

Early detection and diagnosis of cerebral palsy

Currently the average age of diagnosis of cerebral palsy in developed countries is between 12–24 months. New high-quality evidence in the form of a Clinical Practice Guideline¹ has alerted clinicians to the fact that cerebral palsy can be accurately diagnosed much earlier, sometimes in the newborn period, but often between 3–6 months of age. Early diagnosis means that infants can be referred promptly for early intervention, at a period when the brain has most plasticity; and parents can be given the information and supports they need to understand the child's areas of ability and disability, the service system and what is available to them, and to enable links with other families with children with cerebral palsy.

Infants at risk of cerebral palsy, for example babies born extremely prematurely or those who have had significant neonatal problems such as neonatal encephalopathy, are an important group where an early diagnosis may be possible using a combination of clinical assessment, brain imaging (MRI) and either the General Movements Assessment² or the Hammersmith Infant Neurological Examination.³

It is also important to know that in half of all infants with cerebral palsy, the pregnancy and labour appeared uneventful. Clinical observations of motor dysfunction, delay and abnormal posture can be difficult in early infancy and become more evident as the child gets older.

Consider referral and investigations for cerebral palsy in babies and toddlers with:

- **Delayed motor milestones:** not sitting by nine months or walking by 18 months (allowing for prematurity) or inability to take weight through the plantar surface (heel and forefoot) of the feet.
- **Asymmetric movement patterns:** hand function asymmetry such as fisting of one hand or early use of one arm and hand may suggest hemiplegia or abnormal muscle tone. Remember that the onset of spasticity may be gradual. Similarly, dystonic movements may not appear until 9–18 months of age.
- **Management problems,** such as severe feeding difficulties, behaviour such as persistent irritability or disturbed sleep patterns. These flag possible developmental problems including cerebral palsy, but may also result from and point to a whole range of other contributing factors including acute illness, environmental factors, family or other social issues. Sometimes the cause remains unknown.

Cerebral palsy is a clinical diagnosis based on clinical signs, neurological symptoms and motor activity limitations. Early diagnosis is supported by the combination of physical assessment and brain MRI.

Identification of cerebral palsy

Before five months of age, Prechtl's Qualitative Assessment of General Movements² (the General Movements Assessment) in combination with MRI, or the Hammersmith Infant Neurological Examination (HINE)³ can be used and are most predictive. The General Movements Assessment can be performed from birth until 20 weeks of age. It is used to identify absent or abnormal general movements and, depending on the type of abnormality, can be highly predictive of cerebral palsy by approximately three months of post term age.



Cerebral palsy is often not diagnosed until 12–24 months of age. New evidence has pointed to the fact that the diagnosis can be made much earlier in many children.

These resources are designed to support healthcare practitioners in the care of their patients with cerebral palsy in Australia. They were developed in partnership by The Royal Children's Hospital; the Centre for Developmental Disability, Monash Health; and Murdoch Children's Research Institute. They have been amended for use by healthcare workers globally in partnership with IAACD. The initial project was funded by an Avant Quality Improvement Grant 2017.

After five months of age (corrected for prematurity), a combination of the Hammersmith Infant Neurological Examination, standardised motor tests such as the Developmental Assessment of Young Children⁴, MRI and history of risk factors is the most accurate method of early detection of cerebral palsy.

The Hammersmith Infant Neurological Examination is an easily performed and relatively brief standardised neurological examination for infants aged between two and 24 months.

The Developmental Assessment of Young Children is a tool for parents to self-report and quantify motor delay. A community health worker, for example an Anganwadi/ASHA worker in rural India, can be trained to identify the developmental difference and refer for early diagnosis and intervention.

A brain MRI can provide information about the approximate time at which the brain injury occurred, severity, laterality and distribution. Early MRI (before sedation is required) is recommended in high risk infants. In about 10% of children with cerebral palsy, the brain MRI is normal. In these children and others with abnormal presentations, further metabolic and genetic tests should be undertaken to determine the underlying cause if possible. Rare metabolic, genetic and degenerative conditions can present with a clinical picture similar to cerebral palsy. **Making the correct diagnosis is important for prognosis, early intervention and genetic counselling.**

Remember:

- If a clinical diagnosis of cerebral palsy is suspected but cannot be made with certainty, the interim diagnosis of **'high risk of cerebral palsy'** should be given to enable early intervention and supports and ongoing diagnostic monitoring until the diagnosis is reached.
- Parents will experience grief and loss at the time of diagnosis of 'high risk' and therefore good communication is essential. As parents may need some time to process the diagnosis, a follow-up appointment to discuss mental health support is recommended. Consider a mental health care plan.
- **Consider referral** to a paediatrician or a paediatric neurologist and allied health professionals with expertise in cerebral palsy if not already involved.
- It is important to remember that **cerebral palsy describes the outcome (i.e. a motor disorder) but not the cause of the underlying neurological disorder.** Genetic review is important when the cause is unknown and, because knowledge in the field of genetics is advancing so rapidly, review every five years is recommended if the cause has not been identified.

More information

The Cerebral Palsy Alliance website has a range of freely available early detection resources including fact sheets, online learning modules and guidelines.

www.cerebralpalsy.org.au/about-conditions/refer-a-client-to-cpa/early-diagnosis-of-cerebral-palsy

REFERENCES

1. Novak I, Morgan C, Adde L, Blackman J, Boyd RN, Brunstrom-Hernandez J, Cioni G, Damiano D, Darrah J, Eliasson A, de Vries LS, Einspieler C, Fahey M, Fehlings D, Ferriero DM, Fetters L, Fiori S, Forssberg H, Gordon AM, Greaves S, Guzzetta A, Hadders-Algra M, Harbourne R, Kakooza-Mwesige A, Karlsson P, Krumlinde-Sundholm L, Latal B, Loughran-Fowlds A, Maitre N, McIntyre S, Noritz G, Pennington L, Romeo DM, Shepherd R, Spittle AJ, Thornton M, Valentine J, Walker K, White R, Badawi N. Early, Accurate Diagnosis and Early Intervention in Cerebral Palsy: Advances in Diagnosis and Treatment. *JAMA Pediatr*. Published online July 17, 2017. doi:10.1001/jamapediatrics.2017.1689Gm
2. Einspieler C, Prechtel HFR, Bos AF, Ferrari F & Cioni G. 2012. *Prechtel's Method on the Qualitative Assessment of General Movements in Preterm, Term and Young Infants*. Mac Keith Press ISBN 1 898683 40 9.
3. Haataja L, Mercuri E, Regev R, et al. 1999. Optimality score for the neurologic examination of the infant at 12 and 18 months of age. *J Pediatr* 1999;135:153–61.
4. Voress JK, Maddox T. 2012 *Developmental Assessment of Young Children, Second Edition*. Austin, TX: PRO-ED.
5. Dias E, Doraeli P, Kishore M. Rapid Response: Re: Cerebral palsy in India—a brief overview. *Bmj*. 2017;356:j462.



In approximately 10% of all children with cerebral palsy, MRI brain scan is normal. These children usually require further investigation.