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Standard for Skeletal Preparation and Sampling in Forensic Anthropology

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Standard for Skeletal Preparation and Sampling in Forensic Anthropology

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Foreword

This standard provides requirements for practitioners on sampling and preparation of skeletal remains for forensic analyses and curation. Continued research and scholarly debate are encouraged to improve skeletal preparation and sampling in forensic anthropology.

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This document was revised, prepared, and finalized as a standard by the Anthropology Consensus Body of the AAFS Standards Board. The draft of this standard was developed by the Anthropology Subcommittee of the Organization of Scientific Area Committees (OSAC) for Forensic Science.

Questions, comments, and suggestions for the improvement of this document can be sent to AAFS-ASB Secretariat, asb@aafs.org or 410 N 21st Street, Colorado Springs, CO 80904.

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Standard for Skeletal Preparation and Sampling in Forensic Anthropology

1 Scope

This standard provides requirements for documenting, preparing, sampling, and preserving skeletal remains for examination and curation. These requirements are used to prevent contamination, unnecessary destruction, and/or adverse alteration of the remains.

2 Normative References

There are no normative reference documents.

3 Terms and Definitions

For purposes of this document, the following definitions apply.

3.1
forensic anthropology laboratory
Any facility used in the analysis of human skeletal remains of medicolegal significance.

NOTE "laboratory" is used in this document instead.

3.2
entomological preparation
The removal of soft tissue from skeletal remains using carrion beetles (typically *Dermestes maculatus*).

3.3
maceration
The removal of soft tissue from skeletal remains through immersion in a liquid bath.

3.4
mechanical preparation
The removal of soft tissue and other materials from skeletal remains using mechanical force.

3.5
sampling
The selective removal of skeletal remains, or portions thereof, for testing.

3.6
skeletal preparation (processing)
The removal of soft tissue or other materials from skeletal remains through mechanical, maceration, or entomological means.

3.7
skeletal reconstruction
The reassociation of bone and tooth fragments that originated from the same skeletal portion.

3.8
skeletal remains
Osseous, cartilaginous, and/or dental tissues.

4 Requirements

4.1 General

4.1.1 To make skeletal remains and features more accessible for analyses, and to procure material that may have additional investigative value, it is sometimes necessary to prepare or sample skeletal remains or other tissues associated with skeletal remains.

4.1.2 The condition of the remains upon arrival at the laboratory and throughout the process of preparation and sampling (and any resulting alterations/damage) shall be documented.

4.1.3 Skeletal preparation and sampling shall be done in a manner that limits or prevents contamination, unnecessary destruction, or adverse alteration of the remains.

4.2 Procedure

4.2.1 General Requirements

4.2.1.1 All remains shall be handled with personal protective equipment to ensure the safety of the practitioner and limit contamination of the evidence and laboratory environment.

4.2.1.2 Photographic documentation shall be taken before and after any preparation or sampling of remains.

4.2.1.3 All applicable data collection procedures (e.g., visual examination, metric analyses) shall be completed before remains undergo sampling.

4.2.1.3.1 Sampling may be necessary before preparation dependent upon case circumstances.

4.2.1.4 The practitioner shall maintain close coordination and collaboration with the medicolegal authority, particularly for unexpected non-skeletal evidence (e.g., tattoos, finger or palm prints, projectiles) and destructive testing.

4.2.1.5 Deleterious practices to the conservation of skeletal evidence shall be avoided, including the indiscriminate use of chemicals that damage or destroy skeletal remains; excessive maceration; unnecessary alteration or destruction of skeletal remains; and unnecessary skeletal reconstruction or stabilization of skeletal remains (e.g., plastic-based, synthetic stabilizers).

4.2.1.6 Equipment and instruments used in preparation and sampling should be documented.

4.2.2 Skeletal Preparation

4.2.2.1 Medical imaging (e.g., radiography) shall be taken prior to skeletal preparation to detect or visualize objects such as foreign material as well as features related to development, variation, trauma, surgical intervention or pathological conditions, when possible.

4.2.2.2 Decisions regarding skeletal preparation method(s) shall include considerations of the condition of the remains, the types of analyses anticipated, and whether long-term curation is needed.

4.2.2.3 Engineering controls (e.g., drain strainers, trays/containers) shall be in place to prevent the loss of small skeletal remains or other evidentiary items.

4.2.2.4 When rinsing with water or dry brushing remains is not sufficient for visualization, there are three general approaches for effective skeletal preparation: mechanical, maceration, and/or entomological.

4.2.2.4.1 Mechanical preparation shall minimize the risk of alteration to the skeletal remains. Instruments such as scalpels or scissors should be utilized in a manner that mitigates damage.

4.2.2.4.2 Boiling temperatures (≥212°F/100°C) shall be avoided during maceration.

4.2.2.4.2.1 Immersion times and temperatures shall be monitored throughout the maceration process to maintain the integrity of the skeletal remains.

NOTE Chemical detergents and additives may be used to facilitate the breakdown of adhering soft tissues, degreasing, and protein degradation.

4.2.2.4.3 When conducting entomological preparation, exposure time to the dermestid colony shall be monitored to achieve denuded skeletal remains and to prevent damage and the loss of skeletal remains.

4.2.2.5 Disposition of soft tissue shall follow appropriate jurisdictional regulations (e.g., biohazard waste, medical cremation).

4.2.3 Sampling

4.2.3.1 Sampling shall be conducted with the permission of the relevant jurisdictional authority and with a specific investigative objective (e.g., DNA testing, stable isotope analysis, histology).

4.2.3.2 Samples shall be taken from regions of skeletal remains that are not analytically relevant (e.g., used to establish a biological profile, analyze trauma, or support a personal identification), when possible.

4.2.3.3 Equipment (e.g., new, disinfected, and/or sterilized) shall be employed to reduce and control contamination of the sample.

4.2.3.4 Resulting samples shall be treated according to laboratory evidentiary procedures or internal operating procedures (e.g., packaging to prevent loss, tampering, contamination, or deleterious change; labeling to include a unique case identifier; chain of custody).

4.3 Post Sampling and Preparation Considerations

4.3.1 If skeletal remains are labeled, labels shall be removable (e.g., utilizing a removable acrylic base coat when labeling using permanent ink).

4.3.2 Skeletal remains retained for extended periods of time should be labeled.

4.3.3 In the event that skeletal remains require reconstruction or stabilization, the process and materials used shall be documented and reversible.



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