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Forensic Odontology - A Different Chapter in Dentistry

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Abstract

Treating live human being is a routine work for practicing dentists. But the things become unusual when dental evidences of dead person are of prime importance in the medico-legal cases. Evidences of Forensic Odontology play a vital role in determining the acquittal or conviction of the alleged person. In the criminal matters the uniqueness of teeth makes them helpful in identification of the victim or the criminal. This identification technique is also useful in identification of victims of accidents or natural calamities. This article gives insight idea regarding role of teeth, oral hard and soft tissues pertaining to the legal cases.

Keywords: Dental evidences; Medico-legal cases; Forensic odontology; Victim; Criminal

Introduction

Forensic Odontology (FO) is a special branch of dental medicine related to study of teeth and surrounding oro-facial structures required for identification of an individual related to the legal matters. Anatomy and composition of teeth make them unique and ideal for their identification even after death of an individual. Due to more inorganic content, teeth are resistant for disintegration due to decomposition or extreme temperature after death [1]. In the criminal or Medico-Legal Cases (MLC) this uniqueness of teeth is advantageous in identification of the victim as well as the criminal. This method of identification is also helpful in searching and identifying the victims of accidents such as fire, natural disasters or terrorist attack. Every individual has specific set of teeth with specific anatomical pattern. Shape of teeth, grooves, cusp-fossa pattern and relation, crowding or spacing, proclination of teeth, type of occlusion and other types of dental anomalies are unique to that particular person. Similarly radio-opaque dental restorations like amalgam or composite restoration, crown, root canal fillings are also helpful in person identification. In identification of the person dental evidences such as ante-mortem and post-mortem dental records and the opinion of dental expert are invaluable as these evidences reveal the underlying composition of the victim where no other sources of information are available. Pattern of teeth in toto would help in the determination of information related to age, race or occupation etc. Study of victim's teeth not only reveals their age but it also helps in determination of their sex, habits, ethnic origin, customs and occupation. Clinically in child or adolescent victim; determination of age can be calculated from the teeth eruption sequence and pattern. In adults wearing pattern of teeth and progressive changes in the form of attrition, loss of attachment apparatus or apical cementum deposition could help in age determination. Radiographically stages of root formation, size of pulp cavity, mineralization density, secondary dentin deposition or root resorption give clues of approximate age [2]. It is evident that exact age or sex determination of the victim is very difficult when other forensic evidences are missing [3]. In such cases linear and diagonal measurements of teeth could be helpful in sex determination of victim's body. Odontometric measurement of canine distal accessory ridge is considered for sex determination; where it is located lingually in between distal marginal ridge and medial lingual ridge of mandibular canine. This ridge is found to be more commonly visible and distinguished in males than females. Recently with increasing technological advances, genetic configuration of chromosomes of an individual from DNA of human dental pulp or dentin or an Amelogenin from enamel could be recovered for sex determination [4]. Customs, traditions or occupation of an individual could also be determined from the teeth. Certain dental patterns or characteristics are common and unique for their specific community. Anatomical variations such as peg shaped lateral incisors, taurodontism or scooping of incisors are more frequent in Mongoloid community where as extra cusp or extra root and canal are common findings in Chinese population. Size of teeth is also predictive of certain community; as smaller teeth are found in Bushmen community. Similarly individual's profession could be identified from teeth characteristics. Professionals like tailors, carpenters, cobblers or pipe smokers have habit of holding the needle, nail or the pipe in between

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the incisors causing change in their shape and different wearing pattern was observed in their incisors [5]. Occlusion and alignment of teeth also play a vital part in determination of individual's identity. From evidence point of view overjet, overbite, alignment of teeth, crowding, spacing, rotation, impacted teeth or proclination etc. are important and unique for one individual. In cases of physical assault, sexual abuse of child or rape, bite marks have major contribution in identification of victim. Bite marks present as sign of resistance of victim at the time of incident whereas; bite marks of assaulter are usually visible as symbol of their animalistic behavior. Additionally, bite marks on any hard food such as apple or cheese gives a good impression to help in identification of teeth anatomy which is unique for that criminal [6-8].

Like the dental hard tissues such as teeth and bone; oral soft tissues also help in identification of person. Cheiloscopy is study of lips or lip impressions, found at crime site or on victims or assaulter's body or clothes could be potential forensic evidence. Lip size, lip prints or philtrum pattern are considered for identification. Lip prints have definite pattern of horizontal and vertical lines. These patterns could be mis-interpreted or mishandled as these are specific to that individual [9]. Similarly palatal rugae located on the hard palate behind the incisive papillae have unique pattern of asymmetry which is considered to be the stable part of body and could act as admissible dental evidence.

Conclusion

The role of forensic odontologist or dental expert is critical as their opinion in MLC or in person identification in natural disaster cases act as admissible evidence in court of law. Anatomical uniqueness of every individual makes the investigation more trustworthy and helpful for determining the identity of the dead victim due to suspicious cause. This not only helps the law enforcement agency to find the victim but also helps in identification of real criminal and prevents wrongful conviction of the innocent.

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