A98 A Refined Classification System for Thermally Damaged Human Remains by Body Segment

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Learning Overview: The goal of this presentation is to provide a comprehensive regional approach to the classification of thermal damage of soft tissue and bone.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by increasing understanding of how to apply a classification that encompasses soft tissue changes, body movement during fire, and skeletal damage to allow categorization of damage by segment. While minor discrepancies by segment are normal, significant differences by body segment will require explanation in terms of fire dynamics, suppression efforts and/or protection applicable to certain body segments.

Previously, a whole-body classification system was presented. Here, this presentation has refined this system and created a regional approach that provides flexibility while simultaneously providing a realistic and easily reproducible assessment of the scale and damage associated with burning. This presentation outlines a six-stage system in which the body may be assessed in segments consisting of the head, torso, arms, and legs. The progression of changes associated with each stage is generated from over 12 years of experience with the San Luis Obispo Fire Investigation Strike Team (SLO FIST).

Classification of burning has normally utilized the Crow-Glassman Scale (CGS), developed from assessment of end-product burning. The CGS scale has five phases: (1) singed and blistered body, (2) charred body, (3) body with loss of arms and/or legs but head present, (4) partial body with significant limb and skull loss, and (5) cremated. While helpful, this system does not allow for assessment by body segment and thus the flexibility to address differential burning and is primarily focused on the product as found by the anthropologist. It does not discuss changes in body position due to the heat.

At the SLO FIST Forensic Fire Death Investigation Course (FFDIC), training for law enforcement, fire investigators, and coroners utilizes donated human remains in realistic fire scenarios. This training is combined with scientific research on body destruction, fire progression, and temperature-dependent changes, based on thermocouple data from the remains and the scenario. Fires are suppressed at various degrees of burning in order to meet the needs of the individual scenario. Consequently, bodies are examined across the spectrum of burn damage in sufficient numbers to provide a good sample size.

Utilizing photographs, video, and recorded statements, this study constructed a classification system for fire damage. Each of the six stages represents a range and is bracketed from early to advanced phases. This range is shown with images and descriptions, allowing assignment to an “a (early)” or “b (advanced)” phase of the stage. Assessment information focuses not only on the overall description of the remains at each stage but on the features that define the transition from one stage to the next and from early to advanced phases. Rather than depend on photographs, where ability to discern the critical features is difficult, the classification system uses inked illustrations with written descriptions.

Significant differences in the assessment scores within a single body may highlight where additional explanation is required. For example, a person on an armchair may have much greater damage to the legs while the torso, arms, and head are significantly less burned as the substrate collapsed, tipping the body away from the central focus of the flames.

While assessment of photographs is possible, the system works far better when used directly on the burned remains. The system is also designed to be utilized by many in the death investigation field and can be used in the field and/or in the laboratory/morgue. Worksheets for recording burn damage have also been developed and facilitate recording on soft tissue, bones, and dentition.

Thermal Damage, Burned Human Bone, Fire Death

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