F12 Restored Interproximal Surfaces in Dental Identification

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After attending this presentation, attendees will understand scientific methods of human identification; know why teeth can be used to identify human decedents; and complete unique dental identifications based solely on the comparison of restored interproximal surfaces.

This presentation will impact the forensic community and/or humanity by serving to verify the certainty of dental identifications based on the comparison of restored dental interproximal surfaces.

The mainstay of forensic dental identification is the comparison of antemortem and postmortem radiographs. But in some cases, an individual's antemortem dental record may lack some or all radiographs, which presents a challenge to identification efforts. In a mass disaster situation, an urgency to make forensic identifications quickly is also present. As the number of points of concordance necessary to make a positive dental identification is not a static number, the strength of identification is typically based on the subjective opinion of an odontologist. Developing techniques to expand capabilities in these situations are important. Attempts to individualize based on the quantifiable patterns created by missing, filled, and/or restored teeth are one area that has been explored. Statistical research conducted separately by Sognnaes (1975) and Keiser-Nielson (1980) looked at the diversity of dental patterns while assessing each unique dental characteristic indepen- dently. The observed dental pattern would be broken down by individual characteristics (e.g., three missing teeth and five restored teeth) that were calculated independently and then multiplied together providing the final figure of possible combinations. The problem with this approach is that dental treatment does not occur randomly throughout the mouth therefore; possible dental patterns are not equally probable in occurrence. Although theoretically possible, the likelihood of observing some of the dental patterns in a population is very small (e.g., every tooth having a restoration). This makes the theoretically derived figures misleading which is problematic in a forensic context. Adams (2003) improved on this with a method of *empirical* comparison that derived frequency information from the occurrence of missing, filled, and unrestored teeth (excluding third molars) as detailed in written treatment records and/or charts from two large reference datasets. This research was able to validate the use of individualistic dental patterns derived from nonradiographic records as an aid to forensic identification.

This research presents the results of a study that attempted to individ- ualize based only on bitewing visible interproximal restored surfaces from a reference dataset. The 11 interproximal surfaces commonly detailed on a bitewing radiograph were assessed simply for the presence or absence of a visible restored surface and assigned a score. This relatively objective analysis could be quickly performed. Individuals with no interproximal restored surfaces were not included in the dataset. Based on the results of this study, individualization based solely on bitewing visible interproximal restorations was validated.

This study is the first leg in a series of investigations that should lead to the automation of collection of dental data from antemortem radiographs. It should be possible to input dental bitewing radiographs into a specially designed scanner and have as output information about the individual's interproximal dental status that will be sufficient to make a positive dental identification. This technology should speed up the identification process in mass disaster and large casualty terrorist attacks. This technology may also prove useful in developing and maintaining a nationwide database of dental interproximal data for use in identifying missing persons and unidentified human remains.

Dental, Human Identification, Interproximal

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