



G91 A Multidisciplinary Forensic Effort Unwraps the Mystery of a Mummified Case

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After attending this presentation, attendees will understand the effectiveness of a multidisciplinary approach in solving difficult forensic cases.

This presentation will impact the forensic science community by presenting the options and resources available to medical examiners for dealing with severely mummified remains. In this instance, experts from multiple fields may be necessary to arrive at a conclusive opinion as to the cause and manner of death.

On October 12, 2012, the mummified remains of a 23-year-old Black male were discovered in the mobile home where he lived with his mother and 18-year-old stepsister. A pungent odor had been reported coming from the mobile home. The decedent was severely mentally challenged, suffering from Cri du Chat (chromosome 5 deficiency). His mother, the primary caregiver, reported that he died in February 2012. The remains were transported to the Georgia Bureau of Investigation's Eastern Regional Crime Lab for examination.

The severely mummified body was clad in a soiled disposable adult diaper, weighed 12 pounds, and was covered with innumerable dead larvae and pupa cases. The medical examiner found no evidence of attempted resuscitation, medical therapy, or recent injury; however, the spine had steel rods that were used to correct neuromuscular scoliosis. An internal examination was not possible because of the advanced state of mummification and the fixation of the body into fetal position; therefore, the medical examiner contacted a forensic anthropologist to examine the remains. The fragile tissues were rehydrated using a room temperature water bath and then carefully dissected. The anthropologist X-rayed and weighed the remains post-processing to assess bone density. Skeletal epiphyses were examined to determine skeletal age, and the long bones were measured to compare the decedent's bony dimensions to those of healthy Black males of similar age. Skeletons from the University of Tennessee's Bass Donated Collection were used for bone weight comparisons, and data from the Forensic Data Bank was used for osteometric comparisons. Samples were also taken from the bed linens upon which the body was discovered in order to approximate Postmortem Interval (PMI) using the Vass *et al.* (1992) Volatile Fatty Acid (VFA) method, as no literature was available to support a PMI estimate of >1 month given the unique conditions in which the body decomposed. These samples were submitted to a biochemist for VFA extraction and analysis.

The skeletal remains exhibited a number of congenital and pathological anomalies. Pathological anomalies included delayed skeletal maturation, craniostynostosis, severe dental decay, advanced osteoporosis, porotic hyperostosis, and cribra orbitalia. The skeleton weighed 4 pounds post-processing (including the Galveston rods), compared to an average skeletal weight of 10 pounds for healthy Black males aged 18-30 years. Skeletal age based on epiphyseal union was determined to be 18-23 years. The state of most epiphyses (specifically shoulder and pelvic girdles) pointed to an age at the low end of this range. The decedent's bone dimensions were consistently within the lowest percentile (1%) or completely outside of the range of normal variation for adult Black males. These measurements were input into the FORDISC® 3 program to evaluate typicality, and the program classified the decedent as a Black female (on account of the small size). The VFA results were inconclusive, as the time lapse between death, collection, and analysis was too long to get an accurate profile of the volatiles. Alternative analyses of the bedding samples are ongoing.

A review of the medical literature suggests that Cri du Chat syndrome symptoms include feeding problems because of difficulty swallowing, low birth weight, poor growth, scoliosis, and Gastroesophageal Reflux Disease (GERD). The decedent's medical records revealed that he exhibited a number of these symptoms. He had undergone fundoplication for his GERD and was scheduled to have a redo of this surgery and insertion of a gastrostomy tube in 2004 (eight years prior to death); these were the last medical records available for review. While delayed maturation can be attributed to Cri du Chat, and osteoporosis and low bone density in the load-bearing skeletal elements can be attributed in part to immobility, porotic hyperostosis and cribra orbitalia are associated with significant nutritional deficiencies (i.e., severe anemia) and are rarely encountered in modern populations. Based on the medical records, investigative reports, and



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anthropology investigation, the medical examiner ruled the cause of death as complications of medical neglect and the manner of death as homicide.

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