



# Intrarater Reliability of a Modified Still Photography Procedure for Measuring Habitual Head Deviation from Midline in Infant with Congenital Muscular Torticollis: A Pilot Study



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## Background

- ❖ Infants with congenital muscular torticollis (CMT) usually present with
  - Head lateral flexion to the side of involved sternocleidomastoid muscle
  - Rotation to the other side
- ❖ Still photography for measuring habitual head deviation from midline is an examination method included in the APTA Pediatrics CMT evidence-based clinical practice guideline.
- ❖ Original measurement procedure:
  - Position infant supine and provide a visual stimulus at midline
  - Take and print a photograph
  - Draw one line through lateral corners of the eyes
  - Draw the 2<sup>nd</sup> line through the acromion processes
  - Measure the angle between the lines with a protractor to the nearest degree
- ❖ Rahlin and Sarmiento, 2010: Intrarater reliability of still photography study:
  - ICC(3,1) ranging from 0.79 to 0.84
  - Recommended modifications to the measurement procedure to improve reliability of measurement

## Purpose

The purpose of this pilot study was to examine the intrarater reliability of a modified still photography procedure prior to its use in a randomized controlled trial (RCT) of two interventions for infants with CMT.

## Subjects

Age (mos.)	Sex (M/F)	CMT Side	CMT Grade
4	M	L	1
5	M	L	1
5	M	L	1
4	M	L	1
4	M	R	2
5	F	R	2
3	F	L	3
3	M	L	1
3	F	L	1
6*	M	R	1

- ❖ A sample of convenience of 10 infants with CMT receiving outpatient PT.
- ❖ Parents signed an informed consent form.

Abbreviations: F, female; M, male; mos., months; CMT, congenital muscular torticollis.

\*Adjusted age – 5 months

## Methods

- ❖ A total of 60 photographs of 10 infants taken in a supine position were obtained by 2 physical therapists.
- ❖ Each therapist took 3 photos of 5 infants at 2 appointments scheduled 1 month apart (6 photos per child).
- ❖ Assessor measured the photos twice, with the 2<sup>nd</sup> measurement scheduled at least 1 month after the first.
- ❖ Assessor was blind to the 1<sup>st</sup> set of measurements when completing the 2<sup>nd</sup> assessment.

### Modified Still Photography Procedure:

- 1 PT attached small band aids to the infant's acromion processes and used a marker to draw a dot on band aids to mark the most prominent part of the acromion (Figure 1).
- 2 PT aligned the infant's pelvis with the trunk manually, provided a visual stimulus at midline, and took 3 photographs.
- 3 Assessor printed the photos and drew 2 lines using a mechanical pencil and a clear ruler, through the dots marked on band aids and through lateral corners of the eyes (Figure 2).
- 4 Assessor measured 3 photos, calculated the average of the 3 obtained angles, with a negative value assigned to head deviation to the right and positive to the left.



Figure 1. Band aids placed on acromion processes.

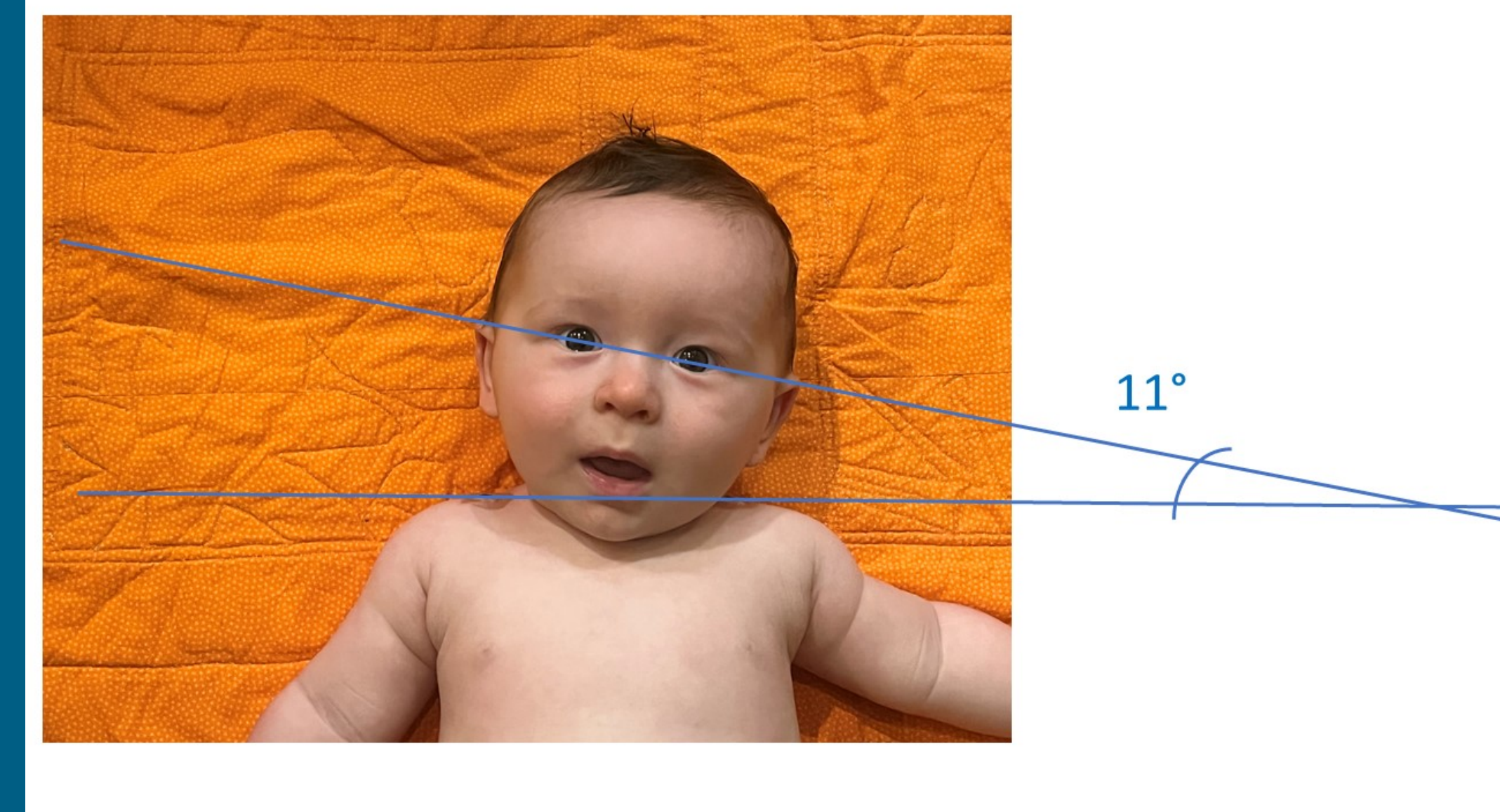


Figure 2: Still photography measurement.

## Data Analysis

- ❖ Data were analyzed using IBM SPSS Statistics for Windows, Version 25.0 (Armonk, NY: IBM Corp.).
- ❖ Intraclass correlation coefficients, ICC(3,1), were calculated to estimate the intrarater reliability of still photography.

## Results

ICC(3,1)	95% Confidence Interval
0.995~1.00	0.99-1.00

## Discussion and Conclusion

- ❖ The obtained ICC(3,1) and corresponding confidence interval indicated good intrarater reliability.
- ❖ Although the sample size was small, it was representative of infants with CMT typically treated in the setting where still photography was to be used in a RCT.
- ❖ Modified measurement procedure improved the intrarater reliability of still photography used to measure habitual head deviation from midline in infants with CMT.