BRUISES BOTTLES BABIES

DETECTING NON-ACCIDENTAL TRAUMA IN PEDIATRIC PATIENTS

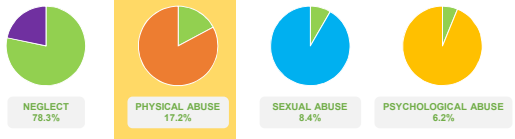
Morgan Dailey Holt, PA-C
medailey0805@gmail.com

OBJECTIVES

- Define the terms: non-accidental trauma (NAT), child maltreatment, and neglect
- Compose a differential diagnosis of NAT
- Recognize the signs of NAT
- Explain the indications for skeletal survey in the diagnostic approach to a potential pediatric victim of NAT
- Identify resources available to the PA in management of a child who is victim of NAT

BACKGROUND

- 4 million reports to CPS invo en in the USA in 2015
  - 683,000 children w ts



- ***Medical personnel made 9.1% of all reports.***

Child Maltreatment 2015. US Department of Health and Human Services. Washington DC: 2015.

BACKGROUND

- ***45% of deaths from child abuse and neglect occur among children <12mo.***
- Diagnosis usually missed in approximately 1/3 of patients.
- **Risk factors:**
  - **Colic**
  - **Failure-to-Thrive**
  - Alcohol abuse
  - Domestic violence
  - Drug abuse
  - Financial insecurity
  - Inadequate housing
  - Public assistance
  - Any caregiver disability

*In 2021, 29 states reported that **7.6% of child fatalities** had a risk factor of **alcohol abuse** and 35 states reported that **22.4% of child fatalities** had a risk factor of **drug abuse.***

Mo- months old

NAT vs. NEGLECT

- Child maltreatment encompasses abuse and neglect.
  - Abuse: Acts of commission
  - Neglect: Acts of omission

Abuse:
Acts of commission

Neglect:
Acts of omission

OTHER CHILD MALTREATMENT

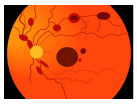
- Neglect
  - Non-adherence to medical treatment
  - Inadequate food intake (may present as growth failure)
  - Poor hygiene (leading to infections of wounds)
  - Poor supervision (injuries, ingestions)
  - Lack of medical care (dental, well child visits)
- Sexual abuse
- Human trafficking
- Psychological abuse
- Physical abuse/non-accidental trauma

PHYSICAL EXAM

BRUISING

FRACTURES

RETINAL HEMORRHAGES



BURNS

BURNS

LINEAR EXAMPLES

Immersion vs splash

Grid

Curling Iron

Knife

CIRCULAR EXAMPLES

Stove top Hot plate

Car cigarette lighter

Cigarettes

Lightbulb

Forks

Adapted from Kliegman, R. (2020). Nelson Textbook of Pediatrics (Edition 21, Volume 1.). Philadelphia, PA: Elsevier.

BURNS

Are there multiple burns or other healed burns?

Where is the burn injury, and could the child reach the area unassisted?

Does the child normally have access to the item that caused the injury?

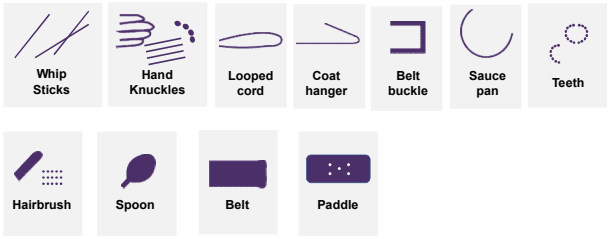
How heavy is the item and how strong is the child?

Is the injury clean and crisp, with a distinctive pattern of the object, or is it shallow or irregular, as from a blow?

How was the item heated and how long did it take to heat it to cause the injury?

Adapted from US Department of Justice (2001). Burn injuries in child abuse. Washington DC.

BRUISES



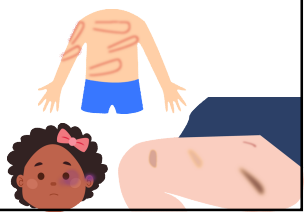
Adapted from Kliegman, R. (2020). Nelson Textbook of Pediatrics (Edition 21, Volume 1.). Philadelphia, PA: Elsevier.

BRUISES

Most common sign of physical abuse

Particularly concerning bruises:
- Non-ambulatory infant
- Located at padded and less exposed areas (buttocks, cheeks, ears, genitalia)
- Patterns/shapes
- Multiple bruises, different ages of bruises

Differential diagnosis:
- Dermal melanocytosis
- Hemophilia
- IgA vasculitis



FRENULUM

A torn frenulum may occur as a result of forced feeding, gagging, gripping, direct blow to upper lip

May present with oral bleeding

Inspect the frenulum of all infants

Other examples of oral maltreatment include:
- Tooth fractures
- Lacerations
- Palatal lesions
- Facial fractures
- Multiple caries (consider neglect)

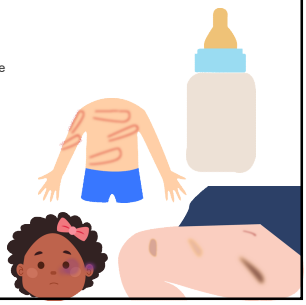
BRUISES AND FRENULUMS

"Sentinel Injuries in Infants Evaluated for Child Abuse"
Journal of Pediatrics 2013 article

Approximately 25% children with confirmed abuse had one of these prior injuries:
- Bruising
- Intraoral injury

95% at or before age <7mo

Medical providers aware of sentinel injury 41.9% of cases



BRUISES

TEN4
TORSO EARS NECK ≤4 YEARS OLD

≤4 MONTHS OLD: ANY BRUISING
If they do not cruise, they should not bruise.

FACESP
- F — FRENULUM
- A — AURICULAR AREA
- C — CHEEK
- E — EYES
- S — SCLERA
- P — PATTERENED BRUISES

Pierce MC, Kaczor K, Lorenz DJ, et al. Validation of a Clinical Decision Rule to Predict Abuse in Young Children Based on Bruising Characteristics. JAMA Netw Open. 2021;4(4):e215832.

ABUSIVE HEAD TRAUMA

"Shaken baby syndrome"

History often describes a short fall

Types of abusive head trauma (AHT) include:
- Subdural hemorrhage
- Cerebral ischemia
- Cerebral edema
- Skull fractures (particularly with intracranial injury)

Differential diagnosis: ?birth injury

Fussiness
Vomiting
Altered mental status, posttraumatic seizures
Failure to thrive
Bruising (TEN-4, FACESP)

Subgaleal hematoma associated with **raccoon eyes**
- **Mechanism:** due to traction on the anterior hair and scalp or after blow to forehead
- Differential diagnosis: neuroblastoma (rare)

Nearly 70% of AHT survivors have lasting neurologic impairment: static encephalopathy, intellectual disability, cerebral palsy, cortical blindness, seizure disorders, behavior problems, and learning disabilities.-

RETINAL HEMORRHAGES

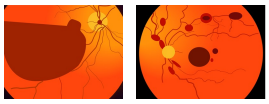
Sign of abusive head trauma (AHT)

If AHT is in consideration, a **dilated eye exam by a pediatric ophthalmologist must be performed**

Hemorrhages that are multiple, involve >1 layer of retina, and extend to the periphery are concerning for abuse

Mechanism: repeated acceleration-deceleration from shaking

There are other causes of retinal hemorrhage, but **the appearance is distinct in child abuse**
- Newborns may have retinal hemorrhages that resolve within 2-6 weeks
- Coagulopathies
- Carbon monoxide
- Sever coughing (rare)
- Seizures (rare)



ABDOMINAL TRAUMA

Significant morbidity and mortality

Mechanism: kick or forceful blow can cause hematoma of solid organs (liver, spleen, kidney) or rupture of hollow organs (stomach)

Risk of intra-abdominal bleeding

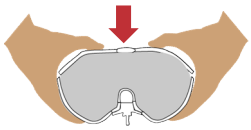
Can present as cardiac failure if delay in seeking care

If concerned, obtain:
- LFTs
- Pancreatic enzymes
- UA (?hematuria)
- Abdominal CT (can perform screening abdominal ultrasound prior to CT)

LFT: liver function tests
UA: urinalysis
CT: computed tomography

FRACTURES

Posterior rib fractures
Positive predictive value of NAT in children = 95%



Estimated Time of Injury

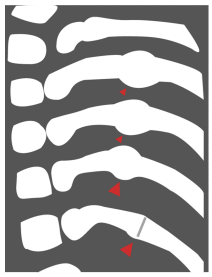
Soft tissue:	2 days – 3 weeks
Periosteal New Bone Formation:	4 days – 3 weeks
Callus formation:	14 days – 13 weeks
Remodeling:	3 months or later

FRACTURES

- **Fractures that strongly suspect abuse:**
  - Posterior rib fractures
  - Metaphyseal fractures
  - Scapula
  - Sternum
  - Spinous process

These fractures all require more force than would be expected from a minor fall or routine handling and activities of a child.

- **Infants MC fractures:** rib fractures, metaphyseal, and skull fractures
- Remember, ***if the child doesn't cruise, they shouldn't bruise*** (non-ambulatory)
  - Femoral fracture
  - Humeral fracture
- Multiple fractures in different stages of healing



MC: most common

FRACTURE DIFFERENTIAL DX

- **Fracture differential diagnosis (Not NAT):**
  - Osteopenia
  - Osteogenesis imperfecta
  - Rickets
  - Scurvy
  - Renal osteodystrophy
  - Osteomyelitis
  - Congenital syphilis
  - Neoplasm

TRAUMA DIFFERENTIAL DX

Trauma
- Accidental trauma/ Non-inflicted trauma
- Birth trauma
- Cupping (Middle Eastern, Asian, Latin America, Eastern European)
- Spooning (China)
- Caida de mollera (Mexico)

Hemorrhage
- Bleeding disorder
  - Vitamin K deficiency
  - Hemophilia
  - Von Willebrand
  - ITP
  - Leukemia
- AV malformation
- Dermal Melanosis
- Salicylate ingestion
- IgA vasculitis

Skeletal
- Osteogenesis imperfecta
- Disuse osteopenia
- Osteomyelitis
- Rickets
- Congenital syphilis
- Pathologic fracture
  - Rickets
  - Copper deficiency
  - Neoplasm

Also Consider
- BRUE
- Feeding intolerance
- Failure-to-thrive

ITP: idiopathic thrombocytopenic purpura
AV: arteriovenous
BRUE: brief resolved unexplained event

SUBTLE SIGNS

Altered mental status

Inconsolable

Abnormal growth curves
- Weight
- Head circumference
- Failure to thrive

Conflicting history from caregivers

DIAGNOSTIC WORK-UP

Detailed history and physical exam

Labs: CBC, PT, PTT, INR, LFT, lipase, consider UDS

Plain film of affected area

Skeletal survey **MANDATED IN ALL CHILDREN ≤2 years old

CT vs. MRI

	CT Scan	MRI
Application	Bone injuries Intraspinal injuries Lung, chest, abdomen	Soft tissue Inflammation Cross-sectional imaging
Advantages	Short time in scanner Less cost	No radiation
Disadvantage	Radiation	**Sedation** (vs swaddle)
Injuries	Acute	Subacute, chronic

CBC: complete blood count
PT: prothrombin time
INR: international normalized ratio
PTT: partial thromboplastin time
LFT: liver function test
UDS: urine drug screen
CT: computer tomography
MRI: magnetic resonance imaging

DIAGNOSTIC WORK-UP

INDICATIONS FOR SKELETAL SURVEY

no mechanism of accidental trauma (MVC, fall in public), no bleeding disorder, no history of birth trauma

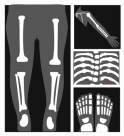
- **<24mo**
  - Confessed abuse or domestic violence
  - Additional injuries (burns, whip marks)
  - Patterned bruising
  - >4 bruises NOT limited to bony prominences
  - Ear, neck, torso, buttocks, genitals, hands, feet if no history of trauma
- **<12mo**
  - Cheeks, eye area, ear, neck
  - Upper arms or legs (not over bony prominences)
  - Hands, feet
  - Torso, buttocks, genitals
  - >1 bruise NOT limited to bony prominences
- **<9mo**
  - >1 bruise in ANY location
- **<6mo**
  - Bony prominences or any location (any bruising is concerning) UNLESS only one bruise and history of fall

MVC: motor vehicle collision
Mo: months old

DIAGNOSTIC WORK-UP

Images for Complete Skeletal Survey
- Skull
- Cervical spine
- Chest
- Pelvis
- Lumbar
- Abdomen, pelvis, lumbosacral spine
- Humerus, radius, ulna
- Hands
- Femur, tibia, fibula
- Feet

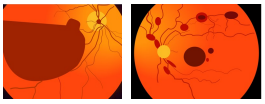
Follow-up Skeletal Survey (SS)
- Exclude spine, hands, feet, pelvis
- Exclude skull if no skull fracture on initial SS
- ***OBTAIN 10-14 days after initial SS***
  - Increase diagnostic yield
  - Negative or equivocal SS



DIAGNOSTIC WORK-UP

LABS
- CBC
- CMP (ALT/AST)
- Amylase
- Lipase
- PT/INR/PTT
- Urinalysis, UDS

OPHTHALMOLOGY EXAM



ABDOMINAL TRAUMA IMAGING
- CT with IV contrast

CBC: Complete blood count
CMP: Complete metabolic profile
ALT: Alanine transaminase
AST: Aspartate transaminase
PT: Prothrombin time
INR: International normalized ratio
PTT: Partial thromboplastin time
UDS: Urine drug screen
CT: Computed tomography
IV: Intravenous

INTERVENTIONS

Treat the underlying injury
- May require subspecialty consultation neurosurgery, orthopedics
- Treat complications (such as poor feeding, seizures)

Typically, initially on trauma service → will either admit to PICU or pediatrics service for further management

Child maltreatment team consultation.

Social work consult
It is your duty to report child abuse when suspected!

Consider palliative care involvement at onset of diagnosis, particularly if traumatic brain injury or other life-limiting injuries.

ROLE OF PROVIDER IS TO INVESTIGATE THE MEDICAL ISSUES – NOT INVESTIGATE WHO THE PERPETRATOR IS.

PICU: pediatric intensive care unit

INTERVENTIONS

Treat the underlying injury
- May require subspecialty consultation neurosurgery, orthopedics
- Treat complications (poor feeding, seizures, etc)

YOU MAY BE A CHILD'S ONLY ADVOCATE

Consider palliative care involvement/referral if discussing prognosis particularly if traumatic brain injury

Know the signs and be confident in your responsibility!

ROLE OF PROVIDER IS TO INVESTIGATE THE MEDICAL ISSUES – NOT INVESTIGATE WHO THE PERPETRATOR IS.

ROLE OF THE PA

- Identify and report suspected child abuse
  - Maintain an index of suspicion
- Discuss with caregivers how to deal with infant crying, their child and stress
  - "When your child cries, take a break---Don't shake!"
  - Period of Purple Crying online resource
  - Parenting strategy courses/support (Triple P parenting)
- Talk about body safety with children
- Help educate families on resources to avoid possible neglect
- ***Document appropriately***
  - Images
  - Include quotes
  - When was the child last normal?
  - Who has been around child?
  - Open ended questions
- **Utilize community resources and agencies**
- **Review cases with specialists** (child maltreatment team)

CPS REPORTING

- Report if you have "reason to believe" there is maltreatment
  - You do not have to be certain
  - Certainly report if physical abuse or severe neglect is noted
- Contact your county's department of social services and ask to speak with the social worker on call regarding a new report
- CPS may or may not accept your report.
  - If the report is accepted, CPS will visit the home (sometimes law enforcement as well)
  - If CPS report is not accepted, services can still be offered such as food, shelter, parenting resources, and childcare.
- Inform family that a CPS report has been made

CPS: Child Protective Services

ROLE OF THE PA: SOFT SKILLS

- Convey concerns of maltreatment to parents, kindly but forthrightly
- Avoid blaming.
- It is natural to feel anger towards parents/caregivers, but they need support and deserve respect
- Be empathetic and state interest in helping
- Focus on ensuring ***safety*** of the child
- Engage the family in the medical plan
- Encourage support system (family, friends, religious affiliation)
- Inform family of CPS report (unless already informed by SW or other member of medical team)
  - Can be explained as an effort to clarify the situation, provide help, and professional responsibility

CPS: Child Protective Services

CASE 1

- 3-month-old ex-full-term female who presented from pediatrician's office to emergency room for weight loss and vomiting. Vomiting 1-2x per day since hospital discharge 10/28. Worsening over last 2 days. RM has had runny stools, but this is unchanged since starting Elecare formula during last admission.
  - Admission 10/6-10/7: BRUE ?secondary to overfeeding
  - Admission 10/13-10/26: Admitted for weight loss, vomiting. Negative GI work-up. Fed via NG tube during admission but achieved PO goal volume prior to discharge. Diagnosed with reflux and milk protein allergy.
  - PCP follow-up on 10/28: 81g weight loss
  - PCP follow-up 11/5: Vomiting with each feed, further weight loss, sunken eyes, bulging anterior fontanelle

aBRUE: Brief resolved unexplained event

CASE 1

- Sent to emergency room by PCP
- Vital signs are reassuring
- **Weight 0%,** length 47%, **head circumference 94%**
- **New-onset seizures** occur after admitted to pediatrics floor
- CT head: **Large low-density bilateral subdural collections**
- Skeletal survey: **left 9th posterior rib fracture**
- *Regarding concerns for non-accidental trauma, there has been no evidence of acute intracranial bleeding on MRI or CT - only chronic bleeding. A left 9th posterior rib fracture has been identified. There is not one cause except inflicted trauma to induce a posterior fracture and intracranial bleeding.*
- DSS involved
- Admitted x20 days, later discharged to mother and father with chaperone

CASE 1: TAKE-AWAY

PRESENTATION

- Vomiting
- Large head circumference
- Later developed posttraumatic seizures

FINDINGS

- Subdural hemorrhage
  - Age
- Posterior rib fracture

CASE 2

- 7-day old newborn female presents to care for 1 week weight check on a Friday afternoon in the pediatric primary care clinic.
- Vital signs, growth curves appropriate.
- At end of encounter, mother asks for you to look at a “red spot on her lower back,” stating “I’m really worried … I’ve been Googling all night what it could be.”
- You note an erythematous 2cm x 2cm erythematous circle of lower thoracic-lumbar vertebrae.
  - Tender to palpation at site of erythema. Non-tender on remainder of exam.

CASE 2

- Differential diagnosis
  - Myelomeningocele
  - Insect bite
  - Cellulitis
  - Osteomyelitis with overlying cellulitis
  - Nevus
  - Trauma – accidental vs. NAT
- Next steps?

CASE 2

- Another provider also examines patient, who agrees with your physical exam findings and assessment.
- Urge mother to go to ED right away for diagnostic work-up, as any abnormality in a newborn's spine needs to be thoroughly investigated.
- Request mother to make newborn weight follow-up (for 2wk old) and state that may need earlier follow-up pending ED evaluation.
- Mother expresses understanding and agrees to plan.

ED: emergency department
WK: weeks

CASE 2

- By late Monday afternoon, no ED reports for the patient have been faxed to your office.
- Staff calls to check on mother and to ask which ED family went to in order to obtain records. Mother does not answer Monday or Tuesday.
- You discover that family did not complete the new patient information packet, so you do not have any other contact numbers available, unfortunately.
- You reach out to the local EDs to ask if the patient was seen in the ED, all local EDs deny records associated with patient.
- What do you do next?

ED: emergency department

CASE 2

- Confer with attending, who agrees with contacting DSS due to mother's lack of phone response.
- You make a formal report to DSS with the limited available information you have available.
- A report from the local ED is faxed to your office the following day, noting that family was instructed per DSS for evaluation.
  - ED report diagnosis "Pressure injury of newborn" and suspected had been sitting in carseat too long.
  - No work-up performed in ED.
- Staff has continued to attempt to reach mother to set-up follow-up appointment; however, no answer.
- Mother requested for records to be transferred care from our practice to another local pediatric office.

DSS: Department of Social Services
ED: emergency department

CASE 2: TAKE-AWAY

- **ROLE OF THE PA**
  - Discuss case with your local team:
    - Confer with attending physician
    - Discuss with pediatric emergency room and/or pediatric hospitalist team if outpatient
      - If child <2yo with suspicion of child maltreatment, then need admission for work-up
    - If inpatient, consult with child maltreatment team
      - Phone consult (if you are not at tertiary center)
      - In-person consult (if you are at tertiary center)
  - As a PCP, be a medical home to survivors of non-accidental trauma
    - Connect with local child advocacy center (outpatient service)
    - Ensure follow-up skeletal survey is performed

CASE 3

- 2yo male previously healthy who fell ski resort presents to care for leg pain. Biological father meets him at the hospital.
- Sent via ambulance alone – mother, siblings, mother's boyfriend remain at ski resort
- **Closed long oblique right femur fracture**
- Negative skeletal survey (other than femur fracture), normal head CT, no retinal hemorrhages, negative labs
- Outcome: SW cleared to discharge home to biological father, open DSS case at time of discharge

SW: social work
DSS: Department of Social Services

CASE 3: TAKE-AWAY

WORK-UP

- Inpatient:
  - Physical exam
  - Head imaging (CT vs MRI)
  - Ophthalmology exam
  - Skeletal survey
  - LFTs, lipase, abdominal imaging if abdominal trauma
  - CBC, PT, INR, PTT
  - Consider UDS
- Outpatient
  - Repeat skeletal survey in 2 weeks

CT: computer tomography
MRI: magnetic resonance imaging
LFT: liver function test
CBC: complete blood count
PT: prothrombin time
INR: international normalized ratio
PTT: partial thromboplastin time
UDS: urine drug screen

CASE 4

- 7-months-old ex-34wk female who presents to care with family for concern of patient fall off counter while seated in a pillow infant lounger. Mother was cooking, father was working in the yard. They did not witness the fall but heard impact and immediate crying. No vomiting, no loss of consciousness, no seizures, no tremors, no fever.
- Vital signs, growth curves all reassuring. Normal mental status in ED.
- Head CT: **Parietal skull fracture, subdural hematoma without shift.**
- Skeletal survey, labs, ophthalmology exam all unremarkable.
- Discharged home to parents per SW.

ED: emergency department
CT: computer tomography
SW: social work

CASE 4: TAKE-AWAY

HISTORY:

- Family provided explanation of event
- No changing stories
- Reported mechanism fits injury
- No delay in seeking care
- Supervision present
  - *Witnesses present?*
  - *Ask parent to act out event*
- Single injury

CASE 5

- 3yo male ex-full term presented s/p cardiopulmonary arrest x2 of unknown etiology. He is reported to be previously healthy but has not seen primary care provider since 4mo.
- He was initially admitted to PICU where he was found to have **severe protein-calorie malnutrition**, **severe osteomalacia**, resultant electrolyte dysfunction including hypophosphatemia and hypocalcemia (HIE vs metabolic brain disease).
- PICU requests transfer to general pediatrics team for further work-up and management. He is s/p intubation x2. He is now s/p G-J placement and tolerating feeds. PICU reports that he has low reserve, and any agitation can cause patient to appear ill. PICU has been working on weaning sedation, stabilizing electrolytes, decreasing oxygen requirement.
- **Found to have multiple fractures of extremities that have healed gravity-dependent.**
- Work-up: Negative bone fragility panel, negative OI panel, renal Fanconi work-up negative.
- DSS involved.

s/p: status/post
PICU: pediatric intensive care unit
HIE: hypoxemic ischemic encephalopathy
G-J: gastro-jejunal
DSS: Department of Social Services
OI: Osteogenesis imperfecta

CASE 5: TAKE-AWAY

NEGLECT

- Failure to provide for basic needs (acts of omission)
- More common than physical abuse

CASE 5: TAKE-AWAY

NEGLECT

YOU MAY BE A CHILD'S ONLY ADVOCATE

Know the signs and be confident in your responsibility!

REFERENCES

1. Administration for Children & Families. Child Maltreatment 2014. Annual Report, US Government Printing Office; US Department of Health and Human Services, Washington, DC 2014 https://www.acf.hhs.gov/cb/resource/child-maltreatment-2014 (Accessed on January 04, 2017).
2. Analysis of missed cases of abusive head trauma. Jenny C, Hymel KP, Ritzen A, Reinert SE, Hay TC. JAMA. 1999;281(7):621.
3. Sentinel injuries in infants evaluated for child physical abuse. Sheets LK, Leach ME, Koszewski IJ, Lessmeier AM, Nugent M, Simpson P. Pediatrics. 2013 Apr;131(4):701-7. Epub 2013 Mar 11.
4. Levi BH, Brown G. Reasonable suspicion: a study of Pennsylvania pediatricians regarding child abuse. Pediatrics 2005; 116:e5.
5. The Evaluation of Suspected Child Physical Abuse. Christian, Cindy W. Pediatrics. 135 (5). May 2015.
6. Kliegman, R. (2020). Nelson Textbook of Pediatrics (Edition 21). Philadelphia, PA: Elsevier.
7. Child Welfare Information Gateway, Definitions of Child Abuse and Neglect. https://www.childwelfare.gov/pubPDFs/define.pdf (Accessed on August 07, 2017).
8. Child Welfare Information Gateway, Reporting Child Abuse and Neglect. https://www.childwelfare.gov/topics/responding/reporting/mandated (Accessed on August 07, 2017).
9. Wissow LS. Reporting suspected child maltreatment. In: Child Advocacy for the Clinician: An Approach to Child Abuse and Neglect, Wissow LS (Ed), Williams & Wilkins, Baltimore 1990. p.209.
10. Narang SK, Fingarson A, Lukefahr J, COUNCIL ON CHILD ABUSE AND NEGLECT. Abusive Head Trauma in Infants and Children. Pediatrics 2020.
11. Reijneveld SA, van der Wal MF, Brugman E, et al. Infant crying and abuse. Lancet 2004; 364:1340.
12. Johnson DL, Boal D, Baule R. Role of apnea in nonaccidental head injury. Pediatr Neurosurg 1995; 23:305.
13. Altman RL, Brand DA, Forman S, et al. Abusive head injury as a cause of apparent life-threatening events in infancy. Arch Pediatr Adolesc Med 2003; 157:1011.
14. Hansen JB, Frazier T, Moffatt M, et al. Evaluation of the Hypothesis That Choking/ALTE May Mimic Abusive Head Trauma. Acad Pediatr 2017; 17:362.
15. Binenbaum G, Mirza-George N, Christian CW, Forbes BJ. Odds of abuse associated with retinal hemorrhages in children suspected of child abuse. J AAPOS 2009; 13:268.
16. Sugar NF, Taylor JA, Feldman KW. Bruises in infants and toddlers: those who don't cruise rarely bruise. Puget Sound Pediatric Research Network. Arch Pediatr Adolesc Med 1999; 153:399.
17. US Department of Justice (2001). Burn injuries in child abuse. Washington DC. .
18. Sheets LK, Leach ME, Koszewski IJ, Lessmeier AM, Nugent M, Simpson P. Sentinel injuries in infants evaluated for child physical abuse. Pediatrics. 2013 Apr;131(4):701-7.

THANK YOU

Morgan Dailey Holt, PA-C
medailey0805@gmail.com