

## Effect of Active and Passive Stretching Exercises on Congenital Muscular Torticollis in Infants – A Clinical Case Report

Silva ECM<sup>1</sup>, Beduschi DZP<sup>1</sup>, Silva GP<sup>1,2</sup>, Regueiro EMG<sup>3</sup>, Verri ED<sup>2,3</sup>, Fioco EM<sup>2,3</sup>, Regalo SCH<sup>2</sup> and Fabrin S<sup>1,2,3\*</sup>

<sup>1</sup>University Center UNIFAFIBE, Bebedouro, São Paulo, Brazil

<sup>2</sup>Ribeirão Preto School of Dentistry - FORP/USP, Ribeirão Preto, São Paulo Brazil

<sup>3</sup>Claretiano University Center, Batatais, São Paulo, Brazil

\*Corresponding Author: Fabrin S, University Center UNIFAFIBE, Bebedouro, São Paulo, Brazil.

Received: November 18, 2020; Published: December 31, 2020

### Abstract

**Background:** Congenital muscular torticollis (CMT) is a musculoskeletal deformity observed at birth and infancy, characterized by unilateral contracture of the sternocleidomastoid. It is the third most common musculoskeletal abnormality in infants. Early treatment and physical therapy result in the best outcome, avoiding surgery to correct the condition. The main objective of the present study was to evaluate the effect of active and passive stretching exercises on CMT in infants.

**Case Report:** We report an infant diagnosed with CMT who was treated with physiotherapy and followed up daily from birth to 10 months of life. The results showed that early physiotherapy treatment is a useful tool to manage CMT with a favorable and effective clinical evolution.

**Clinical Rehabilitation:** Passive and active stretching exercises have produced a positive and effective response for the treatment of CMT in infants, demonstrating that physiotherapy exercises are effective, safe and painless forms of treatment that can effectively reduce CMT, thus avoiding surgery.

**Keywords:** Torticollis; Congenital; Stretching; Physical Therapy

### Abbreviations

CMT: Congenital Muscular Torticollis; SCM: Sternocleidomastoid

### Introduction

Congenital muscular torticollis (CMT) is a musculoskeletal condition commonly observed in infants shortly after birth. It is characterized by a unilateral shortening of the sternocleidomastoid muscle. CMT may be accompanied by fibromatosis coli. It is estimated to be found in 0.3% to 1.9% of infants [1].

CMT may cause the head to turn to the opposite side and/or tilts downward to the same side, resulting in a preferred head position. It becomes difficult for the infant to independently alter head position, and prolonged pressure on the same area occurs when the infant is in a reclined position or sleeping. Consequently, the abnormal muscle forces produce an asymmetric pressure on the skull and facial bones that are still under development. Prolonged pressure on the baby's skull in uterus or soon after birth may cause an asymmetric (plagiocephaly) head shape [2]. If left untreated, CMT can trigger postural problems and gross motor delay due to persistent head tilt and eye changes [3]. The key components of the clinical diagnosis include head and neck posture and tolerance to positioning, presence and location of SMC mass, size, shape and elasticity of the sternocleidomastoid (SCM) muscle and secondary muscles [4].

After the clinical diagnosis, initial physical therapy interventions should be specified by the physiotherapist. To complement the postural rehabilitation process, guidelines are also given to parents/caregivers on how to perform the daily home therapy program. Manual

techniques of active and passive stretching, muscle fascia stretching, exercises to increase the motion range amplitude of the affected side and active positioning are used for the rehabilitation of SCM muscle imbalance [5].

### Case description

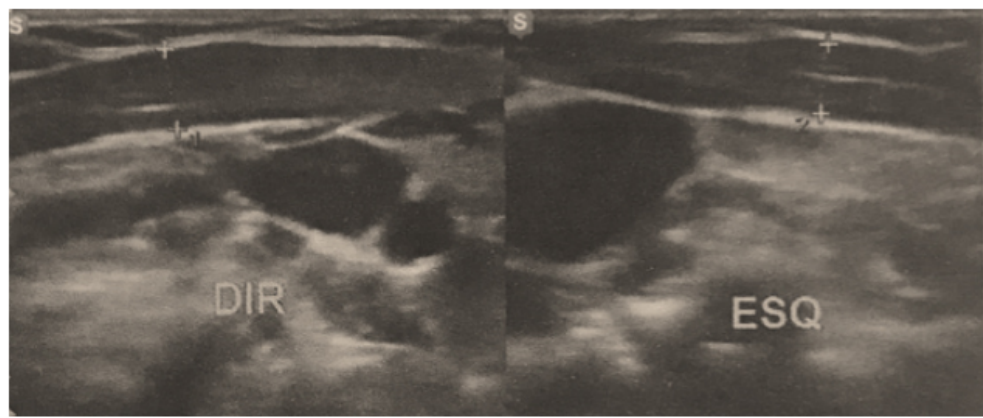
This case report describes a female infant at 15 days of age. The mother had a monitored 39-week pelvic gestation, underwent a c-section, without intercurrence. The parents were a healthy non-consanguineous couple with no positive family history for CMT. Maternal serology confirmed negative HBsAg, HIV and VDRL. Detailed medical history revealed: The Apgar score at birth of 6/9; anthropometric measurements at birth of 3265g/49.5 cm/33.5 cm; neonatal jaundice without criteria for phototherapy; no reports of hospitalizations or surgeries; no allergy symptoms; no changes in pulmonary and cardiac auscultation; normal eye and otoscopic examination; no changes in components of neurological examination. The infant showed inclination of the neck to the right side, and rotation of the neck to the left side with limited inclination of the neck to the left side and rotation of the neck to the right side, either actively or passively, as shown in Figure 1 (a).

The physiotherapy treatment was divided in three phases: 1. Acute phase (15 days to 5 months of life); 2. Intermediate phase (6 months to 8 months of life); and 3. Final phase (9 months to 10 months of life). In the acute phase, the treatment included the application of heat, massage, passive and active stretching exercises, postural exercises, active exercises with playful stimuli, using songs and light stimulus. Low-intensity passive stretching exercises were performed without causing pain or discomfort to the infant. At the beginning of the treatment, heat was applied locally for 5 minutes, using a thermal bag for muscle relaxation, followed by a massage on the SCM for 5 minutes. Passive stretching exercises were then performed for 15 seconds each, according to the infant’s tolerance. The procedure was performed twice a day for 15 minutes up to the 3rd month of life. After 3 months, the physical therapy was performed 3 times a week, 2 times daily for 15 minutes. In the course of the day, active stretching exercises were carried out through fun and games, sound and light stimuli to encourage the active movement of the neck. The head position was observed and corrected during sleep, transport and breastfeeding, in order to promote the passive stretching of the muscle. Clinical evolution from the 1<sup>th</sup> to the 5<sup>th</sup> month of life is shown in Figure 1b-f.



**Figure 1:** Post-treatment photographs showing postural changes from the 1th day to the 5th month of life.

At 6 months of age (Figure 3a), there was a recurrence of the deformity without apparent reasons, (Figure 3b). The infant was referred to an orthopedist who observed increased muscle diameter to the right side of approximately 0.8 cm in relation to the left side, signs of asymmetry between the muscle bellies of the SCM, with increased muscle diameter caused by fibromatosis colli (Figure 2).



**Figure 2:** Increased muscle diameter. Right SCM measuring 0.46 cm; left SCM measuring 0.38 cm.

The intermediate phase started on the 6th day after the first crisis. Physical therapy was then applied 3 times a week, 2 times a day for 15 minutes, complemented with active and playful stretching exercises, as well as visual and sound stimuli. The infant showed a rapid improvement of the SCM following a week of treatment and received the treatment regimen until 8 months of life (Figure 3c-d).

At 8 months, another recurrence was observed in the SCM (Figure 3e-f) without apparent cause. She remained with sharper contraction for 3 days and a cervical brace was applied. The final phase of the physiotherapeutic treatment started, and playful active stretching exercises were applied once a week, once a day, for 15 minutes, using visual and sound stimuli. The position of the infant head was observed daily and also during sleep. There was a significant improvement of the neck repositioning, without restrictions in ROM (Figure 4a-b). The physiotherapy treatment was applied once a week until the infant was 10 months. During this period there were no relapses and/or complications.

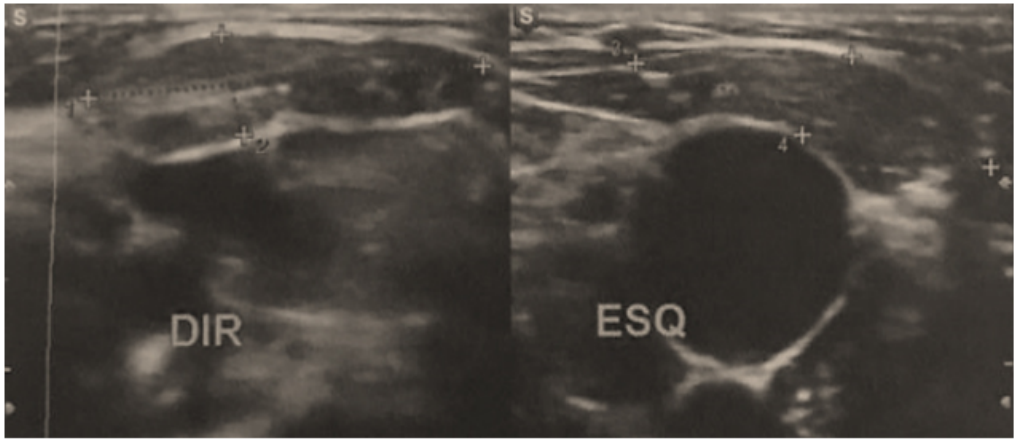


**Figure 3:** Postural changes and treatment evolution from the 6th to the 8th month of life.



**Figure 4:** Postural changes and treatment evolution from the 9th to the 10th month of life.

The infant was reexamined using a multi-frequency ultrasound linear probe scanner, which revealed no increase in the SCM diameter as well as a significantly regression of the CMT (Figure 5). After a 10-month physical therapy period, there was no limit the range of motion of cervical or postural impairment. Relapses have ceased and the follow-up continued until the infant was 1 year old. After this period, the patient was discharged from the physiotherapy service.



**Figure 5:** Decreased muscle diameter. Right SCM measuring 0.56 cm; left SCM measuring 0.53 cm.



### Discussion

The present case report was based on the 2018 evidence-based clinical practice guideline (CPG) on Physical Therapy Management of Congenital Muscular Torticollis published by the Academy of Pediatric Physical Therapy of the American Physical Therapy Association. The guideline provides instruction on assessments and treatment approaches, which include passive and active stretching exercises, and recommendations to parents on how to correctly implement the home therapy [2]. Based on best described in the literature, earlier intervention is more effective than later intervention. If started before 1 month of age, 98% achieve near normal range within 1.5 months, but waiting until after 1 month of age prolongs intervention to about 6 months. Our findings corroborate this information.

The application of specific and progressive manual forces allows the stretching of shortened structures [6]. In a 2014 study, the researchers observed that soft tissue mobilization (STM) with proprioceptive neuromuscular facilitation (PNF) improved range of motion, reducing muscle tension [7]. Manual therapeutic exercises are safe in the treatment of CMT in infants [8]. Parents/caregivers are taught by the physiotherapist to carry out a home therapy program with specific instructions to stimulate greater symmetry and the daily movements of infants [9]. There have been no reports of recurrence in previous studies. This may be explained by the fact that the follow-up was not carried out until the 12 months of life, and 4 to 12 months after discharge, as proposed by the clinical practice guidelines [10].

### Considerations

The obtained results suggest that both active and passive stretching exercises had positive effects on CMT in the infant patient. Early physiotherapeutic treatment produces the best outcomes in cases of CMT. The results of this study demonstrate that physiotherapy is a safe, effective and painless treatment and may prevent invasive interventions.

### Conflict of Interest

We declare that there are no conflicts of interest.

### Bibliography

1. Persing J., *et al.* "Prevention and Management of positional skull deformities in infants". *Pediatrics* 112 (2003): 199-202.
2. Kaplan SL., *et al.* "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 (2018): 240-290.
3. Twee D. "Congenital Muscular Torticollis: current concepts and review of treatment". *Current Opinion in Pediatrics* 18 (2006): 26-29.
4. Freed S and Coulter-O'Berry C. "Identification and Treatment of Congenital Muscular Torticollis in Infants". *Journal of Prosthetics and Orthotics International* 16 (2004): 18-23.
5. Klackenberg EP., *et al.* "Inter-rater reliability in measuring range of motion in infants with congenital muscular torticollis". *Advances in Physiotherapy* 7 (2005): 4-91.
6. Godges JJ., *et al.* "The immediate effects of soft tissue mobilization with proprioceptive neuromuscular facilitation on glenohumeral external rotation and overhead reach". *Journal of Orthopaedic and Sports Physical Therapy* 33 (2003): 713-718.
7. Dajah A and Bweir S. "Soft Tissue Mobilization and PNF Improve Range of Motion and Minimize Pain Level in Shoulder Impingement". *The Journal of Physical Therapy Science* 26 (2014): 1803.
8. Haugen EB., *et al.* "Manual therapy in infantile torticollis: a randomized, controlled pilot study". *Acta Paediatrica* 100 (2011): 687-690.

9. Boere-Boonekamp MM and van der Linder-Kuiper AT. "Positional preference: prevalence in infants and followup after two years". *Pediatrics* 107 (2001): 339-343.
10. Luther BL. "Congenital muscular torticollis". *Orthopaedic Nursing* 21 (2013): 21-28.

**Volume 13 Issue 1 January 2021**

**©All rights reserved by Fabrin S., et al.**