G48 The Use of Dental Patterns in Decedent Identification: The Role of the New and Improved OdontoSearch 3.0 Program

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After attending this presentation, attendees will be informed regarding the use of the OdontoSearch 3.0 program in dental identification. Instructions on the use of the program will be provided as well as information about the reference data. Case examples will be used to highlight how the OdontoSearch program can be used in the field of forensic odontology. The OdontoSearch 3.0 program provides an easy-to-use interface and customizable searches that will assist forensic odontologists in their casework

This presentation will impact the forensic science community by introducing a new version of the OdontoSearch program. In addition, this presentation will demonstrate how to utilize the frequency of occurrence for dental restorations in combination with concurring contextual evidence to identify a decedent in the absence of antemortem radiographs.

Dental identification via comparison of antemortem and postmortem X-rays is a well-accepted and reliable method of decedent identification. In some cases, antemortem dental X-rays may not be available, but treatment records may contain notes and diagrams that can still be used for comparison. The problem with dental treatment charts and notes is that, unlike X-rays, the information cannot be shown to be exclusively correlated with a specific individual (i.e., numerous people may have the same teeth filled or extracted). In the past, the strength of a match between a missing person's dental treatment records and the treatments observed on an unidentified set of remains was based on the clinical experience of the dentist. This interpretation is subjective because different dentists may arrive at very different conclusions even though they are considering the same records.

The original OdontoSearch computer program was developed to provide an objective means of assessing the frequency of occurrence for dental treatment.[1] OdontoSearch 3.0 is an update of this online program that provides immediate frequency results and adds additional features. The statistical values provided by OdontoSearch provide forensic odontologists with an objective means of quantifying the relative frequency with which a sequence of dental characteristics would be expected to occur in the general population. The program works by coding the condition of the individual teeth (missing, filled, or unrestored) using a graphical odontogram interface to create an overall dental pattern (i.e., the dental pattern is created by forming a sequence with the tooth codes). The resulting pattern is then compared to a large, representative sample of the United States population to determine the pattern frequency within the population. The methodology and rationale behind the OdontoSearch program is very similar to the statistical procedures that have been established for mitochondrial DNA profile comparisons. Use of the original OdontoSearch program confirmed that there was a large amount of diversity in the dental pattern sequences created by missing, filled, and unrestored teeth, and the updated program has expanded the database size by more than 50%.[2]

With the OdontoSearch 3.0 program, uncommon dental patterns can be recognized as such, and a frequency value can be associated with specific patterns. In many instances, these results may be counterintuitive because the presence of only a few common fillings may still create a very rare dental pattern when all of the teeth are considered as a whole sequence. The OdontoSearch results may be used along with other analytical information (e.g., skeletal analysis, personal effects, and geographic area) to build a convincing case for identification of a specific individual.

The new version of OdontoSearch (version 3.0) is now available at a new web address (www.odontosearch.com). OdontoSearch 3.0 includes numerous improvements and updates from earlier versions of the program. These include: (1) an improved user-interface that presents an odontogram and allows for easier data entry; (2) new reference data from the National Health and Nutrition Examination Survey (NHANES); (3) expansion of the age parameters in the reference data to include individuals between the ages of 14 years and 90 years old; (4) a reference dataset of 57,980 individuals; and, (5) customizable searches so the user can select different parameters for age, sex, and ancestry. For example, if the user was only interested in observing the frequency of a specific dental pattern in Caucasian males between 30 years and 60 years of age, the OdontoSearch 3.0 program would be able to provide these results.

Reference(s):

1. Adams B.J. Establishing personal identification based on specific patterns of missing, filled, and unrestored teeth. *J Forensic Sci*. 2003 48(3):487-96.
2. Adams B.J. The diversity of adult dental patterns in the United States and the implications for personal identification. *J Forensic Sci*. 2003. 48(3):497-503.

OdontoSearch, Forensic Odontology, Dental Identification

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