



Physical Anthropology Section – 2011

H54 Determining the Epidemiology of Hyoid Fractures in Cases of Hanging and Strangulation

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After attending this presentation, attendees will become familiar with literature in forensic science concerning injuries to the hyoid bone following hanging or strangulation; will learn about local hanging or strangulation cases from recent years exhibiting fracture of the hyoid bone; and, will learn about possible epidemiological causes for the trauma seen in the hyoid following hanging or strangulation.

This presentation will impact the forensic science community by providing age ranges for unilateral and bilateral fusion of the greater cornua to the hyoid body, discussing the effect of demographic variables on the fusion patterns, and improving the interpretation of traumatic injuries to the neck.

A review of the forensic literature on neck trauma in hanging and strangulation cases showed two distinct patterns. Overall, there appears to be little debate that hyoid fractures are more common when the cause of death is strangulation. Traumatic injuries to the hyoid bone following strangulation have been described as being frequent and previous studies have shown that up to one third of strangulations cases lead to a fracture; however, in cases of hangings, opinions are much more varied. Some studies argue that fractures in hanging cases are much fewer than in strangulations cases, while other authors mention that trauma to the

hyoid bone is common following hanging. Population variation may be responsible for the divergent literature and this study attempts to identify the variables that may be responsible for the variation.

To study local cases of hanging and strangulation, data collection was performed at the Hillsborough County Medical Examiner's Office in Tampa, Florida. The Hillsborough County Medical Examiner's Office services a population of more than one million people and investigated an average of 1,915 cases between 2004 and 2009. A total of 148 cases between fall 2004 and spring 2010 listed hanging, ligature strangulation, manual strangulation, asphyxia, or compression of neck as the cause of death. Autopsy reports were analyzed to obtain a series of variables from each case. In addition to sex, age, and ancestry of the victim, cause and manner of death, past or present history of substance abuse, description and location of the hyoid bone trauma if present, and if noted by the medical examiner, fusion of the hyoid bone were collected.

The vast majority of cases, 134 out of 148 (91.0%), were classified as hangings. An additional eight were indicated as strangulations, two as ligature strangulation, and four were classified as a combination of suffocation, asphyxia, and compression of neck and chest. Similarly, 134 cases were listed as suicides. Nine cases were homicides, four were classified as accidents, and one case remained undetermined. From the 148 cases reviewed, only eight contained a fractured hyoid bone while another two autopsy reports made no mention of the hyoid bone. Six of the eight fractured hyoid bones were from hanging cases while the remaining were classified as manual strangulations. Overall, 2.05% of strangulations cases contained a traumatic injury to the hyoid bone, while damage was present in only 4.0% of suicides cases analyzed. In half of the hanging cases exhibiting trauma to the hyoid, force exerted on the ligature implement appeared to be a significant cause for the damage. In one case, the victim hung them self from a bridge while in two additional cases, the men weighed well over 200 lbs. Age could possibly be a factor as an ossified hyoid bone is more prone to traumatic injuries than an unfused one. Unfortunately, the autopsy report discussed the fusion of the hyoid in only five cases. Seven out of eight fractured hyoid bones were males, but this is representative of the sample used. Through a better understanding of the variables that affect hyoid fractures in hanging and strangulation cases, forensic anthropologists may be able to better interpret a fracture found on a skeletonized hyoid.

Hyoid Bone, Hanging, Strangulation