Mass General Brigham

PEDIATRIC NEWBORN MEDICINE CLINICAL PRACTICE GUIDELINES

Management of Common Suspected Perinatal Injuries

Implementation Date:

Clinical Guideline Name	Management of Common Suspected Perinatal Injuries
Effective Date	9-1-2023
Revised Date	
Contact Person	Director of Neonatal Neurocritical care
Approved By	Clinical Practice Council _____ Department of Newborn Respiratory ____ Department of Newborn Medicine _____ Department of Neonatal Nursing ____
Keywords	

This is a clinical practice guideline. While the guideline is useful in approaching of Common Suspected Perinatal Injuries in the newborn intensive care unit and Newborn nursy, clinical judgment and/or new evidence may favor an alternative plan of care, the rationale for which should be documented in the medical record.

I. Purpose

To standardize the process of diagnosing, evaluating, consulting, and managing common neonatal birth injuries namely:

1- Instrumental Delivery- page 3
2- Subgaleal hemorrhage/ collection- page 4
3- Brachial plexus injury- page 6
4- Facial nerve injury- page 8
5- Clavicle fracture- page 10
6- Humerus fracture- page 12

II. All CPGs will relay on the NICU Nursing Standards of Care.

III. Definitions (if applicable)

IV. Patient population

These guidelines apply to infants admitted to Brigham Women's Hospital (BWH) nursery or NICU.

V. Background/Summary Information & Guidelines

1- Instrumental Delivery

1) Background

Instrumental delivery refers to vaginal delivery or cesarean section in which the operator uses forceps, a vacuum device, or another instrument to extract the fetus, with or without the assistance of maternal pushing. In the United States, in 2017, 3.1 percent of all births were instrumental. Vacuum births accounted for 2.6 percent and forceps births accounted for 0.5 percent of all vaginal births. Instrumental deliveries are associated with increased risk for skin injury, facial nerve injuries, subgaleal collections and skull fracture.

2) Management

All instrument assisted deliveries need to be staffed by the NICU team.

- In the DR, the NICU provider will ensure:
  - Stabilization and resuscitation using NRP
  - Documenting head and neck examination and extremities examination including any apparent injuries
  - Measuring baseline head circumference
  - Brief neurological assessment
  - Confirm that vitamin K was administered. If declined, ensure risks are explained to parents and properly documented.

- In one hour, the NICU provider will assess:
  - Vital signs
  - Full examination including a full neurological assessment
  - Repeat head circumference

Any change in vital signs, neurological examination or significant increase in HC not explained by resolution of moldings requires triage/NICU admission and assessment.

- If no concern, the infant will continue to be observed in labor and delivery and postpartum floors for the following 6 hours:
  - The head will remain uncovered
  - The baby's nurse will assess vital signs and examine the scalp every 2 hours and notify the provider about any significant changes

2- Subgaleal collection

1) Definition

Subgaleal hemorrhage refers to hemorrhage beneath the aponeurosis covering the scalp and connecting the frontal and occipital components of the occipito-frontalis muscle. Blood may spread beneath the entire scalp and even dissect into the subcutaneous tissue of the neck. Since there is evidence that the majority of subgaleal collections do not have significant blood component, it is appropriate to use the more general term “subgaleal collection”.

Subgaleal hemorrhage is likely due to disruption of emissary veins crossing from the scalp superficial veins to drain into dural venous sinuses. Some cases are associated with skull fracture.

2) Incidence

0.1 to 0.6 per 1000 spontaneous vaginal deliveries and 3 to 7.6 per 1000 vacuum extractions. Higher incidences of 41-210 per 1000 vacuum extractions are reported in prospective surveillance studies. 60 to 89% of cases of Subgaleal hemorrhage are related to vacuum extraction.

3) Clinical features

The onset of subgaleal hemorrhage is variable. The range of onset of presentation is between 1 to 6 hours.

Clinical findings suggestive of subgaleal collection include a diffuse fluctuant mass, that feels like a "leather pouch filled with water", which increases in size after birth, and may displace earlobes and extend in the subcutaneous tissue of the posterior neck.

The main concern from subgaleal hemorrhage is the massive blood loss in a large space that can accommodate volumes close to whole body blood volume. This will lead to a picture of hypoperfusion, hypotension, and shock status. This will include tachycardia, tachypnea, hypotonia, and pallor. We recently reported subgaleal collections (minimal blood by MRI) not associated with encephalopathy which can be totally asymptomatic beyond the swelling.

4) Outcome

Asymptomatic subgaleal collection could be benign and resolves in few days.

In symptomatic subgaleal hemorrhage, complications include shock, coagulopathy, DIC, anemia, renal injury, hepatic injury, and lactic acidosis. Mortality as high as 14% from shock and the associated coagulopathy have been previously reported.

After the acute phase, the lesion resolves over 2 to 3 weeks.

5) Management

I- Asymptomatic (small size, stable vital signs and normal neurological examination:

- NICU admission for 12-24 hours
- cUS to confirm subgaleal hemorrhage and rule out associated intracranial pathologies (optional)
- Continuous vital signs monitoring
- Serial neuro exam every 3-6 hours
- Hb/ Hct on admission and every 6 hours x 2

II- Symptomatic (moderate-large size, unstable vital signs or abnormal neurological examination)

- NICU admission
- Provide adequate oxygenation: oxygen, continuous positive airway pressure, assisted ventilation
- Immediately place a line for central venous access (umbilical venous line)
- Place an umbilical arterial line to draw blood and measure blood pressure
- Replace volume loss aggressively (10-20 mL/kg bolus infusions), anticipate a 40-mL blood loss for every 1-cm increase in occipital frontal circumference
- Monitor serial hematocrits and evaluate for coagulopathy
- Transfuse with packed red blood cells, fresh frozen plasma, cryoprecipitate, or platelets as indicated
- Maintain accurate monitoring of fluid intake and output
- cUS to confirm subgaleal hemorrhage and rule out associated intracranial pathologies
- Brain MRI is recommended within 24 hours after stabilization

3- Brachial plexus injury

1) Definition

Weakness or total paralysis of muscles innervated by the nerve roots that supply the brachial plexus.

2) Incidence

The incidence has varied generally between 0.5 and 2.5 per 1000 live births.

3) Clinical features

Forms of brachial plexus injury:

- Erb-Duchenne palsy: injury to C5-6
- Klumpke palsy: injury to C8 to T1
- Global palsy: injury to C5-T1
- Horner syndrome: miosis, ptosis, anhydrosis

In neonates, approximately 90% of cases of brachial plexus injury involve the proximal upper limb and correspond to Erb's palsy or "extended" Erb's (C5-C7) palsy. A true Klumpke palsy usually does not occur in the newborn period; infants with distal involvement also exhibit proximal involvement. These severe lesions involving the entire brachial plexus account for 10% or less of neonatal brachial plexus injuries.

Erb's palsy :

- Weakness at the shoulder of abduction and external rotation, at the elbow of flexion and supination and to a variable extent at the wrist and fingers of extension.
- Thus the limb assumes the characteristic "waiter's tip" posture because of the preservation of shoulder adduction and internal rotation, elbow extension and pronation, and wrist and finger flexion.
- Moro reflex is disturbed.
- Grasp reflex is preserved except in total plexus injury.
- Affection of the diaphragm (5% of cases) may be associated if involvement extends to cervical roots 4 and, perhaps, 3.

Total plexus injury:

- Affection of sympathetic outflow from the cervical sympathetic chain may result in Horner's syndrome, manifested in the newborn by ptosis and miosis.
- The presence of Horner's syndrome suggests that the principal pathology is an avulsion injury and thereby implies a poor prognosis.

4) Outcome

The prognosis of brachial plexus injury relates to the severity and extent of the lesion. Reported rates of full recovery range generally from 65% to 90%.
The variation in rates depends particularly on whether the population has been followed from the neonatal period, and whether full recovery is based on careful clinical examination and excludes good functional recovery albeit with residual weakness.

5) Management

This section refers to brachial plexus injury in neonates without other associated injuries. Please refer to "Humerus Fracture" for further management recommendations for a neonate with brachial plexus injury and associated humerus fracture.

- Neurology Consult
- PT/OT Consult
- Proper Handling: The majority of neonates with brachial plexus injury will recover nerve function within the first 4-6 weeks, with best prognosis of full recovery if elbow flexion is present by 6 weeks. Therefore, it is important during this timeframe to allow the neonate to initiate active spontaneous movements of the arm as tolerated during the healing process.
  - It is not recommended to pin the arm or restrict active spontaneous movements.
  - Support the injured arm in a comfortable position without restricting movement
  - Allow the neonate's arm to rest for nerve healing and to prevent further stretch/ injury to the nerve
  - Perform daily activities without pulling or putting stress on the injured arm
  - Provide education to caregivers regarding positioning/precautions/mobility
- An Orthopedic Consult is optional for more severe injuries, to address significant family concerns, and for these remaining inpatient > 2 weeks.

Please refer to **Appendix II** [brachial plexus] for general handling recommendations in a neonate with upper extremity injury.

6) Follow-up

- Referral to the Brachial Plexus Clinic at Boston Children's Hospital. Either providers or parents can schedule an appointment by calling 617-355-6021. Follow-up typically occurs within a few weeks.
- For further help, either providers or parents can directly contact the Patient Navigator for the Brachial Plexus Program, Julia Ainsworth, at Julia.Ainsworth@childrens.harvard.edu or 617-355-3752.

4- Facial nerve injury

1) Definition

Facial palsy refers to weakness of facial muscles and, in this context of perinatal trauma, indicates facial nerve (CN VII) injury and, therefore, usually affects the muscles of the upper as well as lower parts of the face on one side (unilateral weakness).

2) Incidence

In one study of 875 term infants examined specifically for facial paresis on the second day of life in a series reported in 1951, the incidence was 6.4%. In a later series, the incidence was 0.75% of term infants, and in a still more recent series, the incidence was approximately 0.18%.

Risk factors include shoulder dystocia, birthweight greater than 4kg, birth length greater than 52cm, instrumented delivery, increased maternal age, increased maternal BMI, and a lower mean head-to-abdominal circumference ratio.

3) Clinical features

By far the most common syndrome of neonatal facial nerve palsy is related to affection of the nerve after exit from the stylomastoid foramen; therefore the typical features include weakness of both upper and lower facial muscles on one side of the face. At rest the palpebral fissure is wider on the affected side, the nasolabial fold is flattened, and the subtle nuances of facial expression are absent. With elicited movement, it is apparent that the infant is unable to wrinkle the brow, close the eye firmly, or move the corner of the mouth or lower face into an effective grimace.

In infants, there is often poor latch and reduced suction, and dribbling of liquid from the corner of the mouth with feeding.

Approximately 75% of cases involve the left side of the face, perhaps in part reflecting the relative frequencies of intrauterine positions.

An example of a scoring system for facial palsy is the House-Brackman Scale :

- **Grade I:** Normal
- **Grade II:** Slight facial weakness or other mild dysfunction. Normal tone and symmetry at rest. Complete closure of the eye without effort. Slight asymmetry of the mouth when facial movements occur.
- **Grade III:** Assigned to patients dealing with moderate dysfunction; these patients generally do not display any noticeable facial weakness with synkinesis, they maintain complete eye closure and good forehead movement with effort.
- **Grade IV**: Assigned to patients dealing with severe dysfunction. Obvious facial weakness. Incomplete eye closure, no forehead movement, asymmetrical mouth movement, and synkinesis.
- **Grade V:** Assigned to patients who have little to no ability to smile, frown or make other facial expressions. The closure of the eye is incomplete, and there is no forehead movement.
- **Grade VI:** No facial motion.

4) Outcome

The prognosis of affected infants is very good. The large majority of infants recover completely within 1 to 3 weeks, and only rarely do infants have any detectable deficit after several months.

5) Management

- Speech and feeding evaluation: Interventions may involve changing feeding equipment (e.g. bottle nipple), feeding position (side-lying with injured side down), and/or feeding strategies (e.g. chin/ cheek support)
- If eyes are affected: Use artificial tears and, only if necessary, tape the involved eye to prevent corneal injury
- Neurology consult
- Brain MRI if facial palsy is not explained by delivery or intrauterine position or if associated with other neurological abnormalities. (will be guided by neurology consult). Make sure this is ordered as 3T MRI and add in comments add the following: “high resolution for cranial nerve imaging: Axial 3D T2 SPACE”.
- Further management based on MRI findings
- Neurosurgery consultation in very rare cases when a petrous temporal fracture is suspected

6) Follow up

- Mainly PCP to follow
- Speech follow-up if needed
- Neurology follow-up if needed

5- Clavicle fracture

1) Definition

Clavicle fracture in the newborn period.

2) Incidence

Fracture of the clavicle is one of the most common injuries in neonates with incidence rates ranging from 0.5-1.6%.

3) Clinical features

There are two types of clavicle fracture depending on if the fracture is displaced or nondisplaced.

Symptoms of displaced fractured clavicles include crepitus, lack of movement of the affected extremity, edema, asymmetrical bone contour, and crying with passive motion. Displaced fractured clavicles are more likely to be associated with physical findings in the immediate post-delivery time.

The differential diagnoses for the physical findings that can be associated with a displaced clavicle fracture include humeral fracture, shoulder dislocation and brachial plexus injury.

Nondisplaced clavicular fracture often has delayed symptoms and diagnosed late by days or weeks until there is a formation of a visible or palpable callous.

About 1% of neonates with clavicular fractures will have an associated CNS or a brachial plexus injury. Another 1% will present with decreased movement of the ipsilateral leg due to an associated long-tract injury.

4) Outcome

Clavicle fracture has an excellent prognosis without any long-term sequelae. Clavicular fractures in neonates without other associated injuries heal quickly and uneventfully within 10 days.

5) Management

- Imaging:
  - In neonates with local crepitus only, *a clinical diagnosis is sufficient*.
  - X-Ray can be used to confirm the diagnosis.
- Orthopedic consult
  - *Optional* for any clavicular fracture to either confirm the diagnosis and management and/or to discuss the findings, plan and prognosis with the neonate's family.

- *Needed if* there are any signs of CNS, brachial plexus or long tract injury associated with the clavicular fracture.

- Handling: **(Appendix III)**
  - Neonate will move the arm as tolerated during the healing process.
  - While restricting movement is not needed, if the infant appears uncomfortable, pinning the arm against the chest in adduction with the elbow flexed for a week (maximum) will decrease any discomfort.

6) Follow up

- PCP can follow-up isolated uncomplicated clavicular fractures. A callous will be palpable in 10-14 days over the fracture site. No F/U imaging is recommended when healing is uneventful.
- Orthopedics will determine the follow-up for clavicular fractures associated with other findings (eg. brachial plexus injury).

6- Humerus Fracture

1) Definition

Fracture of humerus.

2) Incidence

Humerus fractures are rare with a reported incidence of 0.2 per 1000 deliveries.

3) Clinical features

Decreased movement of the affected arm, swelling and crepitation, decreased or absent Moro reflex, and tenderness with palpation of the arm.

4) Outcome

Most of infants with Humerus fracture recover completely.

5) Management

- X-Ray
- Orthopedic consult
- PT consult

It is recommended to provide comfort to neonate and protect arm from further injury by immobilizing the arm:

- Elbow should be in 90 degrees of flexion
- Stabilize the humerus against thorax by either:
  - Pinning sleeve against torso (typically recommended x 3 weeks)
  - Gently wrap with elastic wrap to support arm against torso (only in more complex fractures as recommended by orthopedics)

- Considerations:
  - If dressing fully (with arm in sleeve) it is recommended to have loose fitting sleeve and to
    - Place affected arm in clothing first when dressing
    - Remove affected arm from clothing last when undressing
  - It is recommended to have clothing that fits snugly around torso to prevent pinned sleeve from sliding
  - May gently swaddle around splinted arm to help support

Please refer to **Appendix IV** [humeral fracture pinning/ace wrap] for general handling recommendations in a neonate with upper extremity injury.

6) Follow up

Humerus fractures in neonates without other associated injuries heal with good outcomes with proper handling and immobilizing. Callus formation can typically be seen on radiograph at 7-10 days. The neonate will regain active spontaneous movements of the arm as tolerated coinciding with healing.

Orthopedics will determine the follow-up for humerus fractures associated without or with other findings (eg. brachial plexus injury):

-Typically, with clavicle/humeral fractures, follow-up occurs in 2-4 weeks for the initial exam to r/o BPI. Radiographs are not obtained at that visit but a disk with imaging is requested of parents to bring to visit.

Appendices:

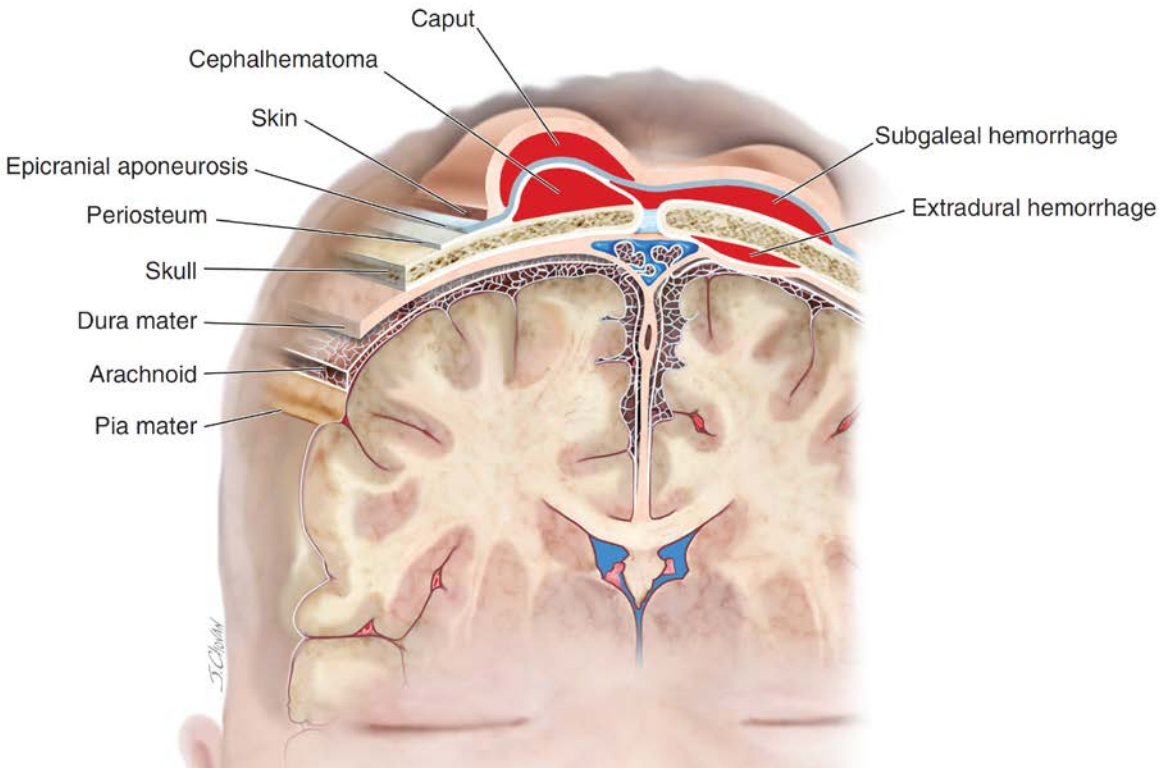
- **Appendix I- Differential Diagnosis of Scalp Swellings**
- **Appendix II- Caring for your baby with a Brachial Plexus Injury**
- **Appendix III- Caring for your baby with a Clavicle Fracture**
- **Appendix IV- Caring for your baby with a Humeral Fracture**

References:

1. Akangire G, Carter B. Birth Injuries in Neonates. Pediatr Rev 2016;37:451-62.
2. Rosenberg AA. Traumatic Birth Injury. NeoReviews 2003;4:e270-e6.
3. Brousil J, Hunter JB. Femoral fractures in children. Curr Opin Pediatr 2013;25:52-7.
4. Dupuis O, Silveira R, Dupont C, et al. Comparison of "instrument-associated" and "spontaneous" obstetric depressed skull fractures in a cohort of 68 neonates. Am J Obstet Gynecol 2005;192:165-70.
5. Govaert P, Vanhaesebrouck P, De Praeter C, Moens K, Leroy J. Vacuum extraction, bone injury and neonatal subgaleal bleeding. Eur J Pediatr 1992;151:532-5.
6. Plauche WC. Subgaleal hematoma. A complication of instrumental delivery. JAMA 1980;244:1597-8.
7. Swanson AE, Veldman A, Wallace EM, Malhotra A. Subgaleal hemorrhage: risk factors and outcomes. Acta Obstet Gynecol Scand 2012;91:260-3.
8. Boo NY, Foong KW, Mahdy ZA, Yong SC, Jaafar R. Risk factors associated with subaponeurotic haemorrhage in full-term infants exposed to vacuum extraction. BJOG 2005;112:1516-21.
9- El-Dib M, Parziale M, Johnson L, Benson C, Grant PE, Robinson J, Volpe J, Inder T. Encephalopathy in neonates with subgaleal hemorrhage is a key predictor of outcome. Pediatr Res 2019;86(2):234-41.
10. Gupta R, Cabacungan ET. Neonatal Birth Trauma: Analysis of Yearly Trends, Risk Factors, and Outcomes. J Pediatr 2021;238:174-80 e3.
11. Dunkow P, Willett MJ, Bayam L. Fracture of the humeral diaphysis in the neonate. J Obstet Gynaecol 2005;25:510-1.
12. Wei C, Stevens J, Harrison S, Mott A, Warner J. Fractures in a tertiary Neonatal Intensive Care Unit in Wales. Acta Paediatr 2012;101:587-90.
13. Uhing MR. Management of birth injuries. Pediatr Clin North Am 2004;51:1169-86, xii.
14. Shah V, Coroneos CJ, Ng E. The evaluation and management of neonatal brachial plexus palsy. Paediatr Child Health 2021;26:493-7.
15. Decraene L, Boudewyns A, Venstermans C, Ceulemans B. Developmental unilateral facial palsy in a newborn: six cases and literature review. Eur J Pediatr 2020;179:367-75.
16. House JW, Brackmann DE (1985). "Facial nerve grading system". Otolaryngol Head Neck Surg. 93 (2): 146–147
17. Martin JA, Hamilton BE, Osterman MJK, Driscoll AK, Drake P. Births: Final Data for 2017. Natl Vital Stat Rep 2018;67:1-50.
18. Clark SL, Belfort MA, Hankins GD, Meyers JA, Houser FM. Variation in the rates of operative delivery in the United States. Am J Obstet Gynecol 2007;196:526 e1-5

Mass General Brigham

Appendix I- Differential Diagnosis of Scalp Swelling



Sites of extracranial (and extradural) hemorrhages in the newborn. Schematic diagram of important tissue planes from skin to dura. Volpe JJ. *Volpe's Neurology of the Newborn - 6th Edition, 2018* (Adapted from Pape KE, Wigglesworth JS. *Haemorrhage, Ischaemia and the Perinatal Brain*. Philadelphia: JB Lippincott; 1979.)

TABLE 36.2 Major Varieties of Traumatic Extracranial Hemorrhage

LESION	FEATURES OF EXTERNAL SWELLING	INCREASES AFTER BIRTH	CROSSES SUTURE LINES	MARKED ACUTE BLOOD LOSS
Caput succedaneum	Soft, pitting	No	Yes	No
Subgaleal hematoma	Firm, fluctuant	Yes	Yes	Yes
Cephalhematoma	Firm, tense	Yes	No	No

Volpe JJ. *Volpe's Neurology of the Newborn - 6th Edition, 2018*

1- Caput Succedaneum



This photo was taken on the first day of life. Caput (scalp edema) is not visibly obvious on first picture, but it could be appreciated on exam. In the following photos, the extent of the edema is easily seen. Constant pressure in one spot is the easiest way to elicit the characteristic pitting edema of caput. After the pressure is released, the pitting indentation is clearly seen. Although caput can cross over suture lines (since it affects the scalp), it is often predominantly or entirely unilateral. Evaluating for pitting edema is a much more useful diagnostic tool than location

2- Subgaleal hemorrhage/ collection



The subgaleal area (between the scalp and the skull) is a large potential space, so when bleeding occurs there, it easily moves to the dependent part of the head (in this photo the fluid is posterior and is causing the scalp to bulge loosely onto the mattress). As pressure is placed on that area, a fluid wave can be seen that radiates from the occiptal area all the way to the space over the anterior fontanelle The second picture is with pressure being applied with the palm and fingers to squeeze the blood that was in a dependent location into a more visible, anterior location. The sensation is similar to that of handling a water balloon. It is a very fluctuent, shifting mass without discernable limitations.

3- Cephalhematoma



Cephalohematoma is a collection of blood under the periosteum of a skull bone. Because of its location, it is impossible for cephalohematoma to cross suture lines. If more than one bone is affected, there will be a separation between the two areas at the suture line as seen in this photo -- the sagittal suture separates the bilateral parietal cephalohematomas.

Adopted from https://med.stanford.edu/newborns/professional-education/photo-gallery/head.html -Photos by Jonelle Aby, MD

Caring for your baby with a Brachial Plexus Injury

During your baby's hospital stay

- It is important to prevent any further damage to the nerve; therefore, monitor your baby's stress and pain signs and avoid any painful activities
- "Affected" arm = _____
- "Unaffected" arm = _____
- Goals
  1. Become familiar with positioning your baby's affected arm to prevent muscle tightness and to prevent further injury
     - "Back to sleep" safe sleep (sleeping on his/her back)
     - Swaddling
     - Awake playtime: on his/her sides, back, and tummy
     - Supporting affected arm in infant seats and swings
     - Your baby may have supports (ex. Folded blankets or towel rolls) to help the affected arm while he/she is sleeping. He/She will not continue to use this when he/she goes home so that your baby can follow safe sleep guidelines.
  2. Become familiar with performing daily activities with your baby without pulling or putting stress on affected arm
     - Support affected arm when picking up, holding, bathing, dressing, and carrying/moving your baby
     - Avoid lifting your baby from under his/her arm pits
     - Avoid lifting your baby by pulling hands or arms
  3. Avoid restricting any active movements that your baby begins to show
     - Avoid splinting or pinning affected arm to shirt

Positioning your baby in infant seats/swings

- Your baby should always be **awake and supervised** while in these devices
- Support your baby on either side with rolled blankets
  - Position the roll on affected side of body to support arm
  - Have affected arm rest forward and in front of body
  - Avoid arms getting stuck by side or under straps
- Encourage your baby to have head turned to left and right for head shape and prevent muscle tightness



Image- Brachial Plexus Palsy: A Therapy Guide for Your Baby; Seattle Children's Hospital; 8/14 PE 604

Therapist's Name:

Swaddling

1. Support your baby's affected arm on his/her chest with
    - Elbow bent
    - Hand near face
    - Shoulder slightly forward
2. Gently wrap with blanket
3. Have your baby's affected arm or both of your baby's arms out of the swaddle

To Do:





Do NOT:

1. Do not pull blanket too tightly on arm
2. Do not swaddle your baby's arms down by his/her side



Positioning your baby on his/her back during play time

3. This should only be performed when your baby is **awake and supervised**
4. Support your baby's affected arm by placing rolled blanket/towel or with your hand behind arm
5. The goal is to keep his/her shoulder forward and prevent affected arm from hanging by his/her side
6. Affected arm can be positioned
    a. Next to your baby's side
    b. Across his/her chest or abdomen




Therapist's Name:

Positioning your baby on his/her side during play time

7. This should only be performed when your baby is **awake and supervised**
8. Position your baby so he/she can practice laying on both his/her right and left sides
    a. It is easier for your baby to use arm muscles when he/she is on his/her side
    b. He/she does not have to work against the weight of gravity
    c. When your baby begins showing arm movements, you can introduce lightweight toy for your baby to help grasp (ex. Rattle)
9. When your baby's affected arm is on top, help support it in front of his/her body
    a. Avoiding letting arm hang behind body
    b. You may use your hand or rolled towel behind back to keep your baby on his/her side
    c. You may use a towel or blanket in front of baby to help support his/her affected arm
10. Monitor baby's stress/pain signs when laying on affected side; if baby is in pain, avoid having baby lay on affected side
11. When he/she begins to lay on his/her affected arm, help position affected arm forward so that your baby is not laying directly on top of his/her arm





Positioning your baby on his/her tummy during play time

12. This should only be performed when your baby is **awake and supervised** as much as tolerated (minimum of 1-5 minutes, 3-5 times per day)
13. Because your baby may weakness of his/her affected arm muscles, it is important to
    a. Position affected arm correctly
    b. Provide enough support to prevent shoulder from "caving in"
14. During tummy time, your baby's affected shoulder should feel strong and rounded
    a. Make sure both elbows are bent and hands are in front of shoulders
    b. Use your hands to help keep your baby's arms close to his/her body
15. Use your hands to support your baby's affected arm. Try to place your fingertips along the front of your baby's affected shoulder to provide support
16. Tummy time can be in a variety of places
    a. On your chest or lap
    b. Over a Boppy pillow or rolled blanket
    c. On a flat surface, such as a blanket on the floor or on a mat





Therapist's Name:

Tips and Tricks: Handling your baby

17. Your baby may not have feeling in his/her affected arm
    a. Your baby may not be aware of the position of his/her arm when being held, laying down, or moving
    b. Your baby may not be aware of or cry if his/her arm is in a "funny" position or uncomfortable
18. Your baby may have trouble using his/her muscles to move his/her affected arm. These muscles may be weak and are unable to protect your baby's joints. Perform movements of the affected arm slowly.
19. Picking up and carrying
    a. Support behind your baby's shoulders and elbows
    b. Affected arm should be close to your baby's body and forward
    c. Avoid letting your baby's arm hang by his/her side or get stuck behind body
    d. Avoid lifting your baby from under the armpits
    e. Avoid pulling on your baby's arms by his/her hands to pick him/her up
20. Feeding
    a. Arm should be well-supported and not hanging by your baby's side
    b. If bottle feeding, consider gently swaddling your baby to keep arm in a good position
    c. If breast feeding, help adjust position of the arm so the arm is not hanging or stuck behind your baby's body
21. Dressing
    a. When putting on clothes, place the ___ arm in first
    b. When taking off clothes, take the ___ arm out last
22. Your baby should spend time in different positions during the day when awake, including
    a. Being held
    b. Playing on back, tummy, and side
23. Due to your baby having one arm that he/she may be able to move more, your baby may prefer having his/her head to one side. Your baby should turn head equally to right and left. To avoid a preference, to help prevent tightness of the neck muscles, and to prevent developing a flat spot on the back of his/her head:
    a. Alternate head position so that his/her neck is turned to right and left when sleeping on his/her back in crib
    b. Hold your baby in your right and left arm
    c. Turn head to right and left side using your face, your voice, pictures in a book, or following toys
    d. Keep your baby's head in midline when your baby is awake and alert
24. Passive range of motion activities
    a. These activities should be performed only if pain-free for your baby
    b. Link: http://www.youtube.com/watch?v=U4aOr1CXAGQ

Therapist's Name:

Caring for your baby with a Clavicle Fracture

During your baby's hospital stay

- It is important to allow your baby's arm to rest and to prevent further injury to the bone. Monitor your baby's stress and pain signs and avoid any painful activities
- "Affected" arm = _____
- "Unaffected" arm = _____
- Goals
  1. Become familiar with positioning your baby's affected arm to prevent muscle tightness and to prevent further injury
     - "Back to sleep" safe sleep (sleeping on his/her back)
     - Swaddling
     - Awake playtime: on his/her sides, back, and stomach
     - Supporting affected arm in infant seats and swings
     - Your baby may have supports (ex. Folded blankets or towel rolls) to help the affected arm during supervised, awake play time. He/She will not use these when sleeping so that your baby can follow safe sleep guidelines.
  2. Become familiar with performing daily activities with your baby without pulling or putting stress on affected arm
     - Support affected arm when picking up, holding, bathing, dressing, and carrying/moving your baby
     - Avoid lifting your baby from under his/her arm pits
     - Avoid lifting your baby by pulling hands or arms
  3. Avoid restricting any active movements that your baby begins to show
     - Avoid splinting or pinning affected arm to shirt – discuss with medical team if concerned about your baby's comfort/pain

Positioning your baby in infant seats/swings

- Your baby should always be **awake and supervised** while in these devices
- Support your baby on either side with rolled blankets
  - Position the roll on affected side of body to support arm
  - Have affected arm rest forward and in front of body
  - Avoid arms getting stuck by side or under straps
- Encourage your baby to have head turned to left and right for head shape and prevent muscle tightness



Image- Brachial Plexus Palsy: A Therapy Guide for Your Baby; Seattle Children's Hospital; 8/14 PE 604

Therapist's Name:

Swaddling

To Do:

1. Support your baby's affected arm on his/her chest with
    - Elbow bent
    - Hand near face
    - Shoulder slightly forward
2. Gently wrap with blanket
3. Have your baby's affected arm or both of your baby's arms out of the swaddle





Do NOT:

1. Do not pull blanket too tightly on arm
2. Do not swaddle your baby's arms down by his/her side



Positioning your baby on his/her back during play time

1. This should only be performed when your baby is **awake and supervised**
2. Support your baby's affected arm by placing rolled blanket/towel or with your hand behind arm
3. The goal is to keep his/her shoulder forward and prevent affected arm from hanging by his/her side
4. Affected arm can be positioned
    a. Next to your baby's side
    b. Across his/her chest or abdomen




Therapist's Name:

Positioning your baby on his/her side during play time

1. This should only be performed when your baby is **awake and supervised**
2. Position your baby so he/she can practice laying on both his/her right and left sides
    a. It is easier for your baby to use arm muscles when he/she is on his/her side
    b. He/she does not have to work against the weight of gravity
    c. When your baby begins showing arm movements, you can introduce lightweight toy for your baby to help grasp (ex. Rattle)
3. When your baby's affected arm is on top, help support it in front of his/her body
    a. Avoiding letting arm hang behind body
    b. You may use your hand or rolled towel behind back to keep your baby on his/her side
    c. You may use a towel or blanket in front of baby to help support his/her affected arm
4. Monitor baby's stress/pain signs when laying on affected side; if baby is in pain, avoid having baby lay on affected side
5. Avoid having baby lay on their affected arm/side for first 10 days while the bone is healing
6. When he/she begins to lay on his/her affected arm, help position affected arm forward so that your baby is not laying directly on top of his/her arm





Positioning your baby on his/her tummy during play time

1. This should only be performed when your baby is **awake and supervised** as much as tolerated (minimum of 1-5 minutes, 3-5 times per day)
2. Because your baby may weakness of his/her affected arm muscles, it is important to
    a. Position affected arm correctly
    b. Provide enough support to prevent shoulder from "caving in"
3. During tummy time, your baby's affected shoulder should feel strong and rounded
    a. Make sure both elbows are bent and hands are in front of shoulders
    b. Use your hands to help keep your baby's arms close to his/her body
4. Use your hands to support your baby's affected arm. Try to place your fingertips along the front of your baby's affected shoulder to provide support
5. Tummy time can be in a variety of places
    a. On your chest
    b. Over a Boppy pillow or rolled blanket
    c. On a flat surface, such as a blanket on the floor or on a mat
    d. On your lap

Therapist's Name:



Tips and Tricks: Handling your baby

1. Your baby may have discomfort in his/her arm – monitor your infant's cues. Perform movements of the affected arm slowly.
2. Picking up and carrying
    a. Support behind your baby's shoulders and elbows
    b. Affected arm should be close to your baby's body and forward
    c. Avoid letting your baby's arm hang by his/her side or get stuck behind body
    d. Avoid lifting your baby from under the armpits
    e. Avoid pulling on your baby's arms by his/her hands to pick him/her up
3. Dressing
    a. When putting on clothes, place the ___ arm in first
    b. When taking off clothes, take the ___ arm out last
4. Your baby should spend time in different positions during the day when awake, including
    a. Being held
    b. Playing on back, tummy, and side

Therapist's Name:

Caring for your baby with a Humeral Fracture

During your baby's hospital stay

- It is important to allow your baby's arm to rest and to prevent further injury to the bone. Monitor your baby's stress and pain signs and avoid any painful activities
- "Affected" arm = _____
- "Unaffected" arm = _____

1. Your baby's arm should be splinted, keeping arm close to body to protect fracture and help with your baby's comfort.
   - "Back to sleep" safe sleep (sleeping on his/her back)
   - Awake playtime: on his/her side and back
   - Supporting affected arm in infant seats and swings
   - Your baby may have supports (ex. Folded blankets or towel rolls) to help the affected arm during supervised, awake play time. He/She will not use these when sleeping so that your baby can follow safe sleep guidelines.
2. Become familiar with performing daily activities with your baby without pulling or putting stress on affected arm
   - Support affected arm when picking up, holding, bathing, dressing, and carrying/moving your baby
   - Avoid lifting your baby from under his/her arm pits
   - Avoid lifting your baby by pulling hands or arms
3. Avoid restricting any active hand and wrist movements that your baby begins to show

Positioning your baby in infant seats/swings

- Your baby should always be awake and supervised while in these devices
- Support your baby on either side with rolled blankets
  - Position the roll on affected side of body to support arm
  - Avoid arms getting stuck by side or under straps
- Encourage your baby to have head turned to left and right for head shape and prevent muscle tightness



Image- Brachial Plexus Palsy: A Therapy Guide for Your Baby; Seattle Children's Hospital; 8/14 PE 604

Therapist's Name:

Positioning your baby on his/her back during play time

1. This should only be performed when your baby is **awake and supervised**
2. Support your baby's affected arm by placing rolled blanket/towel or with your hand behind arm
3. The goal is to keep his/her affected arm from hanging.



or



Positioning your baby on his/her side during play time

1. This should only be performed when your baby is **awake and supervised**
2. Position your baby so he/she can practice laying on his/her unaffected side
    a. It is easier for your baby to use arm muscles when he/she is on his/her side
    b. He/she does not have to work against the weight of gravity
3. When your baby's affected arm is on top, help support the arm
    a. You may use your hand or rolled towel behind back to keep your baby on his/her side
    b. You may use a towel or blanket in front of baby to help support his/her affected arm
4. Monitor baby's stress/pain signs if baby is in pain
5. Avoid having baby lay on their affected arm/side for first _____ while the bone is healing
6. When he/she begins to lay on his/her affected arm, help position affected arm forward so that your baby is not laying directly on top of his/her arm



or



Therapist's Name:

Positioning your baby on his/her tummy upright on parent's chest

1. This should only be performed when your baby is **awake and supervised** as much as tolerated (minimum of 1-5 minutes, 3-5 times per day)
2. Hold infant upright on parent's chest.
    a. Monitor infant's stress/pain signs.
    b. Encourage infant to lift and rotate head side to side.
    c. Avoid any weight bearing through affected side.



or



Tips and Tricks: Handling your baby

1. Your baby may have discomfort in his/her arm – monitor your infant's cues. Perform movements of the affected arm slowly.
2. Picking up and carrying
    a. Support behind your baby's shoulders and elbows
    b. Affected arm should be close to your baby's body and forward
    c. Avoid lifting your baby from under the armpits
    d. Avoid pulling on your baby's arms by his/her hands to pick him/her up
3. Your baby should spend time in different positions during the day when awake, including
    a. Being held
    b. Playing on back, upright on parent's chest, side-lying, and supported sitting
4. At this time, we are leaving affected arm outside of clothing to prevent excess manipulation of the arm.
    a. When it is allowed
        i. When putting on clothes, place the affected arm in first
        ii. When taking off close, remove the affected arm last

Therapist's Name: