

Cerebral Palsy (CP)

CONDITION: Cerebral Palsy (CP)

DEFINITION: CP is a group of disorders that affect a person's ability to move and maintain balance and posture; most common motor disability in childhood.

CONDITION SPECIFIC PRESENTATIONS:

- **Gross Motor Functional Classification System (GMFCS)** levels describe function related to sitting, transfers, gait, and stairs and assistance and or mobility equipment required
 - [GMFCS level descriptions and illustrations](#)
- **Possible communication, fine motor, and cognitive impairments**
 - [Manual Ability Classification System \(levels of fine motor control\)](#)
 - [Communication Function Classification System \(describes effectiveness of everyday communication\)](#)
 - Some individuals may not be able to report their pain
 - Ask family and or caregivers how to best identify pain
 - Use observational or descriptive pain scales to assess pain
- **Muscle tone and movement disorders** possibilities includes:
 - Spasticity (most common)
 - Dystonia
 - Ataxia
 - Athetosis
 - Mixed (combination)
- **Possible topographic presentations** include:
 - Hemiplegia
 - Diplegia
 - Triplegia (bilateral lower extremities and one upper extremity)
 - Quadriplegia
- Typically more involved distally > proximally
 - Decreased selectivity
 - Decreased strength
 - Increased contractures
- Typically more involved in upper extremity(ies) > lower extremity(ies)
- Risk of osteoporosis and fracture risk in individuals with:
 - Decreased mobility
 - Decreased weight bearing
 - Need for assistance for moving
 - Taking anticonvulsants or proton pump inhibitors
 - History of a previous low-impact fracture
 - History of fall

RED FLAGS	YELLOW FLAGS
Shunt malfunction or infection	Hip subluxation
Intrathecal baclofen (ITB) pump dysfunction	Increased fracture risk

Cerebral Palsy (CP)

COMMON IMPAIRMENTS	IMPAIRMENT BASED TESTS & MEASURES				
Muscle tone (spasticity most common)	<ul style="list-style-type: none"> • Ashworth Scale • Modified Ashworth Scale • Hypertonia Assessment Scale 				
Decreased muscle extensibility	<ul style="list-style-type: none"> • PROM 				
Contractures Most common locations of contractures: <table border="1" style="width: 100%; margin-top: 5px;"> <thead> <tr> <th style="text-align: center;">UE</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> • Shoulder adductors • Elbow flexors • Wrist Flexors • Finger Flexors </td> </tr> <tr> <th style="text-align: center;">LE</th> </tr> <tr> <td> <ul style="list-style-type: none"> • Hip Flexors • Hip ADD • Knee Flexors • Ankle PF </td> </tr> </tbody> </table>	UE	<ul style="list-style-type: none"> • Shoulder adductors • Elbow flexors • Wrist Flexors • Finger Flexors 	LE	<ul style="list-style-type: none"> • Hip Flexors • Hip ADD • Knee Flexors • Ankle PF 	<ul style="list-style-type: none"> • PROM • Spinal Alignment and Range of Motion Measurement (SAROMM) <ul style="list-style-type: none"> ○ Training video ○ PDF Score Sheet
UE					
<ul style="list-style-type: none"> • Shoulder adductors • Elbow flexors • Wrist Flexors • Finger Flexors 					
LE					
<ul style="list-style-type: none"> • Hip Flexors • Hip ADD • Knee Flexors • Ankle PF 					
Decreased muscle strength & power	<ul style="list-style-type: none"> • Functional Strength Assessment (FSA) <ul style="list-style-type: none"> ○ Training video ○ PDF Score Sheet 				
Decreased muscle power	<ul style="list-style-type: none"> • Five time sit to stand 				
Long bone torsion Typically: <ul style="list-style-type: none"> • Femoral anteversion • Excessive internal or external tibial torsion 	<ul style="list-style-type: none"> • Femoral version <ul style="list-style-type: none"> ○ Craig's test • Tibial torsion <ul style="list-style-type: none"> ○ Thigh foot angle ○ Bimalleolar axis ○ Second toe test 				
Joint instability					
Scoliosis	<ul style="list-style-type: none"> • Adam's forward bend test 				
Hip subluxation/dislocation Higher risk associated with: <ul style="list-style-type: none"> • With higher GMFCS level (level III, IV, V) • Hip flexor and adductor spasticity 	<ul style="list-style-type: none"> • Galeazzi sign • Supine bent knee hip abduction <ul style="list-style-type: none"> ○ Hip abduction <60 degrees ○ Limitation of ≥ 20 degrees compared to contralateral side 				
Impaired selective muscular control					
Impaired postural control <ul style="list-style-type: none"> • Reactive and anticipatory 	<ul style="list-style-type: none"> • Berg balance scale • Balance Error Scoring System (BESS) • Modified Clinical Test of Sensory Interaction of Balance (MCTSIB) 				

Cerebral Palsy (CP)

Impaired motor learning	
Pain	<ul style="list-style-type: none"> • Body chart • Visual Analog Scale (VAS) • Faces Legs Activity Cry Consolability (FLACC) pain scale
Decreased endurance	<ul style="list-style-type: none"> • Six minute walk test • Five time sit to stand • Functional Mobility Scale (FMS) <ul style="list-style-type: none"> ○ PDF Score Sheet
Excessive energy expenditure	
Low physical activity levels	
Skin integrity issues (from orthotics or wheelchair positioning)	

COMMON ACTIVITY LIMITATIONS	ACTIVITY BASED TESTS & MEASURES
Dependent upon GMFCS level	
Gait impairments (toe walking, crouch gait, jump gait, etc.)	<ul style="list-style-type: none"> • Observational gait analysis • 10 meter walk test • Functional Mobility Scale (FMS) <ul style="list-style-type: none"> ○ PDF Score Sheet
Stairs/curbs	<ul style="list-style-type: none"> • Timed up and down the stairs (TUDS)
Transfers	<ul style="list-style-type: none"> • Timed up and go (TUG) • Timed floor to stand (TFTS) • Five time sit to stand
Impaired wheelchair mobility	<ul style="list-style-type: none"> • Functional Mobility Scale (FMS) • Six minute wheel test
Impaired gross motor skills	<ul style="list-style-type: none"> • Gross Motor Function Measure 66 or 88 (GMFM-66, GMFM-88)

EQUIPMENT CONSIDERATIONS:

GMFCS level	Assistive device	Wheelchair	Orthotics
I	None	Unlikely	Possible
II	Unlikely	Possible	Possible
III	Reverse walker Lofstrand crutches	Used for long distances	Possible
IV	Walker possible Likely gait trainer or stander	Full time user	Possible
V	Gait trainer or stander	Full time user	Possible

Cerebral Palsy (CP)

Wheelchair	Possible for transport in community related to fatigue or safety concerns
Orthotics	Ranges from no orthotics, foot orthotics, SMOs, or AFOs

AGE SPECIFIC CONSIDERATIONS:

- Overuse syndromes
 - (examples: upper extremity issues with manual wheelchair propulsion or long-term use of Lofstrand crutches or reverse walker)
- Early degenerative conditions related to postural alignment
 - Osteoarthritis
 - Cervical instability or spondylosis
 - Spinal deformity
 - Hip subluxation
 - Shoulder subluxation
 - Biomechanical knee problems
 - Abnormalities of foot structure
- Need for an assistive device and/or wheelchair for safety, long distance ambulation, energy conservation
- Increased weight gain
- Decreased physical activity
- Decreased physical fitness
- Increasing contractures

PROGNOSIS:

- GMFCS level observed around 12 years of age is highly predictive of adult motor function

PLAN OF CARE:

- Plan of care will depend upon reason for referral to physical therapy

INTERVENTIONS:

SUPPORTED IN EVIDENCE	Motor specific: <ul style="list-style-type: none"> • Strength training^{3,11} • Treadmill training^{3,11} • Task specific training^{3,11} • Goal directed training¹¹ Tone management: <ul style="list-style-type: none"> • Botox^{3,11} • Intrathecal baclofen^{3,11} • Diazepam¹¹ Contracture management & alignment: <ul style="list-style-type: none"> • Botox + casting¹¹ • Hip surveillance¹¹
------------------------------	---

Cerebral Palsy (CP)

	<ul style="list-style-type: none"> • Scoliosis surgery^{3,11} • Lower limb casting¹¹ <p>Self-care/function:</p> <ul style="list-style-type: none"> • Goal directed training¹¹ • Home program¹¹
NOT SUPPORTED IN EVIDENCE	<p>Motor specific:</p> <ul style="list-style-type: none"> • Cranial osteopathy¹¹ • Hyperbaric oxygen¹¹ • NDT (original passive form)¹¹ • Sensory integration¹¹ <p>Contracture management & alignment:</p> <ul style="list-style-type: none"> • Manual stretching¹¹ • NDT (original form)¹¹ <p>Self-care/function:</p> <ul style="list-style-type: none"> • NDT (original passive form)¹¹ <p>Hyperbaric oxygen¹¹</p>

REFERENCES & RESOURCES:

1. Adults with CP. Cerebral Palsy Foundation. <https://www.yourcpf.org/adults-with-cp/>. Accessed April 13, 2020.
2. American Academy for Cerebral Palsy and Developmental Medicine. AACPDM. <https://www.aacpdm.org/>. Accessed April 13, 2020.
3. Campbell SK, Palisano RJ, Orlin MN. *Physical Therapy for Children*. 4th ed. Missouri: Elsevier; 2012.
4. Communication Classification. Cerebral Palsy Foundation. <https://www.yourcpf.org/communication-issues/>. Accessed April 22, 2020.
5. Functional Mobility Scale (FMS). Sydney Children's Hospital Network. https://www.schn.health.nsw.gov.au/files/attachments/the_functional_mobility_scale_version_2.pdf. Accessed April 22, 2020.
6. Functional Strength Assessment. Can Child. https://canchild.ca/system/tenon/assets/attachments/000/000/468/original/Muscle_Strength.pdf. Accessed April 22, 2020.
7. GMFCS E & R: Descriptors and illustrations. GMFCS - E&R. https://canchild.ca/system/tenon/assets/attachments/000/002/114/original/GMFCS_English_Illustrations_V2.pdf. Accessed April 11, 2020.

Cerebral Palsy (CP)

8. Learn More About Cerebral Palsy (CP). Centers for Disease Control and Prevention. <https://www.cdc.gov/ncbddd/cp/index.html>. Published February 27, 2020. Accessed April 14, 2020.
9. Manual Ability Classification System (MACS). Cerebral Palsy Foundation. <https://www.yourcpf.org/manual-ability-issues/> . Accessed April 22, 2020.
10. McCormick A, Brien M, Plourde J, Wood E, Rosenbaum P, Mclean J. Stability of the Gross Motor Function Classification System in adults with cerebral palsy. *Developmental Medicine & Child Neurology*. 2007;49(4):265-269. doi:10.1111/j.1469-8749.2007.00265.x
11. Novak I, Morgan C, Fahey M, et al. State of the Evidence Traffic Lights 2019: Systematic Review of Interventions for Preventing and Treating Children with Cerebral Palsy. *Current Neurology and Neuroscience Reports*. 2020;20(2). doi:10.1007/s11910-020-1022-z
12. Overview: Cerebral palsy in adults: Guidance. NICE. <https://www.nice.org.uk/guidance/ng119>. Accessed April 14, 2020.
13. Spinal Alignment and Range of Motion Measure Test Items. CanChild. <https://canchild.ca/system/tenon/assets/attachments/000/000/431/original/sarommtestitemstoaccompanyvideo.pdf?license=yes>. Accessed April 22, 2020.
14. *Training Instructions for the Functional Strength Assessment*. On Track; 2020. <https://vimeo.com/390790077>. Accessed April 22, 2020.
15. *Training Instructions for the Spinal Alignment and Range of Motion Measure for Children with Cerebral Palsy*. On Track; 2015. <https://vimeo.com/131889315>. Accessed April 22, 2020.