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Forensic Odontology in Pediatric Dentistry

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Abstract:- Forensic odontology is a new and growing phase of medical speciality. Keiser-Nielson was described in 1970 as a forensic pathology specialist, in the interests of justice concerned with the proper management and evaluation of dental evidence and the proper evaluation and presentation of dental findings. Spy science refers to areas of effort that can be used in the judiciary and approved by the court and the general science committee to distinguish truth from falsehood.

Keywords:- *Age Estimation; Child Abuse; Bite Marks; Cheiloscopy; Palatal Rugoscopy; Pediatric Dentist.*

I. INTRODUCTION

Forensic odontology (dentist) may be a new and growing section of medical distinctiveness.[1] Forensic odontology is defined by way of Keiser-Nielson in 1970 as "that medical department that investigates instances that within the hobbies of justice manage with the right coping with and exam of dental validation but as right assessment and presentation of dental investigation." Forensic technology refers to experimental areas to be able to be employed in a judicial placing and authorized via the court docket and also the popular science committee to tell aside fact from fiction. [2]

Mortal identity is the dependence on civilization, and hence the identity of unknown individualities always has been of consummate significance to society. Now not the simplest is it vital to spot the departed to ensure relevant burial, but additionally there are issues like lawless examinations, insurance agreements, and military lawsuits if you want to be resolved only with a recognition. Standard, in the course of a global environment, professional dentists play a pivotal part in diagnosing human beings, analysing biting signs and symptoms, severe trauma, and abnormalities.[3]

In line with FDI, a forensic dentist is described as a department of dentistry that, inside the interests of justice, is chargeable for the right dealing with and evaluation of dental evidence, additionally as for the right assessment and illustration of dental acquisitions.[4] Forensic odontology has emerged as a particularly strong point supported dental and jaw expertise, macroscopic anatomy, histology, radiography, pathology, dental materials, and increased confusion.[4]

The pedodontist performs a key position in forensic odontology via his understanding in diverse fields like unintended and non-verbal abuse, child abuse and forgets, age willpower, dental records, and main failures by analyzing enamel and jaw structure for clues. These dental findings/facts could also be helpful in felony identity.

II. EASE OF USE

A. Dental identification

A pediatric dentist is a specialist dentist related to the treatment of dental problems in children. This forte is used to perceive human beings with visible results, clinically and radiographically and dental caries affecting the enamel, root canal treatment, kinds of tooth replacement, dental sealants, electrical appliances, oral and maxillofacial pathologies and developmental defects related to dental harm and dental examination. [6]

B. Comparative identification

The prognosis of mortal enamel is wished in special instances for a range of reasons. post-mortem enamel lives with antemortem dental data comparable to assure possession. Antemortem data, comparable as internal/ fresh oral radiographs, scientific photos, exploration declares, ortho/ prostho electronics, oral guards can also be used. beginning and obtained signs are compared. Comparisons are usually made grounded on individual tooth and enamel recuperation related to the presence/ absence of teeth, enamel decay, current eruptions and eruptive situation. The morphology of coronal/ dental root elements, root length/ role, foramina, sinuses, and TMJ can additionally be compared. [7]

C. Dental age estimation

Determining age unearths its use in a variety of situations, comparable because of the identity of nonnatives, in felonious and dangerous scenes, and is notably used to measure children's age series of unknown delivery record. Other approaches consist of bone improvement, physical examination, the usage of anthropometric measures, and a combination of most of these. Tooth eruption in the oral cavity is usuallly affected by authentic elements, comparable as lack of space and systemic features, while tooth decay is taken into consideration as the maximum accurate index of development in kids as it's much less suffering from nutritive and endocrine situations. (8)

D. Reconstructive identification (dental profiling)

Dental profiling refers to the event of a dental profile that has a collection of specific or minor features associated with the oral fissure and/or teeth. Sometimes dental identification is employed not only to spot an unknown person but also to determine a known identity. [9]

E. Craniofacial identification

Craniofacial identification is a forensic process where a picture of a missing person is compared with a model of a skull to see its identity. There are various methods of sculpting, all of which are supported facial expressions (Phillips and Smuts, 1996). Facial reconstruction could be a method utilized in forensic research to help in diagnosis. [10]

F. Sex determination

The first step in relating existent is a sexual exposure. The determination of a sex using cadaverous remains presents an excellent problem to forensic experts especially when only fractions of the body are recovered. The Forensic Dentist can help to determine the sex of the residue by using the teeth and a cranium. Multiple of dental characteristics, such as morphology, a crown size, the root length, etc., is an element within the male and female gender. There also are differences in cranium patterns. New developments like enhancing a PCR etc., will help to directly determine the gender of the remainders. The forensic odontology plays a significant part in establishing the fornication of victims with unseen mutations due to disastrous events. [11]

G. Tooth morphology

During a dental examination, a forensic odontologist plays an important role to spot an individual as accurately as possible from existing natural teeth in the oral cavity. Well-formed dental data are typically used for diagnostic purposes.[12]

III. CRIME INVESTIGATION

A. Child abuse

Child abuse is a serious violation of the fundamental rights of the child and could be a significant public health concern worldwide. It does not discriminate between classes and masses and pervades all sectors of society. Paediatricians are at the forefront when it involves to diagnosing child abuse. The literature indicates that around 70% of child abuse victims usually presents with a face, head and mouth injuries. Additionally, pedodontists meet regularly with the children and caregivers and thus have the chance to assess not only their physical and mental condition but also their family situation. [13]

B. Bite marks

Forensic odontology could be a branch of forensic pathology within interests of justice deals with dental evidence presented within the courts of law. The oldest method of investigation supported forensic science was bite marks. A bite mark might be a kind of injury that features a pattern, which may well be a physical results of the bite action applied to the skin or other things like food or other non-living parts. Bites are employed by a person as an irritant and to protect oneself. The forensic odontologist collects, records, evaluates, and compares evidence of bite marks. Biting symptoms are considered to be an important alternative to fingerprinting and DNA testing in specialist tests. Symptoms of bite marks are often found in almost any a part of the physical structure, common areas of the face, arms, neck, hand, shoulder, fingers, nose, ear, chest, legs, buttocks and genitals. Sexual abuse affects the face, lips, breasts, shoulders, neck, thighs, genitals, and testicles. To spot the perpetrator, suspected human dental tests are performed using dental equipment and matched. Symptoms of bites if properly analyzed can confirm the involvement of an individual or persons in an exceedingly particular crime. [14]

C. Cheiloscopy

Cheiloscopy is about the identification of individuals supported by the lips. The word “Cheilos ” maybe a Greek signified “lip” and “Copy” means to look at. Everyone's lip print is different. The liner of the lips (sulci labiorum) is different for everybody and might be used for individual identification. In professional identification, the lip print pattern gives us valuable information and helps in identifying the individual. Lip prints are natural lines and fissures within the kinds of wrinkles and grooves found within the zone where the inner oral labial mucosa meets the outer skin or vermilion border of the human lip. The study of those grooves or furrows is thought of as Cheiloscopy. A motivating feature of Cheiloscopy is that the wrinkles and features of the lips retain individuality and may be used as a record during the question of gender determination or in cases of self-identification. It's possible to spot lip patterns at the start of the 6th week of intrauterine life. They're unique, permanent and don't change even after death whereas are unique to every other apart from monozygotic twins. [15]

D. Palatal Rugoscopy

Identification of someone is that the basis of civilization, whether he's alive or dead, and therefore the identification of a stranger has always been important in our society. Human identification depends on the scientific principles, especially those containing dental records, fingerprints, and DNA comparisons. Occasionally, it becomes necessary to use a lesser known and less common technique like palatoscopy.

Palatoscopy are often of interest group in those cases when no fingers are available to be studied like burnt bodies or bodies in severe decomposition. Palatal rugae form a pattern on the anterior part of the palate that's considered unique to every individual, resembling fingerprints. Rugoscopy finds use within the fields of anthropology, anatomy, genetics, forensic odontology , prosthodontics , and orthodontics. Within the field of forensic odontology , rugoscopy remains in its infancy. Despite the continuing problem of defining the palatal rugae pattern, in quantity and quality, their diversity in individuals has been recognized as providing a strong source of identification.[16]

E. Forensic orodental radiology

Forensic radiology is asserted almost completely on X-rays and radiographs. Advanced methods, like CT (CT), cone-beam computed tomography (CBCT), and resonance imaging (MRI), are added to the forensic tool kit. The X-ray method of fingerprints referred to as X-ray fluorescence radiography (XFR) has been improved to detect hidden prints within the area. A forensic odontologist diagnoses and divulges teeth of unknown bodies and is simpler with radiographs. The dental charts of missing persons can then be compared with the forensic odontologist 's report for physical examination. If the body decomposes, bone marrow is split, burned, or cut for the other reason, it's quite common that dental implants are going to be complete and can provide a vital diagnostic tool. This is often very true for victims of fireside and disaster. [17]

IV. RECENT ADVANCEMENT IN FOREIGNSIC ODONTOOGY

A. **Appliance inscribed with Aadhaar number and OR code-** It's a singular number that is compulsory for each and every citizen of India. Baal Aadhaar card within which one's personal identification is enclosed government database which may be accessed by forensic personnel. The Aadhaar card number and therefore the QR code may be labeled on occlusive surface of the appliance.

B. **3D imaging and facial and dental scanning-**Use of 3D datasets for comparison of bite mark analysis and facial reconstructions for identification of people in disaster. CAP MI and Win ID are the recently developed imaging software that has better control to attenuate the human error.

C. **Dental Nano biochip**- It contains valuable information for identification that may be inserted on the tooth like studs.

D. **Dental DNA fingerprinting-** DNA profiling system can help in exact identification of person. DNA extracted from the teeth of an unidentified individual are compared with DNA isolated from known antemortem samples, like stored blood, toothbrush, hairbrush, clothing, collected buccal cells with help of DNA-SAL, Papanicolaou smear, biopsy, or DNA of parent or sibling.

E. **Epiluminescence microscopy**- It's a recent advancement in documentation of bite mark records. This system, through the translucency of the stratum, helps with visual representation and pictorial documentation.[18]

V. ROLE OF PEDODONTIST

A Pedodontist can play a very important role in identifying bite marks. A toothache could be a common occurrence in children that may be caused by sports, accidents, or abuse. Therefore, proper information and its use are vital. A pediatric dentist can help within the investigation of legal authorities by using his or her expertise in identifying signs and symptoms of child abuse and identifying those that are being abused. Additionally, the pedodontist can provide appropriate information to physicians about oral and dental manifestations of child abuse and neglect. The dental records of the pediatric patient should be kept until the patient reaches the age of maturity. For adults, records should be kept for 7-10 years. The dental record includes a range of clinical trials, laboratory tests, research frames, artificial limbs, photographs, and radiographs. [19]

VI. CONCLUSION

From personal identification to child abuse, there is a special role played by the pedodontist in the field of forensics. It is very important to keep written and dental records that can be used as evidence in public and criminal proceedings. Dentists have a responsibility to protect the rights and protection of children in intelligence investigations based on age, identity, and abuse related to dental skills. As crime and law enforcement improve with the ever-increasing crime rate, forensic odontology has emerged as a forensic expert. Its power to solve crime must be used to help humanity.

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