

## **THE EFFECTS OF KINESIO TAPING METHOD IN TREATMENT OF CONGENITAL TORTICOLLIS CASE STUDIES**

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The Use of the Kinesio Taping Method in Congenital Torticollis in Infants: Case History Analysis

Torticollis from the Latin *torti*, meaning twisted, and *collis*, meaning neck, refers to presentation of the neck in a twisted or bent position. Congenital Muscular Torticollis is a condition that occurs at birth or up to age two months. Congenital Muscular Torticollis is characterized by unilateral fibrosis or shortening of the sternocleidomastoid muscle, causing lateral flexion of the head and deviation of the chin to the contralateral side with noted loss of active and passive range of motion in the cervical spine (Karmel-Ross, 1997). The literature suggests that it is common for patients with Congenital Muscular Torticollis to exhibit a tumor or palpable mass in the sternocleidomastoid muscle (SCM) during the first three months of life, followed by restricted range of motion and “torticollis posturing” due to a fixed or restricted SCM muscle. (Golden, Beals, Littlefield, Pomatto, 1997). The mass is located at the mid-portion of the muscle which is actually a transformation of the SCM rather than a tumor. It is believed that the associated mass within the SCM may be secondary to a hematoma (blood clot), forming scar tissue, thus pulling the head into lateral flexion.

The patient presents with lateral flexion, the head is tilted towards the side of the affected muscle and rotation to the contralateral side, face is turned toward the opposite side. Lateral neck flexion is limited to the uninvolved side and rotation is limited to the involved side. Active and passive cervical range of motion is limited.

Infants born with Congenital Muscular Torticollis appear healthy at birth. Over a period of days to weeks, the infant develops soft tissue swelling and shortening of the SCM. The asymmetry may not be recognized at birth as head control is limited and babies under three months typically lie in asymmetrical positions.

The asymmetrical resting position frequently leads to non-synostotic plagiocephalic head deformation. Asymmetrical skull and facial features may develop by two to three months. The infant presents with asymmetry of head shape when viewed from the top. A flattening of the occipital and parietal bones on the opposite side occur as well as a flattening of the chin on the involved side. The deformation of the infant’s skull is due to normal brain growth combined with asymmetrical postnatal resting position resulting in progressive cranial asymmetry.

The other problems which are associated with Torticollis are diseases affecting the cervical spine, metatarsus adductus, and developmental dysplasia of the hips. One in five babies born with Congenital Torticollis have dysplasia of the hips. It is recommended that an x-ray or ultrasound of the hips be performed to rule out developmental dysplasia of the hips. It is also recommended that children with persisting torticollis, dysplasia of the hips or metatarsus adductus have radiography of the cervical spine to rule out vertebrae abnormalities such as atlanto-axial (C1,C2) subluxation, hemivertebra, or spinal cord abnormalities.

The causes of Congenital Muscular Torticollis are trauma at birth causing a bleeding in the

muscles of the neck, SCM muscle, a hematoma (blood clot) scars down, causing a shortening of the SCM muscle pulling the head into lateral flexion; SCM muscle shortening as a result of scarring due to intrauterine vascular disturbance and intrauterine position of the head causing fibrosis or shortening, the head may be compressed unevenly resulting in asymmetry of the length of the SCM on either side.

Treatment of Congenital Muscular Torticollis encompasses several approaches. The conservative approaches include:

Gentle massage and myofascial release to the contracted SCM muscle;

Stretching of the affected SCM to include rotation and lateral flexion through feeding, holding, carrying, and play techniques;

Passive rotation during sleep, particularly toward the non-twisted side.

Passive stretches of affected SCM, approximately 2-3 months, 15-20 times per day for 4 - 6 weeks.

Strengthening exercises for the contralateral, opposite side, SCM. Strengthening may be performed through head and neck righting. Strengthening must be preceded by stretching.

Adapting the environment by encouraging head rotation to side of the affected muscle by placing visual stimulus.

Altering infant's sleep position. Parents are encouraged to do this by placing the baby in his/her crib in such a position that the child must lie opposite to preferred position. May be accompanied by sand bag, pillow, or placing toys and other stimulating objects in field of view.

Persisted Congenital Muscular Torticollis which is not resolved with conservative treatment may be treated by an injection to the involved SCM muscle with Botox, Botulinum Toxin. Botox injection is a procedure in which a neurotoxin purified from bacteria *C botulinum* is injected into the SCM muscle belly. The Botox acts at the neuromuscular junction to block the release of the neurotransmitter acetylcholine, weakening the muscle temporarily. The injection takes effect in two to seven days and lasts two to three months. The side effects are similar to vaccinations or blood drawn. Botox injections may be performed on babies over 2-3 months of age.

After one year of age, patients with persistent Congenital Muscular Torticollis and significant deformities may require surgery.

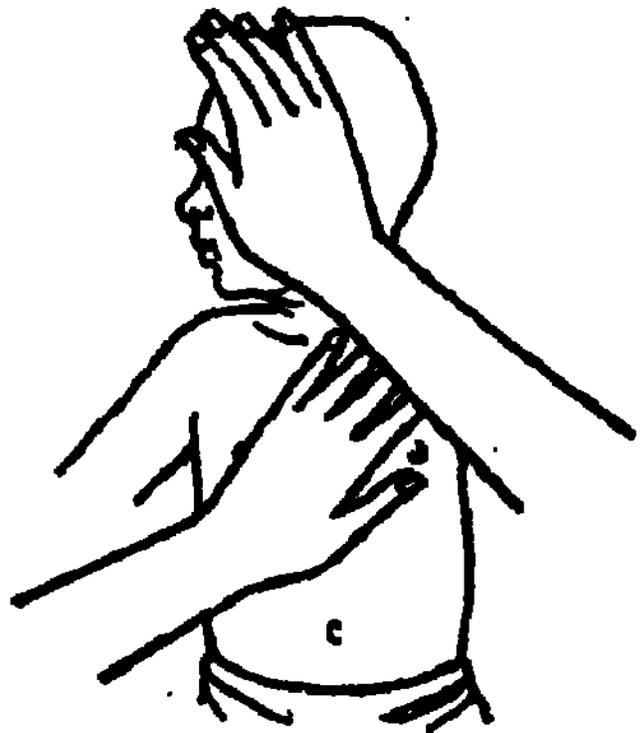
An examination was performed on each patient. The examination included a musculoskeletal assessment of the cervical spine including: active and passive range of motion, clinical observation of resting posture, cranial deformities and facial asymmetries; and assessment of motor function.

The musculoskeletal assessment was performed by stabilizing the trunk with the patient supine lying and assessing rotation and lateral flexion bilaterally. As described by Emery (1994), if the

chin reaches the shoulder in the median sagittal plane rotation equaled  $90^{\circ}$ , which is normal. Lateral flexion was considered normal if the ear could be brought gently to the shoulder with opposite shoulder stabilized.



Lateral Flexion  
Range of Motion



Rotation  
Range of Motion

**CASE STUDY I** - female, age 2 months 6 days. Date of Birth: 07-25-01.

**REFERRAL:** Patient was referred to physical therapy for evaluation and treatment by pediatrician with a diagnosis of Torticollis and VSD.

**HISTORY:** Patient was born 40 weeks gestation by vaginal delivery without complications. Reportedly, the delivery was 1.5 hours. Birth weight was 7 lbs. 9 oz.; height 20". Patient is the second sibling. At four weeks, the patient was diagnosed with a heart murmur.

**EXAMINATION:** October 1, 2001.



Before Treatment

**Clinical Observation:**

The patient presents lateral flexion to right side with rotation to left side. Skull asymmetry and flattening was present. A flattening of occipital and parietal bones on left side was observed. An ear shift was present very slightly.

**Musculoskeletal Evaluation:**

The patient presents with rotation, 90° towards the left side passively and rotation 35° towards the right side passively. Lateral flexion to the right side was normal passively, and lateral flexion to left side was to midline passively.

**Developmental Motor Assessment:**

The patient presents gross motor skills at one month level, and fine motor skills at newborn level with no tracking of objects. Pathological reflexes were normal with the exception of neck righting.

**Symptoms:**

The patient demonstrated an inability to passively rotate and laterally flex head equal in both directions. Asymmetry of posture at rest and function in all positions was observed. Asymmetrical skull, flattening of the occipital and parietal bones on left side was present.

**Treatment:**

Treatment was performed for 45-60 minutes, once per week from October 3 through November 5, 2001. Treatment continued bi-monthly through January 2002. Treatment consisted of:

**Massage** was performed as patient was falling asleep or sleeping by parent.

**Myofascial release** was performed to the right SCM muscle and bilateral shoulder in sitting.

**Stretching** was performed during feeding, holding, and playing.

Strengthening was performed utilizing a Neuro-Developmental Treatment approach with emphasis on neck righting and lateral flexion in sidelying, prone lying, and sitting.

Passive rotation was performed to the neck during sleep to encourage rotation towards right side.

Occipital and mastoid release was performed.

Instruction in home program to the parent, teaching the mother to utilize a daily routine of carrying, positioning, feeding, and adapting the environment.

Kinesio Taping Method for Tortocollis was implemented for the SCM muscle utilizing taping application to the SCM muscle.



The patient was taped with the Kinesio Tape method in the second therapy session to the right SCM muscle from insertion to origin with 5-10% tension placed on tape. At the third therapy session, SCM was taped bilaterally. The right SCM was taped from insertion to origin, 5-10% tension. The left SCM was taped from origin to insertion, 10-15% tension. Approximately 1/4" to 1/2" tape was used. The patient was taped weekly from 10-3-01 through 11-5-01. The patient wore tape 4-5 days per week. The mother was instructed in taping and to continue to perform massage, gentle stretching, and positioning through age 9-12 months.



**RESULTS:** The patient presents full passive rotation range of motion by third treatment session. The patient presents full passive lateral flexion by the sixth treatment. The patient presents active rotation bilaterally by the eighth treatment session. The patient presents 12-15° lateral flexion toward right at the eighth treatment session.



**CASE STUDY II** - male, age 4 months 5 days. Date of Birth: 05-18-99.

**REFERRAL:** Patient was referred to physical therapy for evaluation and treatment by pediatrician with a diagnosis of Congenital Torticollis.

**HISTORY:** Patient was born at 37 weeks gestation by Cesarean section due to breech position. The birth weight was 7 lbs. 7 oz., height 20". Patient was hospitalized four days. Pregnancy was complicated and high risk. At 18 weeks, the mother was placed on bed rest secondary to vaginal bleeding. At 22 weeks, the mother was hospitalized and treated with terbutaline. Patient is the second sibling.

**EXAMINATION:** September 23, 1999

**Clinical Observation:**

The patient presents lateral flexion to the left side with rotation to the right side. A significant flattening of the occipital and parietal bones on the right side is noted. Patient presents with an ear shift with the left ear posterior. A mass was palpable at middle of SCM. Fibrosis of the left SCM was present.

**Musculoskeletal Evaluation:**

Patient demonstrates rotation to 90° towards the right passively and actively and rotation was 31° towards the left side passively with no active rotation towards left side. Lateral flexion towards left side was normal. Lateral flexion to the right was -10° from midline passively. No active lateral flexion to the right was observed.

**Developmental Motor Assessment:**

Patient presents gross motor developmental delays. Patient was able to perform 50% of the skills to three months. No skills at four months were performed. Fine motor skills were delayed. Patient was unable to perform tracking in all planes. Patient was unable to perform skills incorporating righting reactions. Head control was delayed and asymmetrical in prone lying, sidelying, and sitting. No neck/head righting reactions were present.

**Symptoms:**

The patient presents asymmetry of posture at rest (sleeping) and during function throughout all positions, which is most prominently seen in supine lying. The patient presents with an inability to passively rotate and laterally flex head equally in both directions. The patient presents asymmetrical skull and facial features. Patient was unable to perform tracking; poor ocular control.



Treatment:

The patient was treated for 45-60 minutes once per week from September 23, 1999 (initial evaluation) through February 29, 2000. The patient was seen 21 of 25 sessions. The patient was discharged from physical therapy on February 29, 2000.

Treatment consisted of:

Myofascial Release was performed to bilateral shoulders in pronelying and supported sitting. Myofascial release was performed to the left SCM muscle with head in lateral flexion towards the right 20° and shoulder stabilization.

Cranial/Sacral Therapy:

Occipital, parietal, sphenoid and vomer bones releases were performed.

Massage was performed to the muscle belly of the SCM slowly from origin to insertion.

Stretching of the left SCM was performed during context of feeding by holding therapist/mother's arm between the ear and shoulder on the affected side with placement of bottle so the head rotates towards affected side. Additionally, stretching was performed while holding and playing with the patient.

Strengthening of the right SCM was performed. Strengthening was always preceded by elongation/stretching techniques. Strengthening utilized a Neuro-Developmental Treatment approach.

Adaptation of Environment was implemented by placement of toys and action, mother's face, at the affected side to encourage rotation on left side.

Kinesio Tape Method for Torticollis was implemented for taping of the SCM muscle on the affected side, left side, from insertion to origin with 5-10% tension; and right SCM, the contralateral side, from origin to insertion with 15% tension.



The patient was treated from September 23, 1999 through December 21, 1999, without utilizing the Kinesio Tape Method as part of treatment. The patient demonstrated no significant improvement during this period. The patient did demonstrate partial rotation range of motion passively bilaterally and improvement in functional motor skills. However, the patient continued to present lateral flexion towards the left side in all positions to include supine through supported sitting.

The patient was taped once per week with 1/4 - 1/2" tape and tape was worn for 3-4 days. Initially, the first two sessions, the patient was taped on the left SCM from insertion at the mastoid to origin. The patient was then taped bilaterally until discharged from physical therapy on 2-29-01. Parent was instructed in taping protocol for Torticollis.

**RESULTS:** The patient was discharged from physical therapy at age 8 months 10 days on February 29, 2000. The patient demonstrated full range of motion bilaterally with neck rotation and lateral flexion. Symmetry of posture to include head control at midline and righting reactions were present in all motor patterns. No skull asymmetries were observed. The patient performed age appropriate gross and fine motor developmental skills.

**CASE STUDY III:** male, age 15 months. Date of Birth: June 12, 2000

**REFERRAL:** The patient was referred to physical therapy for examination and treatment by a pediatrician with a diagnosis of Torticollis.

**HISTORY:**



Before Treatment

Patient was born at 37 weeks gestation by vaginal delivery. The pregnancy and birth were without complications. Reportedly, the mother felt an increase in pressure at the pelvis with head engaging over the last 2-3 months of pregnancy. It is felt that the cause of the patient's Congenital Muscular Torticollis was from intrauterine position of the head. Birth weight was 7 lbs. 11 oz. and height was 19.5". The patient had a hematoma on the right parietal bone and the left eye wandered with the left tear duct clogged at birth. Reportedly, the patient was born with significant skull and facial asymmetries. The left ear was folded in half and concavity of face was present. Patient did not demonstrate head control for first three months.

The patient has been seen by a chiropractor since age three months. The eye abnormality cleared with chiropractic treatment. The last chiropractic session was at age 12 months at the time of the initial evaluation.

At age six months, the patient was evaluated by a physical therapist at another facility. The parent was instructed in traditional stretching exercises and massage. Reportedly, the mother performed exercises until approximately age one year. The mother continues to perform massage.

**EXAMINATION:**

September 6, 2001.

**Clinical Observation:**

The patient presents with lateral flexion towards the left side and rotation towards the right side. A shortened left SCM, upper trapezius, and levator were observed. The patient presents flattening of the occiput and parietal bones on the right side. A prominent frontal bone (forehead) is present on the right side with flattening of the left frontal bone. Asymmetry of the ears is present with the left ear significantly smaller. The mandible (jaw) is compressed on the left side and appears asymmetric.



A mass was palpable at the left SCM in the mid-muscle. The SCM presented with fibrosis. A significant loss of muscle mass was present on the left SCM.

**Musculoskeletal Assessment:**

A specific muscular assessment was difficult to perform due to the patient's age and inability to tolerate handling/facilitation techniques. The patient presented lateral flexion to 90° on the left side passive and active and lateral flexion to -20° from midline on the right side passive. The patient presented full rotation towards the right side, passive and active and rotation to the left side was approximately 35° active and 47° passive.

Developmental Motor Assessment:

Patient presents age appropriate gross and fine motor development. Patient performed motor skills to age 15 months. The patient presents delays in optical righting reactions. Head righting was not present; tilted to right side. Equilibrium reactions were delayed.



Symptoms:

Patient presents asymmetry of posture at rest (sleeping) and during function throughout all movement postures. Patient demonstrates an inability to perform passive rotation and lateral flexion equally in both directions. Patient presents a mass at the left SCM. Patient presents a fibrotic band at the SCM. Patient presents cranial asymmetry, plagiocephaly, and ocular asymmetry.

Treatment:

Chiropractics: The patient was seen by his chiropractor in September, 2001.

Osteopath Physician: Patient is being treated by a traditional osteopath one to two times per month.

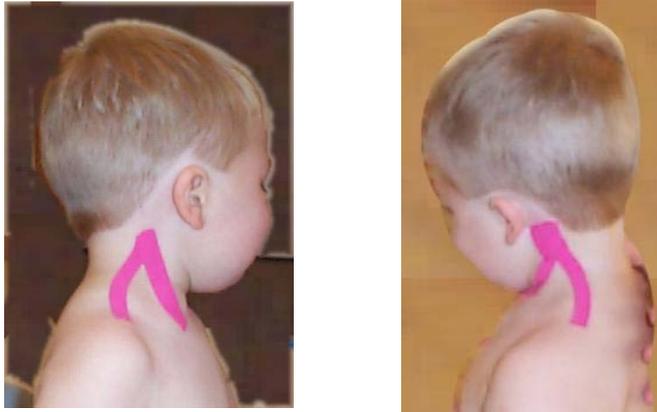
Myofascial release was performed to the left SCM with head in 10-20° lateral flexion to right. Myofascial release was performed to bilateral shoulder in sitting in conjunction with righting reactions. Traditional stretching to the left scalene muscles, upper trapezius, and levator scapulae was performed.

Joint Mobilization was performed to include segmental traction to the Atlanto-axial(C1-C2).

Strengthening to the contralateral SCM through NeuroDevelopmental Treatment Techniques was implemented utilizing neck righting, balance, and equilibrium.

Home Exercise Program was instructed to the parent to include massage; positioning with rotation side to side during sleep; environmental adaptation to encourage active head rotation toward the affected side and strengthening.

Kinesio Taping Method was performed utilizing the Torticollis Protocol for SCM muscle.



The patient was initially taped on September 24, 2001 with ½” tape applied to the left SCM muscle from insertion to origin. The patient wore kinesiotope for 4-5 days. The patient was subsequently taped with Kinesio tape to the left SCM, the left upper trapezius and the left levator scapulae from insertion to origin with 5-10% tension. The right SCM, the right upper trapezius, and the right levator scapulae were taped from origin to insertion. This Kinesio Tape Method was initiated on October 1, 2001.



**RESULTS:** The patient demonstrated increased rotation to the left side and symmetry of head, head control at midline. The patient continues to be followed in Physical Therapy and receive treatment with an Osteopathic physician.

Due to persistency of Torticollis, it is recommended that the patient receive radiography of the cervical spine to rule out vertebral abnormalities, such as, Atlanto-axial subluxation, hemivertebrae and spinal cord abnormalities.

## **SUMMARY:**

In conclusion, the success of conservative management of Congenital Muscular Torticollis is directly related to early referral. Congenital Muscular Torticollis responds best to conservative treatment if initiated during the first four months of life. When diagnosed early, 80% recover completely with no long-term effects with conservative treatment.

According to [Emery C., The Determinants of Treatment Duration for Congenital Muscular Torticollis, 1997], treatment duration was defined as the time between initiation of treatment and achievement of full passive neck range of motion. The mean treatment duration was 4.7 months. It is possible that with the adjunct of Kinesio taping in conservative treatment, the mean treatment duration is decreased due to longer lasting efficacy of treatment with Kinesio taping application. In these case studies, two of three patients were discharged less than mean treatment duration of 4.7 months. Case Study I was discharged at three months duration. The patient was seen from October 1, 2000 through January 1, 2001. Case Study II was discharged at two months post the initiation of Kinesio tape application; total duration of treatment was four months.

The literature suggests that causes of Congenital Muscular Torticollis are: birth trauma resulting in bleeding in the SCM, hematoma, which scars the muscles causing a contracted or shortened SCM; intrauterine position of head causing fibrosis; and intrauterine vascular disturbance resulting in scarring which cause a contracted or shortened SCM.

According to Dr. Kase, the Kinesio Tape application increases blood flow and lymphatic circulation; normalizes muscle tone and abnormality of fascia; supports a weakened and contracted muscle allowing the muscle to work more efficiently. It is felt that the Kinesio Tape directly affects the bleeding and scarring of the involved SCM, allowing the muscle to elongate and work more efficiently.

However, the three patients in this study is too small of a population sample to make a decisive conclusion regarding the impact of Kinesio Tape Therapy on the Treatment of Congenital Muscular Torticollis. Further research is indicated.