

RESEARCH LETTER

Multimodal intervention for congenital muscular torticollis: Visual and neck stability exercises compared to stretching

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Fine congenital muscular torticollis (CMT) is a prevalent musculoskeletal condition in infants, characterised by unilateral shortening or fibrosis of the sternocleidomastoid muscle, leading to a distinctive head tilt toward the affected side and rotation away from it [1]. The sternocleidomastoid muscle begins at the sternum and clavicle, rising upwards, backwards, and sideways to attach to the mastoid bone and superior nuchal line [2]. This condition is typically evident within the first few weeks of life and can result from factors such as intrauterine positioning, birth trauma, or postnatal environmental influences. The incidence of CMT ranges from 0.4% to 2% of live births, making it a significant concern in paediatric physiotherapy [3]. CMT is reported as the 3rd most prevalent congenital musculoskeletal disorder in neonates and babies [4]. CMT is broadly classified into three subtypes: sternocleidomastoid tumour, muscular torticollis, and postural torticollis. In this condition the primary exercises such as neck stretching and strengthening and task oriented activities are encouraged and ergonomical and postural corrections are done [5]. If left untreated, CMT can lead to secondary complications such as plagiocephaly, facial asymmetry, visual field deficits, scoliosis and delayed gross motor development [6].

Early identification and intervention are crucial in managing CMT to prevent secondary complications, including craniofacial asymmetry, plagiocephaly and delays in motor development [7]. However, Visual training involves stimulating the infant's visual tracking and gaze stabilisation abilities, which are integral to developing head control and postural stability. Neck stability exercises focus on strengthening the deep cervical flexors and extensors, facilitating improved head control and alignment. Understanding the relative effectiveness of these interventions is essential for optimising treatment protocols and improving functional outcomes in this population [8]. The study seeks to determine whether the addition of these modalities offers a significant advantage in promoting motor development and reducing the severity of torticollis.

This experimental multi centre study included 80 infants aged 2-7 months. It was done between 25 January and 20 March 2026. Informed consent from the infant's guardian was taken before the commencement of the study after explaining the study procedure. Infants who were clinically diagnosed with congenital torticollis, non-neurological torticollis, such as congenital muscular torticollis or postural torticollis and with mild to moderate severity as assessed by a clinician were

Key messages

Multimodal physiotherapy is more effective than stretching alone in infants with congenital muscular torticollis. Incorporating visual training and neck stability exercises significantly improves motor performance and reduces severity. This approach enhances neuromuscular control, promotes symmetrical movement, and supports postural development. Early, structured, and individualized interventions contribute to improved functional outcomes and timely achievement of motor milestones in affected infants.

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included in the study. Infants with conditions such as cervical dystonia, brain tumours, and cerebral palsy leading to torticollis, structural abnormalities, and vision impairment were excluded from the study. The subjects were divided into two groups, Group A (n=40) received stretching exercises while Group B (n=40) received visual training visual cards activity, line tracking activities, light tracking activity, and neck stability training-tummy time activities, prone on the wedge, vertical carrying for 5 days a week for 5 weeks.

A total of 80 participants were equally divided into the two groups (n=40 per group) using a simple random sampling method, and outcomes were assessed using the Test of Infant Motor Performance (TIMP) and the Torticollis Severity Scale (TSS), both before and after the intervention period. The statistical analysis was conducted using both descriptive and inferential statistics. Paired *t* test and unpaired *t* test were used for within-group and between-group statistical analysis, respectively. In Group A, there was a statistically significant improvement in motor performance post-intervention. The mean TIMP score increased from 77.2 (6.8) to 88.6 (7.1), and this change was confirmed by a paired *t* test, which revealed a significant difference ($P < 0.001$). Similarly, a significant reduction in torticollis severity was observed, with TSS scores decreasing from 4.4 (0.7) to 2.9 (0.6) ($P < 0.001$). In Group B, the improvements were even more pronounced. The mean (SD) TIMP score increased from 76.8 (7.2) to 101.3 (6.4), and the paired *t* test showed a highly significant improvement ($P < 0.001$). Likewise, the TSS score in Group B decreased significantly from 4.5 (0.8) to 1.7 (0.5), supported by a paired *t* test result of $P < 0.001$.

Unpaired *t* tests were conducted to compare post-test scores between the two intervention groups. The analysis revealed a statistically significant difference in TIMP post-test scores between Group A and Group B ($P < 0.001$), with Group B exhibiting superior motor performance. Similarly, post-test TSS scores differed significantly between the groups, with Group B showing a greater reduction in torticollis severity compared to Group A ($P < 0.001$). These findings suggest that while both interventions were effective in improving motor performance and reducing torticollis severity, the combination of visual training and neck stability exercises yielded significantly better outcomes than stretching alone.

In this study, infants who received stretching underwent a significant increase in TIMP scores and a reduction in TSS scores post-intervention. These results align with existing literature that emphasised the benefits of early stretching interventions for congenital muscular torticollis [9]. The use of visual training helps the infant develop tracking and focus skills and stimulates active movement of the head and neck, resulting in a symmetrical head position. Neck stability exercises, however, work the neck

muscles to enhance postural alignment and control of the head. These modalities are integrated into development of motor, both muscular and neurological components.

This study underscores the importance of a holistic approach to CMT management. Stretching is great visual training method and neck stability exercises can still achieve better results. Although the results were favourable, there are some caveats to consider: the relatively short period of follow-up and the fact that the sample may not have been representative of the entire clinical range of CMT. Larger sample sizes, more diverse groups of participants, and longitudinal assessments should be used for future research, to examine the lasting benefits that are observed. This multimodal strategy tackles both the biomechanical and developmental factors to support faster and more comprehensive healing from CMT. It helps doctors to adopt a more holistic approach to therapy, highlighting early, personalised and functional therapy. In this way promoting infants motor capacities and quality of life for babies with CMT and their families.

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Author contributions

Manuscript drafting and revising it critically: ES. *Approval of the final version of the manuscript:* ES, MR, MM, RK, RR, AAFM. *Guarantor of accuracy and integrity of the work:* ES, RK, AAFM.

Conflict of interest

We do not have any conflict of interest.

Data availability statement

Data supporting the findings of the study are available from the corresponding author upon reasonable request.

AI disclosure

After completion of the manuscript, AI was used solely for language polishing and grammatical refinement. We critically reviewed and edited all content and take full responsibility for the integrity, accuracy, and originality of the work.

Supplementary file

None

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