

Dental records of forensic odontological importance: Maintenance pattern among dental practitioners of Pune city

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Introduction

The dental record is a legal document owned by the dentist containing all subjective and objective information about the patient. It is a patient's chart which is considered as an official dental office document that records or accounts all of the treatment done and all patient-related communications that occur in the dental office.^[1] It gives

Abstract

Context: Forensic odontology plays a pivotal role in the identification of victims in mass disasters with the help of "Preserved dental records" available with the general dental practitioners (GDPs). However, the status of such dental records of forensic importance has not been studied extensively. **Aim:** To study the current status of awareness and practice of dental record maintenance by GDPs of Pune. **Materials and Methods:** A cross-sectional study was conducted among 100 randomly selected GDPs from Pune. Data was collected in a personalized manner by means of a questionnaire. **Results:** Six percent of GDPs do not maintain any records of the patient, 11% of them do not record about developmental dental anomalies, and 22% GDPs do not retain radiographs. Sixty-seven percent GDPs mention about the use of abbreviations while recording history. Only 17% of GDPs record denture marking and 11% take conformity certificate for the denture. Thirty percent GDPs do not mention the serial number of an implant whereas 17% of them do not mention about the prescribed medication. Five percent GDPs handover original dental record to the patient and 91% said that they discard casts and models immediately after treatment. **Conclusion:** There was inadequate knowledge and lack of practice regarding proper record maintenance among GDPs.

Key words: Dental records, forensic odontology, general dental practitioners, mass disasters


essential information about the history of present illness, clinical examination, diagnosis, treatment done, and prognosis. A thorough cognizance of dental records is vital for practicing dentist because of its legal implication such as insurance consumerism and most importantly, forensic application.^[2] Maintenance of dental record is legally obligatory in the American and European countries,^[3] but

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in developing countries like India, the scenario is totally different. There is unawareness regarding the same among the dentists, with most of them maintaining a substandard or no dental records at all.

Thousands of lives are lost every year by various mass disasters such as natural (earthquake, drought, and tsunami), accidental (air-crash and train accidents), or criminal (terrorism/homicides/suicide bombing) not only in India but across the globe, which results in a large number of unidentified victims. Forensic odontology plays a pivotal role in assisting the identification of such victims with the help of these “preserved dental records” (antemortem records) as dental tissues are most reliable, unique for each individual and are capable to withstand high temperature, humidity, and pressure changes.^[4,5] In addition to this, identification by comparing antemortem and postmortem records can be a cheaper method as compared to other methods like DNA analysis. It has been reported in the literature that in major mass disasters such as tsunami and World Trade Center attack, forensic odontology has played a major role in victim identification.^[6] Thus, it can be a very useful tool for victim identification in developing country like India.

For becoming future ready, it is very important to know the current status of dental records available at the general dental practitioners (GDPs). Hence, in the present paper, humble effort has been made to study the current status of awareness and practice of dental record keeping at GDPs of Pune, Maharashtra, India. Only those dental records which are of forensic importance were included in the present study.

Materials and Methods

An epidemiological survey was conducted to assess the knowledge, attitude, and practice (KAP) of dental records of forensic importance and its retention at GDPs of Pune city.

Data collection

The questionnaire was designed for practicing GDPs, who in their day-to-day life might be encountering cases of forensic interest. Questionnaire was audited through the internal and external validation processes. Simple random sampling methodology was carried out to select GDPs for the present study. GDPs with either Bachelor of Dental Surgery (BDS) or Master of Dental Surgery (MDS) degree with a valid Maharashtra Dental Council Registration and minimal 5 years of dental practice were included in the present study. The data was collected from 100 GDPs in a personalized manner by means of the questionnaire. The questions were both open-ended and close-ended [Table 1]. The questions were framed to assess the KAP criteria-KAP. Information was obtained on the following aspects:^[7]

1. Knowledge about the significance of dental records and keeping them in proper pattern
2. Practices about the maintenance of dental records and attitude of the practitioner toward the maintenance of dental records.

Statistical analysis

The obtained responses from the questionnaire were plotted on Microsoft Excel Spreadsheet. Percentage for each response was calculated and conclusions were drawn from the responses.

Results

Demographic details of general dental practitioners

A total of 100 dentists participated in the study. All the GDPs were in the age range of 27–51 years with a mean age of 34 years. Sixty-one percent of practitioners were males whereas the remaining 39% were females. Their years of practice ranged from 5 to 25 years with a mean of 6 years of practice. Eighty percent of GDPs had done MDS from varied branches whereas 20% were BDS. Out of all the practitioners involved, 12% had qualified from government dental colleges, 38% from private, while the remaining 50% from deemed universities.

General dental practitioners’ responses regarding knowledge, attitude, and practice of dental records of forensic importance

Ninety-four percent of the GDPs maintain dental records whereas 6% practitioners do not maintain any dental records in their clinic. Out of the total dental practitioners who maintain dental records, 83% of them record case history manually in preprinted forms whereas 6% of the practitioners record it manually on a blank page, while the remaining 11% record the case history digitally (with a computer software program). There was no significant difference in maintaining the record pattern between MDS practitioners and BDS practitioners.

Case history records

All 100 dentists record the full name, date of birth, address, and contact number of the patient. Ninety-four percent mention about the previously done treatment procedures, 78% GDPs record E-mail addresses, 50% record patient’s profession, 44% record marital status with number of children, and only 28% mention about the socioeconomic status of the patient. Forty-six percent uses Zsigmondy–Palmer notation, 40% used Federation Dentaire International notation, while 16% used both the notations interchangeably for tooth numbering.

Medical history records

All the GDPs included in the study record, the various preexisting systemic medical conditions such as heart

Table 1: Questionnaire along with the results

Question	Options	Percentage
Do you start a dental file of all new patients?	Yes	94
	No	6
How do you record the case history?	Manually preprinted forms	83
	Manually blank page	6
	Digitally (with a computer program)	11
How do you document patient data?	Details in result section	-
Recording past medical history?	Yes	67
	No	33
Which tooth numbering system do you use?	Zsigmondy–Palmer notation	46
	Universal notation	0
	Federation Dentaire International notation	40
	Any two	16
Do you note any additional abnormalities?	Yes	89
	No	11
Do you use abbreviations?	Positive response	67
	Universally accepted?	83
	Abbreviations of your own?	17
Do you keep a list to explain these abbreviations?	Yes	67
	No	33
How is your style of recording a case history?	It varies from patient to patient	22
	It varies from disease to disease	18
	It is consistent	60
Do you keep the record of the dates?	At patients' first visit only?	0
	At every visit?	67
	After every procedure/treatment?	33
	Whenever any corrections made?	0
Do you take written informed consent signed by the patients?	Positive response	100
	For all patients	66
	For select cases	22
	For children (from parents/guardian)	12
Do you write any explanations for any correction in the dental record?	Yes	44
	No	56
What do you use for writing records?	Ink	100
	Pencil	0
How do you make a crosscut?	Single-line crosscut	67
	Double-line crosscut	11
	Cut it in such a way that nobody can read it	12
What do you use to erase?	Correction fluids like whitener	67
	Eraser	33
Do you maintain a chronological order of the recorded data?	Yes	89
	No	11
Which type of radiographs do you take?	Conventional radiographs	55
	Digital radiographs	45
Do you mention the findings of the radiographs in the case history form?	Yes	56
	No	44
What do you do with the patient's radiographs after the treatment?	Retain the radiograph as a hard copy	33
	Retain the radiograph as a soft copy	39
	Hand over the radiograph to the patient	22
	One copy to the patient and the other is retained	0
Do you retain the radiographs?	Do not retain the radiographs	1
	Yes	78
	No	22

Contd...

Table 1: Contd....

Question	Options	Percentage
Do you keep a record of every treatment done?	Yes	78
	No	22
	In code	20
	Fully written	44
Do you mention details about denture?	Denture marking	17
Do you mention the serial number of an implant?	Yes	70
	No	30
Do you mention the prescribed medication in the file?	Yes	83
	No	17
What do you do with the patient's dental file after the treatment?	Preserve the dental file	89
	Hand over the original record to the patient	5
	Hand over a copy of the record to the patient	6
If you preserve the record, how long do you retain them?	Days/months/years/permanently	
	Weeks to few years	50
	Permanently	50
Method of preservation	For radiographs	82
	For casts and model	9
	For photographs	100
	For dental file	22
Do you preserve all the patient-related correspondence?	Yes	44
	No	56

complaints, high or low blood pressure, diabetes, asthma, and allergy if any. All of them enquired about the history of pregnancy in female patients. Ninety-four percent sought about the history of epilepsy; 83% posed leading questions related to endocrine problems such as hyper- or hypo-thyroidism; 78% of practitioners queried about the congenital problems; 72% mentioned about any previously done treatments such as any major surgeries, radiotherapy, or history of blood transfusion; and 67% further interrogated about liver or kidney complaints.

Eighty-three percent mention the prescribed medications in the dental file whereas 17% do not mention the prescribed medications in the file. Eighty-nine percent preserve the dental file, 5% hand over the original dental record to the patient, while 6% hand over a copy of the record to the patient [Figure 1].

Developmental dental anomalies records

Eighty-nine percent of GDPs record developmental dental anomalies. Of the 89%, 94% GDPs note down about various developmental disturbances like microdontia, rotations along with history of any trauma. Eighty-nine percent document supernumerary teeth, congenitally absent teeth/missing teeth, abnormal shape, and diastema. Fifty percent register about torus maxillaris/mandibularis and only 28% mention about dysgnathic anomaly/malocclusions, if present [Figure 2].

Sixty-seven percent dentists use abbreviations and 33% do not use them. Out of the total dentists who use abbreviations, 83% use universally accepted abbreviations

and only 17% of them use acronyms. Sixty-four percent dentists keep a list to explain the abbreviations.

Method of recording case history

Sixty percent record case history in a consistent form, 18% record case history which varies from disease to disease, and 22% record case history which varies from patient to patient. Sixty-seven percent dentists keep the record of dates at every visit and 33% keep a record of dates after every procedure/treatment. None of them keep the date records at patient's first visit or whenever any corrections are made. All 100% dentists take written informed consent signed by the patients. Sixty-six percent take written informed consent for all the patients, 22% takes consent for selected cases, and only 12% of dentists take written informed consent for children (from parents/guardian).

Corrections in dental records

Fifty percent of dentists do not write explanations for any correction in the dental record whereas 44% write explanations for any correction in the dental record. All 100% dentists use ink for writing dental records whereas none of them use a pencil. Sixty-seven percent make single-line crosscut, 11% make double-line crosscut, while 12% smudged the mistake. Sixty-seven percent use correction fluids like whitener whereas 33% mention the use of an eraser. Eighty-nine percent maintain a chronological order of the recorded data whereas 11% do not maintain any chronological order.

Radiograph records

Fifty-five percent take conventional radiographs using X-ray films and about 45% take digital radiographs. Fifty-six percent mention the findings of the radiographs in the case

history form whereas 44% do not mention them whatsoever. Thirty percent retain all the radiographs in the form of soft copy, 33% retain the radiograph as hard copies, 22% of the dental practitioners hand over the radiographs to the patient, 1% of the practitioners do not retain the radiographs, and none of them produce two separate copies, one for the patient and the other for themselves [Figure 3]. Seventy-eight percent conserved the radiographs, 42% preserved it for 2–3 months, and 58% maintained it for 2–3 years, while 22% do not preserve the radiographs. Seventy-eight percent preserved the dental records whereas 22% do not keep any record of the treatment done. Twenty percent keep the record of treatment in code whereas 44% keep the records in fully written forms.

Dental prosthetic records

Fifty-six percent of dental practitioners mention about the type of denture; 44% state the kind of denture; 33% revealed about the material used; 39% mention about the number of teeth in the denture; 17% commented about the color, number of clamps, and denture marking; and only 11% of dentists take conformity certificate for the denture [Figure 4]. Seventy percent indicate the serial number of an implant whereas 30% do not mention the serial number.

Preservation of dental records

Fifty percent preserve the dental record for weeks to a few years (2 weeks to 1.5 years) whereas 50% preserve them

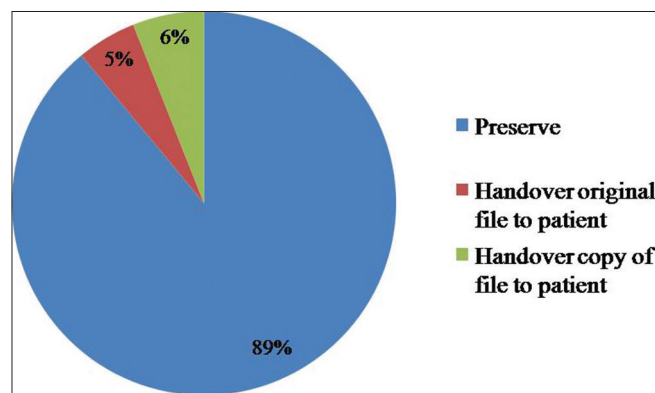


Figure 1: Distribution of preservation of dental file by general dental practitioners

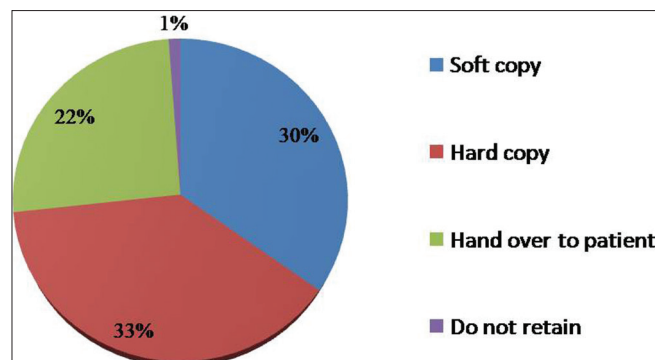


Figure 3: Distribution of method of preservation of dental radiographs by general dental practitioners

permanently. Eighty-two percent dental practitioners conserve enveloped radiographs whereas 18% preserve digital radiographs as a soft copy. Ninety-one percent of dentists said that they discard casts and models immediately after the treatment, and only 9% of the dentists preserve the casts (after crown/bridge cementation and orthodontic treatment) till the first follow-up. Hundred percent dentists told that they preserve soft copies of the photographs. Seventy-eight percent dentists preserve the dental file of the patient in as a soft copy and only 22% of dentists maintain the record on case papers.

Forty-four percent maintain all the patient-related correspondence whereas 56% do not preserve any patient-related correspondence. Thirty-nine percent sustain all the patient-related correspondence for 2–3 years whereas 11% preserve it for a period of about 2 months.

Discussion

Dental records play a vital role in dental practice (forensic odontology). Maintaining a dental record report in the form of dental charts, radiographs, photographs, impressions,

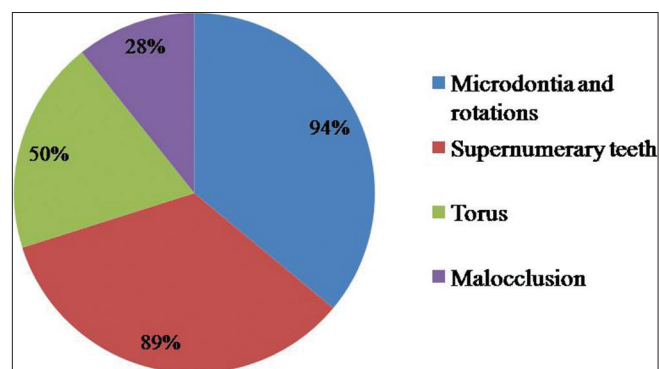


Figure 2: Distribution of recording of developmental dental anomalies. Eighty-nine percent general dental practitioners maintain the record of developmental anomalies

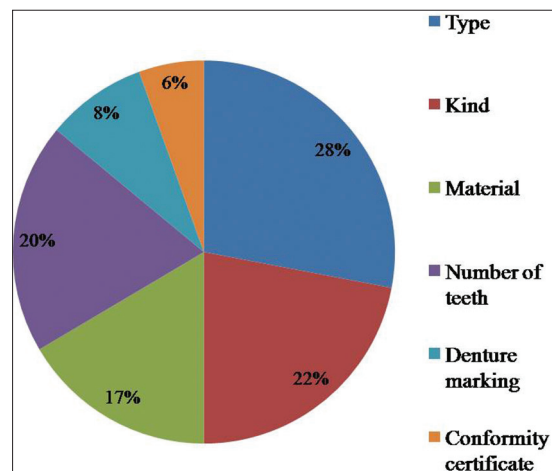


Figure 4: Distribution of recording of denture details by general dental practitioners

casts, etc., is an ethical and a legal obligation on the part of the dentist. These records play an important role in forensic dentistry as findings of postmortem examinations are compared with antemortem dental findings that have been entered into the records.^[1]

This study was conducted among the dental practitioners to assess their awareness about forensic odontology. The results show that the knowledge of forensic odontology among the dental practitioners is feeble and inadequate.

A previous study carried out by Preethi *et al.* inferred that only 12% maintained a complete dental record and 21% did not maintain any record, while 93% dentists did not preserve a record for more than 7 years.^[7] Astekar *et al.* found that only 38% of dentists retain records whereas 62% did not maintain any record of the patients.^[8] Waleed *et al.* in their study observed that students in college maintain proper dental records than private practitioners.^[9] In our study, we found that 94% of the practitioners conserved the dental records whereas 6% practitioners did not maintain any dental records of their patients in the clinic.

The importance and value of radiographs must never be underestimated as they play a major role in revealing tooth colored restoration and obtaining positive identification, as well as they play a role in age estimation, by the number of teeth erupted.^[10,11] Waleed *et al.* carried out a comparative study between students and dentists, and found out that 100% of students maintained intraoral periapical radiographs whereas 8% of students and 6% of dentists obtained bitewing radiographs. In our study, we found 78% practitioners retain the radiographs whereas 22% do not conserve the radiographs, 56% mentioned the findings of the radiographs in the case history form which could help to correlate and compare antemortem and postmortem radiographs in turn proving to be an important tool in the identification of an individual.

Photographs are important in the identification of an individual visually as the Countess of Salisbury has been identified visually by her gold denture.^[12] Waleed *et al.* found only 8% of dentists and 28% of students maintained photographs of the patient. Whereas, in our study, we found 100% dentists said that they preserve the soft copy of photographs. Most dentists mentioned that they took photographs for every case while 10% of dentists took photographs only for special or rare cases.

Casts and study models are very beneficial in the process of identifying an individual through the process regarded to as rugoscopy as every individual in the world possesses a unique pattern and is considered as a reliable method in postmortem cases but is considered impossible without antemortem records. Therefore, encountering casts and study models can be very valuable.^[13] Waleed *et al.* observed

49% of students obtained cast and study models of their patients whereas only 21% of the dentists retrieved them. In our study, we found only 9% of dentists preserve the casts (after crown/bridge cementation and orthodontic treatment) till first follow-up whereas 91% of dentists said that they discard casts and models immediately after treatment is done.

Various details used in the questionnaire help us to evaluate the quality of record that the practitioners maintain. Maintenance of record by ink gives the exact record of the patients' details than that of the pencil as there are no chances of alteration of findings from the practitioners end. Through the survey we found 100% of dentists use ink for record writing, 5% mentioned the mixed use of ink or pencil as per the availability during the recording of the case history. Interestingly, we also found that few dentists have started maintaining records digitally in computers. It was seen through our survey that only 11% GDPs in Pune recorded case history digitally (with a computer program) The awareness of maintaining record digitally should be increased as it is the easiest way as to sustain for a longer period of time and requires less space as well.

In our survey, we revealed that 67% of practitioners used single-line crosscut for any mistake done; this could help other dentists or the forensic investigators to make out what were the previous findings that were corrected. Fifty percent of dentists do not write explanations for any correction in the dental record. This can create confusion while comparing the postmortem dental records and also make it difficult for dentists to defend during a legal action.

Additional dental abnormalities such as developmental disturbances in the size, shape, and number of teeth like microdontia and rotated teeth were mentioned by 89% of the practitioners. This can prove as one of the important antemortem guidelines in the maintenance of record which would play a major role from the forensics point of view in the identification of the victims. We found that 70% of practitioners mention the serial number of an implant; this is again an important guideline as it can retain in the oral cavity for an extensive duration. We also observed that there is no single system followed for tooth numbering, and this could create a problem in future for revealing the details of the patients' records or while consulting another practitioner.

Conclusion

This study, conducted among 100 dental practitioners regarding their awareness of maintaining proper records of the patients from forensic point of view, revealed that there was inadequate knowledge and lack of practice regarding proper record maintenance prevailing among these study subjects. More awareness is required among

the practitioners regarding proper record maintenance to evaluate its potential use for the cases of forensic importance and its implication for identification of victims in mass disasters. In addition, to enrich knowledge about forensic odontology, more number of conferences and seminars should be conducted.

Along with the above-mentioned points, a standard norm for proper dental record keeping should be established; a governing body should be appointed which will verify the already maintained dental records. Various guidelines to maintain proper dental records are also suggested. Thus, record well today, rest assured tomorrow!

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Conflicts of interest

There are no conflicts of interest.

References

1. Devadiga A. What's the deal with dental records for practicing dentists? Importance in general and forensic dentistry. *J Forensic Dent Sci* 2014;6:9-15.
2. Charangowda BK. Dental records: An overview. *J Forensic Dent Sci* 2010;2:5-10.
3. American Academy of Pediatric Dentistry. Clinical guideline on record-keeping. *Pediatr Dent* 2004;26 7 Suppl: 134-9.
4. Fereira JL, Fereira AE, Ortega AI. Methods for the analysis of hard dental tissues exposed to high temperatures. *Forensic Sci Int* 2008;178:119-24.
5. Holden JL, Clement JG, Phakey PP. Age and temperature related changes to the ultrastructure and composition of human bone mineral. *J Bone Miner Res* 1995;10:1400-9.
6. Sarode SC, Zarkar GA, Kulkarni MA. Role of forensic odontology in the world's major mass disasters: Facts and figures. *Dent Update* 2009;36:430-2, 435-6.
7. Preethi S, Einstein A, Sivapathasundharam B. Awareness of forensic odontology among dental practitioners in Chennai: A knowledge, attitude, practice study. *J Forensic Dent Sci* 2011;3:63-6.
8. Astekar M, Saawarn S, Ramesh G, Saawarn N. Maintaining dental records: Are we ready for forensic needs? *J Forensic Dent Sci* 2011;3:52-7.
9. Waleed P, Baba F, Alsulami S, Tarakji B. Importance of dental records in forensic dental identification. *Acta Inform Med* 2015;23:49-52.
10. American Academy of Pediatric Dentistry. Guideline on adolescent oral health care. *Pediatr Dent* 2011;33:129-36.
11. American Academy of Pediatric Dentistry. Clinical Affairs Committee – Infant Oral Health Subcommittee. Guideline on infant oral health care. *Pediatr Dent* 2012;34:e148-52.
12. American Academy of Pediatric Dentistry. Guideline on periodicity of examination, preventive dental services, anticipatory guidance, and oral treatment for children. *Pediatr Dent* 2011;33:102-9.
13. American Academy of Pediatric Dentistry. Guideline on acquired temporomandibular disorders in infants, children, and adolescents. *Pediatr Dent* 2011;33:248-53.