



A30 Determining Common Skeletal Injury Locations Based on Manner of Death (MOD)

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The goal of this presentation is to inform attendees of common injury patterns associated with specific modes and causes of death.

This presentation will impact the forensic science community by discussing how these findings will assist attendees in better interpreting patterns of injury across the body and to help substantiate estimation of MOD in forensic casework.

Data was collected from the Washoe County Medical Regional Medical Examiner's Office (WCRMEO) to document specific injury locations based on the MOD and trauma class and explore which anatomical locations presented with the highest frequencies. This presentation will impact the forensic community by providing corroboration for trauma interpretations based on injury location, by increasing our understanding of the circumstances surrounding the death event, as well as informing scientists of influential future research directions.

The justification for the majority of trauma research is that it is assumed to be a common injury location and, therefore, will impact forensic anthropologists and other similar practitioners. For example, numerous studies explore cranial bone reactions to blunt force trauma, utilizing tools that resemble hammers, baseball bats, and other common weapons used in cases of homicide. The goal of the current study is to quantify the frequency of trauma on the skeleton based on MOD and trauma classes (i.e., blunt force, sharp force, or ballistic) as well as determine whether significant differences were observed.

Deceased individuals recorded in the WCRMEO VertiQ case-reporting database were included in the study if: (1) they have a documented MOD consistent with accident, homicide, or suicide; (2) they have a documented Cause Of Death (COD) consistent with some type of traumatic skeletal injury and not a drug, soft tissue disease state, or disease-related complication; and, (3) were more than 18 years of age. Only cases from January 2016 to July 2017 that had been designated "closed" at the time of data collection were included, which resulted in a total sample size of 300 individuals. Variables collected from the WCRMEO autopsy reports for each individual included age, sex, weight, height, body mass index, ancestry, MOD, COD, and specific skeletal trauma location. All fracture locations were recorded as present or absent for each bone and the general location on each bone (i.e., left/right, proximal/midshaft/distal). Frequency distributions of fracture location based on MOD were created as well as frequency distributions of fracture location based on trauma class, as interpreted from COD. Chi-square tests were conducted to explore the relationship between fracture location and MOD.

Interpretation of the frequency distributions of MODs suggested that cranial injuries were most common with suicides and accidental deaths. On average, greater than 50% of suicides resulted in fractures to the cranium. Ribs, the appendicular skeleton, and the innominates were most often affected by an accidental death. An MOD of homicide resulted in similar amounts of trauma (26%) appearing on both the cranium and thoracic area; however, unlike the aforementioned studies within the field, no MOD homicide reported a COD of blunt trauma. When examining frequencies of COD, sharp force trauma most frequently affected the ribs (62%) and ballistic trauma most frequently affected the cranium (70%). Blunt force trauma had a slightly higher occurrence on the ribs overall, where 55% of blunt force trauma cases resulted in lateral rib fractures; however, a substantial portion (28%) of blunt force trauma also appeared on the cranium. Chi-squared tests revealed that some of these location frequencies had a statistically significant relationship with MOD ($p < 0.05$).

The results from this research demonstrate that MOD has a significant correlation with the location of trauma. Recognizing common injury location does not directly influence the trauma interpretation, but rather provides information regarding the death event and corroborates any findings from the trauma analysis. These findings will assist forensic scientists to better interpret patterns of injury across the body and help substantiate estimation of MOD in forensic casework. Additionally, these findings will direct future forensic anthropological research by providing data on the anatomical areas presenting with the highest frequency of trauma per MOD and COD.

Trauma Analysis, Frequency Tables, Cause of Death