

Exploring Trends in Forensic Odontology

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ABSTRACT

Background: Forensic odontology nowadays has become a developing science and is of great importance to society. It is important that dental practitioners should have a proper knowledge of forensics as the need has increased greatly over the last decades due to the unprecedented demand from the criminal justice including terrorism in Kashmir valley (J&K India).

Materials and Methods: Data was collected based on questionnaire survey among qualified dental practitioners related to their awareness of forensic odontology.

Results: A total number of 235 dental practitioners responded to the questionnaire. Results showed that there was a low confidence, in handling of forensic odontology related cases among dental practitioners and majority of dental practitioners were not having any formal training in forensic odontology.

Conclusion: Each dental practitioner has a responsibility to understand the forensic implications associated with the practice of his profession and thus he should work sincerely enough so to ensure his contribution in the field of forensic odontology.

Keywords: Bite marks, Child abuse, Dental practitioners, Mass disaster

INTRODUCTION

In India forensic odontology started in 1193, when Jai Chand, the raja of Kanauj, was murdered by Muhammad Ghor at the Battle of Chandawar and was later identified by his false teeth after being found among the slain [1]. Other important cases in India such as in 1991 former Prime Minister Mr. Rajiv Gandhi who was killed in human suicide bomber was also later identified from his dentition [2] and more recently, Dr Ashith B Acharya, the forensic odontologist, helped in solving the 16th December 2012 Delhi gang rape case with the help of bite mark analysis [3].

Forensic odontology envelopes a plethora of subjects like identification of human remains of air traffic accidents, industrial accidents, natural disasters, terrorist attacks, determination of age, gender and ethnic origin, bite marks analysis particularly in case of child abuse and rape victims [4].

Dental identification assumes a primary role in identification of remains when postmortem changes, traumatic tissue injury or lack of finger print record invalidate use of visual or finger print method [5]. Manmade disasters are quite frequent in India [6] particularly in politically unstable state such as Kashmir valley, (India) where manmade disasters such as bomb blasts, missile & bullet injuries etc are frequent and in these circumstances it becomes an important duty and responsibility of dental practitioners to play an important role in identification of mutilated bodies of victims [7].

Thus the profession of every dental practitioner, especially in Kashmir valley, makes it compulsory for him to understand the forensic implications and importance associated therewith. His knowledge should be much beyond the ethical and jurisprudential limits which used to be attached to it traditionally. Dental practitioners are required to appreciate forensic dental problems so as to maintain legally acceptable records and thus abet legal system in identification of the victims of disaster and crimes but unfortunately dentists often fail to maintain appropriate dental records which results in errors making dental identification difficult. These days, we find people dying due to suicide, homicide, accidents, natural calamities and other various sudden, unexpected and un-noticed causes' day in and day out.

Thus this study was designed to analyse and assess the awareness of forensic dentistry among dental practitioners in Kashmir valley, (India).

MATERIALS AND METHODS

A cross-sectional study was conducted among 235 dental practitioners in Kashmir Valley (India).

A questionnaire based cross sectional study was conducted among purely practicing dental practitioners of Srinagar, Kashmir (India). Those practitioners, who had completed their graduation and willing to participate, were included in the study. The modified S Preethi et al., questionnaire [2] was used that included both open and close ended questions. Information regarding knowledge about the significance of dental records, identification of child abuse, estimation of dental age, individual identification, bite marks and court witness, were obtained from the respondents. Questionnaire also included maintenance of dental records and the attitude of dental practitioners towards maintenance of dental records and towards child abuse. The questionnaires were personally given to the study subjects and the duly filled questionnaires were collected back from them the next day so that they get sufficient time to fill the same. Prior to the conduct of study, the ethical clearance was taken from the IERB (Institutional Ethics Review Board), Kothiwal Dental College and Research Centre, Moradabad. Present study was conducted during Jan-Feb 2014 (a period of one month).

RESULTS [TABLE/FIG-1]

Q: Since how many years you are in dental practice?

A: Seventy six percent dental practitioners were practicing in clinic since 10 y. Rest was having less than 10 y experience.

Q: Do you maintain dental records in your clinic? If so which of the following are maintained and for how long?

A: Forty two percent of dental practitioners were not maintaining dental records. Remaining fifty eight percent only five percent maintained full dental records. 98% among those did not maintain the records for ten years.

Q: Are you confident in handling forensic odontology related cases?

A: Eighty one percent of dental practitioners were not confident.

Q: Do you know the importance of keeping dental records in identifying the deceased and crime suspects?

A: Twenty percent of dental practitioners were not aware of significance of maintaining dental records

Q: Can you recognize physical/ignored/sexual/psychological abuse of a child?

- A:** Fifty eight percent of dental practitioners were not fully aware of how to identify child abuse, while rest emphasized on trauma, behaviour, malnutrition and psychological behaviour etc.
- Q:** *How will you handle if you notice signs or symptoms of child abuse?*
- A:** Twenty percent dental practitioners did not answer this question while others mentioned reporting to concerned authorities such as police department.
- Q:** *How do you assess the dental age of an individual by teeth examination?*
- A:** Forty four percent dental practitioners did not know how to estimate dental age of an individual. Rest of dental practitioners reported about dental eruption method of age estimation.
- Q:** *What is the most precise and sensitive method to identify an individual?*
- A:** Twelve percent dental practitioners did not know the answer, while sixty eight percent answered that DNA would be an accurate method for identification followed by ten percent finger print method, eight percent anthropological method and two percent serological analysis.
- Q:** *Do you have any knowledge regarding bite marks pattern of teeth?*
- A:** About thirty eight percent of dental practitioners didn't responded to this question.
- Q:** *Do you have any recognized training in collecting, assessing and presenting dental evidence?*
- A:** Ninety four percent of dental practitioners didn't had any formal training of forensic odontology,
- Q:** *Do you know that you can be a witness in the court to present forensic dental evidence?*
- A:** Sixty percent of dental practitioners were not aware that they could testify as an expert witness in judicial court.
- Q:** *Can you identify the age and gender of the deceased in the event of a mass disaster?*
- A:** Fifty eight percent dental practitioners did not know to identify the age and gender of the deceased in the event of mass disaster.

In the present study it was revealed that 76% dental practitioners were practicing in clinic since 10 years. Rests were having less than 10 years of experience. 42% percent of dental practitioners were not maintaining dental records while among remaining 58% respondents, only 5% maintained full dental records and the rest did not maintain the records for 10 y. 81% percent of dental practitioners were not confident in dealing with the cases of forensic odontology. 20% of dental practitioners were not aware of significance of maintaining dental records. 58% of dental practitioners were not fully aware of how to identify child abuse, while rest emphasized on trauma, behaviour, malnutrition and psychological behaviour. 44%

dental practitioners did not knew how to estimate dental age of an individual while as 66% dental practitioners reported dental eruption as the method of age estimation. 94% dental practitioners did not have any formal training of forensic odontology. 60% of dental practitioners were not aware that they could testify as an expert witness in judicial court. 58% dental practitioners did not know to identify the age and gender of the deceased in the event of mass disaster.

DISCUSSION

Now-a-days, the most rapidly developing Forensic medicine and science are incomprehensible without talking of Forensic Odontology which is a highly specialized branch of science dealing with the legal aspects of dentistry, as it has been established over many years as reasonably tenable and widely acceptable method of ascertaining dental evidence for identification of victims and suspects in mass disasters, abuse and organized crimes [8].

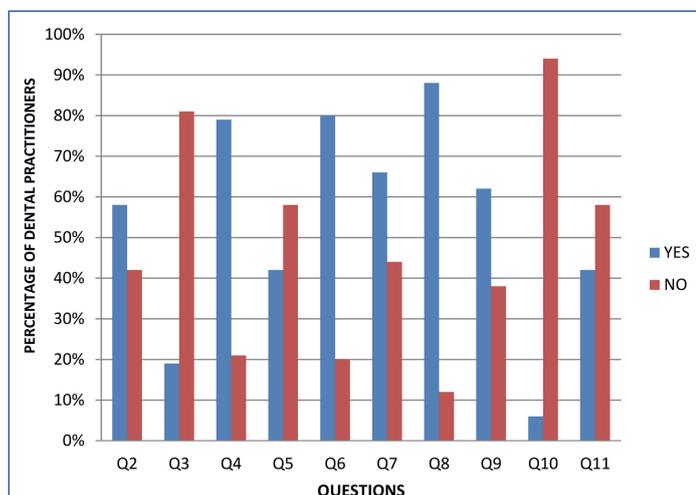
The Federation Dentaire Internationale (FDI) defines forensic odontology as that branch of dentistry which deals with the proper handling and examination of dental evidence and with the proper evaluation and presentation of dental findings so as to facilitate justice delivery system [9]. Forensic odontology is also defined as the application of dental science to the law, i.e. the use of dental evidence in the interest of justice [10].

Utilizing method of dental identification is handy in scattered instances throughout recorded history and primitive forms of dental identification have most probably been used in prehistoric times. It is why a complete charting of dentition using FDI system or any other nomenclature is possible to be done by evaluating the type of dentition and surfaces of teeth involved. Teeth, periodontal tissues and normal anatomical features are assessed in comparative dental identification. Odontograms form a basic outline to compare dental characteristics at the simplest level [11]. In the present study, 42% of dental practitioners were not maintaining dental records. Remaining 58% only 5% maintained full dental records. 98% among those did not maintain the records for ten years. This finding reveals the fact that additional extensive training is essential to understand and know the different methods of maintaining dental records and to acquire latest technical skills associated with forensic odontology [12].

There is a need to start the specialty training in forensic dentistry. A huge number of graduate doctors would definitely pursue the carrier as forensic odontologists which in turn will improve the services to Indian judicial as well educational system [13].

Bite-mark analysis is an important division of forensic odontology. Bite marks can be found in food stuffs such as butter products, chocolates, cheese and thus these marks provide a kind of dental identification. It is now well recognized that bite marks provide detail of a kind comparable with the minute detail that was earlier made available only by finger prints [14]. However, 58% of dental practitioners in Kashmir valley were not fully aware of how to identify child abuse. The reason for such deficit knowledge might be that the practitioners are not aware of journals of forensic odontology and are not having much access to the database. Moreover, Forensic Odontology was introduced by DCI in BDS curriculum recently, so majority of the practitioners were unaware of the related issues [15]. The inability to handle the child abuse cases compel the practitioners to refer such cases to the specialist as observed in the previous studies where few practitioners were found to refer the child abuse cases to a psychiatrist, as they claimed it was not their field of work [2].

Age assessment by means of teeth provides the most trustworthy guide in the process of identification. A variety of methods are used including the visual method, radiographic method, histological method, physical and chemical analysis. Eruption sequence, neonatal line formation, incremental lines of Retzius, Schour and



[Table/Fig-1]: Response to Questionnaire

Massler chart and Gustafson's method are main parameters in age estimation [16]. Reason to maintain legible and legally acceptable records to assist legal authorities in the identification of victims and suspects is derivable from the fact of extensive appreciation of Forensic Odontology based on a dentist's broad background knowledge of general dentistry, encompassing all dental specialities and primary knowledge of the role of the forensic pathologist and the methods used in autopsy. In the present study 44% dental practitioners did not know how to estimate dental age of an individual. Rest of dental practitioners reported about dental eruption method of age estimation. This finding was similar to the previous results found in Chennai [2] and other metropolitan cities [15]. The reasons for this finding might be their unawareness or lack of basic knowledge apart from not knowing the significance of dental age with regard to forensics [2].

There is a need to devote several hours for Forensic Odontology during the undergraduate students' last two years of BDS course in Indian dental colleges as followed in Canadian Dental Schools [17].

The regulatory bodies (DCI) and government, should emphasize for conducting continued dental education programmes (CDEs) and National/International conferences on Forensic Odontology and make it compulsory for dental practitioners to attend the same.

Current worsening of the conditions due to increasing crime and man-made disasters has amplified the role of forensic odontology in identification of the victims. Hence, in near future, Forensic odontology must be introduced into the BDS curriculum effectively as a separate subject, so that the students get well acquainted with the required knowledge for handling the medico-legal cases in their future practice. It is however also emphasized that model for forensic dental education should be drafted to educate new emerging dental students and they should also be encouraged for pursuing further forensic higher education. Since oral pathologist have a specialized knowledge about physiological and pathological craniofacial conditions, therefore can play a vital role in training new generation dentists, as future forensic odontologists.

Unfortunately in Srinagar, Kashmir probably due to the lack of proper awareness, neither the government nor the qualified dentists have completely understood the role that can be played by them and is still in infancy like in other states of India [18].

LIMITATIONS OF THE STUDY

- More sample size could have been included in the study which was not possible due to time limitation.
- Gender wise difference in the knowledge and attitude among dental practitioners about forensic odontology was not analysed.

CONCLUSION

The study which was conducted on 235 dental practitioners regarding their awareness about forensic odontology revealed that they do not have enough knowledge and awareness regarding forensic odontology. It is as such imperatively emphasized that each dental practitioner has a responsibility to understand the forensic implications associated with the practice of his profession and thus he should work meticulously enough so to ensure his contribution in the direction of due acceptability thereof, which in turn will

assist legal authorities in the identification of victims and suspects, with end-goal of facilitating optimum justice-delivery system. It is however also emphasized that model for forensic dental education should be drafted to educate new emerging dental students and they should also be encouraged for pursuing further forensic higher education. Since oral pathologist have a specialized knowledge about physiological and pathological craniofacial conditions, therefore can play a vital role in training new generation dentists, as future forensic odontologists.

It was concluded that majority of dental practitioners in Srinagar, Kashmir (India), did not have enough knowledge and awareness regarding forensic odontology. It is as such imperatively emphasized that a common strategic approach should be carried out by the Government, Regulatory bodies and Oral pathologists and dental practitioners in the field of Forensic Odontology for its authentic usefulness.

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With due permission from Dr. Preethi this question was modified and reproduced"

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