

Self-Assessment of the Forensic Value of Dental Records

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ABSTRACT: One of the most important aspects of a person's dental record may well prove to be its potential value should the forensic dental identification of their remains become necessary. The better the quality of the antemortem dental records, the easier and faster the identification of the remains will be. The forensic dentist must be able to select identifying features by decoding the deceased's antemortem dental records. A study was conducted on two groups of dentists who were asked to self-assess the forensic dental value of the dental records maintained in their own practices. The three most frequently recorded identifying dental features, other than caries and restorations, were the presence of diastemas, displaced or rotated teeth, and dental anomalies. Surveyed dentists imbedded identifying information into the removable prosthetic devices fabricated for their patients an average of only 64% of the time. Only 56% of the two groups combined felt that their dental chartings and written records would be extremely useful in dental identifications. It is concluded that the quality of antemortem dental records available for comparison to postmortem remains varies from inadequate to extremely useful. Practicing dentists can become valuable members of the dental identification process by developing and maintaining standards of record keeping which would be valuable in restoring their patients' identity.

KEYWORDS: forensic science, forensic odontology, forensic dentistry, human identification, forensic dental records

One of the most important aspects of a person's dental record may well prove to be its potential value should the forensic dental identification of their remains become necessary. The general public's perception that forensic dentistry deals primarily with the dental identification of human remains is hardly surprising since it has become an almost daily occurrence to read or watch news reports of deadly natural disasters, accidents, bombings, homicides, or other incidents resulting in tragic bodily injuries to humans. Quite frequently in the news reports, it is mentioned that the injuries to the victims were so severe that the dental identification of the victims was necessary since the bodies were damaged beyond identification through other means. The victims of such incidents are often reported as having been partially or completely fragmented, incinerated, or decomposed. News reports also frequently relate the

discovery of human skeletal remains that the authorities will attempt to identify through dental records. It is no wonder then, that the use of dental records is a widely known method for identification of human remains. Obviously, the better the quality of the antemortem dental records, the easier and faster the identification of the remains will be (1). The quality of the dental records available for comparison to the postmortem remains of an individual varies from the extremes of non-existent to inadequate to archival quality. The forensic dentist must be able to select identifying features by decoding the deceased's antemortem dental records. Identifying features may include missing teeth, broken or chipped teeth, displaced or rotated teeth, diastemas, extent of shoveling of the maxillary incisors, presence and angulation of impacted teeth, intrinsic staining, occupational or habit-created wear facets, restorations, caries, prosthodontic appliances, bone level, and dental anomalies present. While antemortem radiographs are invaluable in most identification situations, not all identifying features are clearly visible on a two-dimensional radiograph. For example, intrinsic staining, such as fluorosis, commonly observed in some geographic areas using well-water, is not observable on a radiograph. Wear facets are not readily discernible when they exist on tooth surfaces other than the occlusal portion. Unusual groove patterns of teeth are also not visible on radiographs. A thorough dental charting and written notes of the morphology present, as well as appropriate radiographs, are necessary for a complete set of antemortem dental records. Since the general public appears well informed as to the potential value of dental records in the identification of human remains, it seems logical to infer that the dentists involved in the making and maintaining of those records should be equally or more cognizant of the importance of the information contained in the dental records used in their own offices. A study was developed to ascertain whether this inference proves valid.

Methods

A questionnaire was designed to allow the participating dentists to self-assess the forensic value of the dental records maintained in their own practices. The questionnaires were distributed at two different local dental society's monthly meetings, only one of which included a presentation on Forensic Dentistry prior to administering the survey. The questionnaires were administered to the first group of dentists attending the monthly meeting of a small local dental society, immediately following an hour long presentation on Forensic Dentistry which included multiple case presentations. Fourteen dentists were present at the local dental meeting, and all participated in the study, leading to a response rate of 100%. The second group of dentists to be surveyed were attending another society's monthly meeting that included no presentation on Forensic Dentistry. The surveys were picked up by the participants at the

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meeting and they were instructed to return them to the table or mail them in the pre-addressed envelope provided. Seventy-two of the 150 surveys picked up were returned, for a response rate of 48%. Both study groups were similar in range of age, gender, and dental practice status, with the only variable between the two groups being the presentation or non-presentation of a Forensic Dentistry program prior to completion of the survey.

The first item on the questionnaire requested that the respondent indicate which of the following identifying dental features they routinely include in dental chartings or written notes: displaced or rotated teeth, diastemas, intrinsically stained teeth, amalgam tattoos, wear facets on individual teeth, and dental anomalies. The dentists were next asked to self-assess the quality of their dental records if these were the only means of forensically identifying human remains. The response choices were: extremely useful, moderately useful, slightly useful, and not useful. The third item on the questionnaire asked the dentist if they currently had a dental record on themselves which they believe would be sufficient to positively identify their own remains, if the need arose. The fourth item asked the dentist if he/she currently had available dental records which they believe would be sufficient to positively identify the remains of all immediate family members. The final questionnaire item pertained to the incorporation of identifying strips into the acrylic of dentures and partials they provide to their patients.

Results

Demographic information supplied by the dentists who participated in the study indicated that their years of graduation from dental school ranged from 1949 to 1994, 17% of the respondents were females who ranged from 29 to 59 years of age, and the other 83% of the respondents were males ranging in age from 35 to 70 years old. Most of the participants were general dentists, with the exceptions of one pedodontist, three orthodontists and five periodontists.

When asked to indicate which of six identifying dental features (other than caries and restorations) they included as part of their dental chartings or written notes on a routine basis, the top three responses were: the presence of diastemas (group 1 = 79%; group 2 = 89%), displaced or rotated teeth (group 1 = 71%; group 2 = 89%), and dental anomalies (group 1 = 71%; group 2 = 84%). Figure 1 illustrates the percentage of the respondents who include each of the dental identifying features in their dental records.

The survey produced disheartening information that the participating dentists imbedded identifying information into the removable prosthetic devices fabricated for their patients only 64% of the time in group 1, and 66% of the time according to group 2. Fifty percent of group 1 and 55% of group 2 imbedded the patient names



FIG. 2—Charred remains of a maxillary denture worn by the victim of an automobile fire. Note that the burn pattern of the denture approximates that of the burn pattern of natural dentition, with the anterior less protected areas burned more severely than the posterior or internal areas. The white strip covers the area where the patient's first and last names had been imbedded into the acrylic.

only, while an additional 14% of group 1 and 11% of group 2 used the more highly recommended technique of imbedding both the name and the social security number of the wearer (2). An alarming 36% of the respondents in group 1 and 34% in group 2 used no identifying marks at all in their removable prosthetic devices, although the techniques available are simple and inexpensive. Figure 2 is a photograph depicting the maxillary denture of an automobile-fire victim who was burned beyond recognition. The white strip seen in the photo is placed on top of the actual imbedded information in order to protect the privacy of the family involved. The individual was edentulous on the maxillary arch and had few teeth remaining on the mandibular arch. While the fractured and partially cremated mandible and mandibular teeth were still able to assist in the deceased's identification, it was reassuring to have the presence of the identifying strip in the denture's palatal area to add to the dental evidence.

The majority (57%) of the dentists in group 1 self-assessed the dental records in their practices to be only moderately useful if they were the only means of identifying their patients through forensic dental identification, whereas group 2 estimated their worth higher with 69% assessing their records would be extremely useful. Only 29% of group 1 felt that their dental chartings and written records would be extremely useful in dental identifications (Fig. 3). The major difference between the responses of the two groups was in their responses to this particular item. One reasonable explanation could be that since group 1 had just been shown multiple identification cases which were hindered by lack of appropriate ante-mortem dental records, they were more acutely aware of how valuable, or not valuable, their dental records would be if used during a dental identification.

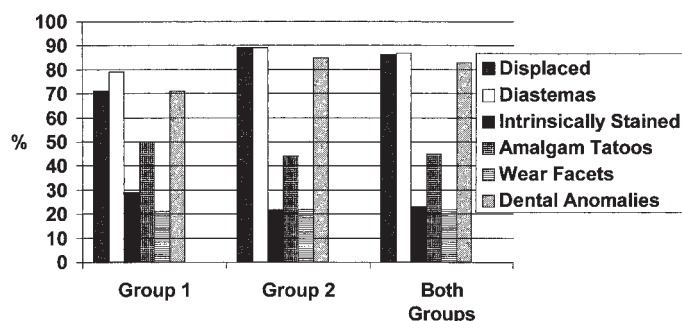


FIG. 1—Percentage of the respondents who include each of the dental identifying features in their dental records.

A surprisingly high number from each group indicated that they had no available dental records on either their immediate family members or themselves (Figs. 4 and 5). In the general discussion after the survey with group 1, the dentists with no previous dental records appeared motivated by the presentation to assemble forensic quality dental records on their families as soon as possible.

One of the forensic cases presented to group 1 is seen in Fig. 6, which is a photograph of a mandible that remains unidentified several years after the discovery of a group of bones in a marshy coastal region. As can be seen in a close-up of the occlusal view of the mandible's right side, there are no dental restorations present (Fig. 7). Therefore, if these skeletal remains were to be identified, it would have to be through the notation of other dental identifying

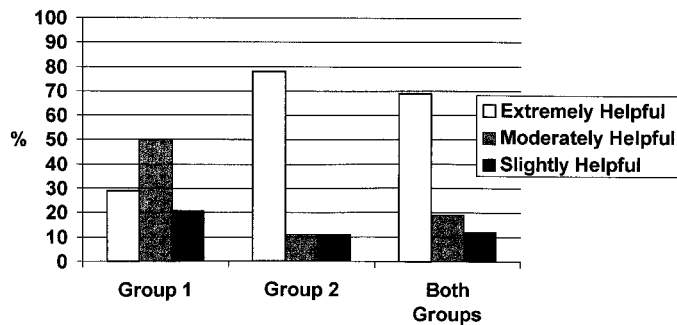


FIG. 3—Results of the respondents' self-assessment of the potential forensic value of the dental records in their practices.

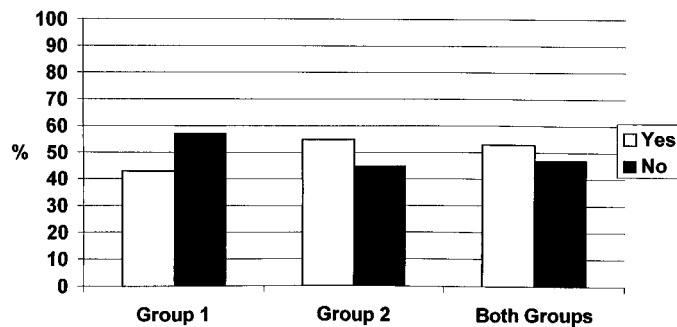


FIG. 4—Percentage of respondents indicating that dental records were currently available for themselves, should the need for their identification become necessary.

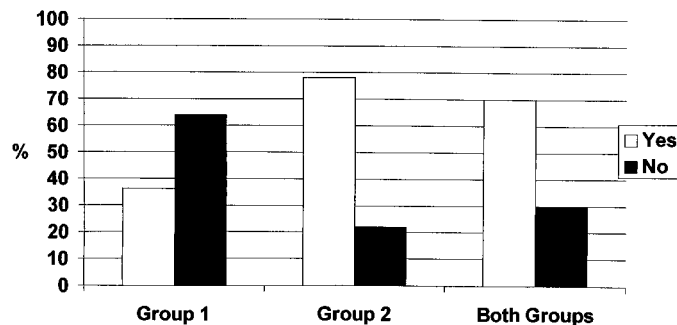


FIG. 5—Percentage of respondents indicating that dental records were currently available for immediate family members, should the need for their identification become necessary.



FIG. 6—This mandible was found in a grouping of skeletal remains in a wet, marshy area near the coast several years ago. Most of the anterior teeth were avulsed after death, as attested to by the unhealed sockets. Most noticeable is the absence of dental restorations to assist in the antemortem and postmortem records comparisons.



FIG. 7—This close-up view of the right side of the mandible shows the presence of wear facets, pitting of the occlusal surface, and a lingually displaced second premolar. All of these identifying features could prove helpful in the identification of these skeletal remains, if they were included in antemortem dental records.

features. Inspection of the right canine through the third molar shows evidence of wear facets on the distal portion of the incisal arm of the canine, as well as flattening of the molar buccal cusps, and pitting of the occlusal surfaces of the first molar. It is also noticeable that the lower right second premolar is slightly displaced to the lingual in relation to the first premolar and the first molar. None of the antemortem records presented for comparison had made notes of these features in their dental chartings or written notes, and the panoramic radiographs were not very clear. Unfortunately, this case remains unidentified to this day.

Discussion

Every individual deserves the dignity of having a name and an identity, even after death. In the world we live in today there are

many ways in which we may perish without the possibility of having our remains identified through visual means or fingerprint comparison. Although medical examiner's now have DNA analysis or "fingerprinting" available to them, the expertise of a forensic odontologist is frequently sought after for several reasons. Dental identifications can be completed within a matter of a few days, rather than the weeks and higher expense it may take with DNA analysis. The rapid positive identification of human remains is necessary not only for the sake of the deceased's family's grieving process, but also for the issuance of a death certificate which is legally necessary for the processing of the deceased's financial matters. Additionally, the successful investigation of criminal cases is often dependent upon the identification of the victim, particularly if family members or acquaintances are suspected of the crime. In the forensic dental identification process, the forensic odontologist is dependent upon the availability of quality dental records from the deceased's dentists. The more complete and accurate the dental records are, the sooner the deceased can regain his or her name and be properly laid to rest. Practicing dentists can become valuable

members of the dental identification process by developing and maintaining standards of record keeping which will be valuable to their patients' dental health, and should it become sadly necessary, in restoring their identity.

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