Fall 12-10-2021

# A Quantitative Exploration of Relationships Between Severity of Infant Congenital Muscular Torticollis and Caregiver Understanding of Positioning and Handling During Occupations of Infancy

Dalton J. Krencik

Pam Kasyan-Howe

Kristin Domville

Lisa Schubert

# A Quantitative Exploration of Relationships Between Severity of Infant Congenital Muscular Torticollis and Caregiver Understanding of Positioning and Handling During Occupations of Infancy

**Dalton J. Krencik, OTD-S; Doctoral Coordinators: Pamela A. Kasyan-Howe, OTD, OTR/L; Kristin J. Domville, Dr.OT, OTR/L; Lisa Schubert, OTD, MA, OTR/L**

## Background

Congenital muscular torticollis (CMT), is a musculoskeletal disorder typically presenting in infants that is characterized by unilateral shortening and increased tone in the upper cervical muscle called the sternocleidomastoid. (Hardgrib, 2017) This causes the infant to present in a higher degree of lateral flexion on the ipsilateral side, and higher degree of cervical rotation on the contralateral side. (Ellwood et al., 2020). Infants participate in occupations with their caregivers throughout daily routines, and the various impairments including limited neck range of motion, proximal instability, delayed motor development/reflex integration, and position intolerance caused by CMT can hinder occupational performance. CMT has different severities including mild CMT, moderate CMT, and severe CMT, and each individual infant's intervention program can vary based on their client factor deficits and symptoms. This requires caregiver understanding on positioning and handling of the infant during the performance of occupations in order to achieve optimal participation of the infant in occupations that promote healthy development. Caregivers of infants with CMT experience stress, anxiety, and increased demands to incorporate a home exercise program including developmentally supportive positioning and handling into daily routines often without formal education/training. (Oledzka et al., 2020; Kaplan et al., 2018)

## Problem

There is a lack of information and statistics on caregivers' self-rating of their understanding on infant positioning and handling during occupations of infancy based on the severity of Congenital Muscular Torticollis.

## Purpose

The purpose of this quantitative research type capstone project is to collect and analyze data on caregivers' self-rating of their understanding on infant positioning and handling during occupations based on the type of infant CMT.

## Theoretical Framework

- The Biomechanical Frame of Reference for Positioning Children for Function
- The Neurodevelopmental Frame of Reference

## Methods

### *Research Questions and Hypotheses*

**R1:** Is there a relationship between CMT type and caregiver understanding on positioning and handling of their infant during the occupation of play?

**Alternative Hypothesis (Ha):** There is a statistically significant relationship between CMT severity and caregiver understanding on positioning and handling of their infant during occupation of play.

**Null Hypothesis (H0):** There is not a statistically significant relationship between CMT severity and caregiver understanding on positioning and handling of their infant during occupation of play.

**R2:** Is there a relationship between CMT type and caregiver understanding on positioning and handling of their infant during occupation of feeding?

**Alternative Hypothesis (Ha):** There is a statistically significant relationship between CMT severity and caregiver understanding on positioning and handling of their infant during occupation of feeding.

**Null Hypothesis (H0):** There is not a statistically significant relationship between CMT severity and caregiver understanding on positioning and handling of their infant during occupation of feeding.

**R3:** Is there a relationship between CMT type and caregiver understanding of positioning and handling of their infant during the occupation of rest and sleep?

**Alternative Hypothesis (Ha):** There is a statistically significant relationship between CMT severity and caregiver understanding on positioning and handling of their infant during occupation of rest/sleep.

**Null Hypothesis (H0):** There is not a statistically significant relationship between CMT severity and caregiver understanding on positioning and handling of their infant during occupation of rest/sleep.

### *Design*

Quantitative Cross-Sectional Survey Design

### *Sample: Participants and Recruitment*

- Target population: caregivers 18 years or older of infants with a current diagnosis of CMT aged 0-12 months old, 100-150 participants.
- Internet survey in group of targeted population.
- Respondents fill out the survey 1 time and remain anonymous

### *Instrumentation*

- Facebook – access to population
- SurveyMonkey – to create and send out survey link, analyze data
- Excel – organize data and perform statistical tests including Students T-test, standard deviation, mean calculation, and normal distribution.

### *Data Collection and Storage*

- Surveys collected on SurveyMonkey had responses organized in Excel throughout the process.
- Responses that did not meet the inclusion criteria were kept, but marked red.
- Responses were sorted by CMT severity.

### IRB Approval

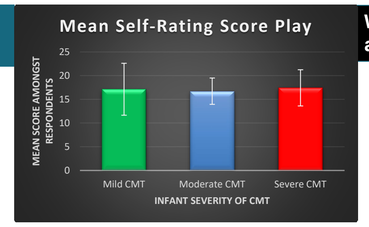
- Obtained 10/28/2021

## Quantitative Analysis

- The research questions were successfully answered, and the appropriate hypotheses were accepted or rejected with the statistical analysis of the data obtained. Statistics were obtained through 1 self-rating (0-5) of understanding of positioning and handling respective one of the 3 target occupations and questions that were sorted under specific understanding of positioning and handling with one of the 3 occupations (4 questions play, 3 questions rest/sleep, 2 questions feeding respectively). Numbers were also obtained through a 1-5 system assigned to answers as seen in the figure below:

| Response Pool 1 | Response Pool 2 | Response Pool 3 | Numerical Value |
|---|---|---|---|
| Extremely familiar | Always | A great deal | 5 |
| Very familiar | Often | A lot | 4 |
| Somewhat familiar | Sometimes | A moderate amount | 3 |
| Not so familiar | Rarely | A little | 2 |
| Not at all familiar | Never | None at all | 1 |

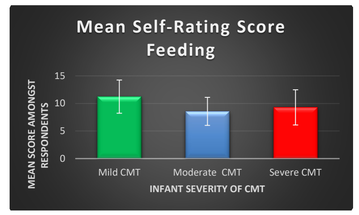
- The analysis of Research Question 1, 2, and 3 was analyzed first by calculating mean score and standard deviation of the 3 severities of CMT to discover significant data outside of the central tendency that would indicate a statistical significance in the difference of one group of severities mean responses.
- Using a two tailed student t-test, the researcher was also able to discover any statistically significant relationships between two severities of CMT at a time within the designated occupation by finding the p-value.




**Which hypothesis do we accept, and which do we reject?**

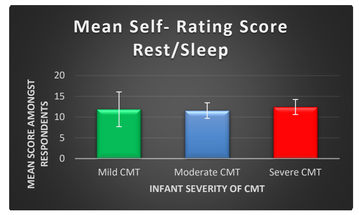
**Alternative**

**Null**




**Alternative**

**Null**




**Alternative**

**Null**

## Results

**Students T-Test to Determine Statistical Significance Between Severity Mean Respondent Scores : Play**

| Relationship | P value | Significant? |
|---|---|---|
| Mild v Mod | 0.77182173 | No, p>0.05 |
| Mod v Severe | 0.55862418 | No, p>0.05 |
| Mild v Severe | 0.85687956 | No, p>0.05 |

**Students T-Test to Determine Statistical Significance Between Severity Mean Respondent Scores : Feeding**

| Relationship | P value | Significant? |
|---|---|---|
| Mild v Mod | 0.00199791 | Yes, p<0.05 |
| Mod v Severe | 0.4410902 | No, p>0.05 |
| Mild v Severe | 0.07778974 | No, p>0.05 |

**Students T-Test to Determine Statistical Significance Between Severity Mean Respondent Scores : Rest/Sleep**

| Relationship | P value | Significant? |
|---|---|---|
| Mild v Mod | 0.78929262 | No, p>0.05 |
| Mod v Severe | 0.47078619 | No, p>0.05 |
| Mild v Severe | 0.71068588 | No, p>0.05 |

**Mean Score and Standard Deviation of Respondents Self-Rating of Understanding: Play**

| Severity | Mean Score | Percentage | Standard Deviation |
|---|---|---|---|
| Mild | 17.12 | 68.48% | 5.4886246 |
| Moderate | 16.71 | 66.84% | 2.76791901 |
| Severe | 17.42 | 69.68% | 3.82348632 |

**Mean Score and Standard Deviation of Respondents Self-Rating of Understanding: Feeding**

| Severity | Mean Score | Percentage | Standard Deviation |
|---|---|---|---|
| Mild | 11.25 | 75% | 3.01188123 |
| Moderate | 8.57 | 57.13% | 2.55106576 |
| Severe | 9.29 | 61.93% | 3.19970237 |

**Mean Score and Standard Deviation of Respondents Self-Rating of Understanding: Rest/Sleep**

| Severity | Mean Score | Percentage | Standard Deviation |
|---|---|---|---|
| Mild | 11.875 | 59.37% | 4.18969825 |
| Moderate | 11.57 | 57.85% | 1.87436056 |
| Severe | 12.43 | 62.15% | 1.812265393 |

## Conclusion

- Important findings were that there were not many statistically significant relationships between severity of CMT and positioning and handling techniques within the occupations of play, feeding, and rest/sleep. This may point towards a successful education of the population across severities regarding the techniques being implemented in home exercise programs.
- However, it should be noted another important finding in the project was the generally low scores amongst the survey respondents regarding their self-rating of positioning and handling amongst the 3 occupations addressed regardless of their infant's severity of CMT.
- This could point towards a general need to increase education efforts to caregivers of infants with CMT regarding positioning and handling techniques during performance of occupations by Occupational Therapists. With more evidence.
- Due to these generally low scores however, a researcher could perform a qualitative analysis to discover trends in why these scores are so low.

## References

Hardgrib, N., Rahbek, O., Møller-Madsen, B., & Maimburg, R. D. (2017). Do obstetric risk factors truly influence the etiopathogenesis of congenital muscular torticollis?. *Journal of orthopaedics and traumatology : official journal of the Italian Society of Orthopaedics and Traumatology*, *18*(4), 359–364. https://doi.org/10.1007/s10195-017-0461-z

Ellwood, J., Draper-Rodi, J., & Carnes, D. (2020). The effectiveness and safety of conservative interventions for positional plagiocephaly congenital muscular torticollis: a synthesis of systematic reviews and guidance. *Chiropractic & Manual Therapies*, *28*(1). https://doi.org/10.1186/s12998-020-00321-w

Kaplan, S. L., Coulter, C., & Sargent, B. (2018). Physical Therapy Management of Congenital Muscular Torticollis: A 2018 Evidence-Based Clinical Practice Guideline From the APTA Academy of Pediatric Physical Therapy. *Pediatric Physical Therapy*, *30*(4), 240–290. https://doi.org/10.1097/pep.0000000000000544

Oledzka, M. M., Sweeney, J. K., Evans-Rogers, D. L., Coulter, C., & Kaplan, S. L. (2020). Experiences of Parents of Infants Diagnosed With or Severe Grades of Congenital Muscular Torticollis. *Pediatric Physical Therapy*, *32*(4), 322–329. https://doi.org/10.1097/pep.0000000000000738

**Acknowledgement: A Special shout out thank you so much to Kayla Sorto, OTR/L, and Eva Pachetti D'Amaro, OTR/L for everything they've done to make this project come to fruition!**