



### D6 Blunt Force Trauma Patterns in Suspected Animal Abuse Cases

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After attending this presentation, attendees will gain a better understanding of the value of forensic anthropological assessments in investigations of animal abuse. The goals of this presentation are to highlight blunt force trauma fracture patterns among canid skeletons and to discuss the value of detailed trauma assessment in animal abuse investigations.

This presentation will impact the forensic science community by providing awareness of perimortem trauma patterns from suspected animal abuse cases, and will highlight novel areas where forensic anthropologists can contribute to medico-legal investigations.

In October of 2009, the California State University, Chico Human Identification Laboratory (CSUC-HIL) was consulted by law enforcement to search the side yard of a private residence in northern California. The property contained the remains of several pets suspected to have died under suspicious circumstances. The recovery team located three shallow gravesites and excavated the remains of four domestic canids (*Canis familiaris*). The decomposed remains were transported to the CSUC-HIL for inventory and analysis. Investigators provided

antemortem documentation to assist in individuating each canid, which was confirmed through assessment of sex (e.g., presence/absence of a baculum), age (epiphyseal union, dental development, dental attrition), bone size, craniofacial morphology, and fur coloration pattern.

The remains were photo-documented prior to the removal of adhering soft tissue and fur through maceration. Each skeleton was laid out in anatomical position and analyzed with the assistance of two zoo archaeologists and a veterinary pathologist. The presence/absence of a baculum identified two of the canids as male and two as female. Three of the canids were skeletally mature and one was juvenile based on dental eruption and epiphyseal union sequences. These findings are consistent with antemortem records and witness statements provided to law enforcement. A detailed trauma assessment identified perimortem blunt force trauma (BFT) on all four canids.

Canid #1 shows evidence of BFT on the craniofacial skeleton, thorax, vertebral column, and metacarpals. On the skull, there is a circular depressed fracture along the midline at the intersection of the parietals and the occipital. A radiating fracture propagates from this impact site along the sagittal suture, and then terminates on the left side of the frontal. The left hemi-mandible shows evidence of a “butterfly” fracture on the medial aspect. Peri-mortem fractures were observed on several ribs, a spinous process of a vertebra, and on left metacarpals III-

V. Well-healed fracture calluses were also observed on five left ribs.

Canid #2 shows evidence of BFT on the craniofacial skeleton, the thorax, the vertebral column, and the pelvis. Both zygomatics exhibit peri-mortem fractures. BFT of the nasopalatal region is associated with a linear radiating fracture that propagates into the lateral squama of the left parietal, terminating at the temporal line (Impact #1). In addition, there is a fracture to the left side of the cranium, which displaced bone endocranially (Impact #2). There are additional peri-mortem fractures of multiple ribs, one vertebral spinous process, and the left pubis.

Canid #3 shows evidence of BFT of the pelvis. The innominate is fractured along the midline (at the pubic symphysis), and a fracture propagates into the dorsal aspect of the left iliopectoral ramus. No other evidence of trauma was observed.

Canid #4 shows BFT of the left thorax, which involved three ribs. No other evidence of trauma was observed.

Although all four canids exhibited BFT, the pattern of involvement varied substantially. Canids #1 and #2 showed extensive trauma to the head, including depressed cranial vault fractures, as well as numerous rib fractures. Appendicular fractures were only observed on the left metacarpals of Canid #1. Canid #3 and #4 showed less traumatic involvement, represented by pelvic and rib fractures, respectively. In summary, the distribution of BFT is consistent with reported cases of animal abuse. Injuries to canids commonly involve the craniofacial region and the thorax and pelvic area, and less commonly occur on the appendicular skeleton.

Forensic anthropologists are uniquely suited to assist with animal abuse investigations because of their advanced knowledge of skeletal anatomy and ability to analyze traumata on the skeleton. However, trauma assessments of non-human animal skeletons provide unique challenges, such as morphological differences in anatomical features, inter-specific variation in areas of buttressing, and differences in bone density. A multidisciplinary approach involving expertise from veterinary pathology and zooarchaeology is essential for accurate reconstruction of trauma to the nonhuman skeleton. These case studies highlight new areas where forensic anthropologists can contribute to medico-legal investigations.



## General Section – 2011

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Animal Abuse, Blunt Force Trauma, Forensic Anthropology