



## **AWARENESS OF FORENSIC ODONTOLOGY AMONG GENERAL DENTAL PRACTITIONERS IN SANGLI -KOLHAPUR DISTRICT - A CROSS- SECTIONAL STUDY**

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**Abstract:**

**Introduction:** The current study was conducted to assess the insights regarding Forensic Odontology among private dental practitioners in Sangli-Miraj-Kupwad Municipal Corporation, Maharashtra.

**Materials and Methods:** A cross sectional study was conducted among private dental practitioners by the means of questionnaires. The questionnaire was divided into different domains such as demographics details, data recording, record maintenance and awareness regarding Forensic Odontology.

**Results:** 68% practitioners recorded patients personal details, with 71% updating patients records for dental and medical history for every patient visit. Around 70% take patient consent prior to treatment with 73% being written consent. All study participants were aware about term Forensic Odontology but only 72% got to know about same through UG program. 84% participants were about being legally bound to provide data though less than 50% were aware how to.

**Conclusions:** The current study revealed 'Accepted' level of insights regarding Forensic Odontology and associated practices. Inclusion of vast and diverse sample population will help understand the situation and recommend the necessity changes in UG curriculum and continued dental programs.

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**Introduction**

Forensic is derived from the Latin word forum, which means "court of law". Odontology refers to study of teeth. Forensic odontology, is a branch of forensic medicine which deals with the proper handling, examination and presentation of dental evidence of in the best interest of justice.<sup>1</sup> The Forensic Odontology involves the management, examination, evaluation and presentation of dental evidence for both civil and criminal proceedings.<sup>2-3</sup> Forensic Odontology came into vogue recently due to increase in the number of calamities, such as civil war, acts of terrorism, natural disasters resulting into severe mutilation of facial recognition features resulting into dependence upon the Forensic Odonatological identification criteria

along side Forensic Medicine.<sup>4</sup> Forensic Odontology is comparatively new forte introduced recently by Dental Council of India (DCI) for dental undergraduate program. The syllabus comprises of age estimation, bite mark investigation, sex determination, etc. A total of 30 hours of theory and practical sessions are advised. This curricular guidelines are in congruence with Australia, Norway and Malaysia.<sup>5-6</sup> Although scarcity of qualified Forensic Odontologists with dedicated Forensic Odontology department at each dental institute in countries like India results into varying amount of knowledge disbursed towards dental undergraduates resulting in probable variable amount of knowledge and practices.

Hence, a basic survey was conducted to assess the knowledge, attitude and



approach towards Forensic Odontology among dental professionals in Sangli – Kolhapur district.

**Methodology:**

The present study was a descriptive cross sectional survey conducted among private practitioners of in Sangli-Miraj-Kupwad and Kolhapur city, Maharashtra, India. The data was collected by the secondary investigators in the respective clinics of the dental practitioners across both Kolhapur and Sangli-Miraj-Kupwad cities. Those dental practitioners who did not give written informed consent were excluded from the study. The participants were provided with 20 minutes to answer questionnaire and in case of any clarification, study participants were instructed to contact investigator.

**Questionnaire details:**

A self designed questionnaire was prepared by testing for content validity, face validity and also reliability. The questionnaire consisted of total 17 questions. Questionnaire was assessed for relevance, clarity, simplicity and ambiguity. Content validity index for clarity, simplicity, relevance and ambiguity

was 0.76, 0.81, 0.75 and 0.79 respectively. A total Content Validity Index was found to be 0.71, hence it was validity. Reliability for the questionnaire was found to be satisfactory.

**Statistical Analysis:**

All the data collected was compiled in MS Excel 2010 to apply descriptive statistical methods for presentation of data.

**Results:**

A total of 396 dental practitioners participated in the survey. Table 1 shows the mean age of participants 29.87. The gender distribution was 41.9% males and 58.1% females among the participants. Owing to the convenient sampling method, among total participants 54.3% were BDS and 45.7% were MDS. The study participants had varying levels of clinical practice experience with 75.5% being less than 5 years. Whereas, 11.1%, 7.8% and 5.6% were 5-10 years, 10-20 years and more than 20 years respectively among remaining. Considering the geographic distribution of clinical practice location of study participants 62.4% were belonging to Urban region with 23.7% in peri-urban and 55% in rural.

Original Table 1: Demographic details of study participants

Variable	Category	Mean±SD/n	%
Age	--	29.87 ± 6.93	--
Gender	Male	166	41.9
	Female	230	58.1
Education	BDS	215	54.3
	MDS	181	45.7



<b>Work experience</b>	<5 years	299	75.5
	5-10 years	44	11.1
	10-20 years	31	7.8
	>20 years	22	5.6
<b>Location of practice</b>	Urban	247	62.4
	Peri-urban	94	23.7
	Rural	55	62.4

Original Table 2: Details of patient records

<b>Question</b>	<b>Category</b>	<b>n</b>	<b>%</b>
<b>Do you record patient's personal details?</b>	Yes	272	68.7
	No	67	16.9
	Occasionally	57	14.4
<b>Do you record patient's medical and dental history?</b>	As per convenience	147	37.1
	Only medical history	245	61.9
	Only dental history	239	60.4
<b>How regularly do you update Patients records?</b>	Every visit	284	71.7
	Twice yearly	36	9.1
	Rarely	76	19.2
<b>Do you keep the patient Data to yourself or give it to patient?</b>	I keep the data	164	61.4
	Patient takes the data	60	15.2
	I keep original and give duplicate to the patient	94	23.7
	I keep duplicate and give original to the patient	78	19.7

Table 2 comprises of details pertaining to record keeping of patients in clinical practice. 68.7% participants record patients' personal details. At the same time 14.4% record patient details occasionally and 16.9% doesn't record patient personal details. For the question whether participants record medical and dental history, 37.1% record according to their convenience whereas, 61.9% record

only medical history and 60.4% record only dental history.

On the contrary, 71.7% study participants update patient records every visit. 19.2% participants rarely and 9.1% twice every year update their patient records. Total of 61.4% clinicians choose to keep the patient data with themselves in contrast to 15.2%. 23.7% and 19.7% duplicate the patient records so that both clinician and patient can be in possession of data.



The frequency of recording patient's complete dental status was found to be 88.6% claiming to be for every visit. On the contrary, 4.8% and 6.6% record never and once a year respectively (Table 3). Maximum of study participants, around 55.1% use FDI system for tooth numbering system and 44.9% use Palmar-Zigmondy system. 86.9% record radiograph based on as and when necessary. While almost 85% study participants use digital radiographic methods. The study participants of around 60% stored their X- ray records for less than 5 years. Followed by 30%, 2.3% and

only 7.1% for 5-10 years, 10-20 years and more than 20 years respectively. Around 60% participants take both intraoral and extraoral radiographs. Whereas, in case of storing of impression records 45% participants said 'yes' and 45% gave response of 'storing till patients' work is completed'.

Total of 77.3% participants took consent prior to any procedure as contrary to 20.7% where consent was taken only for invasive procedures. The contribution of written consent was highest among all other types with 73.5%.

Original Table 3: Details of clinical records, radiographic records and consent

Question	Category	n	%
How frequently do you record patient's complete dental status?	Never	19	4.8
	Once a year	26	6.6
	Every visit	351	88.6
Which tooth numbering system do you follow?	FDI system	218	55.1
	Palmar-zigmondy system	178	44.9
How frequently do you record radiograph of patients?	As and when necessary	344	86.9
	Every visit	37	9.3
	Every 3 months	15	3.8
How do you take radiograph?	Conventional IOPA	57	14.4
	Digital	339	85.6
How long do you store X-ray record?	<5 years	239	60.3
	5-10 years	120	30.3
	10-20 years	9	2.3
	>20 years	28	7.1
Do you take intraoral and extraoral Photographs?	Only intraoral	139	35.1
	Only extraoral	2	0.5
	Both	237	59.8
	None	18	4.5
Do you store Impression Records?	Yes	180	45.5
	No	35	8.8



	Only till patient's work is done	181	45.7
<b>Do you take consent?</b>	Yes	306	77.3
	No	8	2.0
	Only for invasive procedures	82	20.7
<b>If yes, please specify the type of consent</b>	Express/implied consent	10	2.5
	Proxy consent	13	3.3
	Verbal consent	82	20.7
	Written consent	291	73.5

Original Table 4: Details of anthropometric records and record keeping

Question	Category	n	%
<b>What Anthropometric measurements do you take?</b>	Facial profile	313	79.0
	Height	126	31.8
	Weight	117	29.5
	Gait	107	27.0
	Built	113	28.5
<b>How do you record the data?</b>	Paper form	214	54
	Digital form	101	25.5
	Digital with backup	81	20.5
<b>How long are you legally mandated to keep patient records?</b>	5 years	148	37.4
	7 years	27	6.8
	10 years	36	9.1
	As long as possible	185	46.7

Table 4 shows the distribution of anthropometric measurements like Facial profile( 79%), Height (31.8%), Weight (29.5%), Gait (27%) and Built (28.5%). Maximum i. e. 54% participants record patient data in paper form whereas, 25.5% record in digital form and 20.5% record digital data with backup. Participants believed that record keeping is mandated for a period of 5 years (37.4%), 7 years (6.8%), 10 years (9.1%) and 'as long as possible' (46.7%).

The current study results revealed (Table 5) that all participants (100%) were about the term Forensic Odontology. And the familiarity of the same was obtained through CDE program (7.3%), UG study (72%), PG study (18.7%) and doctoral study (2%). Around 92% study participants believed that dental records are in Forensic Odontology for Age Estimation, whereas same dental records can be used for identification of deceased in unidentified cases (98.2%), identification of the perpetrator by the bite mark analysis (93.4%) and other legal proceedings (91.9%). Total of 84.1% study participants were aware that they are legally



bound to produce dental records whenever asked for as contrary to 15.9%. Although, 38.1% were unaware about how to produce data when asked by legal authority; and that owes to the fact that majority i. e. 75% of the total participants never came across any medico-legal cases in course of their dental practice.

Original Table 5: Details about knowledge and awareness about forensic odontology

Question	Category	N	%
<b>Are you aware of the term Forensic Odontology?</b>	Yes	396	100
	No	0	0.0
<b>How did you gain familiarity with Forensic Odontology?</b>	CDE program	29	7.3
	UG study	285	72.0
	PG study	74	18.7
	Doctoral study	8	2.0
<b>What according to you is the use of dental records in Forensic Odontology?</b>	Age estimation	365	92.92
	Identification of the deceased in unidentified cases	389	98.2
	Identification of the perpetrator by bite mark analysis	370	93.4
	Other Legal Proceedings	364	91.9
<b>Are you aware that you are legally bound to produce dental records whenever asked for?</b>	Yes	333	84.1
	no	63	15.9
<b>Are you aware about how to produce data when asked by legal authority?</b>	Give complete data	64	16.2
	Give complete data except for financial data	35	8.8
	Give only what is asked for	146	36.9
	Don't know	15	38.1
<b>Have you come across any medico-legal case in course of your practice?</b>	Yes	74	18.7
	No	297	75.0
	Maybe	25	6.3
<b>Have you given any data for any legal proceedings?</b>	Yes	65	16.4
	No	331	83.6
<b>Which radiograph according to you is most useful in Forensics?</b>	IOPA	27	6.8
	OPG	281	71.0
	RVG	88	22.2



For the purpose of Forensics, 71% study participants thought OPG is most useful radiograph followed by RVG (22.2%) and IOPA (6.8%).

#### Discussion:

In the coming years, the role of Forensic Odontology in aspects such as identification of deceased victims in natural disasters, manmade calamities, etc . through use of Ante-mortem and post-mortem data. Although, the first use of informal Forensic Odontology dates back to 49 and 66 AD.<sup>7-8</sup> (And Forensic Odontology is important branch of dentistry in many such aspects and calls for need to increase awareness about Forensic Odontology among dental practitioners. In developed countries the field of Forensic Odontology has gained the necessary momentum to at certain level in contrary to countries like India.

In last few years many calamities has claimed several victims, where the number of Forensic Odontology practitioners could have helped the concerned authorities identify the deceased. For one such example is, Uttarakhand floods and landslide that occurred in June 2013 and claimed 5700 people who were declared as 'presumed dead' and 'unrecovered'.<sup>9-10</sup> Often, the legal authorities are in dire need of dental practitioners from the own governmental system to help assist, although the scarcity of required optimal knowledge about practice of Forensic Odontology makes the authorities to reach out private

Forensic Odontologist like in case of Nirbhaya Case: Delhi Gang Rape – 2013, where bite marks from victim corpses were compared to dental models of accused by renowned Forensic Odontologist, Dr. Ashith B. Acharya (Secretary, Indian Association of Forensic Odontology) from SDM Dental College, Dharwad, Karanataka, India.<sup>11</sup>

With the same aim to help suggest related authority in incorporating Forensic Odontology in UG curriculum and focusing on extended CDE programs with competent hands on exercises to help enable grow the Forensic Odontology practitioner base, the current study was conducted to assess the baseline level of awareness towards the specialty of Forensic Odontology. The results of current study clearly shows the awareness regarding Forensic Odontology is haphazard owing to factors like diversified dental education across country with varying amount of emphasis on subject and availability of specialist from the field. Hence, the basic necessity marks at teaching dental students as well as teachers about Forensic Odontology which is in tandem with the finding from previous studies.<sup>4</sup>

To disseminate optimal level of knowledge and practice in Forensic Odontology it's the responsibility of competent authorities like healthcare Universities, dental institutes to establish a functioning Forensic odontology department. Also, for the existing dental





practitioners are required to provide with fellowship, masters or short certified training course in the subject of Forensic Odontology. Also, additional training in various roles a dentist can play in disaster management throughout Forensic Odontologist.<sup>4,12</sup>

#### Conclusions:

The current study among 399 participants revealed overall cumulative basic level of knowledge, attitude as well practices in day to day routine dental practice. The results depict the current situation of awareness related to Forensic Odontology with some limitations such as restrictive population size taken into consideration. Inclusion of more vast study population will reveal the actual situation of Forensic Odontology among dental practitioners and will help the stakeholders to make necessary changes in dental curriculum.

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