



ROLE OF DENTAL EXPERT IN FORENSIC DENTISTRY: A SOCIAL RESPONSIBILITY

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ABSTRACT

Forensic dentistry is the law application that defines the superposition between dentistry and the legal professions. In forensic dentistry, dentists play a crucial role through their experience in different areas, such as accidental or non-accidental oral trauma, violence and neglect in childhood, age assessment, dental history and mass catastrophe through analysing the anatomy of teeth and skin for clues. These dental results/records can be useful in the forensic identification of a non-identified person with teeth. Owing to the physiological changes and pathology of the knowledge of the tooth record is held during life and beyond. Lipper prints and palatal rugae patterns may also provide useful details and help us recognise individuals. Teeth may also help to assess the gender of dental DNA skeletonised remains. In teething crime investigation, forensic odontology plays a part as well, such as bite marks. The dentist will help the doctor determine bite marks as a result of violence. The purpose of this article is to discuss the role of dentist in various aspects of forensic odontology and procedures required for examination, identification, and investigations of bite marks.

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INTRODUCTION

The word Forensic is derived from a Latin word "forensis" meaning "before the forum," a place where legal issues were addressed. Forensic odontology or forensic dentistry is the implementation of dental knowledge to those criminal and civil laws that are enforced by police forces in the criminal justice system. The two peculiar aspects of forensic science are it is multi-professional and multidisciplinary (Balachander, 2015). Forensic Odontology has been defined by the Federation Dentaire International (FDI) as "that branch of dentistry that in the interest of justice deals with the proper handling and examination of dental evidence and the proper evaluation and

presentation of dental findings in the interest of the justice" (Mishra, 2014). The father of forensic odontology is Dr. Oscar Amoedo. In 1898 he wrote his first dissertation titled "L'Art Dentaire en Legale." This was the first comprehensive text on forensic odontology (Verma, 2014). A forensic odontologist reinforce the legal authorities by analysing dental evidence by examining and evaluating teeth, jaws and oral tissue injuries arising from different causes such as abuse, violence, major accidents, and crime-related injuries, by examination of marks in order to eventually remove or identify a suspect as the perpetrator and by examining of dental remains (whether fragmentary or complete and including all forms of dental restorations) from unknown persons or bodies with a view to identifying the latter as possible (Goswami, 2019). The aim of this article is to discuss the role of dentist in various aspects of forensic odontology.

Role of dentist/ dental surgeon in forensic odontology: Dental identification of humans occurs for different reasons and different situation such as for the body of victim during violent crime, fire, road traffic accident, and workplace accident. Body can be damaged to such an extent that identification by a family member is neither reliable nor desirable. Bodies of people who have been damaged for long time before discovery and those found in water also present difficulties in identification. Through the specialty of forensic dentistry, dentist can play an important role in this process. By identifying the victims of crime and disaster through guidelines and standards, a dentist can support those involved in crime investigation (Reddy, 2016). The major role of forensic dentistry is to help in the identification of those individuals who cannot be identified visually or by other means. The distinctive nature of dental anatomy and the placement of custom made restorations ensure accuracy when the techniques are correctly employed (Sharma, 2018). Therefore it the duty of dentist/dental surgeons of the country to maintain the dental records and remaining tooth material in case of restorations in patients treated by dental surgeons, so that preserved material may be used in identification of damaged individuals (Pretty, 2001).

Role of Pedodontist: Pedodontist can play important role in identification of bite marks and abuse. Pediatric dentist can help in the investigations of legal officers by implementing his expertise in recognition of signs and symptoms of child abuse and help in recognition of such victims. Pedodontist should furnish trust worthy information to physicians about oral and dental manifestations of child abuse and neglect. Pedodontist is usually more concerned with ante mortem record maintenance which may later be useful in dental identification (Vinutha, 2015).

Role of Orthodontist: In 1974 Salzmann mentioned the importance of orthodontic diagnostic aids in forensic odontology. Maintenance of diagnostic and treatment records by orthodontists may help in identification of deceased victims or suspects. At times a single feature may be so extraordinary that, it alone may be enough to make a positive identification. Irrespective of whichever the method employed in order to identify a disfigured face (person), the results of the comparison of ante mortem and postmortem data. The role of an orthodontist may be discussed under Pre treatment records, Mid treatment and Post treatment records (Dongre, 2017).

Role of Prosthodontist: Prosthodontist can play a very important role in forensic identification and can incorporate various techniques available in literature used for identification. Prosthodontist are used in forensic odontology because they have a sound knowledge of dental materials, engraving records into prosthesis, Study of rugae patterns- rugoscopy, Impression making and models of bite marks and Lip print recording and identification (Ahmed, 2017).

Role of Periodontist: Periodontist can aid in postmortem identification of a deceased person in the Comparative dental identification, Gingival morphology and pathology, Periodontal ligament morphology and pathology and Alveolar process and lamina dura in the Periodontal tissues, Gingival Margins, Cementum in age determination, Gingival tissue changes (Gupta, 2019).

Role of Endodontist: Studies have shown that with advancing age the size of the dental pulp cavity is reduced as a result of secondary dentine deposition, so that measurements of this reduction can be used as an indicator of age. The following ratios were calculated: Pulp/root length, pulp/tooth length, tooth/root length and pulp/root width at three different levels and are used for age determination (Purnima, 2017). Endodontist has a wide knowledge on Root and Root Canal Anatomical Variations, use of Periapical Radiographic Images, use of Three-Dimensional Imaging Techniques for Pulp Canal Space And Age Determination and identification and Characterization of Endodontic Materials (Bansode, 2018).

Oral and Maxillofacial Surgery: Oral and maxillofacial surgery is the specialty of dentistry which is utilized for identification of

individuals through maxillomandibular and dentoalveolar fractures, surgical repairs and implants and craniofacial superimposition. Usually the assessment of accidental or damage to the teeth and jaws comes within the scope of the oral surgeon. In many instances where this damage may be relevant to a criminal activity, the oral surgeon has to appear before the law court for medicolegal investigation. Craniofacial superimposition is used widely as a method of identification instead of fingerprinting. Photographs are compared with images of skull and radiographs are compared with skull to reconstruct face. The reliability of the technique is hugely depending upon the experience and subjective judgement of the expert making the superimposition (Shamim, 2012).

Role of Oral Medicine and Radiology: This specialty is utilized for age estimation studies using radiographic method. The parameters used to estimate age by radiographic method include secondary dentin formation, changes in the orientation of mental foramen and inferior alveolar canal, eruption and formation of mandibular third molar, trabecular pattern in jaws, pulp/tooth area ratio of teeth and pattern of lamina dura. Deposition of secondary dentin can be assessed using periapical radiograph to estimate age. Examination of the mandible will help in assessing the age of the individual approximately. Age estimation is also assessed from root development of mandibular third molars in comparison with skeletal age of wrist joint (Ranganathan, 2008).

Role of Oral Pathology: Oral pathology and microbiology speciality is utilized for age estimation studies using ground sections of teeth. Ground sections are the sections prepared without using any chemical and thus maintaining normal anatomy and constituents. The histological technique is more appropriate for postmortem situations and also accurate in estimating the age of early development of dentition. A pathologist can identify people through developmental disturbances of teeth, regressive alterations of teeth and tumours and cysts of oral cavity (Jeddy, 2017).

Role of Public Health Dentist: Public Health Dentist identifies the individuals of endemic fluorosis region. The presence of fluorosis of teeth in an unidentified person gives a clue that the person is from an endemic area and this will help in identification. The prevalence of dental caries, periodontal disease and oral cancer in a population, the type of restorative material used may give some important information concerning socioeconomic grouping. Malpractice is a term referring to the failure to exercise skill, knowledge or care with resultant injury to the patient. Dentists are considered to be negligent when he/she does not provide the appropriate duties to the patient. Charging for materials that were not used or performed are frauds. In cases of dental fraud and malpractice, the public health dentist may serve as witness to make conclusion about physical facts based on ordinary experience. Public Health Dentists may be called upon to examine and give their opinion regarding suspected elderly abuse cases. Public Health Dentists may serve as expert witness to give opinion regarding tooth loss in homicide cases, since the loss of tooth is designated as grievous hurt under section 320 of the Indian Penal Code (I.P.C) (Ranganathan, 2008).

CONCLUSION

Forensic dentistry is a modern dentistry division with a lot of growth potential. The dental evidence is investigated and interpreted by forensic dentists at the criminalization scene. The beauty of dental anatomy and the personalised dental restoration guarantees precision in the correct use of the techniques. All available data must be computerised in order to allow comparison in a consistent way. Dental documents that act as antemortem data have to be preserved. Every dental practitioner has a duty to consider the role of each other in forensic dentistry. The tools available and their use in forensic dentistry should be made known to dentists and students. New research into forensic dentistry needs to be promoted, thus paving the

way for new technology to be used in the production of human identification.

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