



Gross Motor Milestones in Idiopathic Clubfoot treated by Ponseti Method

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Question asked by parent



Will my baby walk



When will my baby walk



Aims and Objectives

- Evaluate the timing of gross motor milestones achieved in children with severe clubfoot
- Difference in unilateral and bilateral clubfoot in terms of motor milestones achieved
- Compare with Published Indian normal data and international data

Materials and Methods

- Prospective study
- 150 consecutive children with idiopathic clubfoot treated by Ponseti method
- Children less than 3 months with no previous treatment taken elsewhere
- No other orthopaedic conditions
- Full term babies without any neonatal complications

Materials and Methods

- Pre-treatment Pirani score of 4 and more
- Percutaneous tendochillis tenotomy was performed after the midfoot score was zero
- A foot abduction orthosis was used for 23 hours for 3 months and then night time for 3 yrs

Motor milestones recorded

1. rolls from back to stomach
2. sitting without support
3. standing with assistance
4. walks with assistance
5. standing alone
6. walking alone

Rolls from back to supine

- Child turns over from prone to stomach from both sides during the observation period



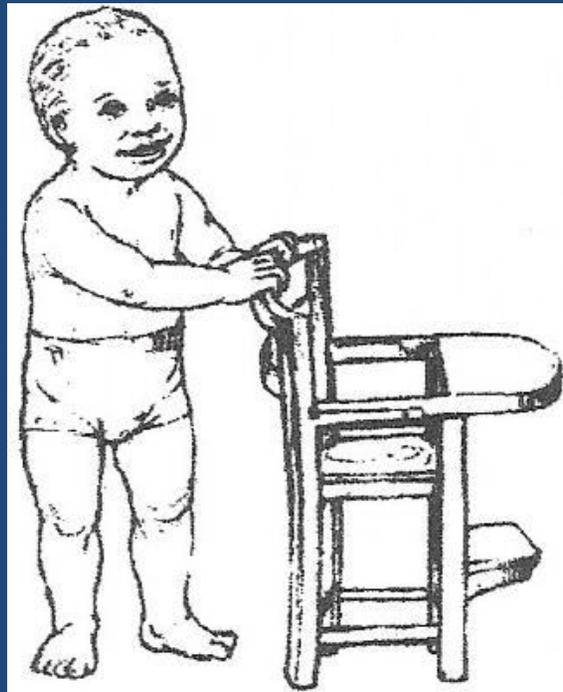
Sits without support

- Child sits up straight with head erect atleast for 10 sec. Child does not use arms or hand to balance his position



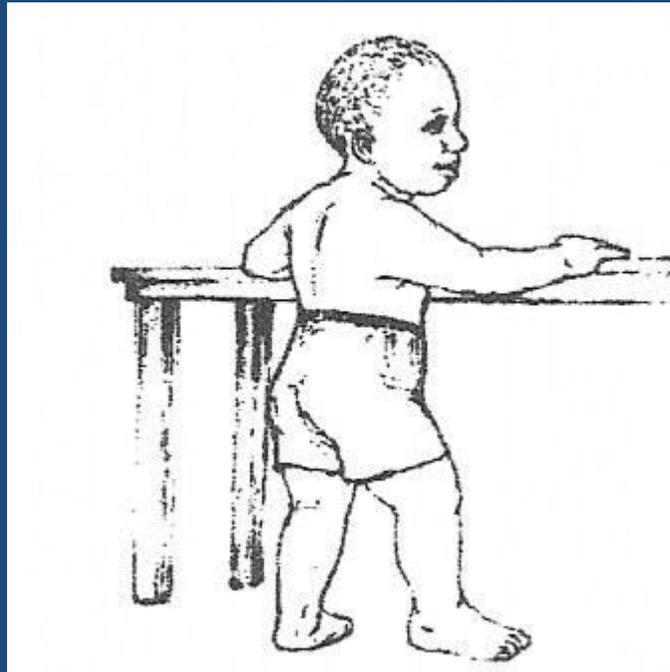
Standing with assistance

- Child stands in upright position on both feet, holding onto a stable object with both hands without leaning on it- 10 sec



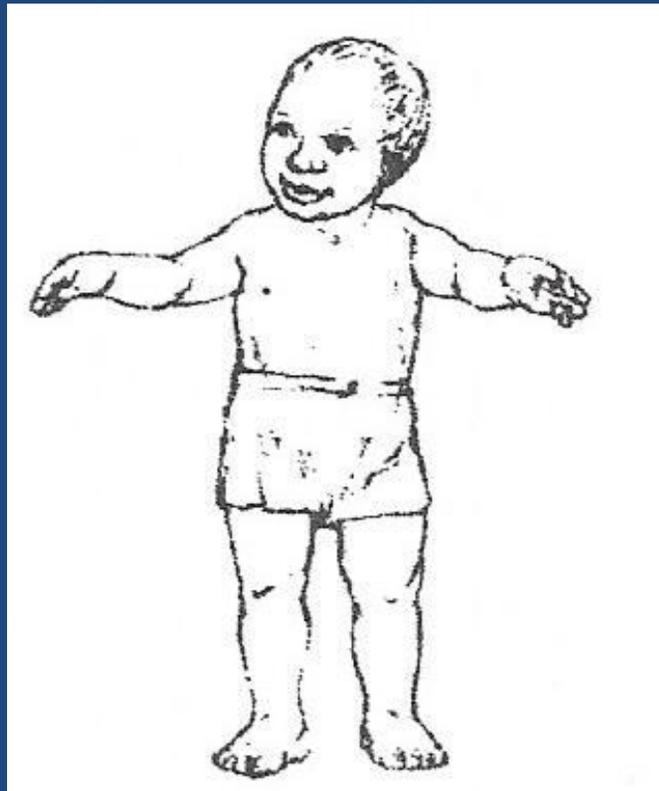
Walking with assistance

- Child makes forward or side movement holding onto a stable object - 5 steps



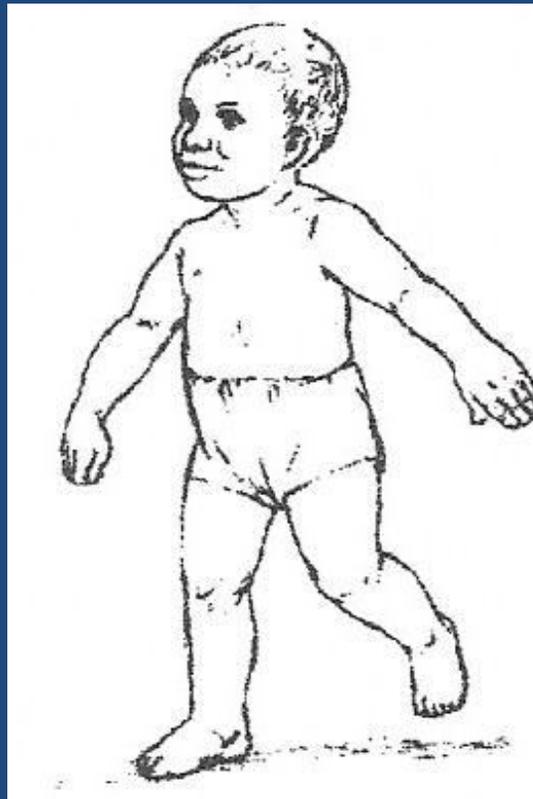
Standing without support

- Child stands upright with legs taking 100 % weight-10 sec



Walking alone

- Child takes 5 steps independently without contact, bearing full weight on body





WORLD HEALTH ORGANIZATION

Multicentre Growth Reference Study
Project NUT01 – Motor development assessment

MDS

Identification	Test items	Examiner report	Caretaker report	
			(b) Precise date of first achievement <i>(Taken from the parent's record form). Only enter date(s) for milestone(s) achieved for the first time between the previous follow-up and present visit.</i>	(c) Type of record 1 = Tested and recorded 2 = Recalled
(a) Form code: <input type="text" value="MDS"/>		(a) Observed 1 = No (inability) 2 = No (refusal) 3 = Yes 9 = Unable to test		
(b) Study number: <input type="text" value="NUT01"/>				
(c) Site number: <input type="text"/>				
(d) Subject code: <input type="text"/>				
(e) Follow-up visit number: <input type="text"/>	1. Sitting without support	<input type="checkbox"/>	<input type="text"/> / <input type="text"/> / <input type="text"/> <i>Day Month Year</i>	<input type="checkbox"/>
(f) Continued testing required? 1 = No 2 = Yes	2. Hands-and-knees crawling	<input type="checkbox"/>	<input type="text"/> / <input type="text"/> / <input type="text"/> <i>Day Month Year</i>	<input type="checkbox"/>
(g) Date of visit: <input type="text"/> / <input type="text"/> / <input type="text"/> <i>Day Month Year</i>	3. Standing with assistance	<input type="checkbox"/>	<input type="text"/> / <input type="text"/> / <input type="text"/> <i>Day Month Year</i>	<input type="checkbox"/>
(h) Examiner's code: <input type="text"/>	4. Walking with assistance	<input type="checkbox"/>	<input type="text"/> / <input type="text"/> / <input type="text"/> <i>Day Month Year</i>	<input type="checkbox"/>
Remarks	5. Standing alone	<input type="checkbox"/>	<input type="text"/> / <input type="text"/> / <input type="text"/> <i>Day Month Year</i>	<input type="checkbox"/>
	6. Walking alone	<input type="checkbox"/>	<input type="text"/> / <input type="text"/> / <input type="text"/> <i>Day Month Year</i>	<input type="checkbox"/>
	7. Child's emotional state <i>Rate the child's emotional state during the testing of all the milestones.</i> <i>Enter a code for each of the two scales.</i>	(a) First scale 1 = Drowsy 2 = Awake and alert	<input type="checkbox"/>	(b) Second scale 1 = Calm 2 = Fussy 3 = Crying

Proforma

Motor Milestone	Date observed by caretaker	Date observed by author
Rolls from back to stomach	dd/mm/yy	dd/mm/yy
Sits without support	dd/mm/yy	dd/mm/yy
Stands with support	dd/mm/yy	dd/mm/yy
Walks with support	dd/mm/yy	dd/mm/yy
Stands without support	dd/mm/yy	dd/mm/yy
Walks without support	dd/mm/yy	dd/mm/yy

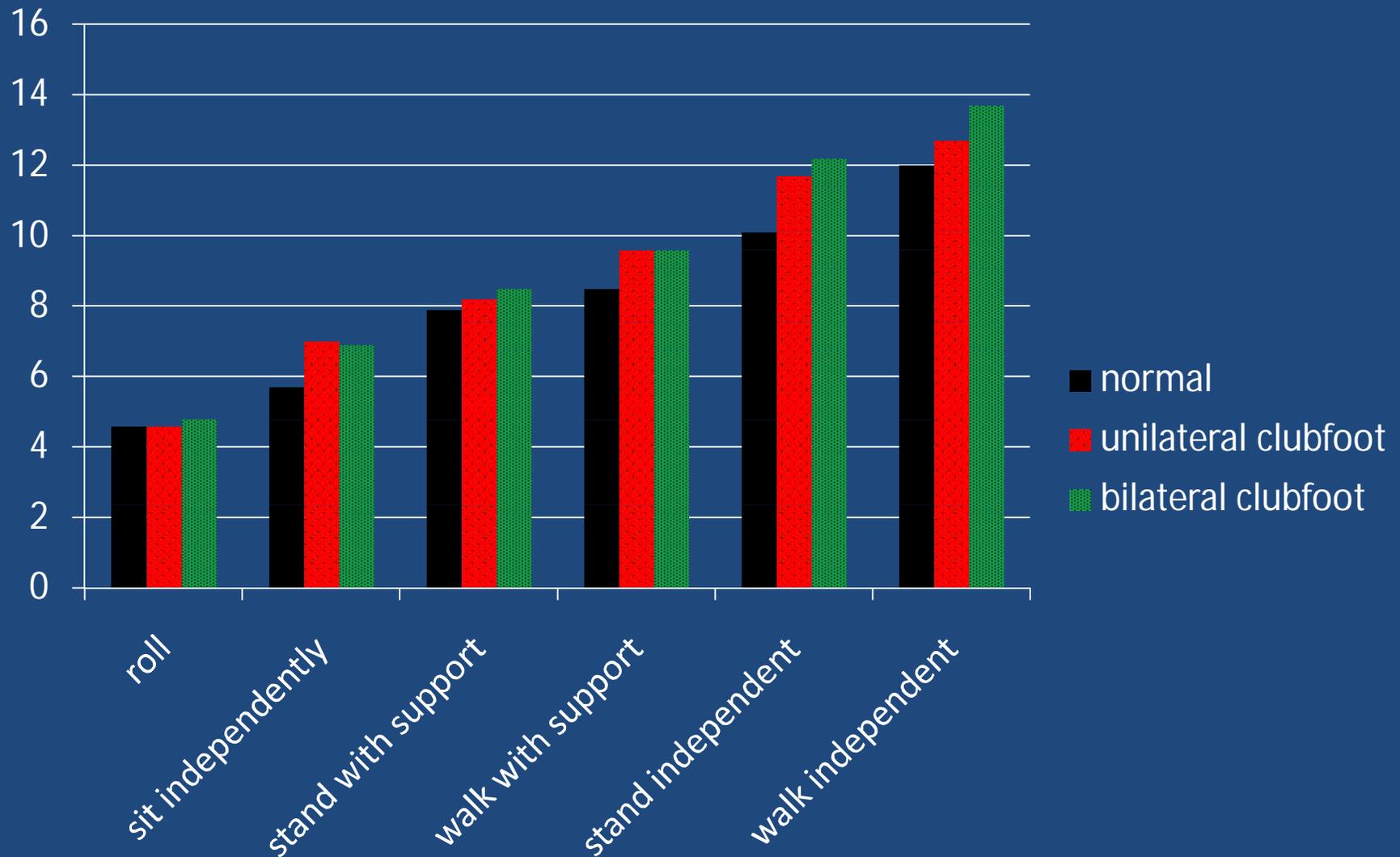
Results

- 10 patients were non compliant
- 5 children had recurrence
- Group 1: 80 children with unilateral clubfoot
- Group 2: 55 children with bilateral clubfoot
- Males/Females: 75/60

Results

- Age of starting plaster: Mean 13.5 days (7-90 days)
- Mean pre operative Pirani score: 5.4
- Mean duration of plaster: 7.7 weeks
- Compared with normal children using Developmental assessment of Indian Infants (DASSI) (Baroda Developmental Scale)

Master chart



Comparison of normal children with unilateral clubfoot

Motor milestone	Unilateral clubfoot	Normal foot	P value
roll	4.684	4.684	0.03 ns
Sitting without support	7.067	5.7	0.0001s
Stand	8.249	7.9	0.0001s
walks with support	9.663	8.5	0.0001s
Stand alone	11.722	10.1	0.0001s
Walk alone	12.787	12	0.0001s

Comparison of normal children and bilateral clubfoot

Motor milestone	Bilateral clubfoot	Normal foot	P value
roll	4.85	4.6	0.001s
Sitting without support	6.96	5.7	0.001s
Stand	8.5	7.9	0.001s
walks with support	9.67	8.5	0.001s
Stand alone	12.20	10.1	0.001s
Walk alone	13.77	12	0.001s

Comparison of unilateral and bilateral clubfoot

Motor milestone	Unilateral clubfoot	Bilateral clubfoot	P value
roll	4.684	4.85	0.03 s
Sitting without support	7.067	6.96	0.183 ns
Stand	8.249	8.5	0.041s
walks with support	9.663	9.67	0.4 ns
Stand alone	11.722	12.20	0.029 s
Walk alone	12.787	13.77	0.004 s

WHO Multicentric Growth Reference Study

- Study conducted at many centers around the world
- Walking independently at 12.1 y(SD 1.8).
- All milestones were delayed in our study

Comparison with other similar studies

Sala AD- JPO 2013

- Mean age of independent walking was 13.9 months

Limitations:

- Small sample size
- Did not differentiate between unilateral and bilateral clubfoot
- Did not study moderate and severe clubfoot separately

Ziots EL –JBJS 2014

- Walking age for severe clubfoot (15.8 months)
- Walking age for moderate clubfoot (14.2 months)
- No significant statistical difference of walking age in bilateral and unilateral clubfoot
- Limitation- studied only walking age

Discussion

- Prospective study with printed chart given to parents to avoid recall bias
- Milestones reconfirmed during each visit
- We did not compare our group with children in whom tenotomy was not performed

Possible reasons for delay in milestones

- Immobilization in above knee casts for 2 months
- Partial restriction of movement due to use of brace
- Primary pathology of clubfoot



Take Home Message

- Delay of 0.7 months for independent walking in children with unilateral clubfoot. 95% children were walking independently by 17 months. Other milestones were delayed between 0.1-0.7 months.
- Delay of 1.7 months for independent walking in children with bilateral clubfoot. 95% children were walking independently by 17.8 months. Other milestones were delayed between 0.1-1.7 months

Take home message

- Parents need to be explained that these delays are mild, with no long lasting implications and they should adhere to the brace protocol to avoid recurrences



Thank You

