

Dangerous Homes? What injuries should make you worry about abuse after household “accidents”

WI CAN Educational Series 6/19/15
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 **Learning Objectives**

- When a household fall is offered as an explanation for an injury, list reasons to suspect abuse based upon the story and the injury
- Describe what injuries are expected in various household fall scenarios



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 **Outline**

- Perspective of falls
 - What are short household falls
 - Developmental Perspective
- Expected injuries in household falls involving pre-mobile infants
- Expected injuries in household falls involving mobile infants and toddlers
- Key points

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Key Points

- Serious injuries result from severe forces
- Serious injury resulting from household fall forces deserve special attention
- Short household falls are usually benign
- Falls are the most common true and false histories when children are injured
- Skull fractures can result from short household falls or abuse; delay in seeking care is usually seen in both!
- Teamwork between investigators and medical is critical!



Distance of a "Short Fall"

- Researchers have used a wide spectrum of distances
- This presentation focuses on household falls which usually are < 4 feet
- Distance – of the head? Of the body? Of the feet? No standard approach.
- Since the head is most often injured, fall distance usually means the distance that the head fell!



Accident or Not?

- Falls are the most common true history to explain injuries in infants/young children
- Falls are the most common false history to explain injuries in infants/young children
- A clear history of a fall does not distinguish between accidental and abusive injuries!

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Considerations

- How do we know if the injury is abuse or accident (or something else)?
- History – is the injury EXPECTED given the story?
- Severe injuries result from severe forces. Are the injuries EXPECTED?
- Developmentally, could the child do what is described?
- Are there occult (hidden) injuries or a history of sentinel injury (bruise or other "trivial" injury before the infant could pull to a stand and take steps)?

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Accident or Abuse?

- Science – many research articles have been published on this topic
- Experience – unintentional injury (commonly called "accidents") is often witnessed
- Expected injuries from unintentional events are well-understood

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Falls

- Developmental perspective of falls
 - Infancy
 - Pre-mobile 0-7 months of age
 - Mobile 7-12 months of age
 - Toddlers
 - Preschoolers
 - School age children

} **Focus of today**

} **Not the focus**

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Children's Hospital of Wisconsin Young Pre-Mobile Infants

- Pre-mobile infants (not yet cruising)
 - Falls off of elevated surfaces such as couch, bed, changing table
 - Falls from arms of caregivers
 - Falls in arms of falling caregivers
 - Falls in baby equipment
 - Rarely injured by a sibling
 - Unusual – dropped by caregiver (common false history)

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Children's Hospital of Wisconsin Gross Motor Development

Chronologic progression of gross motor development

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Children's Hospital of Wisconsin Child Development Resource

- [Milestone Moments](#)
- Publication of the CDC and the AAP to help parents and others detect developmental delays

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Fall From Sofa or Bed

- Expected Injury
 - No injury - majority
 - Soft tissue swelling on the forehead (goose egg)
 - Bruise on forehead
 - Rarely a skull fracture
 - Very rarely a compression fracture of the femur if the infant lands on knee (rare injury in very heavy infants)

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Falls in Well Children

- 2001 Warrington – Survey of parents < 6 mo
 - Most kids who fall don't seek care
 - The only serious injuries resulted from serious accidents
- Haney et al. Survey study of well children < 5 y/O (Pediatr Emer Care 2010;26:914-918)
 - 19.6% of children had a fall by 6 months of age per parent report
 - Only 5% of the children had any injury beyond swelling or a bruise. There were no serious injuries

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Definition of Sentinel Injury

- Sentinel injury –
 - **Visible/detectable** injury in a pre-cruising infant detected by a parent and suspicious for abuse
- Example: 6-month old infant with abusive head trauma
 - healing rib fractures (not sentinel injuries)
 - history of an unexplained cheek bruise at 2 months of age



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Summary of Findings

- Sentinel injuries preceded more severe abuse in 27.5% of abused infants
- Medical providers were reportedly aware of the sentinel injury in 42% of cases
- "Prevention window" between sentinel injury and more severe abuse ranged from 1 day to 7.3 months
- Apparently trivial injuries (other than a scratch) in young infants should raise a concern about abuse

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Isolated Bruising – Is It Abuse?

- Isolated bruising in pre-cruising infants evaluated for abuse
 - < 6 months old evaluated for abuse
 - 50% have other serious injury identified on skeletal survey, neuroimaging or abdominal injury screening
 - 70% were screened for bleeding disorders and none identified
 - Always consider alternative hypotheses to abuse!
 - Bruising can be the first injury from abuse!
 - Remember that the lack of other injuries on skeletal survey and other tests does not rule out abuse!

Harper NS et al. J Pediatr 2014;165(2):383-388

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Skull Fractures: Expect Delay in Seeking Care

- Unlike most serious injuries, skull fractures often present several days after the fall
- Child cries but then is fine after the fall
- Several days later (often during a bath) a “boggy” or “squishy” area on the head is noted
- Care is sought

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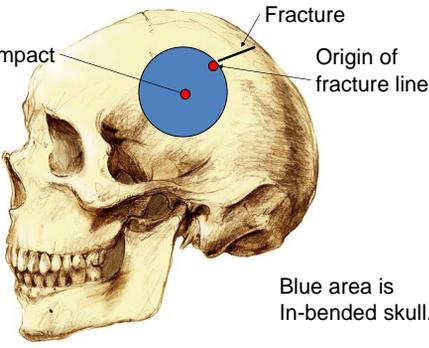
Skull Fractures

- Simple:
 - Linear
 - Parietal (side of head)
 - Accidental or abuse



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Point of impact

Fracture

Origin of fracture line

Blue area is In-bended skull.

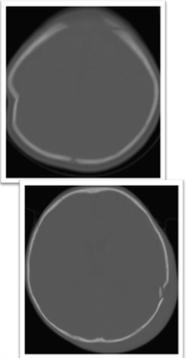
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Unexpected Skull Fractures

- Complex (everything except simple):
 - Depressed
 - Diastatic
 - Comminuted
 - Stellate or branching
 - Multiple
- Front and back of skull (Occipital and frontal) require more force than the side. Unusual in short falls



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Fractures: Specificity for abuse*

- High Specificity:
 - Classic Metaphyseal Lesion (CML)- commonly called bucket handle or corner fractures
 - Rib- especially posterior
 - Scapula (shoulder blade)
 - Sternum (breast bone)
- Moderate Specificity:
 - Vertebral body
 - Digits
 - Complex skull fx
- Low Specificity:
 - Clavicle (collar bone)
 - Long bone shaft
 - Linear skull fx
 - Supracondylar fracture

* All can be caused by abuse even if the specificity is low!

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What does specificity mean?

- Nothing when confronted with an individual case
- Low specificity = Most are not caused by abuse but there is no way to apply this to an individual patient
- High specificity fractures = rarely seen in settings other than abuse
- However, even specific fractures can rarely occur from "accidents"

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Fracture Specificity

- Interesting
- Not useful in individual cases
- Details of fall are critical in determining if injuries are consistent
- Multi-disciplinary team response is often critical to making the determination
- Re-consult medical if new history or details emerge – need medical input to determine if injury is explained

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Rare – femur fracture from short fall

- The only long bone fracture that is rarely seen, but not unexpected, in infant falls from sofa or bed
- Must have high suspicion of abuse when a long bone fracture reportedly resulted from bed/sofa fall

• 2009 Honey Pediatr Emerg Care 25(12):841

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Axial Loading (Compression forces)



- Fall onto the knee
- Compressive force along the length of the femur
- Causes buckling of the metaphysis
- Buckle or torus fracture

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A little more information about fractures (broken bones)

INVESTIGATORS PLAY A KEY ROLE

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Symptoms of Long Bone Fxs

- Swelling to extremity
- Pain to extremity
- Decreased movement
- Often no bruising!
- General fussiness
- No symptoms – rare!




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Bruising and Fractures

- Short household falls can result in a bruise, particularly over a bony prominence
- Short household falls can result in a fracture (broken bone) rarely
- The presence or absence of bruising does not help differentiate accident from abuse. 25% of fractures in either case are associated with bruising

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 **Higher force falls**

- Falls from caregiver arms, changing table, kitchen counter, table
- Long bone fractures still rare
- Young children tend to injure the head
- Fall onto the top of the head (vertex) can result in bilateral skull fractures!

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 **Summary: Short Falls & Skull Fractures**

- Uncommon but not unexpected
- Even a fall from a sofa onto a carpeted floor can result in a skull fracture
- Simple, linear, parietal (side of head) – but these are also seen in abuse
- Complex fractures are unexpected – crossing suture line, depressed, comminuted (bone chips)

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 **Depressed Skull Fractures: Get the details!**

- Depressed skull fractures can rarely result from unusual accidental falls
- Require much more force than typical household falls
- But. . . Striking the edge/corner of an object “concentrates” the forces

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Case Examples

- Case involving the fall onto the corner of the table
- Case involving the fall onto the wrought iron table leg (in salon)



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FALLS FROM CAREGIVER ARMS

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Stair falls in caregiver arms

- Considered complex falls
- Injury is more likely in complex falls
- However, such falls are commonly provided as false history in child abuse cases
- Lower extremity fractures can occur (buckle most common followed by spiral)



Child abuse was not considered in all cases:
 Pennock et al. J Child Orthop. 2014;8:77
 Zielinski et al. Pediatrics. 2012;129:721

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Mobility of infant can result in higher force falls which are more likely to result in bruising and sometimes fracture

FALLS INVOLVING MOBILE CHILDREN

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Mobility = Injury

- Mobile infants/toddlers
 - Falls from standing/crawling height
 - Falls from elevated surfaces
- Complex Falls
 - Falls down stairs
 - Falls in arms of falling caregivers
 - Falls in baby equipment

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WHEN MOBILE CHILDREN FALL

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 **Expected Injuries – Falls from Standing Height – Walk or Run**

- Usually no injury
- Bruise – primarily over bony prominences
- Fall onto outstretched hand (FOOSH) – buckle fractures of radius, ulna; clavicle
- Slip/trip and fall – sometimes a toddler fracture or rarely < 3 y/o a femur fracture
- Fall onto elbow – supracondylar fracture
- History is the key! All can be either from abusive or accidental means!

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 **Location of Bruises**

- Toddlers/preschoolers fall a lot!
- Usually no bruise
- If bruising – over bony prominences (forehead, knees, shins)
- Be very suspicious if most bruises are on the face or on soft parts of the body!

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 **Falls - The Story**

- Detailed enough that you could re-create it
- How far, in what position, onto what surface
- How did the child behave before **and after** the incident
- Developmentally, what could the child do before the incident?
- What symptoms would be expected given the injury? Did the child display these symptoms
- What did the caregiver do after the incident? To help or to resuscitate?
- Who witnessed the incident?

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 **Kirschner's "Dirty Dozen"+**

TABLE 19.1. Common suspicious stories (a dirty dozen + one)

1. Child fell from a low height (<4 ft) such as couch, crib, bed, or chair
2. Child fell and struck head on floor or furniture, or hard object fell on child
3. Unexpectedly found dead (age and/or circumstances not appropriate for SIDS)
4. Child choked while eating and was therefore shaken or struck on chest or back
5. Child suddenly turned blue or stopped breathing, and was then shaken
6. Sudden seizure activity
7. Aggressive or inexperienced CPR to a child who suddenly stopped breathing
8. Alleged traumatic event day or more before death
9. Caretaker tripped or slipped while carrying child
10. Injury inflicted by sibling
11. Child left alone in dangerous situation (e.g., bathtub) for just a few moments
12. Child fell down stairs
13. Self-inflicted injuries

SIDS, sudden infant death syndrome; CPR, cardiopulmonary resuscitation.

- Sibling blamed for injury
- Incident happened when alone with mother's boyfriend
- Help is first sought from a relative or neighbor

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SEVERE HEAD INJURIES IN SHORT HOUSEHOLD FALLS?

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Witnessed Short Falls

- 5 studies*
- Total of 802 children with witnessed short falls
 - Most occurring in hospital
 - From bed, chair, crib, parents' arms
- 8 skull fractures (< 1%)
- **No neurological abnormalities or deaths**

*Heller, *Pediatrics* (1977) Nimityongskul, *J Pediatr Ortho* (1987) Williams, *J Trauma* (1991) Levene, *Arch Dis Child* (1993) Lyons, *Pediatrics* (1993)

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Subdural hemorrhages from short falls are...

- Unusual
- Usually small and at site of impact
- Usually do not cause symptoms
- More severe injuries are usually associated with greater heights, a fall backwards onto the occiput or more complicated fall (such as a fall in baby equipment)




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Falls: Summary and Conclusions

- Short falls (< 5 ft) can *uncommonly* cause cranial injuries
 - Skull fractures most commonly
 - Epidural hemorrhage
 - Subarachnoid hemorrhage
 - Localized subdural hemorrhage
- Brain injury beyond a concussion are rare
- Injuries are often clinically silent or minimally symptomatic, resolve without long-term problems
- Short falls are rarely lethal
 - Frequency of ~ 0.5 per million
 - Most are from expanding mass lesions (large, surgical EDH, SDH)



Complex falls – falls with caregivers or baby equipment

COMPLEX FALLS = INCREASED RISK OF INJURY



Complex Falls – Increased Risk

- Tend to be more severe
- Includes:
 - Fall in baby equipment
 - Fall of caregiver and infant
 - Caregiver or furniture falls onto infant
- Falls in baby equipment
 - Additional weight/inertia of the object
 - Injuries tend to be worse when infant not strapped into equipment

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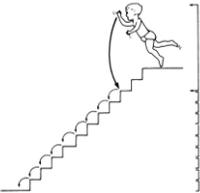
HIGHER FORCE FALLS AND MOBILE CHILDREN

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Falls Down Stairs

- One big fall then a series of short falls
- Many are not injured
- Head/neck is most common body location of injury
- Rarely more than one body region injured
- Rarely any injury to the trunk; no visceral injury
- **Serious injury is unexpected**



Studies did not systematically evaluate/screen for abuse:
Svanstrom Scand J Soc Med. 1974;2:113
Joffe and Ludwig Pediatrics. 1988;82:457
Chiaveiello et al Pediatrics. 1994;94(5):679
Zielinski et al. Pediatrics. 2012;129:721

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Falls from Bunk Beds

- National Electronic Injury Surveillance System database study
- Typical age 4 y/o
- Head and face most common site of injury. Visceral (abdominal organ) injury is not expected
- **Rarely fatal unless there is a mass-effect intracranial hemorrhage**

2008 D'Souza – Pediatrics;121:e1696

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Other Complex Falls

- Falls from shopping carts:
 - Smith (Arch Pediatr Adol Med 1995;149:1207)
- Falls in walkers:
 - Partington (Ann Emerg Med 1991;20:652)
 - Reider Pediatr (1986;78:488)
- Playground falls
- Bathtub falls

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Falls - Straddle

- Common injury in boys and girls
- May present with bruising and/or bleeding
- Usually in children out of diapers; usually child can report what happened
- There should be a clear history
- Hymenal/vaginal injury is unexpected unless fall is onto a pointed object

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Accidental Genital Injury

- More likely to be anterior (front part of the genitals)
- Tend to be external
- In boys, consider zippers and toilet seats as culprits (should have clear history)

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Key Points

- Serious injuries result from severe forces
- Serious injury resulting from household fall forces deserve special attention
- Short household falls are usually benign
- Falls are the most common true and false histories when children are injured
- Skull fractures can result from short household falls or abuse; delay in seeking care is usually seen in both!
- Teamwork between investigators and medical is critical!

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References

- Injuries resulting when small children fall out of bed. Hefter RE, Slovits TL, Black M. *Pediatrics* 1977;60: 533-535.
- Hobbs CJ. Skull fracture and the diagnosis of abuse. *Arch Dis Child*. 1984;59:246-252.
- Williams RA. Injuries in infants and small children resulting from witnessed and corroborated free falls. *J Trauma*. 1991;31:1350-1352.
- Long bone fractures in young children: distinguishing accidental injuries from child abuse. Thomas SA, Rosenfield NS, Leventhal JM, Markowitz RI. *Pediatrics* 1995; 88(3): 471-476.
- Duhalme AC, Alario AJ, Lewander WJ, et al. Head injury in very young children: mechanisms, injury types, and ophthalmologic findings in 100 hospitalized patients younger than 2 years of age. *Pediatrics*. 1992;92(2 Pt 1): 179-185.
- Etiology of supracondylar humerus fractures. Farnsworth CL, Silva PD, Mubarak SJ. *J Pediatr Orthop* 1998; 1: 38-42. Studied records on 388 children.
- Ewing-Cobbs L, Kramer L, Prasad M, et al. Neuroimaging, physical, and developmental findings after inflicted and noninflicted traumatic brain injury in young children. *Pediatrics*. 1998;102(2 Pt 1):300-307.
- Child abuse and unintentional injuries: a 10-year retrospective. DiDicasia C, Sage R, U G, Reece R, Arch *Pediatr Adol Med* 2000 Jan; 154: 16-22.
- Fall and suffocation injuries associated with in-home use of car seats and baby carriers. Pollock-Newton C. *Pediatric Emergency Care* 2000 Apr; 16(2): 77-79.
- Reece RM, Sage R. Childhood head injuries: accidental or inflicted? *Arch Pediatr Adolesc Med*. 2000;154:11-15.
- DiDicasia C, Sage R, U G, et al. Child abuse and unintentional injuries: a 10-year retrospective. *Arch Pediatr Adolesc Med*. 2000;154:16-22.
- Non-accidental rib fractures. Michelle Shoultz and Dori Hayer. In: T. J. David, ed., *Recent Advances in Paediatrics*. St. Edinburgh: Churchill Livingstone, 2000, pp. 63-76.
- Feldman KW, Bethel R, Shugerman RP, et al. The cause of infant and toddler subdural hemorrhage: a prospective study. *Pediatrics*. 2001;108: e46-466.
- Computer simulation of stair falls. Bertocci GE, Pierce MC, Deemer E, Aguel F. *Arch Ped Adol Med* 2003 Sep; 155: 1008-1014.
- Accidents and resulting injuries in premobile infants: data from the ALSPAC study. U Warrington SA et al. *Arch Dis Child* 2001; 85: 104-107.

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References

- Hettler J, Greenes DS. Can the initial history predict whether a child with a head injury has been abused? *Pediatrics*. 2003;111:602-607.
- Agnes PT, Anderson C, Winn D, et al. Rates of pediatric injuries by 3-month intervals for children 0 to 3 years of age. *Pediatrics*. 2003;111 (6 Pt 1):e883-e892.
- Richter JB, Patrick DA, Hyatt TL, et al. Nonaccidental trauma is a major cause of morbidity and mortality among patients at a regional level 1 pediatric trauma center. *J Pediatr Surg*. 2006;41:2013-2015.
- Femur fractures in resulting from stair falls among children: an injury plausibility model. Pierce MC, Bertocci GE, Janney B, et al. *Pediatrics* 2006; 115: 1712-1722.
- Leventhal JM, Martin KD, Asnes AG. Incidence of fractures attributable to abuse in young hospitalized children: results from analysis of a United States database. *Pediatrics*. 2008;122:599-604.
- Parkya NK, Redden K, Hoffmeyer R, et al. Child abuse and orthopaedic injury patterns: analysis at a level 1 pediatric trauma center. *J Pediatr Orthop*. 2009;29:619-625.
- Haney SL, Staring SP, Neider KW, et al. Characteristics of falls and risk of injury in children younger than 2 years. *Pediatr Emerg Care*. 2010;26:914-918.
- Williamson M, Keenan P, Kuan S, et al. Heading for a fall? Management of head injury in infants. *Ir Med J*. 2010;103:241-243.
- McGuire L, Martin KD, Leventhal JM. Child abuse consultations initiated by child protective services: the role of expert opinions. *Acad Pediatr*. 2011;11:467-473.
- Maljour C, Sibogean B, Trethewey SJ. The epidemiology of nonaccidental trauma in children. *Clin Orthop Relat Res*. 2011;469: 759-767.
- Zelinski AE et al. Stair-Related Injuries to Young Children Treated in US Emergency Departments, 1999-2008. *Pediatrics* 2013;132:721-727.
- Pennock AT et al. Stair falls: caregiver's "missed step" as a source of childhood fractures. *J Child Orthop* 2014;8:77-81.
- Postantoni EM et al. Infant Head Injury in Falls and Nonaccidental Trauma: Does Injury Pattern Correlate With Mechanism? *Pediatr Emer Care*. 2014;30:677-679.
- Kurinsky RM et al. Helical Injuries Associated With High Chairs and Chairs in the United States, 2001-2010. *Clinical Pediatrics*. 2014;53(4):372-379.

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