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Forensic Dentistry - A Buzzing Issue

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INTRODUCTION

The term "forensic" is a Latin word, meaning forum or a place where legal matters are discussed. Forensic dentistry or forensic odontology is the proper handling, examination and evaluation of dental evidence, which then is presented for the interest of justice.[1]

Human identification is one of the major fields of study and research in forensic science. Fingerprints have been historically used for identification. However, hands and fingers may be mutilated or damaged following putrefaction, fire or prolonged immersion in water. In some conditions, a body may be completely skeletonized within two months after death.[1] Here, the craniofacial structures have the advantage of being composed largely of hard tissue which is relatively indestructible. The teeth are the least destructible part of the body under most conditions occuring in nature. So cephalo-facial remains are frequently brought in for forensic & postmortem examinations. This encompasses forensic dentistry.

HISTORY

The first treatise on forensic odontology as a subject in its own right was written in 1898 by **Dr. Oscar Amoeda,** who is generally recognized as the father of Forensic Odontology. In 1770's, Paul Revere; a practicing dentist in US, identified the remains of his friend, Dr. Joseph Warren from a silver bridge made by him. This is thought to be the first case of identification of a person by a dentist.[7] In 1968, the Federation Dentaire Internationale (FDI) recommended its member associations, that forensic odontology should be included in the curricula of all dental schools within their respective countries.[2]

Progress in the field of forensic medicine and dentistry expanded in 1984, when Sir Alec Jeffreys developed the first DNA profiling test. In 1986, he used this test in the successful prosecution of Colin Pitchfork, who was suspected and ultimately convicted of murdering two girls. Subsequently**,** in 1987, DNA profiling was used successfully in the United States during the trial of a sexual predator in Orlando, Florida. Today, DNA is becoming the "gold standard" in the area of forensic identification and criminalistics.[3]

FIELDS OF ACTIVITY IN FORENSIC ODONTOLOGY

It can be classified as:

Civil
Criminal
Research

Civil: It is concerned with mass disasters like airline accidents, **e**arth quakes or train accidents; require identification of the victims in advanced stages of physical destruction, malpractice and different types of fraud.

Criminal: Identification of the persons from their dental remains alone in cases of rape, suicide or homicide through bite mark analysis, rugoscopy, cheiloscopy.

Research: Forensic Odontology training for dentists working in criminology or police departments.[4]

SCOPE OF FORENSIC ODONTOLOGY

- Identification of human beings (age, sex, race, height) either dead or alive by means of teeth and skull
- Identification in mass fatalities and natural calamities
- Assessment of bite mark injuries
- Assessment of cases of abuse (child, spousal, elder)
- Civil cases involving malpractice
- In Archaeology to identify the fossils
- Facial reconstruction for identification

Forensic odontology aims to establish a profile of an unidentified dead person when the circumstantial evidence fails to reveal any findings. This profile is based on extraction of triad of information from teeth which can give a clue regarding the age, sex and race of the individual.[5]

Determination of sex: Teeth

· Males have much larger teeth.
· Males have a larger mandible.

Age Determination: Jaws & Teeth

Newborn
· No teeth
· Two sets of buds in jaw

- Primary teeth
- Permanent teeth

Age 1-3
· 20 Primary teeth by age three

Age 6-10
· Larger and stronger jaw
· Greater amount of muscle attached to jaw
· Buds for permanent teeth
· All permanent teeth are in by age 10

Young Adult
· Larger and stronger jaw
· Jaw shows complete set of permanent teeth (32)
· Wisdom teeth
· Molar development is apparent at age 18-21

In forensic dentistry, determination of dental age using stages of tooth development to gauze an individual's degree of maturity is one of a few biologic methods for monitoring physiologic development.

Features of the jaw Used in Race Determination

- Palate (triangular, rectangular, rounded or horse shoe shaped)
- Prognathism: extended lower jaw

Height estimation can be done by using:

1. Odontometry that is maximum mesio-distal diameter of maxillary anterior teeth.
2. Facial measurements.
3. Skull measurements like circumference of head & skull diameter.

RECENT RESEARCH

The established importance of Forensic Dentistry for human identification, mainly when there is little remaining material to perform such identification (e.g., in fires, explosions, decomposing bodies or skeletonized bodies), has led dentists working with forensic investigation to become more familiar with the new molecular biology techniques.

Role of DNA in dental identifications

Because of the resistant nature of dental tissues to environmental assaults, such as incineration, immersion, trauma, mutilation and decomposition, teeth represent an excellent source of DNA material. When conventional dental identification methods fail, this biological material can provide the necessary link to prove identity. With the advent of the polymerase chain reaction (PCR), a technique that allows amplification of DNA at pre-selected, specific sites, this source of evidence is becoming increasingly popular with investigators. Comparison of DNA preserved in and extracted from the teeth of an unidentified individual can be made to a known antemortem sample (stored blood, hairbrush, clothing, cervical smear, biopsy, etc) or to a parent or sibling.[6]

CONCLUSION

Human dentition is considered as hard tissue analog to finger prints. This is particularly useful in identification of bodies in mass disasters & natural calamities. Teeth are also frequently seen in fossils. Dental forensic techniques may help to identify personnel in as many as 70% of these cases. There has been growing recognition all over the world which expert evaluation of dental evidence may play in the enforcement of law, especially where fingerprint identification fails.

Forensic odontology involves dentists' participation in assisting legal and criminal issues. Formal teaching in forensic odontology has existed for over a 100 years. Over the last century, forensic odontology has evolved and, today, it is an integral part of undergraduate dental training in many countries. Forensic odontologist should have a thorough knowledge about basics of anatomy including dental anatomy. An awareness of forensic pathology & the methods of autopsy are merited. Furthermore a comprehensive cognizance of the pertaining laws to the legal implications involved in it.

REFERENCES

[1]. Keiser- Nielsen S. Person identification by means of the teeth. American Journal of Forensic Medicine & Pathology 1981; 2(2):189.
[2]. Stimlson PG, Mertz CA. Forensic dentistry. CRC Press;1997.
[3]. Whittaker DK, Mac Donald DG. A colour atlas of forensic dentistry. Wolfe Medical Publications, London;1989.
[4]. Dayal PK, Srinivasan SU, Parvathy RP. Determination of sex using tooth. In*:* Textbook of Forensic Odontology. 1 st ed. Paras Medical Publisher;1998.
[5]. Shafer, Hine, Levy. Chapter Forensic Odontology. In: Rajendran R, Sivapathasundharam B, editors. Textbook of Oral Pathology. 6th edition. Elsevier India Pvt. Ltd.; 2009.
[6]. Stavrianos C, Eliades, Kokkas A. The role of DNA in Forensic Odontology: Part II. Research Journal of Medical Sciences, 4:309-14.