ORIGINAL RESEARCH

Comprehension and Awareness of Forensic Odontology among Medical and Dental Practioners in Andhra Pradesh – A Cross-Sectional Study.

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Abstract

Background: One of the most important subfields of forensic medicine is forensic odontology. When medical and dental practitioners possess the necessary expertise of forensic odontology, they may recognise and generate pertinent data at the appropriate moment to aid in investigations. The study's objective is to examine Andhra Pradesh's medical and dental professional's understanding, attitudes and use of forensic odontology.

Objective: The purpose of this study was to assess the forensic odontology knowledge, attitudes and practices among medical and dental professionals in Andhra Pradesh, India.

Materials and Methods: 2000 medical and dental professionals in Andhra Pradesh, India were participated in a cross-sectional observational study that was conducted from August 2019 to November 2023. In the study, a pre-made, pre-validated multiple-choice questionnaire with 20 questions was employed. After data analysis, results were presented in numbers and percentage.

Results: 60% medical practitioners maintain records and 40% did not maintain medical records in their clinic. 50% dental practioners maintain records and 50% did not maintain dental records. 70% medical practitioners know the importance of records in identifying crime suspects and 30% are not aware of the importance of records in identifying crime suspects. 60% dental practioners know the importance of records in identifying crime suspects and 30% are not aware of the importance of records in identifying crime suspects.

Conclusion: This study highlighted the fact that although physicians and dentists are well-versed in forensic odontology, they nevertheless require more exposure from a practical standpoint and should periodically refresh their interest in and awareness of this discipline.

Keywords: Forensic Odontology, Perception, Knowledge, Forensic medicine, Dentistry, Crime Investigation.

Introduction

Forensic odontology is the branch of dentistry that deals with the proper documentation, analysis, and display of dental findings for the benefit of the general public, according to Keiser Neilsen. This branch of dentistry deals with the proper handling, examination and presentation of dental results as well as the proper evaluation and handling of dental evidence for the sake of justice[1]. Dr. Oscar Amoedo, a dentist from Cuba who was practicing in Paris, became personally involved in a case and thought that the dental records might be helpful in identifying the victim's charred remains or at the very least to rule out any other possibility and Dr. Oscar Amoedo is now acknowledged as the "Father of Forensic Odontology." Later in 1898, Dr. Amoedo wrote a book outlining the process for victim dental identification. "L'Art Dentaire Medicine Legale" is the name of this treatise, which is the first forensic odontology scientific text. American revolutionary Dr. Joseph Warren lost his life to a bullet wound to the head while fighting the British forces at Breed Hill. Subsequently, after learning that Warren was interred in a mass grave, his friend Paul Revere a silversmith turned dentist excavated the body and identified it using the distinctive dental prosthetic he had made for Warren Forensic

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odontology is also essential to the settlement of criminal cases. The 'accuseds' dental models were matched to the several bite marks found on the victim's corpse in the Nirbhaya rape case. People's dentitions are never exactly the same. Teeth and jaws are well protected from fire and mechanical force. Teeth have played a major role in crucial cases like the Hitler suicide case, the Nithari case and the killing of Mr. Rajiv Gandhi. Unfortunately, India lacks qualified forensic odontologists. This is probably due to a lack of awareness; neither the general public nor the government is completely aware of the variety of tasks that forensic odontologists can complete[2]. When it comes to possible legal applications, medical staff members ought to be able to recognise, alert and interact with dentists. As a result, professionals in the fields of medicine and dentistry who have the requisite expertise in forensic odontology will be able to identify and produce pertinent information when needed, supporting criminal investigations[1]. In consideration of this, a study was conducted to examine and evaluate Andhra Pradesh's medical and dental professionals' knowledge of forensic odontology.

Materials and Methods

From August 2019 to November 2023, a cross-sectional observational study was carried out among 1200 medical practitioners and 1100 dental practitioners in Andhra Pradesh, India. Kurnool, Kadapa, Tirupathi, Ananthapur and Vijayawada practioners were considered, due to the large concentration of medical and dental clinics in these areas. Among 2300 practioners, we received 2000 responses. The study's inclusion criteria comprised of professional physicians and dentists in Andhra Pradesh. Professionals from states other than Andhra Pradesh and the professionals who did not respond were excluded.

Data Collection and Questionnaire

In this study, a pre-made, pre-validated multiple-choice questionnaire with 20 questions was employed. To verify the accuracy and suitability of the questions, 2300 medical and dental professionals participated in a cross-sectional observational study. The majority of the participants thought the questionnaire was satisfactory and easy to understand. The questionnaire proforma was prepared to assess the command and approach towards forensic odontology among both the practitioners. The questions included the importance of medical and dental records, detection of child abuse cases, dental age assessment, recognition of an individual and bite marks assessment. Questionnaire was distributed by means of google forms to 2300 practioners out of which 2000 practioners were responded. Participants were informed about purpose and objective of study. Only complete forms were considered for analysis. Participation was voluntary. All the participants were asked to respond to each question. Confidentiality of the participants were guaranteed. Data were analyzed on Statistical Package for the Social Sciences (SPSS version 20.0, IBM Corp., Armonk, NY, USA) for Windows. Descriptive statistics were used and the results are presented as number and percentage.

Results

Q1: Sixty percent medical and Fifty percent dental practioners practitioners maintain records. Number and Percentile of both the practioners response are shown in Table 1.

Q2: Sixty percent medical and Fifty percent dental practitioners maintain Patient details, Photographs, Dental and Medical history, Family history, Study models, Clinical and Radiographic findings, Investigation findings, Treatment plan, the following are regularly maintained. Duration of maintenance of medical and dental records is from 10 and 7 years respectively. Number and Percentile of both the practioners response are shown in Table 1.

Q3: Seventy percent medical and Sixty percent dental practitioners know the importance of records in identifying crime suspects. Thirty percent medical and Forty dental practioners are not aware of it. Number & Percentile of both the practioners response are shown in Table 1.

Q4: Forty percent medical and dental practitioners have knowledge/awareness about forensic odontology. Number & Percentile of both the practioners response are shown in Table 1.

Q5: Seventy percent medical and dental practitioners responded positively to teaching forensic odontology in undergraduate course. Number & Percentile of both the practioners response are shown in Table 1.

Q6: Eighty percent medical and Ninety percent dental practioners felt that the tooth is a preferred investigation record to estimate the age. Number & Percentile of both the practioners response are shown in Table 1.

Q7: Seventy percent medical and Sixty percent dental practitioners were aware about the correlation of physical evidence to child abuse. 30% medical and 40% dental practioners were not aware of this correlation. Number & Percentile of both the practioners response are shown in Table 1.

Q8: Eighty percent medical practitioners know to differentiate bite mark injuries as contusion, laceration, incision and while 20% were not aware. Sixty percent dental practitioners know the differentiation and Forty percent are not aware of it. Number & Percentile of both the practioners response are shown in Table 1.

Q9: Twenty percent medical and dental practitioners had undergone formal training in the field of forensic odontology. Number & Percentile of both the practioners response are shown in Table 1 and Graph 1.

Q10: Twenty percent medical and dental practitioners had attended workshops or CDE programmes regarding forensic odontology. Number & Percentile of both the practioners response are shown in Table 1 and Graph 1.

Q11: Forty percent medical and Thirty percent dental practitioners are a part of the forensic team in the city. Number & Percentile of both the practioners response are shown in Table 1 and Graph 2.

Q12: Fifty percent medical and Forty percent dental practitioners refer forensic related journals/publications.

Number & Percentile of both the practioners response are shown in Table 1 and Graph 2.

Q13: Forty percent medical practitioners had formal training in collecting, evaluating and presenting dental evidence and Sixty percent are not trained. Thirty percent dental practitioners had formal training and Seventy percent are not trained. Number & Percentile of both the practioners response are shown in Table 1 and Graph 3.

Q14: Fifty percent medical and Forty percent dental practitioners know about medicolegal cases solved with the help of forensic odontology. Forty percent dental practitioners are aware of it. Number & Percentile of both the practioners response are shown in Table 1 and Graph 3.

Q15: Seventy percent medical and Sixty percent dental practitioners are aware to testify as an expert witness in the court to present forensic evidence. Number & Percentile of both the practioners response are shown in Table 1 and Graph 4.

Q16: Forty percent medical and dental practitioners know a forensic odontologist from India and Sixty percent of both the practioners are not knowing. Number & Percentile of both the practioners response are shown in Table 1 and Graph 4.

Q17: Fifty percent medical and Forty percent dental practitioners know how to identify the age and gender of the deceased in the event of a mass disaster. Number & Percentile of both the practioners response are shown in Table 1 and Graph 5.

Q18: Seventy percent medical and Sixty percent dental practitioners were aware of bite marks as an important adjunct in crime assessment. Number & Percentile of both the practioners response are shown in Table 1 and Graph 5.

Q19: Forty percent medical and Sixty percent dental practitioners were aware of lip prints as an important adjunct in crime assessment. Number & Percentile of both the practioners response are shown in Table 1 and Graph 6.

Q20: Forty percent medical and dental practitioners are confident in handling forensic-related cases. Number & Percentile of both the practioners response are shown in Table 1 and Graph 6.

Discussion

In today's world, the swift advancement of forensic medicine would be inadequte without the presence of forensic odontology, a highly specialised field of study that addresses the legal dimensions of dentistry. For many years, forensic dental sciences have been recognised as a generally accepted approach in identifying victim's and suspects in mass disasters, abuse cases and other criminal cases based on dental evidence[17]. The first case based on forensic odontological results was approved by law in 1849. The work that can be applied in a court of law and subsequently approved by the general scientific committee to distinguish between truth and falsity is referred to as the forensic science branch. The field of forensic odontology has grown in significance in several developed nations worldwide. However, in emerging nations such as India, it has not yet reached its full potential. More than 15,000 people died in India as a result of the 2004 tsunami, but it is unclear if all of the casualties were identified. If there had been enough forensic odontologists to identify the victim's, this may have been feasible[3,4]. Without forensic odontology, a highly specialised field of study that addresses the legal implications of dentistry, the rapid advancement of forensic medicine today would be inconceivable5.

In the present study, 60% medical and 50% dental practitioners maintain records in their clinics. Our results were in accordance with the study conducted in Pune by Namrata et al, found that 70% of dental practitioners usually maintain the records. It is also maintained as consumer court evidence and for dental insurances[6]. Our results are in contrast to the study which was done by Ramandeep Singh et al. concluded that only 12% of practitioners maintain complete records which was in contrast to our study. So, the practioners of our survey are aware of the importance of maintaining dental records.

60% medical and 50% dental practitioners maintain Patient details, photographs, dental and medical history, family history, study models, clinical and radiographic findings, investigation and treatment plan were followed regularly. 40% and 50% did not maintain medical and dental records. Duration of maintenance of medical and dental records is from 10 and 7 years respectively. All practioners should take health histories initially and update the same periodically as necessary. It is also important that a patient understands the questions, provides appropriate answers and signs the completed form. A health history form provides a starting point for the dental team to fulfill its professional obligations[7]. The NHS Terms of Service, state that dental records should be kept for a period of two years and that, treatment records, radiographs, photographs and study models should be retained after the completion of any course of treatment and care, under a continuing care or capitation arrangement for this period[8]. Although the Indian Dental Association recommends that an individual's dental records (radiographs, models, photographs, and clinical correspondence) should be securely retained for at least the legal minimum period of 5-6 years, the practice is yet to be enforced in all dental practices across India (Prakash et al., 2019).

In our study 70% medical and 60% dental practioners know the importance of records in identifying crime suspects. Our study results are contrast to Khare P et al, where there is lack of knowledge and attitude towards the status of maintaining records. Al Azri et al. conducted a study which suggested the need of record keeping guidelines and practices to increase the level of details, extent and period of retention of records so that the information needs of forensic odontology activities are met[21]. The study conducted by us has shown that the practioners have adequate knowledge about the importance of records in crime identification.

40% medical and dental practitioners have knowledge/ awareness about forensic odontology. Adequate knowledge and awareness were not found among the practitioners in our study, However, inadequate knowledge and practice was revealed among Saudi, Indian and Nigerian dental practitioners[10]. This is mainly because of inadequate exposure in the field of forensic dentistry and lack of practical exposure

to forensic cases. Also inadequate awareness, knowledge and attitude about forensic odontology among the medical students were noticed in a study conducted by Kumaraswamy et al. and the reason they suggested for this could be lack of handling of forensic dentistry cases in emergency medicine department[11].

70% medical and dental practitioners were positive towards forensic odontology, that they should be taught in undergraduate and 30% of both the practioners were not positive towards that. Regarding the inclusion of forensic odontology in the curriculum of dentistry, in the present survey, only 70% of the respondents were aware of the fact that according to Dental Council of India (DCI) curriculum forensic odontology should be taught in the third and final years of bachelor of dental surgery (BDS) and medical course[12]. Undergraduate program must be improved for both medical and dental students by including preclinical lectures on forensic medicine and forensic odontology, followed by clinical training. The postgraduate trainee must develop adequate knowledge of proper report presentation to the police department, record keeping and archivization, criminology, legal jurisprudence, use of computers, forensic photography, postgraduate diploma course/certificate course/short-term courses be started in the specialty of forensic dentistry[22]. Collaborative work of medical and dental professionals a great success in the field of forensics.

In our study, 80% of both the practioners responded positively, that the tooth is a preferred investigation record to estimate the age and 20% of both the practioner results were negative. Our results are in accordance with the studies done by Sahni et al. 95% participants, Kumaraswami et al, 63% participants, Al azri et al. 63.3% participants and Almutairi et al. 64.2% practioners, Mohit et al (81.8 %)[20] and Namrata et al who observed that 65% of dentists were in favour of DNA examination as the preferred method of identification. Once DNA material can be recovered, positive identification of person becomes very easy. The teeth, skeleton or bone structures can be used for the estimation of age both being indicators for maturity. The teeth maturation process offers a valuable index of dental age and it serves as a better index of maturation than other indices. Tooth eruption, attrition, tooth calcification, secondary dentin deposition, periodontal diseases, cementum apposition, root translucency, color changes, root resorption and the increase in root roughness are the dental changes related to age which can be observed in radiographs as different types of the dental age estimation methods[3]. This makes teeth an excellent and an accurate source for DNA material[9]. For medical practioners, due to DNA-based studies using tooth and saliva, which is gaining popularity in recent years and is more exposed to such studies from social media. Comparison of DNA from teeth, jaws, and other parts of unidentified individuals is possible with a known antemortem sample from

Table: 1 Responses of Medical and Dental practioners in number and percentage

	MEDICAL				DENTAL			
	Number (YES)	% (YES)	Number (NO)	% (NO)	Number (YES)	% (YES)	Number (NO)	% (NO)
QUESTION 1	600	60%	400	40%	500	50%	500	50%
QUESTION 2	600	60%	400	40%	500	50%	500	50%
QUESTION 3	700	70%	300	30%	600	60%	400	40%
QUESTION 4	400	40%	600	60%	400	40%	600	60%
QUESTION 5	700	70%	300	30%	600	60%	400	40%
QUESTION 6	800	80%	200	20%	900	90%	100	10%
QUESTION 7	700	70%	300	30%	600	60%	400	40%
QUESTION 8	800	80%	200	20%	600	60%	400	40%
QUESTION 9	200	20%	800	80%	200	20%	800	80%
QUESTION 10	200	20%	800	80%	200	20%	800	80%
QUESTION 11	400	40%	600	60%	300	30%	700	70%
QUESTION 12	500	50%	500	50%	400	40%	600	60%
QUESTION 13	400	40%	600	60%	300	30%	700	70%
QUESTION 14	500	50%	500	50%	400	40%	600	60%
QUESTION 15	700	70%	300	30%	600	60%	400	40%
QUESTION 16	400	40%	600	60%	400	40%	600	60%
QUESTION 17	500	50%	500	50%	400	40%	600	60%
QUESTION 18	700	70%	300	30%	600	60%	400	40%
QUESTION 19	400	40%	600	60%	600	60%	400	40%
QUESTION 20	400	40%	600	60%	400	40%	600	60%

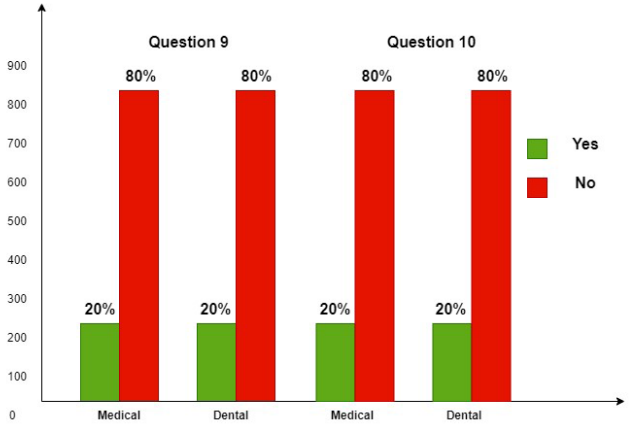
clothing, hairbrush, stored blood, biopsy specimen or cervical smear of the same individual.

70% medical and 60% dental practitioners in our survey were aware about the correlation of physical evidence (bite marks) to child abuse. Child abuse and neglect is any interaction or lack of interaction between a caregiver and a child resulting in non-accidental harm to the child's physical and developmental state and varies widely in degree of severity. Child abuse is a presenting serious social problem with global dimensions, increasing at an alarming rate in all socioeconomic strata and all ethnic or racial communities. Beckstead et al. stated that "A bite mark is registration of the tooth cutting edges on a substance inflicted by the closure of jaw. Nearly half of the medical and dental practitioners did not know how to identify child abuse; a few of them did not know the actions to be taken in cases of child abuse[13]. Dorion stated that the abuse of children needs to be listed among the human activities related to the evidence of bite marks. Our study results are in accordance with the findings of the study conducted by Preethi et al. 60% would identify by physical injury, scars, behavior, clothing, etc and 40% of dental practitioners did not have the expertise to identify child abuse. Again 60% of dentists agreed on parental/child counseling and reporting to the child care authorities in case of any incident in the same study the rest of the studies did not gather any information on these issues from their subjects[14]. Least, practioners of our study were not aware of physical evidence to child abuse.

80% medical and 60% dental practitioners knew how to differentiate bite marks as contusion, laceration or abrasion. Our results are in accordance to the study conducted by Preethi et al. where 82% of dentists knew the significance of bite marks pattern of teeth. Reasons commonly cited for a dentist's failure to report are lack of education about the signs and symptoms of abuse and neglect, ignorance of the reporting procedure and concern about making a false accusation and disrupting the dentist's relationship with the family. In New York City, almost 20% of the children requiring autopsies exhibited bite marks inflicted before death[14]. The clarity and shape of bite marks found on the skin of the victim's will change in very short duration (10–20 min) both in living and dead; therefore, this necessitates their recording at the earliest possible time. Medical practitioners may be the one who can come across such findings within this interval of time. Proper management of such marks by placing a scale beside the bite mark and making a note of distance at which photograph was taken within this time can serve as an excellent clue for the final proper judgment in the court of law. Medical practitioners may be the one who can come across such findings within this interval of time[20].

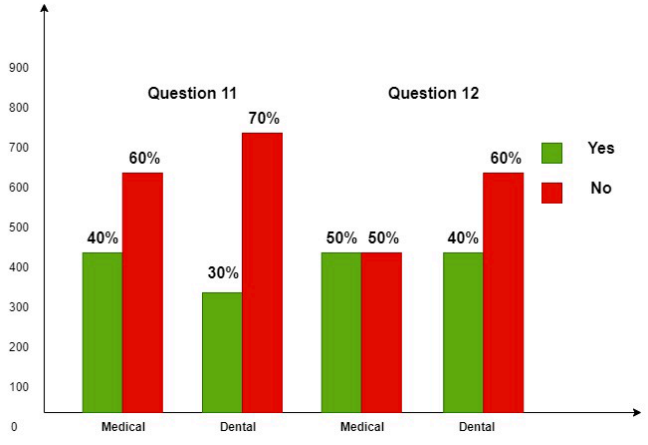
According to our study very few practioners (20% medical and dental) had undergone formal training in the field of forensic odontology. As per other studies, there are very few institutions offering formal training in forensic odontology. Most of the practitioners had no formal training. There are no fully equipped labs for forensic odontology in India and FO was not included as a part of our academic curriculum until recently[14]. Only 7% of study participants were exposed to formal training in forensic odontology in the study reports of Shetty and Raviprakash[22].

20% medical and dental practitioners attended workshops regarding forensic odontology. Reasons are lack of exposure to this branch of science as it is not included in the medical and dental curriculum for undergraduates and the few number of workshops or conferences that have been conducted in the field of forensic odontology[14]. Workshops may be conducted so that the practical skills would be developed in handling forensic odontology related cases in emergency department, which could kindle an interest among the practitioners to probe deeper into the subject.



Graph 1: Que 9: Number and Percentage of Medical and Dental Practioners who know undergone formal training in the field of forensic odontology

Que 10: Number and Percentage of Medical and Dental Practioners who attended the workshop or CDE programme regarding forensic odontology



Graph 2: Que 11: Number and Percentage of Medical and Dental Practioners who were part of the forensic team in their respective cities

Que 12: Number and Percentage of Medical and Dental Practioners who read forensic dentistry/odontology related journals/publications

40% medical and 30% dental practitioners are a part of the forensic team in the city. Our survey revealed that most of the practioners were not a part of the forensic team dealing with medico-legal cases in their respective cities. There must be a detailed program to assess exposure to forensic cases. Training in forensic medicine and other branches of forensic science should include forensic aspects of dentistry. Teachers need to be trained to teach forensic dentistry[22].

50% medical and 40% dental practitioners refer forensic related journals/publications. Our study revealed low percentage of practioners go through forensic related journals. According to some studies, more than 50% of the subjects practicing in the metro area cited journals as their main source of knowledge, whereas internet and newspapers were cited as the main sources of knowledge by dentists who were practicing in tier-2 cities. Journals were read by only 48% of dentists in another study[16]. Participating in programs and workshops as well as reading journals of forensic science about dental findings can be a possible solution to enhance the knowledge of forensic odontology[15].

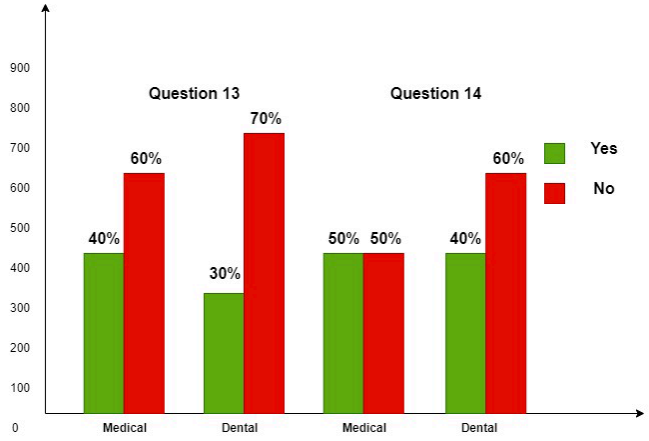
Nearly, 60% medical and 70% dental practitioners had no formal training in collecting, evaluating and presenting dental evidence. Our survey indicates that the low confidence of medical and dental practioners, with regard to handling forensic cases is mainly because of inadequate formal training in the field of forensics. The traditional tools for obtaining continuing education like clinical training, articles, oral presentations and books seem to be preferred over the more innovative tools such as videos and the internet by dental practitioners. One must note that the sources rated most important in theory are not necessarily the most used in practice[16].

50% medical and 40% dental practioners were aware about medicolegal cases solved with the help of forensic odontology. Forensic dental age estimation helped in identifying numerous victim's in various disasters including airlines crashes. Of these is the Nepal Airlines in 2014 case where two dead kids were identified and their age was estimated through teeth examination. Another known disaster scene was the DANA air crash in Lagos in 2012 where victim's identification and age estimation were realized by means of forensic odontology joined with DNA analysis. Hence literature confirms the medicolegal cases can be solved with the involvement of forensic odontologist[5].

70% medical and 60% dental practitioners were aware of their capacity to testify as an expert witness in the court to present forensic evidence. Our results are in contrast to the studies conducted by Preethi et al and Namrata et al wherein nearly one-third and 65% of the respondents, respectively, were unaware of their eligibility to present forensic dental evidence. Above all, a few were not willing to testify even if they were called upon. Forensic odontologists 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[9,14].

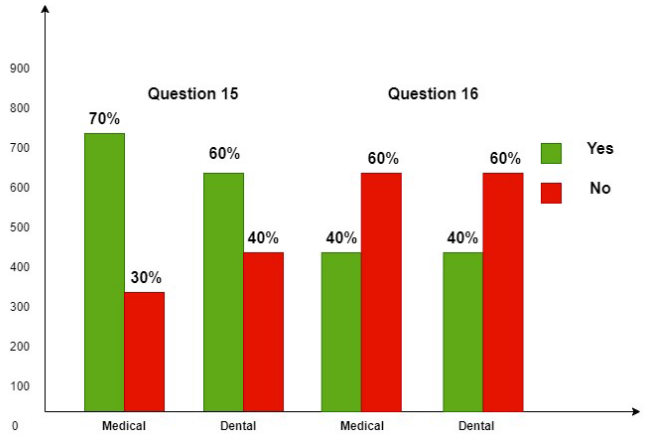
In our survey, 60% medical and dental practitioners are not aware of a forensic odontologist from India. To overcome this, we need a dental team, comprising personnel from all branches of dentistry, working in close association with experts from other branches of forensic science. The government has a social obligation to recover, identify and hand over the remains of a deceased person to the relatives and every effort must be made to achieve this. Academicians, law-enforcing authorities, statutory bodies and government have to get together and coordinate an action plan[22].

FO enables the identification of a large number of casualties in mass disasters like earthquakes, flood, aviation disasters, tsunamis, crime investigations, identification of decomposed and disfigured bodies, victim's due to burn and motor vehicle



Graph 3: Que 13: Number and Percentage of Medical and Dental Practioners who had formal training in collecting, evaluating and presenting dental evidence

Que 14: Number and Percentage of Medical and Dental Practioners who are aware of medicolegal case solved with the help of forensic odontology



Graph 4: Que 15: Number and Percentage of Medical and Dental Practioners who are aware that they can testify as an expert witness in the court to present forensic dental evidence

Que 16: Number and Percentage of Medical and Dental Practioners who knows forensic odontologist from india

accidents. The first victim of ??? Lollia Paulina a rich Roman Empress, was identified using unique arrangement of her teeth[17]. Later, Adolf Hitler was identified which was a turning point in history, which proved forensic odontology had the potential to serve as corroborative evidence which supplements fingerprints and DNA. In our study, 50% medical and 40% dental practitioners are aware of the identification of the age and gender of deceased in the event of a mass disaster. Our study is in accordance to the study conducted by Preethi et al. only 40% of the dentists are cognizant of estimation of the age and gender of deceased in any major catastrophe[14] and in contrast to only 4% of subjects in the study findings of Sengupta et al. reported to have contributed to the identification of victim's in mass disasters[23].

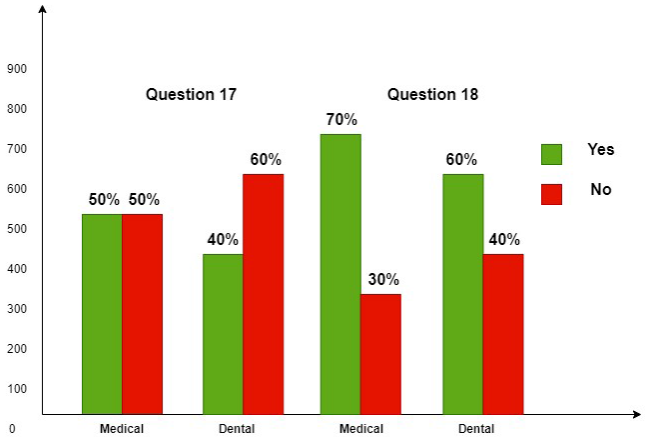
In the current study, 70% medical and 60% of dentists are aware of bite marks in the identification of crime assessment. Our results are in contrast with the study conducted by Preethi et al where 82% of dentists knew the significance of bite marks pattern of teeth[14]. Our results are in accordance with a study conducted by Nagarajappa et al in 2014 where 71.4% of dentists were aware of this fact[18]. Literature confirms that the use of bite mark evidence started around 1870 with the Ohio vs. Robinson case. The big breakthrough was found with cases involving rape and serial killing of innocent persons, where the perpetrators leave bitemarks. Collectively, human brilliance and technical progress uncovered the latent mystery of ambiguous forensic situations. More number of medical professionals are aware of bite marks because of updation in their knowledge in the field of forensics through their exposure to social media or by forensic odontology-related awareness programs.

Examination of lip prints, known as cheiloscopy, is also one of the adjuvant techniques in identification of crime. In the current study 40% medical and dental practioners are aware of lip prints in the identification of crime assessment. Our results are in contrast with the study conducted by Preethi et al. where 82% of dentists are very well aware of lip print identification[14]. Lip prints are also as unique as finger prints of an individual, therefore it can also be used as a supplementary tool to verify the suspect in a criminal act. Our survey data noted that 40% of dentists were aware of lip prints identification and the figures are a less than the study conducted by Nagarajappa et al in 2014 where 71.4% of dentists were aware of this facet[18]. Lip prints play a vital role in the identification of crime.

It is vital that a person interested in forensic odontology be properly educated and trained. Oral pathologists have a major responsibility of training forensic experts as well as handling forensic cases since they have specialized knowledge of the normal development, morphology, functions of oral tissues and the variations seen in different pathological/nonpathological states. Also, only they can understand the histological basis of various dental treatment procedures and the physiologic ageing process in the dental tissues. In our survey, only 40% medical and dental practitioners are confident in handling forensic-related cases. However, the application of special knowledge and skill in the field of forensics is minimal in India. The present survey indicates that the low confidence of both medical and dental practioners, with regard to handling forensic cases is mainly because of inadequate formal training in the field of forensic dentistry, inadequate exposure to the subject, minimal importance given to the subject in the undergraduate curriculum, no clear outline or format is provided in the postgraduate curriculum and lack of practical exposure to forensic cases[22].

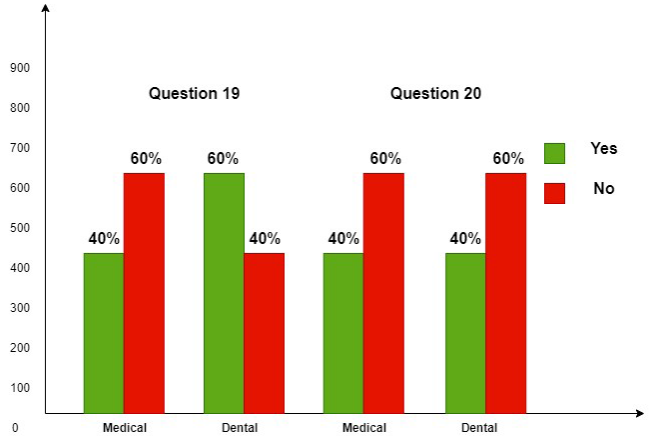
Conclusion

The study findings led us to the conclusion that practitioners in medicine and dentistry were aware of the field of forensic odontology. The ability to determine a person's age and



Graph 5: Que 17: Number and Percentage of Medical and Dental Practioners who can identify the age and gender of the deceased in the event of a mass disaster

Que 18: Number and Percentage of Medical and Dental Practioners who are aware that lip prints and bite marks are important adjunct in crime assessment



Graph 6: Que 19: Number and Percentage of Medical and Dental Practioners who's source of knowledge about forensic dentistry is from Books, Internet, Scientific articles/journals, Seminars, lectures

Que 20: Number and Percentage of Medical and Dental Practioners who are confident in handling forensic-related cases

Questionnaire used for the study

Questionnaire For Medical Practioners

- Do you maintain dental records?
- Patient details, Photographs, Dental and Medical history, Family history, Study models, Clinical and Radiographic findings, Investigation findings, Treatment plan, the following are regularly maintained and duration of maintenance of records?
- Do you know the importance of dental records in identifying crime suspects?
- Do you think your knowledge level/awareness about forensic odontology is adequate?
- Forensic odontology should be taught in undergraduate and postgraduate?
- Do you think tooth is a preferred investigation record to estimate age?
- Do you know how to correlate the physical evidence to child abuse?
- Can you differentiate bite mark injuries as contusion, laceration and abrasion?
- Have you undergone any formal training in the field of forensic odontology?
- Have you attended the workshop or CDE programme regarding forensic odontology?
- Are you a part of the forensic team in your city?
- Do you read forensic dentistry/odontology related journals/publications?
- Have you had any formal training in collecting, evaluating and presenting dental evidence?
- Do you know about any medicolegal case solved with the help of forensic odontology
- Are you aware that you can testify as an expert witness in the court to present forensic dental evidence?
- Do you know any forensic odontologist from India?
- Can you identify the age and gender of the deceased in the event of a mass disaster?
- Are you aware bite marks are important adjunct in crime assessment
- Are you aware lip prints are important adjunct in crime assessment?
- Are you confident in handling forensic-related cases?

Questionnaire For Dental Practioners

- Do you maintain medical and dental records?
- Patient details, Photographs, Dental and Medical history, Family history, Clinical and Radiographic findings, Investigation findings, Treatment plan, the following are regularly maintained and duration of maintenance of records?
- Do you know the importance of dental records in identifying crime suspects?
- Do you think your knowledge level/awareness about forensic odontology is adequate?
- Forensic odontology should be taught in undergraduate and postgraduate?
- Do you think tooth is a preferred investigation record to estimate age?
- Do you know how to correlate the physical evidence to child abuse?
- Can you differentiate bite mark injuries as contusion, laceration and abrasion?
- Have you undergone any formal training in the field of forensic odontology?
- Have you attended the workshop or CDE programme regarding forensic odontology?
- Are you a part of the forensic team in your city?
- Do you read forensic dentistry/odontology related journals/publications?
- Have you had any formal training in collecting, evaluating and presenting dental evidence?
- Do you know about any medicolegal case solved with the help of forensic odontology?
- Are you aware that you can testify as an expert witness in the court to present forensic dental evidence?
- Do you know any forensic odontologist from India?
- Can you identify the age and gender of the deceased in the event of a mass disaster?
- Are you aware bite marks are important adjunct in crime assessment?
- Are you aware lip prints are important adjunct in crime assessment?
- Are you confident in handling forensic-related cases?

gender from their teeth, related structures, facial bones and saliva and tooth DNA tests should be a strong suit for both specialists. Our study found that certain forensic odontology components were plagued by a lack of practice and inadequate understanding and in addition, there has been a noticeable trend of professional upgrading. A basic forensic odontology training program should be given to medical professionals for assisting a dentist and legal professionals in presenting the proper evidence to detect and to solve a crime. Medical and Dental professionals should be encouraged to attend regular conferences and seminars related to forensic odontology, which in turn could improve their knowledge and practical skills to handle forensic odontology-related cases and must be introduced in the undergraduate curriculum effectively as a separate subject. We hope to draw the conclusion that a highly skilled medical and dental team should be actively involved in an effective forensic investigation to assess positive result. We suggest conducting additional research to assess medical and dental professional's awareness, understanding and quality of practice in FO.

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