The Assessment, technique and current status of tooth evidence for forensic identification.

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Abstract:-The use of teeth and oral structures in a legal sense is mainly a matter of forensic odontology. Various methods of forensic dentistry assist the detection of human remains in events such as terrorist attacks, ships, trains and road crashes, explosions, mass killings, and the occurrence of natural disasters such as tsunamis, terrestrial quakes and floods. The dental structures in the body are the hardest and most safe. These structures are immune to decay and high temperatures and are among the last to decay after death. The key explanation for the recognition of dental products lies in the absence of two oral cavities and the teeth being special to one individual. In order to identify the deceased from the crime / occurrence scene, the dental evidence is compared to the ante-mortem results. Every individual has a unique identity with dental characteristics including tooth morphology, shape and sizes variations, restorations, pathologies, lack of tooth, patterns of wear, tooth crowding, dental rotations and other unusual dental abnors. In the absence of ante mortem dental records, age, gender , race / ethnicity, behaviors, workplaces, etc. can be determined by the teeth to provide additional clues about individual identity. This text provides a summary of the evidence, the use and limitations of dental evidence. Keywords: age calculation, dental defects, forensic odontology, sex and ethnicity dental determination, mistaken beliefs.

Key words:-Tooth ,Evidence,Identification,Forensic odontology.

Introduction:-"Forensic odontology is a dental division that deals with the proper management and testing of dental evidence, the correct assessment and presentation of dental results for justice" [1]. [1]. Forensic dentistry has been included in the present scenario as a discipline in the wide field of Forensics. Forensic dentistry is central to major foreign forensic educational organisations, such as the American Academy of Forensic Sciences and the IAI. In identifying the human remains the primary usefulness of forensic odontology relies upon the individualistic features of the individuals' teeth. In the event of tsunamis, floods, slides on ground, bomb explosions and terrorist attacks, airplane crashes, trains collisions or road traffic, etc., highly mutilated and dismembered dead bodies that are beyond recognition[2,3], this specialty has an important role to play in identifying human remains. This disaster victim identification method is called Disaster Victim Identification (DVI). Teeth are the most potent component of the human body that resists high explosion and are not affected by accidents of this type [4, 5]. Via the other recognition means, for example fingerprints and face characteristics, tooth decomposition is likely to regenerate in mass. Adult human teeth consist of incisors, canines, premolars and molars, which differ between individuals in form , size and intersection between the teeth. The arrangement of these teeth in various oral cavities is special in each person[6]. Each tooth has, at the same time, a set of unique characteristics which form the basis of identification, called 'tooth class features.' Dental disorders, restorements, dental abnormalities, etc.[7] are other features which aid in identification. In addition, teeth may be used for determining age, sex , race / ethnicity, occupation, habit etc[8]. This analysis aims to emphasize the significance of dental substances in identifying processes, its usefulness in estimating the biological profile (age, sex , race, etc.) and the present state of dentistry in forensics. The study also focuses on the

quantity of information about the victim from the teeth by means of dental abnormalities and other dental records.

The Determination of Age:-In the age estimate in children and teenagers, dental maturity plays a significant role[9]. An individual's aging can be reasonably determined by the number and sequence of the teeth erupted. More details on different stages of mineralization[10, 11] and further assistance in a more reliable assessment of age are possible with radiographic methods. The estimation of a chronological age is stronger than the mineralization of the bone [12], considering the lesser impact of a difference in the individual's nutritional and endocrine status in the mineralisation stages in the teeth. In this respect, Demirjian et al.[13] have used the developmental stages of teeth greatly in order to estimate the historical age worldwide. Gustafson developed an age estimate system from a single toothpath back in 1950 for estimating age in adults[14]. The technique uses different phases of regressive tooth adjustments, such as occlusal attrition, the development of coronary secondaries in dentine, the loss of periodontal adhesion, cement modification, apical resorption and root transparency[12]. Johnson[15] improved the Gustafson-described method, which forensic scientists have now been mainly used for adult age assessment. An additional age estimate approach was introduced by Kvaal et al .[16] in adults by calculating the pulp measurements from the periapical x-ray teeth that are based on the person's sex. The best approach is to verify the eruption status of the teeth in the oral cavity when the age is determined by the victim / accused who is still adulthood. This gives the observer an indication of how many teeth are bursting. The series and the number of teeth in children and adolescents can be taken from a rough idea of the age. In cooperation with other age estimate techniques, certain records and observations can be used for more reliable results, depending on the available information.

The process of determination of gender determination:-While sex determination from teeth is not definitive, teeth can offer insights into the sex of the individual in the absence of further evidence. The findings can be further compared and checked with the forensic scientist's other facts and evidence. The scientists used odontometrics, a tool for measuring their teeth for the determination of gender [17, 18]. This technique is based on the sexual dimorphism of the scale of the teeth. In the past, measurements of the mesiodistal and bucco-lingual teeth were used for sex determination [19, 20]. These dimensions are referred to as linear metrics. However, measurement of rotational, crowded, and close-restored teeth by diagonals is helpful[21]. Some dental indexes such as Incisor Index, Mandibular Canine Index, Crown Index, etc. have been extracted from linear dental measurements in order to illustrate sexual dimorphism [22-24] in the teeth. The jaws are shown to display greater sexual dimorphism than the jawbones. The overall accuracy rate of the sex determination is ~72 percent, according to Joseph et al . [21]. In addition, the 'distaltive channel accessory' on the lingular surface between the medium lingual and the distal marginal channels indicates sexual dimorphism[25], both on the upper and lower channels. There is also a non-metrical feature. This ridge is greater and more common in men than in women. The presence of chromatin sex or Barr bodies in teeth pulp, as per the method designed by Barr & Bertram, was a more recent method of sex determined from the teeth[26, 27] [28]. The experiments also included the extraction of DNA from the pulp and dentine pulp[29, 30] and the use of Polymerase Chain Reaction (PCR) to sex determination. The enamel protein[31] was also used for sex determination using DNA techniques due to its different patterns in males and females. The main protein present in man's enamel is amelogenin or AMEL. In male and female enamels, amelogenine has different nucleotide sequence patterns. Nakahori et al. [32, 33] sequenced amelogenin gene for the first time. In males, however, the females have two

similar AMEL genes, one on chromosome X, and the other on the Y chromosome, which are found in X chromosome.[34] The amelogenin test for sex determination should be viewed cautiously, according to Michael and Brauner[35].

The determination of race:- Certain morphological characteristics of the teeth indicate heterogeneity in population that can differentiate between race or ancestry. The race determination from morphological characteristics of teeth is nevertheless contentious. These features and marks provide an indication of a community of people / ethnicity 's behaviors and cultural traditions. The ethnicity of the individual can be determined by dental characteristics such as the showling of the upper incisor (most prominent in Asian Mongolians and Amerindians), tauradontism, chisel-like incisors, cusp of the carabel, hypoconia and protostylide [36-38]. According to Vij,[8] the Australian Aborigines, the Melanesians and the American Indians and Eskimos are mostly wide dental breeds with big courts and the Lap and Bushmen are smaller teeth. Dental restorations may often suggest an individual's ethnicity,[39] restoration procedures may be unique and may not be used anywhere else in those countries or regions. The use of costly therapy may also reflect a person's social and economic status[40]. It was also observed that teeth provide significant proof of people's behaviors and careers. Clothing or tailors maintain nadels between the teeth and the sewing thread; cobblers, carpenters and electricians keep nails between the incisors; pencils and pencils bit, open teeth on tops of the bottles [40]. [42]. Certain clothing, such as pipe smoking, smoking cigarettes and cigarettes can also be marked on your teeth. In the mining industry, excessive tooth wear was found associated with occupational exposure to olivine dust[42]. Often artificial deformations contribute to an individual being recognized because they are linked to cultural traditions of a specific population group. The central incisors are generally deformed artificially as they are most visible from outside the mouth.

Dental Comparison and anmosions in the teeth:-Dental documentation is contrasted with the antemortem reports of the deceased[43] in DVI that are available to dentists. The dental [11, 44] and dental reports available with the dentist will allow these distinctions. Dental proof may also be linked to pre-mortem images of family members that typically reveal previous teeth[7]. The dental records are based on the universal dental system and provide a great deal of knowledge on the individual's teeth. The comparison of the forensic dentures includes the comparison of certain important teeth characteristics, which can also be known as individualizing features, including dental fillings, extractions, root and surface configuration, adjacent teeth, dental room crowding (Fig . 1), tweezed / winkled teeth, rotation of teeth and transfers, missing teeth, extra dents, suppressed teeth, and transfusions. The dental anthropologist and forensic odontologists have had a lasting interest in variation in tooth morphology since they help to distinguish population and recognize individual forensic examinations and Hanihara[45]. Dental defects and improvements include dental issues such as microdontia, macrodontia, and the numbers of tooth disorders such as anodonty (congenital teeth absence), polydontia, hyperdontia (with extra teeth); teeth rash disturbances (failed to erupt and remain buried in the alveolar) Dental defects and differences are present. Dental anomalies include Occlusions can also help identify the individual by the form of oclusion between the mandibular and maxillary teeth, with occlusions of three kinds: overbit or deep over bite (Fig . 5), regular bite and underbit [47]. All these irregularities and differences in dentistry help to equate an ante mortem and a postmortem match and validate a person's identity. Dental features and abnormalities allow the uniqueness and identity of the dead person to be determined during forensic examinations. Dental characteristics can lead, in the same manner as DNA profiling and morphological fingerprints, to positive identification. However, in the absence of ante-mortem dental records, or if a comparison of

the post-mortem dental records is not feasible, this will not be of great benefit to the investigator. The investigator could at least limit the information by estimating the biological profile (estimate of age , gender, race etc.) of the deceased, even from the dental records available.

Teeth bite marks.-The teeth are special to a person; even one person's tooth is very individualistic. The bite marks imposed by teeth are likewise regarded as highly individual to a person and, from a forensic point of view, are of considerable importance[48, 49]. In scientific writings and media this aspect of forensic dentistry has gained significant coverage on its controversial aspect[50]. The bite mark evidence has been deemed relevant in many cases and resulted in the prosecution of the offenders. On places such as sheeks, buttocks, knees, lips, or any other body part, bite marks are present on a victim's body or can be seen on the assailant's arm or face that the victim has attempted to protect against. On food items such as hard cheese , butter, fruit and more the bite marks can also be found. It is also possible to make the cast of the bite marks or take images of the surface and compare them to the original or cast of the teeth[51]. The analogy of these individualistic characters is helpful with the absence of teeth, malformed teeth, breaks, crowding teeth, diastemas and other specific characteristics of teeth.

Palatal Rugae:-Palatal rugae are irregular asymmetrical plugs which lie behind the incisive papillas at a fore-third of the palate (Fig . 6). However, their morphologies remain unchanged over the lifetime; they vary in size due to the growth of the palate. They are considered special to an individual. In forensic analysis, this feature makes them a strong identification parameter. In the identification of edentulous individuals, they are especially significant. It can also be examined in burned and broken bodies, where other potential identification methods are destroyed. Trauma, intense infancy finger sucking, and constant orthodontic care and prothesis pressure can affect these conditions[52, 53]. If killed, they will then re-establish in the living beings, in some cases. Different previous studies have been carried out in order to confirm that they are special, individual [54, 55] and probable in forensic analysis in estimating sex [56].

45/45 Sentences

Questionable Dental Evidence and wrongful convictions:-Evidence for DVI, The proof may be founded on a lack of empirical and Statistical validation and on the deceptive indicative reasoning[57]. Although forensic odontologists around the globe have developed new methods to recognize and compare proof of the bite mark, the procedure, technique, and expertise are not monitored. According to The Innocence Project in New York[58], several cases of false conviction and prison sentences have been recorded in literature on grounds of bite mark testimony. You were released when DNA from the same morsel marks showed that the morsel marks were not part of the marks. In the British journal "Nature,"[59] a recent article showed that bite marks on the skin of a crime victim enable the perpetrator to be reliably identified. The "Nature" article focuses in particular on incorrect assumptions of untrustworthy approaches such as bite mark analysis in forensics. In the month of February 2014, the United States Department of Justice and the National Institute of Standard and Technology formed the First American National Forensic Science Commission (USNCS), where a public meeting took place in Washington D.C., which recommended the creation of a 'f' We expect a compulsory test of competence to be conducted soon, which will avoid such wrongful convictions based on dental evidence, for qualified forensic odontologists.

Conclusion:-In forensic exams and in the court of law, the use of unique characteristics and morphological distinctions in the identification of individual teeth is generally recognized. Despite advances in leading identifying technologies such as DNA profilization, fingerprints and facial reconstruction, the detection of the deceased by airplane crashes, other significant incidents or terrorist attacks and natural catastrophes is largely related to comparison of dental records (records in form of observation by dentist or radiographic). If ante-mortem dental records are not equivalent, then the dental evidence collected from the scene will give forensic anthropologists or dentists clues as to the age, race and sex of those who are deceased. However, the specificity of the population should be taken into consideration when deciding the age and sex of teeth since different cultures have different levels of human dental variations. This analysis aims to clarify the meaning of different forms of dental evidence, procedures and methods used for identification purposes in forensic odontology. Since DVI and other medical-legal cases play an important role for forensic dentists, this speciality must urgently be promoted. Initiatives such as raising knowledge of dentistry graduates to this profession and mandating and encouraging dentists to be involved in research and identification teams[61] will help to improve forensic dentistry as a profession under Forensic sciences or the dentistry.

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