Role of forensic odontology in disaster victim identification in the Indian context

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ABSTRACT

Proper identification of the dead in disasters is an essential component of ensuring closure to surviving family, while also addressing legal issues pertaining to insurance and inheritance claims. The use of the dentition is considered integral to the process and methods of identification, and is standard procedure around the world. However it is seldom applied in the Indian context, which still relies more on unscientific methods such as visual identification and personal property. The Disaster Management Act of 2005 also has no reference to the use of scientific methods of post-mortem identification. This is reflected in several recent disasters— both accidental and natural—wherein bodies were not identified thoroughly, contributing to misidentification. Dentists are willing to assist in the identification process and it is for the government and local administrations to make the most of such services by passing regulations that ensure the use of teeth in post-mortem identification.

Forensic odontology is the branch of dentistry that deals with the law. The specialty's application is primarily in identification of post-mortem remains by the careful examination of teeth, identification of perpetrators of sex crimes from analyzing bite marks, and estimation of age from dental radiographs. However, the very existence of forensic odontology today owes, perhaps, to the application of the dentition in the identification of burned human remains following two disasters of late nineteenth century in Europe. The first occurred in 1881 when the ring theatre in Vienna, Austria, was destroyed during a performance with 449 casualties; 284 among the dead were identified and here, "a medical practitioner used dental data in his investigation" (p. 296).[1] The second—the Charity Bazaar fire in Paris in May 1897—resulted in 126 deaths. In both tragedies, dental features were used in post-mortem identification. In the latter, relatives identified many bodies, however, on the day following the disaster, 30 unidentified bodies remained. Several of the victims were Countesses, Duchesses and other ladies from the 'high society' of the day who could afford quality dental care and treatment available at the time.[2] The treating dentists were called in and "all 30 bodies were eventually identified thanks to meticulous dental record keeping of amalgam fillings, gold repairs, crowns and evidence of extraction spaces noted in the mandibles and maxillae of the victims" (p. 129).[2] According to Harvey,[3] one of the dentists who assisted the identifications in Paris was a

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Cuban named Oscar Amoedo (who was working as a Professor at the Dental School in Paris University). Amoedo later that year wrote an article that described the techniques used in the post-mortem dental identification process and proposed a methodology that could be used in similar procedures in the future. This perhaps was a precursor to his work entitled "L'Art dentaire en médicine légale" which he authored in 1898—a seminal work that inspired modern forensic dentistry.

Forensic odontology is today integral to the identification protocols in several countries, and the dentition is one of three essential methods of disaster victim identification (the other two being fingerprints and DNA). Despite such importance being placed on post-mortem dental identification, the practice is still rare in India. Part of the reason may be a greater reliance on post-mortem visual identification methods, use of personal effects (such as clothing and jewellery), fingerprints and DNA. A popular belief is also that an absence of dental identification owes to the lack of availability of dental treatment (ante-mortem) records for use in comparison with the post-mortem dental data.[4] However, a recent survey reveals that 86% of dentists in India maintain records;[5] hence, it is probably an absence of government regulations necessitating use of post-mortem dental identification, and perhaps a degree of apathy from certain local agencies (such as some district administrations) responsible for identification in mass disasters that continues to deny the routine and compulsory application of this important tool.

Hence, it is unsurprising that the use of post-mortem dental identification in disasters in India is relatively sparse in spite of numerous examples of natural (Fig. 1), accidental or man-made disasters such as floods, tsunami, earthquake,

train and bus accidents, airplane crashes, and terrorist attacks. In fact, neither the Disaster Management Act of 2005 nor the National Policy on Disaster Management of 2009 have any reference to identification of post-mortem human remains, further undermining the prospects of using scientific methods of identification in such situations.

Fig 1: More than 600 skulls were recovered in the village of Annigeri near Dharwad in Karnataka in 2010. The skulls were dated as being ~200 years old—all victims of a 1790 famine in the region. This is a rare example where the District Commissioner's Office and State Archaeological Department formally asked for teeth to be used in estimating age-at-death and sex of the post-mortem remains, which contributed to solving the mystery in the case.

Therefore, use of dental records for comparison with dentitions of victims of disasters is, at best, incidental in nature. For example, in the Air India Express flight IX-812 crash of May 2010 in Mangaluru, Karnataka, barely one or two bodies were identified using dental status—although a forensic dental specialist volunteered services in identification, the local authorities made scant use of the same; the legal heirs of the victims not providing ante mortem dental records at the time of the identification parade,[6] perhaps, also contributed to the deficiency. In general, the approach and prevailing attitudes of the next of kin of deceased and district authorities to identification in this disaster, as detailed in Menezes et al.,[6] did not help. Similarly, in the December 2004 tsunami, despite death occurring in the thousands, and in spite of senior dentists meeting State administrators at the highest echelons of power in Chennai, nothing fruitful materialised insofar as application of dental methods in identification was concerned.

The inadequate use of the dentition in disaster victim identification is also reflected in a relative lack of literature, specifically case reports, in India—one body (out of 25, constituting 4%) identified by a dental bridge in Gupta et al.[7] is a rare exception. Therefore, one wonders with a degree of scepticism what the future holds in the area. There is hope, however: Clauses 36(f)(i) and 39(f)(i) of the Disaster Management Act, 2005, do state that it is the responsibility of the State and Central Governments of India to draw up "mitigation, preparedness and response plans, capacity-building, data collection and identification and training of personnel in relation to disaster management", and clauses 36(h) and 39(i) which states that such other actions as may

be necessary for disaster management should be taken, thereby keeping the option open for use of post-mortem dental identification methods.

Dentists, for their part, certainly have shown willingness and enthusiasm in helping in the identification process in disasters—for example, 3.5% percent of surveyed dentists in India said that they had contributed to identification of victims in disasters while 91.9% of dentists were willing to share records for the purpose of identification of victims in disasters, if approached.[5] Moreover, enhanced record-keeping in the wake of recent Dental Council of India regulations that require the compulsory maintenance of dental records for a period of at least three years from the date of commencement of treatment (Gazette of India—Extraordinary, Part III, Section 4, No. 191, New Delhi, 27 June 2014) can contribute to post-mortem dental identification. Furthermore, education on the importance of post-mortem dental identification, particularly in the wake of examples of misidentification in recent disasters,[4] can compel authorities to encourage application of scientific methods such as teeth, and be more cautious in premature declaration of identification results based purely on personal property and such unscientific methods. To prevent the embarrassment of misidentification that concerned government agencies incur, not to mention the emotional trauma caused to relatives to whom wrong bodies are handed over, the following suggestions are made along the lines of Nandineni et al.[4] and Menezes et al.,[6] but with an emphasis on dental identification:

- Procedures for identification of victims in disasters based on dental methods must be included as standard operating protocols in disaster management plans
- The National Disaster Management Authority (NDMA) must identify and include a core group of dentists who are qualified/experienced in procedures related to post-mortem dental identification in general, and disaster victim identification in particular
- Dental radiographs (preferably orthopantomograms) of all Indian citizens applying for a passport must be made mandatory and be archived by/with the NDMA for easy retrieval for comparison with post-mortem remains of victims in disasters
- Victims' remains must be released to families only after confirmative identification using one of the three scientifically accepted methods, viz., fingerprints, DNA, and dental.

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