

A119 Toward a Skeletal Atlas of Elder Abuse: A Pilot Study of Fracture Patterns in Documented Cases

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After attending this presentation, attendees will be aware there are skeletal fracture patterns associated with the abuse/neglect of elderly individuals distinguishable from those found in accidental falls.

This presentation will impact the forensic science community by introducing skeletal manifestations and patterning of elder abuse, contributing novel data to the ongoing effort to unmask elder abuse at a state and national level.

Increasing rates of elder abuse in the United States have produced an urgent need for improved diagnostic criteria.¹ Physical abuse of elders represents the most severe manifestation of this trend, yet is difficult to prove.² Skeletal expressions of elder abuse offer key indications of inflicted injuries, but often are masked by assignment to accidental falls. Currently, there is no standard for the diagnosis of elder abuse in the skeletal system; research in this field is “decades behind.”³⁻⁵ Here, results of a pilot project are presented identifying fracture patterns associated with suspected cases of elder abuse/neglect in contrast with those associated with accidental falls.

To establish skeletal patterns of abuse/neglect versus accidental falls, 300 investigative summaries, dating from January 1, 2014 through June 30, 2017, were reviewed. From these, 30 individuals above the age of 60 years were included in the pilot study population based on the following criteria. Decedent must: (1) have been admitted for full exam; (2) be associated with an Adult Protective Services and/or law enforcement investigation; (3) present with skeletal fractures; and, (4) have radiographs/samples available for review. Given these strict criteria, this sample size is known to be an underestimation of cases of abuse/neglect. To establish a comparative baseline of those fractures most likely to occur in accidental falls, 75 cases of witnessed falls from the same pool were reviewed.

A significant difference in the skeletal manifestation of injury was observed between those individuals involved in accidental falls and those for whom abuse/neglect is suspected. For individuals involved in a witnessed fall, fractures occurred most frequently in the hip ($n=51$; 68%), followed by vertebral compression fractures ($n=14$; 19%). Five individuals involved in an accidental fall presented with multiple fractured ribs (7%). In contrast, for those individuals identified as possible victims of abuse/neglect, fractures occurred most frequently in ribs 8-11 ($n=8$; 27%) and the arm ($n=9$; 30%), followed by fractures in the femur ($n=7$; 23%) and the tibia/fibula ($n=3$; 10%).

In cases of suspected abuse/neglect, femoral fractures occurred along the shaft or distal end, while femoral fractures in witnessed falls occurred at the proximal end. Rib fractures occurred in the posterolateral shafts of ribs 8-11 in cases of suspected abuse/neglect, but in varying locations in falls. When an accident involved fractures of the arm, the bones involved consistently displayed fracture types associated with a fall on an outstretched arm.⁶⁻⁸ In cases of suspected abuse/neglect, arm fractures presented as chronic dislocation of the humeral head and/or healing fractures of the radius and/or ulna shaft. In several cases of suspected abuse/neglect in which the humeral head was involved, fractures of the lateral clavicle and acromion process of the scapula were also noted. This finding complicates reports that falls onto an outstretched hand account for the majority of proximal humeral fractures in the elderly and serves as a warning that cases of abuse/neglect may be masked by a tendency to over-assign arm fractures in the elderly to accidental falls.⁸⁻¹¹

By exploring these patterns within their contexts, mechanisms that may account for observed differences can be proposed. In several cases of suspected abuse/neglect in this sample, fractures occurring in ribs 8-11 are correlated with reports of a “bear hug” restraint. Where fractures of the distal femur and tibia/fibula are associated with cases of suspected abuse/neglect, individuals were non-ambulatory and had been dropped, resulting in a “crushing” fracture. A rough “jerking” of the arms in the process of moving a non-ambulatory individual resulted in crushing and dislocation of the humeral head.

Fractures are the most common musculoskeletal condition requiring hospitalization among individuals aged 65 and older in the United States, and rigorous diagnostic criteria must be developed to differentiate accidental injury from abuse.¹² Results from this pilot project offer a first stage in the effort to develop and improve diagnostic criteria for a skeletal atlas of elder abuse.

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