H79 Taphonomic Changes Observed on Skeletal Remains in Southeast Texas

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After attending this presentation, attendees will better understand taphonomic changes, in particular how sun-bleaching of skeletal remains can be attributed to the clothes worn by the decedent during decomposition.

This presentation will impact the forensic science community by potentially providing a link between the last known attire worn by a missing person to sun-bleached patterns on skeletal remains.

Few studies focus directly on the taphonomic process of sun- bleaching and the resulting patterns produced on human bone (Calce and Rogers 2007, Janjua 2008, Quatrehomme and Iscan 1997). The goal of this study is to expand upon the current taphonomic literature as well as enhance the interpretation of sun-bleaching patterns observed on skeletal remains. During the course of a year in Southeast Texas, it is expected that an individual exposed to the environment would undergo taphonomic alterations during decomposition.

Taphonomy is the study of processes affecting an organism from the time of death to the time of discovery (Calce and Rogers 2007, Haglund and Sorg 1997). Forensic anthropologists, as well as other death investigators, rely on taphonomic studies in order to properly interpret alterations sustained by skeletal remains. The extent of alteration to skeletal remains is dependent upon weathering processes, such as the amount of moisture, sun, and soil type to which the remains are exposed (Janjua 2008, Calce and Rogers 2007). Taphonomy also includes modifications by carnivore activity, fluvial transport, and trampling (Haglund and Sorg 1997, Janjua 2008), though these processes were not the focus of the present study.

This study revolved around an individual involved in a fatal vehicular accident. The remains of the individual were donated to the Southeast Texas Applied Forensic Science (STAFS) Facility where they were clothed in shorts, a short-sleeved button-up shirt, and flip-flops. The remains were placed within the maximum security outdoor research facility on July 14, 2009 and were removed on June 2, 2010. Throughout the eleven-month duration of the study, scavenger activity was inhibited by the placement of a hardware cloth cage over the remains. At the time of removal, the remains were skeletonized with mummified tissue remaining on the skull and both hands and legs. A visual examination of the remains revealed sun-bleaching on areas of the bone that were not protected by clothing, thereby creating a color pattern consistent with the decedent's postmortem attire. The sun-bleached bones include facial bone fragments not covered by desiccated tissue, clavicles, cervical and lumbar vertebral bodies, sternal rib ends, distal portions of both arms, portions of the pelvic girdle, and portions of the distal legs not covered by desiccated tissue. Algal growth was also observed on two left ribs, several vertebrae, the superior sacrum, distal portions of the left ulna, two carpals and eleven tarsals and metatarsals. It is important to note that algal growth occurred only on bones that were bleached by the sun.

Facial bones sustained blunt force trauma with comminuted fractures as a result of the vehicular accident in which the individual was involved. Several of these facial bone fragments, as well as the proximal and distal ends of the left ulna and the proximal end of the left radius, exhibited uniform sun-bleaching. It was determined in a recent study that perimortem-inflicted blunt force trauma to pig skulls (*Sus scrofa*) also revealed uniform sun-bleaching of fracture sites (Calce and Rogers 2007). Postmortem trauma; however, can result in inconsistent sun- bleaching or coloration of the fractured bone (Quatrehomme and Iscan 1997). Acknowledging this phenomenon could be potentially beneficial to the forensic investigator by providing a means to differentiate between peri-mortemand postmortem trauma of skeletal remains.

The sun-bleaching patterns observed on the skeletal remains can possibly reflect clothing worn by the decedent which, in turn, can provide seasonal clues as to when the person may have died. This information can be related to clothing details provided in a missing persons report and can thereby link skeletonized remains to an individual's identity.

Taphonomy, Sun-Bleaching, Blunt Force Trauma

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