**Objectives**

- Attendees will be able to describe the pertinent objective data that will assist in development of a differential diagnosis for children with torticollis.
- Attendees will list all systems that should be screened when creating a differential diagnosis for children with torticollis and how the child’s health history guides the evaluative plan.
- Attendees will be able to determine what type of torticollis a patient presents with and understand the typical prognosis for that presentation.
- Attendees will explain when it is appropriate to refer back to a physician for further medical assessment.
- Attendees will be able to explain the impact of plagiocephaly for children with torticollis.
- Attendees will explain a typical treatment regimen for children with congenital muscular torticollis and/or plagiocephaly utilizing the APTA clinical practice guidelines.
- Attendees will utilize most current research to plan treatment strategies for children with torticollis.
- Attendees will understand the dynamic nature of the diagnosis of torticollis and how therapist expertise guides patient care.

**Torticollis-Definition**

- Latin for “twisted neck”
- Classically involved some sort of shortening and/or weakness of the Sternocleidomastoid (SCM)
- But remember that not every child with a diagnosis of “Torticollis” has CMT-Congenital Muscular Torticollis
- Most common causes of “torticollis”- SCM fibrosis, bony abnormalities in c-spine, neurological or ocular
- Typical head position is laterally flexed toward the affected side, rotated away from the affected side

**“Typical” Presentation**

- Ipsilateral lateral cervical flexion with contralateral cervical rotation
- The laterality of the torticollis is determined by which side the patient leans toward: R lateral cervical flexion with L cervical rotation = RIGHT TORTICOLLIS

**A Short Anatomy Lesson**

- Origin has 2 heads (Manubrium of sternum and clavicle)
- Insertion on Mastoid Process
- Motions: Ipsilateral lateral flexion, contralateral rotation, and if working bilaterally they are strong cervical flexors and can act to extend
- Other muscles that may be involved: Scalenes, Hyoid, Platysma, Levator, upper trap

**PROM Norms**

- Infant PROM norms for Cervical Spine
  - Rotation: Mean 110°
  - Lateral Flexion: Mean 70°
TABLE 3a: MEASUREMENT EVIDENCE TABLE

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
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</tbody>
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Physical Therapy Evaluation

- There are unique components of the evaluation that may be more specific for this particular diagnosis
- We have found it helpful to have a specialized form to document those components
- Follow the ICF model and keep in mind the APTA clinical practice guideline

TABLE 3b: MEASUREMENT EVIDENCE TABLE

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Evidence</th>
</tr>
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TABLE 3c: MEASUREMENT EVIDENCE TABLE

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<th>Evidence</th>
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<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Strength Norms 24

- Muscle Function Scale:
  Average score variable with age of infant
  - 2 months MFS 1 (range 0-2)
  - 4 months MFS 2.6 (range 1-4)
  - 6 month MFS 3 (range 2-4)
  - 10 month MFS 3.4 (range 3-4)

ICF Model

![ICF Model Diagram]
Appendix 1: ICF AND ICD 10 Codes

<table>
<thead>
<tr>
<th>ICD CODE</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>E73A</td>
<td>Birth asphyxia | skull fracture | fractures | tearing of birth canal | asphyxia of newborn | congenital | and | sequelae | of | birth | asphyxia | and | congenital | bone | deformity</td>
</tr>
<tr>
<td>E73B</td>
<td>Birth trauma | skull fracture | fractures | tearing of birth canal | asphyxia of newborn | congenital | and | sequelae | of | birth | trauma</td>
</tr>
<tr>
<td>E73C</td>
<td>Birth asphyxia | skull fracture | fractures | tearing of birth canal | asphyxia of newborn | congenital | and | sequelae | of | birth | asphyxia | and | congenital | bone | deformity | and | birth | trauma</td>
</tr>
<tr>
<td>E73D</td>
<td>Birth trauma | skull fracture | fractures | tearing of birth canal | asphyxia of newborn | congenital | and | sequelae | of | birth | asphyxia | and | congenital | bone | deformity | and | birth | trauma</td>
</tr>
</tbody>
</table>

Evaluation History Components

- Gestational age at birth/ Chronological age at evaluation
- Age of onset of symptoms
- Typical posture observed by caregiver
- Prenatal and Birth history including in utero positioning, type of delivery, multiple birth, primaparity

Medical Diagnostics

- X-rays-Skull, neck, spine
- US-Neck, hips
- CT
- MRI
- Biopsy

Objective Exam

- Behavior
- Skin Integrity
- Visual Assessment
  - Visual pursuit/Eye Position
- Hearing Assessment: Turn toward sound?
- Muscle palpation:
  - Nodule, fibrosis
- AROM/PROM
  - C-spine, trunk, extremities
- Strength

Evaluation History Components (continued)

- GI (reflux, constipation)
- Ear infections
- Hip Dysplasia
- Vision/Hearing
- Other specialists or treatments currently
Objective Exam (continued)

- Hip Screening (Ortolani and Barlow testing, ROM, Leg length)
- Resting Head Position
- Trunk posture
- Righting Reactions
- Protective reactions
- Head Shape
- Developmental Skills

Objective Tools

- Hands
- Goniometers
- Inclinometers
- Anthropometric Protractors
- Anthropometric Calipers
- Photography/Dartfish
- Muscle Function Scale

ROM of Cervical Spine

- Active and passive ROM will need to be compared
- Should utilize objective tools such as goniometers, protractors, inclinometers etc
- Can use body landmarks-Not as accurate, but still objective
  - Nose over acromion approximately 90° cervical rotation

AROM

- Typically only active cervical rotation measured in young infants and not lateral flexion
  - Lateral flexion is elicited through righting reactions, which is a function of strength
  - Can measure AROM in an older child (who can follow directions and has enough body awareness) in the same way as with an adult
- Position of measuring tools is same as in PROM except AROM may be taken in any developmental position (supine head supported on surface, prone, sitting, standing)

Passive ROM Protractor

- Lateral Flexion
  - Patient placed in supine
  - Baseline of protractor placed even with shoulders (C7)
  - Use tip of the nose/center of head as indicator
- Rotation
  - Patient placed supine at edge of mat
  - Protractor placed on mat table in the transverse plane
  - Tip of the nose is indicator
Passive ROM Goniometer (will need 2 sets of skilled hands)

- **Lateral flexion**
  - Patient lying supine
  - Axis placed on center of chin (C7)
  - Stationary arm Parallel with the sternum
  - Moving arm on bridge of the nose

- **Rotation**
  - Patient lying in supine
  - Axis placed on the center of the cranium
  - Stationary arm is in line with acromion process
  - Moveable arm is in line with the tip of the nose

### Strength

- Difficult to assess strength in children in general
- Use functional tasks: Prone, rolling, upright
- Analyze movement patterns and describe differences one side to the other

### Muscle Function Scale 15

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
<th>Degrees</th>
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</thead>
<tbody>
<tr>
<td>5</td>
<td>Below the horizontal line &lt;0 degrees</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>On the horizontal line At 0 degrees</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Slightly above horizontal line &gt;0 to &lt;15 degrees above horizontal</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>High above horizontal line, but less than 45 degrees &gt;15 to &lt;45 degrees above horizontal</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>High above horizontal line, more than 45 degrees &gt;45 to &lt;75 degrees above horizontal</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>Head almost in vertical line &gt;75 degrees above horizontal</td>
<td></td>
</tr>
</tbody>
</table>

### MFS 15

<table>
<thead>
<tr>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
</tr>
<tr>
<td>4</td>
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<tr>
<td>3</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>
Resting Head and Trunk Position

- Static position of the child’s head and trunk in different developmental positions
- Measured in degrees of motion from upright for lateral flexion and degrees of rotation (c-spine)
- Trunk position is easiest to describe as type of curve and side of convexity and concavity (C-shaped curve with apex R or S-shaped curve with thoracic concavity R and lumbar concavity L)
- May be different measurements given the developmental position you are assessing: supine, prone, sitting, quad, standing

Plagiocephaly

- This is a common concurrent diagnosis observed with torticollis
- There may be referrals made for physical therapy by physicians for this diagnosis
- Cranial and facial asymmetries may be more obvious to families and other health care providers compared to the more subtle ROM and postural asymmetries
- Plagiocephaly can impact patient’s ability to rotate head especially in supine
- Need to rule out craniosynostosis

Plagiocephaly

- Commonly with CMT, will present with an asymmetrical plagiocephaly

Variations of Plagiocephaly

- Asymmetrical plagiocephaly- flattening of unilateral occiput with concurrent bossing of ipsilateral frontal bones, ipsilateral forward ear shift and sometimes contralateral occipital bossing
- Brachycephaly- Flattening of the posterior aspect of skull, increased width and decreased length
- Scaphocephaly- Elongated and narrow head shape

Measuring for Plagiocephaly

- Can measure plagiocephaly in the clinic with Calipers
- Many local orthotists are offering initial evaluations at their clinic to measure the plagiocephaly with various scanning techniques
- Scanning will typically be the most accurate
Why Measure?

- Looking for change over time (improvements or not)
- Keep in mind that you have to treat to improve outcome of torticollis, and prevent torticollis for some groups of patients
- Limited time to make changes to shape: 12 months of age tends to be the accepted limit for most change over time with the most change occurring earlier in development.
- Cosmetic vs Medical Necessity
- Insurance, insurance, insurance (justification for treatment of plagiocephaly, torticollis, and developmental skills)

Anthropometric Documentation

- EU = eurion  
  FZ = frontozygomaticus  
  T = tragion  
  Sn = Subnasal  
  Ex = exocanthion
- Width = ___ cm
- Length = ___ cm
- Cephalic Index: ___
- Cranial Vault-R FZ to L EU = ___ cm, L FZ to R EU = ___ cm  
  Difference = ___ cm
- Cranial Base-R Sn to R T = ___ cm, L Sn to L T = ___ cm  
  Difference = ___ cm
- Facial Asymmetry- R Ex to R T = ___ cm, L Ex to R T = ___ cm  
  Difference = ___ cm

Measuring for Plagiocephaly

Cranial Vault Asymmetry Index (CVAI)

\[
CVAI = \frac{|A-B| \times 100}{A + B} 
\]

(whichever is greater)
### Severity Scale

<table>
<thead>
<tr>
<th>Severity Level</th>
<th>Description</th>
<th>CVAI</th>
<th>Suggested Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>All asymmetry within normal limits</td>
<td>&lt; 3.5</td>
<td>None</td>
</tr>
<tr>
<td>2</td>
<td>Asymmetry in 1 Posterior Quadrant</td>
<td>3.5-6.25</td>
<td>Repositioning</td>
</tr>
<tr>
<td>3</td>
<td>Asymmetry in 2 Quadrants</td>
<td>6.25-8.75</td>
<td>Repositioning or Orthosis</td>
</tr>
<tr>
<td>4</td>
<td>Asymmetry in 3 Quadrants</td>
<td>8.75-11.0</td>
<td>Orthosis</td>
</tr>
<tr>
<td>5</td>
<td>Asymmetry in 4 Quadrants</td>
<td>&gt; 11.0</td>
<td>Orthosis</td>
</tr>
</tbody>
</table>

**Children’s Hospital of Atlanta**

### Measuring for Brachycephaly/Scaphocephaly

**Cephalic Ratio (CR)**

### Management

- **Positioning program**
  - Decrease amount of time spent with head flat against support surface
  - Frequent changes in positioning
  - Use of positioning tools to decrease atypical pressure
- **Increased opportunity for prone**
  - Short bouts for regular intervals to improve compliance
  - Increased tolerance gradually
  - Family education for benefits of “Tummy Time”

### Cranial Molding Helmets

- **Demonstrates more favorable outcomes than repositioning program alone**
  - Improvements can occur sooner with helmet
- **Physician/Specialist preference**
  - Neurosurgeons less likely to refer for a helmet than Plastic surgeons

### Cranial Molding Helmets

- **Referral for fitting at 4-5 months is ideal**
  - Largest window for correction
  - Less effective if initiated after 8 months of age
- **Initial evaluation and scan is a free service**
  - Physician Prescription required
- **Scans are objective and quantifiable**
  - Insurance approval with deviation of 6 mm or more
  - May require a Letter of Medical Necessity
- **Insurance coverage will vary**
  - Orthotist will be able to provide this information

### Developmental Screening
Developmental Screening
- Increased incidence of gross motor delays with h/o CMT or plagiocephaly, but causality difficult to determine 26, 27, 28, 29
- Quick screen as part of initial evaluation
  - Check motor milestones
- Need to monitor gross motor and development skills regularly
  - Pts will change/develop quickly
  - Continued monitoring during treatment
  - Reassessment as part of every session

Developmental Assessments
- Peabody Developmental Motor Scales (PDMS-2)
- Alberta Infant Motor Scale (AIMS)
- Bayley Scales of Infant and Toddler Development
- Mullen Scales of Early Learning
- Test of Infant Motor Performance (TIMP)
- DAY-C

Differential Diagnosis in Torticollis
- Differentiating between acquired versus congenital torticollis as well as what type of torticollis
- Always keep in mind that 1/5 patients with a diagnosis of torticollis have a non-muscular etiology:
  - Guides your referral to appropriate specialists
  - Guides plan of care
  - Guides prognosis/outcome

Acquired Versus Congenital Muscular Torticollis

Acquired Torticollis
Either traumatic or not-traumatic
- Traumatic: Fracture, Subluxation, Soft tissue injury to SCM, Hemiated cervical disc
- Non-traumatic: Bony changes secondary to inflammatory process (RA, osteomyelitis, Pharyngitis, tonsillitis, mastoiditis), Ocular (Lesions or Duane Syndrome, superior oblique palsy, strabismus), Sandifer Syndrome, Arnold-Chiari Malformation, Syringomyelia, Dystonia, Malfunctioning shunt, Seizures, Posterior fossa pathology (tumors), Encephalitis, Osteoid Osteoma, Osteoblastoma
- Also: Reflux, Ear infections, Vestibular system insults or infection

Sandifer Syndrome-A combination of GER with or without Hiatal Hernia. You will see hyperextension body positioning with dystonic-like movements of the head, neck, trunk and UE’s. Commonly mistaken for seizure or CVSD dyssynchrony. Symptoms usually resolve with resolution of GI symptoms.
**Congenital Torticollis**

- **Congenital Muscular Torticollis**
  - Pseudotumor of the SCM and/or Fibrosis of SCM
  - Restrictions in A/PROM and strength asymmetries
- **Postural Torticollis**
  - Head position without tumor or tightness of SCM
  - Usually have restrictions in cervical rotation AROM and lateral cervical flexion strength
  - Do not have PROM restrictions for either motion

**Muscular Torticollis—Basic Etiology**

- 3rd most common congenital MS diagnosis with varying incidences behind hip dysplasia and Club foot
- Incidence range reported to be between 0.3% - 2.0% of live births
- Other commonly associated diagnoses: hip dysplasia, plagiocephaly, brachial plexus injury, clavicle fracture

**Multiple theories on causes 3,4**

1. In utero compaction or malposition
2. Ischemia to the muscle secondary to abnormal vasculature
3. Acute muscle injury during birthing process
4. Infection
5. Compartment Syndrome
6. Heredity

**Muscular Torticollis—Basic Etiology**

**Postural Torticollis—Etiology**

- Benign Paroxysmal torticollis of infancy
- Absence of cervical musculature
- Plagiocephaly without synostosis
- Hypotonia
- Reflux/Constipation

BPTI: Recurrent episodes of head tilt secondary to cervical dystonia (switches sides). Changes in head position are often accompanied by vomiting, pallor, and ataxia, settling spontaneously within hours or days. Episodes begin within the first 12 months of life and resolve by 5 years. Thought to coincide with later onset of migraine headache.

**Case Studies**

**Case A**

- 18 mo. female with medical diagnosis of torticollis
- Parental description of head position: Head tilt that switches sides, no rotation. Noted by daycare to appear “off balance” and have trouble walking.
- Onset in the last couple of months.
- Birth history non-contributory.
- Significant history of over 12 ear infections in her left ear. Just received tubes.
- Mom unsure if head tilting when had ear infections previously
- Range of motion normal, no head tilt noted at eval, appropriate righting, developmental skills WNL.
- Has never received treatment previously.
Case B

- 2 m.o. male with medical diagnosis of torticollis
- Parental description of head position: No head tilt, always rotated to the right.
- Onset since birth.
- Birth history: >10 lb. birth weight full-term vaginal delivery without complications, second child (1 = also >10 lb.).
- Significant history of breast fed and allergic to dairy, soy, and various other things by way of mom. Reflux treated with meds. Constipation.
- Very mild plagiocephaly right occipital flattening, frontal bossing.
- PROM full in c-spine, but patient resistant. No active left rotation past midline.
- Arching noted in trunk, belly distended and firm.

Case C

- 5 m.o. male with diagnosis of torticollis
- Parental description of head position: Left head tilt.
- Birth history: Breech position, 6 lb c-section delivery. No complications.
- Significant history of bilateral hip subluxation R>L but not treated by the orthopedist with harness. Reflux (treated with meds, sleeps in car seat).
- Mild right occipital plagiocephaly, temporal and frontal bossing, increased head height. Decreased active and passive left cervical rotation, decreased and asymmetrical active cervical extension in prone, decreased passive right lateral cervical flexion. Left cervical skin breakdown.

Case D

- 32 month old female diagnosis of torticollis
- Twin pregnancy (B) born at 33 weeks gestation, c-section, breech position, NICU x 16 days, otherwise healthy and developing normally
- Head position noted by parents: R head tilt started around 12 months of age, not consistent
- History of “lazy eye” with patching treatment R
- Ophthalmologist noted “resistance” to lateral flexion during ocular testing.
- Resting head position at eval: 10-15 degrees R lateral flexion, 10-15 degrees R rotation. Also noted occasional 5 degrees L. lateral flexion.
- ROM: Lateral flexion 50 PROM B, rotation 85A/90PROM B
- Strength: 5/5 MFS
- Developmental: Typical 2 y.o. skills

Treatment Considerations / Duration / Prognosis

- Type of torticollis
- Age of treatment initiation
- Degree of fibrosis on ultrasound
- ROM restrictions

APTA Clinical Practice Guidelines

Published in 2013 for Congenital Muscular Torticollis
Type of torticollis

- Postural torticollis has historically been known to resolve spontaneously or respond quickly to treatment
- Cheng et al 2001 found that the type of torticollis is a predictor of treatment duration and outcome
- Divided cases into 3 groups (SCM tumor, SCM restriction, Postural Torticollis) with differences in positive outcomes

Age treatment initiated

- Earlier to initiate treatment the better the outcome and shorter treatment duration
- Emery found that age at initial treatment does not affect treatment duration, but age at initial treatment was related to severity of restriction or presence of tumor. Conservative treatment has a positive outcome if started before 2 years old.
- Celayir found that 100% resolution of ROM deficits in 45 patients started with treatment prior to 4 mo.
- Celayir reports there is an average 3.8 month treatment duration and no need for surgical intervention if treatment started before 4 mo.
- Petronic divided pt's into 5 age groups and found as child gets older, treatment duration increases and good/satisfactory results decreased with poor results increasing
- Cheng et al 2001 also found that children with SCM tumors presented earlier to therapy and older presentation consistent with longer treatment duration
- Lee found that even young infants (3mo) with severe fibrosis on US have positive outcomes

US and prognostics

- Lee divides findings on US into 4 Types
  1. localized heteroechoic mass
  2. diffuse hyperechogenicity along entire muscle with hypoechohogenecity(normal) background muscle
  3. diffuse hyperechogenicity along entire muscle with almost no hypoechohogenetic background
  4. hyperechogenic band of entire muscle
- Has an increasing amount of ROM restriction and an increasing length of treatment time

ROM restrictions and SCM Tumors

- More ROM restriction (most specifically rotation) longer treatment duration
- Emery noted that degree of restriction of rotation predicts treatment duration in a group of pt's without masses and creates an equation to determine time in treatment
- Also notes that presence of a mass is also a predictor (but not as strong a predictor as ROM) for treatment duration. In addition presence of a mass had a strong correlation with younger age at presentation and more significant ROM restrictions
- Cheng (remember divided into 3 types of torticollis) found that the presence of SCM tumor group had a higher rate of rotational restriction greater than 15 degrees, whereas the Muscular group had a higher rate of rotational restriction less than 15 degrees, and the Postural group had the highest rate of rotational restriction less than 15 degrees and the treatment duration decreased with each group and the overall outcome became more positive with less restriction.
Treatment Options

- Many options
- Use research specifically on torticollis
- Use research on other treatment modalities and apply to torticollis

A/PROM activities

- PROM/Stretches
  - Lateral flexion
  - Rotation
  - Extension
  - Flexion
- AROM
  - Focus on this for children without PROM restrictions (postural torticollis or other etiology)

A/PROM activities-Why we use this

- Postulated that manual stretching provides an environment that stimulates myoblasts and myogenesis compared to overriding fibroblast activity and resultant fibrosis.
- Cheng found that manual stretching was a “safe and effective” treatment for CMT using manual stretches to “tight muscle” 3x/week compiled by physiotherapist including 3 reps of 15 stretches with 1 second of “gentle force” with 10 second rest between.
  - Other activities included positioning and they were not to perform any PROM/manipulation.
- Celayir found 100% resolution in 45 cases/full PROM using a strict stretching protocol: lateral flexion, rotation, flexion/extension each performed 10 x 10 seconds in supine up to 7-8x/day (at every feed).
  - Other activities included positioning, handling skills to promote rotation and prevent tipping (not described) by parents.
- Emery found complete recovery in 99/100 cases (one needing surgery) using 2 person stretching protocol: cervical rotation, lateral flexion in combination with slight flexion and rotation toward affected side both performed 5 x 10 second hold 2x/day.
  - Other activities included positioning, handling skills to promote rotation and prevent tipping, strengthening using lateral righting reactions, T.O.T. collar if head tilt still persisted.

Lateral flexion stretch

Rotation stretch

Extension Stretch
Massage

- Promotes blood flow
- Primary massage of twining manipulation with one finger (PMTMOF) vs. tuina manipulation
- PMTMOF: SCM treated in 3 segments (upper, middle, inferior) placed on a slight stretch and vertical, deep, fast frequency (20-23Hz/min) for 5 minutes for upper and inferior, 10 minutes for middle. Other muscles and points were also massaged all for 1 minute each. SCM lifted and twisted. PROM into rotation x 15 repetitions to relax muscle, then manipulation. Treatment 30 minutes 1x/day x 15 days.
- Tuina: SCM massage x 6 minutes entire length followed by lifting and pinch between thumb and forefinger x 5 minutes. Similar points were each massaged x 1 minute. Manipulation into lateral flexion. Treatment 20 minutes 1x/day x 15 days.

Positioning/Handling

- Sleeping
- Car seat
- Feeding
- Upright/Carrying
- Ohman showed application of “handling techniques” improved outcome 14

Sleeping

Car Seat

Feeding Midline

Facing Parent  Cradle Hold

Feeding (slight rotation)
Carrying

E-stim for Strengthening

- Neurorotor retraining and strengthening
- Small portable stimulators preferred
- Wave form: symmetric biphasic has no chance for polarity to build up and cause skin irritation
- Pulse rate 1-10pps (pulses/second) will produce a twitch contraction which babies tolerate better than a tetanic contraction, then increased pulse rate with training to produce a tetanic contraction. Pulse rate of 15-50pps will produce a more comfortable tetanic contraction.
- Phase duration 50-100 microseconds for small muscles
- No on/off time, no ramp for twitch contraction. On/off 1:3 or 1:4 ratio for tetanic.
- Intensity will also increase over time, but go by patient tolerance. Increase until you get a contraction.

Strengthening

- AROM
- Righting
  - Supine
  - Side-lying
  - Prone
  - Sitting

E-Stim

- Cut electrodes down to fit over muscle but do not cut lead in the pad.
- Clean skin with alcohol, but rehydrate skin with water before applying pad
- Only stimulate 1 side of neck at a time, will constrict airway if performed bilaterally

Postural Correction

- Manual cueing
- Kinesiotaping
- T.O.T. Collar

Manual Cueing

- Use hand or fingers to position head in midline
- Can be used to assess response
- Easy to teach families
- Only works when you are actively helping them
Manual Cueing

Tubular Orthosis for Torticollis (T.O.T. Collar)
- Soft PVC tubing and 2 hard plastic struts that are height adjustable
- Therapists cut and adjust the tubing to fit the patient's needs
- The collar acts as a noxious stimulus and a manual cue to the child to lift their head to a neutral position

T.O.T. Collar

When to Choose T.O.T. collar
- Persistent head tilt of greater than 5 degrees
- When patient has at least 10 degrees lateral flexion ROM past neutral
- Righting reactions have to be age appropriate and present

T.O.T. Collar Family Ed (modified from Karmel-Ross)
- Begin with 30 minutes or to tolerance. When you take the brace off, look for red marks (especially under where the hard plastic posts lay). They should fade in 20-30 minutes. If they do not go away, call your therapist because adjustments may be needed.
- Watch for any vital signs changes. Take collar off if you observe nasal flaring, facial color changes, changes in rate of breathing, eye rolling, or perspiration.
- Wear collar only with direct supervision. DO NOT WEAR IN CAR SEAT OR WHEN SLEEPING.
- Wear pattern should be 6 hours total time per day. Begin with 30 minutes 3 times per day and increase to 4 hours 2 times per day.
- Encourage L-rotation while wearing brace. Include looking up and down to follow toys with L rotation.
- Check neck motion after removing brace in all directions.
- Child should be encouraged to play in all positions (tummy, back, sitting, hands and knees, standing) with brace on.
- You may use the brace during feeding.
- You may use the brace for strengthening exercises.

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- When patient has at least 10 degrees lateral flexion ROM past neutral
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T.O.T. Collar

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- When patient has at least 10 degrees lateral flexion ROM past neutral
- Righting reactions have to be age appropriate and present

T.O.T. Collar

When to Choose T.O.T. collar
- Persistent head tilt of greater than 5 degrees
- When patient has at least 10 degrees lateral flexion ROM past neutral
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T.O.T. Collar
Kinesiotaping

- Basic Principles of tape is to act like our hands.
- Creators report the tape to affect 5 major systems
  - Skin, Fascia, Circulatory/lymphatic, Muscles, Joints
- Can be used to activate or inhibit cervical musculature in a child with torticollis
- There are certain applications techniques and strategies to accomplish the activation or inhibition with the directions tape is applied and amount of tension on the tape

Kinesiotaping (Continued)

- Cervical Muscles to inhibit: Involved side SCM, Upper trap, Scalenes, Levator
- Cervical Muscle to activate: Uninvolved side SCM, upper trap, Scalenes, Levator
- Can do a combination of activation and inhibition
- Also can be used on the trunk

“l” Strip and “Y” Strip

Tear the paper to expose your anchor

Kinesiotaping

Example of taping SCM-activation

- Measure tape from origin to insertion and cut
- Cut one end of the tape to split into a “Y”
- Round the corners of the tape
- Apply 2 ends of anchor to the 2 origins of SCM at the manubrium and clavicle-NO TENSION
- Apply 15-30% tension to tape as laying down over the muscle
- Apply single end to the insertion at mastoid process-NO TENSION
- Rub entire tape application to activate adhesive
- Look for convolutions in tape
- Can be left on 3-5 days of active work, after that the tape loses some of its elasticity
Apply Anchor in neutral position

Lengthen muscle and apply stretch

Place ends under no tension

Rub tape after application

Aquatics
- Utilizes the principles of water for stretching, strengthening, developmental skill development
- We tend to bring older babies into the water if they get difficult to handle behaviorally

Discharge Considerations
- Full A/PROM
- Midline/symmetrical head position 85-100% of the time
- Functional Movement Scale: May have 1-2 points difference in the 2 sides even with symmetrical head posture
- Development Skills Appropriate for age
- Use your Clinical Practice Guidelines!!
Institutional Specific Treatment Data Review

References


References

References

