

Patterns of Missing, Filled and Unrestored Teeth as a Simple Tool for Personal Identification

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ABSTRACT

Introduction: By identifying the victims of crime and disasters through dental records, dentists assist those involved in forensic investigation. The present study was undertaken with the aim to show that dental patterns in each individual are unique and to stress the need of recording dental patterns of an individual in every dental setup, as an antemortem record.

Methods: A total of 150 patients were selected by simple random sampling from those visiting to the Department of Oral Medicine and Radiology. Patterns of missing, filled and unrestored teeth were recorded for all 32 teeth in all the participants using Win ID coding method. Descriptive statistical analysis was performed.

Results: About 88% patients examined had unique dental patterns, with maximum variation observed in maxillary and mandibular first molars. Common patterns observed were intact teeth and impacted or missing third molars. 6.67% patients had all teeth intact. 5.33% patients had impacted or missing third molars.

Conclusion: Rare dental patterns can arise from a small number of dental characters of individual teeth. This may be used as antemortem record for identifying or excluding an individual/corpse.

Keywords: Dental patterns, Dental records, Personal identification

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INTRODUCTION

Every human has an identity in life, therefore, society has the duty to preserve this identity beyond life.¹ Sometimes bodies of victims of natural or man-made disasters may be distorted to such an extent that identification by family members is neither desirable nor reliable.² Teeth survive most post mortem events, have unique and identifying anatomic features and may contain custom restorations. Thus they are very useful for human identification in cases of mass disasters, fires, airplane crashes etc., where soft tissues have been destroyed beyond recognition.^{3,4} Dental evidence can serve as antemortem records in various forms like radiographs, photographs, dental casts, treatment summary etc.^{3,4} Dental radiographs may not be done for every patient, whereas preparing and storing dental casts for each patient may be cumbersome

and will require space. Thus, in developing countries, where funds and space are a limitation, maintaining antemortem records should be at as minimal cost as possible. In rural areas where only basic facilities are available, methods of maintaining antemortem records should be practical and easily recoverable in times of need.

DNA extracted from the teeth that may survive most of the disasters and decomposition over time, is also proving very useful, but may be an expensive method.¹

The first case of identification by teeth, dates back to 1775 where Dr. Joseph Warren's body was identified by his dentist by the ivory bridge that he had placed.¹ Identification of Hitler and his mistress Eva Brauma by dental prosthesis and records is also well-known.¹ Since 2000 years identification

by teeth is well-recognized, but no standard procedure for maintaining antemortem records is being followed.¹

According to Fellingham *et al.* there are 1.8×10^{19} possible combinations of 32 intact, decayed, missing or filled teeth.⁵ According to Adams, the diversity obtained in dental patterns by using the simple dental characteristics is as huge as that seen in the DNA sequences of mitochondria.¹

Identification by dental characteristics can have a variety of conclusions like an identification without discrepancy, consideration of a possibility of identification, insufficient to reach at a conclusion and definite exclusion.² Although it may not be useful in all cases and may not give consistent results, but it may be the easiest antemortem record to maintain and compare with the postmortem records.

The present study was undertaken with the aim to show that dental patterns in each individual are unique and to stress the need of recording dental patterns of an individual in every dental setup, as an antemortem record.

METHODS

Totally 150 patients were selected by simple random sampling from those visiting to the Department of Oral Medicine and Radiology of A. B. Shetty Memorial Institute of Dental Sciences. Informed consent was obtained from the patient after explaining the procedure and aim of the study. Mouth mirror and probe were used to note the findings from all 32 teeth of each patient. The findings of missing, filled, unrestored teeth were recorded in a predesigned data sheet according to Win ID coding system (Figure 1).^{6,7} The Win ID coding system comprised of primary and secondary codes. Every tooth was given a primary code. If secondary code was required, the primary code was followed by a "hyphen" and then the secondary code. The study was completed over a period of 2 months.

Win ID coding system used was as follows:^{6,7}

Primary codes

Code	Interpretation
M	"Mesial surface of the tooth is restored"
O	"Occlusal surface of the posterior tooth is restored"
D	"Distal surface of the tooth is restored"
F	"Facial surface of tooth is restored"
L	"Lingual surface of the tooth is restored"
I	"Incisal edge of the anterior tooth is restored"
U	"Tooth is unerupted"
V	"Non-restored tooth"
X	"Tooth is missing-extracted"
J	"Tooth is missing postmortem or the clinical crown of the tooth is not present for examination. Also used for avulsed tooth. The root or an open socket is present, but no other information is available"
/	"No information about tooth is available"

Secondary codes

Code	Interpretation
A	"An anomaly is associated with this tooth. Specifics of the anomaly may be detailed in the comments section"
B	"Tooth is deciduous"
C	"Crown"
E	"Resin filling material"
G	"Gold restoration"
H	"Porcelain"
N	"Non-precious filling or crown material. Includes stainless steel"
P	"Pontic. Primary code must be X to indicate missing tooth"
R	"Root canal filled"
S	"Silver amalgam"
T	"Denture tooth. Primary code must be X to indicate missing tooth"
Z	"Temporary filling material. Also indicates gross caries (used sparingly)"

RESULTS

The present study comprised of 150 subjects, out of which 82 were males and 68 were females. The study population was aged between 20 and 60 years with a mean age of 36.14 years. A high variability was recorded in dental patterns of each individual. Of the 150 patients examined, 88% had unique dental patterns. Common patterns observed were intact teeth and impacted or missing third molars. About 6.67% patients had all teeth intact. 5.33% patients had impacted or missing third molars apart from the other intact teeth (Table 1 and Figure 2).

A pattern recorded as VV implies that all teeth are intact. The dental characters correspond to 18, 17, 16, 15, 14, 13, 12, 11, 21, 22, 23, 24, 25, 26, 27, 28, 38, 37, 36, 35, 34, 33, 32, 31, 41, 42, 43, 44, 45, 46, 47, 48, respectively. The same sequence was used while recording and noting in all cases.

Maximum variability was seen in the maxillary and mandibular first molars. Up to 17 different patterns were observed in mandibular first molars (Table 2).

DISCUSSION

If dental records are maintained by every dental professional, it can provide continuity of care for the patient and can be a written communication between the previous treating dentist and any other dentist or doctor who treats the patient in future. Furthermore, it is a part of good clinical practice protocols. Apart from these, dental records also help to protect against any commercial, legal and medico-legal litigation, and they are critical in events of a malpractice insurance claim. They can play an additional and very crucial role in forensic investigations.^{8,9}

Table 2: Variability in dental patterns in each tooth

Tooth no.	Number of different characteristics observed
18	7
17	7
16	16
15	11
14	10
13	4
12	8
11	4
21	5
22	7
23	4
24	8
25	9
26	15
27	6
28	5
38	7
37	9
36	17
35	9
34	9
33	5
32	6
31	5
41	3
42	5
43	5
44	8
45	8
46	17
47	14
48	7

upgradation of record is required as dental patterns are dynamic.

Various coding systems that can be used to record dental findings are systemized nomenclature of dentistry, "CAPMI" system, "Win ID," "disaster and victim identification web," "Plass data DVI system international software," "forensic dental symbols," "dental encoder database" etc.^{6,12-15} Many softwares like "The Dentist," "Densoft program," "Saral® dentalsoft," "Practo ray" etc. can also be downloaded from internet and used for dental record maintenance in dental clinics.

Under Article 51A(h) of constitution of India, there is a moral obligation on the doctor, and a legal duty, to maintain and preserve medical, medico legal, and legal documents in best interests of social and professional justice.¹

According to Devadiga, a large number of dental practitioners in India are not maintaining dental

records.¹⁶ Record keeping may be a challenge in India because of lack of space, infrastructure, skilled manpower and financial support, ignorance and lack of cooperation of patients, lack of a centralized health care monitoring system or due to lack of a statutory body to monitor record maintenance. Also, no training for record maintenance is provided in BDS or MDS curriculum.

A minimum criteria or uniform guidelines in record maintenance need to be established and followed. An existing coding system may be rectified or new dental record maintaining system may be devised and used.

CONCLUSION

The success of forensic identification through dental means largely depends on availability of antemortem dental records. An acceptable and uniform system and training in this regard at various levels need to be addressed. The government and statutory bodies should enforce certain guidelines in this regard. Every dentist should realize their social responsibility of maintaining dental records of their patients so that they can be used for the identification in the event of any disaster.

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