

Static Progressive Cervical Orthosis for the Management of Congenital Muscular Torticollis - A Case Study

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ABSTRACT

Background: Among the musculoskeletal anomalies Congenital Muscular Torticollis is the third most common with 0.4% to 1.9% of incidence. The orthotic management of Congenital Muscular Torticollis can be non-operative or post-operative. But a very few literature was found on static progressive orthosis for the management of torticollis.

Case Description and Methods: A 10 years old girl with left Sternocleidomastoid contracture had undergone surgery suffering from Torticollis. Post surgically the patient was treated with an indigenously designed static progressive cervical orthosis. The lateral flexion and cervical rotation was measured immediately before the application of orthosis as well as after 10 weeks of regular use.

Result: The contracture angle of lateral flexion was decreased from mean 25° to 8° and cervical rotation was decreased from mean 30° to 10°.

Conclusion: The static progressive orthosis can be considered as a new alternative method for gradual correction of Congenital Muscular Torticollis.

Clinical Relevance: This orthosis can effectively reduce the ROM of lateral flexion contracture as well as and cervical rotation in CMT.

Key words: Static progressive orthosis, Congenital, Torticollis, Sternocleidomastoid.

INTRODUCTION

Torticollis, sometimes referred as wry neck, is a physical symptom found in all ages, in which the head laterally tilts towards the affected side and chin elevates and turns to the opposite side.² The CMT is due to unilateral fibrosis in the SCM muscle present at the time of birth, resulting in a swelling that leads to shortening of the muscle. The etiology of Torticollis is attributable to a variety of factors including, infection, and ophthalmologic issues, neurological impairment, and bony malformation or muscle tightness.² Macdonald further divided the CMT into sternocleidomastoid and those with tightness SCM but no clinical “tumour” as

muscular Torticollis (MT) and Postural Torticollis (POST) was used to describe a Postural Torticollis from the CMT was not made clearly in the literature and in most of the term CMT would include all those in CMT groups.⁵

The Sternocleidomastoid muscle comprises into four distinct anatomical elements, and each with a different action.⁶ The typical lesion is a hard mass within the substance of a tight Sternocleidomastoid muscle (SCM). CMT Presents itself after birth in roughly one in 300 births and is the third most common paediatric orthopaedic diagnosis.¹⁰

The prevalence of CMT varies from 0.3% to 2.0%.¹⁰ Currently various designs of

orthotic options are available for the management of CMT. Those vary from a simple collar to a complex cervico-thoracic orthosis. The collar orthosis were not sufficient to restrict the contracture. At the same time the complex designs are commented as expensive, heavy, bulky and difficult to apply.⁵The complication of a multi adjustable post-operative orthosis was minor scalp irritation and child was not tolerating the orthosis.¹ Due to these reasons, in this study a static progressive orthosis was designed to cover less area at the same time functionally good.

MATERIALS AND METHODS

Case Report

A 10- year old female was affected with congenital muscular torticollis involving the left side SCM muscle. There was no family history of congenital deformities. Congenital muscular torticollis was diagnosed in the first year of life. She didn't have any other abnormalities. All data considering her health status provided by her parents reported that the first symptoms appeared in a first year of life. Patient had moderately disproportionate physique especially due to raised shoulder and shortened neck on left side. Range of motion of the cervical region (cervical rotation and lateral flexion) was deficit along with short, tight, firm and fibrous non tender left SCM muscle.

She had undergone physical therapy of active neck stretching exercise at the age of their diagnosis as part of the rehabilitation process. Before some days' unipolar surgical release of the left SCM muscle was performed. Post-operative use of a cervical brace was indicated for maintaining corrective alignment after the surgical release of SCM and aggressive physical therapy and postural exercises were continued.

Methodology

The subject was included after taking the consent based on the inclusion criteria- age group (5-12) years, congenital torticollis, and limited neck motion). Approval from Institutional Ethical Committee was taken before the initiation of the study. The subject was undergone through the musculature test which decided whether the deformity is fixed or flexible. After that the measurement of lateral flexion and cervical rotation was recorded with a Conventional Goniometer. Then the orthosis was given to the patient for 10 weeks. After 10 weeks a follow up was done and data were again measured to examine the effectiveness of the orthosis. The static progressive cervical orthosis is a less inclusive design. It consists of head piece, shoulder piece, connecting multipositional joint, straps. The multipositional joint has a gear type mechanism and it contains eight intervals(Figure-1).

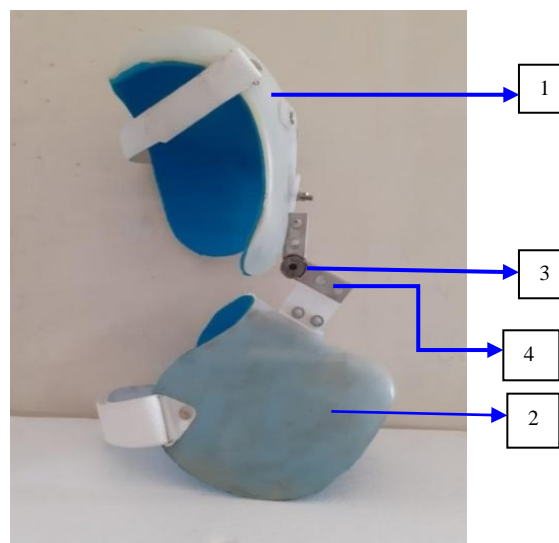






Figure-1 static progressive orthosis

Each interval of joint is 45° and also can be adjusted at any incremental angle and can be fixed at that particular position. The upper bar and lower bar is welded over the joint with hole of diameter 8mm is at the centre of the joint to place the bolt and nut. Then the joint is connected in between the head piece and shoulder piece (Table-1). The joint controls the frontal plane and transverse plane motion. Soft tissue contractures are resolved most effectively when a constant tensile force within their elastic range gently stretches the optimal length of tissues and prevent loss of range of motion.

Table-1: Components and its function of the static progressive orthosis

Sr.no	Components	Figure	location	Function
1.	Head piece and velcro strap		It encircles the skull and trimmed to avoid pressing on the ears. Velcro strap is attached to support the head	Support and maintain the head in correct position.
2.	Shoulder piece and velcro strap		It covered the anterior delto-pectoral region and posterior of scapular region and strap is attached to pull and maintain in correct position.	Helps to maintain the shoulder in normal position.
3.	Bolt and nut		It was attached in the middle of the joint.	Fastens different components.
4.	Multipositional joint		The joint consist of upper and lower bar (4cm) with hole of diameter 8mm and it was connected by head piece and shoulder piece.	Correct the contracture by gradually extending the neck.

RESULT

The static progressive cervical orthosis found to be satisfied by the patient. There was a gradual improvement in ROM of both transverse plane and frontal plane. The contracture angle of lateral flexion was decreased from mean 25° to 8°. Cervical rotation was decreased from mean 30° to 10°. There was improvement in cervical alignment, posture and cosmesis. The pain gradually decreased by using the orthosis. However there was no complication resulted due to use of it.

DISCUSSION

The orthosis was preferred by the patient because of its less invasive nature. The trim line was made such that it will cover less area at the same time it will provide much restriction to movement. It

also provides the sufficient strength to align the head and neck in desired position.

The design was also user friendly and biomechanically satisfactory. Adjustments are there for gradual increase in angle and for gradual strength on the contracted muscle. Initially it was meant to maintain the corrected posture gained through surgery. Gradually by the adjustment, angle between the ipsilateral shoulder and head was increased. It put some stress on the contracted soft tissue and caused elongation. The adjustment was done easily by the caretaker because of the allen key screw (8mm).

However the main drawback of the design is the material used for the manufacturing of the adjustable joint (i.e. stainless steel bar and iron material). Due to the use of stainless steel bar the orthosis

became bit heavy which can be replaced by aluminium as well.

Another problem encountered by the professional was cosmetic issue, intolerance. In order to avoid the intolerance of the child, the wearing time of the orthosis was gradually increased. Initially the child was using the orthosis for less time, and subsequently the time was extended according to the tolerance level.

Literature also allows the use of soft cervical collar, orthoplast, Plastazote collar in case of post-surgical CMT treatment.¹ But the orthosis do not maintain the head and neck in proper alignment. However the current rigid cervical orthosis provides the rigid immobilization for correction of lateral flexion and cervical rotation on cervical vertebra.

Future research

Future work in this area can be done to evaluate the effect of decrease in range of motion on congenital muscular torticollis by using the static progressive cervical orthosis. And due to the less intervention of time the result was not accurate, so same study can be done with larger intervention period.

CONCLUSION

The above mentioned multipositional cervical orthosis provides the corrective force for the contracture of SCM muscle. The virtues include easy donning & doffing, less invasive nature and gradual correction. Along with that there are some limitations as high weight, and poor cosmesis. In spite of all the vices it was proved to be a better postsurgical treatment option for CMT.

Conflict of Interest

The authors do not have any conflict of interest regarding research, authorship and publication of this article.

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