Early diagnosis – cerebral palsy

Early detection and diagnosis recommendations from best available evidence

STRONG RECOMMENDATION

CONDITIONAL RECOMMENDATION

1 The clinical diagnosis of cerebral palsy can and should be made as early as possible. When the clinical diagnosis is suspected but cannot be made with certainty, the interim clinical diagnosis of 'high-risk' of cerebral palsy should be given.

MOTOR DYSFUNCTION GMs +/- HINE + ABNORMAL NEURO IMAGING MRI +/- HINE + CLINICAL HISTORY

Based on MODERATE QUALITY evidence for infant and parent outcomes.

2 Early standardised assessments and investigations for early detection of 'high-risk' of cerebral palsy should always be conducted in 'high-risk' of cerebral palsy populations, i.e. infants born pre-term, infants with neonatal encephalopathy, infants with birth defects or infants admitted to Neonatal Intensive Care Unit (NICU).

Based on HIGH QUALITY evidence of test psychometrics.

Early detection of cerebral palsy before 5 months corrected age

Option A: The most accurate method for early detection of cerebral palsy in infants with newborn-detectable risks and younger than 5 months corrected age (CA) is to use a combination of a standardised motor assessment, neuroimaging and history taking about risk factors.

MOTOR DYSFUNCTION + ABNORMAL NEURO IMAGING

3 **TEST:** General Movements Assessment (GMs), to identify motor dysfunction [95–98% predictive of cerebral palsy]; combined with neuroimaging.

STANDARDISED MOTOR

TEST: MRI (before sedation is required for neuroimaging) to detect abnormal neuroanatomy in the motor area/s of the brain [80–90% predictive of cerebral palsy].
Note: Normal neuroimaging does not automatically preclude the diagnosis of risk of cerebral palsy.

ABNORMAL NEURO IMAGING

Based on HIGH QUALITY evidence of test psychometrics in newborn-detectable risk populations.

Option B: In contexts where the General Movements Assessment is not available or MRI is not safe or affordable (e.g. in countries of low to middle income), early detection of cerebral palsy in infants with newborn-detectable risks and younger than 5 months (CA) is still possible and should be carried out to enable access to early intervention.

STANDARDISED NEURO EXAM + STANDARDISED MOTOR

4 **TEST:** Hammersmith Infant Neurological Examination (HINE) [HINE<57 at 3 months is 96% predictive of cerebral palsy].

STANDARDISED NEURO EXAM

Based on MODERATE QUALITY evidence of test psychometrics in newborn-detectable risk populations.

TEST: Test of Infant Motor Performance (TIMP).

STANDARDISED MOTOR

Based on LOW QUALITY evidence of test psychometrics in newborn-detectable risk populations.

Early detection of cerebral palsy after 5 months corrected age

Accurate early detection of 'high-risk' of cerebral palsy in those with infant-detectable risks and age 5-24 months can and should still occur as soon as possible, but different diagnostic tools are required.

5 Any infant with:
(a) inability to sit independently by 9 months; or

(b) hand function asymmetry: strong early preference for one side; or

(c) inability to take weight with feet flat on the floor should receive standardised investigations for cerebral palsy.

Based on HIGH QUALITY evidence of motor norms.

Option A: The most accurate method for early detection of cerebral palsy with infant-detectable risks older than 5 months (corrected age) but younger than 2 years old is to use a combination of a standardised neurological assessment, neuroimaging, and a standardised motor assessment with a history taking about risk factors.

STANDARDISED NEURO EXAM + STANDARDISED MOTOR + ABNORMAL NEURO IMAGING

6 **TEST:** HINE (90% predictive of cerebral palsy). HINE scores lower than 73 (at 6, 9 or 12 months) should be considered at 'high-risk' of cerebral palsy. HINE scores lower than 40 (at 6, 9 or 12 months) almost always indicate cerebral palsy; combined with neuroimaging and standardised motor assessments.

TEST: MRI to detect abnormal neuroanatomy in the motor area/s of the brain (sedation required >6 weeks up to 2 years of age).

STANDARDISED NEURO EXAM

ABNORMAL NEURO IMAGING

Specific tests of movement and development called the Developmental Assessment of Young Children (DAYC) and the Alberta Infant Motor Scale (AIMS) are also recommended and can be performed and scored by experienced clinicians.

MOTOR DYSFUNCTION

Based on MODERATE QUALITY evidence of test psychometrics in newborn-detectable risk populations.

LOW-MODERATE QUALITY evidence of test psychometrics in newborn-detectable risk populations.

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Early diagnosis – cerebral palsy

Early detection of cerebral palsy after 5 months corrected age (continued)

Option B: In contexts where MRI is not safe or affordable, early detection of cerebral palsy is still possible with infant-detectable risks between 5-24 months (corrected age) and should be carried out to enable access to early intervention.

STANDARDISED NEURO EXAM + STANDARDISED MOTOR

7

TEST: HINE [90% predictive of cerebral palsy at 2–24 months of age] HINE scores at 6, 9 or 12 months: <73 indicates 'high-risk' of cerebral palsy. A score of <40 indicates abnormal outcome, usually cerebral palsy.

STANDARDISED NEURO EXAM

Based on MODERATE QUALITY evidence of test psychometrics.

TEST: Developmental Assessment of Young Children (DAYC) to quantify motor delay [83% predictive of cerebral palsy].

STANDARDISED MOTOR

TEST: Motor Assessment of Infants (MAI) to quantify motor delay [73% predictive of cerebral palsy].

STANDARDISED MOTOR

LOW-MODERATE QUALITY evidence

Early detection of motor severity of cerebral palsy

Prognosis of long-term motor severity is most accurate in children over 2 years using the Gross Motor Function Classification System (GMFCS).

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In infants under 2 years old, prognosis of motor severity predictions should be made cautiously and always involve the use of standardised tools, because incomplete development of voluntary motor skills or abnormal tone might confound clinical observations. Motor severity of cerebral palsy under 2 years of age is most accurately predicted using the Standardised Neurological Assessment.

STANDARDISED NEURO EXAM + ABNORMAL NEURO IMAGING

Based on LOW QUALITY evidence.

TEST: HINE. Cut-off scores predict the probable severity.

HINE 40–60

HINE <40

STANDARDISED NEURO EXAM

TEST: MRI Normal imaging does not preclude cerebral palsy, and abnormal imaging does not automatically lead to cerebral palsy.

ABNORMAL NEURO IMAGING

Based on MODERATE QUALITY evidence in newborn-detectable risk populations.

Early detection of motor sub-type and topography of cerebral palsy

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Early detection of motor sub-type and topography can be difficult in infants under 2 years old, but wherever possible it is very important to identify unilateral versus bilateral cerebral palsy early, as the early interventions (e.g. constraint induced movement therapy) and long-term musculoskeletal outcomes and surveillance needs differ (e.g. hip surveillance).

Based on LOW QUALITY evidence.

Early intervention

10

Clinical diagnosis of cerebral palsy or the interim diagnosis of 'high-risk' of cerebral palsy should always be followed by a referral to cerebral palsy-specific early intervention (e.g. constraint induced movement therapy and hip surveillance). Parent concern is a valid reason to trigger formal diagnostic investigations and referral to early intervention.

Based on HIGH QUALITY evidence.

Early detection of associated impairments

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Clinical diagnosis of cerebral palsy or interim diagnosis of 'high-risk' of cerebral palsy should always include standard medical investigations for associated impairments and functional limitations (e.g. vision impairment, hearing impairment and epilepsy).

Based on HIGH QUALITY evidence.

Communicating the diagnosis to parents compassionately

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Parents experience grief and loss at the time of diagnosis or 'high-risk' notification; therefore communication with a family should be a series of well-planned and compassionate conversations. Communication should be empathetic and involve the family, face-to-face with both parents or caregivers present (where appropriate), private, honest and jargon-free. This should be followed by written information, identification of strengths, invitation to ask questions, discussion of feelings, recommendations to use parent-to-parent support and arrangement of early intervention.

Based on HIGH QUALITY qualitative parent interviews.

Adapted with permission from: Novak et al 2017. Early, Accurate Diagnosis and Early Intervention in Cerebral Palsy. *JAMA Pediatr.* 2017;171(9):897-907. doi:10. 1001/jamapediatrics.2017.1689 Available from: http://jamanetwork.com/journals/jamapediatrics/article-abstract/2636588

Cerebral Palsy ALLIANCE

CENTRE OF RESEARCH EXCELLENCE Cerebral Palsy

EARLY DIAGNOSIS – CEREBRAL PALSY

Prechtl's General Movements Assessment

Prechtl's General Movements Assessment is simply a video of your baby lying on their back whilst they are awake, calm and alert.

STANDARDISED
MOTOR

- The assessment can be completed from birth up to 20 weeks of age (corrected age).
- It is non-invasive and non-disruptive.
- The video can be taken by parents or clinicians with appropriate consent.
- The video may be recorded by medical professionals whilst your baby is an inpatient, an outpatient, or by you in your home via the BabyMoves app.

What's involved?

It is a standardised test of movement that can be scored, based on observation of your baby's movements, by certified assessors trained by the General Movements Trust. The length of the video depends on how old your baby is.

AGE	PHASE	VIDEO DURATION
Up to 6-9 weeks, corrected age	'Writhing' phase	Up to 15 minutes
From about 9 weeks corrected age through to about 20 weeks corrected age	'Fidgety' phase	3-5 minutes

Prechtl's General Movements (GMs) are predictive of how the young central nervous system is developing. They can identify neurological issues predictive of cerebral palsy and other developmental disabilities. The results of your GMs videos will be discussed with you thoroughly by your medical team.

If your baby's GMs indicate an abnormal result, your multidisciplinary team may guide you through further investigations, assessments and early intervention supports.

Specific early intervention and supports for babies and their families who are identified 'at risk of cerebral palsy' is proving to demonstrate better outcomes for children and families.

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EARLY DIAGNOSIS – CEREBRAL PALSY

Prechtl's General Movements Assessment

What are General Movements?

STANDARDISED MOTOR

General Movements (GMs) are distinct spontaneous movement patterns that are evident in babies before birth and after birth up to 20 weeks of age (corrected age).

They are seen spontaneously when the baby is awake, calm and alert and not externally stimulated (such as a parent playing or talking with them).

You may be familiar with other spontaneous motor patterns seen in young babies such as startles, twitches, yawning and breathing movements.

GMs involve the whole body and are variable, complex, fluent and elegant.

GMs mature and change in a specific order:

AGE	PHASE
Up to 6-9 weeks, corrected age	'Writhing'
From about 9 weeks through to about 20 weeks, corrected age	'Fidgety'

What are the benefits of GM assessment?

- General assessments are a cost-effective way of assessing a baby's young nervous system.
- The standardised Prechtl's GMs assessment provides an assessment of these General Movement patterns of young infants.
- If GMs are identified as 'absent' or 'abnormal' it may indicate risk of neurological conditions, in particular cerebral palsy.
- GMs videoed around 3 months of age (12–16 weeks corrected age) provide the most predictive information about the likelihood risk of cerebral palsy.
- Identifying infants at 'high risk of cerebral palsy' early using the GMs assessments means that parent supports and specific treatments can start very early with potentially better outcomes for infants and families.

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Prechtl's General Movements Assessment

How is the assessment done?

STANDARDISED MOTOR

Consent to the video must be given prior to videoing, and clinicians will discuss the assessment with you if the video is being taken by a clinician.

The assessment can be done by observing the spontaneous movements of your baby, lying on their back on a mat on the floor in quiet surrounds while they are awake, calm and alert.

Your baby should not have any toys or pacifiers and be lightly dressed (no socks).

Try not to play or talk with your baby while the video is taken as this can change the movements that are seen.

Comfort your child as required, however babies that are upset or crying change the movements and make the video difficult to score.

If your baby has a strong head preference, try to reposition their head towards the middle during the video assessment.

The clinician taking the video may position your baby nested in a pillow if your baby has severe reflux or is more settled in a nested pillow position.

Video quietly over the top of your baby, with your baby orientated vertically and make sure that you can see all of your baby including their hands and feet.

The clinician taking the video may set up a tripod and will need to document your baby's date of birth, date of video and corrected age.

Regardless of who takes your baby's video, the General Movements Assessment will be scored by certified assessors trained by the General Movements Trust.

There are a growing number of certified assessors throughout Australia qualified to score the GMs assessment.

Results of your baby's GMs assessment will be communicated with you by your multidisciplinary team.

Your baby's GMs video will be stored securely following all state and federal policies and standards.

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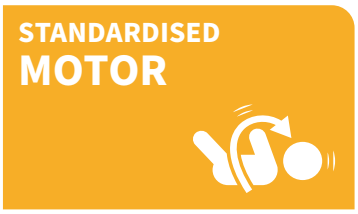
EARLY DIAGNOSIS – CEREBRAL PALSY

Prechtl's General Movements Assessment

Should my child have the General Movements Assessment?



The General Movements Assessment may give extra information of how your baby's neurological system is developing if your baby is under 20 weeks age (corrected age) and:

- there were medical concerns at birth (spent time in a Neonatal Intensive Care Unit, prematurity, lack of oxygen, stroke or congenital heart disease); or
- your baby is not developing typically like babies of similar corrected age.

The General Movements Assessment is not currently used as a screening tool for all healthy babies without any developmental concerns.

Please speak to your doctor or multidisciplinary team if you have concerns about your baby or you would like to know more about the General Movements Assessment.

Who can do this assessment?

In some hospitals and community centres across Australia, videos are taken and scored by General Movements Trust trained medical professionals.

Videos can also be taken by parents including via the BabyMoves app.

These videos are then scored by professionals who are trained by the General Movements Trust.

Please follow the instructions on how the video assessment is done, and read the BabyMoves handout if taking a video at home.

If you have any questions, please don't hesitate to discuss these with your doctor or therapist.

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