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[FORENSIC ODONTOLOGY AND ITS FUTURE IN INDIA](#)

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Abstract

Forensic odontology is a well developed discipline and widely accepted in the courts in advanced countries. In India its development is slow and it has recently been recognized as a separate branch. Investigating police officers, medical officers, dental officers and judicial officers are still not properly aware of the scope and utility of forensic odontology. All these officials are needed to be properly oriented to make the full utilization of benefits of various aspects of forensic odontology.

Keywords : Forensic odontology; Forensic dentistry; Bite marks; Identification

Introduction

It is the branch of science which deals with the knowledge of dentistry required for solution of cases by the police and the courts. Forensic odontology helps in identification and assessment of severity of injuries involving teeth. Study, comparison and evaluation of bite marks is another important area in forensic odontology which helps in the identification of the criminals from the bite marks.

Like other creations of the God no two sets of teeth are alike and this uniqueness of teeth helps in identification of individuals. Teeth are well protected and resistant structures in the body and they remain protected in many diverse situations when other body structures are destroyed e.g. aircraft accidents. They also resist decomposition and serve as useful evidence when most of other body structures are of no use due to putrefactive changes in the body. In such situations examination of teeth is very useful tool to establish identification of mutilated and decomposed corpses.

Knowledge of legal provisions is required to assess the severity of injuries involving teeth and surrounding structures. Experience and skill is required to find out that dislocation of teeth is due to disease process or trauma. It needs to be determined that fall or dislocation of teeth is due to assault or fabrication.

Bite marks are usually left by the criminals in sexual assault cases on the body of the victim. Sometimes burglars eat food at the crime scene and leave behind partially eaten food e.g. fruit or cakes leaving bite marks on these items. Study of these bitemarks at the crime scene help in the identification of the culprit. In certain situations bite marks may be the only evidence from which criminal may be identified and apprehended.

History of forensic odontology is as old as the history of mankind. Probably the first crime on earth was solved on the basis of evidence of bite marks which comes under the purview of forensic odontology. This has been mentioned in the bible that God forbade the Adam and Eve not to taste the apple in the paradise. But serpent instigated them to eat the fruit for which Adam and Eve were thrown out of the



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paradise. God could not have taken this action until or unless he was very sure of their involvement in the act. When apple was bitten by Adam and Eve they left their bite marks and God may have identified them only on the interpretation of bite marks. This is the first reported use of forensic odontology.

Agrippina killed the mistress of emperor Cladius after mrrying him. She recognized the decapitated head of mistress Lollia Paulina from her dark discolored anterior teeth. This was in 16-59 AD. General Joseph Warren who was killed in a battle and his dead body was identified in 1776 by his dentist from the silver wire bridge which he had made for the General. in 1775. Forensic odontology gained importance because corpses of many famous persons in the history were identified from their teeth only. Hitler was identified from the peculiarities of his teeth. William the conqueror had distinct misaligned teeth and he used these teeth to mark the wax of the official seal¹.

The first attempt in US courts to introduce bite mark evidence was in 1870 (Pierce et al, 1990) and such type of evidences has been accepted since 1954 In US in case of Doyle vs State².

In India the first reported case of utility of bite marks evidence in solving the criminal cases has been reported in the journal of Indian Academy of Forensic medicine where a person was charge sheeted on the basis of evaluation and analysis of bite mark evidence³.

American Board of Forensic Odontology (ABFO), American Society of Forensic Odontology (ASFO) and American Academy of Forensic odontology (AAFO) are working to make useful guidelines for the practice of forensic odontology. In USA where there is medical examiner system for investigation of death, no office of medical examiner is considered complete unless that office has a forensic odontologist⁴. British Association of forensic Odontology (BAFO) is another important organization working for the cause of forensic odontology in UK.

Indo Pacific Academy of Forensic Odontology has recently been established with head quarters in India. It is planning to bring out the scientific journal for the betterment of the field of forensic odontology. People from different faculties are getting involved in it to make forensic odontology a popular discipline.

Forensic odontology helps in various situations to solve the problems faced by the crime scene investigating officers and there is a lot of scope for the development of forensic odontology in India.

It helps in the determination of age of persons whose age is under question. It becomes very important under certain situations e.g. attainment of majority or determination of age of victim of rape to ascertain whether she has attained the age of 16 years or not. As valid consent of sexual intercourse can be only given if the girl has attained the age of 16 years and below that age consent for sexual intercourse is invalid.

Incremental lines also help in the determination of age particularly in young children. Determination of age can be done by finding out whether teeth are temporary or permanent; and from chronology of eruption of teeth. Calcification of the roots of teeth which can be determined by radiological examination of the teeth also helps in finding out the age of the person. Fusion of the calcospherites in the dentine structure of the teeth can also help in the determination of age after 21 years when all teeth have erupted. This can be seen by Scanning Electron Microscope. Physiological changes in teeth also help in determination of age after all teeth have erupted and their roots have been calcified. Degree of attrition, root resorption, root transparency, secondary dentine formation, cementum apposition and periodontosis also help in determination of age of the person.

Nutritional status of the individual is also indicated by teeth. More rough and coarse food will cause more attrition of the teeth. Many illnesses cause changes in color of teeth. Red brown discolouration will be evident in disturbance in porphyria metabolism and blue brownish discolouration can be seen in erythroblastosis if these diseases are present during eruption of teeth.

There is high statistical rate of identification in mass disasters solely by dental records⁵. Teeth pulp can help in finding out sex by finding out Barr bodies and Y-chromosomes and DNA analysis. Measurements of canine teeth are particularly helpful in finding out the sex of the individual. Social status of the individual is indicated from the type and material used for restoration for dental defects. Rich people used gold restorations in old days and average people used silver restorations. Features like shoveling, Carabelli's trait, tuberculum intermedium, tuberculum dentale hypocone, protostylid and parastyle help in determination of the race of the deceased person.

Forensic odontology helps in identification in mass disasters. In aircraft accidents teeth usually escape injuries and can be of help in identification. Identification of the dead persons is possible if their ante mortem records are available. If person has died due to burns body as such may not be identifiable but examination of teeth may provide useful hints for identification as they may remain intact because they

are well protected in oral cavity. Teeth are strong structures of the body and they resist decomposition. Examination of teeth in such bodies can provide very useful evidence for identification. DNA analysis of tooth pulp in such cases may provide the absolute basis of identification.

Indication of poisoning in the individual can be also evident from examination of the teeth. Yellow brown spots are visible in teeth of persons living in areas where fluorine content is high in drinking water. High intake of tetracycline can also cause yellow orange colouring of the teeth. In chronic lead poisoning or plumbism blue lead line, in copper poisoning green line and blackish discoloration in silver poisoning are self explanatory. Many times teeth may be only structures available due to destruction of other parts of the body due to decomposition from which poisoning may be ascertained. This part of odontology may develop in future as Forensic Odonto-Toxicology.

Study of bite marks is another important area of forensic odontology which helps in apprehending the culprits. Forensic odontologist should be able to distinguish the injury caused by bites. Due to inability to distinguish injury caused by bitemarks or other agents may lead to overlooking such injuries and such valuable evidence. It is important to learn to identify bite marks and differentiate animal bite marks from human bite marks. It is an important duty of the forensic odontologist to collect and preserve the bite mark evidence after identifying the bite marks. Later on he has to evaluate this evidence and give his interpretation of this evidence. Dinkel and Captain (1974) have mentioned 5 cases when culprits were caught based upon bite mark evidence⁶.

In cases of sexual offences role of forensic odontology cannot be denied because in many cases evidence of bite marks may be present on various parts of the body. In many cases assailant in such crimes may be identified only on the basis of bite marks evidence. Pattern of bite mark, individual characteristics of bite marks and DNA evidence from saliva may pinpoint the culprit.

Knowledge of forensic dentistry is required in injury cases when medicolegal examination of the injured person is done and there are injuries involving the teeth. As fracture and dislocation of teeth is a grievous injury under section 320 IPC it becomes important to differentiate dislocation due to disease process or due to trauma as this point is greatly misused by people by fabricating dislocation of teeth.

Discussion

Forensic odontology can help the investigating officer in a number of cases and variety of situations. It varies from mass disaster identification to identification of individual case. It can help in proper evaluation of injury cases in cases of assault and accidents. It can help in apprehending the criminal where he has left back the dental evidence. Bite mark evidence is of particular help in sexual offences and burglaries where the criminal can leave back bite mark evidence. But for all these things to happen police officials as well as medical and dental officers must be properly oriented to changing knowledge and skills of forensic odontology.

Conclusions

It is an upcoming branch of dentistry which has a great scope of development in India. It has been introduced in the syllabus of BDS by the dental council of India and ultimately it is bound to become separate discipline in the dentistry as it is in the western world. Forensic odontologists will also be needed by the Forensic Science laboratories to investigate and interpret the dental evidences at the crime scene. Forensic odontologists will have a great role to play in mass disasters for identification of the victims. There will be many jobs generated in this discipline in India in the times to come.

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