

Survey on the perception of forensic odontology-Its knowledge, awareness and practice among dental practitioners in India

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Abstract

Background: The role of a dentist is not only to examine and treat the oral diseases but also to assist the legal authorities by means of its branch- forensic odontology. Forensic science is defined as a discipline concerned with the application of science and technology to the detection and investigation of crime and administration of justice requiring the coordinated efforts of a multidisciplinary team

Aim: To assess the knowledge, awareness and practice of forensic odontology among the individuals from the field of dentistry with the help of a survey.

Materials and Methods: A cross-sectional survey was carried out on 102 dental practitioners in India. A 10 question based questionnaire was developed to assess their attitude, awareness, skills, materials and methods employed. Data were subjected to appropriate statistical measures and analyzed.

Statistical analysis: The dentist’s knowledge, attitude, practice as well as awareness were expressed in proportions.

Result: 94.06% participants were aware that forensic odontology is a branch of dentistry. 97.06% dental practitioners were aware that teeth serve as a source of DNA. 98.02% participants were aware that forensic odontology is useful in identifying criminals and dead people. 95.05% participants knew the significance of bite mark pattern of teeth. 92.16% were aware that as a dentist they can testify as an expert witness in the court. 42.57% had forensic odontology as part of their curriculum. 91.09% were aware that enamel/ dentin act as an aid in the identification of age. 99% were aware that they can help forensic experts by maintaining records. 40.59% were aware of formal training centers in India for forensic odontology. 90.2% believe that India has very limited resources and equipment to study forensic science.

Conclusion: The study indicates that dentists practicing in India have adequate level of knowledge and awareness regarding forensic odontology. The results show that there is an adequate level of good practice related to dental record keeping.

Keywords: Forensic odontology, attitude, awareness, knowledge, practice, India, survey.

Introduction

The term “forensic” has its origin in the Latin word “forensis” from “forum,” which means a place where legal matters are discussed. [1]

Forensic odontology as defined by FDI is that branch of dentistry which, in the interest of justice, deals with the proper handling and examination of dental evidence, and with the proper evaluation and presentation of dental findings. [2]

Forensic dentistry is a challenging and fascinating branch of forensic science that involves the application of dental sciences in the identification of deceased individuals through the comparison of ante - and post-mortem records. From AD 66 till date, dental identification has proved vital in identifying deceased individuals, the first case being accepted by the law in the year 1849. [3]

The first case of identification known to involve dentition in India occurred when Raja Jayachandra Rathore of Canouj died on the battlefield in 1191 and his body was identified by his prosthetic anterior teeth.[4]

Another successfully reported case is that of assassination of the former Prime Minister of India, Mr. Rajiv Gandhi, where the forensic odontologists had played a very valuable role. [5]

And more recently dr. Ashith B Acharya the forensic odontologist, helped in solving the 16 December 2012 Delhi gang rape case with the help of bitemark analysis.[6]

The speciality of forensic dentistry generally covers three basic areas namely: 1) identification of human remains, 2) litigation relating to malpractice, criminal proceedings primarily in the areas of bite-mark 3) evaluation and abuse cases specially child abuse.

Much of this expertise is based on clinical experience, fundamental research and advances in knowledge in relation to dentistry in general.[7]

Teeth are the hardest and robust tissues of the human body. They are often resistant to decomposition even in major accidents, crime, burial or other severe exposure to the elements .The dental patterns are unique for every individual. This uniqueness is also due to the variety of treatments given by the dentist. Therefore dentition of a person is useful for individual identification and comparison if records exist for the purpose.[8]

Identification of victims in mass disasters (aviation, earthquakes and tsunami)and the criminals in Medico-legal cases is one of the most challenging subjects that humans have been confronted with.[9]

The forensic discipline in conjugation with science and technology aids in the investigation and detection of crime and enforcement of justice with the help of a multidisciplinary team.[10]

Although globally forensic odontology has taken giant steps in the technical advancement, In India the field of forensic odontology is still miles behind in this regard there is increased need for a dental surgeon to have good knowledge about forensic odontology as it is useful in identification of an individual and to detect abuse among all ages. Dentists are the healthcare professionals who routinely assess the head and neck of the patients and have great chance of identifying the signs of abuse and neglect.[11]

Thus this study was designed to assess the awareness of forensic dentistry among dental practitioners in India

Materials and methodology

A cross sectional study was conducted on 102 dentists in India to assess their knowledge, awareness, attitude and practice in forensic odontology. Keeping in mind the current COVID-19 situation a Whatsapp based survey

was conducted in two phases (survey tool development and data collection) for a period of 6 days to the contacts of the invigilator

Survey tool development

After a thorough literature search a survey tool of 10 item questionnaires was drafted in the form of Whatsapp based questionnaire. The settings of the survey were such that one phone could only take a survey once to remove bias.

Data collection

The dentist's knowledge, awareness, attitude and practice were expressed in proportion. A two point scale was adapted for each of the following 10 questions:

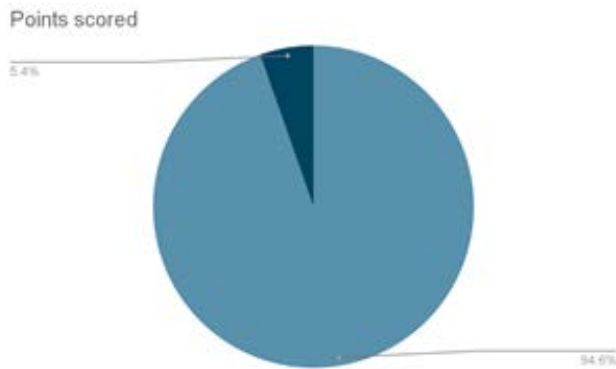


Fig. 1: 94.06% out of 102 dental practitioners are aware about forensic odontology as a of dentistry.

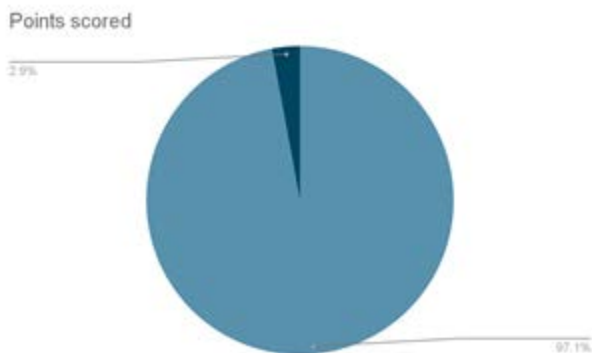


Fig. 2: 97.06% are aware that teeth can serve as a source of DNA.

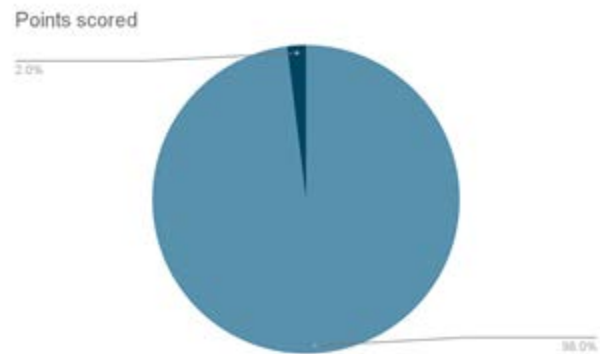


Fig 3: 98.02% is aware that forensic dentistry is useful in identifying criminals and dead people.

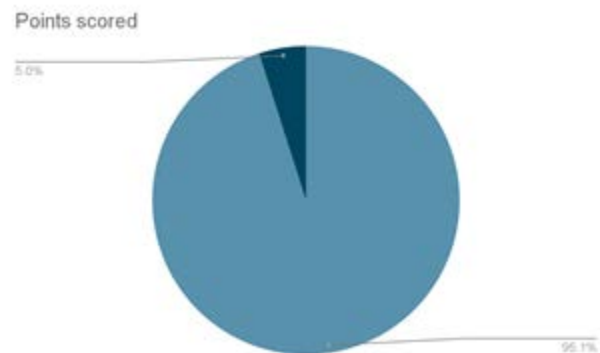


Fig. 4: 95.05% is aware of the significance of bite mark pattern of teeth.

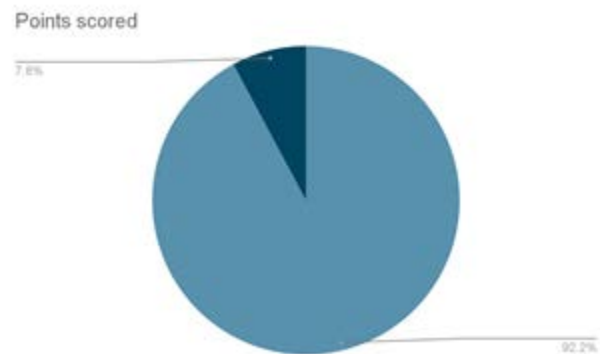


Fig. 5: 92.16% dental practitioners are aware that they can testify as an expert witness in the court to present forensic dental evidence.

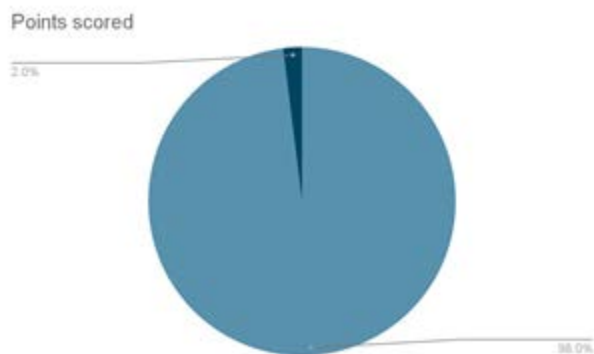


Fig. 6: 98.02% had forensic odontology as a part of their curriculum.

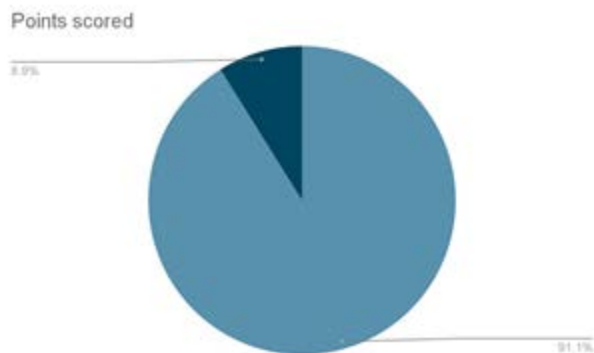


Fig. 7: 91.09% dentists are aware that enamel/dentin acts as an aid for identification of age.

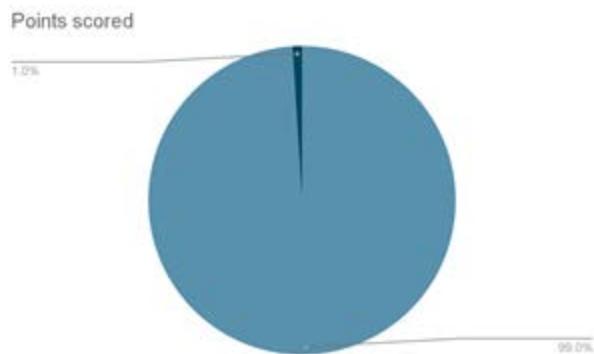


Fig. 8: 99% are aware that they can help the forensic experts by maintaining records

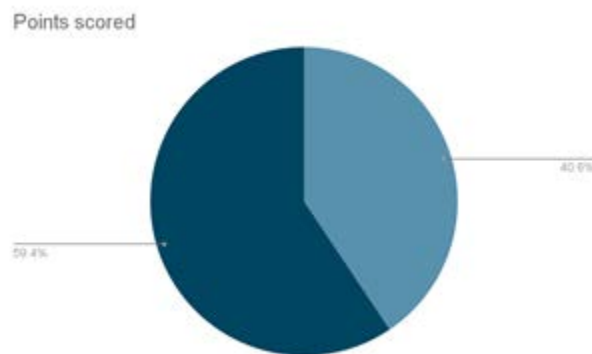


Fig. 9: 40.59% dentists are aware of any formal training center in India for forensic odontology.

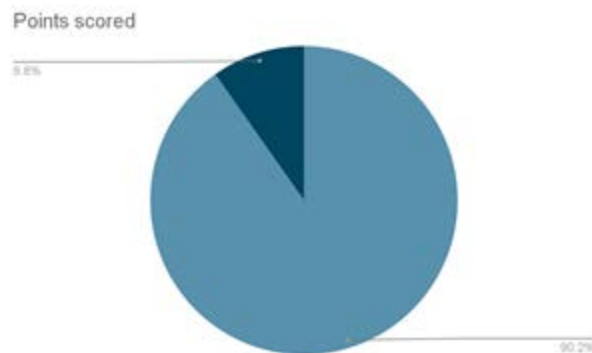


Fig. 10: 90.2% dental practitioners think that India has very limited resources and equipments to study forensic science.

Discussion

Among 102 dental practitioners 94.06% were aware about forensic odontology as a branch of dentistry. The establishment of forensic odontology as a unique discipline has been attributed to Dr. Oscar Amoeda (Father of Forensic Odontology). [12]

97.02% of dental practitioners were aware that teeth can serve as a source of DNA. Because of the resistant nature of dental tissues to environmental assaults, such as incineration, immersion, trauma, mutilation and decomposition, teeth represent an excellent source of DNA material. [13]

With the advent of the polymerase chain reaction (PCR) a technique that allows amplification of DNA at pre-selected, specific sites. This source of evidence is

becoming increasingly popular with investigators. Comparison of DNA preserved in and extracted from the teeth of an unidentified individual can be made to a known anti-mortem sample (stored blood, hair brushes, clothing, cervical smear ,biopsy etc) or to a parent or sibling. [14]

98.02% of dentists were aware that forensic odontology is useful in identifying criminals and dead people. Identification plays a very important role in natural as well as man made disasters. Identification is based on comparison between known characteristics of a missing individual (termed ante mortem data) with recovered characteristics from an unknown body(termed post mortem data). When they have no clue of the identity or no antemortem records are present , a detailed post mortem record is compiled for further use and a foreign anthropologist is used for contributing information such as age, sex and ancestry of the deceased, which is known as post mortem dental profiling. [15]

The late President of Pakistan, General zia-ul-Haq died in the year 1988 in a plane crash due to an explosion. He was identified from his dentition. [16]

Out of 102 dental practitioners 95.05% were aware of the significance of the bite mark pattern of teeth. The use of dental records for identification appears in scattered instances throughout recorded history even in primitive forms in prehistoric times. According to the Old Testament of the Bible Adam was convinced by Eve to put a “bite mark” on the apple .This was the first reported evidence of bite mark in the history of mankind. [17]

Bite marks are usually Documented taking photographs or taking impressions.Measuring the size of the tooth of the suspect and comparing it with bite mark can be done with metric analysis. [18]

92.16% dental practitioners were aware that as a dentist they can testify as an expert witness in the court. Forensic dentists who are associated with identification of the deceased and crime investigations are usually required to provide testimony in the court of law in the capacity of an “expert witness”. [19]

Only 42.57% dentists had forensic odontology as a part of their curriculum. One of the important milestones for forensic odontology in India is the Dental council included this branch as a subject in Bachelor of Dental Surgery(BDS) course regulations in the year 2007. [20]

91.09% dentists were aware that enamel/ dentin act as an aid for identification of age. Tooth acts as a reliable tool in age estimation that is adopted by most of the anthropologists, archaeologists, and forensic odontologists. The age-related changes in teeth can be divided into three categories: Formative, degenerative, and histological changes. Formative changes include the completion of the crown/root and eruption of tooth and thus it act as good predictors till the age of 12 years. Degenerative changes include periodontitis, periodontosis, secondary dentin and cementum apposition (both seen microscopically), root resorption, and transparency of the root seen in ground sections. Histological measures mainly include incremental lines of enamel/dentin, neonatal lines, dentinal translucency, degree of formation of crown, and root etc. Incremental lines remain in the fossils and represent internal records and may serve as a valuable tool in age determination. Dentinal translucency is one of the morpho histological parameters considered best for dental age estimation, not only in terms of accuracy but also in terms of simplicity. [21]

99% were aware that they can help forensic experts by maintaining records. It is essential to maintain good quality dental records as they are important for patient

care, identification and for medical legal cases .Well recorded information improves the accuracy and efficacy of identification. Dentists should not only know the importance of preparing an accurate dental record but also the importance of preserving these records.

The ante mortem records should provide information from written notes, medical and dental histories, charts and diagrams,radiographs, clinical photographs, study models, reference letters, results of lab investigations and prescriptions. [22]

40.59% dental practitioners were aware of any formal training centers in India for forensic odontology. There are not many institutions offering formal training in forensic odontology, with lack of job opportunities for qualified forensic odontologists who have obtained degrees abroad. [23]

90.2% believe that India has very limited resources and equipment to study forensic science. There are no fully equipped labs for forensic odontology in India. [23]

References

- 1 Puerini SJ. Forensic odontology and the postmortem identification process. *Med Health R I.* 2005;88:308-9.
- 2 Acharya AB, Sivapathasundharam B. Forensic Odontology. *Shafer's Textbook of Oral Pathology* 5th Ed. Elsevier 2006;1199-227
- 3 Chandra Shekar BR , Reddy CV. Role of dentist in person identification. *Indian J Dent Res.* 2009;20:356-60.
- 4 Sansare K. Forensic odontology, historical perspective. *Indian J Dent Res.* 1995;6:55-7
- 5 Chandrasekharan P. The untold story of Rajiv Gandhi assassination. *ALT Publ;* 2010. The first human bomb.
- 6 <https://m.timesofindia.com/city/hubli/Forensic-odontology-department-plays-key-role-in-solving-crime-cases/articleshow/22562742.cms>
- 7 Syrjänen SM, Sainio P. Forensic dentistry--recent development towards an independent discipline in modern dentistry. *Proc Finn Dent Soc.* 1990;86(3-4):157-70.
- 8 Auerkari E. Recent trends in dental forensics. *Indones J Leg Forensic Sci-* 2008; 1:5-12
- 9 Jerry N, Ravi S, Rashida T. Current trends in forensic odontology. *J Forensic Dent Sci* 2017; 9:115-9
- 10 Saxena S, Sharma P, Gupta N, Experimental studies of forensic odontology to aid in the identification process. *J Forensic Dent Sci* 2010,2:69 – 76
- 11 Srinivasa P, Sumatra G, Sivakumar G, Muruganandhan J. Forensic dentistry - what a dentist should know. *Indian J multidisciplinary Dent.* 2012;2: 444-9
- 12 Saxena S, Sharma P, Gupta N. Experimental studies of forensic odontology to aid in the identification process. *J Forensic Dent Sci.* 2010;2:69–76.
- 13 Schwartz TR, Schwartz EA, Mieszerski L, McNally L, Kobilinsky L. Characterization of deoxyribonucleic acid (DNA) obtained from teeth subjected to various environmental conditions. *J Forensic Sci.* 1991;36:979–90.
- 14 Sweet D, DiZinno J A . Personal identification through dental evidence-tooth fragments to DNA. *J Calif Dent Assoc* 1996; 24: 35–42.
- 15 Pretty IA, Sweet D. A look at forensic dentistry- Part 1 : The role of teeth in the determination of human identity. *British Dental Journal* 190, 359-366(2001)

- 16 Shamim T, Sudha S, Shaheen PM, Varghese V. An insight to forensic odontology. Kerala Dent J. 2006 ; 29:45-7.
- 17 Shamim T. Editorial, forensic odontology, JCPSP. 2010;20(1):1-2
- 18 Preity IA and Sweet D. A look at forensic dentistry part 2 : teeth as weapons of violence – identification of bite mark perpetrators. Brit Dent J 2001; 190: 415-418.
- 19 Rajendran R, Sivapathasundharam B, editors. Shafer's Textbook of Oral Pathology. 6th ed. India: Elsevier Pub; 2009.
- 20 Dinakar A . Forensic odontology: trends in India. J Forensic Dent Sci 2014 ; 6 : 1-2.
- 21 Saxena S, Sharma P, Gupta N. Experimental studies of forensic odontology to aid in the identification process. J Forensic Dent Sci. 2010;2:69–76.
- 22 Hinchliffe J. Forensic odontology part 1. Dental identification. British Dental Journal 2011;210:219-224.
- 23 Preethi S, Einstein A, Sivapathasundharam B. Awareness of forensic odontology among dental practitioners in Chennai : A knowledge, attitude , practice study. J Forensic Dent 2011;3:63-6.