

APPENDIX XXXIII

All GAS scores for researcher with CI raters

Children's subscales	Baseline Investigator Rater 1	Baseline CI Rater 2	Post test Baseline Investigator Rater 1	Post test CI Rater 2	Follow Up Baseline Investigator Rater 1	Follow up CI Rater 2
1 J53 1	-2	-2				
1 J51 1			-2	+1		
1 J52 1					-1	-1
1 J53 2	-2	-2				
1 J51 2			-1	+1		
1 J52 2					-2	-2
1 J53 3	-2	-2				
1 J51 3			-1	-2		
1 J52 3					-2	-2
1 J53 4	-2	-2				
1 J51 4			-1	0		
1 J52 4					+2	+2
2 J93 1	-2	-2				
2 J91 1			-1	+1		
2 J92 1					0	0
2 J93 2	-2	-2				
2 J91 2			-1	-2		
2 J92 2					-1	-1
3 J73 1	-2	-2				
3 J71 1			-1	-2		
3 J72 1					0	-1
3 J73 2	-2	-2				
3 J71 2			-1	-2		
3 J72 2					-1	-1
3 J73 3	-2	-2				
3 J71 3			-2	-1		
3 J72 3					-1	-2
3 J73 4	-2	-2				
3 J71 4			-1	-1		
3 J72 4					-2	-2
4 K83A 1	-2	-1				
4 K81A 1			-2	-1		
4 K82A 1					0	0
4 K83A 2	-2	-2				
4 K81A 2			-2	-2		
4 K82A 2					-2	-2
4 K83A 3	-2	-2				
4 K81A 3			-1	-2		
4 K82A 3					-2	+1
4 K83A 4	-2	-2				
4 K81A 4			-1	-2		

4 K82A 4					-2	-1
4 K83B 1	-2	-2				
4 K81B 1			-2	0		
4 K82B 1					-2	-1
4 K83B 2	-2	-2				
4 K81B 2			-2	0		
4 K82B 2					-2	-2
4 K83B 3	-2	-2				
4 K81B 3			-2	0		
4 K82B 3					-1	-1
4 K83B 4	-2	-1				
4 K81B 4			+2	+1		
4 K82B 4					+1	0
5 J103 1	-2	-2				
5 J101 1			+2	+2		
5 J102 1					0	0
5 J103 2	-2	-2				
5 J101 2			0	0		
5 J102 2					0	0
5 J103 3	-2	-2				
5 J101 3			0	+2		
5 J102 3					-1	-1
6 K63 1	-2	-2				
6 K61 1			-1	-2		
6 K62 1					No follow up	
6 K63 2	-2	-1				
6 K61 2			-1	-2		
6 K62 2					No follow up	
7 J13 1	-2	-1				
7 J11 1			-1	0		
7 J12 1					No follow up	
7 J13 2	-2	-1				
7 J11 2			-1	-1		
7 J12 2					No follow up	
7 J13 3	-2	-1				
7 J11 3			-2	0		
7 J12 3					No follow up	
7 J13 4	-2	-2				
7 J11 4			-1	-2		
7 J12 4					No follow up	
8 K33 1	-2	-2				

8 K31 1			+2	0		
8 K32 1					0	-2
8 K33 2	-2	-1				
8 K31 2			-2	-2		
8 K32 2					-1	-2
9 J43A 1	-2	-2				
9 J41A 1			-2	-2		
9 J42A 1					No follow up	
9 J43A 2	-2	-1				
9 J41A 2			0	0		
9 J42A 2					No follow up	
9 J43A 3	-2	-1				
9 J41A 3			-2	-2		
9 J43A 3					No follow up	
9 J43B 1	-2	-1				
9 J41B 1			-1	-1		
9 J42B 1					No follow up	
9 J43B 2	-2	-2				
9 J41B 2			-1	-2		
9 J42B 2					No follow up	
10 J123 1	-2	-2				
10 J121 1			0	-2		
10 J122 1					+1	+1 no hilite!
10 J123 2	-2	-2				
10 J121 2			+1	0		
10 J122 2					+2	+2
11 K23 1	-2	-2				
11 K21 1			-1	-1		
11 K22 1					0	0
11 K23 2	-2	-2				
11 K21 2			-2	-2		
11 K22 2					-1	-2
12 J113 1	-2	-2				
12 J111 1			-2	-2		
12 J112 1					0	-1
12 J113 2	-2	-2				
12 J111 2			-1	-1		
12 J112 2					0	0
12 J113 3	-2	-1				
12 J111 3			-2	-2		
12 J112 3					+2	+2
12 J113 4	-2	-2				
12 J111 4			0	-1		
12 J112 4					+1	-1

APPENDIX XXXIV

Wilcoxon signed-rank test statistical analysis

All data for researcher's ratings on same group of children from baseline to post-test

Descriptive Statistics	N	Mean	Std. Deviation	Minimum	Maximum
baseline GAS rating for researcher	42	30.0000	.00000	30.00	30.00
GAS score on post test for researcher	42	40.4762	11.03263	30.00	70.00

Ranks	N	Mean Rank	Sum of Ranks
GAS score on post test for researcher - baseline GAS rating for researcher	Negative Ranks	0 ^a	.00
	Positive Ranks	28 ^b	14.50
	Ties	14 ^c	
	Total	42	
a. GAS score on post test for researcher < baseline GAS rating for researcher			
b. GAS score on post test for researcher > baseline GAS rating for researcher			
c. GAS score on post test for researcher = baseline GAS rating for researcher			

Test Statistics ^b	
Z	GAS score on post test for researcher - baseline GAS rating for researcher -4.808 ^a
Asymp. Sig. (2-tailed)	.000
a. Based on negative ranks.	
b. Wilcoxon Signed-Ranks Test	

All data for researchers's ratings on same group of children from baseline to follow up

Descriptive Statistics					
	N	Mean	Std. Deviation	Minimum	Maximum
baseline GAS rating for researcher	42	30.0000	.00000	30.00	30.00
GAS score on follow up for researcher	31	45.1613	12.61506	30.00	70.00

Ranks				
	N	Mean Rank	Sum of Ranks	
GAS score on follow up for researcher - baseline GAS rating for researcher	Negative Ranks	0 ^a	.00	.00
	Positive Ranks	23 ^b	12.00	276.00
	Ties	8 ^c		
	Total	31		
a. GAS score on follow up for researcher < baseline GAS rating for researcher				
b. GAS score on follow up for researcher > baseline GAS rating for researcher				
c. GAS score on follow up for researcher = baseline GAS rating for researcher				

Test Statistics^b	
	GAS score on follow up for researcher - baseline GAS rating for researcher
Z	-4.250 ^a
Asymp. Sig. (2-tailed)	.000
a. Based on negative ranks.	
b. Wilcoxon Signed-Ranks Test	

All data for Researcher's ratings on same group of children from post test to follow up

Descriptive Statistics					
	N	Mean	Std. Deviation	Minimum	Maximum
GAS score on post test for researcher	42	40.4762	11.03263	30.00	70.00
GAS score on follow up for researcher	31	45.1613	12.61506	30.00	70.00

Ranks				
	N	Mean Rank	Sum of Ranks	
GAS score on follow up for researcher -	Negative Ranks	9 ^a	12.56	113.00

GAS score on post test for researcher				
	Positive Ranks	16 ^b	13.25	212.00
	Ties	6 ^c		
	Total	31		
a. GAS score on follow up for researcher < GAS score on post test for researcher				
b. GAS score on follow up for researcher > GAS score on post test for researcher				
c. GAS score on follow up for researcher = GAS score on post test for researcher				

Test Statistics ^b	
	GAS score on follow up for researcher - GAS score on post test for researcher
Z	-1.407 ^a
Asymp. Sig. (2-tailed)	.159
a. Based on negative ranks.	
b. Wilcoxon Signed-Ranks Test	

Wilcoxon signed-ranks test - Researcher.

Baseline to post-test for the same children with a randomised group of CI raters

Ranks	N	Mean Rank	Sum of Ranks	
CI raters views of follow up - raters views of post-test	Negative Ranks	11 ^a	14.86	163.50
	Positive Ranks	14 ^b	11.54	161.50
	Ties	6 ^c		
	Total	31		
a. CI raters views of follow up < raters views of post-test				
b. CI raters views of follow up > raters views of post-test				
c. CI raters views of follow up = raters views of post-test				

Test Statistics ^b	
	raters views of post-test - rater's views of baseline
Z	-3.340 ^a
Asymp. Sig. (2-tailed)	.001
a. Based on negative ranks.	
b. Wilcoxon Signed-Ranks Test	

Baseline to follow up for the same children with a randomised group of raters from the same group of raters

Ranks				
	N	Mean Rank	Sum of Ranks	
CI raters views of follow up - rater's views of baseline	Negative Ranks	1 ^a	7.50	7.50
	Positive Ranks	20 ^b	11.18	223.50
	Ties	10 ^c		
	Total	31		
a. CI raters views of follow up < rater's views of baseline				
b. CI raters views of follow up > rater's views of baseline				
c. CI raters views of follow up = rater's views of baseline				

Test Statistics^b		
		CI raters views of follow up - rater's views of baseline
Z		-3.896 ^a
Asymp. Sig. (2-tailed)		.000
a. Based on negative ranks.		
b. Wilcoxon Signed-Ranks Test		

Post-test to follow up for the same children with a randomised group of CI raters from the same group of CI raters

Ranks				
	N	Mean Rank	Sum of Ranks	
CI raters views of follow up - raters views of post-test	Negative Ranks	11 ^a	14.86	163.50
	Positive Ranks	14 ^b	11.54	161.50
	Ties	6 ^c		
	Total	31		
a. CI raters views of follow up < raters views of post-test				
b. CI raters views of follow up > raters views of post-test				
c. CI raters views of follow up = raters views of post-test				

Test Statistics^b		
		raters views of follow up - raters views of post-test
Z		-.028 ^a
Asymp. Sig. (2-tailed)		.978
a. Based on positive ranks.		
b. Wilcoxon Signed-Ranks Test		

Wilcoxon signed-ranks test. Each level (baseline, post test and follow up) compared for the CI raters

Researcher's rating							
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*CI raters comparing score to Researcher's Crosstabulation							
Count							
	CI raters comparing score to Kate	Total					
	-2.00	-1.00	.00	1.00	2.00		
Researcher's rating	-2.00	42	15	4	2	1	64
	-1.00	13	10	2	2	0	27
	.00	2	3	8	0	1	14
	1.00	0	2	1	1	0	4
	2.00	1	0	0	1	4	6
Total	58	30	15	6	6	115	

(i) Cross tabulation for researcher's and CI ratings

	identifies CI raters within one score	Total					
	-2.00	-1.00	.00	1.00	2.00		
identifies rater	-2.00	45	15	0	0	0	60
	-1.00	12	9	1	0	0	22
	.00	0	3	8	0	0	11
	1.00	0	0	1	1	0	2
	2.00	0	0	0	1	3	4
Total	57	27	10	2	3	99	

(ii) Cross tabulation of researcher's and CI scores within one point of each rater

APPENDIX XXXV

Kappa statistical analysis

GROUP KAPPA - SSPS

Researcher's rating	CI raters comparing score to Researcher's	Crosstabulation					
Count							
	CI raters comparing score to Kate	Total					
	-2.00	-1.00	.00	1.00	2.00		
Researcher's rating	-2.00	42	15	4	2	1	64
	-1.00	13	10	2	2	0	27
	.00	2	3	8	0	1	14
	1.00	0	2	1	1	0	4
	2.00	1	0	0	1	4	6
Total		58	30	15	6	6	115

(i) Cross tabulation for researcher's and CI ratings

	identifies CI raters within one score	Total					
	-2.00	-1.00	.00	1.00	2.00		
identifies rater	-2.00	45	15	0	0	0	60
	-1.00	12	9	1	0	0	22
	.00	0	3	8	0	0	11
	1.00	0	0	1	1	0	2
	2.00	0	0	0	1	3	4
Total		57	27	10	2	3	99

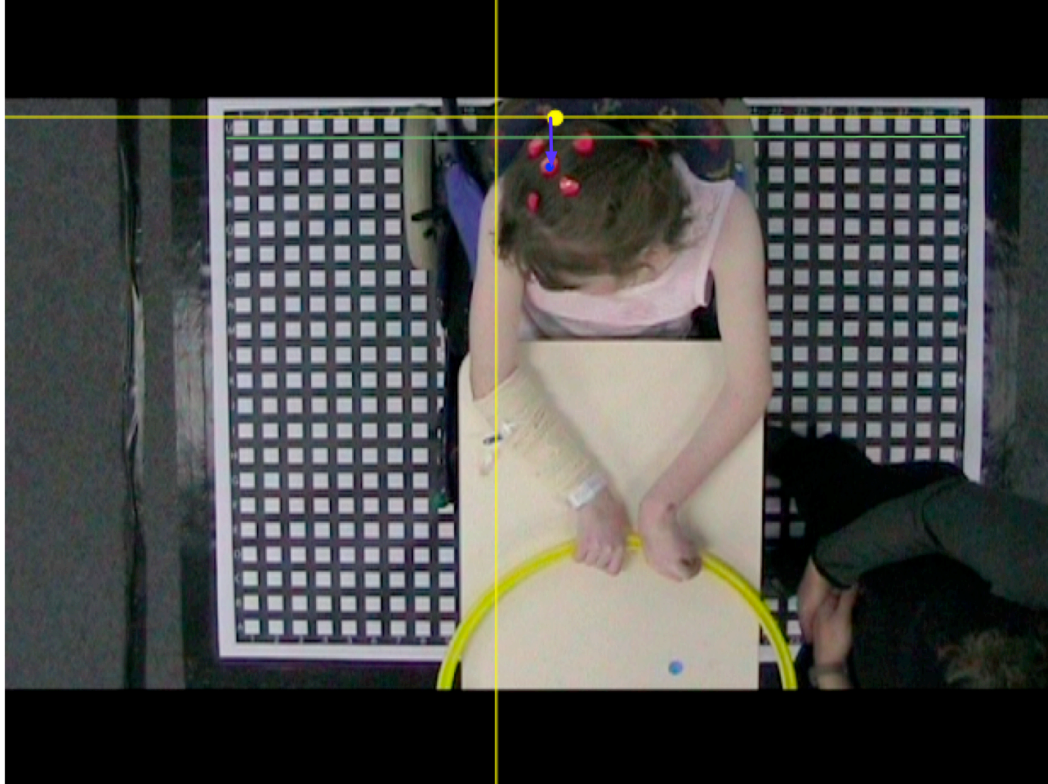
(ii) Cross tabulation of researcher's and CI scores within one point of each rater

APPENDIX XXXVI i-v

Pictures and measurement analysis comments from Logger Pro / Excel, examples from the 12 children in Pilot Study Three.

(i) Upright head

Measurement

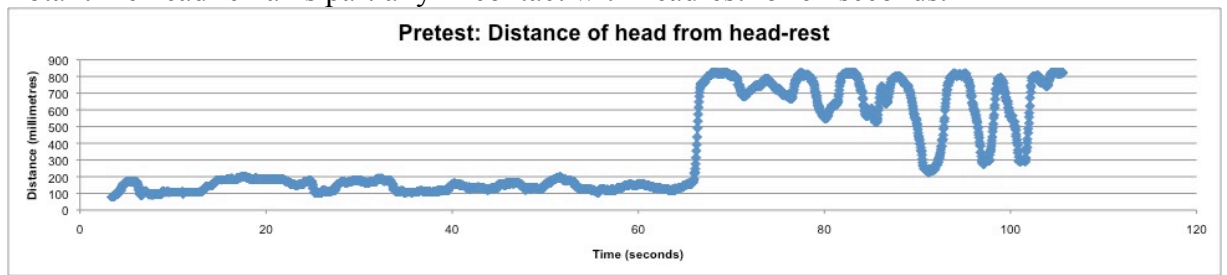


The reference point is set on the left corner of the headrest of the wheel chair. Dots then set on top of the child's head, and tracked. Distance from the reference point to the centre dot was then measured for each frame of the video. Total time head remains in contact with the headrest was determined from the measurement readings.

Results

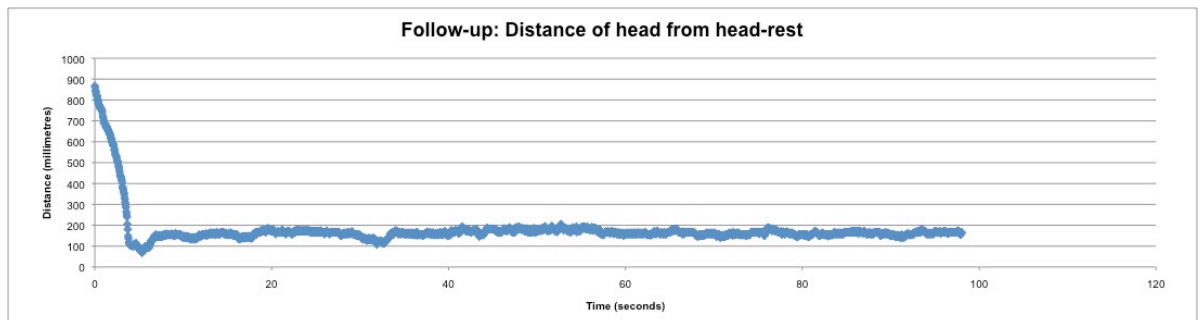
Pre-test video (106 seconds duration):

Total time head remains partially in contact with headrest for 64 seconds.



Follow-up video (98 seconds duration):

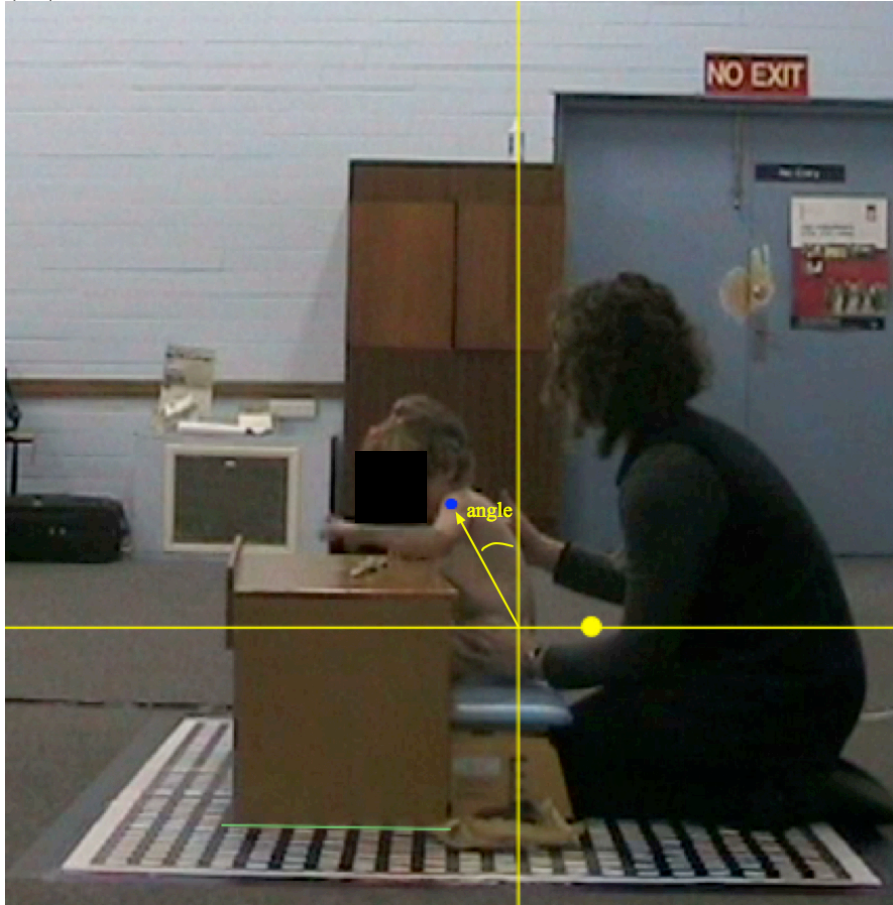
Total time head remains partially in contact with head-rest for 94 seconds.



(ii) Lean Forward

Measurement

(iia) Pre-test video



The reference point is set on the dot on the lower left trunk of the child. The dot on the left shoulder was tracked over time, and the angle between the vertical and this dot was calculated.

(iib) Lean forward

Follow-up video



Results

Pre-test video (37 seconds duration):

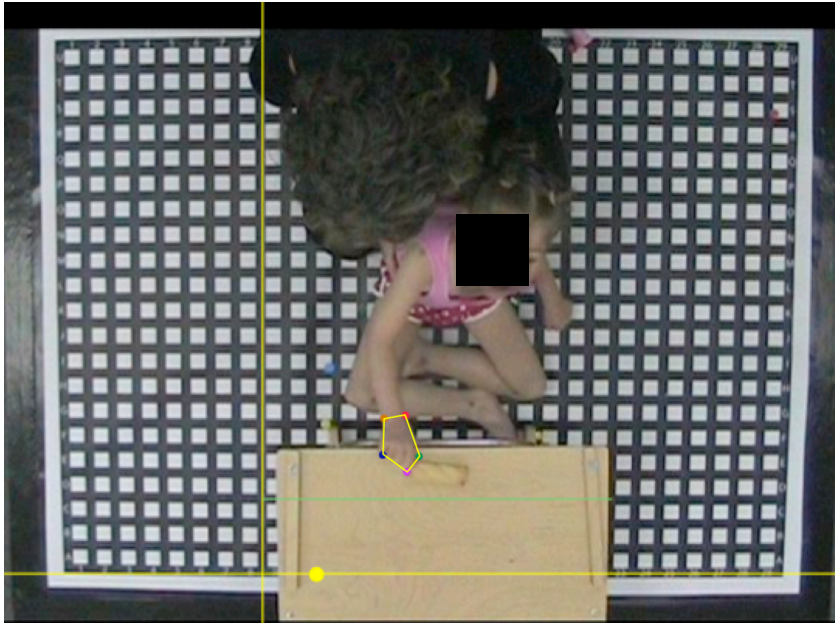
Range was from 8.7° to 32.7°, with an average angle of 20.3°.

Follow-up video (66 seconds duration):

Range was from 14.3° to 19.5°, with an average angle of 19.5°.

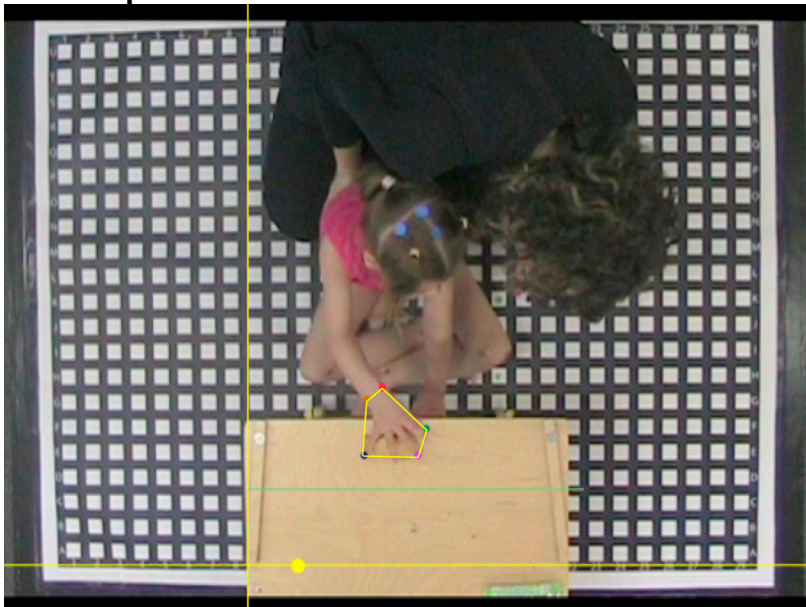
(iii) Hand spread

Pre-test video



The reference point is set on the front edge of the floor grid. Dots were placed on the wrist and front edge of the child's hand as it was initially in contact with the wooden block, and the area of the pentagon formed was measured.

Follow-up video

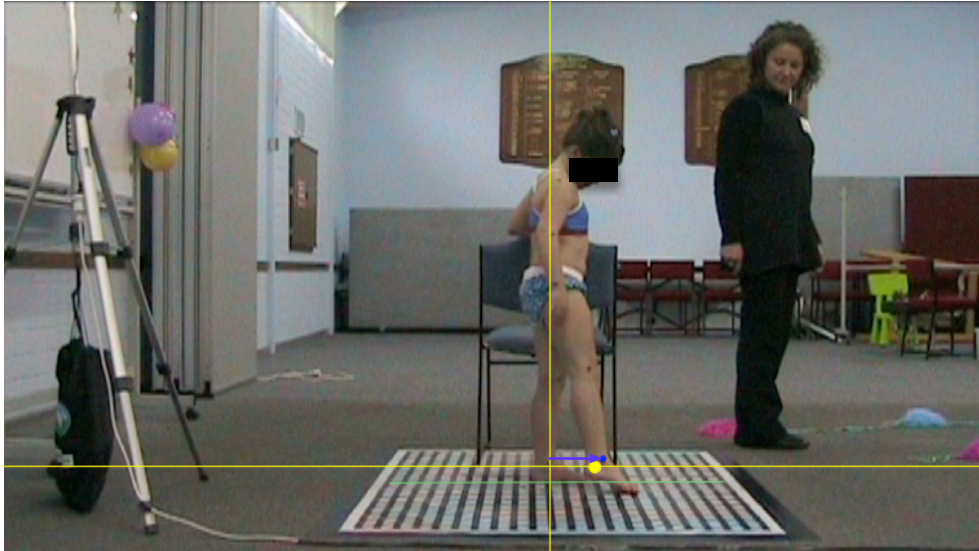


(iv) Right leg extension

Measurement

The reference frame is set on the corner of the floor grid at the side of the child, so as the vertical axis runs through the dot on the inside left ankle. It is used to determine coordinates of the dot on the outside right ankle. Dots are placed on each frame as the child extends her right foot forward. The furthest extension is noted

Pre-test video



Maximum distance from left ankle is 243 mm.

Post-test video



Maximum distance from left ankle is 505 mm. Increase in distance pre- to post- is 262 mm (108% increase).

(v) Angle of leaning

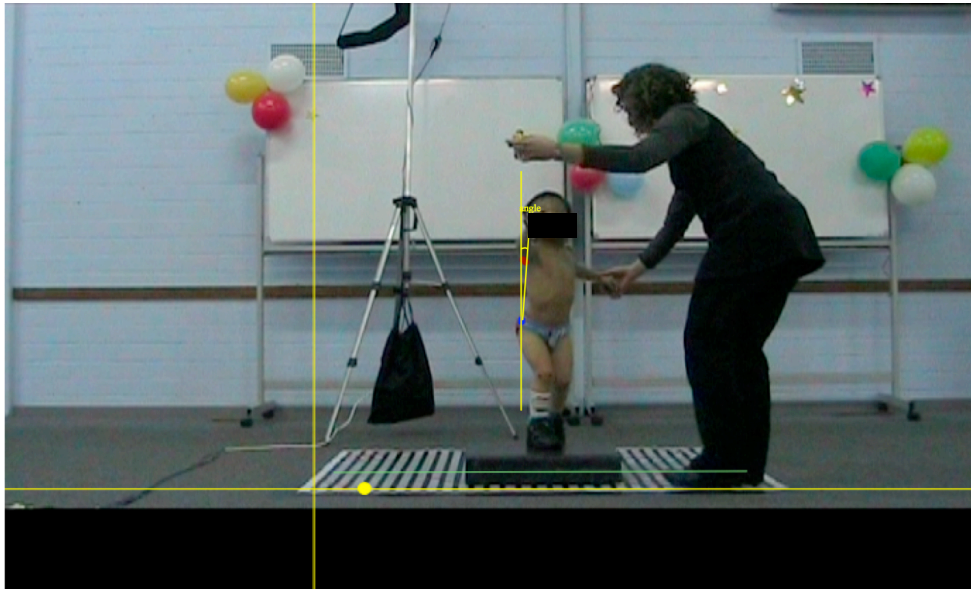
Measurement

The reference frame is set on the one of lines on the floor grid in front of the child. It is used to determine coordinates of specific points on the child's body. Two dots are used to mark out a line, running parallel to the right side of the child's trunk. One dot is drawn on the hip and other is placed under the armpit as the child is about to place his left leg onto a small step. The angle is then determined between this line and the vertical.

Pre-test video



Post-test video



Pre-test video: Angle was determined to be 12° from vertical.

Post-test video: Angle was determined to be 1° from vertical.

APPENDIX XXXVII

Logger Pro results (& rationale for measurements)

Table A: Logger Pro Results (Vernier, 2010), (Excel, 2004), (Kapandji, 1982)

Child - Code	Task Related Posture & Movement Behaviour	PRE TEST	POST TEST	FOLLOW UP	MEASURE OF POSITIVE CHANGE
1.J53, J52	Head control for vision. - % of total time head remains at least partially in contact with headrest.	Total time: 3.9 seconds of a 98.4 secs time block from start = 4.0 %		Total time: 94.8 seconds of a 98.4 seconds time block from start = 96.3 %	= 92.3% increase in total time head remains at least partially in contact with headrest
2. J93, J92	'Lean forward' to use his fork is reduced from pre test to follow. Range of movement is recorded between fingerprint ink dot on most lateral aspect of left iliac crest & 'virtual line' between it & the dot on most lateral/superior aspect of left spine of scapula.	Excursion of trunk flexion with scapula movement forward: 8.7 ° to 32.7 ° ie Excursion of 24 °		Excursion of trunk flexion with scapula movement forward: 14.3 ° to 19.5 ° ie Excursion of 5.2 °	18.8 ° or 78.3% decrease in 'atypical lean forward' to use his fork
3. J93, J92	There is observable change from pre test to follow up in the 'expansion' in size of R.hand - in readiness to grasp 'biscuit' from table in front .	Area in mm ² = 5,300 mm²		Area in mm ² = 12,100 mm²	= 6,800 mm² or 128.3% increase in size / expansion of hand opening in preparation to successfully grasp 'biscuit' from the table.
4. K83, K82 Goal A	Time to initiate reach to successfully	Time from beginning of video footage		Time from beginning of video footage	9.6 seconds or 69.6 %

	grasp a toy with L. hand across midline whilst seated on a bench will be measured. This will be timed from beginning of clip (toy introduced) to toy in child's hand & clear of assistant's hand.	to toy held in child's hand & clear of assistant's hand – in seconds: = 13.8 seconds		to toy held in child's hand & clear of assistant's hand – in seconds: = 4.2 seconds	decrease in time taken to grasp toy with left hand across midline from pre test to follow up.
5. K83, K81	Maintenance of feet steady on the surface is measured by *excessive movement of feet on or away from the surface of the grid. Measurements are made at pre test & post test. * 'Excessive movement' ie >15mm in reference to a corner dot on the grid. This is detailed in Appendix 19 (Logger pro / Excel) Pictures and Measurement analysis comments for the 12 children from researcher 3 – Analysis 5	*Excessive movement 31 seconds duration Left in seconds: 17.8 seconds Right in seconds: 23 seconds	*Excessive movement 31 seconds duration Left in seconds: 0.6 seconds Right in seconds: 1.0 seconds		Left foot: Decrease in "excessive movement" = 17.2 seconds = 96.6% decrease Right foot: Decrease in "excessive movement" = 22 seconds = 95.6% decrease - in time that feet "moved excessively" on the surface (* with reference to given 'excessive movement' definition)
6. K63, K61	Excursion of SG counter rotation from pelvic girdle during bat swing is recorded. Measurement from 'virtual line' through 'dots' on 'most lateral SG acromial processes - records ROM from 'virtual	Range of movement (counter rotation) of SG over pelvis in degrees: = 32.9 °	Range of movement (counter rotation) of SG over pelvis in degrees: - Pelvis dot obscured by nappy		'Visually observable' improvement in counter rotation was not measurable – clothing obscured pelvis dot.

	line' through most lateral aspects of iliac crest at (L. & R. – 'visual judgment'), recorded & compared for duration of video clip during pre test & post test.				
7. J13, J11	Movement forward with right foot is measured between R lateral malleolus & L. medial malleolus at the extent of forward movement of foot in the sagittal plane across the floor grid. Comparison will be made pre to post test.	Measurement of distance between malleoli (as stated) in mm's: 243mm	Measurement of distance between malleoli (as stated) in mm's: 505mm		262mm or 108% increase in distance R. foot moved forward in ballet step, pre to post test.
8. K33, K32	Speed of unscrewing his drink bottle is measured from closure of right hand on top to unscrew it, to release of hand after unscrewing.	Time in seconds: = 11.7 seconds		Time in seconds: = 7.6 seconds	4.1 seconds or 35% decrease in time taken to unscrew the lid of drink bottle
9. J43, J41 Goal A	% of time that L. elbow is flexed at 70 ° or more (from beginning walking until ball is released) is measured from 'virtual' lines drawn from shoulder 'dot' to L. lateral epicondyle & to the 'dot' centred on the L.medial wrist styloid process. Angles are measured & timed from pre to post test.	% of time L. elbow flexed beyond 70 ° or more: 89.7%	% of time L. elbow flexed beyond 70 ° or more: 19.0%		78.8% decrease in time L. elbow flexed beyond 70 ° or more from pre test to post test (Note that in post test elbow flexion at or >70 degrees was only in lifting & releasing ball)

<p>10. J123, J121</p>	<p>Measurement of 'angle of leaning' towards the L.side (- while (L.foot off ground stepping .The 2 reference points are R.greater trochanter 'dot' to base of R.posterior axilla. The angle of movement of a virtual straight line drawn between the 2 is recorded - with reference to a virtual line drawn through 'hip dot' 'to the floor. The <i>best</i> right side vertical alignment is measured at both pre test and follow up.</p>	<p>Range of movement of R. posterior axilla from R. greater trochanter: =168 °</p>	<p>Range of movement of R. posterior axilla from R.greater trochanter = 179 °</p>		<p>11 ° or 6.5% increase in vertical orientation of upper body over pelvis & lower extremity of the ('more involved') R. stance leg while stepping.</p>
<p>11. K23,K21, K22</p>	<p>Presence or absence of left hand assisting donning of right sock, seated, will be measured by counting and adding the time durations in which this occurs.</p>	<p>Timed presence or absence of left hand as an assistant in seconds: Presence: 8.2 seconds Absence: 8.2 seconds <u>Percentage presence = 50%</u></p>		<p>Timed presence or absence of left hand as an assistant in seconds: Presence: 9.49 seconds Absence: 1.66 seconds <u>Percentage presence = 84.8%</u></p>	<p>69.6% increase in present timed assistance of left hand in sock donning from pretest to follow up.</p>
<p>12. J113, J112</p>	<p>'Environmental assistance' from edge of table used periodically for support in standing is measured from pre test to follow up test as 'present' (at any time during task performance) or 'absent' (throughout</p>	<p>Timed presence or absence of table edge as support in seconds: Presence: = 6.9 seconds Absence: = 2.8 seconds</p>		<p>Timed presence or absence of table edge as support in seconds: Presence: = 0.0 seconds Absence: = 6.1 seconds</p>	<p>% of total time leaning on table or research assistant 1 at pre test = 100%. At follow up, % of time he stands independently (and at least 10 cm from the table</p>

	task).	(though during this time he leans on research assistant 1) % of time he leans on table = 60.3%		% of time he leans on table = 0%	edge) =100%
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Notes:

- Change has been represented in measures of seconds, 'presence or absence' in seconds, degrees or ranges of movement.
- Change has been expressed as % (change/original x 100/1) - % 'increase', such as step length or % 'decrease' such as time