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The importance of increasing the forensic relevance of oral health records for improved human identification outcomes

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THE IMPORTANCE OF INCREASING THE FORENSIC RELEVANCE OF ORAL HEALTH RECORDS FOR IMPROVED HUMAN IDENTIFICATION OUTCOMES

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ABSTRACT

Purpose: Dental comparison can confirm human identity to a high degree of certainty. Research examining Australian-made records demonstrated suboptimal recording of dental traits important for forensic dental identification and compliance with Dental Board of Australia (DBA) record keeping guidelines¹. This is a significant issue for human identification by dental comparison; lack of adequate antemortem information can hinder or obstruct outcomes.

Methods: Reported identification opinions from Forensic Odontology Unit of South Australia (FOU-SA) during 2011-2015 were assessed to determine whether the quantitative and qualitative value of antemortem records affected the ultimate identification outcome.

Results: Identity was established in 79% (n=197) of the 249 cases presented to FOU-SA; odontology was unable to categorically confirm an individual's identity for the remaining 21%. Dental records of almost all cases demonstrated a lack of antemortem data for comparison.

Conclusion: Inadequate antemortem information within dental records may preclude identity determination; at minimum, an outcome is hindered by a greater number of issues requiring reconciliation. Given previous results regarding adherence to DBA guidelines, practitioners should reasonably be expected to make small recording changes to improve the continuity of clinical patient care. This antemortem recording improvement will potentially improve the rate at which a forensic identification is reconciled.

Keywords: forensic; dental; identification; outcomes; records

Word count: 2864

INTRODUCTION

According to the Dental Board of Australia's 2010 guidelines on dental record keeping, case notes are made 'to serve the best interest of patients...and contribute to the safety and continuity of their dental care'².

A dental record or case note should provide comprehensive evidence of the history of illness, examination, clinical diagnoses, treatment and management of a patient by an oral health practitioner. Case notes often consist of a written or electronic account made by the treating health provider about patient visits and the treatment that occurred, along with important patient details, diagnostic aids such as radiographs, dental casts, extra-oral and intra-oral photographs, laboratory forms and referrals.

These very same dental records made during an individual's lifetime of dental care can be an excellent source of information comparable to an unknown deceased. In fact, the use of dental records in forensic identification situations has long been documented^{3,4}.

As teeth are composed of extremely resilient tissues, they are often the last remaining indication of a person's identity after death. By compiling all available antemortem dental information about an individual and comparing it to a postmortem data set, a conclusion can be drawn as to a matching (or mis-matching) of two identities⁵.

However, the ability to form any such conclusion rests with adequate and accurate information regarding the antemortem status of an individual's orofacial features being available. Forensic dental identification requires that *any* discrepancy between consolidated antemortem records and the available postmortem data be reconciled, even if the detail is minor and unlikely to affect the conclusion. As such, detailed and up-to-date records will provide the most-timely dental identification in the majority of circumstances.

Different classification criteria are used worldwide to describe the certainty in the reconciliation and consequent identification process relating to antemortem and postmortem dental records⁶⁻⁸. In South Australia, the identification categories currently used when reporting a dental identification opinion to the Coroner are those specified by Interpol⁹ (Table 1).

This study aimed to highlight cases within the period 2011-2015 where a lack of adequate antemortem information in dental records hindered or entirely obstructed forensic identification outcomes reported to the Coroner by the Forensic Odontology Unit of South Australia (FOU-SA).

METHODS

Reported outcomes for dental identification requests made to the FOU-SA during the period 2011-2015 were assessed via annual case log records and review of individual case files.

Whilst identification outcomes were mainly classified as per the Interpol Disaster Victim Identification Guide, 2009 (Table 1), an additional category of 'Not progressed' was also required to demonstrate cases where the FOU-SA was originally recruited for opinion but was then directed to withdraw from the case because the individual had been identified using alternate methods, such as finger prints.

For each case within the period 2011-2015, departmental reports issued to the Coroner were reviewed for their terminology related to the quality and quantity of existing antemortem records of the individual. In particular, the incidence of the use of the phrase 'lack of antemortem data' was determined.

The percentage of cases where the lack of existing antemortem dental data actually inhibited the individual's identity from being established was determined.

RESULTS

In the five-year period 2011-2015, the FOU-SA received 262 requests for identification via comparison of antemortem and postmortem dental data. Thirteen of these cases (5%) were commenced but not completed, as the individual was identified by other means (eg. fingerprints, DNA).

In 197 cases (79%), the available data for comparison allowed the identity of the individual to be established. In a forensic dental identification, this is the best possible outcome for the deceased individual and their family, as it provides the Coroner with definitive information with which to finalise the case and release the body for burial.

Twenty cases (8%) were deemed 'probable' identifications; 18 cases (7%) were determined to be 'possible' identifications; 14 cases (6%) had 'insufficient' evidence to provide an opinion; and no cases (0%) were 'excluded' from identification. All 52 of the cases that were not identified to a level of 'established' were reported to the Coroner as featuring a 'lack of antemortem data' for comparison to postmortem examination results. This meant that dental comparison was not able to identify the individual with absolute certainty to the Coroner.

These outcomes are summarised in Table 2.

DISCUSSION

Dental records are created expressly to assist with the continuity of clinical dental care for an individual during their lifetime. In fact, maintaining accurate and complete dental case notes is an oral health practitioner's ethical and legal obligation¹⁰. In Australia, all oral health care workers must produce and manage patient case notes in line with professional guidelines and laws¹¹⁻¹⁵.

As an approved registration standard for a health profession and a code approved by a National Board, record keeping guidelines are admissible in proceedings under the Health Practitioner Regulation National Law (South Australia) Act 2010; they can be used against a health practitioner registered by the Board as evidence of what constitutes appropriate professional conduct¹⁵.

Failure to comply with professional record keeping guidelines may not only lead to suboptimal continuity of patient care, it can also leave practitioners open to indefensible litigation actions.

Whilst the Australian Health Practitioner Regulation Agency and the Board regulate practices related to *clinical use* of dental records at a national level, practitioners should also be aware of the influence of their relevant state's Coroner's Act, as well as the Commonwealth Privacy Act (Commonwealth of Australia, 1988), on compliance to requirements^{16,17}. It is of particular relevance in the Privacy Act that authorities can request the use and release, by dentists and other oral health workers, of personal information (including dental records) for *forensic* services, even though this was not their original intended use.

This research hence assessed the value of dental records, originally prepared for clinical practice, in assisting an optimal and timely outcome for forensic identification.

A large proportion (79%) of cases that were brought to the attention of the FOU-SA in the five year period of assessment were finalised at the highest degree of forensic identification ie 'established'. It should, however, be noted that even though the identity of each individual was established, the case reports written to the Coroner commonly featured the phrase 'lack of antemortem data' with regard to the dental records. In these cases, odontologists clearly perceived a decreased quality or quantity of dental records related to the individual. Whilst this lack of data did not inhibit an optimal outcome it is likely that the reduced quality or quantity of the records complicated or slowed the rate of finalisation of these case, simply because a greater number of issues needed to be reconciled.

For the 52 cases (21%) that were reported to the Coroner at an identification level below that of 'established', the lack of antemortem data contained within the records for the individual was inadequate for an optimal dental identification. In these cases, the lack of antemortem information meant that a dental identification could not definitively be made. As a professional group, it is for these individuals that we particularly need to improve dental record keeping processes.

The following three cases highlight real instances where dental records failed to provide reasonable information that could have established the identity of an individual.

Case 1

This case was a routine identification for which the postmortem dental examination progressed unremarkably. Following the postmortem examination, all available antemortem dental information was compiled for reconciliation of the two data sets.

A review of the available antemortem data highlighted that the records did not contain any dental charting (complete nor incomplete) and despite written documentation that the deceased's impacted third molars had been removed, no panoramic radiograph was present. Odontologists deemed it reasonable to expect that these sources of information should have been available in the antemortem dental records.

Additionally at the postmortem examination, odontologists documented that the deceased presented with symmetrical 'accessory cusps' on both lower first molars. No information regarding the accessory cusps had been documented in the antemortem records. Whilst odontologists did not deem it reasonable to expect that such anatomical variant information be present in dental records that were constructed for clinical purposes, it would have been particularly useful for the forensic identification. Such a situation highlighted how useful dental casts (perhaps taken for orthodontic purposes or mouthguard construction) may prove in a forensic identification.

MAIN DOCUMENT WITH FULL AUTHOR DETAILS AND AFFILIATIONS

Given the lack of antemortem data contained within the dental records for the individual, FOU-SA documented a conclusion of ‘probable’ in the report to the Coroner ie. specific characteristics corresponded between the records but the antemortem data was minimal. In this case the Coroner needed to seek evidence beyond the dental opinion to irrefutably determine the individual’s identity.

Case 2

This case was another routine identification for which odontologists from the unit performed a postmortem dental examination. Again this progressed unremarkably. Following the postmortem examination, all available antemortem dental information was compiled for reconciliation of the two data sets.

The available antemortem records contained only one radiograph – a periapical view of the lower right second premolar – despite documentation that most of the patient’s teeth had been extracted. Written antemortem dental records also indicated that a panoramic radiograph had been taken of the patient but this radiographic view was not provided in the information that was received by FOU-SA. In these instances, odontologists deemed it reasonable to expect that the radiographs should have been available in the antemortem dental records.

Interestingly, the deceased also had upper and lower removable dentures situated in the mouth at the postmortem examination phase. These were not labelled with a personal identifier, such as the deceased’s name or an individualised barcode. Patients and clinical professionals remain divided as to whether denture labelling is an appropriate use of time and money but amongst forensic odontology circles, it remains an important identifier¹⁸⁻²⁰. In this case, it can categorically be stated that should both the compiled antemortem and postmortem records have contained information that the dentures were labelled with an identifier, the forensic identification outcome would have been different. Here, the ‘possible’ outcome that was provided to the Coroner may easily have been elevated to an established identification.

Case 3

Again, the case was routine and the postmortem examination progressed unremarkably. The deceased victim was a very young adult, with limited obvious dental treatment. Following the postmortem examination, all available antemortem dental information was compiled for reconciliation of the two data sets.

Predictably because the deceased had sound dental health, there was limited antemortem information available for reconciliation. However, he had a notable dental trait in his upper anterior region at the postmortem examination – a 1.5mm diastema between 11 and 21. Given the prominence of the trait, odontologists deemed it reasonable to expect that the information should have been available in the antemortem dental records. In fact, school-based dental records noted that the diastema was present in the deciduous dentition for the individual but there was no mention of it in the permanent dentition. Additionally, no antemortem photographs were available to FOU-SA for comparison. Consequently, the identification advised to the Coroner for this case was ‘probable’, with some specific characteristics existing between the records but with limited antemortem data available for reconciliation. Had antemortem records actually documented the presence of this diastema, it is possible that a more definitive identification outcome could have been provided to the Coroner.

In addition to highlighting obvious areas for improvement in record keeping in relation to forensic identification, the current review also highlighted that some consideration should be given to changes to the reporting phrase ‘lack of antemortem data’ in forensic odontology reports. Clearer reporting would make it more obvious as to the true impact of dental case note recording on identification outcomes. In particular, it might be prudent to distinguish the following:

- a. ‘Lack of antemortem information’ being that where limited or no antemortem information is available to the forensic odontologist. Such instances might include the inability of relevant authorities to source dental records: can’t locate where the individual went to the dentist; the person never actually went to a dentist; or the dental records have been shredded/disposed of by the dentist.
- b. ‘Inadequate antemortem information’ being that which comprises incorrect or incomplete information. Information that is not present but that a sensible clinical dentist or forensic odontologist would reasonably expect to be available within dental records would fall into this category. One example of this would be a case note saying that a radiograph was taken on a particular date that is not contained in the

dental records at the time of examination. Another example would be an expectation that a completed odontogram be present in the dental case notes if the patient has been charged for a comprehensive examination.

If these changes to the reporting phrase were made, by far the most commonly used one throughout the 2011-2015 period at the FOU of South Australia would have been 'inadequate antemortem information', highlighting that clear improvement is needed in case note recording in order to expedite forensic dental identification.

CONCLUSION

It has been shown that optimal forensic dental identification outcomes *can* be achieved despite a lack of antemortem case note detail for comparison to a postmortem examination. However, this is not always the case.

Professional education is suggested in order to improve the dental recording practices of oral health care workers. In particular, this education should highlight the need for simple but adequate detail and accuracy in record keeping, with consideration to the realistic time-restraints of busy practice. Whilst this will be with the aim to improve the outcome of those few individuals' whose dental records are not sufficient to definitively identify them after death, it will also assist in a more timely and valid (easily explainable) dental identification outcome for all those requiring it.

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APPENDICES

Identification category	
Established	Absolute certainty that the antemortem and postmortem records are from the same person.
Probable	Specific characteristics correspond between the records but either antemortem data or postmortem data or both are minimal.
Possible	There is nothing to exclude identity but either the antemortem data or postmortem data or both are minimal.
Insufficient	No comparison can be made with the data available.
Excluded	Antemortem and postmortem records are from different persons.

Table 1. Deceased individual identification categories utilised in South Australia, as per the Interpol Disaster Victim Identification Guide, 2009.

Year	Total cases	Identification outcome					
		Established	Probable	Possible	Insufficient evidence	Exclude	Not progressed
2011-2012	73	52 (71%)	8 (11%)	2 (3%)	7 (10%)	0 (0%)	4 (6%)
2013	76	57 (75%)	6 (8%)	7 (9%)	3 (4%)	0 (0%)	3 (4%)
2014	62	47 (76%)	6 (10%)	2 (3%)	2 (3%)	0 (0%)	5 (8%)
2015	51	41 (80%)	0 (0%)	7 (14%)	2 (4%)	0 (0%)	1 (2%)

Table 2. Identification case outcomes for FOU-SA in the five-year period 2011-2015.

