

Original Research Article

Perception of dental practitioners in and around Kanpur city towards forensic odontology: a cross sectional study

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ABSTRACT

Background: In the present era, forensic odontology has expanded as one of the most remarkable and commendable branches of Forensic Sciences. Through forensic odontology, a dentist plays a very important role in crime investigation of any type. The main objective of the present study was to evaluate the knowledge, perception and practical perception of forensic odontology among the dental practitioners in and around Kanpur city.

Methods: A cross-sectional study was conducted from Jan-Mar 2019 among 207 dental practitioners in and around Kanpur city including 143 BDS and 64 MDS through a questionnaire proforma. The proforma consisted of 20 questions prepared on the topic of forensic Odontology and role of dentist in the field of forensic Odontology.

Results: In this study, nearly 70% of dental practitioners were aware of the role of dentist in forensics, and around 60% of dental practitioners maintain dental records with recording of personal data and clinical findings being the most frequently used method. In the present study most of the dental practitioners were not aware of significance of chelioscopy (63%) and rugoscopy (66%) in field of forensic Odontology. Nearly 70% of dentist accepted the fact that their level of knowledge regarding forensic dentistry is inadequate and nearly 40% of them were not confident in giving any opinion regarding the same.

Conclusions: This study shows that although there is an adequate awareness of role of dentist in forensic Odontology, but there is lack of good knowledge, confidence and practical approach of the dental practitioners towards forensic Odontology which may be due to lack of training, experience, exposure in field of forensics. Thus, the need of the hour lies in updating the knowledge and also developing interest of the dental practitioners regarding forensic Odontology.

Keywords: Dentist, Forensic odontology, Knowledge

INTRODUCTION

In today's world as the crime rate is increasing drastically, so is the level of impediment of identification of the victims and also a stumbling block in recognition of the mode of crime. The dentist plays a remarkable role in crime exploration through the area of specialization known as Forensic Odontology.¹ According to Keiser-

Nielson, "Forensic Odontology is a branch of forensic medicine that deals with the proper handling, examination, and presentation of dental evidence in the best interest of justice".² Forensic Odontology deals with the proper handling and examination of dental evidence and with the proper evaluation and presentation of dental findings in the civil and criminal proceedings.³ It also helps in determination of age and gender of the living or

deceased.⁴ In this day and age natural and man-made cataclysms are affecting Indian subcontinent routinely and more often resulting in mutilated and unidentifiable bodies of the sufferers. In these demanding circumstances dental identification with the help of previous dental records can be a utilitarian tool in the singling out such cases.⁵ Although presently the knowledge and experience of the dentists in India in regards to Forensic Odontology is still inadequate.⁶ Therefore, the present study was conducted to assess the percipience and practical approach of Forensic Odontology among dental professionals in and around Kanpur City.

METHODS

Study population

A cross-sectional study was conducted from January to March 2019 to assess the percipience and practical approach of Forensic Odontology among dental professionals in and around Kanpur City. Those entire dentists who were ready to participate in the present study were requested to fill the consent form and were asked to complete a 20 questions questionnaire. In total around 207 dental practitioners of which 64 MDS and 143 BDS took part in this study (Table 1).

Criteria of selection

Inclusion criteria was, all the BDS MDS dental practitioners practicing in and around Kanpur city were included in the study.

Exclusion criteria was, all those dental practitioners who did not respond or were unable to complete the entire questionnaire were excluded from this study.

A total of 207 dental practitioners completed the questionnaire and the consent form.

Questionnaire

A questionnaire was prepared which consisted of 20 questions related to the basic knowledge, approach and the awareness of the dental practitioners towards Forensic Odontology. All the participants were asked to complete the entire questionnaire. Confidentiality and ambivalence of all the participants was assured.

Data analysis

All data was entered in Microsoft excel sheet and was analyzed by using SPSS statistics-version 17 (SPSS, Chicago, IL, USA).

RESULTS

The study sample composed of 207 private dental practitioners in and around Kanpur city, out of which 143 were BDS and 64 were MDS (Table 1). Of these 207

private dental practitioners 120 were males and 87 were females (Table 2).

Table 1: Qualification of the dental practitioners.

Gender	Males (n/%)	Females (n/%)
BDS (143)	76 (53%)	67 (47%)
MDS(64)	44 (69%)	20 (31%)

Table 2: Awareness of forensic Odontology according to gender.

Gender	Number (n)	Percentage (%)
Males	120	58%
Females	87	42%

A similar type of cross-sectional study was conducted to determine the knowledge, attitude and practice regarding forensic Odontology was conducted by Bhakhri S et al where a total of 165 dentists (BDS, MDS Faculty and Interns) present during the study were given the questionnaire and 152 of them retorted with the complete proforma (Annexure 1).⁵

Around 69.5% of the general dental practitioners were having knowledge and perception about the role of dentist in forensic Odontology and only about 41.5% of the dental practitioners were aware of the role of teeth, found in skeletal remains can be the source of identification of genetics, sex and age of an individual. The internet (96/46.3%) being the most common source of gaining knowledge regarding forensic odontology.

47.8% of the dental practitioners were aware of the fact that teeth act as an accurate source of DNA material and only 56.5% of the dentists were cognizant of the fact that the enamel/dentin can act as an aid for identification of age.

Many of the dentists (66.6%) did not have knowledge and awareness regarding bite marks identification and child abuse. 24.1% of them said that they would report it to the parents, and 45.4% were in favour of reporting to the police and only 27.5% were in favor of reporting to the NGO's or child-care authorities. Ideally, in any case of child abuse, it should be first reported to the child-care authorities, as in many of the cases parents are directly involved with the child abuse. 59.9% of the respondents in the present study maintain dental records in clinic in various forms of which collection of personal data (71.4%) and recording of the clinical findings (52.1%) were the most common methods. About 88.8% agreed that maintaining records will be helpful for the forensic experts for the identification.

Majority of the respondents i.e. 82.6% were unaware of the fact that aware that a dentist can testify as an expert witness in the court to present forensic dental evidence and also 94.6% of the dentists were unaware of any

criminal case solved with the help of forensic Odontology. More than half (70%) dentists believe that their level of knowledge regarding forensic dentistry is inadequate, and 40.5% were not confident in giving an opinion on forensic Odontology.

Due to lack of knowledge and paucity in level of confidence in the field of forensic Odontology 77.2% of the dentists was corroborative to undergo training and specialization in the field of forensic Odontology.

DISCUSSION

Human identification is one of the most challenging subjects in the field of forensic odontology.¹ The identification of an individual is mandatory for personal, social, and legal reasons. Hence, one of the main focuses of forensic odontology is identification of an individual.⁷ At the present time and in this era of expeditious evolution in the field of forensic medicine, Forensic Odontology plays an indecipherable role and a sufficiently good method of establishing dental evidence for identification of victims and suspects in mass disaster, abuse and other criminal cases in the court of justice.⁸ The practice of forensic odontology has gained importance in a number of developed countries across the world. In the developing countries such as India, it is yet to attain its significant position.¹ In the present study a questionnaire was designed consisting of 20 questions, which was used to assess the awareness, knowledge, and interest of dental practitioners in and around Kanpur city in the field of forensic odontology. Teeth serves as an incorruptible method of age assessment and this depends on the availability of antemortem and postmortem records.³

Dentists should know not only the importance of preparing an accurate dental record but also the importance of preserving these records. These dental records serve the purpose of future reference for their practice when needed and for medico-legal cases. As stated by the law, the records should be maintained for a minimum of 7 years to a maximum of 10 years for forensic purposes.⁹

This makes the maintenance of complete dental records incomprehensible. In the present study nearly 60% of the dental practitioners were maintaining dental records with majority of them storing the data in form of personal data (71%) and clinical finding (52%) of the patients. In the study conducted by Bhakhri S et al, 85% of the dental practitioners maintain the dental records with documentation of documenting patient's essential details (25.50%) as the most routinely followed method of storing dental records. In another study conducted by Namrata et al.^{5,10} nearly 70% of dental practitioners usually maintain the records. In the study conducted by Sahni et al,¹ 96% of the individuals agreed that maintaining records will be helpful for forensic experts for the identification. In the study conducted by N.Navya

et al¹¹ only 30% of the dentist maintained dental records which were in contrast to the results obtained from above mentioned studies.

A tooth serves as an exceptional and a precise source for DNA material due to its potentiality to withstand environmental assaults. In the present study nearly 48% of the dentists were aware of the fact that the tooth can serve as a source of DNA. This was closely similar to results of the study conducted by S. Bhakhri et al⁵ where 41% of the dentists identified DNA comparison as amongst the most accurate and sensitive method to identify an individual in mass disaster. In contrast to the above findings, 65% of dentists were in favor of DNA examination as the preferred method of identification in the study conducted by Namrata et al.¹⁰ Similar contradiction in results were seen in the study conducted by Sahni A et al, where 95% of the respondents were aware of the ability of the dental tissues to withstand environmental assaults and still retain some of its original structure.¹ This property of the teeth makes it as an excellent and an accurate source of DNA.⁹

In the present study on 17% of the dentists were aware of the fact that they can testify as an expert witness in the court to present forensic dental evidence which was in contrast to the studies conducted by S. Bhakhri et al⁵ where 57.4% dentists were aware of the importance of dental evidence in court of justice and in studies conducted by Preethi et al, and Namrata et al.^{9,10} wherein nearly one-third and 65% of the respondents, respectively, were unaware of their ability to witness forensic dental evidence where in contradiction.

Child abuse presents as a serious social problem with global dimensions, increasing at an alarming rate in all socioeconomic strata and in all ethnic or racial communities. All cases of child abuse that are greatly growing in number in day-to-day life should be detected as early as possible.¹

Bite mark analysis play a cardinal role in forensic odontology. Each dentition, including the number of teeth, their position, occlusion and the restoration are distinctive for each individual, which furnishes the bite marks analysis as a mode of dental identification. Dental health professionals have to be alert about a variety of physical and behavioral indicators to identify suspected child abuse.^{9,11-13} In the current study, nearly 67% of the dentists were aware of bite marks identification while in the studies conducted by Preethi et al, and S. Bhakhri et al, 71.4% and 82% of dentists respectively knew the significance of bite marks pattern of teeth.^{5,9} Dentists must be aware that they are required to report suspected cases of abuse and neglect to social service or law enforcement agencies. In the present study 45% of dentists were in favor of informing police followed by NGO's (27.5%) and parents (24%). This result was in contrast to the study conducted by N.Navya et al¹¹ where 69% of the respondents said that they would only inform

parents. In cases of mass disaster, the identification of large number of causalities is complex and a difficult process. A forensic odontologist plays an important role in the identification of the age and gender of the deceased individuals.¹⁴ In the present study only 10% of the dentists were aware of the role of forensic Odontology in age and gender identification. The results of the present study were in contrast to studies conducted by S. Bhakhri et al⁵ and Preethi et al, where in majority (nearly 60%) of the dentists are cognizant of estimation of the age and gender of deceased in any major catastrophe.⁹ Lip prints are distinctive as fingerprints of an individual and therefore can also be used as an additional tool to prove the suspect in a criminal act.¹⁵ Study of lip prints is known as cheilioscopy and serves as adjuvant technique in personal identification.¹⁶

In the present study only 37% of the dentist had knowledge about cheilioscopy which was somewhat similar to the result of the study conducted by N Navya et al, where nearly fifty percent of dentist was aware of the significance of cheilioscopy.¹¹ Although the results of the present study were in contrast to the other studies conducted by Bhakhri S et al, where 88% of dentists were aware of lip prints identification and also in the study conducted by Nagarajappa et al.^{5,17} where 71.4% of dentists were aware of this facet. The results of the present study reflect lack of adequate knowledge (nearly 70% of the respondents) and also the level of confidence (40% of the respondents) among the dental practitioners in and around Kanpur city. Majority of the respondents (nearly 78%) were interested in undergoing any such training, but few of them were not because of the lack of time and interest. This lack in knowledge and level of confidence may attribute to number of factors such as unavailability of fully operational laboratories of Forensic Odontology and due to absence of forensic science as an integral subject in the dental academic prospectus.⁵ Use of forensic dentistry is, however, not yet a reality in India. The present study revealed an inadequate knowledge, and sparse interest of the dentists in and around Kanpur city towards Forensics. This makes periodic conferences, workshops, CDEs, and seminars to be conducted imperatively for the dentists, which will not only increase their interest but also enrich their knowledge regarding forensic Odontology and its role in court of justice.

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Annexure 1: Results of the questionnaire for the assessment of perception of dental practitioners (n%).

Sr. No.	Question of the study	Response of the participants
1.	Are you aware about role of dentist in forensic Odontology	Yes (144/69.5%) No (63/30.4%)
2.	What is the source of information about your knowledge in forensic Odontology?	Academic teaching (24/11.6%) Media (TV, Serials, Radio) (43/20.7%) Internet (96/46.3%) Books, Journals (05/2.4%) Lectures, Seminars, CDE (23/11.1) Newspaper (16/7.7%)
3.	Are you aware of the fact that teeth which are found in skeletal remains provide information of which of the following?	Genetic origin (10/4.8%) Sex (12/5.7%) Age (20/9.6%) All the above (80/38.6%) None of above (85/41%)
4.	Are you having knowledge regarding the most regularly followed method for assessing the age of an individual?	Don't know (64/30.9%) Erupted teeth examination (130/62.8%) DNA examination of teeth (03/1.4%) Jaw examination (10/4.8%)
5.	Can enamel/dentin act as an aid for identification of age?	Yes (117/56.5%) No (90/43.4%)
6.	Can teeth serve as a source of DNA?	Yes (99/47.8%) No (108/52.1%)
7.	Do you have knowledge and awareness regarding bite marks identification and child abuse?	Yes (138/66.6%) No (69/33.3%)
8.	What would you do if you come across a case of child abuse in your dental practice?	Inform police (94/45.4%) Inform parents (50/24.1%) Inform NGO's (57/27.5%) Take no actions (06/2.8%)
9.	Are you aware of lip prints identification?	Yes (77/37.1%) No (130/62.8%)
10.	Are you having awareness regarding rugae pattern identification and its role in forensics?	Yes (71/34.2%) No (136/65.7%)
11.	Do you maintain dental records in clinic?	Yes (124/59.9%) No (83/40%)
12.	What are the records which you maintain in your dental clinic?	Photographs (62/29.9%) Radiographs (104/50.2%) Clinical findings (108/52.1%) Dental history (64/30.9%) Personal data (148/71.4%) All the above (67/32.3%) None (20/9.6%)
13.	As a dentist, can we help forensic experts by maintaining records?	Yes (184/88.8%) No (19/9.1%)
14.	Are you aware that you can testify as an expert witness in the court to present forensic dental evidence?	Yes (36/17.3%) No (171/82.6%)
15.	Do you know about any criminal case solved with the help of forensic Odontology?	Yes (11/5.3%) No (196/94.6%)
16.	Can you estimate the age and gender of deceased in the mass disaster?	Yes (21/10.1%) No (186/89.8%)
17.	What do you think about the level of knowledge regarding forensic dentistry? Is it adequate?	Yes (62/29.9%) No (145/70%)
18.	How confident are you in giving an opinion on forensic Odontology?	Very confident (21/10.1%) Confident (42/20.2%) Not confident (84/40.5%) No idea (60/28.9%)
19.	Are you willing to attend any CDE programme on forensic odontology?	Yes (164/79.2%) No (43/20.7%)
20.	If given a choice, would you like to undergo any such training?	Yes (160/77.2%) No (47/22.7%)