



Are Functional Symmetry Observation Scale, Version 2 Scores in Infants with Congenital Muscular Torticollis Independent from Their Age and Motor Development?

Mary Rahlin, PT, DHS,PCS,¹ Steven Miller, PhD, PStat®, CStat,¹ Bernadette Sarmiento, PT²

¹Rosalind Franklin University of Medicine and Science, North Chicago, IL; ²Independent Practitioner

Background

- ❖ Functional Symmetry Observation Scale, Version 2 (FSOS-V2) is a video-based assessment of symmetry in posture and movement in infants with congenital muscular torticollis (CMT)
- ❖ Infants with CMT demonstrate asymmetrical postures and unequal use of extremities when performing motor tasks (see Figure)
- ❖ The FSOS-V2 is the only valid instrument that captures the impact of torticollis on the entire body.
- ❖ The FSOS-V2 reliability study yielded good intrarater but poor to moderate interrater reliability ($ICC_{(3,1)}=0.70$ to 0.78 ; $ICC_{(2,1)}=0.40$ to 0.54)
- ❖ An evaluation of potential sources of error was necessary.
- ❖ FSOS-V2 scores should be independent of the infants' age and gross motor development.
- ❖ Visual inspection of reliability data suggested a potential scoring bias, with younger infants seemingly receiving lower scores from one rater. This could have impacted the interrater reliability.

Purpose

The purpose of the current study was to examine relationships between the FSOS-V2 total scores assigned by each rater and the age and number of achieved milestones observed in infants with CMT who participated in the reliability study.

Subjects

- ❖ The reliability study participants were a sample of convenience.
 - Infants with CMT, N=50
 - Mean age (SD): 7(3) months
 - Age range 1-16 months
 - Born prematurely: 14
 - Male infants n=38, female infants n=12
 - Left torticollis n=28, right torticollis n=22
- ❖ Recruited from 2 outpatient clinics of Cranial Technologies, Inc. located in the Chicagoland area, Illinois.
- ❖ Parents signed an informed consent form.



Figure. An infant with CMT displays an asymmetrical posture and hand preference in a prone position.

Methods

- ❖ In the FSOS-V2 reliability study, 4 raters scored 50 videos twice.
- ❖ For secondary data analyses, participants' videos were examined for the number of achieved gross motor milestones, including :
 - Movement transitions between positions
 - Hands-free independent sitting
 - Standing with one-hand and/or no support
 - Independent locomotion

Data Analysis

- ❖ Data were analyzed using the IBM SPSS Statistics for Windows, Version 29.0 (Armonk, NY: IBM Corp.).
- ❖ Spearman correlation (r_s) was used to examine the relationships between each of the 2 sets of the FSOS-V2 total scores assigned by each rater and participants' age.
- ❖ Pearson correlation (r) was calculated to examine the relationship between the infants' age and achieved milestones.

Results

- ❖ Median number of achieved milestones: 3
- ❖ Participants' motor skills:
 - Unable to sit/stand unsupported: 31
 - Achieved independent sitting: 7
 - Able to transition in/out of sitting & pull to stand: 12

Results

- ❖ There was a significant, strong relationship between age and number of achieved milestones ($r=0.77$, $p<0.001$; 95%CI: 0.70 to 0.83)
- ❖ For Scoring 1, there were no significant relationships between the FSOS-V2 total scores and infants' age or achieved milestones

Table. Scoring 2 Relationships: Infants' FSOS-V2 Total Scores & Age, and FSOS-V2 Total Scores & Milestones (N=50)

Rater	FSOS-V2 Total Scores & Age			FSOS-V2 Total Scores & Number of Milestones		
	r_s	2-tailed p	95% CI	r_s	2-tailed p	95% CI
1	-0.10	0.51	-0.37 to 0.20	-0.13	0.37	-0.40 to 0.16
2	0.13	0.37	-0.16 to 0.40	0.15	0.30	-0.14 to 0.42
3	0.34*	0.02*	0.06 to 0.57	0.33*	0.02*	0.05 to 0.57
4	0.07	0.62	-0.22 to 0.35	-0.04	0.81	-0.32 to 0.25

Abbreviations: FSOS-V2, Functional Symmetry Observation Scale, Version 2; p, probability value, CI, confidence interval.

*Low to fair, significant relationship.

Discussion and Conclusion

- ❖ Results suggest that Rater 3 considered the infants' age and motor development when assigning the FSOS-V2 scores while others did not.
- ❖ This impacted the interrater reliability of the FSOS-V2.
- ❖ Examiner training and scoring guidelines should be modified to emphasize the evaluation of symmetry regardless of the infants' age and displayed motor skills.