CONGENITAL MUSCULAR TORTICOLLIS

PRESENTED BY: LYNSA ROSS, PT, DPT, DHS, MS

PROVIDER DISCLAIMER

- Allied Health Education and the presenter of this webinar do not have any financial or other associations with the manufacturers of any products or suppliers of commercial services that may be discussed or displayed in this presentation.
- There was no commercial support for this presentation.
- The views expressed in this presentation are the views and opinions of the presenter.
- Participants must use discretion when using the information contained in this presentation.

COURSE OBJECTIVES

- Discuss the etiology and pathophysiology of CMT
- List nine health history factors associated with CMT to include in infant history
- List components of the systems screening examination for CMT
- Identify RED FLAGS for which consultation and/or referral to pediatrician or appropriate specialist is required
- Select appropriate tests and measures for the CMT examination
COURSE OBJECTIVES (CONT.)

- Develop an effective plan of care for CMT
- List common CMT body function/structure impairments, activity limitations, and participation restrictions
- Classify type and grade severity of CMT
- Select appropriate evidence-based interventions for CMT
- Discuss discharge criteria and follow-up recommendations for CMT
- Integrate CMT clinical practice guidelines into clinical practice

WHAT IS CMT?

- Unilateral shortening of the SCM muscle
- Named for side of the involved SCM muscle
- Lateral head tilt toward and chin rotation away from involved side
- Decreased neck ROM
- 0.3 to 16% of newborns
- Slightly more prevalent in boys versus girls
- 3rd most common congenital MSK condition
- Cranial deformation in up to 90% of infants with CMT
- Hip dysplasia, brachial plexus injury, scoliosis, pelvic asymmetry, distal extremity deformities, early and persistent developmental delay, facial asymmetry, TMJ dysfunction

ETIOLOGY

- Exact cause of CMT is unknown
- Birth trauma
- Intrauterine packaging problems
  - Larger babies, breech position, decreased intrauterine space, forceps assisted or vacuum extraction deliveries
- "Back to Sleep" campaign → prone position → CMT and CD
PATHOPHYSIOLOGY

- Excessive fibrosis, hyperplasia, atrophy of SCM
- Degree of fibrosis decreases over time
- Palpable nodule in SCM as early as 2-3 weeks old

PHYSICAL THERAPY MANAGEMENT

- 1994 Seminal article by Emory in PTJ: The determinants of treatment duration for CMT
- Cincinnati Children's Hospital Guideline on CMT update 2009

CLINICAL PRACTICE GUIDELINE

- Diagnostics and referral process
- Screening and examination procedures
- Prognosis determination for intervention intensity and duration of care
- Effective first-choice interventions, dosage guidelines, supplemental interventions
- When to refer for more invasive interventions
- Prognosis for untreated, conservative interventions, invasive interventions
- Intervention outcomes
- Patient characteristics that impact outcomes
IDENTIFICATION AND REFERRAL

ACTION STATEMENT 1: IDENTIFY NEWBORN INFANTS AT RISK FOR CMT
Assess the presence of neck and/or facial or cranial asymmetry within the first 2-3 days of birth
- Passive cervical rotation and lateral flexion
- Visual observation

Increase early identification and early referral to PT

Risk Factors
- Plagiocephaly
- Facial asymmetry
- Primigravity
- Birth trauma (including use of instruments for delivery)
- Longer birth body length

ACTION STATEMENT 2: REFER INFANTS WITH ASYMMETRIES TO PHYSICIAN & PT

- Positional preference
- Reduced cervical ROM
- SCM masses
- Facial asymmetry
- Plagiocephaly
ACTION STATEMENT 3: DOCUMENT INFANT HISTORY

- Age at initial visit
- Age of onset of symptoms
- Pregnancy history including mom's sense of baby being "stuck" last 6 weeks
- Delivery history including birth presentation (cephalic or breech) or multiple births
- Use of assistance during delivery (forceps, vacuum suction)
- Head posture/preference and changes in the head/face
- Family history of torticollis or any other congenital/developmental conditions
- Other known or suspected medical conditions
- Developmental milestones appropriate for age

ACTION STATEMENT 4: SCREEN INFANTS
**MSK SCREEN**

- MSK conditions that mimic CMT
  - Klippel-Feil syndrome, clavicle fracture, congenital scoliosis, C1-2 rotary subluxation
- Symmetrical shape of face, skull, spine
- Symmetrical alignment of shoulder and hip girdles
  - Cervical vertebral anomalies
  - Rib cage symmetry
  - Hip dysplasia
- Symmetrical PROM neck
- Palpation for SCM masses or restricted movement

**MSK RED FLAGS**

- Atypical positions
- Asymmetrical cervical vertebrae
- Acute pain with neck movement
- C1-2 instability (Down syndrome-AA instability)
- Late onset of head tilt with known symmetry for first few months of life
- Tissue masses outside of SCM

**NEUROLOGICAL SCREEN**

- Neurological causes of asymmetrical posturing
  - Brachial plexus injury, CNS lesions, astrocytoma, brain stem or cerebellar glial, agenesis of CNS structures, hearing impairments
- Visual causes of asymmetrical posturing
  - Ocular apraxia, strabismus, ocular muscle imbalances, nystagmus, visual field deficits
- Muscle Tone
- Developmental motor milestones
- Visual tracking
- Movement quality and symmetry
- Cranial nerve integrity
- Abnormal posturing
NEUROLOGICAL RED FLAGS

- Abnormal or asymmetrical muscle tone
- Retention of primitive reflexes
- Resistance to movement
- Cranial nerve dysfunction
- Temperament (irritability, alertness)
- Delayed developmental milestones
- Asymmetrical and disordered visual tracking in any direction
- Clinician inability to distinguish between ocular control versus neck rotation

INTEGUMENTARY SCREEN

- Skinfold symmetry of hips (inguinal, upper thigh) and cervical regions
- Color and condition of the skin
- Redness or irritation in the folds of the neck
- Asymmetry of skinfolds about the neck
- Signs of trauma that might cause asymmetrical posturing
- Red Flags
  - Asymmetrical skinfolds, bruising, raw skin breakdown, or purulent exudate

CARDIOPULMONARY SCREEN

- Symmetrical coloration
- Symmetrical rib cage expansion
- Clavicle movement
- Acute respiratory distress
- Red Flags
  - Stridor, wheezing, SOB, cyanotic lips
**GASTROINTESTINAL SCREEN**

- Reflux and/or constipation history
- Preferential feeding from one side
- Sandifer syndrome: trunk arching and neck flexion to the right after eating
- Infant's behavior before, during, and after feeding

**Red Flags**

- Curvature or arching of the trunk as a means of extending away from the esophagus usually accompanied by crying

**ACTION STATEMENT 5: REFER INFANTS TO PHYSICIAN IF RED FLAGS**

**REFERRAL TO PEDIATRICIAN**

- Poor visual tracking, abnormal muscle tone, extramuscular masses, or other asymmetries inconsistent with CMT
- After 4-6 weeks of initial intense intervention in absence of red flags with little or no reduction in neck asymmetry
- Refer back to physician
  - For immediate care
  - For further consultation
  - Consult with physician but also proceed with conservative interventions
ACTION STATEMENT 6: REQUEST IMAGES AND REPORTS

- Comorbidities
- R/O ocular, neurological, skeletal, and oncological reasons for asymmetrical posturing
- US: degree of fibrosis, size and location of fibrotic tissue
- Informs prognosis

PHYSICAL THERAPY EXAMINATION
ACTION STATEMENT 7:
EXAMINE BODY STRUCTURES & FUNCTION

OBSERVATION

- General posture and movement in supine, prone, sitting, and standing
  - Symmetrical alignment
  - Preferred positioning or posturing
  - Secondary movement asymmetries or compensations in the shoulders, trunk, hips, and distal extremities
    - Asymmetrical preference for limb use, asymmetrical/delayed protective and righting reactions, Trendelenburg in children who are walking, shoulder hiking, neck muscle strength imbalance, scoliosis

OBSERVATION

- Supine
  - Side of torticollis, asymmetrical hip positions, facial and skull asymmetries, asymmetrical use of the trunk and extremities
- Prone
  - Asymmetry of the spine, scoliosis, head on trunk, symmetry of UE WB, position tolerance, asymmetrical use of trunk and extremities
- Sitting, Supported Sitting, Supported Upright, Standing
  - Asymmetrical preferential postures and compensations in shoulders, trunk, and hips
BILATERAL ACTIVE CERVICAL ROTATION, LATERAL FLEXION, & DIAGONAL MOVEMENTS

- Rotation
  - Infants < 3 months: supine
  - Infants > 3 months: sitting on parents lap
- Lateral Flexion
- Muscle Function Scale

Active neck extension and rotation in prone

Rotations

- 0° below the horizontal line
- 10° or horizontal line
- 15° or 10° head above the horizontal line
- 20° or 15° head above the horizontal line
- 25° or 20° head above the horizontal line

Lateral Flexion

Muscle Function Scale

ROM

Passive and AROM UIEs and LEs, including screening for hip dysplasia.

Bilateral passive cervical rotation and lateral flexion measured with an arthrodial protractor.


PAIN AT REST & DURING A/PROM

- The Face, Legs, Activity, Crying and Consolability (FLACC): 2 months to 7 years old
- Rate facial expressions, movement, and behavior state

<table>
<thead>
<tr>
<th>Face</th>
<th>Legs</th>
<th>Activity</th>
<th>Cry</th>
<th>Consolability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calm</td>
<td>Neutral position or minimal activity</td>
<td>Calm</td>
<td>Calm</td>
<td>Content or relaxed</td>
</tr>
<tr>
<td>Anxious</td>
<td>Increased activity or minimal activity</td>
<td>Anxious</td>
<td>Anxious</td>
<td>Resisted by external touching, crying, or rocking</td>
</tr>
<tr>
<td>Pain</td>
<td>Sitting, sitting back in chair, walking or being held</td>
<td>Pain</td>
<td>Pain</td>
<td>Crying, wailing, kicking or high-strung</td>
</tr>
<tr>
<td>Comfort</td>
<td>Increased activity or minimal activity</td>
<td>Comfort</td>
<td>Comfort</td>
<td>Content or relaxed</td>
</tr>
<tr>
<td>Discomfort</td>
<td>Sitting, sitting back in chair, walking or being held</td>
<td>Discomfort</td>
<td>Discomfort</td>
<td>Resisted by external touching, crying, or rocking</td>
</tr>
<tr>
<td>Pain</td>
<td>Sitting, sitting back in chair, walking or being held</td>
<td>Pain</td>
<td>Pain</td>
<td>Crying, wailing, kicking or high-strung</td>
</tr>
</tbody>
</table>

INTEGUMENTARY: NECK & HIP SKIN FOLDS

- Neck skin folds on the anterior lateral side are deeper & reddened indicating SCM tightness.
- Redness and deeper posterior neck folds are an indication of upper trapezius muscle tightness.
- Symmetry of the hip skin folds in the inguinal and upper thigh area as an indicator of hip dysplasia.
- Discoloration, reddening, skin breakdown, irritation, or rashes.

MUSCLE INSPECTION

- Size, shape, and elasticity of the SCM, trapezius, and capital muscles.
- SCM nodule or fibrous band:
  - Locations: inferior, middle, superior, or entire length.
  - Nodules > than 1/3 of the SCM and are located distally are indicative of greater severity.
  - Nodules that are higher up or < 1/3 of the muscle length resolve quicker.

CRANIOFACIAL CHARACTERISTICS

- Head shape and facial features:
  - Anterior
  - Vertex
  - Posterior
  - Lateral
  - Inferior or submental view
- Argenta’s Clinical Classification:
  - http://www.cranialtech.com/online-assessment/
ACTION STATEMENT 8: CLASSIFY LEVEL OF SEVERITY

CLASSIFICATION FACTORS

- Age of treatment initiation
- Type of CMT (postural, muscular, SCM nodule)
- Severity of ROM limitations
- Presence of plagiocephaly
- Muscle fiber appearance by US

TYPE OF CMT

- Postural (Mild)
  - Positional preference of head and neck
  - No PROM limitations
  - No SCM nodule
- Muscular (Moderate)
  - Unilateral tightness of SCM
  - Decreased PROM ipsilateral rotation +/- contralateral lateral flexion
  - No SCM nodule
- SCM Nodule (Severe)
  - Palpable SCM nodule of fibrous bands
  - Decreased PROM ipsilateral rotation +/- contralateral lateral flexion
Grade of CMT Severity | Definition
--- | ---
**Grade 1: Early Mild** | 0-6 months
- Postural preference OR
- Muscular tightness < 15° cervical rotation
**Grade 2: Early Moderate** | 0-6 months
- Muscular tightness = 15° - 30° cervical rotation
**Grade 3: Early Severe** | 0-6 months
- Muscular tightness > 30° cervical rotation OR
- SCM Nodule
**Grade 4: Late Mild** | 7-9 months
- Postural preference OR
- Muscular tightness < 15° cervical rotation
**Grade 5: Late Moderate** | 10-12 months
- Postural preference OR
- Muscular tightness < 15° cervical rotation
**Grade 6: Late Severe** | 7-12 months
- Muscular tightness > 15° cervical rotation
**Grade 7: Late Extreme** | > 12 months
- SCM Nodule
- Muscular tightness > 30° cervical rotation

**ACTION STATEMENT 9: EXAMINE ACTIVITY & DEVELOPMENTAL STATUS**

- Types of and tolerance to position changes
- Examine motor development for movement symmetry and milestones
  - Delays as early as 2 months
  - Resolve by 10 months
  - 10% may not
- Test of Infant Motor Performance (34 weeks PCA to 4 months postterm)
- Harris Infant Neuromotor Test (2.5-12.5 months old)
- Alberta Infant Motor Scale (0-18 months old)

**ACTIVITY LIMITATIONS & MOTOR DEVELOPMENT DELAYS**
ACTION STATEMENT 10: EXAMINE PARTICIPATION STATUS

PARTICIPATION RESTRICTIONS

- Infant participation in life roles
  - Sleep
  - Feed
  - Play
  - Explore
  - Bond/interact
  - Developmental positions
  - Diapering/dressing/bathing

ACTION STATEMENT 11: DETERMINE PROGNOSIS
PURPOSE

- Predict resolution of CMT (expected outcomes)
- Predict length of episode of care
- Determine need to refer for more invasive interventions
- Guides intervention selection, frequency, and dosage

PROGNOSTIC INDICATORS

- Age of initiation of treatment
- Classification of severity
- SCM nodule location and size
- Intensity of intervention
- Presence of comorbidities
- Rate of change
- Adherence to home programming

CMT PROGNOSIS WITH PT

- 100% full resolution of CMT
  - < 3 months of age
  - Early referral
  - Caregivers are adherent with conservative intervention
- 75% full resolution of CMT
  - 3-6 months of age
- 30% full resolution of CMT
  - 6-18 months of age
LENGTH OF EPISODE OF CARE

- Intervention Duration
  - < 3 months = 1.5 to 3 months of care
  - > 3 months = 3 to 6 months of care
  - Extent of fibrosis impacts treatment duration
  - Severity of ROM restrictions = best predictor of treatment duration

SURGICAL RISK PREDICTORS

- After 6 months of controlled manual stretching:
  - Persistent head tilt
  - Limitations in cervical ROM > 15
  - Tight muscular band or SCM mass
  - Poor result on special assessment chart
    - Rotation and lateral bending deficit
    - Craniofacial asymmetry
    - Residual band
    - Head tilt
  - Parent assessment: cosmetic and functional

PHYSICAL THERAPY INTERVENTION
ACTION STATEMENT 12: PROVIDE THE FOLLOWING 5 COMPONENTS AS THE FIRST-CHOICE INTERVENTION

NECK PROM

- Manual Stretching
  - Origin/Insertion
  - Biomechanics
  - Location of nodules or fibrous bands
- Positioning & Handling
- Contraindications: Klippel-Feil syndrome, bony abnormalities, fractures (clavicle), C1-C2 subluxation, odontoid abnormalities, CNS or bone tumors, or brain stem malformations (Arnold-Chiari)
- Monitor for worried facial expressions, chin quivering, nasal flaring, increased body tone, changes in color, breather, or heart rate
- http://www.tandfonline.com/doi/pdf/10.1080/J006v17n02_03

NECK & TRUNK AROM

- Strengthen neck & trunk muscles
  - AROM during positioning, handling, carrying, feeding
  - Righting reactions in upright postures, rolling, side lying, sitting
  - Visual and auditory tracking towards affected side
  - Reaching
  - Active play in prone
DEVELOPMENT OF SYMMETRICAL MOVEMENT

- Promote active and symmetrical play during prone reaching, prone on elbows/hands, rolling, creeping, crawling, sitting, transitional movements, standing, and reaching.
- Prevent positional preference to one side.

ENVIRONMENTAL ADAPTATIONS

- Adapting car seats, infant carriers, infant swings, strollers, bouncer seat, feeding chairs, exersaucer, bumbo seat, rockers to promote symmetry.
- Place toys on the affected side to turn head toward the tighter side.
- Minimize amount of time in positioning/seating devices, strollers, car seats, cribs, swings.

Container Baby Syndrome or Bucket Babies:
http://www.moveforwardpt.com/symptomsconditionsdetail.aspx?cid=53d90264-1846-4b86-891f-0facc63db3e8

PARENT EDUCATION

- Importance of daily adherence to HEP
- Positioning & handling to encourage symmetry & midline development.
- "Tummy Time".
- Reinforcing or improving neck ROM, strength, and postural control.
- Minimize time spent in "containers".
- Alternate feedings to each side.
- Embed in daily routines.

Pathways Awareness Center: Five Essential Tummy Time Moves; Torticollis & Tummy Time
https://www.youtube.com/watch?v=M3rCtW9DMD4
https://www.youtube.com/watch?v=256SLL40v_Y
**KEY INTERVENTION CONCEPTS**

<table>
<thead>
<tr>
<th>LIMITATIONS</th>
<th>PT INTERVENTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decreased cervical rotation</td>
<td>Manual stretching of tight musculature, active cervical rotation toward non-preferred side, strengthening of cervical musculature, passive positioning to stretch tight tissues.</td>
</tr>
<tr>
<td>Head tilt</td>
<td>Manual stretching of tight musculature, active cervical lateral flexion away from head tilt, strengthening of cervical musculature, passive positioning to stretch tight tissues.</td>
</tr>
<tr>
<td>Positional preference +/- trunk asymmetry</td>
<td>Active movement and strengthening opposite of the preferred side or asymmetry.</td>
</tr>
<tr>
<td>Prone position intolerance</td>
<td>Increase use of prone positioning to strengthen capital muscles and facilitate symmetrical trunk and head alignment.</td>
</tr>
<tr>
<td>Asymmetrical postures</td>
<td>Active movement and strengthening opposite of the asymmetry.</td>
</tr>
<tr>
<td>Developmental Delay</td>
<td>Facilitate equal use of all extremities and head turning to both directions during daily activities and play.</td>
</tr>
</tbody>
</table>

**ACTION STATEMENT 13: PROVIDE SUPPLEMENTAL INTERVENTIONS**

- Microcurrent (Level II evidence)
- Myokinetic stretching (Level II evidence)
- Kinesiological taping (Level III evidence)
- TAMO (Level IV evidence)
- Cervical collars (Level V evidence)
ACTION STATEMENT 14: REFER FOR CONSULTATION WHEN OUTCOMES ARE NOT FULLY ACHIEVED

SIGNS OF NOT PROGRESSING
- Asymmetries of the head, neck, and trunk are not resolving after 4 to 6 weeks of initial intense treatment
- After 6 months of treatment with only moderate resolution
- Older than 12 months on initial examination
  - Facial asymmetry
  - 10°-15° difference persists between sides
- Older than 7 months on initial examination
  - Tight band or SCM mass is present
- Side of torticollis changes

DISCHARGE AND FOLLOW-UP
ACTION STATEMENT 15: DOCUMENT OUTCOMES & DISCHARGE FROM PT WHEN CRITERIA ARE MET

- Full PROM within 5° of the uninvolved side
- Symmetrical active movement patterns throughout the passive range
- Age-appropriate motor development including symmetrical movement patterns between sides during static, dynamic, and reflexive movements
- No visible head tilt
- Parents/caregivers understand what to monitor as the child grows

DISCHARGE CRITERIA

ACTION STATEMENT 16: PROVIDE A FOLLOW-UP SCREENING 3-12 MONTHS POST DISCHARGE
FOLLOW-UP SCREENING EXAM

- Positional preference
- Structural and movement symmetry of neck, face, and head, trunk, hips, UEs and LEs
- Developmental milestones

PRACTICE IMPLEMENTATION

- Compare what is already being done with recommended actions
- Try selected changes in practice to determine efficacy
- Identify gaps in knowledge and skills to determine staff needs
- Use documentation templates to facilitate standardized collection and implementation
- Institute quality assurance processes to monitor routine collection of recommended data, implementation of recommendations, and barriers
- Measure structural outcomes, process outcomes, and service outcomes

PRACTICE RECOMMENDATIONS
REFERENCES

REFERENCES


