

Role of forensic odontology in the Indian Armed Forces: An unexplored arena

Karandeep Singh Arora,
Prabpreet Kaur¹

*Department of Oral Medicine
and Radiology, Daswani Dental
College and Research Center,
Kota, Rajasthan, ¹Department of
Oral and Maxillofacial Pathology,
B. R. S. Dental College and
General Hospital, Panchkula,
Haryana, India*

Address for correspondence:

*Dr. Karandeep Singh Arora,
House No. 1078, Sector 19-B,
Chandigarh (UT) - 160 019,
Punjab and Haryana, India.
E-mail: drkaranarora@yahoo.com*

Abstract


Forensic odontology (FO) is a branch of forensic medicine that in the interest of justice deals with proper handling and examination of dental evidence. Teeth can survive in most conditions encountered at death and during decomposition, even when the body is exposed to extreme forces and/or temperatures. FO is being practiced worldwide since 1775, after which it has not only become an integral part of the judicial system of the developed countries but also been adopted by the armed forces and investigative agencies of these countries. In India, the awareness of FO is gaining pace since the last decade after the establishment of various organizations and the Dental Council of India making it a part of the curriculum. However, its identity as an individual endeavour is still to be established. Awareness and applicability of FO in the Indian Defense Forces would be of great help for better and accurate record keeping of the dedicated and vigilant warriors of our army. These records will be of great help for easy recognition of our army men at the time of calamities, wars, and other difficulties. It would also be useful in the identification of terrorists who enter our country and travel easily in disguise.

Key words: Armed forces, army, bite marks, dental identification, forensic dentistry, forensic odontology (FO), personnel, wars

What is Forensic Odontology (FO)?

The most acceptable definition of forensic dentistry or forensic odontology (FO) according to Brig. D. V. Taylor (1968) is "The application of dental knowledge to the elucidation of legal problems."^[1] It was further defined by Keiser-Nielson (1980) as "The branch of forensic medicine which in the interest of justice deals with the proper handling and examination of dental evidence and with the proper evaluation and presentation of the dental findings."^[2]

The identification of a person through teeth is not a new technique. The oldest example of dental finding that was used for forensic purpose in history was in 66 AD, in which Nero's mistress, Sabina had identified the head that was brought to her as Nero's wife only by identifying the black anterior tooth. And the first formally reported case of dental identification was that of the 8-year-old warrior John Talbot, who fell in the Battle of Castillon and was identified due to a gap caused by a tooth extracted close to the time of his demise.^[3]

Access this article online	
Website: www.jfds.org	Quick Response Code 
DOI: 10.4103/0975-1475.195124	

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Arora KS, Kaur P. Role of forensic odontology in the Indian Armed Forces: An unexplored arena. J Forensic Dent Sci 2016;8:173.

Teeth have been used to estimate age both in the young and old, as well as in the living and dead.^[4] Positive identification of either a disoriented living person or a found body, through comparison of natural or acquired traits found in the teeth when compared with the records from a dentist's office is the most common way that forensic odontologists can assist death investigators.^[5]

The knowledge of teeth being durable not only comes from the present day knowledge but also from the research on the remnant dental evidence found as fossils.^[6] Teeth can survive in most conditions encountered at death and during decomposition, even when the body is exposed to extreme forces and/or temperatures.^[5] Any dental examination of a deceased person whose identity is unknown should include an estimation of age. In cases where there is no indication of the identity, age estimation may be crucially important for the progress of the investigation. It narrows down the search within the missing persons' files and enables a more efficient approach.^[7]

Avon has classified FO according to major fields of activity into civil, criminal, and research. Forensic dentistry specializes in several areas that include dental records as legal document, radiographic examination, age determination, anthropological examination, mass disaster identification, bite mark evidence, and family violence.^[8]

Forensic Odontology and the World

The first recorded medicolegal identification of a body using dental means was that of Dr. Joseph Warren, who was killed at the Battle of Bread Hill, in New England in 1775. The mass forensic identification by dentition was first used in Paris, in the aftermath of the fire of the bazaar de la Charité in 1897. Significance of FO and its development over the years in the world has resulted in number of famous cases of murder, a guilty verdict, and death penalty.^[8] The discovery of the badly burned bodies of Adolf Hitler and Eva Braun by the Russian troops on May 1, 1945, and the subsequent identification of remains were done solely based on the dental evidence that was identified by Dr. Hugo Johannes Blaschke who was Hitler's dentist, and from his records it was found that the evidence of frontal sinus x-rays can be as unique as figure prints.^[8,9]

FO has been incorporated in the armed forces of many developed nation including the United States, Canada, Russia, Australia, etc. An institute run by the United States named the Armed Forces Institute of Pathology has officially introduced courses in the field of forensic dentistry.^[10]

The identification techniques used by the US military and British forces to identify air crash and service personnel improvised explosive devices (IED) victims from the wars in Iraq and Afghanistan include the assessment of

frontal sinuses and knees that are archived and then later accessed and compared to the relevant body fragments of unidentified victims for possible further confirmation if DNA tests are inconclusive or not possible.^[11,12]

The Current Scenario in India

In India, FO is an upcoming branch of dentistry that has a great scope of development. It has been introduced in the syllabus for Bachelor of Dental Surgery (BDS) by the Dental Council of India. Currently, FO has not been introduced as an individual subject in the curriculum of Dental Council of India but this branch has been linked to two other branches accordingly, namely Oral Medicine and Radiology and Oral and Maxillofacial Pathology.^[13] In the near future, FO in India is bound to become a separate discipline of dentistry as in the Western world. Many national and international societies have been registered and working in India and are actively participating for the promotion of this field such as the Indian Association of Forensic Odontology and Indo Pacific Academy of Forensic Odontology, which have been recently established with their headquarters in India.^[14]

In the history of criminal prosecution in India, first time ever death sentence was given to the accused in which dental forensics had played a vital role in providing evidence. It was the Delhi gang rape case where the forensic odontologist linked the dentition of the two accused to the bite marks on the victim.^[15]

Advantage in the Indian Armed Forces

The primary goal of the Indian defense forces is to guard the nation against any external enemy. In the peace time, their role also includes assisting the civil administration at times of natural calamities; at least in the initial part, because of their readiness to attend any such emergencies. In the past, there have been many situations in which the Indian defense forces have participated. From World War-I in 1912 to Kargil War in 1999, Indian army has been actively involved all through. They have also been active against cross-border terrorism at the international boundaries with the neighboring countries.

Because of these incidents, many soldiers become martyrs; some unfortunately are captured by the enemy country while bodies of some martyrs cannot be identified due to burns or other disorientations. When every available measure to identify such bodies fails, an option that has come to light over the past decade is FO. It has great potential both for identification of the deceased soldiers as well as terrorists who are escaping in disguise.

FO in the Identification of Soldiers

Every soldier who joins the defense forces undergoes a thorough medical examination before the commencement

of his/her services. A series of medical tests are performed and samples collected to keep a detailed record of the recruit in the database for any future referral.

In order to identify a body that has been disfigured or disoriented, it is compared with the records available in the database. The samples that are usually kept as record include the DNA and figure prints of an individual. However, in worst cases the finger prints and DNA may be destroyed due to delay and the bodies have to go unidentified. If along with these records, the dental records of recruits are also taken, it may prove beneficial in identifying the bodies even after a lag of time. Dental records can be useful in the following ways:

- First, orthopantomogram (OPG)^[16] of every army personnel should be taken and updated from time to time. The dentition of every person is unique, i.e., it is different for every person. In case of remote areas where OPG is not possible, full mouth intraoral periapical radiograph (IOPAR) should be taken, arranged in the form of OPG and digitized to have a digital record of each individual that can be taken using a portable x-ray unit. These records should be updated from time to time, to have the latest available dental records of an individual. This method of identification can also serve as a first line for identification before DNA analysis as the latter can prove to be time-consuming and expensive.
- Second, impressions of the dental arches of army personnel should be taken and castes should be prepared and preserved. A six-digit code for dental description is presented. It is intended to simplify the establishment of ante- and postmortem data files in a computer and consists of two digits for designating the individual tooth, two digits for describing the surface or surface combination involved, and two digits for describing treatment type and material. Depending upon the number of teeth present, the dental description of one person may thus comprise from 1 to 32 six-digit numbers, ante- or postmortem. The comparison of the antemortem with one postmortem set of numbers is a simple procedure.^[17]
- Also from these prepared dental castes, the incisal edges are marked and then scanned. Further, for every individual the overlay of these edges can be digitalized and preserved.^[18] The data now available gives details of the area, perimeter, angulation of tooth, mesiodistal, and buccolingual width of individual anterior teeth that can be matched for identification of body.

FO in Identification of Terrorists

A terrorist is a person, usually a member of a group, who uses or advocates terrorism. These people are a threat to the peace and integrity of society and nation. They can cause violence by means of impersonation in which

their identification becomes difficult. So, whenever these terrorists are arrested or nabbed, complete dental records should be taken and saved carefully in database along with the other possible samples. These records should be made available on the INTERPOL network from other countries for proper identification of the criminals and updated from time to time.

If these records are timely updated over the database, a terrorist who is impersonating or concealing his/her identity can be identified on the basis of dental records available, as impersonating face and figure prints is easy but it is nearly impossible to impersonate the dental records. The best example for the same, from Indian court, is the decision on juvenility of Mohammed Ajmal Kasab, the lone survivor of Mumbai terror attacks of 26/11. The court had ordered a radiologist and forensic dentist to examine Kasab, and it was proved that he was not a juvenile.

Conclusion

In conclusion, FO that has gained its pace as a subject in the curriculum of the Dental Council of India should also be incorporated as a part of the nation's highest security forces and implemented on a regular basis. It would help in identifying bodies of their soldiers and also to protect the nation from terrorists who impersonate and spread terrorism acting as a threat to the security of the nation.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Taylor DV. Forensic dentistry. J R Army Med Corps 1968;114:80-6.
2. Keiser-Nielsen S. Person Identification by Means of the Teeth. Bristol: John Wright & Sons; 1980. p. 54-72.
3. Stavrianos C, Petalotis N, Stavrianos I. Identification of human remains by teeth - the previously undiscovered case of William II Villehardouin. Bull Int Assoc Paleodont 2009;3:4-8.
4. Acharya AB, Kumar KK. Age estimation in Indians from extracted unsectioned teeth. Forensic Sci Int 2011;212:275.e1-5.
5. Sweet D. Forensic dental identification. Forensic Sci Int 2010;201:3-4.
6. Leung C. Forensic odontology. Dent Bull 2008;13:16-20.
7. Willems G, Moulin-Romsee C, Solheim T. Non-destructive dental-age calculation methods in adults: Intra- and inter-observer effects. Forensic Sci Int 2002;126:221-6.
8. Bruce-Chwatt RM. A brief history of forensic odontology since 1775. J Forensic Leg Med 2010;17:127-30.
9. Kelsey Fry W. The baptist church cellar case. Brit Dent J 1943;75:154.
10. Luntz LL. History of forensic dentistry. Dent Clin North Am 1977;21:7-17.
11. Mann RW. Use of bone trabeculae to establish positive identification. Forensic Sci Int 1998;98:91-9.

12. Quatrehomme G, Fronty P, Sapanet M, Grévin G, Bailet P, Ollier A. Identification by frontal sinus pattern in forensic anthropology. *Forensic Sci Int* 1996;83:147-53.
13. Dinakar AD. Forensic odontology: Trends in India. *J Forensic Dent Sci* 2014;6:1-2.
14. Acharya AB. A decade of forensic odontology in India. *J Forensic Dent Sci* 2010;2:1.
15. Balachander N, Babu NA, Jimson S, Priyadharsini C, Masthan KM. Evolution of forensic odontology: An overview. *J Pharm Bioallied Sci* 2015;7(Suppl 1):S176-80.
16. Soomer H, Lincoln MJ, Ranta H, Penttilä A, Leibur E. Dentists' qualifications affect the accuracy of radiographic identification. *J Forensic Sci* 2003;48:1121-6.
17. Keiser-Nielsen S. A six-digit code for computer-aided dental identification. *Forensic Sci Int* 1983;21:85-9.
18. Verma AK, Kumar S, Bhattacharya S. Identification of a person with the help of bite mark analysis. *J Oral Biol Craniofac Res* 2013;3:88-91.