



## Congenital Torticollis: Surgical Approach and Outcome

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### Abstract

**Introduction.** Torticollis, also known as crooked neck, is a contraction or contracture of the neck muscles that causes the head to tilt to one side. This is accompanied by rotation of the chin to the opposite side with flexion. The congenital form of torticollis usually appears within a few weeks of birth. The basis of diagnosis is clinical examination findings, and the mainstay of treatment is physical therapy. Surgical management is an option only when medical and physical treatments are not producing the desired results or for cosmetic reasons.

**Case Report.** A-11 year young girl came with a chief complaints of a tilted head to the right, she also had difficulty shaking her head and nodding and had an asymmetrical face. This has been experienced since birth.

**Result.** The patient underwent bipolar removal of the lower end of the sternocleidomastoideus muscle (SCM). The patient's neck was extended with a sandbag, and then the patient's head was turned toward the shoulder on the opposite, uninvolved side. First, the distal portion of the SCM was released by making a skin incision 3 to 5 cm long on the medial end of the clavicle, with consideration given to palpable fibrous bands, and then deepening the incision to the tendons of the sternal and clavicular attachments of the SCM. The tight band and muscle tendon were dissected to pass a right angle instrument posterior to the tendons and were then resected by electrocautery near the insertion site to the clavicle. The SCM was then carefully dissected and released near the bone, while checking the nearby nerves and vessels. Outcomes were assessed using the cervicalmandibular angle (CMA), calculated using the radiological head tilt, which was defined as the angle between the line crossing the upper border of the C7 vertebral body and another line connecting the lower border of the mandibular angle.

**Conclusion.** Release of the bipolar CMT in the patient in this study increased head tilt, leading to a better quality of life since surgery, and the patient adapted fairly well to her new neck position.

**Keyword :** Outcome, Torticollis, Bipolar

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## Introduction

Torticollis, also known as crooked neck, is a contraction or contracture of the neck muscles that causes the head to tilt to one side.[1] The clinical term "torticollis" comes from two Latin words: *tortum collum*, which means twisted neck. Congenital muscular torticollis (CMT) is the third most common congenital musculoskeletal anomaly after dislocation of the hip and clubfoot.[2]

The worldwide incidence rate of congenital torticollis varies between 0.3% and 1.9%, other studies indicate a ratio of 1 per 250 newborns being the third congenital orthopedic anomaly, more frequently following congenital hip dysplasia and the calcaneovalgus feet.[3]

Usually, torticollis is not a diagnosis but rather a manifestation of a variety of underlying conditions. It can result from congenital or acquired causes. Congenital torticollis is the primary condition of the muscle, which is detected at birth or in the first weeks of life. The acquired torticollis are, for example, congenital skeletal anomalies, traumatic conditions, infections, inflammation of adjacent structures, tumoral conditions, ocular, and neurological dystonias.[4]

It can occur at any age, depending on the etiology.[1,5] This is accompanied by rotation of the chin to the opposite side with flexion. [1,5] The congenital form of torticollis usually appears within a few weeks of birth. The basis of diagnosis is clinical examination findings, and the mainstay of treatment is physical therapy.

When diagnosed early, it is accepted that torticollis can be managed with good or excellent results using conservative physiotherapy.[2,6] Ling has stated that the optimal time for surgery is between 1 and 4 years if required. Surgical management is an option only when medical and physical treatments are not producing the desired results or for cosmetic reasons. Surgical approaches include unipolar sternocleidomastoid release, bipolar sternocleidomastoid release with or without Z-plasty, selective denervation, and dorsal cord stimulation. This paper describes our experience utilizing bipolar removal of the lower end of the SCM for the patient. [2,6]

## Case Report

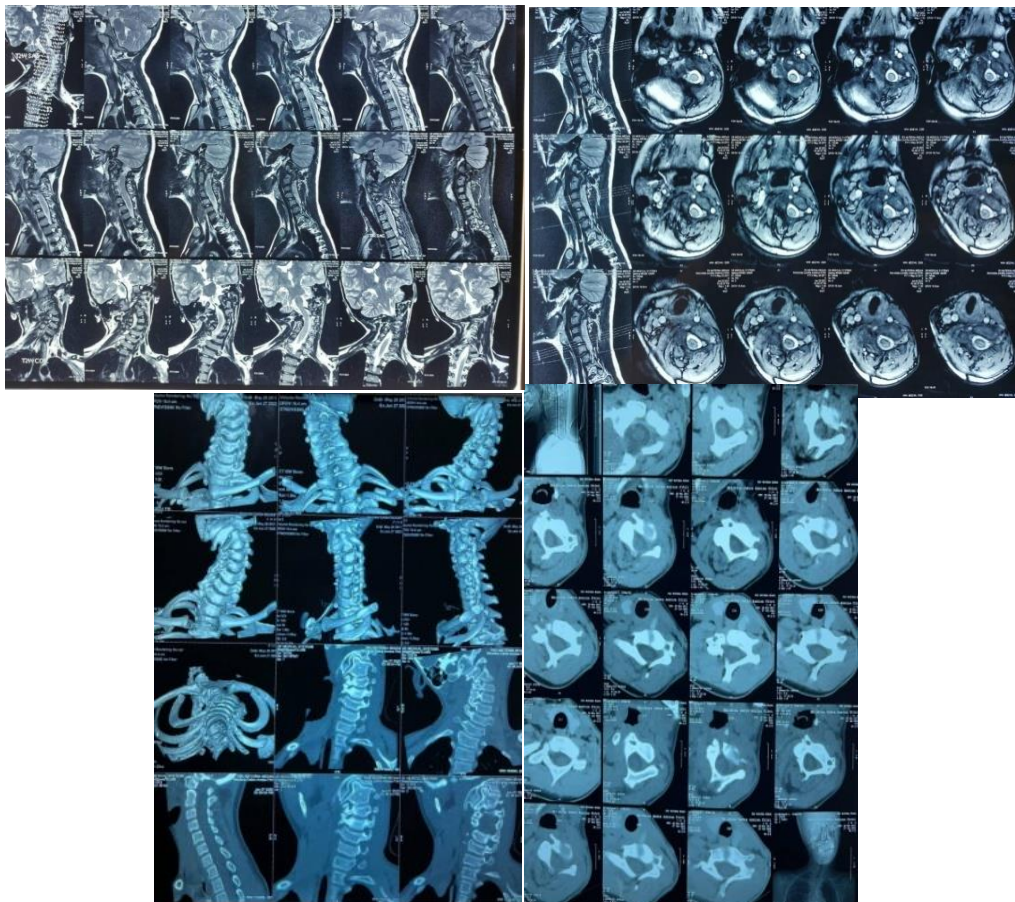
A-11 year young girl came with a chief complaints of a tilted head to the right, she also had difficulty shaking her head and nodding and had an asymmetrical face. This has been experienced since birth. The patient was first-born child with no positive family history for muscular torticollis. Detailed medical history revealed no events of abnormal obstetric presentation during birth, unusual or prolonged infection, prior head and neck surgery, or associated pain in the neck. No other congenital abnormality existed.



**Figure 1.** Pre-operative frontal and lateral photograph of the wry-necked patient.

On the physical examination, patient showed disproportionate physique especially due to shaking her head, nodding, and shortened neck on the right side. Maxillofacial region showed inclination of head to right side, raised chin, rotated to the opposite direction of tilt and asymmetrical face (plagiocephaly). Range of motion of the cervical region (neck rotation and lateral flexion) was deficit along with short, tight right SCM muscle (Fig 1). Additionally, ophtalmological, ENT evaluation and complete neurologic examination are in normal limits.

Pre-operative cervical radiographs (Fig 2) revealed cervical and thoracic scoliosis (S-shaped) without subluxation of the cervical vertebrae, and the patient was planned to undergo unipolar surgical release of the right SCM.



**Figure 2.** Pre-operative MRI and CT Scan of The Cervical.

### **Surgical Procedure and Postoperative Management**

The patient's neck was extended with a sandbag, and then the patient's head was turned toward the shoulder on the opposite, uninvolved side. First, the distal portion of the SCM was released by making a skin incision 3 to 5 cm long (Fig. 3) on the medial end of the clavicle, with consideration given to palpable fibrous bands, and then deepening the incision to the tendons of the sternal and clavicular attachments of the SCM. The tight band and muscle tendon were dissected to pass a right angle instrument posterior to the tendons and were then resected by electrocautery near the insertion site to the clavicle. Next, the proximal portion of the SCM, was released by making a short transverse skin incision 1.5 cm to 2 cm long behind the ear, just distal to the tip of the mastoid process. The SCM was then carefully dissected and released near the bone, while checking the nearby nerves and vessels (Fig. 4). Finally, the wound was closed with Vicryl 4-0 to approximate the subcutaneous tissues, with meticulous repair of the platysma. The skin was then closed with Nylon 4-0.



**Figure 3.** Incision line



**Figure 4.** Bipolar surgical release of the right SCM

Following surgery, manual stretching and rehabilitation of a cervical range of motion were performed by rehabilitation in the department twice daily, with each session lasting 30 min, for 3 days. On the 3rd postoperative day, patient was discharged with the advice to continue manual stretching for 3 months and self-mirroring. Patients were advised- cervical collar for 3 months postoperatively.

#### **Outcome Assessment**

Outcomes were assessed using the cervicalmandibular angle (CMA), calculated using the radiological head tilt, which was defined as the angle between the line crossing the upper-border of the C7 vertebral body and another line connecting the lower border of the mandibular angle.

The result seem to be superior to cosmetic result, with head tilt to opposite side and cervical mobility improvement, while the asymmetrical face was most resistant to change (Fig 5).



**Figure 5.** Three months post-operative frontal photograph.



At 3 months post-operative, patient was able to extend the neck to the opposite side. Head and chin was in near central position. There was mild amount of scar tissue formation at the surgical site (Fig 5).

## Discussion

Although there is no general consensus, surgical treatment of CMT is considered to be applicable after failure of conservative means. Early operative treatment has been reported to yield better results before the age of 2 years.[7]

The worldwide incidence rate of congenital torticollis varies between 0.3% and 1.9%, other studies indicate a ratio of 1 per 250 newborns being the third congenital orthopedic anomaly, more frequently following congenital hip dysplasia and the calcaneovalgus feet. <sup>3</sup> The right side seem to be more affected than the left and there is an equal sex distribution.[8]

The timing of surgery is controversial. Canale *et al.* and Lee *et al.* reported that full recovery of facial asymmetry after age 4 years is difficult to achieve.[9,10] Lee *et al.*, and Chen and Ko reported that late release of the SCM for patients more than 6 years of age could yield acceptable results. [11,12] However, literature assessing SCM release in adolescent and adult patients (over 20 years of age) is limited. [10,13]

Various surgical procedures have been used for the treatment of CMT, such as subcutaneous or open tenotomy, resection of SCM, Z-plasty, and minimally invasive endoscopic approaches, with the unipolar and bipolar releases being the most popular.[7]

Unipolar release may be sufficient in most cases, but when the extent of impairment is not fully corrected or a recurrence occurs, reoperation may be required. The effectiveness of bipolar release in improving ROM and function in late presenting cases has been well documented and has been suggested as the treatment of choice, advocated mostly by the severity of the deformity. Several studies advocate unipolar and bipolar releases as they are safe procedures with low complication rates and sufficient results.[7]

Chen and Ko recommended bipolar release as the treatment of choice for CMT in patients older than 6 years. In the present study, a bipolar release without Z-plasty gave satisfactory results in the neck contour, with no loss of the lateral column of the muscle and with sufficient release of the lateral fibrous bands in most patients with meticulous repair of the platysma.[2,7]

According to the prospective case series by Kamboh *et al.* between 2016 and 2019, revealed that if we can recognize that SCM tension will decrease and limitation of the range of motion for the neck will improve, selection recommended as a surgical options for the adolescent patient with neglected CMT and it is appropriate in uncomplicated cases than more extensive surgical options like bipolar release with or without Z plasty. Bipolar release of CMT

in most patients in that study improved the head tilt, leading to better life quality since the surgery, and patients adapted quite well to their new neck position.[2,7]

### **Conclusion**

It is recommended that, in those with CMT, the surgery should be performed between 1 and 4 years old. However, in our case, the patient was already 11 years old. Nevertheless, release of the bipolar CMT in this study increased head tilt, leading to a better quality of life since surgery, and the patient adapted fairly well to her new neck position.

She had achieved regained full cervical range of motion, and significant improvement after undergoing bipolar SCM release and three months aggressive physical therapy.

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