affected than arms Total body involvement Often signifi cant intellectual impairment and associated difficulties Brain injury is non-progressive Classified as unilateral or bilateral involvement: hemiplegia, diplegia or TBI Tone may be high, low or variable but there is always a generalised, relative muscle weakness In ambulant children, gait analysis may be used to plan management In TBI, primary concerns are hip subluxation and spinal deformity

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