CEREBRAL PALSY: INCLUSION CRITERIA

Cerebral Palsy is defined as**:** "a group of permanent disorders of the development of movement and posture, causing activity limitation, that are attributed to non-progressive disturbances that occurred in the developing fetal or infant brain. The motor disorders of cerebral palsy are often accompanied by disturbances of sensation, perception, cognition, communication, and behaviour, by epilepsy, and by secondary musculoskeletal problems".[1(p. 9)]

Cerebral palsy is not defined by the underlying etiology of the condition. All non-progressive disturbances of the fetal or infant brain occurring in the pre-natal, peri-natal and post-natal period, up to the age of 2 years, can lead to cerebral palsy. For example, children with a genetic anomaly, a chromosomal abnormality, a metabolic condition, or an acquired brain injury resulting from meningitis, encephalitis, or a stroke in early life can also be diagnosed with cerebral palsy if they have the motor findings described in the above definition.

Children who have not received a diagnosis of cerebral palsy may still be enrolled in the Hip Surveillance Program. A diagnosis of CP may not be provided while investigations are being completed to determine the underlying cause of a child's condition. It is the motor impairment, consistent with the definition of cerebral palsy, which is most important.

Disorders of the spinal nerves (i.e. spina bifida), peripheral nerves (i.e. spinal muscular atrophy), muscles (i.e. muscular dystrophy), or mechanical origins (i.e. arthrogryposis) are not cerebral palsy. Children with these conditions are not appropriate for hip surveillance.

GROSS MOTOR FUNCTION CLASSIFICATION SYSTEM

Classify the child by Gross Motor Function Classification System (GMFCS) level[2].

- Determining a child's GMFCS level requires familiarity with the child and their usual performance of motor skills but no formal assessor training is required.
- It can be completed in only a few minutes.
- User instructions for the GMFCS - Expanded and Revised (GMFCS – E & R) are available for free download at https://www.canchild.ca/system/tenon/assets/attachments/000/000/058/original/GMFCS-ER_English.pdf.

MOTOR DISTRIBUTION & HEMIPLEGIC GAIT

Unilateral (Hemiplegia): involvement of one side of the body, including involvement of only one extremity

Bilateral: involvement of both sides of the body

Group IV Hemiplegic Gait (Figure 1): Winters, Gage and Hicks (WGH) (1987) described the classification of hemiplegic gait into four gait patterns.

Group IV hemiplegic gait involves more marked proximal involvement with:

- hip flexion,
- hip adduction,
- hip internal rotation, and
- pelvic retraction[3,4].

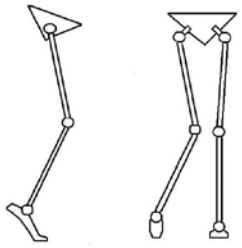

Figure 1: Group IV Gait includes hip flexion, hip adduction, hip internal rotation, and pelvic rotation.

MOTOR TYPE

Spasticity: increased muscle tone with one or both of the following: "1) resistance to externally imposed movement increases with increasing speed of stretch and varies with the direction of joint movement; 2) resistance to externally imposed movement rises rapidly above a threshold speed or joint angle"[5,pe91]

Dystonia: "a movement disorder in which involuntary sustained or intermittent muscle contractions cause twisting and repetitive movements, abnormal postures, or both" [5 p.e92, 6]

Chorea: "an ongoing random-appearing sequence of one or more discrete involuntary movements or movement fragments"[6, p.1542]

Athetosis: "a slow, continuous, involuntary writhing movement that prevents maintenance of a stable posture" [6, p.1542]

Ataxia: an "inability to generate a normal or expected voluntary movement trajectory that cannot be attributed to weakness or involuntary muscle activity about the affected joints"[7p2162]

Hypotonic: decreased resistance to passive stretch at rest[8]

An online learning module describing the classification and assessment of movement disorders in children is available on the PHSA Learning Hub at: https://learninghub.phsa.ca/Courses/4968/movement-disorders-in-children.

MEASURE

Please document the clinical measures as completely as possible. Completing this clinical exam can be challenging, particularly with school aged youth due to the size of the child/youth and space restrictions. It may help to have the child's parent or assistant provide extra support while you measure. If space is an issue, consider using school changing tables. If you are unable to complete a test, please check the "not tested" box and provide a comment indicating the reason. Inability to complete these measures should not prevent enrolling a child in the program.

Hip Abduction Range of Motion[9]

Start Position:

- Position the child supine with the pelvis level; legs are in the anatomical position; hips should be at 0° flexion and the knees fully extended
- If the child has a hip or knee flexion contracture, complete the measure position with the child as close to the desired position as possible

Goniometer Placement:

- The axis is placed over the ASIS on the side being measured.
- The stationary arm is between the two ASISs.
- The movable arm is parallel to the longitudinal axis of the femur.
- In the start position, the goniometer will read 90^{o}. This is recorded as 0^{o}.

End Position (R1 and R2 values)[10,11]:

- The hip is abducted to the limit of motion with the knee in extension. Ensure the pelvis does not move.
- Complete the movement slowly to get full passive range and record as the R2 value.
- Repeat the movement with a fast velocity to determine if there is a catch in the movement. If present, stop and measure the abduction range and record as the R1 value. If no catch is present, record N/A (not applicable) as the R1 value.

Modified Thomas Test[9]

Start Position:

- Position the child supine near the end of the bed.
- Flex both hips and knees until the lumbar spine is flat. Do not flex the lumbar spine.

Goniometer Placement:

- The axis is placed over the greater trochanter of the femur.
- The stationary arm is parallel to the midaxillary line of the trunk.
- The movable arm is parallel to the longitudinal axis of the femur.

End Position:

- The test leg is brought down towards the exam table; the non-test leg is held in flexion to maintain the position of the pelvis.
- Ensure the lumbar spine remains flat.
- The test is negative if the test leg rests flat on the exam table
- The test is positive if the test leg is maintained in a flexed position; ensure knee flexion is not blocking hip extension.
- Measure the angle of hip flexion deformity

Videos showing how to complete these measurements are available as part of the Child Health BC Hip Surveillance Program **e-learning module,** available on the program website: www.childhealthbc.ca/hips.

ASK

Information from the child or youth and their family or caregivers is an important part of hip surveillance. Have the child and/or the child's caregiver consider the last 6 months or the time period since their last clinical exam. Ask the following questions related to the hip:

1) Do you/your child have hip pain? You may notice this when changing your child's position, when you move your child's leg or when looking after your child's personal care.
2) Do you have more difficulty looking after your/your child during personal care, dressing, bathing or other activities that involve moving your/their hip?
3) Has there been a decrease in your child's ability to walk, sit, or stand that is related to the hip?

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