## G13 Fetal Maceration and Dental Age

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**Learning Overview:** The goal of this presentation is to demonstrate fresh and decomposed fetal maceration techniques, tooth bud dissection from jaws, and age assessment from a dissected specimen using published standards.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by creating a methodology for recognizing, harvesting, and reporting on crown and root growth for age assessment in fetal viability.

This presentation provides traditional and expedited instructions for processing fetal remains, especially the oro-facial elements, to perform assessment of dental age. Because of their rare occurrence, the discovery of fresh, decomposing, disfigured, or skeletal fetal remains engenders a heightened awareness by the forensic pathologist primarily concerned with age in relation to viability. With decomposed, mutilated, or isolated remains, the anthropologist can assess "human" or "non-human" and will focus on long bone measurements and other skeletal maturity indicators to help assess age. Crucial for the pathologist: "Is this fetus beyond the age of viability and how long will it take to obtain an age assessment?" Equal to sub-adult remains, dental development is the most precise means of age assessment in the fetal skeleton. Dental age assessment involves: (1) dissection and maceration of soft tissues, (2) recognition of craniofacial bones and partially mineralized crowns in decomposing remains, and (3) excision and preservation of tooth buds for metric analysis.

Twelve fetuses ranging in age from 18 to 39 weeks were dissected and macerated using low power dissecting microscopy, magnifying loops, and lenses for limb, torso, and head removal. Parts were placed in glass jars with distilled water that was changed monthly. There was no heat or chemical treatment, which can compromise the structural integrity of the initial fragile mineralized tissues. Sloughed-off soft tissue was removed during decomposition by pouring off the water through a 14- and 18-gauge sieve. Cartilaginous epiphyses enlarge and separate easily from the metaphyses. Skull bones gradually separate along fontanelles. Extraction and wet preservation of tooth buds may be performed anytime during the soft tissue sloughing process. The dentoenamel junction separates easily and particular care is required to identify and retain the dentin. Teasing the crown out of the follicle is easier earlier in the decomposition process prior to later expansion of the follicle. Later, tooth buds may slough off with gingival tissue making identification more challenging. Dissolving fetal soft tissues is best achieved in the distilled water solution with complete skeletalization of a fresh fetus in four months. Sunlight exposure did not appreciably increase decomposition time. Decomposed "wet" remains are easier to dissect compared to desiccated remains that require extensive and careful dissection. Desiccated jaws and tooth buds need hydration to enlarge and loosen from hydrated alveolar bone. While any alcohol solution should be avoided because of tissue distortion, formalin submersion of the tooth buds will enhance preservation, though may render the follicle more tenacious to dissect. Kraus and Jordan age-assessed the largest sample of fetal deciduous teeth and that standard is still valuable today.[1] Partial to completely mineralized crowns, especially molars, are well-correlated to gestational age. Regardless of the condition of the jaws, a dissecting microscope, magnifying loops, lenses, and a good light source are used in combination to allow the dentist to perform the oral autopsy in a timely manner to provide the forensic pathologist an estimation of age.

**Reference(s):**

1. Krause, B.S. and Jordan, R.E. *The Human Dentition Before Birth*, Philadelphia: Lea and Febinger, 1965.

**Fetal Viability, Dental Age, Decomposition**