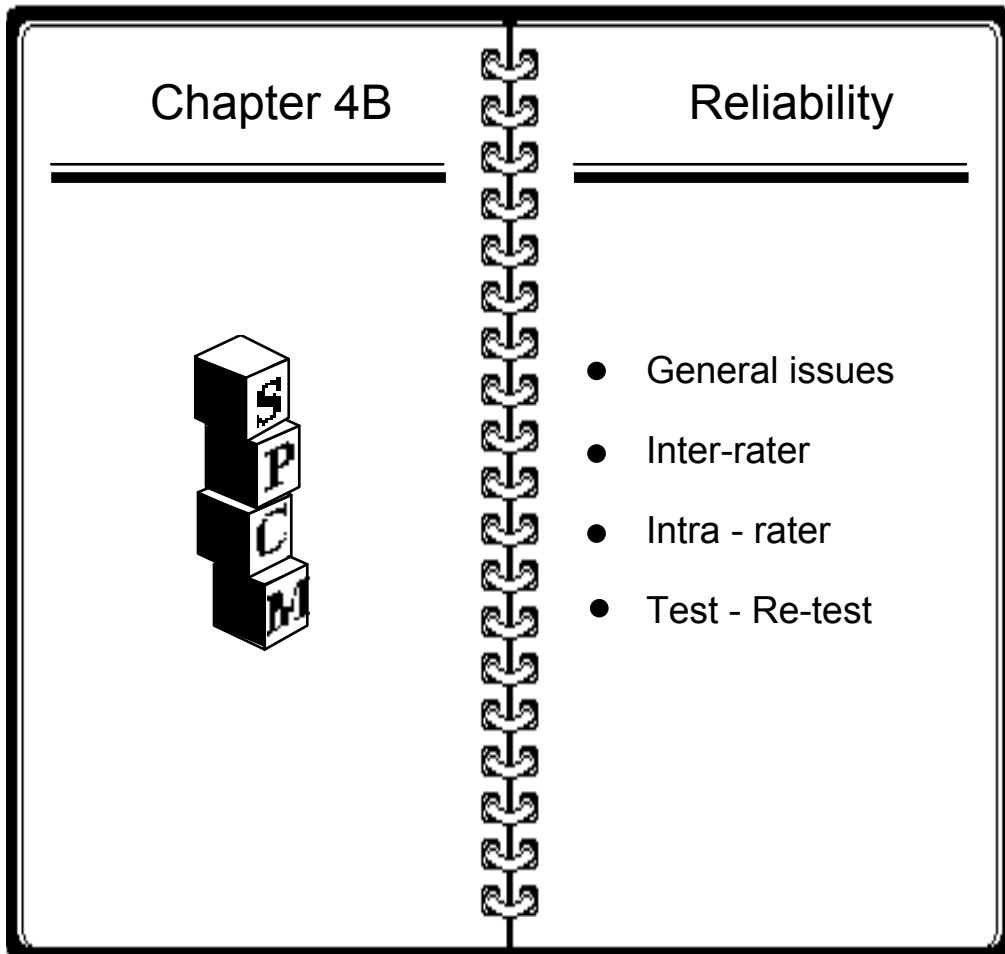


## Chapter 4B: Reliability – Trial 2



## **Trial 2**

The second clinical trial was conducted in the spring of 1992 using SPCM Draft 6, November, 1991. This version is essentially the same as the Research Version, January, 1994 shown in Appendix 3. The only difference between the two versions is that alignment domain scores required re-coding after data collection to effect the highest score, 4, for normal alignment and the lowest score, 1 for the most severe postural deviation. The research version incorporates the changes recommended after Trial I as stated above. As well, two subject descriptor items, 'Cognitive Level', and Cooperation Level' were added to the cover sheet of the research version of the SPCM. These descriptors are described in Chapter 6.

The primary purpose of Trial 2 was to assess inter-rater and test-retest reliability of the measure. Subjects were assessed while seated in their own seating system and not in the 'without seating system' condition. The results of Trial 2 have been described in two reports (Fife, Roxborough, Story, Field, Armstrong, 1993a; Fife, Roxborough, Story, Field, Harris, Armstrong, 1993b).

### **Subjects: Trial 2**

All residents of the Lower Mainland/SW Region who had attended the Positioning Assessment Unit at Sunny Hill Health Centre for Children (SHHC) in the preceding two years, and were seating system users, were contacted by mail (n=304). Fifty-one consenting subjects were enrolled into the trial.

### **Raters: Trial 2**

The two raters were an occupational therapist and physical therapist (D.F. and M.S.), each with at least five years' experience in pediatrics including two or more years in the adaptive seating field. One rater (D.F.) participated in Trial 1. The other rater had administered the SPCM in six or more practice sessions.

### **Procedures: Trial 2**

Data were collected over a six week period (February 24 - April 10, 1992) with subjects attending on two occasions approximately 3 weeks apart. As in Trial 1, this interval was chosen to best alleviate potential problems of remembrance of scores by the raters and change within the subjects between sessions. Each rater independently

administered the LSS while the other rater was outside of the testing room. The SPCM was administered to subjects while sitting in their own seating systems. Both raters assessed and independently scored the alignment items simultaneously. One rater administered the function items while the other rater observed and each scored the items independently. The same rater administered the function items to a given subject at both sessions. The administering rater and the order of testing alignment vs function domains was alternated in successive subjects and the same order for a given subject was repeated at the second session. Subjects attended in pairs for sessions approximately one hour long. This was a more efficient use of time and allowed for rest periods and repositioning of subjects between administration of the LSS and the SPCM.

### **Data Analysis: Trial 2**

Item reliability was assessed by the weighted Kappa statistic,  $K_w$ , using the Cicchetti method for assigning weights to discrepancies in scores between raters and between tests (Fleiss, 1980). Reliability of SPCM components, i.e., alignment and function domain scores and summed alignment scores for individual body segments, was assessed by intra-class correlation coefficients (ICC 3, 1) as described by Shrout and Fleiss (1979).

### **Results: Trial 2**

Fifty of the 51 recruited subjects attended both sessions. There were 22 females and 29 males, ranging in age from 1.3 to 27.9 years, with an average age of 11.9 years. The most common diagnosis was cerebral palsy. The Level of Sitting Scale scores across raters and tests covered the range of 1 to 7, with a mean of 3.6 and standard deviation of 1.7. Subject characteristics are presented in Tables 8 and 9 and descriptive statistics in Table 10.

Table 8. Characteristics of Subjects in Trial 21 (N=51)

Variable	N
Sex	
Male	27
Female	24
Age Category (yr)	
<3	4
3-5	8
6-9	5
9-16	20
>16	14
Medical Diagnosis	
Cerebral Palsy	
Spastic quadriplegia	20
Spastic Diplegia	4
Spastic hemiparesis	1
Brain injury	6
Meningomyelocele	4
Chromosomal abnormality	3
Duchenne muscular dystrophy	2
Other	1

Table 9. Distribution of subject descriptor ratings<sup>a</sup> in Trial 2.

Level of Sitting Scale		Cognition <sup>b</sup>		Cooperation <sup>c</sup>	
Level	Frequency	Level	Frequency	Level	Frequency
1	8	1	20	1	37
2	5	2	31	2	14
3	13			3	0
4	9				
5	7				
6	5				
7	4				

<sup>a</sup> Averaged across four data sets: Rater 1:Test 1, Rater 2:Test 1, Rater 1:Test 2, Rater 2:Test 2

<sup>b</sup> 1 = 'understands most instructions'; 2 = 'understands few instructions'

<sup>c</sup> 1 = 'cooperates fully'; 2 = 'cooperates with prompting'; 3 'uncooperative'

Table 10. Descriptive statistics<sup>a</sup> of subjects in Trial 2

	Mean	Sd	Range
Age (Years)	11.9	6.52	1.3 - 27.9
Cognitive Level	1.6	0.46	1 -2
Cooperative Level	1.2	0.32	1 -3
Level of Sifting Scale	3.6	1.7	1-7

<sup>a</sup> Overall mean scores in 50 subjects across four data sets: Rater 1:Test 1, Rater 2:Test 1, Rater 1:Test 2, Rater 2:Test 2

### **Items**

Overall mean Kw values for inter-rater and test-retest reliability were 0.83 and 0.77 for the LSS, 0.67 and 0.59 for alignment items and 0.96 and 0.86, respectively, for function items (Table 11).

### **Component Scores**

Means of SPCM component scores are shown in Table 12. For the alignment domain, the higher the score, the closer the rated alignment to normal sitting posture. For the function domain, the higher the score, the greater the task achievement. Reliability of component scores between the two raters and two tests is presented in Table 13. ICCs for inter-rater reliability ranged from .79 to 1 and, for test-retest reliability, from 0.63 to 0.99.

Table 11. Reliability<sup>a</sup> of Level of Sitting Scale and SPCM items in

Item	Description	Inter-rater	Test-Retest
LSS	Level of Sitting Scale	0.83	0.77
<i>Alignment Items</i>			
A1	Pelvic obliquity	0.65	0.57
A2	Trunk lat incline	0.50	0.53
A3	Shoulder height	0.45	0.30
A4	Head lat tilt	0.78	0.38
A5	Hip R rotation	0.51	0.50
A6	Hip L rotation	0.69	0.49
A7	Pelvic tilt	0.59	0.71
A8	Lumbar curve	0.50	0.67
A9	Thoracic curve	0.70	0.64
A10	Trunk AP incline	0.52	0.49
A11	Head AP tilt	0.75	0.52
A12	Hip R fl/ext	0.74	0.66
A13	Hip L fl/ext	0.75	0.75
A14	Knee R fl/ext	0.94	0.81
A15	Knee L fl/ext	1.00	0.91
A16	Ankle R df/pf	0.88	0.88
A17	Ankle L df/pf	0.94	0.68
A18	Pelvic rotation	0.56	0.60
A19	Trunk rotation	0.34	0.45
A20	Head rotation	0.70	0.47
A21	Hip R add/abd	0.59	0.55
A22	Hip L add/abd	0.59	0.43
Mean		0.67	0.59
<i>Function items</i>			
F1	Head up AP	0.94	0.74
F2	Head up midline	0.86	0.4
F3	Trunk move AP	<sup>b</sup>	<sup>b</sup>
F4	Trunk move rot	0.93	0.86
F5	Arm lift	1.00	0.82
F6	Grasp block	0.95	0.95
F7	Grasp raisin	0.97	0.88
F8	Manipulate jar	0.95	0.89
F9	Manipulate pen	0.99	0.90
F10	Manipulate dice	1.00	0.95
F11	WC mobil. speed	0.99	0.87
F12	WC mobil. accuracv	1.00	0.94
Mean		0.96	0.86

<sup>a</sup>Overall weighted Kappa values in 50 subjects. Interrater reliability evaluated across Test 1 and Test 2; Test-Retest <sup>b</sup> reliability calculated across Rater 1 and Rater 2.

<sup>b</sup>The distribution of scores for this item was such that the Kappa statistic could not be calculated.

Table 12. Means of SPGM component scores<sup>a</sup> in Trial 2

SPCM	Possible Score		Mean	s d
	Minimum	Maximum		
<i>Alignment</i>	22	88	76	6.5
Pelvis	3	12	9	1.9
Trunk	6	24	20	2.1
Head	3	12	9	1.9
Lower Limbs	10	40	37	2.7
Function	12	48	27	11.9

<sup>a</sup> Overall mean scores in 50 subjects across four data sets:

Rater 1:Test 1, Rater 2:Test 1, Rater 1:Test 2, Rater 2:Test 2

Table 13, Reliability<sup>a</sup> of SPCM component scores in Trial 2

SPCM	N <sup>b</sup>	Inter-rater		Test-retest	
		Test 1	Test 2	Rater 1	Rater 2
<i>Alignment</i>	22	.93	.91	.89	.87
Pelvis	3	.88	.80	.87	.83
Trunk	6	.85	.79	.72	.78
Head	3	.93	.88	.65	.63
Lower Limbs	10	.90	.89	.80	.85
Function	12	1.00	1.00	.99	.99

<sup>a</sup> intraclass correlation coefficients. formula 3. 1. as described by

<sup>b</sup> N = number of items in SPCM component

Discussion: Trial 2

LSS and item reliability results compared favorably with the pilot version.

Unweighted Kappa values for Trial 2 (not presented in the above results) were used for this comparison. We consider reliability of the SPCM to be satisfactory when using well-trained raters, i.e., experienced seating clinicians who have administered the SPCM at least ten times.

The following really belongs in validity chapter

Trial 1: Effect of Seating System on Alignment and Function Scores

An analysis of variance was performed using a repeated measures design to compare alignment and function scores with vs without the seating system. was assessed with the seating system as opposed to either independent or Tumbleform support. There was no significant effect of seated condition on the function component score. Alignment and function component scores, with and without the seating system (Conditions 1 and 2, respectively) are illustrated in Figure 1.

Re Trial 2 validity: Product-moment correlations between the LSS and alignment, the LSS and function and between alignment and function were 0.57, 0.79 and 0.36, respectively ( $p < 0.001$ ).

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