

ED Bruising v4.0: Screening/Work-up

Approval & Citation

Summary of Version Changes

Explanation of Evidence Ratings

PHASE I (E.D.)

High Risk Screening (to be completed by RN)

- <6 months full body skin exam
- 6 months – 4 years (48 months) skin exam in TEN (torso, ears, neck) region
- Torso includes back and front of abdomen and genital/buttock region. Genital/buttock exam to be done by MD in children over 6 months

Inclusion Criteria

- <48 months old
- Any patient with clinical concern for [abusive bruising](#)
- Genital bruising

Exclusion Criteria

- Other non-accidental trauma (NAT) without bruising
- Sexual assault with or without bruising

Urgent Care Transfer Recommendations

If concerned for neglect or abuse (including bruising) consult SCAN and transfer to the ED for further work-up

<4 years old

Positive High Risk RN Screen

[Routine ED Visit](#)
(consider other high risk populations)

Off Pathway

Not a bruise

Notify Attending/Fellow MD to confirm high risk bruise



[Risk for Inequity](#)

Yes

!
If bruise identified in high risk group and considering going off pathway obtain AMSCONnect photos and consult SCAN

Bruise confirmed

!
If uncertain if bruise, obtain AMSCONnect photos and consult SCAN and/or Dermatology

Bruise(s) [concerning for abuse](#) identified

Yes

No

Notify Attending/Fellow MD to confirm high risk bruise
Consult SCAN to direct work-up and interventions

Not a bruise

Off Pathway

WORK-UP and INTERVENTIONS

Use the Non-Accidental Trauma/Abuse Evaluation Power Plan

HISTORY AND PHYSICAL

- [Historical indicators of abuse](#)
- Development
- Family bleeding history
- [Physical exam indicators of abuse](#)
- Head circumference

SOCIAL WORK CONSULT

- Full Child Abuse Protection Assessment
- Patient Family Risk Assessment (PFRA) form complete

LABS

- CBC, PT/INR, PTT, VWF antigen
- AST/ALT, lipase
- Urinalysis (if abdominal bruising or signs of abdominal trauma)
- Coagulation storage specimen (blue top drawn for hold)
- Factor 8 level, Factor 9 level, and von Willebrand factor activity

PHOTOGRAPHY BY RN

- Refer to "Guide for Medical Photography for Child Abuse & Neglect" (for SCH only)

IMAGING

- <6 months of age: Head imaging, skeletal survey
- 6 months - 24 months: Head imaging (for seizure or neurologic signs and symptoms, OFC >95%, history of head trauma), skeletal survey
- >24 months: Head and/or focused skeletal imaging only if clinically indicated

Huddle/Disposition

ED Bruising v4.0: Huddle and Disposition

[Approval & Citation](#)

[Summary of Version Changes](#)

[Explanation of Evidence Ratings](#)

PHASE I (E.D.)

Inclusion Criteria

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ED Attending/Fellow with Resident and Social Work huddle, consult SCAN MD together in person or via phone to discuss:

ED Provider

- History and Physical
- Results of current work-up
- Consults

SCAN MD

- Additional work up needed
- Consults
- Reporting to Child Protective Services (CPS) and/or Law Enforcement (LE) and documentation of decision and communication
- Disposition and safety planning

Social Work

- Psychosocial risk factors
- Disposition and safety planning

- Consider examining siblings or other children in the home if conclusion in index child is abuse

Consensus with SCAN MD regarding abuse diagnosis

- Concerning for abuse
- Not concerning for abuse
- Indeterminate

Disposition and Safety Plan

- Placement (i.e. home, protective custody, foster care, admitted, medical hold)
- Reporting to Child Protective Services
- Reporting to Law Enforcement

Discharge Criteria

- Safe discharge plan
- Work-up complete
- Agreement with SCAN on reporting to CPS/LE
- Follow-up arranged (with providers, further testing)

Follow-up

- Primary Care
- Harborview Abuse and Trauma Center (HATC) or other victim service center
- Further SCAN recommendations (i.e. additional imaging)

**Return to
Screening/Workup**

Providing Equitable Care

Pause to examine bias:

- Patients with high-risk bruising are at risk of inequitable care.
- In an analysis of Seattle Children's bruising pathway data, we found that following the pathway guideline decreased disparity in CPS and law enforcement reporting for non-privately insured patients. Before the pathway was created, children without private insurance were more likely than privately insured patients to have reports made to CPS and law enforcement for high-risk bruising ([Crumm 2023](#)).
- Other research has suggested significant bias in decision making to perform a child abuse workup for children with bruising, fractures, and head injuries. This can lead to disparities in testing as well as missed child abuse, which can have devastating consequences.
- Please pause to consider objective factors in a decision to not include a child in the bruising pathway; consider whether implicit bias or structural racism is impacting your care.

What is Implicit Bias?



The National Institutes of Health defines implicit bias "as a form of bias that occurs automatically and unintentionally, that nevertheless affects judgments, decisions, and behaviors." This bias impacts our interpersonal relationships with patients, families/caregivers, and colleagues and care decisions. Please keep this in mind when utilizing CSW pathways and consciously challenge your assumptions and biases.

[Return to
Screening/Workup](#)

Learning Objectives

Upon completion of this module, participants will be better able to:

1. Describe why bruising is considered a sentinel injury
2. Identify patients at risk for abusive bruising
3. Identify bruises concerning for abuse
4. Identify patients appropriate for the bruising pathway
5. Initiate the appropriate workup for a patient with concerning bruises
6. Identify resources that can be accessed to help distinguish abusive from accidental bruising



[Return to
Screening/Workup](#)

[Return to
Huddle and Disposition](#)

Scope of Problem

- Bruising is the most common and most visible sign of physical abuse
- Missed as sign of physical abuse in up to 44% of fatal or near-fatal cases
- May be the only visible sign of injury or signal of internal injury
- There have been multiple cases of bruising not recognized as abusive bruising at Seattle Children's Hospital where the child was discharged and returned to medical attention with either new injuries or dead

Pierce MC, Kaczor K, Aldreidge S, et. al. Bruising Characteristics Discriminating Physical Child Abuse From Accidental Trauma. *Pediatrics*. 2010;25(1)

Pierce MC, Kaczor K, Acker D, et al. Bruising missed as a prognostic indicator of future fatal and near-fatal physical child abuse. E-PAS2008:634469.46. Available at: <http://www.abstracts2view.com/pasall/>



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Bruising

Bruising can look innocuous and benign or more involved and concerning

[Return to
Screening/Workup](#)

[Return to
Huddle and Disposition](#)

Historical indicators of abuse

When obtaining a history from the caregiver(s) pay special note for the following:

- No or vague explanation for a significant injury
- Changing story of how the injury occurred
- Explanation provided is inconsistent with the pattern, age, or severity of the injury or injuries
- Explanation given is inconsistent with the child's physical and/or developmental capabilities
- Different witnesses provide different explanations
- Unexplained or unexpected delay in seeking medical care

Christian CW, Committee on Child Abuse and Neglect, The Evaluation of Suspected Child Physical Abuse, *Pediatr* 2015;135(5):e1337-e1354



[Return to
Screening/Workup](#)

[Return to
Huddle and Disposition](#)

Bruising concerning for abuse

"Those who don't cruise rarely bruise"

- Bruises in infants <6 months of age or pre-mobile children
- Bruising in unusual locations in any age child:

Examples include:

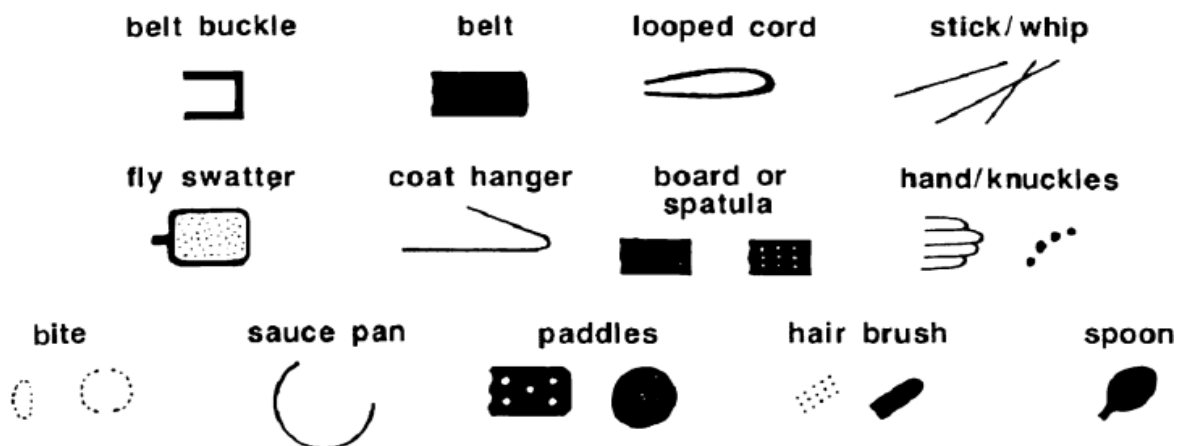
- Ear pinna
- Genital bruising
- Neck, under chin
- Torso, buttocks
- Flexural bruises
- Patterned bruises
- Loop marks
- Hand print

- Bruising in medically complex children
- TEN-4 Bruising Clinical Decision Rule (next slide)

Sugar NF, Taylor JA, Feldman KW. Bruises in infants and toddlers: those who don't cruise rarely bruise. *Arch Pediatr Adolesc Med.* 1999;153(4):399-403



Other concerning bruises



Pediatric Dermatology
[Volume 23, Issue 4, pages 311-320, 8 AUG 2006 DOI: 10.1111/j.1525-1470.2006.00266.x](http://onlinelibrary.wiley.com/doi/10.1111/j.1525-1470.2006.00266.x)
<http://onlinelibrary.wiley.com/doi/10.1111/j.1525-1470.2006.00266.x/full#2>



[Return to
Screening/Workup](#)

[Return to
Huddle and Disposition](#)

TEN-4 decision rule

- ANY bruise in a child < 4 months of age

OR

- Bruising present in TEN region (torso, ears, neck)
 - Torso includes: chest, abdomen, back**, buttocks, GU & hip

AND

- No confirmed accident in a public setting that accounts for bruising in TEN region or infant < 4 months
- *Sensitivity of 97% and specificity of 84% for predicting abuse*

**** In many cases bruising over the spine is ok – “The Spine is Fine”**

Pierce MC, Kaczor K, et. al. Bruising characteristics discriminating physical child abuse from accidental trauma. *Pediatrics* 2010;125(67)



TEN-4 **FACES** Additional areas to pay special attention to

FACES



F = Frenulum

A = Angle of the
jaw or Auricular
area

C = Cheek
(buccal)

E = Eyelid

S = Sclera



[Return to
Screening/Workup](#)

[Return to
Huddle and Disposition](#)

High Risk Populations

- Children with special health care needs
- Children who are non-communicative
- Any child who resides in a home with a child who has suspected abusive injuries should have a full, age-appropriate screening for occult injuries
- Mental health patients



[Return to
Screening/Workup](#)

[Return to
Huddle and Disposition](#)

What are the distinguishing features of abusive bruising in children?

- *Screen all Emergency Department patients less than 4 years of age for bruising, specifically bruising in the TEN (torso, ears, neck) region for children under 4 years, any bruising in infants < 6 months and patterned bruising. [LOE (Guideline 2009, ★★ Maguire 2013, Anderst 2013 Expert Opinion)]*
- *Place all Emergency Department patients less than 4 years of age in a gown to allow better visualization for bruising. [LOE: expert opinion]*
- *Initiate ED bruising pathway for patients with high risk bruising. [LOE: expert opinion]*



How are the distinguishing features of abusive bruising the same or different across the age spectrum in children?

- *Have a high level of concern for non-accidental trauma when a non-mobile child presents with a bruise or a child < 4 years of age with bruising in the TEN region (torso, ears, neck). [LOE: ★★ Maguire 2013, Guideline 2009]*
- *Initiate non-accidental trauma work-up for bruising if concerning and/or high risk bruises are identified. [LOE: ★★ Maguire 2013, Guideline 2009]*



[Return to
Screening/Workup](#)

[Return to
Huddle and Disposition](#)

What specific laboratory evaluation is recommended for children with suspected abusive bruising?

- *If < 4 years of age and concerning bruise confirmed, obtain CBC, PT/INR, PTT, von Willebrand antigen, liver enzymes, lipase, urinalysis (if abdominal bruising or signs of abdominal trauma) and have a coagulation storage specimen held. [LOE: Expert opinion (Kellogg 2007)]*
- *If > 4 years of age and concerning bruise confirmed, discuss with child protection team physician on call to help determine potential work-up. [LOE: Expert opinion (Kellogg 2007)]*

What specific imaging is recommended for children with suspected abusive bruising?

- *Obtain bone survey if < 24 months and concerning bruise identified for age or if clinical condition precludes reliable exam (medically complex, obtunded or altered mental status) [LOE: Guideline 2012]*
- *Consider bone survey if > 24 months and clinical condition precludes reliable exam (medically complex, obtunded or altered mental status) [LOE: Guideline 2012]*
- *Obtain head imaging (non-contrast CT) if < 6 months and bruise identified, focal neurologic changes or clinical condition precludes reliable exam (medically complex, obtunded or altered mental status), or history of head trauma. [LOE: Guideline 2012]*
- *Obtain focal radiographs per exam when concerned for skeletal injury in children > 24 months. [LOE: Guideline 2012]*



ED Bruising photography procedures

- “Real time” photography is helpful in allowing the SCAN physician to see the concerning lesion while the child is still in the ED. The system we use for this is AMSCConnect.
- AMSCConnect photos should be used when a bruise is identified in a high risk group and the ED physician is considering going off pathway.

e.g. A 2-year old child with a bruise to the ear and a story of falling off of a slide.



[Return to
Screening/Workup](#)

[Return to
Huddle and Disposition](#)

Team Huddle

A “huddle” with the ED physician, social work and SCAN physician will occur once the initial evaluation/workup is complete.

- The goals of the huddle are:
 - To share information regarding circumstances surrounding the injury
 - To determine whether further workup is necessary
 - To determine disposition of the child including:
 - CPS and/or law enforcement involvement
 - Appropriate follow-up (HATC, PCP, repeat imaging)
 - Recommendations to CPS & law enforcement on likelihood of abuse



[Return to
Screening/Workup](#)

[Return to
Huddle and Disposition](#)

Important Medical Information for Team Huddle

When calling the SCAN physician the important *medical* information communicated by medical team:

- Circumstances surrounding injury
 - How, when, where, under whose supervision
- Developmental level of the child (crawling, cruising, walking)
- Family medical history (bleeding disorders, easy bruising or fractures)
- Head circumference in children under 1 year of age
- ANY other injuries
- Results of initial workup



Important Social Information for Team Huddle

When calling the SCAN physician the important *social* information communicated by the social worker:

- The timeline of events leading up to the injury
- Psycho-social risk factors (i.e. domestic violence, mental illness, drug use)
- Who is the legal guardian of the child
- Previous history of CPS or law enforcement involvement
- Other children in the household

[Return to
Screening/Workup](#)

[Return to
Huddle and Disposition](#)



ED Bruising Approval & Citation

Approved by the CSW ED Bruising Pathway team for October 6, 2016.

CSW ED Bruising Team:

Safe Child and Adolescent Network (SCAN), Owner
Emergency Department, Owner
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Hematology, Stakeholder
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Retrieval Website: <http://www.seattlechildrens.org/pdf/ED-bruising-pathway.pdf>

Please cite as:

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Return to
Screening/Workup

Return to
Huddle and Disposition

Summary of Version Changes

- **Version 1.0 (11/22/2016):** Go live.
- **Version 2.0 (2/15/2017):** Algorithm revised to clarify off-pathway option.
- **Version 2.1 (5/24/2017):** Updated TEN-4 FACES slide to align with SCH Privacy Policies.
- **Version 3.0 (6/25/2020):** Updated references to using Cureatr for photography; updated acronym names to Harborview Abuse and Trauma Center (HATC) and Safe Child and Adolescent Network (SCAN); updated verbiage to align with current practice for urinalysis use; and updated links to internal documents.
- **Version 3.1 (1/24/2022):** Updated “Guide for Medical Photography for Child Abuse & Neglect” link.
- **Version 4.0 (2/21/2024):** Factor 8 level, Factor 9 level, and von Willebrand factor activity screening labs added to align with latest evidence. On Screening/Work-up, removed link to Child Abuse & Neglect at Off Site Clinics and Urgent Care document. An equity pause was also incorporated into Screening/Work-up with supporting content. Updated paging system from Cureatr to AMSConnect.

[Return to
Screening/Workup](#)

[Return to
Huddle and Disposition](#)

Medical Disclaimer

Medicine is an ever-changing science. As new research and clinical experience broaden our knowledge, changes in treatment and drug therapy are required.

The authors have checked with sources believed to be reliable in their efforts to provide information that is complete and generally in accord with the standards accepted at the time of publication.

However, in view of the possibility of human error or changes in medical sciences, neither the authors nor Seattle Children's Healthcare System nor any other party who has been involved in the preparation or publication of this work warrants that the information contained herein is in every respect accurate or complete, and they are not responsible for any errors or omissions or for the results obtained from the use of such information.

Readers should confirm the information contained herein with other sources and are encouraged to consult with their health care provider before making any health care decision.

[Return to
Screening/Workup](#)

[Return to
Huddle and Disposition](#)

Evidence Ratings

This pathway was developed through local consensus based on published evidence and expert opinion as part of Clinical Standard Work at Seattle Children's. Pathway teams include representatives from Medical, Subspecialty, and/or Surgical Services, Nursing, Pharmacy, Clinical Effectiveness, and other services as appropriate.

When possible, we used the GRADE method of rating evidence quality. Evidence is first assessed as to whether it is from randomized trial or cohort studies. The rating is then adjusted in the following manner (from: Guyatt G et al. J Clin Epidemiol. 2011;4:383-94.):

Quality ratings are *downgraded* if studies:

- Have serious limitations
- Have inconsistent results
- If evidence does not directly address clinical questions
- If estimates are imprecise OR
- If it is felt that there is substantial publication bias

Quality ratings are *upgraded* if it is felt that:

- The effect size is large
- If studies are designed in a way that confounding would likely underreport the magnitude of the effect OR
- If a dose-response gradient is evident

Guideline – Recommendation is from a published guideline that used methodology deemed acceptable by the team.

Expert Opinion – Our expert opinion is based on available evidence that does not meet GRADE criteria (for example, case-control studies).

Quality of Evidence:

★★★★ High quality

★★★○ Moderate quality

★★○○ Low quality

★○○○ Very low quality

Guideline

Expert Opinion

[To Bibliography](#)

[Return to
Screening/Workup](#)

Bibliography

Search Methods, ED Bruising, Clinical Standard Work

Studies were identified by searching electronic databases using search strategies developed and executed by a medical librarian, Susan Klawansky. Searches were performed in June 2016 in the following databases – on the Ovid platform: Medline, Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials; elsewhere – Embase, National Guideline Clearinghouse and TRIP. Retrieval was limited to 2006 to current, English language and 0-18 years of age. In Medline and Embase, appropriate Medical Subject Headings (MeSH) and Emtree headings were used respectively, along with text words, and the search strategy was adapted for other databases. Concepts searched were contusions, bruising, ecchymosis and child abuse, battered child syndrome, non-accidental injuries, unexplained injuries, inflicted trauma and other related terms. Retrieval was further limited to certain evidence categories, such as relevant publication types, Clinical Queries, index terms for study types and other similar limits.

Susan Klawansky, MLS, AHIP

September 21, 2016

Identification

139 records identified
through database searching

0 additional records identified
through other sources

Screening

139 records after duplicates removed

139 records screened

130 records excluded

Eligibility

9 records assessed for eligibility

4 full-text articles excluded,
3 did not answer clinical question
0 did not meet quality threshold
1 outdated relative to other included study

Included

5 studies included in pathway

Flow diagram adapted from Moher D et al. BMJ 2009;339:bmj.b2535

[To Bibliography pg. 2](#)

[Return to
Screening/Workup](#)

Bibliography

Included Studies

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