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Awareness about Importance of Forensic Odontology among General Dental Practitioners in Jammu Region

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Abstract

Introduction: Forensic odontology is a branch of dentistry that deals with age and gender estimation and personal identification from human remains by using tooth as a source of evidence. Its awareness is crucial among dental practitioner for proper identification.

Aims: Aim of this study was to create awareness about knowledge and practice of forensic odontology among the general dental practitioners in Jammu region.

Materials and Methods: Cross sectional study was conducted in a sample of 161 dentists and the data was collected by means of questionnaires.

Results: 74% of the participants did not maintain the complete dental records for more than ten years. Hardly 11% maintained the complete dental records.

Conclusion: The present study revealed lack of awareness, knowledge and practice regarding the role of forensic odontology in human identification.

Keywords: Forensic odontology, human identification, child abuse, age estimation.

Introduction

The term "forensic" has its origin in the Latin word "forensis" from "forum," which means a place where legal matters are discussed. Forensic odontology has been described as 'the application of dental science to the administration of the law and the furtherance of justice' and 'that branch of dentistry, which in the interest of the law, deals with the proper handling and examination of dental evidence and the proper evaluation and presentation of such evidence' and 'the overlap between the dental and the legal professionals'.[1]

Dental identification assumes a main role in the identification of remains when there are postmortem changes, tissue injury, and a lack of fingerprints or other identifying methods. The identification of dental remains is of key significance in cases where the deceased person is decomposed, skeletonized, or burned. The main advantage of dental evidence is that it is frequently preserved after death and not affected by adverse conditions.[2]

Forensic Odontology is a rapidly developing branch with immense importance in the examination of dental evidence for legal implications which is required for the identification of victims of mass disasters or abuse. Forensic odontology utilizes information from various dental disciplines (Oral surgery, Oral medicine and radiology, restorative dentistry, orthodontics, Oral Pathology etc.) In modern times, forensic odontologists have become invaluable members of forensic investigation teams.[3]

The main focus of the present study is to evaluate the knowledge, attitude, practice and awareness of forensic odontology among general dental practitioners in Jammu district. A self-reported questionnaire was used for gathering information from the subjects regarding forensic odontology.

It has been observed that knowledge and awareness level regarding forensic odontology among the subjects is inadequate and. There are very few workshop conferences that have been conducted in forensic odontology per year for dental practitioners, which could kindle an interest among the students to probe deeper into the subject.

Materials & Methods

A cross sectional descriptive questionnaire based study was conducted among general dental practitioners in which a total of 161 participants gave responses. The finalized questionnaire consisted of 12 open and close ended questions and was uploaded online through google forms. The participant's privacy and confidentiality was preferred. The information of the participants documented was Age, Gender, education qualification- undergraduate, postgraduate, faculty of a private or Govt Dental College, Only a practitioner and for how many years. The percentage was used to describe the categorical data. Data collected was tabulated.

Questionnaires designed for the study

1. Do you maintain dental records?
2. For how long you maintain dental records ?(More than 10 years)
3. Less than 10 years
4. Which dental records you maintain?

a) Patients details including medical and family history
b) Photographs
c) Dental casts
d) Radiographs
e) Investigations
f) Treatment plan

5. Are you aware about the importance of maintaining dental records?
6. How will you estimate the age of an individual by clinically examining the teeth?
7. How will you estimate the gender of an individual with the help of teeth?
8. Are you aware of the signs and symptoms of child abuse?
9. Are you aware of the bite marks patterns?
10. Are you aware of palatal rugae patterns?
11. Which is the most accurate and sensitive method of an individual identification?

a) DNA
b) Fingerprinting
c) Bite marks
d) Serological comparison
e) Visual identification
f) Anthropological examination

12. Are you aware that you can be an expert witness in the court of law by using dental evidence?

Results

1. Do you maintain dental records?

15% did not maintain the dental records in their clinics at all. Remaining 74% of the participants did not maintain the complete dental records. About only 11% maintained the complete dental records.

2. For how long you maintain dental records? (More than 10 years)
3. Less than 10 years

94% did not maintain the dental records for more than 10 years. Only 6% maintain the records less than 10 years.

4. Which dental records you maintain?

The one who maintained the records were mainly dental casts and radiographs.

5. Are you aware about the importance of maintaining dental records?

The importance and significance of maintaining dental records were not known to 27% of the participants.

6. How will you estimate the age of an individual by clinically examining the teeth?

46% participants did not know how to estimate the age of the teeth. Rest mainly were able to identify the age through eruption of teeth in the oral cavity.

7. How will you estimate the gender of an individual with the help of teeth?

59% of the general dental practitioners had no idea about gender estimation with the help of teeth.

8. Are you aware of the signs and symptoms of child abuse?

54% were unaware of child abuse signs and symptoms related to teeth and oral cavity. Torn and dirty clothes, injuries, bruise marks, shabby looks etc were the signs they thought of neglect and child abuse.

9. Are you aware of the bite marks patterns?

62% had no knowledge about the significance of bite marks in identification.

10. Are you aware of palatal rugae patterns?

82% were extremely ignorant about rugae pattern significance in identification.

11. Which is the most accurate and sensitive method of an individual identification?

89% said that DNA is the most accurate and sensitive method. 53% were aware about the role of fingerprints in identification.

12. Are you aware that you can be an expert witness in the court of law by using dental evidence?

39% were not aware that dentist can be an expert witness.

Discussion

Forensic odontology is a science that uses the skill of dentist in personal identification during mass calamities, sexual assault and child abuse. It is a proper handling, examination, and evaluation of dental evidence, which will be presented in the interest of justice. The establishment of forensic odontology as a unique discipline has been attributed to Dr. Oscar Amoedo (considered as the father of forensic odontology), who identified the victims of a fire accident in Paris, France, in 1898.[4]

Forensic odontology is of supreme importance because teeth are considered crucial biological evidence that is not affected by any type of external factors such as heat, decomposition process, etc. The fact that every human dentition and the treatment delivered on every patient is unique, makes it a chief identification key.[5]

To the general community, forensic odontology is most frequently associated with personal identification of the deceased, and gains significant publicity at the time of disasters, natural or manmade, that claim many lives at a single point in time. The actual scope of practice of

forensic odontology is considerably broader than this. In addition to human identification forensic odontologists are also involved in the examination and assessment of bite mark injuries, orofacial injuries following assault or trauma and child abuse injuries; age assessment of both living and deceased persons and civil cases involving malpractice and fraud allegations.[6]

The success of forensic odontology can be achieved only if the dentist and the dental institutions maintain antemortem dental records of their patients regarding name, age, sex, number of teeth present, filled teeth, decayed teeth, missing teeth, dentures, any morphological variations of teeth and oral mucosa with radiographs and photographs. During homicide and mass disasters or natural calamities, antemortem records can be compared with that of post-mortem for human identification.

Although it was reported that forensic odontology was used to identify victims of a fire in the Vienna Opera House in 1878, the modern era of forensic odontology is said to have commenced with the identification of the victims of the Bazar de la Charité fire which occurred on 4 May 1897 in Rue Jean-Goujon, Paris. One hundred and twenty-six members of the Parisian aristocracy perished after an ether–oxygen film projector ignited a rapidly destructive fire. All but 30 of the victims were identified visually or by personal effects, mainly jewellery, on the day after the fire.[7]

In the present study there was less response with regards to maintaining dental records of the patients. 94% did not maintain the complete records for more than 10 years and 6% maintained the records for less than 10 years.[8,9] This was not in accordance to the previous studies where 79% and 87 % preserved their records. This clearly shows the lack of awareness and importance of forensic dentistry among dental practitioners.

In the present study, the records preserved were mainly dental casts and radiographs and 27 % of the practititioners were not aware of its importance. This was not in accordance with previous studies. Sarode et al. who stated in 2017 that 78% of the General dental practitioners retained radiographs.[10] Results of our study was a matter of concern in these modern times. A dental practitioner must be proficient with the importance of preserving and taking accurate dental records which can serve as source of future reference and can be helpful in medicolegal circumstances. Patients records should be retained for a minimum of seven years and a maximum of 10 years.[11]

Radiographs are an essential aspect of forensic odontology. They play a substantial role in revealing the identity of a person. Study casts are extremely reliable as they are a duplication of the patient's natural dentition. In the current study, 57% of the total participants knew about radiographic methods used for age estimation. This lack of confidence could be attributed either to lack of interest or lack of seminars and conferences held on the subject.

In the present study there was slightly more than 50% response as far as their awareness about child abuse, gender and age estimation was concerned. 82% of the practitioners had no idea about the importance of rugae pattern in human identification. Lack of confidence and knowledge is most likely a result of lack of awareness and lack of training opportunities. Dentist who are employed and affiliated to teaching colleges as academicians through CDEs, lectures, conferences, seminars, articles etc generally update their knowledge as and when they can.

DNA profiling systems can expose the exact identity of a person. 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. The DNA extracted from the teeth of an unidentified individual is compared with DNA isolated from known antemortem samples, such as stored blood, toothbrush, hairbrush, clothing, collection of buccal cells with help of DNASAL™, cervical smear, biopsy, or DNA of a parent or sibling. In the present study 89% of the practitioners were aware of the importance of DNA in identification.[12]

Skin on the palmer and planter surface of the human hand and foot is continuously wrinkled with minute narrow ridges known as friction ridges. The impression of the epidermal or the friction ridges on all parts is known as fingerprints, which begin to develop on 12th to 16 weeks of IUL and their formation gets completed by 6th foetal month. These ridges remain unchanged throughout the life of an individual until destroyed by the decomposition of skin after death. These features statistically differ among sexes, ethnic group and age categories. Fingerprints pattern have become an infallible identification system. In the present study 53% of the practitioners had knowledge about the importance of fingerprint identification.[13]

Recently scope and reliability of all forensic evidence have seen an explosion of research and literature relating to improving the performance and professionalism of practitioner. Recent rulings challenging admissibility of specialist evidence, recognition of specialist disciplines and the evidentiary weight of forensic evidence also highlight the need for continued research into aspects of practice and the need to establish and maintain high professional standards.

Conclusion

For an efficient forensic investigation, we need a dental team, comprising personnel from all branches of dentistry, working in close association with experts from other branches of forensic science. TPractitioners must have a sound working knowledge of dental anatomy and pathology; comparative dental anatomy; the natural sciences; legal system law and relevant legislation. An understanding of the activities and interactions of other forensic disciplines is also important in developing an appreciation of the scope and practice of forensic odontology. Forensic odontologists should have broad dental experience, a methodical and analytical approach with considerable patience and attention to detail. Personal honesty and integrity and emotional stability are vital. Good communication and interpersonal skills and the ability to work as part of a team, as well as autonomously, are important, as is the ability to formulate and articulate well-balanced views.

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