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# Congenital muscular torticollis, its physiotherapy management and differential diagnosis

**Chinelo Nkemdilim Onwunzo**
Department of Physiotherapy, General Hospital Ekwulobia, Ministry of Health, Awka, Anambra State, Nigeria

**Abstract**
Congenital muscular torticollis (CMT) is a neck deformity that involves shortening of the sternocleidomastoid (SCM) muscle resulting in limited neck rotation and lateral flexion. This results in a head tilt to the affected side and rotation to the contralateral side. This occur due to some underlying factors, such as genetic/physiological abnormality, improper positioning of the fetus while still in the uterus, or circumstances surrounding birth delivery. Presence of limited range of motion in the neck that makes it difficult for the baby to turn the head sideways, then up and down which is one of the symptoms presentation. Proper diagnosis of congenital muscular torticollis will lead to the treatment given for the condition. Physiotherapy treatment involves positioning, stretching, strengthening and neuromuscular facilitation; also home exercise program is involved. In general, most conditions give similar presentation to congenital muscular torticollis, therefore proper assessment with differential diagnosis leads to proper diagnosis.

**Keywords:** congenital muscular torticollis, sternocleidomastoid, physiotherapist, differential diagnosis

## 1. Introduction
Congenital muscular torticollis is a condition of infants present at birth or shortly after birth [1]. It is also called twisted neck or wryneck, a condition in which the infant chin points to one shoulder while the head tilts toward the contralateral shoulder [2, 3]. Congenital muscular torticollis (CMT) is a neck deformity that involves shortening of the sternocleidomastoid (SCM) muscle resulting in limited neck rotation and lateral flexion. This results in a head tilt to the affected/ipsilateral side and rotation to the contralateral side [4].
The term torticollis is derived from the Latin words tortus, meaning "twisted" and collum, meaning "neck." Tubby first defined it in 1912 as "a deformity, congenital or acquired in origin, characterized by lateral bend of the head to shoulder, with twisting of the neck and deviation of the face" [5]. The muscle that extends down the side of the neck, the sternocleidomastoid muscle is unilaterally shortened and tight [1, 3, 6]. It is usually discovered in the first 6 to 8 weeks of life, when a newborn begins to gain more control over the head and neck [7].

## 2. Epidemiology
Congenital torticollis occurs in 0.4 to 3.94% of births according to different sources [2, 6]. This is seen in 0.3 to1.9% of all live births [8]. It is the third most common musculoskeletal abnormality in infants [1, 6, 3]. In 75% of babies with torticollis, the right side of the neck is affected [9] (Brennan, 2018). The right side of the sternocleidomastoid muscle is more affected, first born, breech on delivery [10].
Generally, the estimated incidence of congenital muscular torticollis is less than 1% of all live births. The incidence may be low as 0.3% in uncomplicated deliveries with vertex position or as high as 1.8% in patients with breech presentation [11].

## 3. Causes
Congenital muscular torticollis unknown etiology may be due to:

a) Birth trauma or intrauterine malposition, intrauterine compartment syndrome of the sternocleidomastoid muscle [12].

- It may be related to a difficult birth, especially if the infant is delivered through breech or crowding of the baby while in the uterus. This results in an injury to the neck muscle that scars as it heals. The amount of scar in the muscle determines how tight the muscle is [7].
- The use of forceps or a vacuum device during delivery, leading to pressure to the sternocleidomastoid muscle.
- During delivery, if the sternocleidomastoid muscle, the neck muscle that extends from the jawbone to the clavicle and sternum is stretched, it may tear, causing bleeding and bruise within the muscle. The injured muscle develops fibrosis (scar tissue) which causes the muscle to shorten and tighten, pulling the infant's head to one side. The fibrosis forms a mass which can be felt on the side of the neck. Having tighter space in the uterus is more common for first-born children, who are more likely to have torticollis, as well as hip dysplasia [13].

## 4. Symptoms
The most common symptoms include [14, 15]

- The head tilts to the opposite and the chin points to same shoulder.
- Presence of limited range of motion in the neck that makes it difficult for the baby to turn the head sideways, then up and down.
- During the baby's first few weeks, a soft lump may be felt in the affected neck muscle. This lump is not painful and gradually goes away before the baby reaches 6 months of age.
- Neck pain or stiffness.
- Asymmetries of the head and face, indicating plagiocephaly, may also be present.
- Musculoskeletal problems, such as hip dysplasia, are sometimes present.

**5. Complications**

If congenital muscular torticollis is left untreated, it may lead to [16]:

- Permanent rotational deformity/ limited range of motion.
- Positional plagiocephaly (congenital oblique malformation of the skull).
- Asymmetric flattening of the skull due to an imbalanced positioning of the skull while the infant is supine.
- Facial asymmetry.
- Dysplasia (abnormal growth) of skull base, atlas and axis.

**6. Assessment**

A. History taking will include circumstances surrounding birth and any possibility of trauma.
B. Physical examination [13]:
   - Inspection: Observation of any asymmetries including facial, cranial, neck and positional preference and presence of plagiocephaly, and observation of skin creases (fold).
   - Palpation: Palpation of sternocleidomastoid for size, elasticity, presence of mass, and check for muscle tone.
   - Postural assessment: Observation of infant in developmentally appropriate positions to detect spine asymmetry.
   - Range of motion: Cervical active and passive range of movement/motion (ROM), upper and lower limb ROM examination, and checking for hip dysplasia, which can be associated with CMT.
   - Neurological: Assess pain at rest and during movements, visual and auditory fixation and tracking, and reflexes.

In addition, diagnostic procedures for congenital muscular torticollis may include [17]:

- X-rays of the cervical spine to rule out bone abnormality/problems as: rotatory atlanto-axial instability, Klippel-Feil syndrome (congenital fusion of 2 or more cervical vertebrae).
- Ultrasound examination helps differentiate this condition neurologic or osseous abnormalities. It is used to differentiate between contracted sternocleidomastoid (SCM) and a neck mass or cyst.
- Magnetic resonance imaging should be considered if there is concern about structural problems or other conditions.
- Computed tomography scan rules out atlantoaxial rotatory subluxation.

**7. Differential diagnosis**

- Posttraumatic infections and inflammation of adjacent structures, neoplastic conditions, and rare structural and functional neurologic conditions may also cause torticollis in childhood.
- Paroxysmal torticollis is an unusual self-limiting condition that consists of intermittent spasms of the SCM muscle, often sporadically involving both sides. Treatment is ineffective and usually resolves by age 2 or 3 years [18].
- Vertebral anomalies: Children presenting with such conditions (congenital vertebral anomalies or atlantoaxial rotatory subluxation/instability) tend to present with head tilt. Cervical spine x-ray is used for the differentiating tests.
- Ocular torticollis / superior oblique palsy: They tend to tilt their head away from the side of the weak eye muscle (superior oblique muscle). Ophthalmologic examination is carried out [19].
- Central nervous system tumor/Posterior fossa tumor: Intermittent torticollis associated with neurological symptoms are seen in the posterior fossa or spinal cord tumor. Cranial/cervical spine magnetic resonance imaging is performed [20].
- Craniosynostosis: Premature fusion of the structures of the skull leading to cranial asymmetry seen in congenital muscular torticollis. From diagnosis, skull x-ray or computed tomography is used [21].
- Sternocleidomastoid tumor: A palpable mass on the sternocleidomastoid muscle. Magnetic resonance imaging of the cervical area is performed.
- Klippel-Feil syndrome: Congenital fusion of 2 or more cervical vertebrae. Cervical spine x-ray is used to diagnose.
- Grisel's syndrome: It involves subluxation of the atlanto-axial from oropharyngeal inflammation [11]. X-ray of the cervical region is performed.
- Sandifer's syndrome resulting from gastroesophageal reflux with spastic torticollis. Electroencephalogram (EEG) is used to rule out other conditions.
- Atlantoaxial rotatory subluxation: Neck pain is common. SCM spasm may occur on the same side as the chin in contrast to congenital torticollis in which the chin will be rotated away from the affected side [16].

**8. Physiotherapy treatment**

A. Physiotherapy is effective using sustained passive stretching exercise which helps relieve tension and increase lengthen the sternocleidomastoid muscle.
B. Another stretching technique can be really effective; this technique is using the gravity to assist in the passive stretch for the affected muscle. Stretching the muscle in a prone position both actively and passively.
C. Active rotation exercises in supine, sitting or prone position by using toys, lights and sounds to attract their attention to enable them turn to unaffected side.
   Steps in relation to physiotherapy treatment [22]:
   - Early (< 4 months old) initiation of physical therapy is optimal. Passive stretching exercise protocols varied: hold times ranging from 10 to 30 seconds and repetitions of 3 to 40 [6, 23, 24, 25].
   - One study from showed that giving 10 stretches per session for 10 to 15 seconds for 10 sessions was more effective at improving head tilt and cervical passive range of motion than at 5 sessions daily over an 8week period [26].
   - By 6 to 8 months of age, infants may not tolerate passive stretching. Facilitation of active movements of the unaffected SCM, utilizing righting reactions, may be a good alternative [27].
   - Massage and myofascial release [27].
   - Handling, positioning, and exercises at home [6, 28].
D. Orthoses: Tubular orthosis for torticollis (TOT) collar: Adjunct for >4.5 months old, >6° head tilt; worn during waking hours [29].
E. Conservative treatment / parental education:
   - Physical therapists teach the parents/caregivers home program which is helpful in treatment [30].

- Lateral neck flexion and overall range of motion can be regained faster in infants when parents perform exercises several times a day [30].
- Ability to modify the environment to improve neck movements and position [13]. Position your child in the crib so activities in the room encourage neck rotation towards the opposite side. Hold toys to encourage the child to look up and out giving the muscle a stretch. During breastfeeding or bottle-feeding your child, position him to face the affected side. Sleeping in supine position turn the head to the affected side.
- Posture should be controlled in strollers, and car seats, using U-shaped neck pillow or blankets to hold neck in neutral position. Addition of neck supports to the car seat for proper neck alignment.
- Reducing time spent in a single position.

**9. Surgical treatment**

- Surgery involves the release of two heads of the sternocleidomastoid muscle. This surgery is performed in over 12 months old child, especially those who do not respond to physiotherapy treatment or have a very fibrotic sternocleidomastoid muscle [31].
- The child is required to wear a soft neck collar (Callot's cast) after surgery. Physiotherapy treatment commence for 3-4 months as well as strengthening exercises for the neck muscles [32].

**10. Prognosis**

Studies and evidence from clinical practice show that 85-90% of cases of congenital torticollis are resolved with conservative treatment especially with physiotherapy [33]. It is possible that torticollis will resolve spontaneously but chance of relapse is possible [34]. Around 3-12 months after the symptoms have resolved, its advised for infants to be reassessed by their physiotherapist [33].

**11. Conclusion**

Evidence based assessment and evaluation of this conditions using the relevant instruments in physiotherapy leads to a proper diagnosis. This guides to a proper scientific intervention that put patients back on their feet on time.

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