Early Active Standing for Infants and Young children - -

Gillian O' Dwyer, Physical Disability Support Services Coordinator, CHO 4 Cork & Kerry

Overview of session

1. Why Stand ?

2. Typical Development.

3. Early Standardised Assessment in atypical trunk.

4. Early Active Standing - case studies with intervention

1. Why Stand ?

- Enables children to interact eye to eye with peers ?
- Improves wellbeing and alertness and sleep problems ?
- Improves respiration and voice control ?
- Aids digestion , bowel function, and bladder drainage?
- Facilitates formation of hip joint in early development?
- Stretches muscles preventing onset of contractures ?
- Maintains bone density?
- Improves skin integrity by relieving pressure encountered in standing ?

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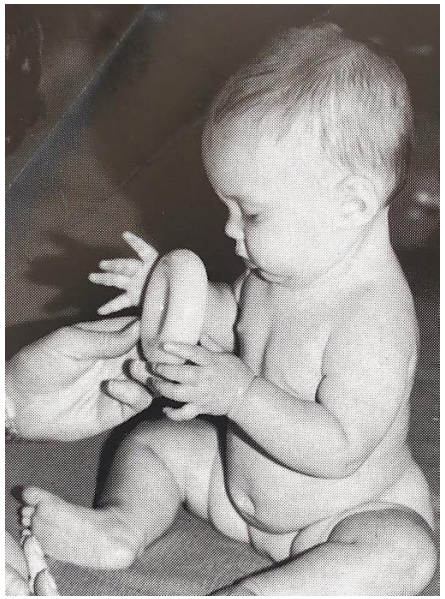
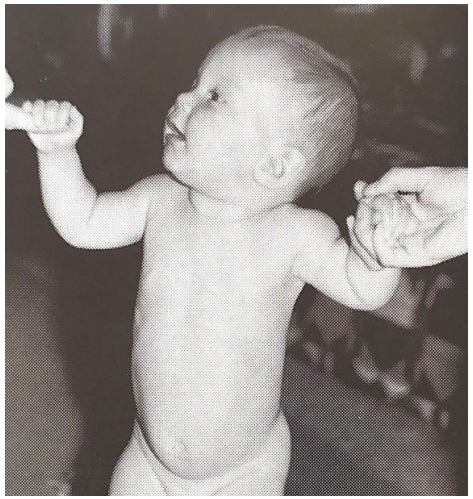
Typical Development.

7th month





Importance of Trunk Control in Typical Development.

(Shumway-cook & Woollacott, 2021 6th edition Motor Control Translating Research into Clinical Practice.)

- **Trunk control** requires muscle groups involved in in the spine, abdomen & hips to work together to maintain upright posture and control movement in various planes.
- **Trunk control** requires the coordination of muscle tone, muscle strength and sensory input
- **Understanding trunk control** and its significance can help physiotherapists guide interventions and treatments for children who may be at risk of atypical trunk control development leading to reduced motor ability.

Relationship between segmental trunk control and gross motor development in typically developing infants aged from 4 to 12 months: a pilot study

Tamis W Pin [1], Penelope B Butler [2], Hon-Ming Cheung [3], Sandra Lai-Fong Shum [4]

Affiliations + expand

PMID: 31711441 PMCID: PMC6844031 DOI: 10.1186/s12887-019-1791-1

Free PMC article

Which health conditions may show impaired Trunk Control ?

- Infants with cranial ultrasound abnormalities including Periventricular leukomalacia (PVL) Cerebral Palsy.
- Genetic Conditions.- e.g West Syndrome.
- Neuromuscular Conditions – e.g Spina Bifida /SMA.
- Global Developmental Delay.

Relationship between segmental trunk control and gross motor development in typically developing infants aged from 4 to 12 months: a pilot study

Tamis W Pin [1], Penelope B Butler [2], Hon-Ming Cheung [3], Sandra Lai-Fong Shum [4]

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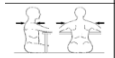
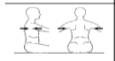
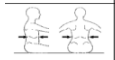
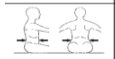
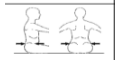
Free PMC article

Client Name: Ref #: Tester Name: Date:	Level of manual support Pelvic / thigh strap used except as indicated	Functional Level Arms and hands in air except as indicated	Static	Active	Reactive	Comments
			Maintain vertical neutral position of head and trunk above manual support level			
			minimum of 5 seconds	while turning head with arms lifted	Maintain / quickly regain following brisk nudge	
	Shoulder girdle Testers hand position may vary from horizontal	**Head control** Arms may be supported throughout			**NOT Tested for Head Control**	
	Axillae	**Upper Thoracic Control**				
	Inferior scapula	**Mid Thoracic Control**				
	Over lower ribs	**Lower thoracic Control**				
	Below ribs	**Upper lumbar Control**				
	Pelvis	**Lower lumbar Control**				
	No support given and pelvic/thigh straps removed	**Full trunk control**				

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HINE
Hammersmith Infant Neurological Examination

HINE – Many of the HINE examinations directly assess child's truncal ability between ages of 3 months and 2 years.

HAMMERSMITH INFANT NEUROLOGICAL EXAMINATION (v 07.07.17)

Name **Date of birth**

Gestational age **Date of examination**

Chronological age / Corrected age **Head circumference**

SUMMARY OF EXAMINATION
Global score (max 78)
Number of asymmetries
Behavioural score (not part of the optimality score)

Cranial nerve function	score	(max 15)
Posture	score	(max 18)
Movements	score	(max 6)
Tone	score	(max 24)
Reflexes and reactions	score	(max 15)

COMMENTS

(Throughout the exam, if a response is not optimal but not poor enough to score 1, give a score of 2)

NEUROLOGICAL EXAMINATION

ASSESSMENT OF CRANIAL NERVE FUNCTION

	score 3	2	score 1	score 0	score	Asymmetry / Comments
Facial appearance (at rest and when crying or stimulated)	Smiles or reacts to stimuli by closing eyes and grimacing		Closes eyes but not tightly, poor facial expression	Expressionless, does not react to stimuli		
Eye movements	Normal conjugate eye movements		**Intermittent** Deviation of eyes or abnormal movements	**Continuous** Deviation of eyes or abnormal movements		
Visual response Test ability to follow a black/white target	Follows the target in a complete arc		Follows target in an incomplete or asymmetrical arc	Does not follow the target		
Auditory response Test the response to a rattle	Reacts to stimuli from both sides		Doubtful reaction to stimuli or asymmetry of response	No response		
Sucking/swallowing Watch infant suck on breast or bottle. If older, ask about feeding, assoc. cough, excessive dribbling	Good suck and swallowing		Poor suck and/or swallow	No sucking reflex, no swallowing		

What sections of HINE assist in assessment of trunk control?

- **Motor milestones: or as it is termed HINE 2**
- Sitting, rolling, crawling, standing.

- **Assessment of posture:**
- Trunk in sitting: is the trunk straight, curved, asymmetrical.

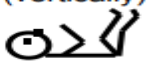
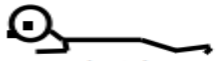
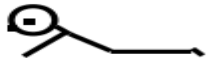
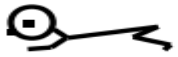
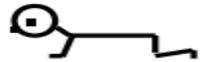
- **Assessment of tone:**
- Ventral suspension:
- Pull to sit:

- **Reflexes & reactions:**
- Lateral tilting:

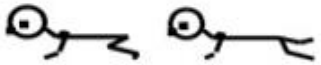
Motor milestones: or as it is termed HINE 2

Head, Sitting, rolling, crawling, standing.

SECTION 2 MOTOR MILESTONES (not scored; note asymmetries)

Head control	Unable to maintain head upright normal to 3m	Wobbles normal up to 4m	Maintained upright all the time normal from 5m			**Please note age at which maximum skill is achieved**
Sitting	Cannot sit	With support at hips  normal at 4m	Props  normal at 6m	Stable sit  normal at 7-8m	Pivots (rotates)  normal at 9m	Observed: Reported (age):
Voluntary grasp – note side	No grasp	Uses whole hand	Index finger and thumb but immature grasp	Pincer grasp		Observed: Reported (age):
Ability to kick in supine	No kicking	Kicks horizontally but legs do not lift	Upward (vertically)  normal at 3m	Touches leg  normal at 4-5m	Touches toes  normal at 5-6m	Observed: Reported (age):
Rolling - note through which side(s)	No rolling	Rolling to side normal at 4m	Prone to supine normal at 6 m	Supine to prone normal at 6 m		Observed: Reported (age):
Crawling - note if bottom shuffling	Does not lift head	On elbows  normal at 3m	On outstretched hands  normal at 4m	Crawling flat on abdomen  normal at 8m	Crawling on hands and knees  normal at 10m	Observed: Reported (age):
Standing	Does not support weight	Supports weight normal at 4m	Stands with support normal at 7m	Stands unaided normal at 12m		Observed: Reported (age):
Walking		Bouncing normal at 6m	Cruising (walks holding on) normal at 12m	Walking independently normal by 15m		Observed: Reported (age):

Assessment of Tone

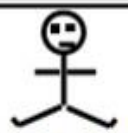
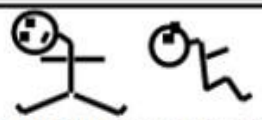
	score **3**	score**2**	score **1**	score **0**		
Pull to sit Pull infant to sit by the wrists. (support head if necessary)						
Ventral suspension Hold infant horizontally around trunk in ventral suspension; note position of back, limbs and head.						

Assessment of Posture

Assessment of Head Posture

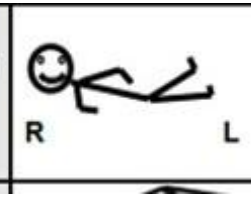
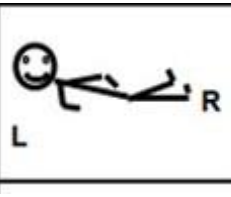
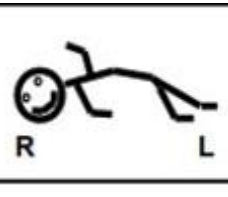
Assessment of Trunk Posture.

score 3 score2 score 1 score 0

	score 3	score 2	score 1	score 0	sc	Asymmetry / comments
Head in sitting	 Straight; in midline		 Slightly to side *or* backward *or* forward	 Markedly to side *or* backward *or* forward		
Trunk in sitting	 Straight		 Slightly curved or bent to side	 Very rounded rocketing back bent sideway		

Assessment of Reflexes and Reactions

Lateral Tilt

	score 3	score2	score 1	score 0		
Lateral tilting (describe side up). Hold infant up vertically near to hips and tilt sideways towards the horizontal. Note response of trunk, spine, limbs and head.						

HINE Training available in Feb 29th 2024 at 9:30 in Enable Ireland Bray.
Please email E.keane@enableireland.ie
This is a free training given as part of the NCPPD Specialist in Education and Expertise to build capacity on network teams giving by Amanda O Sullivan CHO 6 and Gillian O Dwyer CHO 4

HINE scores at 3, 6, 9 or 12 months:

- 50-73 indicates likely unilateral cerebral palsy (i.e. 95-99% will walk)
- <50 indicates likely bilateral cerebral palsy

HINE scores at 3-6 months:

- 40-60 indicates likely GMFCS I-II
- <40 indicates likely GMFCS III-V

In infants under 2 years of age, it is important to give parents accurate and clear information about the likelihood of cerebral palsy as a clinical diagnosis, while at the same time explaining that severity is difficult to predict accurately prior to two years of age. It helps parents to maintain hope by explaining that all infants can learn and that the condition has varying levels of severity, with mild being more common than severe in high income country contexts. See fact sheet on 'Communicating the diagnosis'.

Hemiplegia (Unilateral) | **Quadriplegia (Bilateral)** | **Ambulant GMFCS I-II** | **Non-Ambulant GMFCS III-V**

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Upright Stander SMARTSTANDER.

Smartstander:
0a 50 cm-70 cm infants total height :
Age approx.7 months to 2 years

Smartstander: 1a:
User height is 70cm-90cm
Age approx.: 2 years to 4 years

Astride –ABDUCTION STANDER 90 to 130 - 4 years to 8

- What is the evidence for the effect of hip abduction in standing on hip integrity in children with cerebral palsy?”

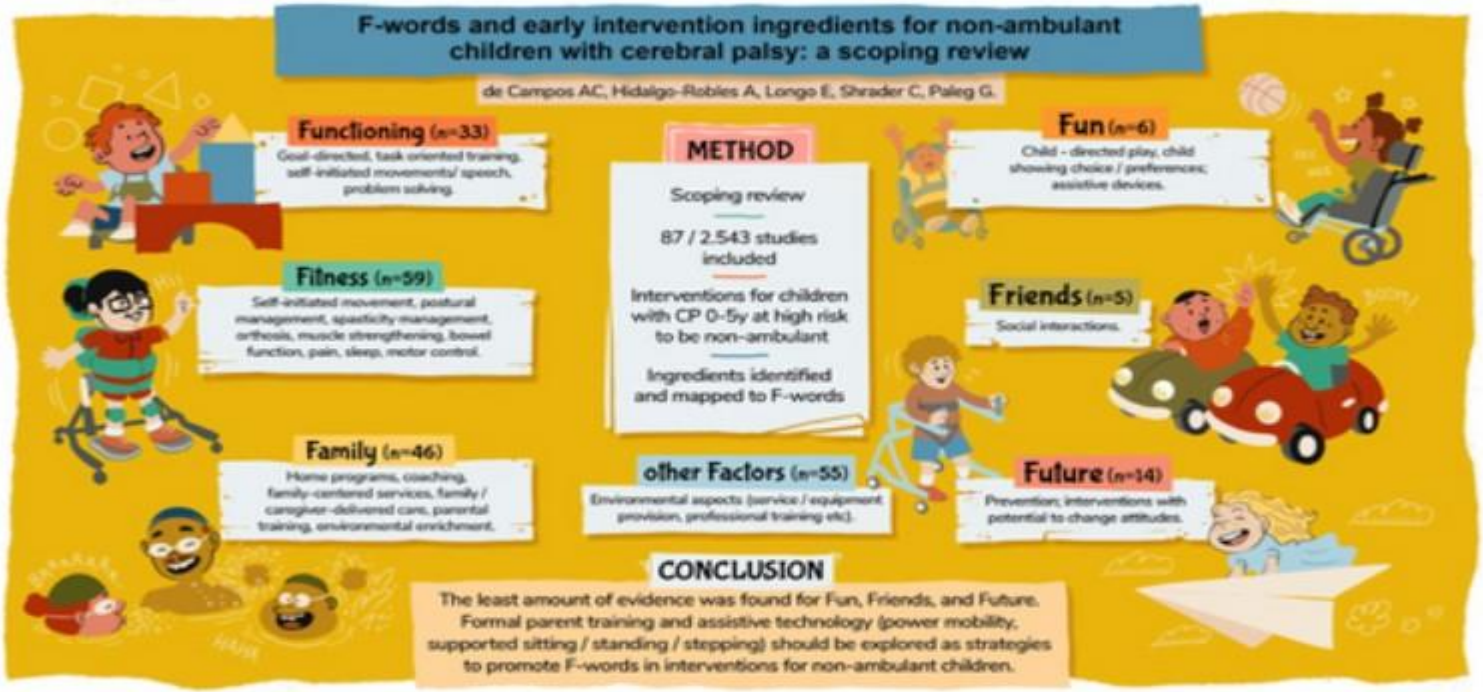
Developmental Medicine & Child Neurology

SCOPING REVIEW

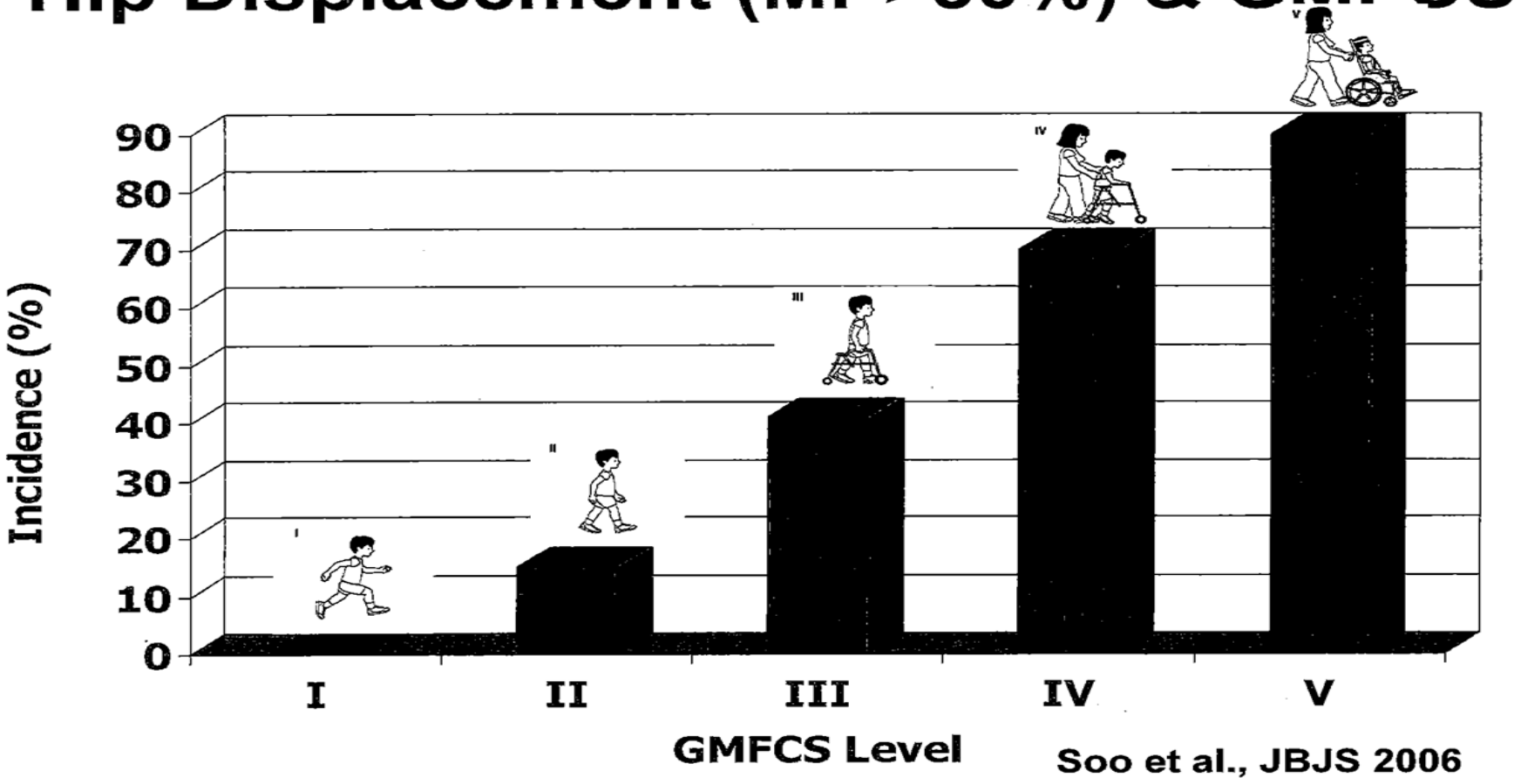
F-words and early intervention ingredients for non-ambulant children with cerebral palsy: A scoping review

Ana Carolina De Campos, Álvaro Hidalgo-Robles, Egmar Longo, Claire Shrader, Ginny Pale

First published: 28 June 2023 | https://doi.org/10.1111/dmcn.15682

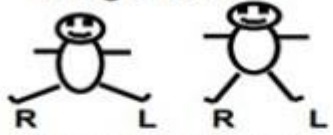
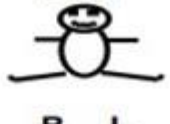
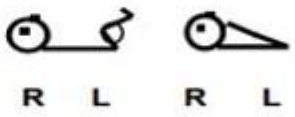
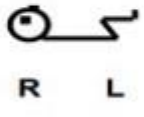
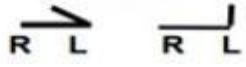


Hip Displacement (MP>30%) & GMFCS



Soo et al., JBJS 2006

Assessment of Tone – Lower limbs

Hip adductors With both the infant's legs extended, abduct them as far as possible. The angle formed by the legs is noted.	Range: 150-80° 	150-160° 	>170° 	<80° 		
Popliteal angle Keeping the infant's bottom on the bed, flex both hips onto the abdomen, then extend the knees until there is resistance. Note the angle between upper and lower leg.	Range: 150°-100° 	150-160° 	~90° or > 170° 	<80° 		
Ankle dorsiflexion With knee extended, dorsiflex the ankle. Note the angle between	Range: 30°-85° 	20-30° 	<20°or 90° 	> 90° 		

GMFCS I-III	Red	Yellow		Green
Hip Abduction	≤30°	>30°	<40°	≥40°
Knee Popliteal angle	≤130°	>130°	<140°	≥140°
Knee Extension	≤ -10°	>-10°	<0°	≥0°
Ankle Dorsiflexion (flexed knee)	≤10°	>10°	<20°	≥20°
Ankle Dorsiflexion (extended knee)	≤0°	>0°	<10°	≥10°
Hip Internal rotation	≤30°	>30°	<40°	≥40°
Hip External rotation	≤30°	>30°	<40°	≥40°
Elys' test	≤100°	>100°	<120°	≥120°
Hip Extension	<0°			>0°

CPIP Measures

Positive Thomas Test

Knee extension

CPIP Measures

Hip external and internal rotation with hip flexed

Hip external and internal rotation with hip flexed

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- Evidence-informed clinical perspectives on postural management for hip health in children and adults with non-ambulant cerebral palsy Ginny Paleg March 2022 .Journal of Pediatric Rehabilitation Medicine 15(2):1-10 DOI:10.3233/PRM-220002
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