Newborn Critical Care Center (NCCC) Clinical Guidelines

Guidelines for Use of Tortle Positioning Device

INTRODUCTION AND BACKGROUND

Infants requiring neonatal intensive care have an increased risk of developing positional cranial deformities such as plagiocephaly, brachiocephaly, dolicocephaly, torticollis, and head position preference. Many of these infants are critically ill and spend extended periods of time dependent on respiratory support and other medical interventions which limit their movement and positioning, resulting in molding of the skull bones. Premature infants have softer skull bones making them even more vulnerable to molding when movement and positioning are limited.

These deformities are a marker of higher risk for developmental delays, especially motor and language related milestones, and can also cause the child to experience stress and negative body image as they mature. Positional cranial deformities may result in the need for attempted corrective measures such as helmet therapy which is known to place personal strain and financial burden on the parents and give rise to a multitude of complications for the child including excessive sweating, skin lacerations and other dermatological problems, impairment of movement and vision, and sleeping problems.

REFERENCES

1. Kluba, S., Lypke, J., Kraut, W., Peters, J. P., Calgeer, B., Haas-Lude, K. Reinert, S. (2015). Positional cranial deformity – the parents' point of view. *International Journal of Oral and Maxillofacial Surgeons, 44*, 57-62
2. Martiniuk, A. L. C., Vujovich-Dunn, C., Park, M., Yu, W., Lucas, B. R. (2017). Plagiocephaly and developmental delay: A systematic review. *Journal of Developmental Behavioral Pediatrics, 38*, 67-78.

TORTLE PROTOCOL

- An order for use of the Tortle cap is included in the EPIC ELBW order set and should be ordered for all infants born at < 1000 grams
- Infants born < 1000 grams will begin wearing the Tortle cap once they reach 1000 grams
- The Tortle caps can be used in combination with all NCCC respiratory devices or alone
- The cap should be used until the infant reaches 34 weeks corrected gestational age
- As corrected gestational age increases, there should be an increased emphasis on back-to-sleep with positional changes (see example preventative "positioning plan")

Exceptions:

- If a specific deformational issue is identified, the provider team may elect to continue use of the Tortle cap on a case-by-case basis
- Concerns about specific problems/cephalic related diagnoses (hydrocephalus, cephalhematoma, skin breakdown, etc.) should be addressed with the provider team on a case-by-case basis

Cleaning:

- Spot clean the cap with soap/water when soiled
- The cap comes with a mesh bag for laundering when necessary
- Each cap is patient specific; the same cap cannot be used for multiple patients

Recommendations with Use:

- Change patient position with each care time (as recommended in the unit structure standards); consider using the optimal positioning plans (below)
- Monitor skin integrity per unit protocol; special attention to pressure points
- Remove cap and assess skin integrity under cap with each care time
- Can remove cap when out of bed with PO feedings (if not on respiratory support)
- Hat size will change as the patient grows; reassess hat size based on head circumference each week

Hat Sizes Based On Head Circumference

- ELBW size cap: 17-22 cm
- Micropreemie size cap: 22-30 cm
- Preemie size cap: 30-38 cm

PREVENTION OF DOLICHOCEPHALY AND HEAD PREFERENCE

- Protocol for premature infants during the period between "neutral positioning" for IVH prevention during the first 72 hours of life and before the institution of the "back to sleep protocol"

- Infants should wear the Tortle Midliner in all positions while practicing this positioning plan

Optimal Positioning Plans

For infants <32 weeks or <1500 grams

Reposition infant every 3 or 4 hours in the following order:

1. Prone
2. Right side lying
3. Supine midline
4. Left side lying
5. Prone
6. Right side lying

For infants between 32-33 weeks

Supine is now offered every 3rd position to assist in transition to “back to sleep protocol:”

1. Prone
2. Side lying
3. Supine (head in midline)
4. Prone
5. Left side lying
6. Supine (head in midline)

ASSOCIATED PROBLEMS WITH DOLICHOCEPHALY

The long head shape causes interference with the development of midline positioning and head control, and can cause preference for the head to fall to either side. This can result in preferred head orientation which is commonly associated with the development of positional plagiocephaly.

Dolichocephaly is associated with many developmental disabilities affecting chewing, swallowing and sometimes breathing. It is also associated with developmental delays and psychological problems including poor self-esteem and depression.

HOW TO TREAT DOLICHOCEPHALY

Plan of Action

Once abnormal head shape has developed, skull molding needs to be practiced until the head resumes a normal shape.

Optimal Positioning Plans

For infants <32 weeks or <1500 grams

Reposition infant every 3-4 hours in the following order:

1. Prone
2. Right side lying (turn infant's head and body gently 30-45 degrees right of the midline, secure the infant's head in position using the beanie, and support infant's back to hold infant in neutral position)
3. Supine with head in midline, (if not tolerated turn head slightly)
4. Left side lying (turn infants head and body gently 30-45 degrees left of the midline, secure the baby's head in position using the beanie, and support infants back to hold infant in neutral position)
5. Prone
6. Right side lying

For infants between 32-33 weeks

Supine is now offered every 3rd position to assist in transition to "back to sleep protocol:"

1. Prone
2. Right side lying
3. Supine (head in midline)
4. Prone
5. Left side lying
6. Supine (head in midline)

ASSOCIATED PROBLEMS WITH HEAD PREFERENCE

Head preference may develop into torticollis which can be associated with asymmetric development of the whole skeletal system. It is also associated with amblyopia and reading difficulties, compensatory scoliosis and many other problems related to asymmetric development.

HOW TO TREAT HEAD PREFERENCE

Plan of Action

Once neck asymmetry has developed, preferential head positioning needs to be practiced to provide the necessary passive stretch on the dysfunctional neck muscles. This treatment should continue until the neck symmetry resumes and full range of movement around the neck has returned.

Optimal Positioning Plans

For infants <32 weeks or <1500 grams

Reposition infant every 3-4 hours in the following order:

1. Prone with head on the non-preferred side
2. Right side lying (turn infant's head and body gently 30-45 degrees right of the midline, secure the baby's head in position using the beanie, and support infant's back to hold infant in neutral position)
3. Supine midline, (if not tolerated turn head slightly to the non-preferred side)
4. Left side lying (turn infant's head and body gently 30-45 degrees left of the midline, secure the infant's head in position using the beanie, and support infant's back to hold infant in neutral position)
5. Prone with head placed on the non-preferred side
6. Right side lying (turn infant's head and body gently 30-45 degrees right of the midline, secure the infant's head in position using the beanie, and support infant's back to hold infant in neutral position)

For infants between 32-33 weeks

Supine is now offered every 3rd position to assist in transition to "back to sleep protocol:"

1. Prone with head on the non-preferred side
2. Right side lying
3. Spine midline
4. Prone with head on the non-preferred side
5. Left side lying
6. Supine (head in midline or slightly to the non-preferred side)

NURSING INSTRUCTIONS FOR THE TORTLE CAP POSITIONER

The Tortle Cap can be used in all positions to prevent cranial asymmetry. First, verify the order in EPIC to use the Tortle hat. Rotate the infant's position every 3-4 hours using the optimal positioning plans. Please remove the Tortle Cap and check for signs of skin breakdown at each care time. If traditional BCPAP is in use be sure the tubing is not resting on the infant's face. See chart below to evaluate the cap fit based on head circumference.

DO NOT THROW DEVICE AWAY IF SOILED. Spot clean using soap and water as feasible. If the device requires laundering, place it in the mesh laundry bag, write the patient's name on the bag and place the bag into the green Tortle bucket in each Pod.

The Tortle Cap can be used for infants who are stable in room air and is also compatible for use in conjunction with all respiratory support devices in the NCCC (including an ETT, traditional BCPAP or RAM cannula, non-invasive NAVA, and nasal cannula).

To secure traditional BCPAP use the white strapettes (left) in the same method used to secure BCPAP to the CPAP-specific hat. Do NOT use the black keyhole cinch straps (right).

TORTLE CAP SIZE BASED ON HEAD CIRCUMFERENCE

- ELBW size cap: 17-22 cm
- Micropreemie size cap: 22-30 cm
- Preemie size cap: 30-38 cm

HOW TO APPLY BCPAP USING THE TORTLE CAP

1. *Place infant's head into the Tortle Cap:*

2. *Place the 2 black Velcro straps along the thick white band of the Cap:*

3. *Apply BCPAP "goal post" and secure with the white strapettes to the black Velcro*

Supine Midline

- Place infant's head in Tortle and adjust until rolls are almost touching infant's shoulders
- Close Tortle by fastening the straps across the forehead, just above the eyebrows
- Make sure the ears are not folded

Partial Side Lying

- Place the infant in supine position, but turn the infant's head slightly in the Tortle
- Fasten straps across forehead

Side Lying

- Apply Tortle according to the supine position directions
- Roll infant to side lying position
- Tuck the prone-most roll back behind the head so both rolls touch
- A Velcro strap can be used to secure the two rolls together

Prone

- Use the directions to position the infant's head facing right or left (as with side lying)
- Then continue to turn the infant's body into prone position
- The Z-Flo, can be used to support the head (as it is with the regular CPAP hat) so the infant is not looking over their shoulder
- Continue to support infant's abdomen with arms tucked in towards midline