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CLINICAL GUIDELINE · PEDIATRIC COMPLEX CARE PLATFORM

Hip Surveillance and Management of Hip Displacement in Children with Medical Complexity

Surveillance, early detection, assessment, referral and management of hip displacement

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Intended for healthcare professionals as a clinical reference. Apply with clinical judgment and in line with local protocols.

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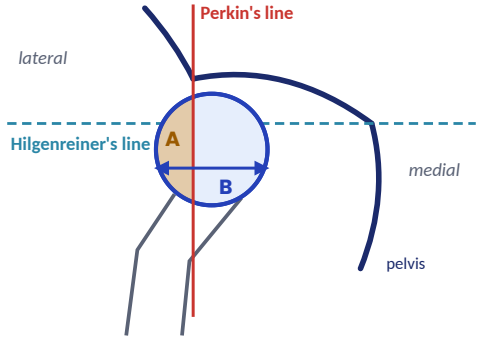
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1 Scope

This guideline provides recommendations for the **surveillance, early detection, assessment, referral and management** of hip displacement in children with medical complexity, particularly those with **cerebral palsy (CP)** and other **neuromotor disorders**.

2 Definitions

Hip displacement	Lateral migration of the femoral head from under the acetabulum; includes **subluxation** and **dislocation**.
Hip subluxation	**Partial** displacement of the femoral head from under the acetabulum.
Hip dislocation	**Complete** displacement of the femoral head from under the acetabulum.
Hip surveillance	Systematic clinical and radiographic assessments to detect hip displacement early; completed at intervals which vary according to risk.
Migration percentage (MP)	Percentage of the femoral head lying **lateral to Perkin's line** on an AP pelvis radiograph.
GMFCS	Gross Motor Function Classification System: five-level classification of gross motor function in children with cerebral palsy.



Measuring migration percentage

$$MP = \frac{A}{B} \times 100$$

- **A:** width of the femoral head lateral to Perkin's line.
- **B:** total width of the femoral head.
- Perkin's line is drawn perpendicular to Hilgenreiner's line through the lateral margin of the acetabulum.

Schematic illustration; not to scale.

3 Etiology and Risk Factors

Hip displacement in children with neuromotor impairment is typically **acquired and progressive**, resulting from muscle imbalance, altered weight-bearing, and abnormal development of the proximal femur and acetabulum.

Cerebral palsy
Particularly GMFCS III–V.

Severe motor impairment
Limited independent mobility.

Tone abnormalities
Spasticity, dystonia and muscle imbalance.

Hip adductors
Adductor spasticity / contractures.

Spine and pelvis
Scoliosis / pelvic obliquity.

4 Clinical Assessment

Hip displacement may initially be **asymptomatic**. Assess for:

Pain	On history or examination, particularly during movement, positioning, transfers or personal care.
Range of motion	Reduced hip abduction / range of motion.
Function	Difficulty with dressing, diaper changes, sitting, standing, mobility, positioning, transfers or perineal hygiene.
Spine and pelvis	Scoliosis / pelvic obliquity.

! **Important:** clinical assessment alone **cannot exclude** hip displacement; radiographic surveillance is essential in at-risk children.

5 Radiographic Assessment

Investigation: standardized AP pelvis radiograph.

- Measure **MP for both hips**.
- Compare with previous radiographs to assess progression.
- Additional imaging (e.g., CT or MRI) is **not routinely required** for surveillance; reserve for specific orthopedic indications.

5.1 Migration percentage interpretation

MP	Interpretation
≤30%	Below the usual referral threshold; continue appropriate surveillance.
>30%	**Hip displacement; orthopedic referral indicated.** As MP increases, the risk of progression and complications increases.

An increase in MP of **10% or more per year** indicates significant progression.

i **Note:** MP should be measured and reported by a **radiologist or pediatric orthopedic specialist** to ensure accuracy and consistency.

6 Hip Surveillance

6.1 General principles

- ✓ Initiate hip surveillance **by 2 years of age** in children with diagnosed or suspected CP, or **immediately** upon diagnosis or suspicion of CP if older than 2 years.
- ✓ Surveillance includes **clinical assessment** and **standardized AP pelvis radiographs**.
- ✓ Children with **hemiplegic CP and Winters, Gage, Hicks (WGH) type IV** gait pattern require a separate surveillance schedule.
- ✓ Continue surveillance following orthopedic intervention according to specialist recommendations.

! **At each surveillance visit,** perform a clinical assessment, obtain an AP pelvis radiograph according to the surveillance schedule, and refer to pediatric orthopedics when indicated.

6.2 Surveillance schedule

Follow the age- and GMFCS-specific surveillance schedule recommended by the **AACPDM** (Appendix 2).

Frequency modifiers (GMFCS III–V)

Do not reduce from the previous higher frequency if:

1. 24 months of surveillance have not yet been completed, based on the child's surveillance start date;
2. **hip stability** is not yet achieved over a period of 2 years; or
3. MP >30%.

Hip stability: MP change of less than 10 percentage points over 12 months.

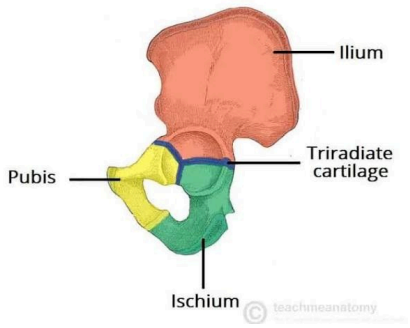
Discontinuation of surveillance

May be discontinued when **all** of the following are met:

- ✓ Skeletal maturity has been reached.
- ✓ Migration percentage (MP) ≤30%.
- ✓ Hip migration remains stable.
- ✓ No pelvic obliquity associated with progressive scoliosis.

GMFCS I–II: earlier discontinuation may be considered according to the AACPDM surveillance schedule.

Note: skeletal maturity is defined as closure of the triradiate cartilage on pelvic radiography.



Triradiate cartilage and skeletal maturity

- The **triradiate cartilage** is the Y-shaped growth cartilage within the acetabulum where the **ilium, ischium and pubis** meet.
- Its **closure on pelvic radiography** marks skeletal maturity for hip surveillance.

Image: © TeachMeAnatomy (teachmeanatomy.info).

7 Indications for Orthopedic Referral

Refer if any of the following

- **MP >30%.**
- Hip abduction **less than 30°.**
- MP progression **≥10 percentage points** over 12 months.
- New or worsening hip pain or reduced hip abduction.
- Deterioration in functional status (e.g., mobility, sitting, positioning or ease of care).
- Progressive scoliosis / pelvic obliquity associated with hip displacement.

Urgent assessment

- Acute severe hip pain*
- Suspected fracture or acute dislocation
- Suspected septic arthritis

* Acute painful presentations should not automatically be attributed to chronic hip displacement.

8 Management

Management depends on **age, MP, progression, symptoms, functional status** and overall medical condition.

8.1 Conservative management

A · Rehabilitation and positioning

- Refer to **physiotherapy** for assessment and management of hip mobility, contractures and positioning.
- Refer to **occupational therapy** for seating, postural support and adaptive equipment.
- Encourage regular, comfortable positioning and gentle range-of-motion exercises as advised by the rehabilitation team.
- Consider **supported standing programs** when appropriate, as directed by the rehabilitation team.

B · Spasticity and dystonia management

- Treat clinically significant spasticity or dystonia when indicated.

! **Important (A and B):** rehabilitation, positioning and tone-management interventions may improve comfort and ease of care but **do not reliably prevent or reverse hip displacement**, and should not replace radiographic surveillance or indicated orthopedic intervention.

C · Pain management

- Assess the cause and severity of pain; **do not automatically attribute pain to hip displacement**, and evaluate for other potential causes (e.g., fractures, muscle spasms, dystonia, contractures).
- Provide appropriate analgesia (e.g., acetaminophen or NSAIDs) based on pain severity and clinical condition.
- Refer for specialist assessment when pain persists or substantially affects quality of life.

8.2 Surgical management

Intervention	Indications
Soft-tissue release	Selected children with early displacement and significant contractures.
Reconstructive surgery	Progressive or substantial displacement; may involve femoral and/or pelvic osteotomy.
Salvage surgery	Selected cases of chronic painful dislocation when reconstruction is unsuitable.

Surgical decisions should consider anticipated benefits, perioperative risks, functional goals and family preferences.

9 Special Considerations in Children with Medical Complexity

For children with **neuromotor disorders other than CP**:

- Assess risk based on diagnosis, motor impairment, mobility and muscle tone.
- Consider **baseline AP pelvis imaging** in children with severe motor impairment, particularly those who are nonambulatory.
- Individualize surveillance according to clinical findings, radiographic progression and orthopedic recommendations.
- Do **not** automatically apply CP-specific GMFCS surveillance intervals to other conditions.

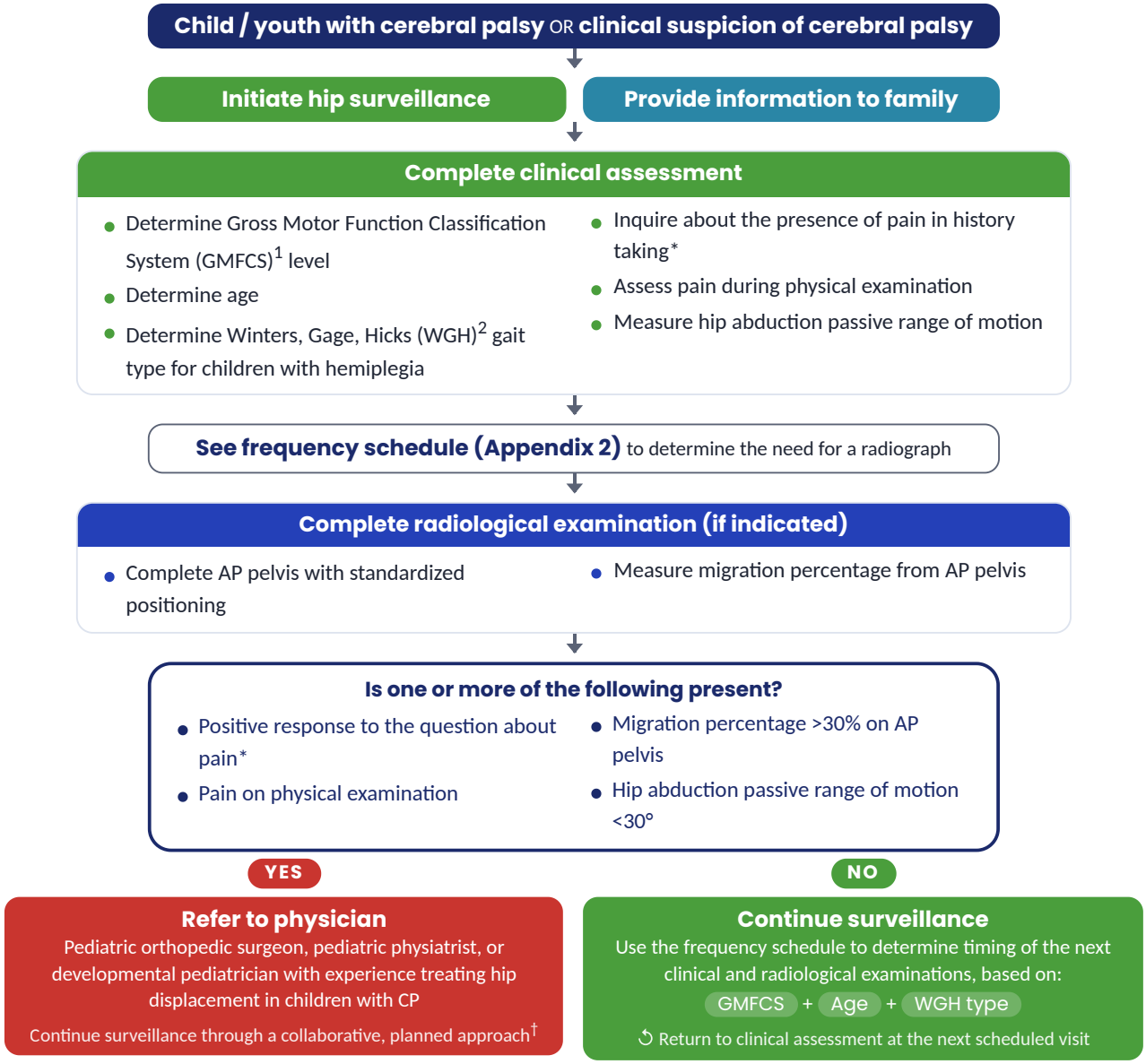
> In children with **life-limiting conditions**, prioritize comfort, positioning, ease of care and individualized goals of care.

10 References

1. Canadian Paediatric Society. Care for children and youth with cerebral palsy (GMFCS levels III to V). 2023.
2. American Academy for Cerebral Palsy and Developmental Medicine (AACPDM). Hip Surveillance in Cerebral Palsy Care Pathway.
3. Australasian Academy of Cerebral Palsy and Developmental Medicine. Australian Hip Surveillance Guidelines for Children with Cerebral Palsy. 2020.
4. National Institute for Health and Care Excellence (NICE). Spasticity in under 19s: management. Clinical Guideline CG145.

11 Appendix

Appendix 1 AACPDM Hip Surveillance Clinical Pathway



* "Do [does] you [your child] have hip pain? You may notice this when you move [your child moves] your [their] hip or after prolonged activity, when changing your [your child's] position, when you move your [your child's] leg or when looking after your [your child's] personal care."

[1] GMFCS: Palisano et al., 1997. [2] WGH gait type IV: Winters, Gage & Hicks, 1987. † Clinicians collaborate to ensure a planned approach to ongoing surveillance.

Adapted from: American Academy for Cerebral Palsy and Developmental Medicine (AACPDM). *Hip Surveillance in Cerebral Palsy Care Pathway*. aacpdm.org. © AACPDM.

Appendix 2 **AACPDM Hip Surveillance Frequency Schedule**

C Clinical examination X AP pelvis radiograph **ID** = identification (diagnosis or suspicion of CP)

SM = skeletal maturity (closure of the triradiate cartilage)

Age (years)	GMFCS I		GMFCS II		GMFCS III		GMFCS IV & V		Any GMFCS level with WGH gait type IV	
	Clin	X-ray	Clin	X-ray	Clin	X-ray	Clin	X-ray	Clin	X-ray
2.0 years or at ID	C#		C	X	C	X	C	X	C	X
2.5							C	X		
3					C	X	C	X		
3.5							C	X		
4	C		C		C	X	C	X*	C	
5					C	X	C	X*		
6	C		C	X	C	X	C	X*	C	X
7					C	X	C	X*		
8			C		C	X*	C	X*	C	
9							C	X*		
10			C	X	C	X*	C	X*	C	X
11							C	X*		
12–16 or skeletal maturity (SM)					Bi-annually C to SM†	Bi-annually X* to SM†	Annually C to SM†	Annually X* to SM†	Bi-annually C to SM†	Bi-annually X to SM†

Notes re: initiation

- **GMFCS I–II:** if CP is diagnosed or suspected after age 2 but before 4 years, begin surveillance immediately. Do not wait until 4 years of age.
- **GMFCS III:** if CP is diagnosed or suspected after age 2, immediately begin a 12-monthly schedule for a minimum of 24 months.
- **GMFCS IV–V:** if CP is diagnosed or suspected after age 2, immediately begin a 6-monthly schedule and continue for a minimum of 24 months at that frequency.
- **WGH gait type IV:** if CP is diagnosed or suspected after age 2 but before age 4, begin surveillance immediately.
- # If there is any doubt about the GMFCS level, follow the recommendation for the higher level.

Frequency modifiers (GMFCS III–V)

* Do not reduce from the previous higher frequency if:

1. 24 months of surveillance have not yet been completed, based on the child's surveillance start date;
2. stability is not yet achieved over a period of 2 years (stability: <10% change in MP over a 12-month period); **or**
3. MP >30%.

Discharge

- **GMFCS II:** discharge if MP ≤30% at age 10 (unless WGH gait type IV).
- **GMFCS III–V and WGH gait type IV:** discharge if skeletally mature and MP ≤30%.
- † In the presence of pelvic obliquity associated with clinical or radiographic evidence of increasing scoliosis **or MP >30%**, the hip(s) continue to be at risk and should ideally be monitored even beyond skeletal maturity.

Adapted from: American Academy for Cerebral Palsy and Developmental Medicine (AACPDM). *Hip Surveillance in Cerebral Palsy Care Pathway*. aacpdm.org. © AACPDM. GMFCS: Palisano et al., 1997. WGH gait type IV hemiplegia: Winters, Gage & Hicks, 1987; Rodda & Graham, 2001.