

PHYSICAL THERAPY MANAGEMENT OF TORTICOLLIS

A Family Centered, Holistic Approach

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Tina Deguzman, PT, DPT, PCS



COURSE OBJECTIVES

01

Understand the etiology and pathophysiology of torticollis

02

Understand the prognosis for torticollis based on initial evaluation age and measurements

03

Comprehend how to apply torticollis assessment techniques for infants, toddlers, children

04

Demonstrate understanding of physical therapy treatment for infants and toddlers with torticollis

05

Demonstrate understanding of treating torticollis within the context of the whole child, environment and family system and how that can impact treatment and outcome

06

Demonstrate understanding of applying sensory system information and neurobiology to a patient with torticollis

07

Be able to screen for differential diagnosis for torticollis and when to refer out to specialists

SPEAKER INTRODUCTIONS

Natalia Blackman

- 10+ years experience
- Doctor of Physical Therapy & Pediatric Clinical Specialist
- Certified Zero to Three Trainer of Trainers
- Parent educator
- Early childhood Co-Chair for COI
- Holistic approach considering all systems and applying principles of neuroscience, neurobiology environmental, parental and societal influences to pediatric PT and classroom environments
- Mom of 3

Disclosures

Non- Financial

- Headstart preschool concept and content & program development
- Vendor San Diego regional center
- Holistic PT course development

Financial

- None



SPEAKER INTRODUCTIONS



Allison Angeli

- 10 + years experience in pediatrics outpatient ortho and neuro
- Early intervention experience 0-3 in home health based physical therapy
- Doctor of Physical Therapy
- Pediatric Clinical Specialist
- Contributing faculty at The University of St. Augustine for Health Sciences in the pediatrics and neuromuscular courses and for the Pro Bono Clinic

Disclosures:

Non-Financial

- Rady Children's Hospital-San Diego
- St. Augustine contributing faculty
- Vendor for San Diego Regional Center

CONTRIBUTING AUTHOR



Tina Deguzman

- 6 years experience in outpatient developmental and orthopedic pediatrics
- Doctor of Physical Therapy
- Pediatric Clinical Specialist

Disclosures:

Non-Financial

- Rady Children's Hospital-San Diego

TODAY'S AGENDA

01	What is Torticollis?	<ul style="list-style-type: none"> • Anatomy • Etiology • Pathophysiology
02	Assessment of Torticollis	<ul style="list-style-type: none"> • Subjective Interview • Systems Screen • Outcome Measures
03	Cranial Deformation	<ul style="list-style-type: none"> • Brachycephaly • Plagiocephaly • Other Cranial Deformities
04	Family Centered and Holistic Approach	<ul style="list-style-type: none"> • Communication Strategies • Real life Application
05	Interventions	<ul style="list-style-type: none"> • Infants • Toddlers • Toddlers and Beyond
06	Discharge Criteria	<ul style="list-style-type: none"> • Initial Discharge Criteria • Reassessment • Realistic Discharge Criteria
07	Q&A	

POLL!

What are you most interested in learning about from this presentation?

1. Assessment & Screening
2. Framework for Intervention
3. Family-Centered Communication





ANATOMY AND ETIOLOGY

WHAT IS TORTICOLLIS?

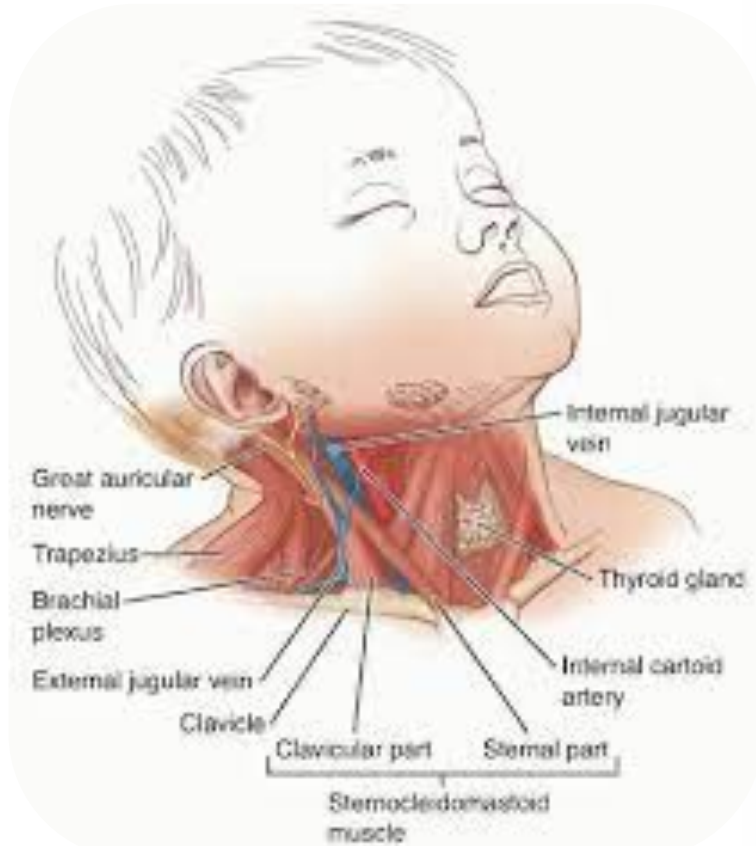


iStockphoto.com

- Torticollis is unilateral shortening of the sternocleidomastoid muscle (SCM) and is named for the side of the involved SCM muscle
- An example would be tightness in left SCM would be named left sided torticollis¹
 - Left head tilt
 - Right rotational preference

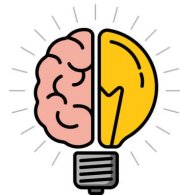


ANATOMY OF TORTICOLLIS



<https://musculoskeletalkey.com/release-of-the-sternocleidomastoid-muscle/>

- SCM has 2 bands:
 - **Medial band** from manubrium of sternum to ipsilateral mastoid process and the superior nuchal line of the cranium
 - **Lateral band** from the medial $\frac{1}{3}$ of clavicle to ipsilateral mastoid process and superior nuchal line of the cranium
- Trapezius may be involved. Synergist for ipsilateral SCM in lateral tilt and elevates the scapula.¹



Critical Thinking!

- Other muscles affected may include: scalenes, platysma, cervical flexors, tongue
- Whole body?

TYPES OF TORTICOLLIS

Postural



<https://www.candokiddo.com/news/torticollis>

- Most mild
- Positional preference
- No nodule
- No PROM limitations

Muscular



<https://www.boostbabiesaustralia.com/>

- Unilateral tightness during cervical rotation and/or lateral flexion
- No nodule

SCM Nodule



<http://myfavouritephysio.com.au/torticollis/>

- Most severe
- Limitations in either/both cervical rotation and lateral flexion
- Nodule present¹

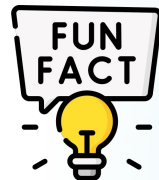
CONGENITAL MUSCULAR TORTICOLLIS (CMT) VS. ENVIRONMENTAL/POSITIONAL TORTICOLLIS



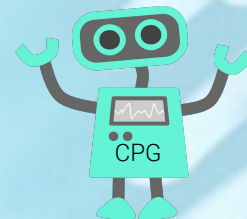
- **Congenital muscular torticollis (CMT)** is present at birth due to in utero positioning or birth process
- **Environmental or positional torticollis** is extremely common clinically seen due to:
 - Lack of different positions baby is in throughout the day
 - Excessive time spent in baby equipment
 - Child often has environmental stimulation on one side only
 - Lack of internally driven movement (good thing to keep an eye on)



<https://www.abcpediatrictherapy.com/torticollis/>



- The CPG is *ONLY* for CMT
- The CPG is great but let's not be CPG robots



CONGENITAL MUSCULAR TORTICOLLIS (CMT) VS. ENVIRONMENTAL/POSITIONAL TORTICOLLIS

- Parents of infants with severe CMT experience more stress than parents of infants with mild CMT
 - Thinking back on their pregnancy to look for a cause
 - Experiencing anxiety after finding a mass²



<https://www.tinytransformationsnyc.com/blog/torticollis>



ETIOLOGY AND PATHOPHYSIOLOGY OF TORTICOLLIS AND CRANIAL DEFORMATION (CD)

Prenatal Factors

- Ischemic injury based on abnormal vascular patterns
- Head position in utero leading to compartment syndrome
- Intrauterine crowding
- Muscle rupture

Perinatal Factors

- Breech and/or assisted deliveries
- Use of forceps or vacuum
- Complicated delivery
- Shoulder dystocia

Postnatal Factors

- Presence of hip dysplasia³
- Positional preference
- Presence of cranial deformity
- Back to Sleep campaign⁴
- Infrequent tummy time
- Bottle feeding in same arm
- Consistent positioning in crib
- Prolonged NICU stay
- Underlying medical diagnoses

ETIOLOGY AND PATHOPHYSIOLOGY OF TORTICOLLIS AND CRANIAL DEFORMATION (CD)

Presence of a Nodule

Degree of nodule and location of nodule are associated with prognosis

Factors Limiting Full Resolution of Torticollis

Age of referral

Severity of ROM limitations

Thickness of SCM nodule

Variability and dosage of intervention

**Fibrotic be aware of decreased elasticity re: stretching*

Differential Diagnosis

Absence of SCM

Benign paroxysmal torticollis

Congenital malformation

Bony anomalies

Brachial plexus injury

Ocular disorders

Neurological impairments¹

RELATIONSHIP TO ICF MODEL

Health Condition:
Torticollis and Cranial Deformation

Body Structure and Function Impairments:

Cervical PROM/AROM
Oral motor function
Muscle Function Scale
UE/LE ROM
Pain
Palpation
Caliper Measurements
Stiff spinal segments throughout the spine
Rib cage mobility
Diaphragm contractility and work of breathing
Vestibular system - tolerance of movement
Cranial deformity
Facial and/or ear asymmetry

Activity Limitations:

Positional preference and decreased tolerance to prone positioning
Asymmetrical propping on upper extremities
Asymmetrical movements and transitions that can affect: rolling, sitting, creeping, quadruped, kneeling, half kneeling, and standing
Decreased visual tracking toward ipsilateral side
Altered midline perceptual motor coordination
Asymmetrical or delayed righting and protective reactions¹
Difficulty visual tracking to the contralateral side from the flattening
Difficulty fitting glasses due to ear asymmetry

Participation Restrictions:

Difficulty bottle or breastfeeding on both sides (prefers one side)
Reduced tolerance to prone positions for play
Prefers one side only for play and sleep¹

Environmental Factors:

Car Seat use, prolonged or excessive
Positioning and use of baby equipment throughout the day
Access to safe place to play
Family dynamic, siblings, multigenerational homes

Personal Factors:

Caregiver mental health
Temperament and personality of child
Sensory system processing (vestibular, proprioception, tactile tolerance)



PHYSICAL THERAPY EVALUATION

KEY PRINCIPLES TO KEEP IN MIND

- Need to be flexible with the order of the evaluation based on caregiver and infant tolerance
- Check in with parents so they can let you know if the infant or toddler is starting off the evaluation rested, tired, fed or hungry this will determine what you might want to start with first or wait until the end to perform
- Focus on helping the parent understand what will best help their child at home, a **solid take away** from the evaluation to start supportive intervention
- Prioritize greatest risks or barriers (example: child spends 5 hours per day in swing etc.)



Critical Thinking!

If they never came back to see you, what is one thing you want them to learn to empower them and affect change for them?

CHATBOX

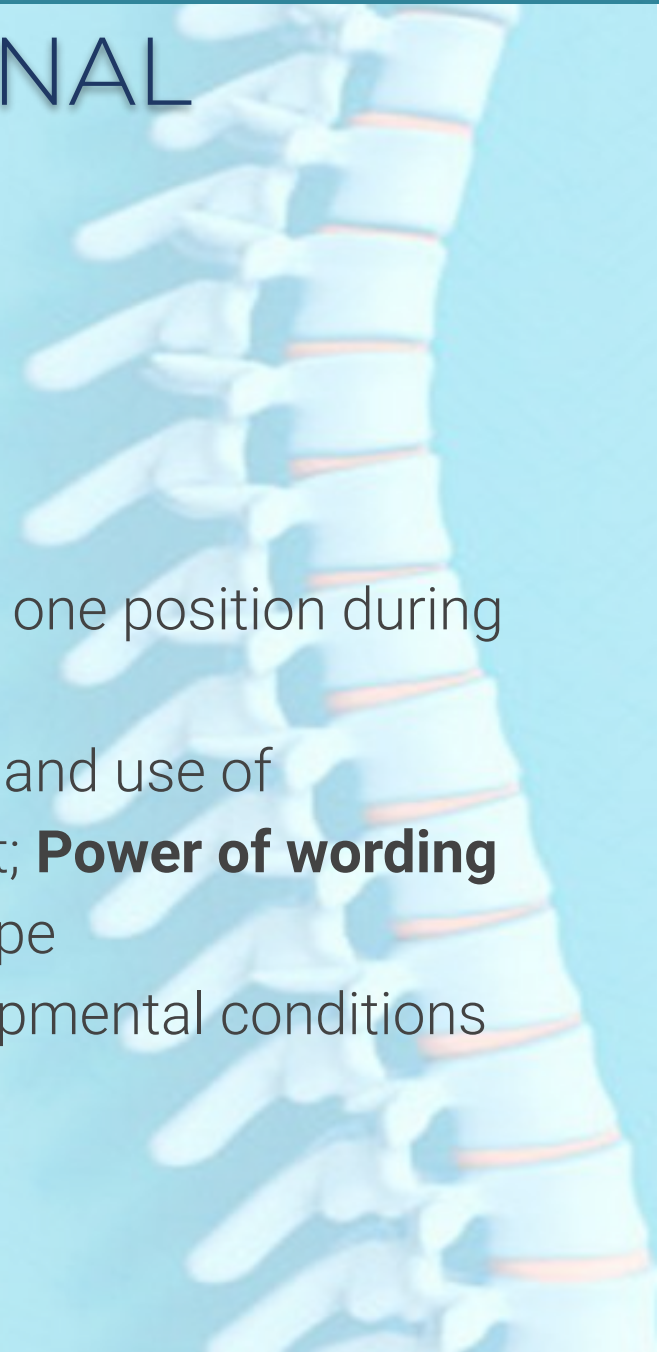
What would your “one thing” be that you want parents to take away from the initial evaluation?



TAKING AN INFANT GESTATIONAL AND DELIVERY HISTORY



- Age at initial visit (chronological and adjusted age)
- Age when symptoms were noted
- Pregnancy history including whether the baby was “stuck” in one position during the end of pregnancy (last 6 weeks or so)
- Delivery history including birth position (cephalic or breech), and use of assistance during delivery such as forceps or vacuum assist; **Power of wording**
- Head posture/preference and changes in the head/face shape
- Family history of torticollis or any other congenital or developmental conditions
- Other known or suspected medical conditions
- Developmental milestones and when they were achieved⁶



TAKING DEVELOPMENTAL AND ENVIRONMENTAL HISTORY

What is their typical day like? What positions? How long?

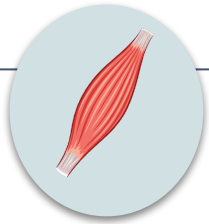
Do they have a safe space to play on the floor like a mat and baby gate? → if not, problem solve with them! What are the barriers?

Do they tolerate different positions such as sidelying, assisted rolling, does the parent default to placing them in sitting?

Do they use or spend time in any baby equipment? How long and what type?

What does floor time look like? What do caregiver interactions look like, what toys are used, etc

SYSTEMS SCREEN



Musculoskeletal

A/PROM of all extremities and trunk, Screen for developmental hip dysplasia^{33,34}
Palpate SCM to assess for possible mass



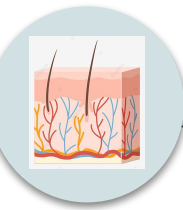
Neurological

Screen for clonus/Babinski, muscle tone, reflexes, cranial nerve integrity, observe for nystagmus, lack of symmetrical eye movements, inconsistent head tilt or alternating sides *



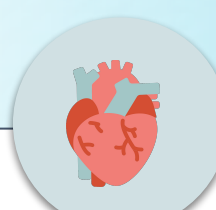
Gastrointestinal

Asking about feeding - any preference towards feeding only to one side
History of reflux or GI discomfort⁷
Breastfeeding or bottle feeding?



Integumentary

Checking the skin in neck creases and body for areas of redness, irritation, and discoloration, low back area (sacral dimple), and symmetry of skin folds in hips and neck regions. * if had surgeries check skin mobility over scars (cardiac patients, extreme prematurity etc.)



Cardiorespiratory

Observe for symmetrical rib cage expansion, Any signs of respiratory distress or abnormal breathing patterns
Vagus nerve position
Parasympathetic nervous system

Children diagnosed with torticollis may be at a greater risk of neurodevelopmental diagnosis & delay⁸

Developmental



Cognitive



Fine Motor



Language



Social/Emotional



Sensory



Caregiver

Concerns

EVAL TEMPLATE *KARMEL-ROSS*⁹

Karen Karmel-Ross and Michael Lepp 23

FIGURE 1. Torticollis assessment form pages 1-5. Pages 1-3 provide for recording of assessment results. Page 4 summarizes problems noted, and page 5 outlines the goals and treatment plan.

Torticollis Evaluation Form

Patient name: _____
Hospital number: _____
D.O.B.: _____

☐ Inpatient ☐ Outpatient

Date: _____ Chronological age: _____ Referral Source: _____
Age at onset: _____ Age at diagnosis: _____ Race: _____ Sex: _____
Pediatrician/family physician: _____ Orthopedic Surgeon: _____
Torticollis: ☐ left ☐ right
X-rays: ☐ cervical ☐ hip ☐ spine ☐ other: _____
☐ comment: _____
Social/family history: _____

Pregnancy/labor/delivery complications:
Delivery: ☐ c-section ☐ vaginal ☐ breech ☐ suction ☐ forceps ☐ nuchal cord
☐ twin A ☐ twin B ☐ other: _____
Birth weight: _____ Birth order: _____ Weeks gestation: _____ Apgars: _____
Hip status: ☐ WNL ☐ dislocated ☐ dysplastic ☐ left ☐ right
Feeding: ☐ bottle ☐ nursing ☐ feeding problems: _____
Related problems/diagnoses: _____

Ocular exam: _____
Palpation SCM: ☐ nl ☐ diffuse fibrosis ☐ mass size: _____
☐ fibrotic mass specify: ☐ left ☐ right ☐ moderate ☐ severe
Craniofacial asymmetry: ☐ mild ☐ moderate ☐ severe ☐ concordant ☐ discordant
Plagiocephaly: ☐ mild ☐ moderate ☐ severe
Hemihypoplasia: ☐ mild ☐ moderate ☐ severe
Typical posture: _____
supine _____
prone _____
sit _____
stand _____
transitions _____

Behavior: ☐ tolerates handling ☐ intolerant with handling
Respiratory: ☐ WNL ☐ retractions ☐ nasal flare ☐ changes with activity
☐ other: _____

Skin: _____
Visual: _____
Focus on objects: ☐ yes ☐ no ☐ up ☐ down ☐ diagonal
Visual pursuit: ☐ left ☐ right
Test positions: ☐ peripheral ☐ head tilt L ☐ head tilt R ☐ head held in midline ☐ supine
☐ head held in midline ☐ independent sit

Developmental Test Used and Results: _____

Therapist's initials: _____

Page 1

Patient name: _____
Hospital number: _____

Joint Evaluation/ROM

Passive tested supine:
Neck: _____ degrees flexion _____ degrees extension
Neck lateral flexion: _____ degrees left _____ degrees right
Neck rotation: _____ degrees left _____ degrees right
Active rotation supine: _____ degrees left _____ degrees right
Active rotation sit: _____ degrees left _____ degrees right
Active rotation prone: _____ degrees left _____ degrees right
Active rotation stand: _____ degrees left _____ degrees right

UE's: ☐ no limitations ☐ limitations: _____
LE's: ☐ no limitations ☐ limitations: _____
Trunk: ☐ no limitations ☐ limitations: _____

Muscle Tone

UE's: ☐ hypo ☐ low ☐ nl ☐ high ☐ hyper
☐ unable to assess, describe _____
LE's: ☐ hypo ☐ low ☐ nl ☐ high ☐ hyper
☐ unable to assess, describe _____
Trunk: ☐ hypo ☐ low ☐ nl ☐ high ☐ hyper
☐ unable to assess, describe _____
Neck: ☐ hypo ☐ low ☐ nl ☐ high ☐ hyper
☐ unable to assess, describe _____

Strength

	Full movement against gravity	Partial movement against gravity	No movement against gravity	Not assessed	Test position
Neck flexion					
Neck extension					
Neck lateral flexion Left					
Neck lateral flexion Right					
Neck rotation Left					
Neck rotation Right					
Trunk flexion					
Trunk extension					
Trunk lateral flexion Left					
Trunk lateral flexion Right					
Left Upper Extremity					
Right Upper Extremity					
Left Lower Extremity					
Right Lower Extremity					
Other strength tests:					

Pull-to-tilt:
Head R: ☐ yes ☐ no
Head L: ☐ yes ☐ no
Trunk R: ☐ yes ☐ no
Trunk L: ☐ yes ☐ no

Therapist's initials: _____

Page 2

EVAL TEMPLATE *KARMEL-ROSS*⁹

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Postural Reactions

Vertical Neck Righting

Upright tilt 45° (2.5-6 mo.):

full response	<input type="checkbox"/> L	<input type="checkbox"/> R
partial response	<input type="checkbox"/> L	<input type="checkbox"/> R
no response	<input type="checkbox"/> L	<input type="checkbox"/> R
not assessed	<input type="checkbox"/> L	<input type="checkbox"/> R

Upright tilt anterior dir. 45° (2.5-6 mo.):

full response	<input type="checkbox"/> L	<input type="checkbox"/> R
partial response	<input type="checkbox"/> L	<input type="checkbox"/> R
no response	<input type="checkbox"/> L	<input type="checkbox"/> R
not assessed	<input type="checkbox"/> L	<input type="checkbox"/> R

Upright tilt posterior dir. 45° (2.5-6 mo.):

full response	<input type="checkbox"/> L	<input type="checkbox"/> R
partial response	<input type="checkbox"/> L	<input type="checkbox"/> R
no response	<input type="checkbox"/> L	<input type="checkbox"/> R
not assessed	<input type="checkbox"/> L	<input type="checkbox"/> R

Prone (1.5-4 mo.):

full response	<input type="checkbox"/> L	<input type="checkbox"/> R
partial response	<input type="checkbox"/> L	<input type="checkbox"/> R
no response	<input type="checkbox"/> L	<input type="checkbox"/> R
not assessed	<input type="checkbox"/> L	<input type="checkbox"/> R

Supine (5 mo.):

full response	<input type="checkbox"/> L	<input type="checkbox"/> R
partial response	<input type="checkbox"/> L	<input type="checkbox"/> R
no response	<input type="checkbox"/> L	<input type="checkbox"/> R
not assessed	<input type="checkbox"/> L	<input type="checkbox"/> R

Rotational Righting Reaction (6-12 mo.):

full response	<input type="checkbox"/> L	<input type="checkbox"/> R
partial response	<input type="checkbox"/> L	<input type="checkbox"/> R
no response	<input type="checkbox"/> L	<input type="checkbox"/> R
not assessed	<input type="checkbox"/> L	<input type="checkbox"/> R

Protective Extension Reactions

Downward (6-7 mo.):

full response	<input type="checkbox"/> L	<input type="checkbox"/> R
partial response	<input type="checkbox"/> L	<input type="checkbox"/> R
no response	<input type="checkbox"/> L	<input type="checkbox"/> R
not assessed	<input type="checkbox"/> L	<input type="checkbox"/> R

Forward (8-9 mo.):

full response	<input type="checkbox"/> L	<input type="checkbox"/> R
partial response	<input type="checkbox"/> L	<input type="checkbox"/> R
no response	<input type="checkbox"/> L	<input type="checkbox"/> R
not assessed	<input type="checkbox"/> L	<input type="checkbox"/> R

Sideways (9-11 mo.):

full response	<input type="checkbox"/> L	<input type="checkbox"/> R
partial response	<input type="checkbox"/> L	<input type="checkbox"/> R
no response	<input type="checkbox"/> L	<input type="checkbox"/> R
not assessed	<input type="checkbox"/> L	<input type="checkbox"/> R

Backward (9-12 mo.):

full response	<input type="checkbox"/> L	<input type="checkbox"/> R
partial response	<input type="checkbox"/> L	<input type="checkbox"/> R
no response	<input type="checkbox"/> L	<input type="checkbox"/> R
not assessed	<input type="checkbox"/> L	<input type="checkbox"/> R

Therapist's initials: _____

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TORTICOLLIS

FIGURE 1 (continued)

Postural Reactions (continued)

Equilibrium Reactions

Prone (5-9 mo.):

full response	<input type="checkbox"/> L	<input type="checkbox"/> R
partial response	<input type="checkbox"/> L	<input type="checkbox"/> R
no response	<input type="checkbox"/> L	<input type="checkbox"/> R
not assessed	<input type="checkbox"/> L	<input type="checkbox"/> R

Supine (7-11 mo.):

full response	<input type="checkbox"/> L	<input type="checkbox"/> R
partial response	<input type="checkbox"/> L	<input type="checkbox"/> R
no response	<input type="checkbox"/> L	<input type="checkbox"/> R
not assessed	<input type="checkbox"/> L	<input type="checkbox"/> R

Sitting (7-8 mo.):

full response	<input type="checkbox"/> L	<input type="checkbox"/> R
partial response	<input type="checkbox"/> L	<input type="checkbox"/> R
no response	<input type="checkbox"/> L	<input type="checkbox"/> R
not assessed	<input type="checkbox"/> L	<input type="checkbox"/> R

Quadruped (8-12 mo.):

full response	<input type="checkbox"/> L	<input type="checkbox"/> R
partial response	<input type="checkbox"/> L	<input type="checkbox"/> R
no response	<input type="checkbox"/> L	<input type="checkbox"/> R
not assessed	<input type="checkbox"/> L	<input type="checkbox"/> R

Standing (12-21 mo.):

full response	<input type="checkbox"/> L	<input type="checkbox"/> R
partial response	<input type="checkbox"/> L	<input type="checkbox"/> R
no response	<input type="checkbox"/> L	<input type="checkbox"/> R
not assessed	<input type="checkbox"/> L	<input type="checkbox"/> R

Other Reflex Tests: _____

Assessment Problems

☐ Torticollis: ☐ L ☐ R ☐ mild ☐ moderate ☐ severe

☐ plagiocephaly ☐ hemihypoplasia

☐ Decreased neck passive range of motion:

<input type="checkbox"/> lateral flexion L	<input type="checkbox"/> rotation L
<input type="checkbox"/> lateral flexion R	<input type="checkbox"/> rotation R
<input type="checkbox"/> flexion	<input type="checkbox"/> extension

☐ Decreased trunk passive range of motion:

<input type="checkbox"/> lateral flexion L	<input type="checkbox"/> rotation L
<input type="checkbox"/> lateral flexion R	<input type="checkbox"/> rotation R
<input type="checkbox"/> flexion	<input type="checkbox"/> extension

☐ Decreased strength:

☐ Decreased active neck rotation:

<input type="checkbox"/> L	<input type="checkbox"/> trunk	<input type="checkbox"/> UE's	<input type="checkbox"/> LE's
<input type="checkbox"/> R	<input type="checkbox"/> R	<input type="checkbox"/> supine	<input type="checkbox"/> prone

☐ No midline head-to-trunk crit:

☐ No visual tracking:

<input type="checkbox"/> sit	<input type="checkbox"/> stand	<input type="checkbox"/> sit	<input type="checkbox"/> stand
<input type="checkbox"/> supine	<input type="checkbox"/> prone	<input type="checkbox"/> L	<input type="checkbox"/> R
<input type="checkbox"/> L	<input type="checkbox"/> R	<input type="checkbox"/> up	<input type="checkbox"/> down

☐ Postural alignment problems

☐ Vestibular and/or sensory problems

☐ Head righting responses:

<input type="checkbox"/> no response	<input type="checkbox"/> L	<input type="checkbox"/> R
<input type="checkbox"/> partial response	<input type="checkbox"/> L	<input type="checkbox"/> R
<input type="checkbox"/> no response	<input type="checkbox"/> L	<input type="checkbox"/> R
<input type="checkbox"/> partial response	<input type="checkbox"/> L	<input type="checkbox"/> R

☐ Equilibrium responses:

☐ Development delay:

☐ Other: _____

Therapist's initials: _____

Page 4

Karen Karmel-Ross and Michael Lepp 27

Rehabilitation Potential ☐ poor ☐ fair ☐ good ☐ excellent

Goals

Short term time frame: _____

Short term goals: _____

Long term time frame: _____

Long term goals: _____

Treatment Plan

Frequency of treatment: _____

Duration of treatment: _____

<input type="checkbox"/> Neck ROM	<input type="checkbox"/> Bracing	<input type="checkbox"/> SOT	<input type="checkbox"/> Foam collar
<input type="checkbox"/> Trunk ROM	<input type="checkbox"/> Development exercises		
<input type="checkbox"/> Extremity ROM	<input type="checkbox"/> Manual therapy		
<input type="checkbox"/> Positioning devices	<input type="checkbox"/> Parent education/home program		
<input type="checkbox"/> Strength exercises	<input type="checkbox"/> SI intervention		
<input type="checkbox"/> Positioning/handling techniques	<input type="checkbox"/> Postural education exercises		
<input type="checkbox"/> Other: _____			

Referral Recommendations

☐ OT/PT

☐ Orthopedics

☐ Pediatric Surgery

☐ Plastic Surgery

☐ Pediatric Neurology

☐ Pediatric Neurosurgery

☐ Ophthalmology

Therapist's signature and date: _____

Phone number: _____

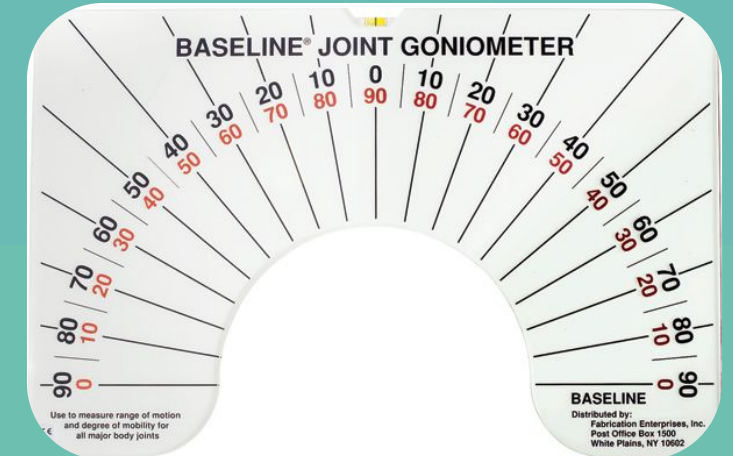
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Page 5

POLL!

How do you measure cervical ROM?

1. Arthrodial goniometer
2. Visual measurement using anatomical landmarks
3. Percentages

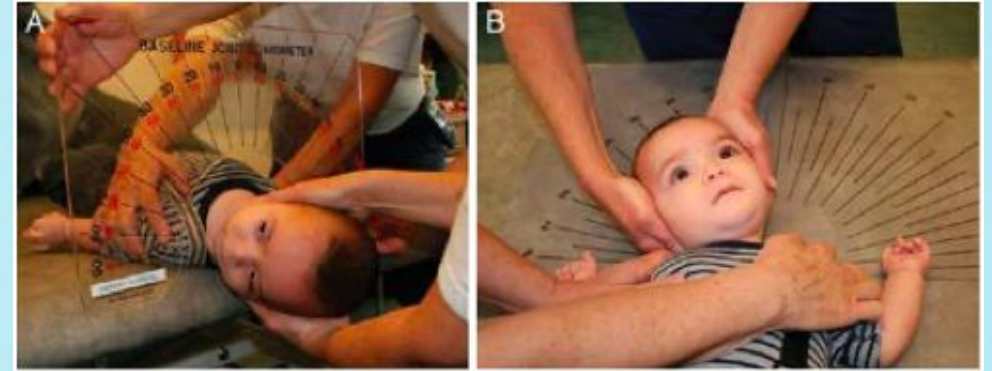


<https://www.tru-medical.com/Evaluation-Products/Arthrodial-Protractor>



ARTHRODIAL GONIOMETER ROM & CLINICAL REALITY

- Arthrodial Goniometer Traditional and Ideal
- Visual Measurement for c/s rotation
 - Acromion process- 90 degrees
 - Axilla- 75
 - Nipple line- 45⁷



Hautopp L, Wester S, Bang B, Buus L, Grindsted J, Christensen K, Knudsen B, Vinther A. Benefit of physiotherapeutic treatment in children with torticollis. Dan Med J. 2014 Dec;61(12):A4970. PMID: 25441728.

- Clinical Reality
 - Don't terrify the child to perform a standardized assessment when it might not give you functional information that will impact your intervention
 - It's about functional dynamic movement!



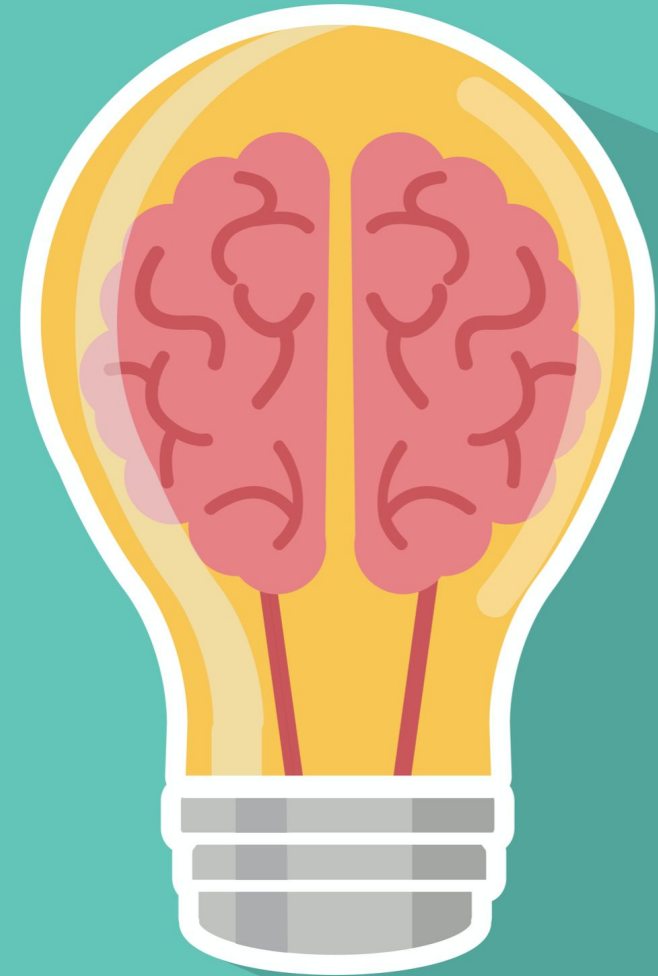
Critical Thinking!

What to document when this happens; parent holds child, observe how they're held, etc.

- Treatment May Look Non-Traditional:
 - Child has severe stranger anxiety and we are 10 ft away coaching parent on what to do (utilize mirrors, utilize family members, utilization communication skills)

EXERCISE

Imagine someone you don't know coming over to you, not telling you what they are going to do, who they are, or what will happen. You are scared and no one communicates with you and then they proceed to touch your body and you are crying.



MUSCLE FUNCTION SCALE



5

Head $>75^\circ$ above horizontal line



4

Head $45^\circ - 75^\circ$ above horizontal line



3

Head $15^\circ - 45^\circ$ above horizontal line



2

Head $0^\circ - 15^\circ$ above horizontal line



1

Head on horizontal line at 0°



0

Head below horizontal line $< 0^\circ$

- Used to assess muscle strength of the cervical lateral flexors of the neck⁷
- 5 grades given
- By **4 months** the infant should be scoring a 5/5⁶

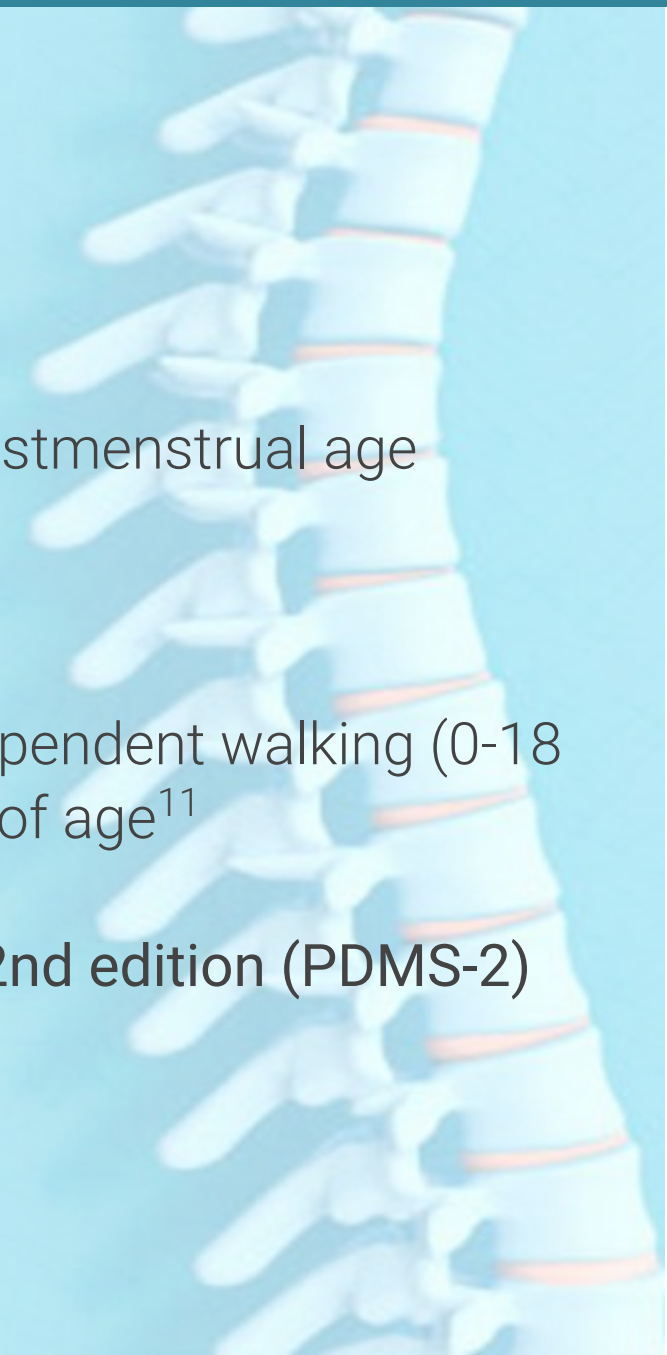


Critical Thinking!

Think global muscle co-contraction, coordination of muscle groups, and vestibular system

OUTCOME MEASURES

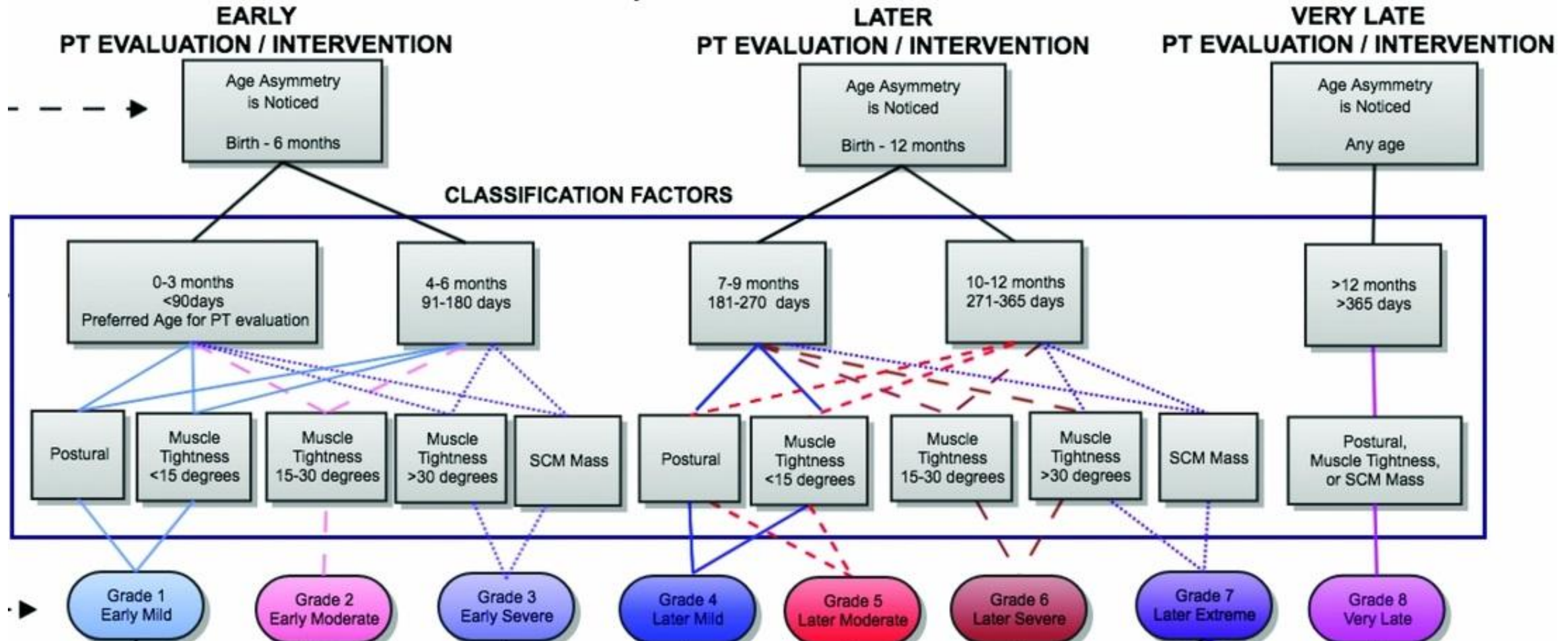
- **Test of Infant Motor Performance (TIMP)**
Through 4 months corrected age or more specifically 34 weeks postmenstrual age through 17 weeks post term (corrected age).¹⁰
- **Alberta Infant Motor Scale (AIMS)**
Developmental tool appropriate for infants from birth through independent walking (0-18 months of age) * *clinical pearl** most sensitive around 4-7 months of age¹¹
- **Gross Motor Subtests of Peabody Developmental Motor Scales, 2nd edition (PDMS-2)**
1-72 months of age



CMT CLASSIFICATION GRADES OF SEVERITY⁶

****Doesn't take
into account tilt
or lateral flexion**

CMT Classification Grades and Decision Tree for 0-12 months 2018 Update*



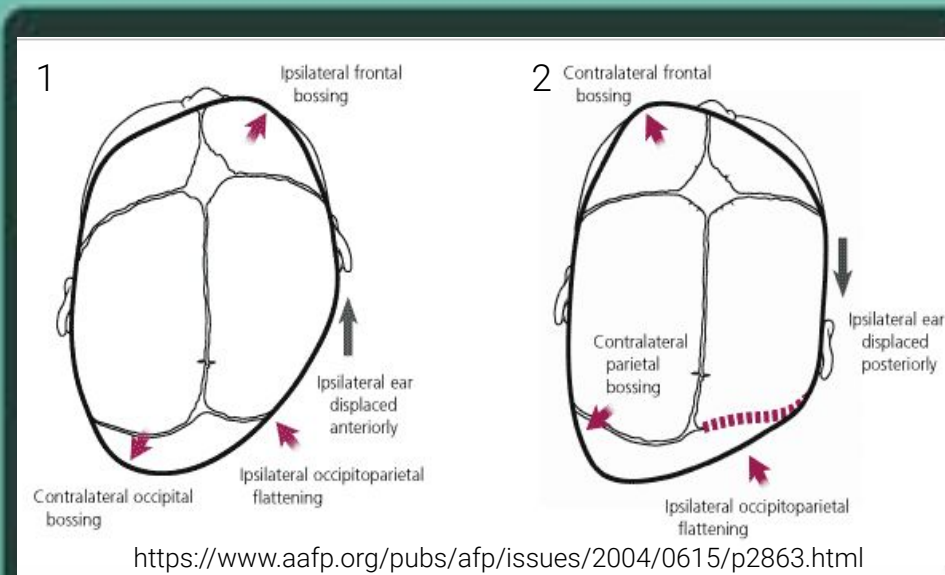


CRANIAL DEFORMATION ASSESSMENT & CONSIDERATIONS

POLL: QUIZ!

Which head shape would cause concern?

1. R occipital flattening, R frontal bossing, L occipital bossing, R ear anteriorly displaced
2. R occipito-parietal flattening, L frontal bossing, L parietal bossing, R ear posteriorly displaced



TYPES OF CRANIAL DEFORMATION COMMONLY ASSOCIATED WITH TORTICOLLIS

- **Deformational plagiocephaly (DP)**- Parallelogram shape with ipsilateral occipital flattening and contralateral occipital bossing. Commonly associated with CMT or positional torticollis
- **Deformational brachycephaly (DB)** - Central occipital flattening, associated with prolonged supine positioning¹



Normal



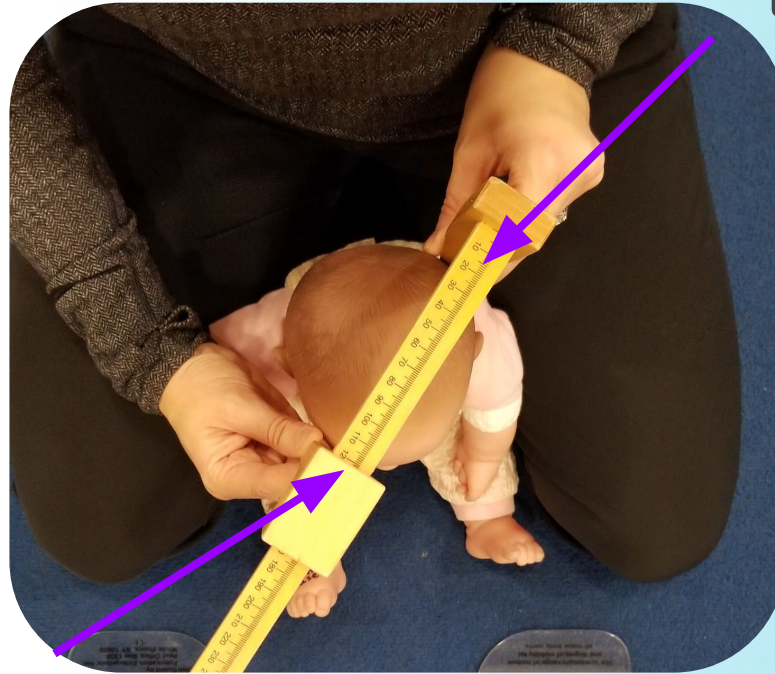
Plagiocephaly



Brachycephaly

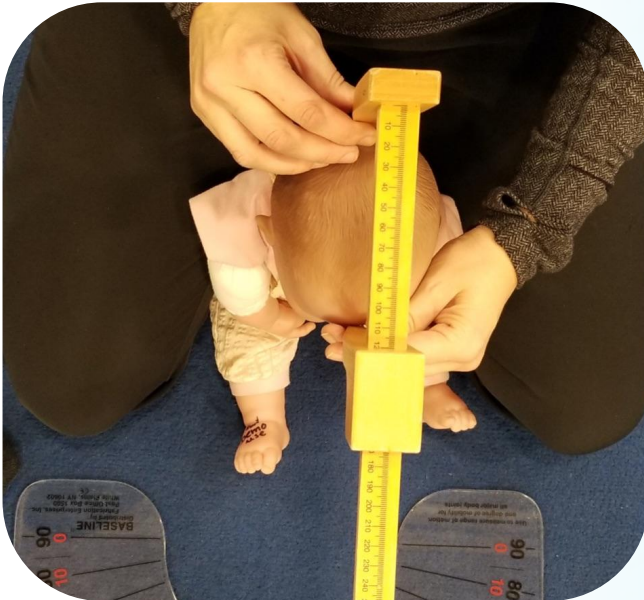
MEASURING FOR PLAGIOCEPHALY

Contralateral occipital area in closest proximity (lambdoidal point; inner rim of the lambdoid suture)¹²



Lateral point of the ipsilateral eyebrow (frontotemporal point)¹²

MEASURING FOR BRACHYCEPHALY



Width:

Eurion; the eurion point is read 1 cm above the otobasion superius point to eurion¹²

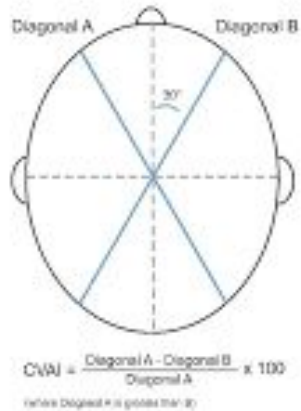


Length:

Glabella (smooth part of forehead above and between the eyebrows) to *Opisthocranion* (the posteriormost point in the midsagittal plane of the occiput)¹²

CALCULATIONS FOR BRACHYCEPHALY AND PLAGIOCEPHALY

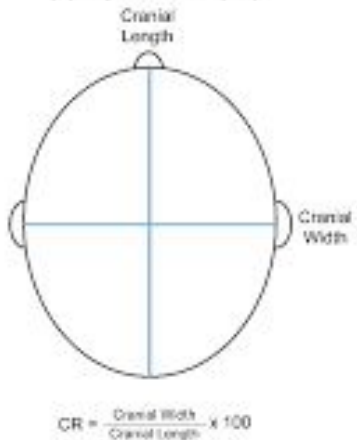
(B) Cranial Vault Asymmetry Index (CVAI)



Cranial Vault Asymmetry Index (CVAI) to measure plagiocephaly

- $CVAI = (A - B) \times 100 / A \text{ or } B \text{ (whichever is greater)}$

(A) Cephalic Ratio (CR)



Cephalic Ratio (CR) or Cephalic Index (CI) to measure brachycephaly

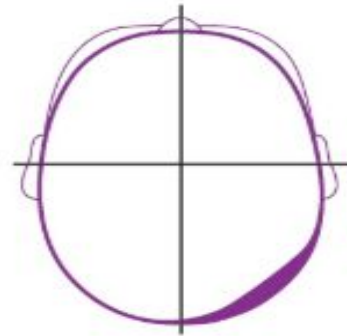
- $CR = \text{width M/L} \div \text{length A/P} \times 100$



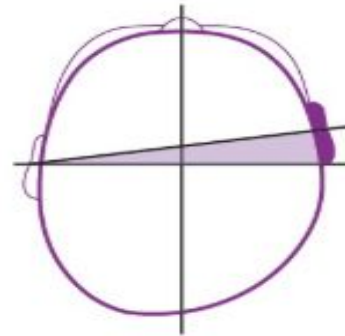
CALCULATIONS FOR BRACHYCEPHALY AND PLAGIOCEPHALY

(A) Cranial Ratio		
Brachycephaly Severity	Level	Value
Normal	0	75.0–84.9
Mild Brachycephaly	1	85.0–94.9
Moderate Brachycephaly	2	95.0–104.9
Severe Brachycephaly	3	≥ 105.0
(B) Cranial Vault Asymmetry Index		
Plagiocephaly Severity	Level	Value
Normal	0	≤ 3.49
Mild Plagiocephaly	1	3.50–6.24
Moderate Plagiocephaly I	2	6.25–8.74
Moderate Plagiocephaly II	3	8.75–10.99
Severe Plagiocephaly	4	≥ 11.00

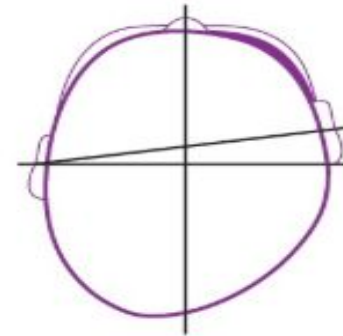
ARGENTA'S CLINICAL CLASSIFICATION OF DEFORMATIONAL PLAGIOCEPHALY



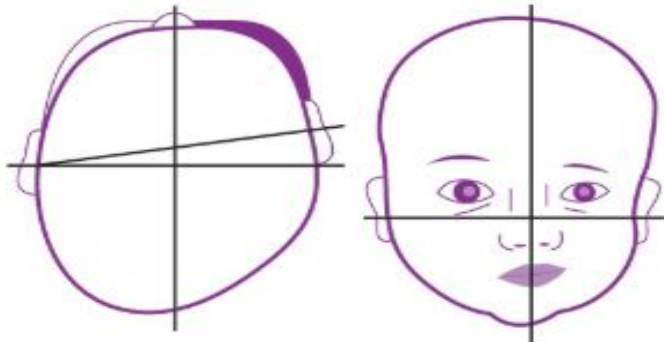
TYPE 1.
Posterior flattening
Normal



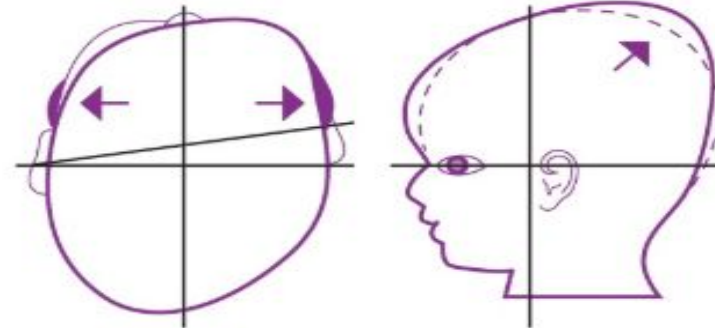
TYPE 2.
Ear shift
Mild



TYPE 3.
Forehead deformity
Moderate



TYPE 4.
Cheek, face & jaw deformity
Severe



TYPE 5.
Vertical and/or temporal deformity
Severe

ARGENTA'S CLINICAL CLASSIFICATION OF DEFORMATIONAL BRACHYCEPHALY



TYPE 1. (or 6A)
Central posterior flattening
Mild



TYPE 2. (or 6B)
Widening of the posterior skull
Moderate



TYPE 3. (or 6C)
Temporal and/or vertical deformity
Severe

FUNCTIONAL CONSIDERATIONS OF HEAD SHAPE FINDINGS

- Shape, volume of the skull and can affect prone head lifting skills
 - Neck as fulcrum
- Head shape affecting volitional neck rotation
 - Severe plagiocephaly in supine
- Influence on helmet and glasses fit later in life
 - Safety & every day life function



<https://www.brillpt.com/pediatricpt>



Clinical Awareness Pearl:

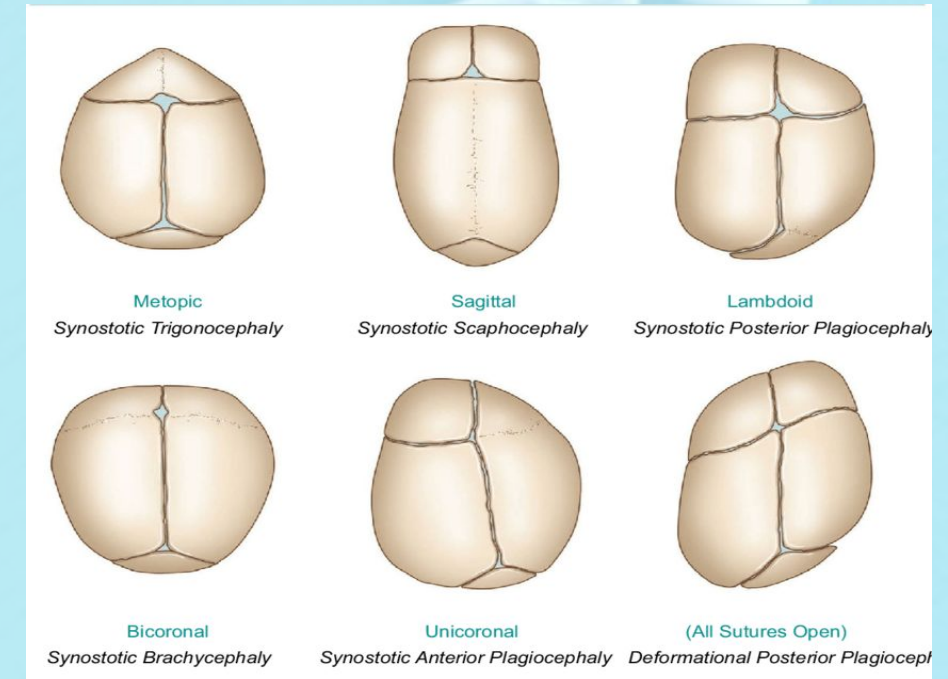
Growing amount of research suggests cognitive & motor delays associated with deformational plagiocephaly¹³



RED FLAGS, CONTRAINDICATIONS & PRECAUTIONS

Craniosynostosis: Restriction of growth perpendicular to the prematurely closed suture, may restrict brain growth¹⁴

- **Sagittal type is most common = scaphocephaly¹⁵**
- Characterized by Hard edges and unusual soft spots
 - Communicate with Pediatrician and request Plastic Surgery referral if appropriate
 - **Requires surgery¹**



Buchanan, Edward & Xue, Yunfeng & Xue, Amy & Olshinka, Asaf & Lam, Sandi. (2017). Multidisciplinary care of craniosynostosis. Journal of Multidisciplinary Healthcare. 10. 263-270. 10.2147/JMDH.S100248.

Down Syndrome, Chiari Malformation, Shunt Placement & Hydrocephalus

- Always communicate clearly with medical team & physicians about individual patient treatment plan prior to PROM/stretching

CHATBOX

What is the most common question you get from families about cranial orthoses?

Fun Fact: the most common complaint from families is odor



WHEN DO WE REFER FOR A CRANIAL ORTHOSIS EVALUATION?



<https://happiestcamper.com/baby-cranial-helmet/>

CR >90 = Brachycephaly

CR <70 = Scaphocephaly **helmet coverage by insurance and pending physician approval*

CVAI 6-7 = Moderate plagiocephaly

Family-Centered considerations:

- Head shape is mild but parent wants to pursue
- Family is unsure but severe head shape affecting development and muscle recruitment
- Ultimately personal family decision
- Influence of pediatrician's recommendation

CRANIAL ORTHOSES COMPANIES - SAN DIEGO

San Diego Local Companies:

- Active Life
- J & J Artificial Limb and Brace
- Cranial Technologies
- Hanger Scope

Cost:

- \$3800 through insurance
- \$2500 out of pocket, \$500 payments
- Tricare- ECHO program



CRANIAL ORTHOSIS AND THINGS TO TAKE INTO CONSIDERATION FOR PATIENT AND CAREGIVERS



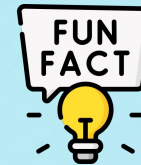
- Ideal age: 4 months (safety: head control ability) to 6 months latest ideal
- *Correction can occur up to 15-18 months of age but often with longer wear time and the correction will likely be incomplete¹*
 - *Most companies do not start cranial remolding process after child is 12 months old*



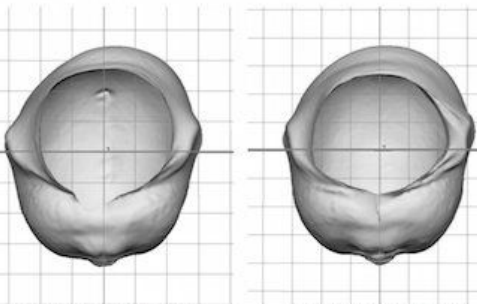
Top (Vertex) View - Before

Top (Vertex) View - After

- 70-80% of skull growth is done by age 2¹



- Cranial remolding therapy is recommended based on age of the child and severity of the cranial deformity
- The expectation is wearing the cranial orthosis 23 hours per day
- Insurance and transportation to appointments



Grayscale Sub-Occipital View - Before

Grayscale Sub-Occipital View - After



PHYSICAL THERAPY INTERVENTION

INTERVENTIONS AND GROSS MOTOR ACQUISITION INFANT (0-12 MONTHS)



- Shifting the Narrative on Torticollis
- Holistic Framework
- Exercise for Felt Experience
- Navigating Crying During Therapy
- Impact of Environment & Societal Influences

SHIFTING THE PHYSICAL THERAPY NARRATIVE OF TORTICOLLIS

Traditional Approach

- Torticollis is an Impairment of a neck muscle(s)
 - Focus on stretching and limited PROM of involved SCM or involved neck muscles
- Torticollis is an Orthopedic Diagnosis

YES

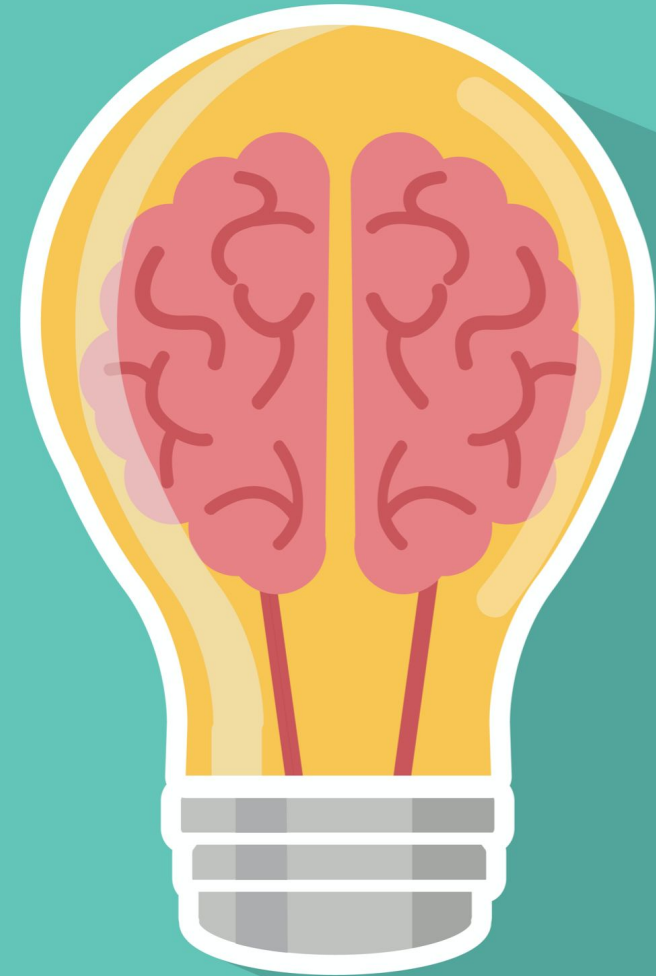
AND

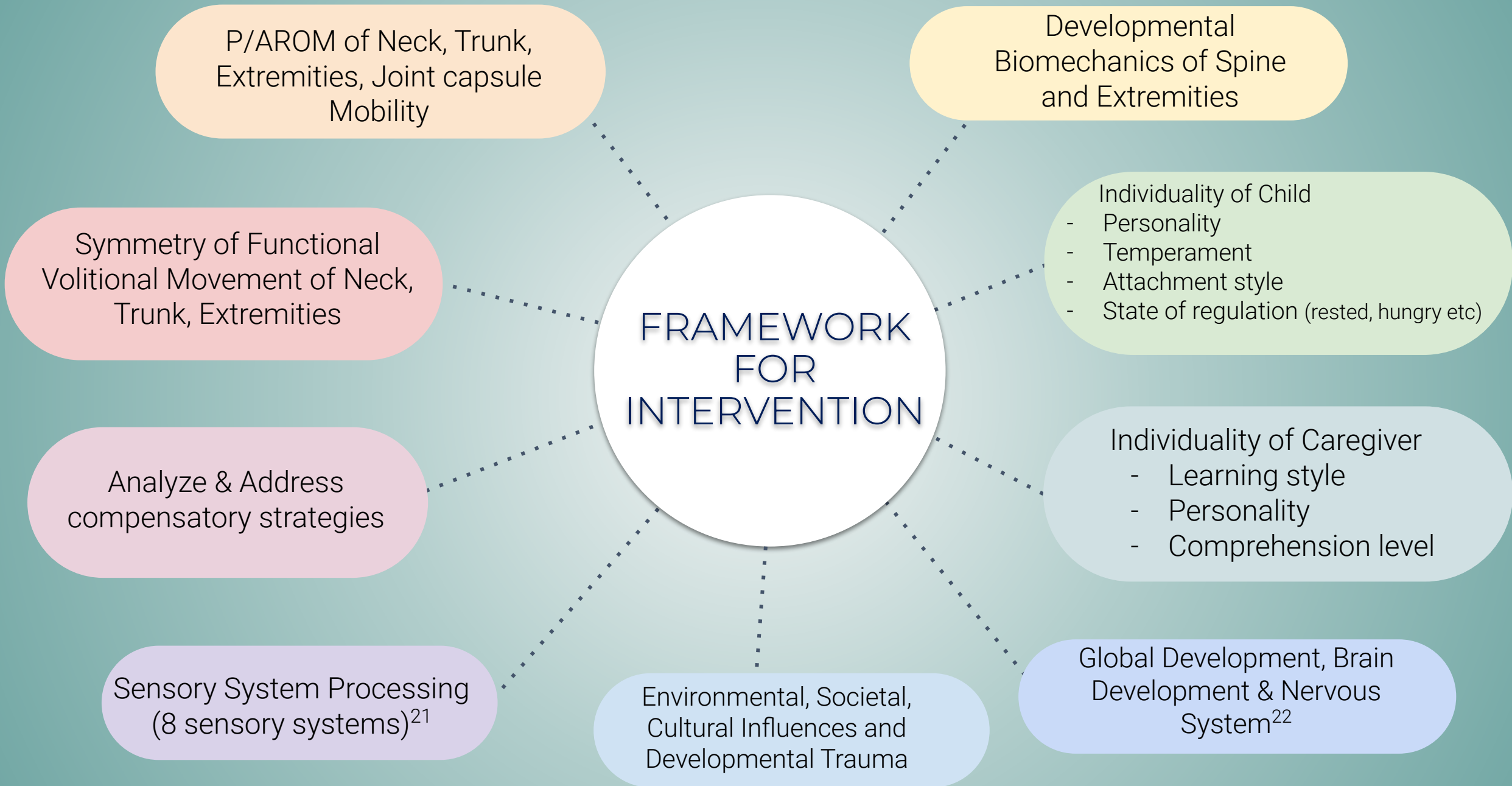
Holistic, Developmental Approach

- Torticollis involves many systems and many muscles
 - PROM is only one of the many components to addressing the altered motor pathways and postural control observed in torticollis^{16, 17}
 - Torticollis typically occurs in infancy when development of brain and body is unfolding and neurons are connecting via synapses
- Torticollis involves the spine, joints and requires orthopedic understanding in combination with
 - a. Development of brain and body¹⁸
 - b. Family-centered care
 - c. Considering all other body systems^{19, 20}

EXERCISE

Close your eyes and imagine your head tilted one way.
What do you feel in the rest of your body?





WHY INFANTS MAY CRY DURING THERAPY

Sensory system processing

Tired

Hungry

Sympathetic nervous system
activated: Fight flight freeze
collapse²²



iStockphoto.com

Developmental stage:
Separation anxiety
Stranger anxiety

Anxious, fearful caregiver

Decreased frustration tolerance
or learned helplessness

Unknown

ADDRESSING CRYING DURING THERAPY

Sensory: Assess, ask screening questions (movement induced distress?)

Tired: Meet need

Hungry: Meet need

Feel safe : activates the higher level brain processing



iStockphoto.com

Coach caregiver, step back, slowly reintegrate as tolerated

Motivational interview-type questions
“what feels scary when___”

The way caregiver responds at home
temperament type: educate them on
capability of child, and building
frustration muscles

We may not always know;
also leave room for ? such as
undiagnosed reflux, or “just
not in the mood”

IMPACT OF ENVIRONMENTAL & SOCIETAL INFLUENCES



iStockphoto.com

Home Environment (Physical Space)

- Size
- Type



freepik.com

- ## Home Environment & Family Dynamics
- Siblings & Pets
 - Multigenerational Housing
 - Culture
 - Mobility Level of Caregivers



<https://penfieldbuildingblocks.org>

Screen Time

- How much
- How often
- What content
- Is there a balance of play and caregiver connection²³



Skiphop.com

Time in Baby Equipment

- How much time
- What type of equipment²⁴



fatbraintoy.com

Types of Toys

- Electronic toys
- Montessori toys
- Access to toys
- Age appropriate toys

CHATBOX

Can you think of a patient where the beliefs, attitude or fears of the caregiver or the patient themselves affected your treatment?



INTERVENTIONS AND GROSS MOTOR ACQUISITION INFANT (0-12 MONTHS)



- Overarching goals for treatment
- Relationship between assessment & intervention
- PROM assessment of neck, trunk & extremities
- Stretching framework
- Movement analysis components
- Dynamic muscle strengthening
- Active movement positional assessment
- Clinical presentation, compensatory strategies & intervention for:
 - supine, prone, sidelying, sitting, upper extremity & dynamic core, quadruped & locomotion, standing & gait

OVERARCHING THERAPEUTIC GOALS

“Muscles don’t become tight from not stretching they become tight from lack of movement “

Liesa Persaud PT, DPT, PCS,CKTP

Support:

1. Alignment
2. Synergistic co-contraction of muscles in whole body kinetic chain
3. Orientation in space in variety of developmental positions
4. Multi-plane postural control
5. Sensory & body systems integration
6. Context of environment and relationships
7. Ability to pursue individual motivation and interests
8. Variety of spontaneous movement & adaptability of neck, trunk and extremities

ASSESSMENT & INTERVENTION

ASSESSMENT



ROM
Position



Asymmetrical

Strength



Weak

Postural Control



Decreased quality/
endurance/coordination

Skill



Delayed

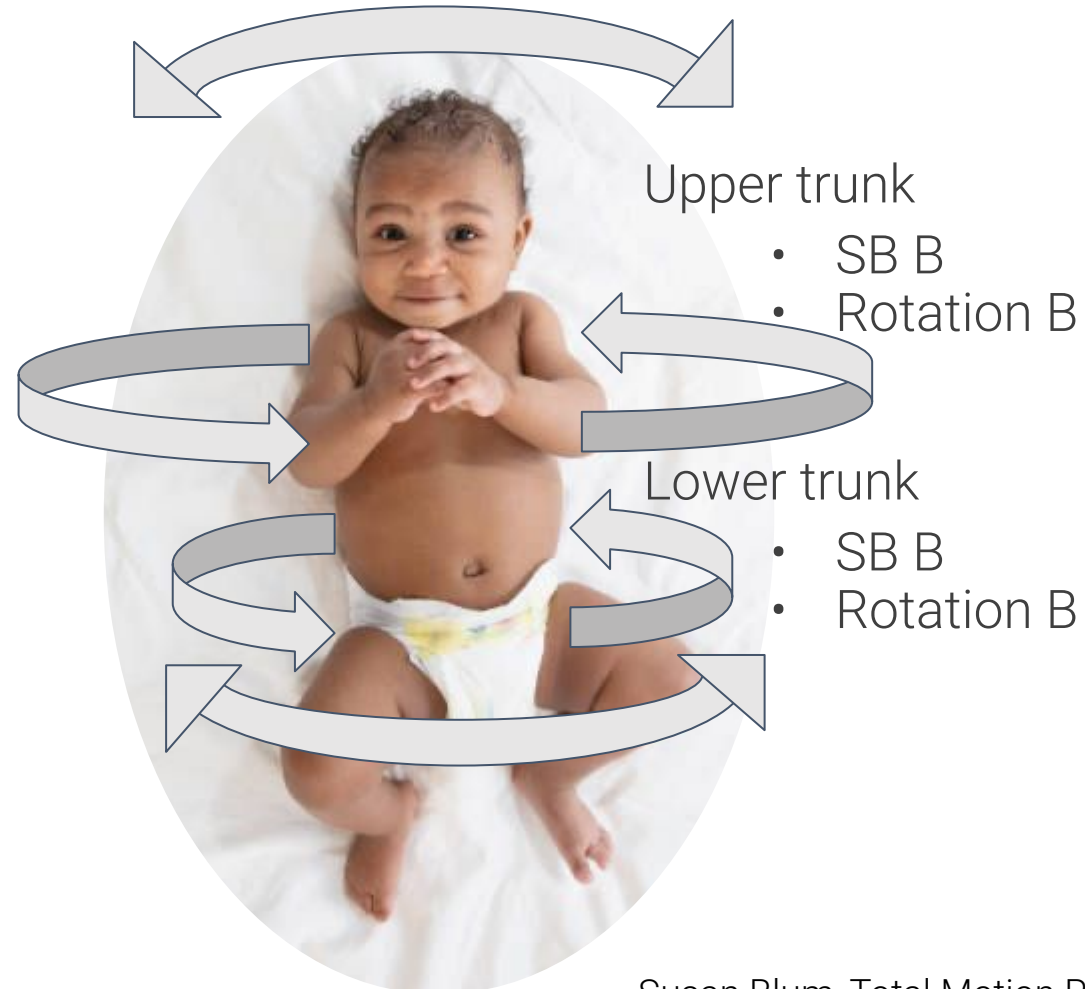


INTERVENTION

MANUAL TRUNK AND EXTREMITY PROM ASSESSMENT



iStockphoto.com



Upper trunk

- SB B
- Rotation B

Lower trunk

- SB B
- Rotation B



Hip

Knee

iStockphoto.com

iStockphoto.com

Susan Blum, Total Motion Release for Tots Level 1, March 2021.

STRETCHING

Most frequently used intervention

The more stretching is done,
the more effective
(but no defined parameters)

Research suggests **3x/day** is
realistic for families²

- Dynamic learning experience
- Connection with caregiver and environment
- Not recommended to continue with PROM or stretching if child is resisting or distressed



Why?

Sensitive neck structures & muscles

Neurons that fire together wire together

Strengthening muscle we want to elongate; we want to strengthen tight muscle as well but in other ways





Rady Children's Hospital – San Diego
3020 Children's Way
San Diego, CA 92123-4282

DTF543

DTF543

PATIENT INFORMATION

Name: _____
MR#: _____ Finance: _____
DOB: _____
MD: _____

Physical Therapy Torticollis Left Sternocleidomastoid Muscle Positioning Home Program

GOAL: Encourage baby to turn head to the left and minimize head tilt throughout the day.

HOLDING and CARRYING

- Hold your baby over your **RIGHT SHOULDER**. Block baby with your cheek to promote baby to **LOOK TO THE LEFT**.
- HOLD BABY IN YOUR ARMS WITH BABY'S BACK TO YOU**, cradling your baby's head and body in your **LEFT ARM**.



SEATING

INFANT SEAT / STROLLER

- Place small towel rolls near baby's hips and body to keep body centered in the seat. **IF** baby still tilts head to the left, place a small towel roll near baby's left side of head to keep head in center.
- To help your baby turn their head to **LEFT** place toys to their **LEFT**.

BATHING

- Encourage your baby to turn to **LOOK TO THEIR LEFT**.
- Place your baby in the bath so you are on your baby's **LEFT SIDE**.

SLEEPING

- When baby is sleeping on their back, turn baby's head to the **LEFT**.
- Place your baby in crib so baby faces out into the room (not a wall) when looking to their **LEFT**.

FEEDING

- BREAST FEEDING:** Position you and your baby **stomach-to-stomach, WITH BABY'S HEAD IN MIDLINE not tilted**.
- BOTTLE FEEDING:** Use the bottle to encourage your baby to turn slightly to the **LEFT**. If head is not turned, **BABY'S HEAD NEEDS TO BE IN MIDLINE**, not tilted left.
- HIGH CHAIR:** When baby is old enough to sit in high chair sit to baby's **LEFT** side.

PLAYING

- Position your face, toys or books on baby's **LEFT** side to encourage rotation.



TUMMY TIME

- Place a small towel roll under baby's chest to make it easier for baby to lift head.
- Place toys in front or to your baby's **LEFT**.



- When baby is ready to take a break, have baby rest looking toward the **LEFT**



Instructions given to: _____ Therapist: _____ Date: _____



Rady Children's Hospital – San Diego
3020 Children's Way
San Diego, CA 92123-4282

DTF543

DTF543*

PATIENT INFORMATION

Name: _____
MR#: _____ Finance: _____
DOB: _____
MD: _____

Physical Therapy Torticollis Left Sternocleidomastoid Muscle Stretching Home Program

Tightness in the **LEFT** sternocleidomastoid muscle causes your baby to **TILT** to the **LEFT** and **TURN** to the **RIGHT**.

GOAL:

- **TILTING** your baby's head to the **RIGHT**
- **TURNING** your baby's head towards the **LEFT**, so chin is over **LEFT** shoulder.

___ STRETCH TILTING HEAD TOWARDS THE RIGHT

- While baby is on their back facing you, cradle baby's head with your **LEFT** hand while your **RIGHT** hand securely holds baby's **LEFT** shoulder.
- **GENTLY** tilt your baby's head so that baby's **RIGHT** ear goes toward the **RIGHT** shoulder without the **LEFT** shoulder moving.
- When you reach the full stretch, **HOLD THE POSITION FOR UP TO 30 SECONDS**.

___ REPETITIONS
___ TIMES PER DAY



___ STRETCH TILTING HEAD TOWARDS THE RIGHT

- Hold your baby with their back next to you and baby's **LEFT** side down.
- Cradle your baby's head with your **LEFT** hand.
- Your **RIGHT** arm is placed between baby's legs with your hand over baby's **LEFT** shoulder.
- Gently move your baby's head up so that **RIGHT EAR** moves toward **RIGHT SHOULDER**, **WITHOUT THE LEFT SHOULDER MOVING**.
- When you reach the full stretch, **HOLD THE POSITION FOR UP TO 30 SECONDS**.

___ REPETITIONS
___ TIMES PER DAY



___ STRETCH TURNING HEAD TO THE LEFT

- While baby is on their back facing you, cradle your baby's head with your left hand with your right hand on baby's cheekbone; **GENTLY** turn your baby's head towards the **LEFT** to look over their **LEFT** shoulder.
- Your left hand/wrist **HOLDS RIGHT SHOULDER** from moving as baby turns head **LEFT**.
- When you reach the full stretch, **HOLD THE POSITION FOR UP TO 30 SECONDS**.

___ REPETITIONS
___ TIMES PER DAY



___ STRETCH TURNING HEAD TO THE LEFT AT YOUR CHEST

- Hold your baby snugly at your chest with baby's head turned **LEFT**, so baby's cheek and chin is over their **LEFT** shoulder.
- Your hand holds baby's **LEFT** shoulder snugly to your body, so baby is turning head to the **LEFT** and not turning body.
- When you reach the full stretch, **HOLD THE POSITION FOR UP TO 30 SECONDS**.

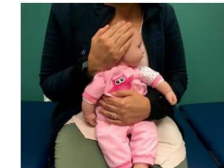
___ REPETITIONS
___ TIMES PER DAY



___ STRETCH TURNING HEAD TO THE LEFT

- Baby sits on your lap with their back towards you.
- Gently turn baby's head so that their chin moves towards their **LEFT** shoulder, **WITHOUT THE RIGHT SHOULDER MOVING**.
- When you reach the full stretch, **HOLD THE POSITION FOR UP TO 30 SECONDS**.

___ REPETITIONS
___ TIMES PER DAY



Instructions given to: _____ Therapist _____ Date: _____

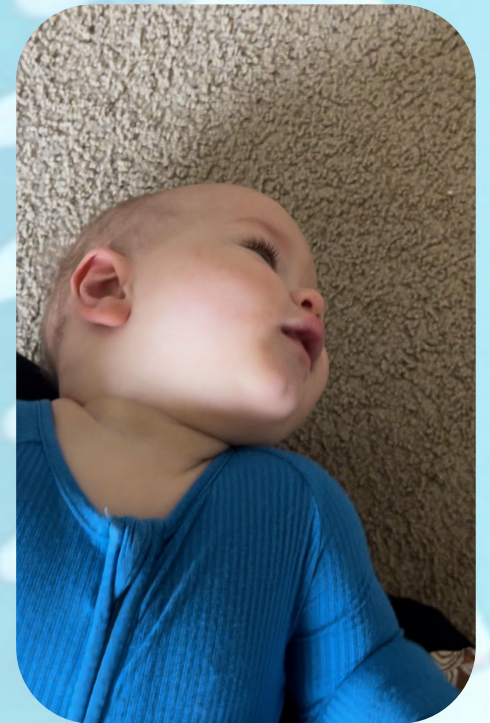
GRAVITY ASSISTED ELONGATION & ROTATION

What are the benefits?

- Increased joint space for increased ease of rotation
- Stretch fascia, oral motor muscles
- Gravity assisted spinal segment elongation with weight of head

Technique

- Gentle extension over leg, head and neck still supported, as tolerated
- Combine it with non-preferred rotation for improved joint mechanics
- Utilize pacifier for regulating, midline orientation and oral motor involvement
- Vestibular system engagement, increased brain activation⁵
- Gentle swaying



Resource alert!
@MilkMattersPT
@Nurture_columbus

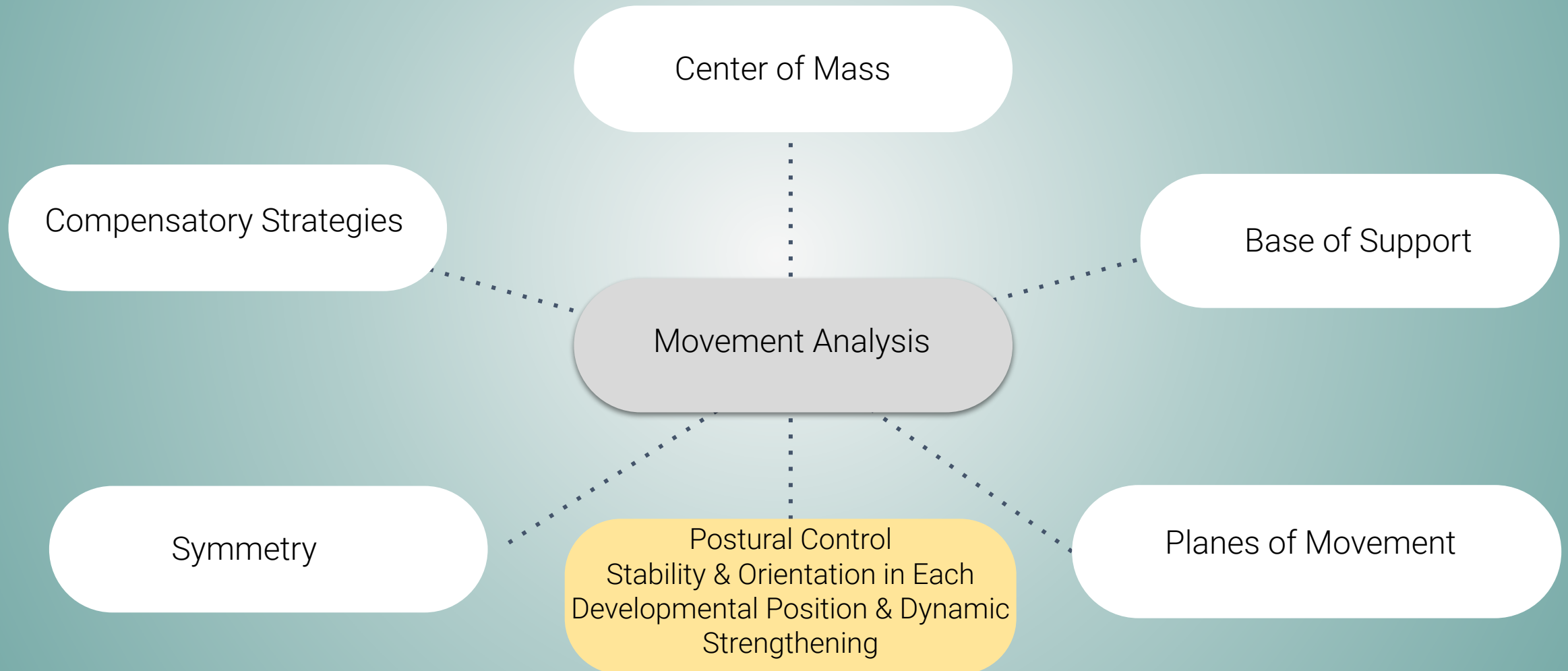


Critical Thinking!

Also an assessment–if they cannot tolerate this position, what does that tell you?

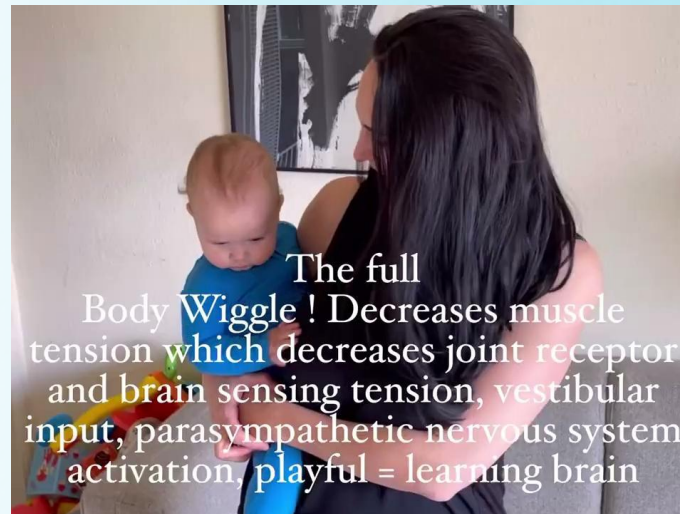
MOVEMENT ANALYSIS

BY TATIANA FERNANDEZ



DYNAMIC MUSCLE STRENGTHENING

- Concentric and eccentric contractions
- Strengthening along the muscle length-tension continuum
- Vestibular & sensory system activation⁵
- Experiencing life



ACTIVE MOVEMENT POSITIONAL ASSESSMENT²⁵



iStockphoto.com

Baby carry position

How do they respond and conform to supports when held by caregiver?



iStockphoto.com

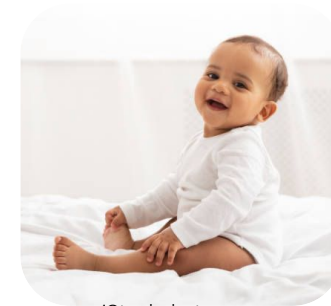
Prone



iStockphoto.com

Rolling

- How are they rolling? Kinetic chain



iStockphoto.com

Sitting

- How are they sitting?
- Variety of positions?



iStockphoto.com

Clapping

- How do they clap?
- Scapular motion, symmetry



iStockphoto.com

Reaching

- How do they reach? Position of wrist, position of shoulder, rotation component, ROM, fluidity

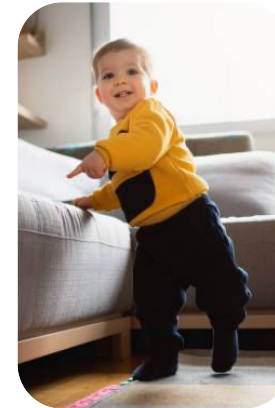


<https://www.leedscommunityhealthcare.nhs.uk>

Pulling up to Stand

- Alignment of limbs

Pelvis



iStockphoto.com

Cruising

- Alignment

Symmetry



iStockphoto.com

Walking

- Step symmetry
- Pelvis rotation
- Foot placement

SUPINE



POSITIONAL ASSESSMENT & TREATMENT

Supine

Clinical Presentation




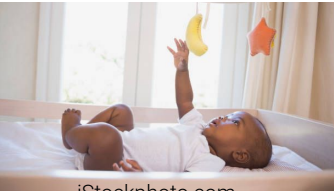
- Only looks one way even if you reposition to look at same object over other shoulder
- Resists movement toward non preferred side
- Preferred hand towards mouth
- ATNR one side
- *consider if head shape affecting neck muscle firing*
- Eyes track but limited by neck movement



What we might assess & treat

- Tracking 180° horizontal semi circle
- Vertical tracking
- Diagonal up and to right/left
- Chin tuck toy on belly
- Reaching at chest level against gravity; test bilaterally and compare

SUPINE COMPENSATORY STRATEGIES

Compensation		Intervention
Only rotating one way- lifting shoulder	 iStockphoto.com	<ul style="list-style-type: none"> ● Manually stabilize shoulder gently toward floor ● Visual tracking (contrast books or toys)
ATNR more present on one side	 iStockphoto.com	<ul style="list-style-type: none"> ● Encourage movement of neck and hand to other side ● visual regard for hand ● Address full body position, move pelvis ● Visual tracking & swiping ● assisted hand to mouth non -preferred
Supine they roll to side but they roll to side to avoid neck ROM	 iStockphoto.com	<ul style="list-style-type: none"> ● Pelvis point of contact ● Shoulder point of contact ● Rotate body on head ● Concentric & eccentric muscle strengthening
Reaching quality, fluidity, height of arm, grasp and coordination	 iStockphoto.com	<ul style="list-style-type: none"> ● Occupy preferred hand with your hand or toy then encourage reaching with other hand

FLEXION-BIASED ASSESSMENT & INTERVENTION POSITIONING

Flexion-Biased

- On floor:
 - Chin tuck
 - Midline
 - Bend up legs, hips, knees
 - Rock and sway
 - Gentle up and down
- Adult: tailor sit
 - Flexes spine and pelvis
 - Protract scapulae
 - If caregiver can not assume this position problem solve and adapt



*

PRONE



POSITIONAL ASSESSMENT & TREATMENT

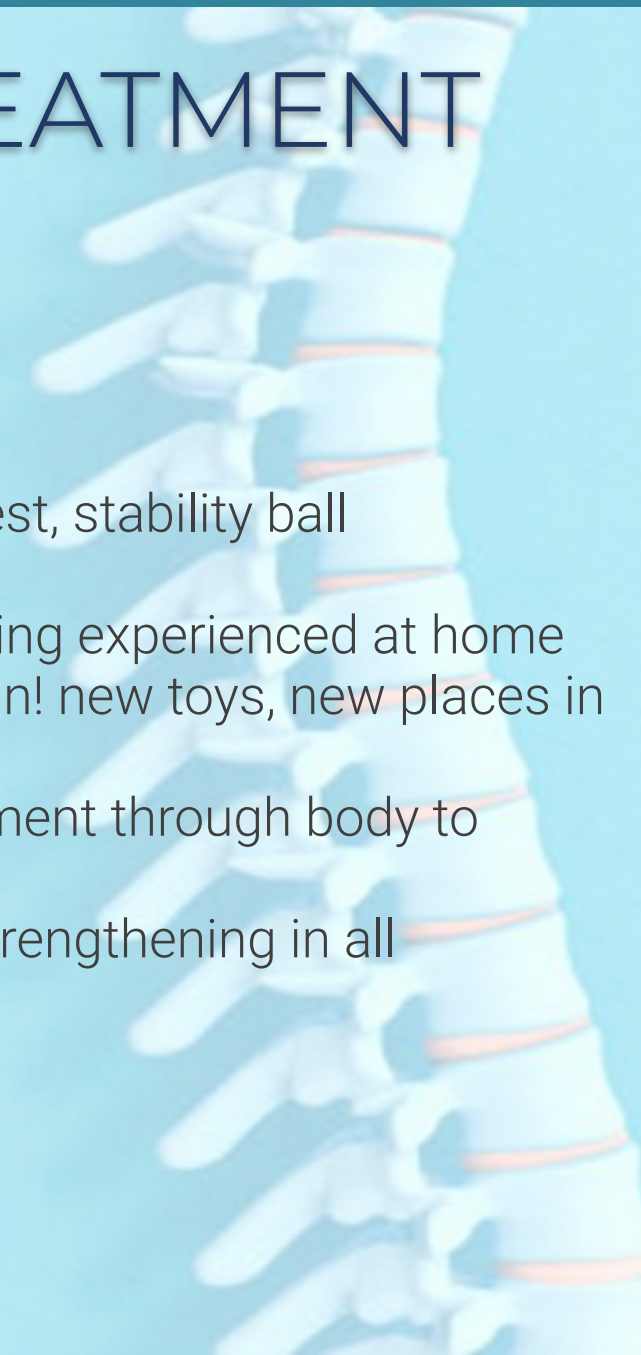
Prone

Clinical Presentation

- Decreased tolerance
- Decreased head lift
- Decreased endurance
- Decreased reaching in prone
- Asymmetrical reaching
- Asymmetrical shoulder, spine, pelvis
- Atypical neck contracture
- Lack of global neck strength

What we might assess & treat:

- Modified prone positions
- Pillow, lap, wedge, caregiver chest, stability ball
- Altered environmental stimuli
- Really dive into how prone is being experienced at home
- Reframe relationship, make it fun! new toys, new places in the house, outside
- Gentle manual input and movement through body to activate systems
- Focus on global neck muscle strengthening in all positions
 - Flexors
 - Extensors
 - Bilateral rotation
 - Bilateral side bend
 - Then for all of spine as well






PRONE INTERVENTIONS

- “Be” “experience life” in prone not “do tummy time”
- Do it anywhere!
- When it doubt, change it up or take it outside



PRONE COMPENSATORY STRATEGIES

Compensation		Intervention
"Kick stand" asymmetrical weight shift	 iStockphoto.com	<ul style="list-style-type: none"> ● Manual weight shift ● Toy placement ● Gentle input and movement ● Encourage scapular protraction of extended arm in other positions
Hyperextension in spine extended arm weight bearing, won't weight bear on forearms (Avoidance of neck muscle dynamic elongation & contraction)		<ul style="list-style-type: none"> ● Reaching in supine (protraction strengthening) ● Modified prone increased angle of surface ● Assisted forearm propping position and maintain ● Cervical flexor strengthening
Not able to co-contrast and lift head in midline, lack of spine extension with lack of capital flexion		<ul style="list-style-type: none"> ● Supine chin tuck toy on belly ● Flexion biased positioning ● Assist forearm propping ● Motivating toy or environment ● Toy placement

SIDELYING



POSITIONAL ASSESSMENT & TREATMENT

Sidelying

Clinical Presentation

- Difficulty obtaining and sustaining sidelying
- Achieves side-lying very well on one side
- Immediately rolls to back from assisted side-lying
- Resists facilitation to roll to sidelying
- Excessive arching, flexion or lack of efficient muscle co-contraction and firing throughout torso and extremities

What we might assess & treat

- Tracking 180 degrees horizontal semi circle
- Vertical tracking
- Diagonal up and to right/left
- Chin tuck toy on belly
- Reaching at chest level against gravity , test bilaterally and compare
- Rib cage mobility



SIDELYING & ROLLING




Prop side lying or environmental modification

Assisted side lying with manual input

- Think about whole spine rotation, rib cage and pelvis mobility muscle engagement, sensory input, manual input
- Muscle co-contraction
- Whole body involvement
- Compare quality of movement to each side



SIDE LYING COMPENSATORY STRATEGIES

Compensation		Intervention
Not able to sustain position on non- preferred side		<ul style="list-style-type: none"> ● Observe how they perform to preferred side ● Side lying in lap ● Supported side-lying with support on the back
Not able to coordinate rolling to non- preferred side		<ul style="list-style-type: none"> ● Observe how they perform to preferred side ● Assist gently with gentle deep pressure or swaying rocking at spine or pelvis ● Motivating toy or caregiver ● Repetition within tolerance
Excessive arching or isolated rotation in neck and lack of co-contraction		<ul style="list-style-type: none"> ● Observe how they perform to preferred side ● Assist gently with gentle deep pressure or swaying rocking at spine or pelvis ● Motivating toy or caregiver ● Repetition within tolerance



UPPER EXTREMITY & DYNAMIC CORE IN PLAY



Dynamic shoulder
girdle stretch &
strengthen, horizontal
tracking, cognitive skill
building



SITTING



Seemingly simple but so much beneath the surface



POSITIONAL ASSESSMENT & TREATMENT

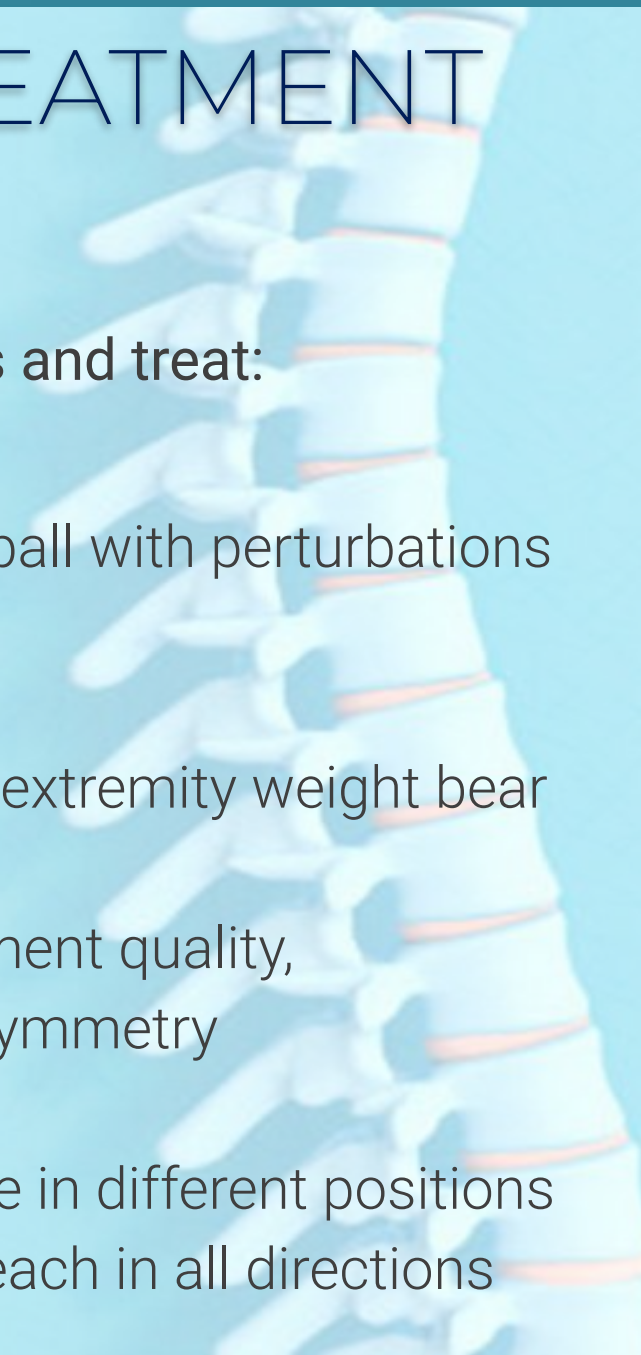
Sitting

Clinical Presentation

- Poor balance reactions
- Flexed spine
- Excessive extension
- Trunk incurvation and asymmetrical pelvis and lower extremity weight bear
- Asymmetrical transitions and weight shifting to access environment

What we might assess and treat:

- Supported side sit
- Sitting on stability ball with perturbations and weight shifting
- Sitting on wedge
- Side sit with upper extremity weight bear
- Righting reactions
- Transitional movement quality, coordination and symmetry
- Reaching in sitting
- Trunk rotation, gaze in different positions with coordinated reach in all directions



SITTING INTERVENTIONS

Dynamic sitting equipment ideas




- On wedge
- On unstable surface
- On lap
- Straddle sit on one adult leg
- Short sitting

Dynamic sitting interventions

- Sit with trunk rotation
- Sitting transitions
- Side sitting
- Pelvic position
- Spinal posture (flexed? excessive extension? lateral incurvation?)



SITTING COMPENSATORY STRATEGIES

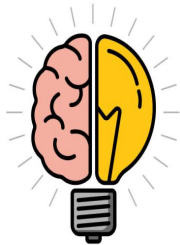
Compensation		Intervention
<ul style="list-style-type: none"> ● Trunk incurvation ● Asymmetrical pelvis WB 		<ul style="list-style-type: none"> ● Unstable/uneven surface: lap, balance cushion, wedge ● Toy placement- weight shifting ● Types of toys ● Positions that activate elongated side
<ul style="list-style-type: none"> ● Delayed onset of sitting ● Lack of variety of sitting positions 		<ul style="list-style-type: none"> ● Supported sitting: pillow, leg, boppy, ● Side sitting supported ● Toy placement- weight shifting ● Bubbles ● Strengthen globally
Decreased balance, postural control, functional play ability		<ul style="list-style-type: none"> ● Dynamic play that improves global muscle firing in torso and extremities ● Stability ball, A/P and M/L ● Sitting on lap ● Straddle sit ● "Horse ride" on lap

QUADRUPED, CREEPING & PRONE MOBILITY



CRAWLING & QUADRUPED

Symmetrical vs. Asymmetrical Creeping



Critical Thinking! CHATBOX

What are you noticing?

What structures of the body, what systems would this impact? Why does it matter?

POSITIONAL ASSESSMENT & TREATMENT

Quadruped and Prone Mobility

Clinical Presentation

- Asymmetrical creep
- Asymmetrical crawl
- Asymmetrical prone pivot
- Excessive rotation of upper extremities
- Decreased neck and trunk extension
- Decreased rib cage, pelvis rotation symmetry

What we might assess and treat:

- Rocking in quadruped
- Reaching in quadruped
- Deep core muscle stability in various positions
- Prone pivot bilaterally
- Back up to rolling symmetrically prone <>supine
- Propped side lying B
- Transitional movement coordination and symmetry
- Torso and neck position in quadruped
- Extremity alignment and position in quadruped






POSITIONAL ASSESSMENT & TREATMENT

Quadruped and Prone Mobility

- **Crawl, creep up wedge:**
 - Pelvic mobility
 - Spinal mobility
 - Abdominal muscle firing
 - Shoulder position
 - Is neck fully extended?
 - Are upper extremities in neutral alignment?
- **Crawl/creep up stairs**
 - Assess pattern of movement
 - Assist with non preferred patterns of knee and foot weight bearing



QUADRUPED & LOCOMOTIVE COMPENSATORY STRATEGIES

Compensation		Intervention
Asymmetrical crawl or creep affecting torso, spine and extremities	 iStockphoto.com	<ul style="list-style-type: none"> ● Alter the support surface & obstacles ● Pillows, couch cushions, crib mattress ● Climbing ● Stairs ● Wiggle hips, weight shift achieve mechanics on non-preferred side
Prone pivoting to preferred side only		<ul style="list-style-type: none"> ● Toy placement ● Assisted torso extremity and pelvis weight shifting & weight bearing ● Point of contact at shoulders, elbows, torso, pelvis, legs, feet- trial and error ● Will vary based on what muscles, joints and systems are being recruited
Transitioning sit, prone <> quadruped asymmetrically		<ul style="list-style-type: none"> ● Side sit ● Supported weight shift in caregiver lap ● Assisted transitions ● Toy placement ● Environmental set up



Rady Children's Hospital – San Diego
3020 Children's Way
San Diego, CA 92123-4282

DTF543

DTF543

PATIENT INFORMATION

Name: _____
MR#: _____ Finance: _____
DOB: _____
MD: _____

Physical Therapy LEFT Torticollis Older Infant Home Program

GOAL: Encourage baby to turn head to the LEFT and minimize head tilt throughout the day.

HOLDING and CARRYING STRETCHING

- Hold your baby with their back against you and baby's **LEFT** side down.
- Cradle your baby's head with your **LEFT** hand or forearm
- Your **RIGHT** arm is placed between baby's legs with your hand over baby's **LEFT** shoulder.
- Gently move your baby's head up so that **RIGHT EAR** moves toward **RIGHT SHOULDER, WITHOUT THE LEFT SHOULDER MOVING.**
- When you reach the full stretch, hold the position for at least 30 seconds.

STRENGTHENING

- Cradle your baby with their back against you with your **RIGHT ARM** between their legs and **LEFT ARM** under their arm
- Baby should pick their head up bringing the **RIGHT EAR** toward the **RIGHT SHOULDER.**
- Hold the position until baby starts to turn or lower their head. If the angle is too difficult hold baby more upright.

STRETCHING

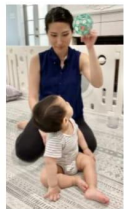


STRENGTHENING



LOOKING UP AND OVER THE SHOULDER

- Use a toy to guide baby to look toward their **LEFT AND UP** over their shoulder.
- Practice this motion in sitting, tummy time, on all fours and while standing



SITTING



TUMMY TIME/ON ALL FOURS



STANDING

REACHING OVERHEAD WITH ONE HAND

- Use a toy to guide your baby to reach up and over their **LEFT** shoulder.
- Practice this motion in sitting, tummy time, on all fours and in standing.



SITTING



TUMMY TIME/ON ALL FOURS



STANDING

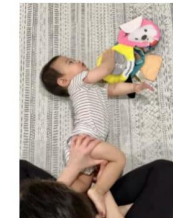
REACHING OVERHEAD WITH BOTH HANDS

- Use a toy, ball or book that requires two hands to grasp and guide baby to reach overhead with **BOTH** hands



ROLLING TO BOTH SIDES

- Place a toy on baby's **LEFT** side to encourage rolling toward their **LEFT**
- Baby should pick their head up, lifting the **RIGHT** ear toward the **RIGHT** shoulder as they roll



___ **SIDE-PROP SITTING (ON HAND OR ELBOW, ON FLOOR OR CAREGIVER'S LEG)**

- Place a toy on baby's **LEFT** side and encourage baby to prop on their **LEFT** hand or elbow, leaning on their **LEFT** hip.
- Both feet can be pointing toward baby's **RIGHT** side
- If baby will not stay in this position you can also lean baby over your **LEFT** leg propping on their elbow
- Propping on the elbow on your leg will be easiest, propping on the elbow on the floor will be more challenging, and propping on the hand on the floor is hardest.



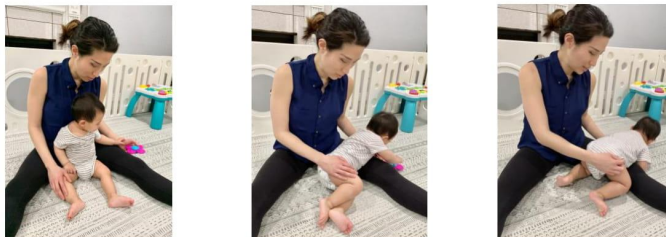
___ **SITTING ON WEDGE**

- Place baby sitting on a wedge (or a couch cushion propped at an angle) with the **LOWER SIDE ON BABY'S LEFT**



___ **SIT TO FLOOR OVER CAREGIVER'S LEG**

- Place baby in sitting between your legs. Put a toy on the outside of your **LEFT** leg
- Help baby rotate their hips to transition onto their hands and knees.



___ **FLOOR TO SITTING**

- Place baby lying on their **LEFT** side and help baby push into sitting toward their **RIGHT** side.



___ **CRAWLING/CLIMBING UP STEPS/OVER OBSTACLES**

- Set up obstacles such as couch cushions, crib mattress or your legs for baby to crawl over.
- Assist baby to put their **RIGHT** knee up as they climb



___ **HALF KNEEL (STATIC)**

- Assist baby into kneeling with their **RIGHT** knee up to play.



PULLING TO STANDING

- Help baby pull to standing by putting their **RIGHT** knee up.



STANDING WITH FOOT ELEVATED

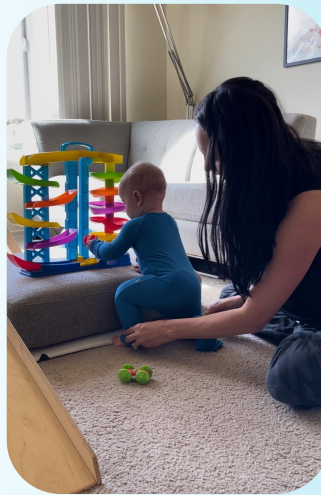
- Place a book, firm cushion or small box under baby's **RIGHT** foot to practice balancing.



Instructions given to: _____ Therapist: _____ Date: _____

POSITIONAL ASSESSMENT & TREATMENT

Standing, Cruising, Squatting, Walking



POSITIONAL ASSESSMENT & TREATMENT

Standing, Cruising, Squatting, Walking

Clinical Presentation

- Asymmetrical WB and mobility in deep squat
- Asymmetry in cruising
- Asymmetrical pull to stand
- Poor standing balance
- Asymmetrical gait

What we might assess and treat:

- Pull to stand
- Short sit to stand
- Cruising
- Transferring surfaces (transfer only one side)
- Standing posture
- plantigrade position competency
- foot and lower extremity position
- Squat transitions
- Orientation in multiple movement planes
- Gait



PLANTIGRADE, MODIFIED UE WB, LOW STANDING INTERVENTIONS

- **Modified standing & UE WB**




- Low standing is a way to still achieve weight bearing on shoulders
- Increase co-contraction of body as a kinetic chain
- Break up extension and flexion preferences
- Mobilize pelvis through movement

- **Equipment:**

- Step stool
- Couch cushion
- Bench
- Wedge
- Caregiver leg



STANDING, CRUISING, GAIT COMPENSATORY STRATEGIES

Compensation		Intervention
Pull to stand asymmetrical, typically the side that they tilt towards		<ul style="list-style-type: none"> ● Kneeling equal WB B pelvis and LE's ● Half kneel non- preferred side ● Assisted pull to stand non-preferred side
Cruising asymmetrally only one direction		<ul style="list-style-type: none"> ● Weight shift hips side to side (playful) ● Weight shift hips rotary motion (playful) ● Toy placement ● Blocking preferred side playfully ● Supported SLB on shortened side as support limb
Impaired postural control excessive extension, poor kinetic chain firing		<ul style="list-style-type: none"> ● swing supported ● rocking horse ● ride on toy

THERAPEUTIC USE OF TOYS AND SELF



amazon.com

Fubbles Bubbles



fatbraintoy.com

Suction Spinners



amazon.com

Baby Mirror



amazon.com

Rain Stick



amazon.com

Pop Up Toy



fisherprice.com

Piggy Bank Toy



littletikes.com

Rocking Horse

<https://www.sproutandthrive.com>



Caregiver/therapist leg or lap,
playful relationship, position of self

IN SUMMARY

Consider torticollis in regard to:

01

Global Development

02

Brain Development

03

Holistic approach, the connection of the brain, body & sensory systems
- “Zoom out” from the neck and involve the entire body

04

Influence of caregivers, environment and lifestyle behaviors

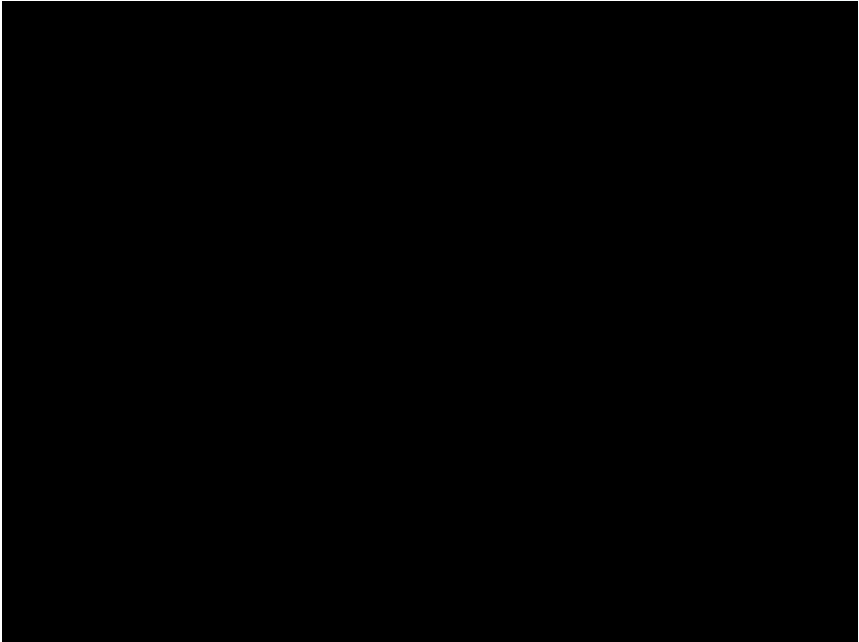
05

Adaptable, unrestricted, balanced movement in all planes



INTERVENTIONS FOR TODDLERS (*UNRESOLVED INFANT TORTICOLLIS*)

INTERVENTIONS FOR TODDLERS AND BEYOND

- 
- Make it fun!
 - Expect that you might need to pivot and have many interventions ready to use
 - Have the parent involved in the session putting their hands on their child and learning how to help their child with the interventions



INTERVENTIONS FOR TODDLERS AND BEYOND

Weight shift in sitting or prone on the swiss ball with caregiver assist



INTERVENTIONS FOR TODDLERS AND BEYOND

Can also perform prior interventions for 12-24 months in addition to these new more challenging interventions

- **Bear Walking -**
 - Engaging the neck extensors, bilateral UE, core and LE
 - Whole body coordination and strength needed
- **Crab Walking**
- **Wheelbarrow Walking**



INTERVENTIONS WITH TOOLS IN THE CLINIC

Throwing balls into hoop/basket overhead in sitting/kneeling/standing positions on stable and unstable surfaces



INTERVENTIONS WITH TOOLS IN THE CLINIC

Climbing up and down ladders alternating lower extremities



INTERVENTIONS WITH TOOLS IN THE CLINIC

Upper extremity propelled
scooter board or arm bike



INTERVENTIONS WITH TOOLS IN THE CLINIC

- Walk outs prone on **swiss ball** with ball stabilized by therapist/parent can also play with shaving cream on the mirror in this position
- Square **swing** on tummy throwing bean bags with alternating upper extremities



INTERVENTIONS WITH SMALL TOYS IN THE CLINIC, CONT.

- **Bean bag** walks with bean bag in the right neck crease for left sided head tilt or balancing bean bag on the head and walking focusing on keeping head in midline
- Walking along **balance beam** one leg up and one leg down (right leg up on beam and left leg on the ground)



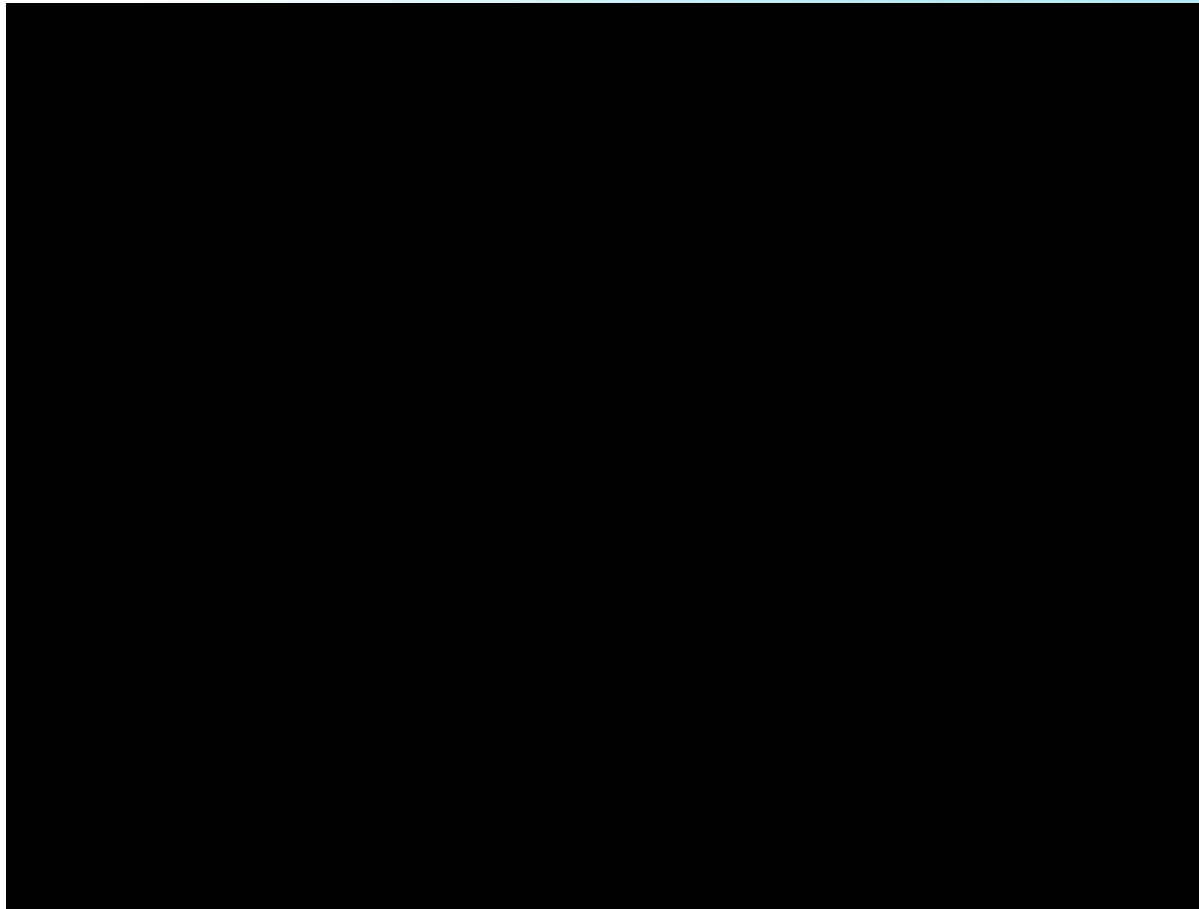
INTERVENTIONS WITH SMALL TOYS IN THE CLINIC, CONT.



Left side-lying playing with toy
with right upper extremity (**puzzle**)



INTERVENTIONS WITH OTHER EQUIPMENT, CONT.



Parachute game with **sheet** using both arms with caregiver or therapist

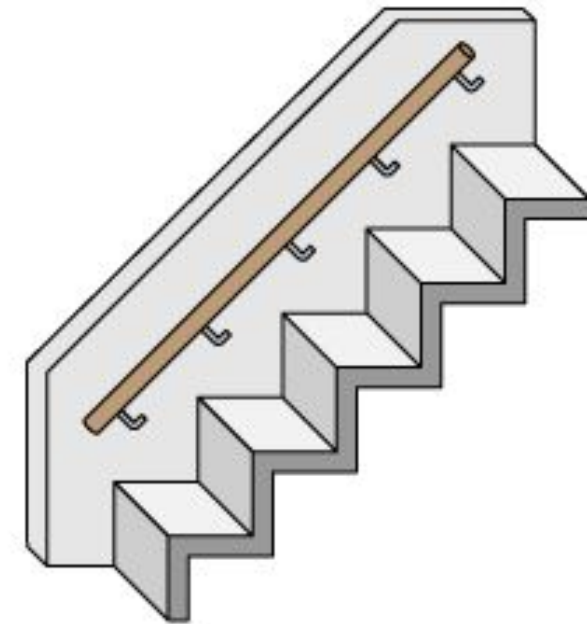
INTERVENTIONS WITH TOOLS IN THE CLINIC, CONT.

- **Pedalo** - small child propelled elliptical type toy which requires equal use of bilateral upper extremities and and lower extremities.



INTERVENTIONS STAIRS/STEPS

- Reciprocally stepping, alternating LE and alternating which side they are using the handrail
- When they no longer need the handrail, try without handrail use in order to decrease assistance from UE but continuing with reciprocal stepping to work on symmetry



INTERVENTIONS

- Rolling both directions on the floor
- Climbing through a tunnel and then rolling
- Rolling up and down an incline or decline
- Climbing through a tunnel to the other side to get toys

Engages neck and UE muscles in a functional way as well as the core and LE



ROLE OF ENVIRONMENT/FAMILY FACTORS AND WHAT WE CAN DO TO HELP

- Home set-up:
 - Ask caregiver for pictures/videos of home set-up and therapist can make helpful suggestions
 - Think of the toddler as a guest in your house, want to make it comfortable and inviting for them
 - Not everything should be a “NO.” Can move furniture around so the toddler can explore and move their body safely
- More outdoor play



ROLE OF ENVIRONMENT/FAMILY FACTORS AND WHAT WE CAN DO TO HELP, CONT.

- Think of inexpensive ways to replicate therapy equipment at home for the family
 - Examples :



- Hardware store supplies for scooter-board
- Climbing and rolling activities that can be accomplished at the local park
- Making obstacle course in the house using pillows
- Using cardboard boxes to climb in and out of and climb through
- Laundry basket for a push toy or pulling to standing
- Using the curb outside as a balance beam, putting tape on the floor, or using chalk outside
- Bedsheet for parachute for UE strengthening

CAREGIVER INVOLVEMENT TODDLERS

- Having caregiver perform the activities during physical therapy session with their children in a fun non-stressful way
- According to Oledzka, et al supplying parents with a video of the home program exercises prescribed will help enhance learning
- Making sure home exercises are understood and the purpose is explained
- Making it realistic and doable for the family
 - Example: embedding HEP into parents and child's ADL's
 - Making it FUN!!
 - Frequency of performing HEP and number of exercises is reasonable for the family dynamic
 - Days of the week chart



iStockphoto.com

FREQUENCY AND DURATION OF PHYSICAL THERAPY APPOINTMENTS/DETERMINING PROGNOSIS

- Realistic: *what is realistic for the family with scheduling*
- Conversations with caregivers: *consider overall development, level of concern of family, personality of child, and level of compliance with HEP*
- Telemed *utilize telemed as appropriate for increased therapeutic intervention if coming to clinic is difficult, family ill, etc.*





DISCHARGE CRITERIA

INITIAL DISCHARGE CRITERIA⁶

1

Full PROM neck, trunk and extremities to within 5 deg of non-affected side

2

Symmetrical movement patterns throughout the passive range

3

Age-appropriate gross motor development including symmetrical movement patterns between R and L sides during static, dynamic, and reflexive movements

4

Improved skull symmetry to Argenta Type 1 or referred for cranial orthosis

5

No visible head tilt

6

Parents and caregivers understand how to monitor as the child grows

REFER WHEN INDICATED

- Up to 18% of cases with asymmetrical head posturing may be due to non muscular causes
- Refer:
 - Asymmetries inconsistent with muscular torticollis
 - The infant is older than 12 months and facial asymmetry and/or 10° to 15° of difference exists in passive or active cervical rotation or lateral flexion
 - If the infant is 7 months or older with an SCM mass
 - If the side of torticollis changes or the size or location of an SCM mass increases.
 - Infants are typically referred for imaging when there is a certain sign or symptom that raises a red flag, or there is no progress despite adherence to the home exercise program⁶



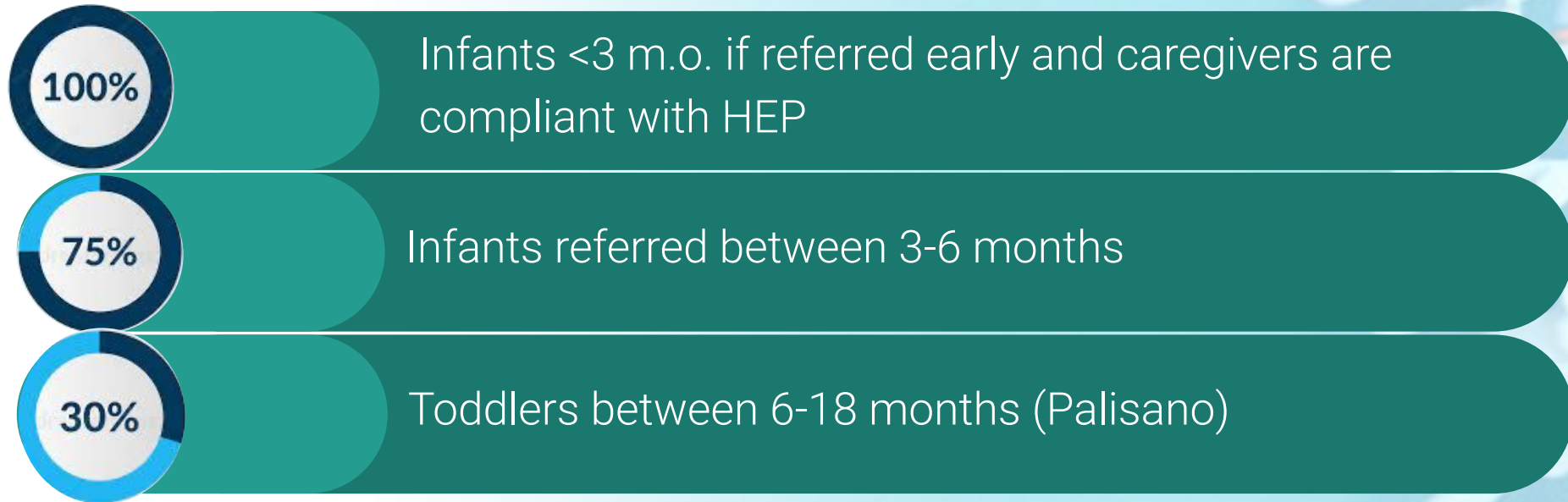
REASSESSMENT

- 3-12 months following discharge from physical therapy intervention **OR** when the child initiates walking
- Re-evaluation should include:
 - Positional preference
 - Symmetry of movement
 - Developmental milestones⁶



REALISTIC DISCHARGE OUTCOMES

- Does not always completely resolve
- Non conservative treatment/alternative treatment
- Prognosis for CMT Full Resolution⁶:



- Clinical judgement: Global development & parent dynamic, concern etc.

QUESTIONS?



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PATIENT/CAREGIVER HANDOUTS

innovation
belongs in every moment

What Is Torticollis?

Torticollis means one or more muscles in your child's neck are tight or weak, causing the child to bend and/or turn their head to one side most of the time. Usually they will bend to one side but turn to the opposite side. Sometimes a child will prefer to bend and turn to the same side, but this is less common.

WHY DO CHILDREN GET TORTICOLLIS?

Children can be born with muscle tightness in their neck from their position in the womb. They can also get muscle tightness after birth by spending a lot of time on their backs and not enough time in other positions, such as on their tummies or sides.

WHAT WE KNOW

Research supports the recommendation that the **more often children do tummy time** and the **more often their neck is straight or turned to the opposite side**, the faster torticollis usually goes away.

Fun Fact! By 3-4 months of age, the ideal amount of tummy time is 60-81 minutes a day to help children meet their physical developmental milestones.



WHICH TYPE OF TORTICOLLIS DOES YOUR CHILD HAVE?

___ **Right neck muscles are tight:** Your child often bends their neck to the right and turns their face to the left.

Treatment: Bending left ear to left shoulder and turning their face towards right shoulder.

___ **Left neck muscles tight:** Your child often bends their neck to the left and turns their face to the right.

Treatment: Bending right ear to right shoulder and turning their face towards the left shoulder.

___ **Bends right and turns right:** Your child bends their neck to the right and also turns their face towards the right.

Treatment: Bending left ear to left shoulder, turning the face towards the left shoulder.

___ **Bends left and turns left:** Your child often bends their neck to the left and also turns their face towards the left.

Treatment: Bending right ear to right shoulder and turning the face towards the right shoulder

PHYSICAL THERAPY WILL TEACH YOU HOW TO:

- Stretch your child's tight neck, shoulder, stomach and back muscles
- Strengthen your child's weak muscles in their neck, shoulder, stomach and back
- Help your child achieve physical movements equally on both sides of the body and support your child's physical development

THIS WILL HELP TO:

- Create more symmetry in your child's body so they can control their neck, torso and arms better
- Improve their ability to hold their neck straight without tilting as well as be able to look to both sides during play
- Allow them to move both sides of their body equally when rolling, sitting, crawling and walking

HOW AND WHEN TO DO THESE THINGS WITH YOUR CHILD TO HELP THEM GET BETTER:

These exercises and positioning suggestions are meant to be done all throughout the day during activities you are already doing with your baby, such as feeding, diaper changes, play and sleeping. Doing these exercises regularly will help your child make the most progress.



WHY IS ALL OF THIS IMPORTANT?

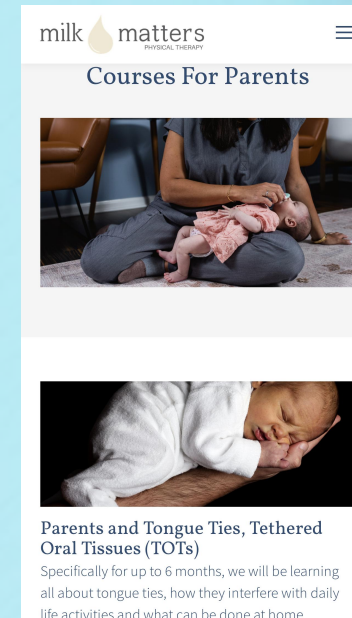
If your child's torticollis is not properly treated or does not get better, it can result in visual problems, neck and back alignment problems and balance problems.

THE CONNECTION BETWEEN THE NECK AND THE HEAD SHAPE:

Your child's head may have flatness at birth due to the position in the womb or it can become flat after birth. It becomes flat after birth when their neck is turned one way most of the time. Infants' heads cannot grow into a flat surface; they grow in other directions, leaving that side of the head flat. From 0 to 6 months of age is the best time to get them off the flat part of their head to help it round out as much as possible.

RESOURCE RECOMMENDATIONS

- Kim Barthel and Shelley Mannel: Torticollis
- Kim Barthel and Shelley Mannel: Every motor event is first a sensory event
- Kim Barthel OT: any course—she's amazing!
- Nurture Columbus: Breastfeeding course
- Dr. Gigi: Tongue tie course
- Beverly Cusick: Postural control courses
- Mary Massery: Pressure system
- Wired on development podcast
 - *It's all connected!*

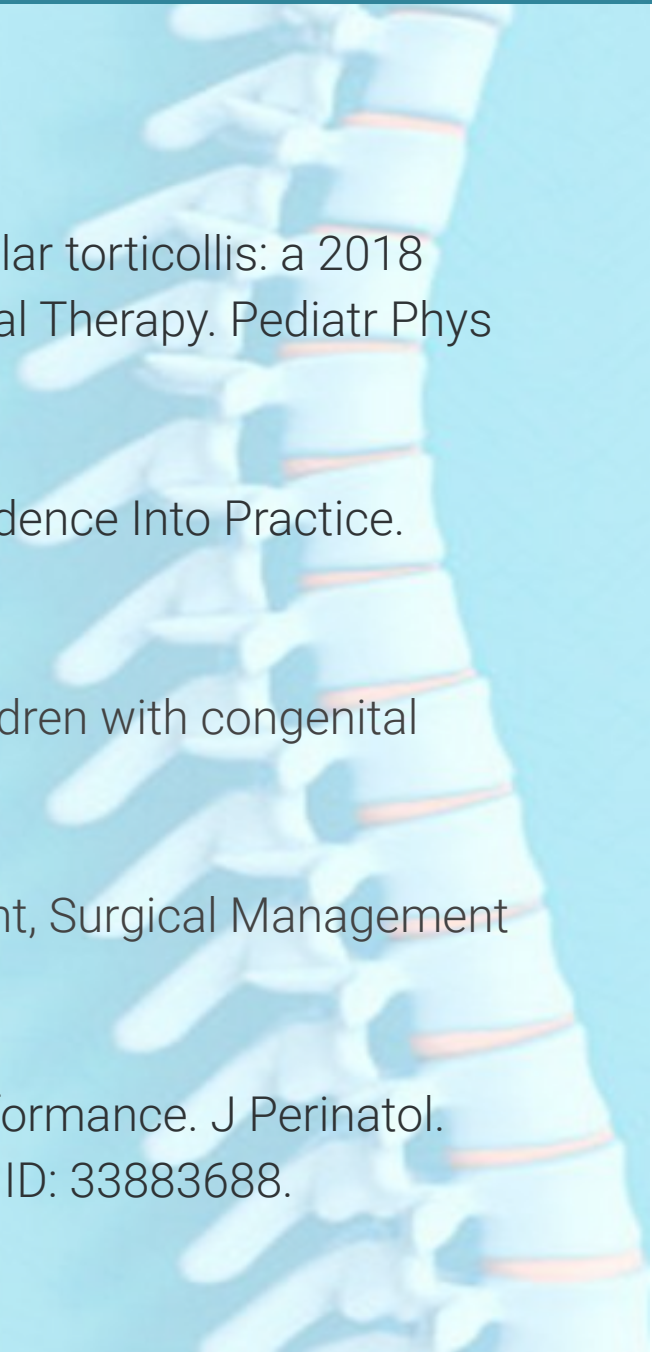


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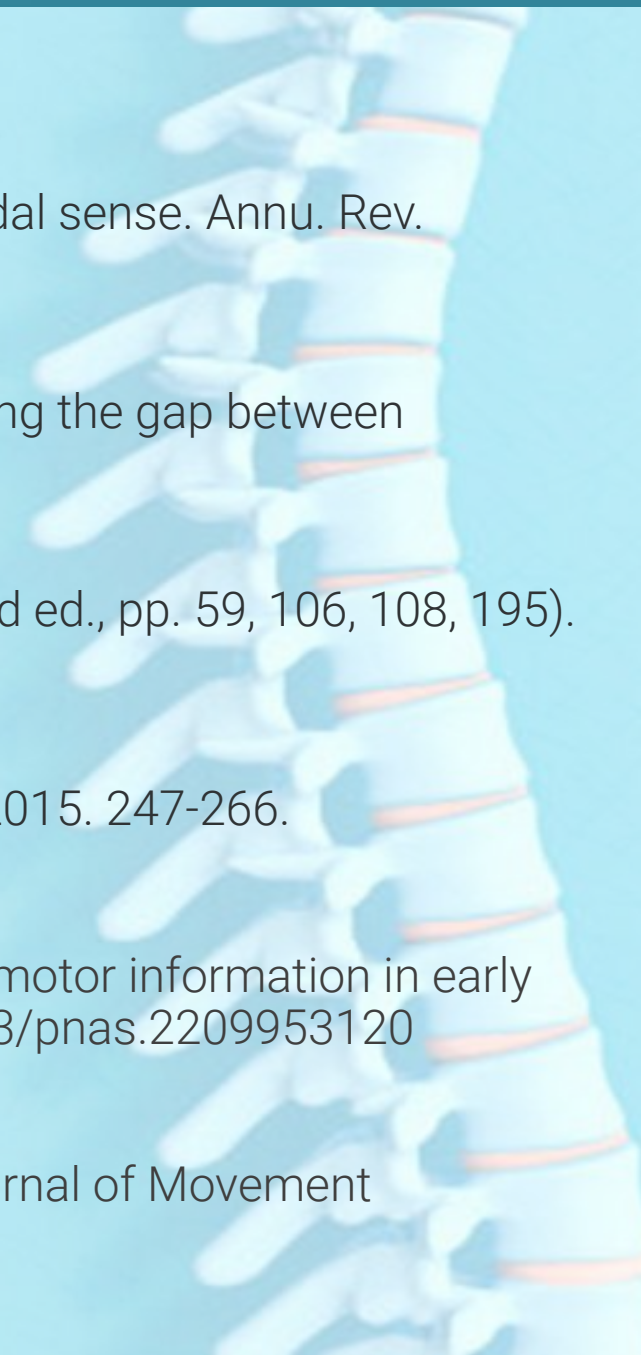
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