H8 Pattern and Distribution of Fractures in the William M. Bass and Hamann-Todd Osteological Collections

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After attending this presentation, attendees will understand whether aspects of modern life predispose individuals to different patterns of trauma than earlier, historical populations. The specific patterns and susceptibilities to injury may be unique to individual populations and provide a reference in order to gauge quality of life and health status for the populations under study.

This presentation will impact the forensic science community by providing information that can be used to determine lifestyle factors that predisposed modern, as well as earlier historical populations, to injury. This may allow for predictions to be made as to what types of injuries will be represented in modern medical institutions, based on the lifestyle of the populations feeding into those systems.

It is possible that modern activities can predispose certain populations to different risks, and therefore different injury patterns. Few studies take into account the effects of ancestry, age, and sex on frequency and location of these fractures. The goal of this study is to determine whether aspects of modern life predispose individuals to different patterns of trauma than earlier populations, as well as whether differences exist across demographic parameters.

Lifestyle choices, as well as biological and environmental factors, can predispose different individuals to fracture. Habitual daily activities combined with poor health characterize the risk factors for many populations experiencing high fracture rates. These can include a sedentary lifestyle, tobacco smoking, alcoholism, and poor diet. An individual's age, deteriorating senses, osteoporosis, hormonal changes, poor health, and/or inactivity all contribute to biological predispositions to fracture. In addition, several non-biological factors can increase an individual's rate of fracture, including geographic location, climate, technology, occupation, and participation in sporting activities. Modern ways of life have introduced longer lives that are on average less laborious than earlier time periods, as well as city crowding, violent crime, automobiles accidents, and accidents attributable to urban architecture. All of these factors interplay to form an individual's unique susceptibility to fracture.

The present investigation was conducted using the Hamann-Todd Osteological Collection and the William M. Bass Donated Collection. The analysis of both collections was conducted macroscopically without the aid of radiographs. Only complete, adult specimens were used to allow for greater statistical power. Each element of the skeleton, except for hands and feet, was visually inspected for the presence or absence of fractures. Demographic information was recorded for each individual and includes cause of death, age, sex, and ancestry. Statistical analyses were performed using two statistical analysis software programs. The frequency data generated by the two collections in this study were analyzed using cross-tabulations with Chi-square tests, to determine if any differences occurred between the earlier and later populations, as well as between age, sex, and ancestry groups.

Among the significant (i.e., Chi-squared test significant) cranial bones we see several patterns emerge, the first being that white males tend to have more fractures than expected. In contrast, white females tended to have fewer fractures than expected in both collections. In the post-crania, there appears to be higher fracture counts than expected only for the Bass collection. There seems to be a predisposition toward more post-cranial fractures in the more modern sample. The highest fracture counts were attributed to the ribs and nasals with some individuals experiencing more than one fracture. This has been found in other studies, since these areas are often susceptible to not only violence, but traumatic injuries from falls and accidents.

Overall, the results indicate that differences exist across the demographic categories. The variation inherent in the sample may be attributed to the fact that the Hamann-Todd collection was created from a more socio-economically disadvantaged population, as compared to the Bass-donated collection. Overall, there is significant variation found between the demographic groups included in this study, which helps garner a further understanding of modern injury patterns.

Fractures, Age Differences / Sex Differences, Patterns of Injury

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