

Follow-up Skeletal Survey for Suspected Nonaccidental Trauma

Source: Harper NS, Eddleman S, Lindberg DM, for the ExSTRA Investigators. The utility of follow-up skeletal surveys in child abuse. *Pediatrics*. 2013;131(3):e672-e678; doi:10.1542/peds.2012-2608

Investigators from Corpus Christi, Texas and Boston conducted a prospective secondary analysis of 2,890 children evaluated by the ExSTRA (Examination of Siblings To Recognize Abuse) study. The purpose of the current study was to evaluate rates of follow-up skeletal surveys (FUSS) in suspected cases of nonaccidental trauma and determine whether FUSS provides new information. Participants included children <10 years of age who underwent evaluation for possible physical abuse by one of 20 child abuse teams in the study network. Only evaluations of index cases were included. Initial skeletal surveys (SS) were obtained based on American College of Radiology or American Academy of Pediatrics guidelines. The primary outcome was whether FUSS provided new information, defined as new fractures, or that a concerning finding on the initial SS was, in fact, not a fracture. A secondary outcome was the change in perceived likelihood of abuse before and after FUSS as measured by a child abuse physician using a previously published 7-point scale.¹

There were 2,049 children who had an initial SS, among whom a new injury was found in 23% (471 children). FUSS were recommended in 50.7% (n = 1,038) of those who had an initial SS, but the FUSS was only obtained in 76.7% of these children. New information was found in 21.9% (n = 174) of FUSS, most of which were new fractures (n = 124). Of those with new fractures on FUSS, the most common were of ribs, long bones, and metaphyseal lesions; 52.4% had multiple fractures. The perceived likelihood of abuse increased in 41 (33%) of these new fracture cases, while the likelihood remained at the maximum value in 51 cases (41%). Findings concerning for fractures on initial SS were determined by FUSS not to be fractures in 55 (6.9%) subjects. An initial negative SS followed by a positive FUSS occurred in 7.1% (n = 18) of cases.

The investigators conclude that FUSS are useful in children with suspected nonaccidental injury. They suggest that FUSS may be valuable in cases with a moderate level of concern for abuse.

Commentary by

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Dr Snyder has disclosed no financial relationship relevant to this commentary. This commentary does not contain a discussion of an unapproved/investigative use of a commercial product/device.

Skeletal surveys are useful to obtain in children for identifying occult injuries, since only approximately 10% of cases will present with bruising or signs of trauma at the fracture site.² This is particularly true in cases of suspected physical abuse. Specific recommendations regarding the indications for FUSS exist, but previously only a few retrospective studies have documented the results.³⁻⁵

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Question: Among children evaluated for nonaccidental trauma, do follow-up skeletal surveys provide new and/or useful information?

Question type: Diagnosis

Study design: Prospective cohort

The investigators of the current study offer interesting insight into the value of FUSS. However, this study has several weaknesses acknowledged by the authors: (1) it is observational and the indications for FUSS were variable between centers and physicians; (2) the rating scale for perceived likelihood of abuse has many subjective measurements and its reproducibility is questionable; (3) FUSS radiographs were not independently reviewed in the research protocol; (4) the time interval between the initial SS and FUSS was not determined, and thus some fractures could have healed and not been seen on FUSS; (5) approximately 25% of recommended FUSS were not obtained, introducing bias; and (6) the investigators did not determine which initial SS had findings that were concerning but inconclusive for abuse, and therefore some fractures identified by FUSS may have already been suspected.

The accurate identification of nonaccidental trauma is critical for appropriate medical treatment, protection of at-risk children, and medico-legal purposes. This report and prior studies document a significant incidence of new fractures found with FUSS and a conversion rate from negative SS to positive FUSS (and vice versa) of about 7% each.²⁻⁴ The direction for future studies should be toward trying to determine the optimal timing of FUSS and which specific radiographs have the highest yield.

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Key words: abuse, fractures, skeletal survey



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