Review Article

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Dental Records- The X-factor for Forensic Odontologists

[1]Chhavi Srivastava, [2]M. K. Sunil, [3]Upender Malik, [4]Surangama Lehri
[1-4]Department of Oral Medicine and Radiology,
Teerthanker Mahaveer Dental College and Research Centre, Moradabad

Abstract:
Clinical record keeping is the core component of good and quality practice. Dental records provide characteristic features of an individual and thus aids in forensic investigations. A thorough habit of maintaining dental records, also gives an edge in the legal matters such as personal identification by antemortem records, age estimation, insurance etc.Therefore, this article gives an overview about the dental records and their role in forensic investigations

Keywords: Dental records, Forensic odontologist, Medicolegal

Introduction:

India is one of the largest countries located in the South Asia with an astounding population of approximately 138 crores, making it the second most populous country in the world.

Over the years, the multilingual land of India has witnessed several mishappenings including both caused by nature and humans. Families lose their loved ones to disasters, accidents, violent fights every year in India. In such grave circumstances, identification of the lost or deceased ones becomes difficult given the geographic and demographic vastness of the country.

Dental and medical records can play a crucial role in circumstances like these and forensic odontologistis a focal player of it.

Forensic Odontology has been defined by the Federation Dentaire International (FDI) as that branch of dentistry which in the interest of justice, deals with the proper handling and examination of dental evidence and with the proper evaluation and presentation of dental findings. It primarily deals with identification, based on recognition of unique features present in an individual's dental structures.[1]

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Dental records consist of documents related to the history of present illness, clinical examination, diagnosis, treatment done, and the prognosis The significance of dental records not only lies with identification of an individual but also with legal affairs as insurance and safeguarding an individual's identity.[2]

However, dental recording system in India is still in the embryonic stage of development. Dental institutions and hospitals still lack in keeping and updating dental records of each patient visiting the outpatient department, thereby making it difficult for forensic odontologist to play a pivotal role in the identification of victim and in many cases offender.[3]

Forensic odontologist requires a detailed recording system to venture in identification of decomposed human body or for analyzing the personality of the lost individual or of a criminal. Dental features are the primary identification tool in

Address for Correspondence : Dr. Chhavi Srivastava
Dept. of Oral Medicine and Radiology,
Teerthanker Mahaveer Dental College and
Research Centre, Moradabad (UP)
Email: drchhavisrivastava65@gmail.com

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the postmortem human recognition because of their physical and chemical properties to resist environmental changes. Even the heterogeneity in teeth types and their arrangement, makes dental records equally pivotal in ante mortem identification of individual. [4]
Thus, the need of the hour is to promote the importance of mandatory practice of maintaining dental records, so that a Forensic Odontologist could be an active tool in bringing crime scenes to conclusion as well as acknowledge the identity of a disaster and crime victim.

Major Elements of Dental Record:

A dental record is an official document of the history of illness, along with examination, diagnosis, treatment and management of an individual.

Clinical dental records are significant in rendering quality care. According to Jerge and Orlowski, in 1985, the records should be extensive and precise, enabling the clinician assess the progression and prognosis of the treatment of the oral disease.

The American Academy of Pediatric dentistry has described the major elements of dental record keeping which includes. [5]

General Charting, Initial Patient Record, Components of Patient Record, Medical and Dental Histories, Dental clinical examination, Treatment Planning, Informed Consent and Progress Report, Consultation and confidentiality Reports.

The dental clinical record must present in depth the morphological characteristics of each tooth in an individual. The mention of edentulous portions of the arch, number and type of restorations, orthodontic brackets and wires, developmental anomalies like “peg-shaped” lateral incisor, fused toot must be highlighted. Stains as well as alterations in anatomy of tooth pertaining to habit, occupation or chemical insult must be noted.[6]

Equally important is documentation of radiographs including that of teeth, jaws and even skull. Apart from these, patient's dental cast, prosthesis, pre and post treatment photographs all are significant part of his/her identity.

In case of pediatric patients, the records must be preserved upto a certain time frame until child grows, where after, fresh records must be recorded.
Moreover, all the records should be segregated as active or inactive on the basis of their current treatment status. Inactive patients are considered to be those who have not returned to the dental practice for 24 months .[6]

Maintaining drug record is another essential need. Dentists regularly prescribe local anaesthetics as well as other drugs, records of which must be tabulated and kept along with the patient's clinical details. However, in a study conducted by Dar-Odeh *et al*. on the analysis of clinical records of dental patients attending the Jordan University Hospital found that drug prescriptions and local anesthetic injections were poorly documented by the investigated group of dental specialists. [7]

Validity of Dental Records:

There are different rules regarding the expiry date of dental records across the globe.

In Nova Scotia, the guidelines mention a basic time frame of 2 years after treatment completion for maintain dental records. However, the Provincial Dental Board of Nova Scotia gives some leeway to this rule. [8]

The Department of Health (DH) for National Health Service (NHS) organizations in England states that dental records has to be maintained for span of 11 years for adults and children until age of 25. [9]

The Medical Council in India in 2002, passed a rule for every physician to maintain medical records pertaining to his/her indoor patients in a standard performa for 3 years from commencement of treatment (Section 1.3.1 and Appendix 3) [10]

As a general rule, it has been established to keep dental records for a term of 5 years for outpatients, for 7-15 years in case of inpatients and for more than 15 years for medico legal purposes. [6]

Dental Records- An Aid to Forensic Odontologist:

Forensic dentistry involves the processing, review, evaluation and presentation of dental evidence with the purpose of contributing scientific and objective data in legal processes. [11]
Forensic odontologist orchestrate a vital role in delivering information that would assist in identifying the culprits and victims of the crime as well as individuals affected in natural

and man-made disasters. The individual identity could be traced using the efficiently kept dental records by the practitioners. Identification is carried out by comparing the antemortem(AM) records kept in the form of dental records with the postmortem(PM) records.

The dental records can therefore play a vital role in the ways described below:

Bite Records as forensic evidence:

Bites are kepts as dental records by the practicing dentist in the form of dental casts or as radiographic records as Orthopantamogram. The alignment and smile patterns are also recorded as pre and post treatment photographic records. Because bite marks are often used as weapons either in an attack or to ward off an attack, thus these are used by forensic expert for identification purpose. Marks left by bites can be matched with the dental records to identify an individual. Presence of distinguishing features as diastema, micro or macrdonts, missing teeth, proves to be unique identification features. [11]

Dental age can be correlated with the chronological age of the unidentified person, especially in young individuals. In older age group, the overall condition of dentition could be matched with the records mentioning the carious and periodontal compromised teeth, number of restorations, attrition etc.

Rugoscopic records as forensic evidence:

Rugae patterns are another unique identifying feature of an individual. Like fingerprints, rugae patterns are personalized mark of one's identity which remains unaltered throughout one's life. These are recorded and preserved in the dental casts and could be used in the cases of burns where identification via other methods become impossible.

Even in the cases of multiple fractures of skull, face and teeth, rugae patterns can be used for comparison.

Facial reconstruction using dental records as forensic evidence:

Using the pre and post treatment photographs as well as radiographs of skull such as Lateral Cephalogram used by orthodontists, the facial profile of an individual could be sketched and thus, facial reconstruction could be put to use by Forensic Odontologist in victim identification.

Prosthodontic Records as forensic evidence:

Prosthodontic record including removable dentures, wires, brackets, tooth jewelry, habit correction appliances, implants could be used to track the owner.
The prosthetic appliances used for partial or complete edentulous patients, for habit correction as well as for orthodontic treatments are tailored for an individual, thus considered to be the identifying hallmark of an individual.

Denture labeling is another unique way of keeping a record of denture wearers. Methods like denture barcoding radio-frequency identification tags (RFITs) and microchips are utilized for the same. However, because of high cost and technique sensitivity, the denture marking is not being practiced in routine. [12,13]

DNA from tooth pulp as forensic evidence:

Moreover, since the extraction of DNA from pulp tissue by Sweet and Hildebrand; it has become one of the most critical dental records to be kept. Pulp tissue samples are collected in three ways: crushing, horizontal or vertical tooth sectioning, and through an endodontic access. [11]

It is an easier but technique sensitive method of data collection which could be used by Forensic Odontologist in identifying an individual. Forensic experts should work more in the area of extracting DNA from oral cavity and preserving it as dental records. [12]

Conclusion:

Though we entered into a new decade this year, yet the crimes, disasters, bioterrorism are occurring on routine basis. Despite technological advancements in every aspect of society, there is no gear in the mishappenings occurring round the globe. However, identifying the victims and culprits of these unfortunate incidents could bring justice and peace to the families involved and also to the society as a whole. Forensic odontologist could be key players in this process by utilizing the well maintained dental records.

There are many loopholes in record keeping in a vast country like India which needs urgent attention by the practicing

dentists, forensic experts as well as the governing boards. It is both a social responsibility as well as the need of the given hour.

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