



A129 A Classification System of Thermal Damage to Human Remains

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Learning Overview: This goal of this presentation is to provide a comprehensive and easily interpretable classification system for the degree of thermal damage to human remains.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by demonstrating how a comprehensive classification system will facilitate discussion between researchers and practitioners and provide a realistic assessment of the types and scale of damage seen. Descriptions about the level of damage and the most critical observations that should be made on a fire victim are addressed.

Classification of thermal damage to human remains is lacking the specificity that comes with witnessing multiple fire-related experiments over a wide range of settings. Currently available classifications are relatively gross and are derived from burn situations where calcination and fragmentation were the norm. This presentation outlines a classification based on 12 years of experience with the San Luis Obispo Fire Investigation Strike Team's Forensic Fire Death Investigation Course (FFDIC). The system is based on changes to: (1) soft tissue; (2) exposure of body components (fat, skeletal muscle, internal organs, bone); (3) changes in body position; and (4) skeletal damage from discoloration to calcination.

The classification system utilizes the normal progression of changes to the human body as both fire temperature and duration increase. The ten stages are developed from "minimal burning" to "calcination and fragmentation." Assignment can be made by whole body and by body segment. The classification chart includes lateral images of a body along with descriptions of soft tissue, body position, and skeletal changes.

In this initial study, inter-observer error is assessed between two people with extensive FFDIC experience and between the FFDIC people and a practicing Forensic Anthropologist (FA) who is familiar with burn cases but without as extensive fire progression experience. Twenty-four cases were selected from the FFDIC records from 2010 through 2014. All photographs of the body were placed in a blind sample file. These were assessed by each person separately. FFDIC inter-observer agreement was 75% for exact match and 100% within one stage. Between the FFDIC people and the FA person, 60% of cases were classified as an exact match and 83% within one stage. Difficulties arose in assessing images in which not all the body was visible or where differential burning was significant.

Variation in degree of heat-related changes is due to a number of factors. Bodies often do not exhibit full pugilistic changes due to the surrounding or overlying materials or differential heating. In such circumstances, the arms are most often affected, where muscle mass may be less. Proximity to the major heat source is also different within structural fires. Those areas further from the center of the fire may be less affected than the areas of the body where temperatures are more extreme. Body build is another factor, with thicker muscle and fat layers protecting internal organs and bones. Finally, it is critical that assessment be made either at the scene or from photographs taken at the scene due to the major changes brought about by transportation. Regardless of the factors, a common and comprehensive classification system that abides by the normal progression of changes due to fire is an asset.

Fire, Thermal Damage, Classification