

Importance and Maintenance of Dental Records - Are Dentists Aware? A Survey Among Private Dental Practitioners

Anoli Agrawal^{1*}, V.K. Prashanth², Arun Dodamani³, Shruti Pundkar¹, Prachi Ray¹ and Asmita Hamand¹

¹Post-Graduate Student, Department of Public Health Dentistry, ACPM Dental College, Dhule – 424001, Maharashtra, India; anoliagrawal@gmail.com, rayprachiis@gmail.com, shrutipundkar@gmail.com, asmita.acpmdc@gmail.com

²Professor, Department of Public Health Dentistry, ACPM Dental College, Dhule – 424001, Maharashtra, India; dr_prashanthvk@yahoo.com

³Professor and Head of Department, Department of Public Health Dentistry, ACPM Dental College, Dhule – 424001, Maharashtra, India; drarundodamani@gmail.com

Abstract

Introduction: Forensic expertise, including dental identification and expertise in civil litigation cases related to dental malpractice and injuries mostly count on dental records. Comparison of dental data obtained from the deceased person with dental data obtained by the dentist from the person's file is a primary method of identification through dental evidence.

Material and Methodology: In all, 180 dentists participated in an online survey. Questions covered general information on dentists, maintenance of dental records, and knowledge of legal requirements and forensic odontology. **Results:** 66.6% of dentists said that they update patient's data on every visit. 86.6% of dentists were aware of the use of Dental records in Forensic Odontology. 89.9% of dentists were not aware of how they should present the data when asked by the legal authority whereas only 10.1% of Dentists were aware of how they are supposed to provide the data. The percentage of dentists who knew how long are they legally mandated to keep patient records showed a significant difference ($p < 0.05$) between Bachelors of Dental Surgery (BDS) and Masters of Dental Surgery (MDS) practitioners. **Conclusion:** Dentists being aware of forensic odontology, still lack the information about the legal aspects of it. Forensic odontology should be included in the curriculum as a separate subject to improve knowledge at the grassroots level. The focus should also be improved towards raising the awareness among private practitioners regarding the practical aspect of forensic odontology.

Keywords: Dental Practitioners, Dental Record, Forensic, Forensic Odontology, Medico-Legal Cases, Survey

Introduction

The Latin word “*forensis*” gave origin to the term “forensic” which means a place where legal matters are discussed¹. Forensic odontology is a branch of dentistry that applies dental science to provide evidence in the interest of the law as stated by Australian Society of Endodontology Inc². It includes Bitemark analysis, age estimation, dental identification and providing expertise in civil litigation cases related to dental malpractice and injuries³. Apart from just dental identification, lip prints (cheiloscopy) and palatal rugae patterns (rugoscopy) are other approaches that can be used in Forensic

Odontology^{4,5}. Forensic Odontology thus encompasses identification, authentication, analysis and presentation of credible dental evidence.

The primary requisite from Forensic Odontologist is providing identification to the deceased. Identity of an individual, even if deceased, stands to be of paramount importance due to legal, financial and social reasons in today's society. Comparison of dental data obtained from the deceased person with dental data obtained by the dentist from the person's life is a primary method of identification through dental evidence. Nevertheless, the competence and correctness of the available dental records is what makes this method a success^{6,7}.

*Author for correspondence

All records, whether written or noted by electronic media, photographs, dental casts, radiographs, communications, and any other investigation during treatment, are considered dental records⁸. Professionally and legally dentists are obligated to create and maintain dental records which help, contribute to and continue the safety of patients' dental care⁹. Good record-keeping practices are crucial for ethically sound treatment, Legal indemnity as well as forensic purposes. Forensically suitable records are complete, precise and intelligible in compliance with the laws and regulations of patient record keeping. To ensure timely identification of a deceased individual there is a need for prompt availability of Dental archives and other evidence

In this study, a survey among private dental practitioners was conducted to assess awareness about Forensic odontology as well as to gain insight into dental record-keeping methods of private dental practitioners. Previous studies have been conducted on the same, but none have been conducted in the North Maharashtra region. The study like-wise - aims to assess the awareness about the legal aspect of record-keeping and the use of dental records in forensic odontology.

Materials and Methodology

The cross-sectional study was conducted in September 2021. The study was conducted to assess awareness about Forensic odontology as well to gain insight into dental record-keeping methods of private dental practitioners. The questionnaire was formed and referred to 10 participants who were willing to give consent to examine the content validity of the questionnaire. These participants further were not included in the final sample. Ethical approval was obtained from the Institutional Ethical Committee (Letter no. 1316/JMF'sACPMDC/IEC). The list of Dentists was obtained from the local branch of the Indian Dental Association. Out of 297 dentists, the email and contact numbers of 228 dentists were correctly obtained, out of which 180 participated in the study giving a response rate of 78%. The questionnaire consisted of 31 questions with single, multiple-choice and open-ended questions. Using the online Google form database, an online survey was designed with all questions being mandatory. Questions were divided into the following three sections.

- a) General information on the dentist – The first section of the questionnaire was framed to gain information on age, gender, work experience and location of the participant's practice. These also included questions on dental school education and regulatory bodies associated with their clinic.
- b) Information on dental documentation and data-keeping – questions in this section were focused on the procedure of taking general patient information like maiden name, names of other dentists the patient visited, name of their general practitioner, recording medical as well as dental history. The incidence of routine use of x-rays and photographs was also examined. Participants were also asked questions on obtaining written consent and their knowledge of the right of patients to dispose of personal dental records.
- c) Awareness of Forensic Odontology – In this section, questions were framed to enquire about the level of awareness about forensic odontology and legal aspects of data-keeping.

Statistical analysis was performed using SPSS statistics software (version 25). Descriptive statistics were applied to calculate the frequency and percentage of the study participants. A chi-square test was used to assess differences in categorical variables except in cases where there were less than 10 participants per cell when Fisher's exact test was used. The statistical significance level was set at $p < 0.05$.

Results

The prime number of participants had more than 10 years of work experience, were educated up to the post-graduate level in Dentistry, having practiced in urban areas with a clinic not associated with any regulatory body (Table 1). The majority of Responses showed that 66.6% of dentists update their patient records on every visit. 84.4% of participants said that they record X-Ray as and when necessary to patients. 34.4% of dentists said that they record only Intra-oral photographs while 58.8% said that they record both Intraoral as well as Extra-oral Photographs (Table 2). 60% of dentists have gained familiarity with forensic odontology during their Undergraduate Training. 86.6% were aware of the use of dental records in Forensic Odontology. 85% of dentists were aware that they are legally bound to produce data whenever asked whereas 39.4% were not aware of how to

produce the data when asked by legal authority. 76.6% of Dentists said that they have not come across any Medico-legal case and 85% of dentists have not given any data ever for any legal proceeding. 71.7% of dentists were aware that OPG is the most useful X-ray in Forensic Odontology (Table 3). The percentage of a dentist who knew how long they are legally mandated to keep the records showed a statistically significant difference (p -value = 0.04, $p < 0.05$) between BDS and MDS participants.

Discussion

The total number of collected responses to the questionnaire was 180, similar to the response rate of 78%. Our study is the first study on the quality and manner of record-keeping among private dental practitioners in the North Maharashtra region. Various studies have been conducted in different metro cities in India, rendering knowledge about dentists of metro cities^{10,11} but very

Table 1. General Information on the dentist

Sr. No.	Question	Results
1.	Gender	Male 86 Female 94
2.	Education	BDS 82 (45.5%) MDS 92 (54.5%)
3.	Work experience after degree completion	>10 years 140 (78%) < 10 years 40 (22%)
4.	Location of practice	Urban 104 (58%) Peri-Urban 49 (27.2%) Rural 27 (14.8%)
5.	Is your Clinic Associated with any Regulatory Body?	None 154 (85.5%) NABH, Clinical establishment act etc. 26 (14.5%)

Table 2. Information on dental documentation and data keeping

1.	Do you record the patient's details? (eg. Maiden name, name of general practitioner, name of another dentist)	Yes 119 (66.1%) No 31 (17.2%) Occasionally 30 (16.7%)
2.	Do you record the patient's medical and dental history? Can choose multiple options	Only medical history 118 (65.5%) Only Dental history 113 (62.8%) As per convenience 73 (40.5%)
3.	How regularly do you update Patients records?	Every visit 120 (66.6%) Twice yearly 12 (6.8%) Rarely 48 (26.6%)
4.	Do you keep the patient Data to yourself or give it to patient	I keep the data 71 (39.4%) Patient takes the data 36 (20%) I keep original and duplicate to the patient 39 (21.6%) I keep duplicate and original to the patient 34 (18.8%)
5.	How frequently do you record a patient's complete dental status?	Record on every visit 65 (36.1%) Update on every visit 86 (47.7%) Update once a year 66 (36.6%) Never 15 (8.3%)
6.	Which tooth coding system do you use?	FDI system (e.g.: 11,22,36) 96 (53.3%) Palmer-zigmondy system (quadrant system) 84 (46.7%) ADA Universal system (eg:1,8,32,28,30,20) 0

7.	How frequently do you record radiographs of patients?	Every visit 23 (12.7%) Every 3 months 5 (2.7%) As and when necessary 152 (84.4%) Avoid X-ray (0)
8.	How do you record Radiograph?	Digital e.g. – RVG 155 (86.1%) Conventional e.g. – IOPA 25 (13.9%)
9.	How long do you store X-ray records?	<5 years 105(58.3%) 5-10 years 54 (30%) 11-20 years 9 (5.1%) >20 years 12 (6.6%)
10.	Do you take intraoral and extraoral Photographs?	Only Intraoral 62 (34.4%) Only Extraoral 2 (1.3%) Both 106 (58.8%) None 10 (5.5%)
11.	Do you store Impression Records? (Cast, previous dentures, pervious prosthesis etc.)	Yes 71 (39.4%) No 18 (10.1%) Only till Patient's work is done 91 (50.5%)
12.	Do you take consent before any treatment?	Yes 131 (72.7%) No 3 (2.1%) Only for Invasive procedures 46 (25.5%)
13.	What Anthropometric measurements do you take? You can choose multiple.	Height 53 (29.4%) Weight 77 (42.7%) Facial profile 153 (85%) Gait 53 (29.4%) Built 59 (32.7%)
14.	How do you record the data?	Digital form (Electronically) 37 (20.5%) Digital with backup (Electronically with Hard drive back up) 30 (16.8%) Paper form (Physically) 113 (62.7%)
15	How long are you legally mandated to keep patient records?	5 Years 63 (35%) 7 Years 15 (8.3%) 10 Years 22 (12.2%) As long as possible 80 (44.5%)

Table 3. Awareness of forensic odontology

1	Are you aware of the term "Forensic Odontology"?	Yes 172 (95.5%) No 8 (4.5%)
2	How did you gain familiarity with Forensic Odontology?	Undergraduate Study 108 (60%) Post Graduate Study 37 (20.5%) CDE programs 25 (13.8%) Doctoral Study 5 (2.8%) No Knowledge 5 (2.8%)
3	What according to you is the use of dental records in Forensic Odontology? You can choose multiple	Identification of the deceased in unidentified cases 40 (22.2%) Identification of the perpetrator by bite mark analysis 33 (18.3%) Age estimation 37 (20.5%) Other Legal Proceedings 27 (15%) All of the above 156 (86.6%)
4	Are you aware that you are legally bound to produce dental records whenever asked for?	Yes 153 (85%) No 27 (15%)

5	Are you aware of how to produce data when asked by legal authorities?	Give complete data 23 (12.7%) Give only what is asked for 68 (37.8%) Give complete data except for financial data 18 (10.1%) Don't know 71 (39.4%)
6	Have you come across any medico-legal cases in course of your practice?	Yes 33 (18.3%) No 138 (76.6%) Maybe 9 (5.1%)
7	Have you given any data for any legal proceedings?	Yes 27 (15%) No 153 (85%)
8	Which radiograph according to you is most useful in Forensics?	RVG 37 (20.5%) OPG 128 (71.7%) IOPA 15 (7.8%)

limited studies have been conducted for assessing the knowledge of dentists in 2 tier cities in India. The majority of the study participants belonged to the 25 to 40 years of age group; this can be explained by the higher digital literacy in the younger generation of dentists.

As mentioned in Table 2, 66.6% of dentists update their patient's record on every visit of the patient whereas 26.6% of dentists update their patient's record rarely. The barrier in recording or record updating could be associated with a busy dental practice including workload and lack of time as mentioned by Al-Azri, Harford, James (2015)².

For the tooth coding system, the most common tooth coding system used is the FDI system according to a survey among Croatian dentists². According to this survey, the majority of dentists i.e., 53.3% use the FDI system as well, but 46.7% use the Palmer-zsigmondy system. The dentist should use one common tooth coding system to avoid discrepancies in the interpretation of their dental record.

In the present survey, dentists of North Maharashtra i.e., 71.7% were aware that orthopantomograms were the most used X-ray for forensic and legal purposes (Table 3), however, 84.4% record X-rays as and when necessary for the treatment. The reason for this could be to avoid unnecessary radiation exposure. X-rays are an important tool for diagnosing different conditions that are otherwise undetectable in clinical examination.

In the present survey, the duration of archiving x-ray was most often less than 5 years, with a further 30% of respondents archiving x-ray for 5-10 years. A crucial part of dental identification could be comparing ante-mortem and post mortem X-rays. Archiving X-rays for as long as possible may be crucial as even old radiographs can

be used to compare tooth morphology and surrounding bone structures.

Intra-oral and extra-oral photographs are a great supporting tool for dental documentation and hold great value in forensics albeit not mandatory except in orthodontics and oral rehabilitation. According to the results of this survey, 58.8% of the respondents used both extra-oral as well as intra-oral photographs. We consider this a good result, given that it is optional in dental documentation. In these modern times of private practices, there is increased use of dental photography for documenting the initial status of the patient and drawing out a therapy plan for them.

Most of the respondents (62.7%) keep documentation in paper form, whereas 16.8% keep it in digital form with an additional backup. However, the former method of documentation is more vulnerable to premature destruction and/or unauthorized use. Thus, raising awareness about the importance of digital documentation keeping practice is deemed necessary among dentists of the North Maharashtra region.

According to this survey, out of the total number of respondents, 60% received knowledge about forensic odontology during their undergraduate course whilst 20.5% received knowledge about forensic odontology during their postgraduate course. These results are in line with a study conducted in Australia² where results showed a majority of them recalled a study about forensic odontology in their undergraduate course. This exposure alone in their undergraduate education may be insufficient to instigate interest in and to raise awareness of the kinds of dental records needed to support forensic odontologists or legal cases.

The majority of the respondents were aware of the use of dental records in forensic i.e., Identification of the

deceased, Identification of the perpetrator by bite mark analysis, Age estimation and Other legal Proceedings such as insurance, malpractice and various medico-legal cases. This may be attributed to the exposure of forensic odontology as a subject at some point in the respondent's career route.

A key number of the participants (85%) exhibited awareness about being legally bound to produce dental records when asked for. This can be attributed to dentists reading news reports of patients taking legal action against their dentist and the courts demanding for patients' medical records as crucial evidence. Thus, dental practitioners are slowly realizing the vital importance of maintaining patient's medical recording.

Record keeping is expected to be poor in less developed countries¹². However research has shown insufficiencies in highly developed countries as well¹³. Treatments performed by the dentist in India often have no records¹⁴. Forensic odontology was introduced as a mandatory course in undergraduate programs in Croatia in the year 1997. There is no such mandatory course in the Dental undergraduate course of India. Forensic odontology is just restricted to one chapter in the book of Oral Pathology in India. Investigation of undergraduate education by The International Organization for Forensic Odonto-Stomatology found that a specific teaching course in forensic odontology is neither mandatory nor elective in most undergraduate programs¹⁵.

Conclusion

The results of this research show that private dental Practitioners keep and store detailed dental documentation to a great extent and were aware of forensic odontology to a limited extent. However, there are some inadequacies regarding the legal portrayal of the dental data and the legal significance of the same. The proper maintenance of record keeping is necessary for this era with considerable increase in dental tourism i.e., bringing a large sum of patients of foreign nationalities. A special course should be made mandatory in the undergraduate course in India, to introduce participants to a legal obligation of record-keeping and the importance and application of documentation in dental identification and use in forensic expertise with litigation related to negligence, malpractice, and the qualification of orofacial injury. We expect the Indian Association of Forensic Odontology

(IAFO) to take further measures by advising authorities to include a basic course of forensic odontology in the undergraduate dental curriculum.

Funding

This research has received no external funding.

Conflict of Interest

The authors declare no conflict of interest.

References

1. Puerini SJ. Forensic odontology and the postmortem identification process. *Med. Health R.I.* 2005; 88:308-309.
2. Al-Azri AR, Harford J, James H. Awareness of forensic odontology among dentists in Australia: Are they keeping forensically valuable dental records? *Aust. Dent. J.* 2015; 61:102-108. <https://doi.org/10.1111/adj.12316>. PMID:25823701.
3. Brkić H, Lessig R, da Silva RHA, Pinchi V, Thevissen P (Eds). *Textbook of Forensic Odonto-Stomatology by IOFOS, Naklada Slap: Jastrebarsko, Croatia; 2021. p. 412.*
4. Bernardi S, Bianchi S, Continenza MA, Pinchi V, Macchiarelli G. Morphological study of the labial grooves' pattern in an Italian population. *Aust. J. Forensic Sci.* 2018; 52:490-499. <https://doi.org/10.1080/00450618.2018.1541192>.
5. Chowdhry A, Kapoor P. Cheiloscopy, Rugoscopy. In: *Textbook of Forensic Odonto-Stomatology by IOFOS; Brkić, H., Lessig, R., da Silva, R.H.A., Pinchi, V., Thevissen, P., Eds.; Naklada Slap: Jastrebarsko, Croatia; 2021. p. 235-248.*
6. Hinchliffe J. Forensic odontology, part 1. Dental identification. *Br. Dent. J.* 2011; 210:219-224. <https://doi.org/10.1038/sj.bdj.2011.146>. PMID:21394152.
7. Avon S. Forensic odontology: The roles and responsibilities of the dentist. *J. Can. Dent. Assoc.* 2004; 70:453-458.
8. Berketa JW, James H, Lake AW. Forensic odontology involvement in disaster victim identification. *Forensic Sci. Med. Pathol.* 2012; 8:148-156. <https://doi.org/10.1007/s12024-011-9279-9>. PMID:21952930.
9. Dental Board of Australia. *Guidelines on Dental Records; 2010.*
10. Rahman J, Routray S, Mishra SS, Mohanty I, Mohanty N, Sukla N. Knowledge, awareness, and practise of forensic odontology among dental surgeons in Bhubaneswar, India. *Journal of Unexplored Medical Data.* 2017 May 21; 2:26-33. <https://doi.org/10.20517/2572-8180.2017.01>.

11. Harchandani N, Marathe S, Hebbale M, UINisa S, Hiremutt D. Awareness of forensic odontology among general dental practitioners in Pune A cross-sectional study. *J. Adv. Med. Dent. Sci. Res.* 2014 Jul; 2(3):10-16.
12. Thampan N, Janani R, Ramya R, Bharanidharan R, Kumar A, Rajkumar K. Antemortem dental records versus individual identification. *J. Forensic Dent. Sci.* 2018; 10:158-163. https://doi.org/10.4103/jfo.jfds_13_18. PMID:31143065 PMCID:PMC6528534.
13. Brown NL, El Jephcote V, Morrison JN, Sutton JE. Inaccurate dental charting in an audit of 1128 general dental practice records. *Dent. Update.* 2017; 44:254-260 <https://doi.org/10.12968/denu.2017.44.3.254>. PMID:29172337.
14. Sarode GS, Sarode SC, Choudhary S, Patil S, Anand R, Vyas H. Dental records of forensic odontological importance: Maintenance pattern among dental practitioners of Pune city. *J. Forensic Dent. Sci.* 2017; 9:48.
15. Pinchi V. Education and Qualification in Forensic Odontology. In: *Textbook of Forensic Odonto-Stomatology* by IOFOS; Brkić, H., Lessig, R., da Silva, R.H.A., Pinchi, V., Thevissen, P., Eds.; Naklada Slap: Jastrebarsko, Croatia; 2021. p. 387-406.

How to cite this article: Agrawal, A., Prashanth, V.K., Dodamani, A., Pundkar, S., Ray, P. and Hamand, A. Importance and Maintenance of Dental Records - Are Dentists Aware? A Survey Among Private Dental Practitioners. *J Forensic Dent Sci* 2020;12(3):150-157.

Access this article online	
<p>Website: www.jfds.org</p>	<p>Quick Response Code</p> 