

Original Article

Forensic Odontology - How Much Do We Know?

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INTRODUCTION

In the today's scenario, when crime-related occurrences are at rise in the society, the identification of the victim, criminal, or the mode of crime becomes a brain-storming process. The dentist plays a small, yet significant role in crime investigation through the specialty known as forensic odontology. According to Keiser-Nielson, forensic odontology is a branch of forensic medicine that deals with proper handling, examination, and presentation of dental evidence in the best interest of justice.^[1] Avon classified forensic odontology into civil, criminal, and research.^[2] It involves the identification of deceased individuals through the comparison of ante- and post-mortem records. This special branch provides scientific background and firm base in criminalistics. From AD 66 until date, dental identification has proved vital in identifying deceased individuals, the first case being accepted by the law in 1849.^[3] The establishment of forensic odontology as a unique discipline has been attributed to Dr. Oscar Amoedo (Father of Forensic Odontology).^[4] It pays special emphasis on the use of dental records to identify crime victims or accidents that are required for medicolegal cases. Despite its indispensable role in the arena of forensics, this vital and integral field is still in the state of infancy in India.

AIMS AND OBJECTIVE

- Analyze the awareness about the subject in dental fraternity
- Assess the knowledge and scope of improvement.

ABSTRACT

Background: Forensic odontology is a branch of forensic medicine that deals with the proper handling, examination, and presentation of dental evidence, dental surgeon playing a role in crime investigation, identification of the victim, criminal or the method in it. It pays special emphasis on the use of ante- and post-mortem dental records to identify crime victims or accidents that are required for medico legal cases.

Aims and Objectives: This study aims to assess the awareness of the dental fraternity towards the subject & scope of improvement.

Materials and Method: A questionnaire was prepared consisting of 15 questions, all related to the field of forensic odontology. The sample consisted of 100 individuals from dental fraternity divided in four groups.

Results and Observations: The participants were assessed on Awareness, Knowledge & Eagerness.

Conclusion: This vital and integral field, in spite of efforts, is still in the state of infancy in India.

KEY WORDS: Dental surgeon, forensic odontology, knowledge

MATERIALS AND METHODS

The present study was carried out in the Department of Oral Pathology and Microbiology, MGPGI, Puducherry. The sample consisting of 100 individuals from dental fraternity was divided into four groups:

- Group 1: Final-year students
- Group 2: Interns
- Group 3: Postgraduate (PG) students
- Group 4: Private practitioners.

A questionnaire was prepared consisting of 15 questions, all related to the field of forensic odontology [Questionnaire 1]. Data were collected in personalized manner. The results obtained were statistically analyzed using one-way ANOVA analysis [Table 1].

RESULTS AND OBSERVATIONS

Of the 15 questions, 12 of them were in Yes/No format. For every answer as Yes, 1 point was awarded, and for a No, 0 was awarded.

Question No. 5 was asked to the participants with the aim to know the common sources from where they attained the

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knowledge about the subject. The results revealed that for the private practitioners, newspapers are the primary source of information whereas the others got the information from the lectures organized in the colleges. Crime-based TV serials are also a common source of information regarding the subject in all the groups, though their authenticity needs validation [Figure 1].

Question No. 10 was aimed at assessing the importance of dental record keeping among the participants. The results reveal that PG students maintain all the necessary records, i.e. casts, photographs, and radiographs. Radiographs are the ones which are maintained by the private practitioners [Figure 2].

Question No. 11 was asked to assess the response of the participants in case they encounter any case of child abuse. The results reveal that most of the participants deemed it important to inform the parents of their observations [Figure 3].

The participants were finally assessed on:

- Awareness of the subject (Question No. 1–5)
- Knowledge of the subject (Question No. 6–12)
- Eagerness to learn more (Question No. 13–15) [Figure 4].

Groups	n	Mean	SD	F	P
Final year	24	3.54	1.95	43.48	0.001**
Interns	26	5.65	1.99		
PG students	27	9.26	1.60		
Practitioners	23	6.39	1.67		

Significant ** $P < .01$, PG: Postgraduate, SD: Standard deviation

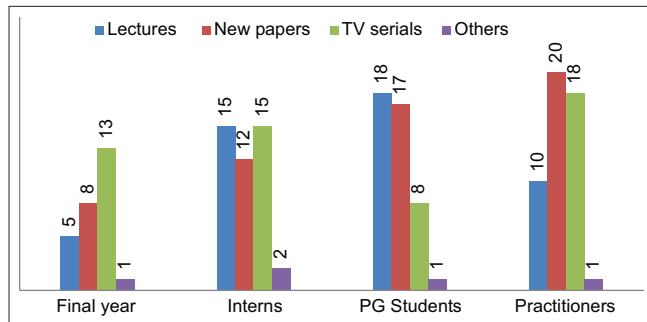


Figure 1: What is your source of information for the knowledge in forensic odontology?

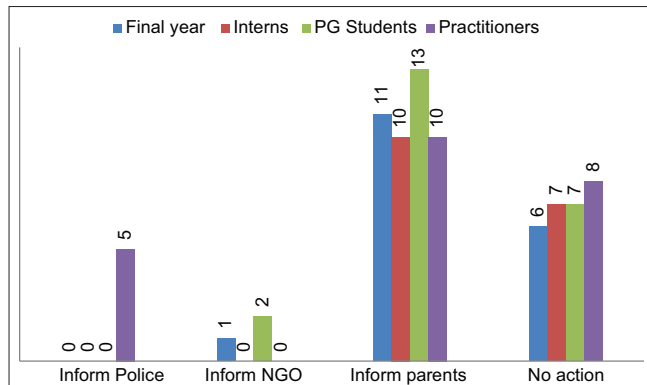


Figure 3: What would you do if you identify signs and symptoms of child abuse?

DISCUSSION

“What a nightmare! Bodies as of Negroes blackened; heads carbonized; shrunk and reduced to nothing, but only the teeth remained.” – this is the famous quote by Dr. Oscar Amoedo (Father of Forensic Dentistry) following the Bazar de la charite’ fire on May 4, 1897.

A unique feature of dental tissues that underlines their importance in forensic investigations is that they can withstand extreme environmental assault and still retain their original structure.

Most of the participants were aware that dental tissues can be source of DNA and enamel/dentin can aid in identification of a person’s age and ethnic background.

The preservation of dental records is a very underrated concept in our country, especially among the private practitioners. Nonetheless, its importance in forensic investigations cannot be undermined. The dental record serves a purpose of future reference for the practitioners when needed and is not always

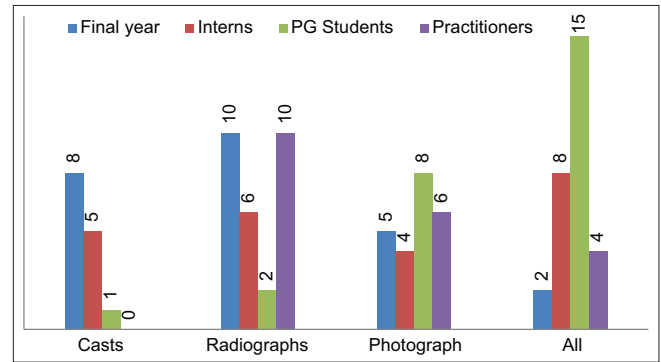


Figure 2: Which of the dental records are maintained?

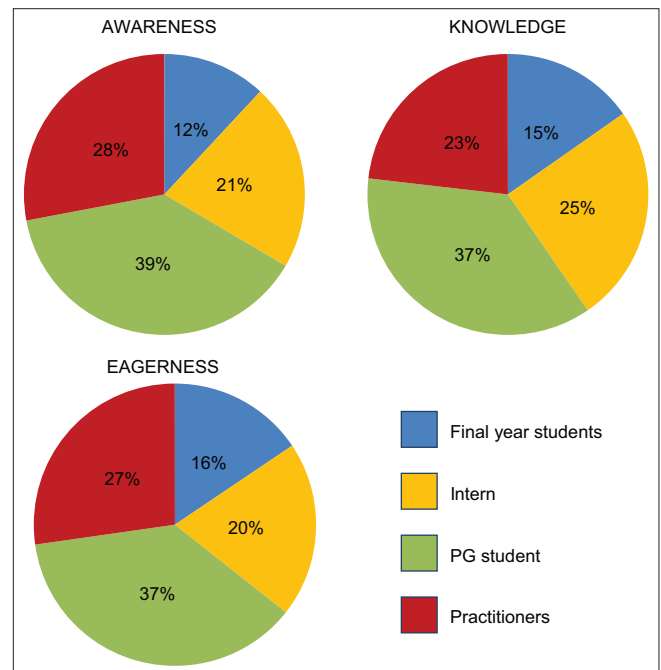


Figure 4: Assessment of participants on awareness, knowledge & eagerness on the subject

Table 2: One way ANOVA analysis of the 3 parameters

Awareness	n	Mean	SD	F value	P value
Final year	24	0.87	0.74	19.80	0.001**
Interns	26	1.57	0.80		
PG students	27	2.81	1.00		
Practitioners	23	2.04	1.10		
Knowledge					
Final year	24	1.66	1.30	19.89	0.001**
Interns	26	2.73	1.15		
PG students	27	3.96	0.80		
Practitioners	23	2.52	0.99		
Eagerness					
Final year	24	1.04	0.90	15.04	0.001**
Interns	26	1.34	0.89		
PG students	27	2.48	0.64		
Practitioners	23	1.82	0.83		

Significant ** $P < .01$, PG: Post Graduate, SD: Standard Deviation

maintained for a forensic purpose. It aids in the comparison of ante- and post-mortem status. Most of the participants who were preserving records were doing it in educational institutes for training purposes. Strikingly, most of the practitioners were not maintaining complete records and were unaware of its forensic applications.

The term “forensic” has its origin in the Latin word “forensis” from “forum,” which means “in the forum,” a place where legal matters are discussed.^[5] The fact that a forensic dentist can serve as an expert witness in the court was not known by most of the respondents.

The awareness of the identification of the clinical cases of legal importance was poor, thus negating any further appropriate action which could have been taken.

According to the study reports of Sengupta *et al.*, the cases related to child abuse in metros are less than in tier-2 cities.^[6] A thorough intraoral and perioral examination of a child by the dentist can reveal suspected cases abuse and neglect. This study revealed that most of the participants of the study thought of informing the parents about the issue, while many private practitioners considered informing to police an option. It is pertinent to mention here that India has a 24-h helpline, i.e. 1098 (CHILDLINE) to address the issue of child abuse.

Most of the respondents in educational institutes gained knowledge about the subject of forensics from *lectures* and

seminars, while majority of the practitioners were known to be gathering information from *newspapers*.

Majority of the final-year students were neither aware of the subject nor did they have much knowledge about its applications, but the eagerness to learn about this upcoming field is very high. To conclude, this study reveals that there is fair amount of awareness among the dental professionals about forensic dentistry.

There is lack of knowledge about the clinical and legal aspects of this subject among most of the dental professionals.

However, eagerness to know more about the subject is quite high, indicating the developing interest of the subject among them.

The present scenario can be improved by having more avenues for imparting systematic knowledge to the dental professionals at various levels.

More stress can be given to the subject in the undergraduate curriculum and introduced as specialty subject at PG level.

The awareness has to be created among the dentists first, and then, the same can be reached out to the society.^[7]

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Nil.

CONFLICTS OF INTEREST

There are no conflicts of interest.

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QUESTIONNAIRE

Questionnaire 1

1. Forensic dentistry involves the study of teeth with the intention of providing facts as evidence in the court of law. This branch is also termed as Forensic Odontology
 - a. Yes
 - b. No
2. The teeth found in incidents of mass disaster help to indicate which of the following
 - a. Person's occupation
 - b. Person's age
 - c. Person's ethnic background
 - d. All the above
3. Can teeth serve as a source of DNA?
 - a. Yes
 - b. No
 - c. Cannot say
4. Can enamel/dentin serve as aid for the identification of age?
 - a. Yes
 - b. No
 - c. Cannot say
5. What is your source of information for the knowledge in forensic odontology?
 - a. Lectures
 - b. Newspapers
 - c. TV serials such as crime patrol, CID
 - d. Others
6. Do you read forensic dentistry-related journal/publications?
 - a. Yes
 - b. No
 - c. Occasionally
7. Are you aware of bite mark pattern of teeth and its applications?
 - a. Yes
 - b. No
8. Do you know that you can be a witness in the court to present forensic dental evidence?
 - a. Yes
 - b. No
 - c. Cannot say
9. As dentists, can we help forensic experts by maintaining dental records?
 - a. Yes
 - b. No
10. A. Do you maintain dental records?
 - a. Yes
 - b. No
- 10 B. If yes, which of the following are maintained?
 - a. Casts
 - b. Radiographs
 - c. Photograph of patient
 - d. All the above
11. What would you do if you identify signs and symptoms of child abuse?
 - a. Inform police
 - b. Inform NGO
 - c. Inform parents
 - d. Take no action

12. Do you know of any criminal cases solved with the help of forensic odontology in India or abroad?
 - a. No
 - b. If yes, please cite the example
13. How confident are you about your ability to handle forensic dentistry-related cases?
 - a. Very confident
 - b. Confident
 - c. Not confident
14. Do you know if there are any formal training courses for forensic odontology in India?
 - a. Yes
 - b. No
15. If given a choice, would you like to undergo training in forensic odontology?
 - a. Yes
 - b. No

CID: Criminal investigation department, NGO: Nongovernment organization