



**NIST Interagency Report
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**Standards and Guidelines in Forensic
Odontology**

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Abstract

This report provides supplemental information to NISTIR 8352 **Bitemark Analysis: A *NIST Scientific Foundation Review***. Standards and guidelines from the American Dental Association (ADA) and the International Organization of Standardization (ISO) as well as efforts by the Organization of Scientific Area Committee (OSAC) for Forensic Science are described and listed. The standards and guidelines discussed in this document represent a snapshot of current practices for bitemark analysis.

Keywords

bitemark; forensic science; forensic odontology; standards; guidelines; pattern evidence; dentition; scientific foundation review.

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1. Introduction

The standards and guidelines discussed in this document represent a snapshot of current practices for bite mark analysis (suspected pattern injury(s) and patterns produced by human dentition). While it is acknowledged that adoption of these standards and guidelines are voluntary for practitioners, they demonstrate current recommendations for best practices in the field. Many of the standards are foundational in that they provide consistent terminology for identification and codification of the teeth, categorization of anomalies, etc. Efforts are underway to develop standards specific to suspected pattern injury (see section on *OSAC - Concepts Not Yet Drafted*).

Documentary standards are “(i) common and repeated use of rules, conditions, guidelines or characteristics for products or related processes and production methods, and related management systems practices; (ii) the definition of terms; classification of components; delineation of procedures; specification of dimensions, materials, performance, designs, or operations; measurement of quality and quantity in describing materials, processes, products, systems, services, or practices; test methods and sampling procedures; formats for information and communication exchange; or descriptions of fit and measurements of size or strength; and (iii) terminology, symbols, packaging, marking or labeling requirements as they apply to a product, process, or production method” ([OMB 2016](#), p. 15).

Voluntary consensus standards (VCS) are part of Federal law and policy and were coined into phrase in the National Technology Transfer and Advancement Act (NTTAA). The NTTAA directs federal agencies to adopt voluntary consensus standards wherever possible to avoid development of unique government standards and establishes reporting requirements for doing so ([NTTAA 1995](#)). A voluntary consensus standards development process uses openness, balance, due process, an appeals process, and consensus (see [ANSI 2022](#)).

The American Board of Forensic Odontologists Guidelines ([ABFO 2018](#)) has been revised many times. The process used to create these Guidelines is unknown. The procedures used to develop these guidelines are not publicly available. These guidelines have undergone several revisions over the years (apparently there were previous versions in, for example, 1986 and 1997, which are not archived on the ABFO website).

Organizations engaged in forensic odontology voluntary consensus standards development in the United States and internationally include the American Dental Association (ADA) and the International Organization of Standardization (ISO). Their activities and published standards are summarized below. In addition, the Organization of Scientific Area Committee (OSAC) for Forensic Science has a forensic odontology subcommittee with activities in this area.

2. International Organization for Standardization (ISO)

2.1. Technical Committee (TC) 106 Dental Informatics

TC 106 is focused on standardization in oral health care including:

- terms and definitions;

- performance, safety, and specification requirements of dental products; and
- clinically relevant laboratory test methods, all of which contribute to improved global health.

Standards relevant to forensic odontology are the terminology standards published out of the Subcommittee on Terminology (SC 3)

2.2. Published ISO Standards

- *ISO 1942:2020 Dentistry — Vocabulary*
- *ISO 3950:2016 Dentistry — Designation system for teeth and areas of the oral cavity*
- *ISO/TR 15300:2001 Dentistry — Application of OSI clinical codification to the classification and coding of dental products*
- *ISO/TR 15599:2002 Digital codification of dental laboratory procedures*
- *ISO/TR 15599:2002/COR 1:2003 Digital codification of dental laboratory procedures — Technical Corrigendum 1*
- *ISO 16059:2007 Dentistry — Required elements for codification used in data exchange*
- *ISO 16202-1:2019 Dentistry — Nomenclature of oral anomalies — Part 1: Code for the representation of oral anomalies*
- *ISO 16202-2:2019 Dentistry — Nomenclature of oral anomalies — Part 2: Developmental anomalies of teeth*
- *ISO 16443:2014 Dentistry — Vocabulary for dental implants systems and related procedure*
- *ISO 20888:2020 Dentistry — Vocabulary and designation system for forensic oro-dental data*

2.3. Standards in Development

- *ISO/AWI 5365 Dentistry — Designation system for tooth developmental stages*
- *ISO/CD 24395 Dentistry — Classification of tooth restorations*

3. The American Dental Association (ADA) Standards Committees

The ADA has two standards committees.

1) ADA Standards Committee on Dental Products (SCDP)

<https://www.ada.org/resources/practice/dental-standards/standards-committee-on-dental-products>

The ADA Standards Committee on Dental Products (SCDP) develops national standards for tools used in dentistry including dental materials, equipment, instruments, oral hygiene products, CAD/CAM. This committee is not applicable to bitemarks.

2) ADA Standard Committee on Dental Informatics (SCDI)

<https://www.ada.org/en/science-research/dental-standards/standards-committee-on-dental-informatics>

The scope of the committee is to develop informatics standards, specifications, technical reports, and guidelines and interact with other entities involved in the development of health informatics standards aimed at implementation across the dental profession.

The ADA is also the sponsor and secretariat of the United States Technical Advisory Group to ISO Technical Committee 106 Dentistry (U.S. TAG for ISO/TC 106). The ADA is an ANSI-accredited standard developing organization. ADA standards have been approved as American National Standards (ANS) by the American National Standards Institute (ANSI) and thus they are designated as ANSI/ADA Standards. The U.S. Technical Advisory Group (TAG) for ISO/TC 106 determines the U.S. vote on all dental standards and provides this input to ANSI for ISO/TC 106.

3.1. Published Standards

- *ANSI/ADA 1058-2020D for Forensic Dental Data Set* (on the OSAC Registry).
<https://ebusiness.ada.org/productcatalog/89182/Informatics/ADA1058-2010D>
The purpose of this standard is to develop uniform nomenclature for the description of forensic dental data and define a standardized set of uniform terms to convey this information. The goal of the standard is not to define the extent of information collected, only to be certain that common terms are used in order to aid in an identifying human remains or a living amnesiac.
- *ADA 1077-2020 Human Age Assessment by Dental Analysis* (on the OSAC Registry)
<https://www.nist.gov/document/ada-technical-report-no-1077july2020registry>
Forensic dental age assessment is the estimation of an individual's chronologic age through scientific evaluation of the dentition and maxillofacial structures. The goal of this technical report is to provide the best available current information and guidance for estimating age from the human dentition. It includes guidelines on how to obtain forensic dental data and the selection of recommended methodologies to establish accurate assessments of human chronologic age.
- *ADA 1088-2017D Human Identification by Comparative Dental Analysis* (on the OSAC Registry)
<https://ebusiness.ada.org/productcatalog/findproduct.aspx#q=1088&sort=relevancy>
The scope of this technical report is to develop a recommended set of guidelines for the process of identifying humans by comparative dental analysis. A goal of this technical report is to create awareness and education for dental practitioners on the forensic

odontology identification process as well as understand what information may be required should the need for them to participate occurs.

3.2. Standards in Development

- *Dentistry - Terminology for Forensic Oro-Dental Data*. The ADA has decided to do a U.S. adoption of the ISO standard (ISO 20888:2020) and plans to merge it into ADA 1058.
- *ANSI/NIST ITL-1: 2011 (Update 2015) Data Format for the Interchange of Fingerprint, Facial & Other Biometric Information (On the OSAC Registry)*
<https://www.nist.gov/organization-scientific-area-committees-forensic-science/osac-registry>

4. The Organization of Scientific Area Committees (OSAC) for Forensic Science

The Organization of Scientific Area Committees (OSAC) for Forensic Science has a group of volunteers working on developing draft text for initial standards proposals for forensic odontology standards.

OSAC Forensic Odontology Subcommittee - Standards Identified for Development
<https://www.nist.gov/osac/forensic-odontology-subcommittee>

Work items list on the OSAC Work Products Tracker for Forensic Odontology Subcommittee.
<https://www.nist.gov/document/osac-work-products-trackermay-2022> (accessed July 5, 2022)

4.1. Standards in Development

- *OSAC 2021-N-0030, Terminology for a Suspected Pattern of Dental Origin*.
<https://www.nist.gov/document/osac-2021-n-0030-terminology-suspected-pattern-dental-origin-osac-proposed-standard-registry>
This document has been drafted and will be sent to the American Dental Association Dental Informatics Committee once reviewed and approved within OSAC.
- *Proposed Guidelines and Best Practices for Human Abuse Recognition by Dental Professionals*. This document has been drafted and will be sent to the American Dental Association Dental Informatics Committee once reviewed and approved within OSAC.
- *Best Practices for the Analysis, Comparison and Reporting of Suspected Pattern Injury(s) and Patterns Produced by the Human Dentition - Part 1: Terminology (Terminology for a Suspected Pattern of Dental Origin)*. The drafting committee has been formed and the document started.

4.2. Concepts Not Yet Drafted

- *Educational Requirements for Forensic Odontology.*
- *Best Practices for the Analysis, Comparison and Reporting of Suspected Pattern Injury(s) and Patterns Produced by the Human Dentition - Part 2: Recording and Collection of Pattern Evidence.*
- *Best Practices for the Analysis, Comparison and Reporting of Suspected Pattern Injury(s) and Patterns Produced by the Human Dentition - Part 3: Pattern Analysis.* Pending initiation of Part 2
- *Best Practices for the Analysis, Comparison and Reporting of Suspected Pattern Injury(s) and Patterns Produced by the Human Dentition - Part 4: Comparison Methodology and Interpretation.*
- *Best Practices for the Analysis, Comparison and Reporting of Suspected Pattern Injury(s) and Patterns Produced by the Human Dentition - Part 5: Reporting.*
- *Standard for a Quality Assurance Program in Forensic Odontology.*
- *Guidelines for Opinions and Testimony in Forensic Odontology.*

5. References Cited

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[ANSI 2022] American National Standards Institute. ANSI Essential Requirements. Available at <https://www.ansi.org/american-national-standards/ans-introduction/essential-requirements> (accessed July 5, 2022).

[NTTAA 1995] National Technology Transfer and Advancement Act of 1995. Available at <https://www.nist.gov/standardsgov/national-technology-transfer-and-advancement-act-1995> and <https://www.govinfo.gov/content/pkg/PLAW-104publ113/pdf/PLAW-104publ113.pdf> (accessed July 5, 2022).

[OMB 2016] Executive Office of the President. Office of Management and Budget OMB Circular A-119: Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities. Final Revision, January 27, 2016. Available at https://www.whitehouse.gov/wp-content/uploads/2020/07/revised_circular_a-119_as_of_1_22.pdf (accessed July 5, 2022).