

Awareness and Acceptance of Denture Marking Procedure as a Tool in Forensic Identification among Undergraduate Dental Students: A Survey

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Abstract.

Forensic odontology plays a crucial role in identifying mortal remains, especially in mass disasters. Denture recognition, a significant aspect within this discipline, relies on the practice of denture marking—a well-documented yet underutilized method. This survey-based study aimed to assess the awareness and acceptance of denture marking procedures among undergraduate dental students. The study, conducted at the School of Dental Sciences in Karad, involved 114 undergraduate students. A questionnaire captured demographic details and probed their awareness and perceptions regarding denture marking. Results revealed that a majority recognized the importance of denture marking, with 84 students being aware of the practice. Notably, 40% emphasized the need for increased awareness. The study concludes that while there is a gap in knowledge about denture markers among dental undergraduates, their positive inclination toward its inclusion in the curriculum suggests a readiness to enhance their understanding of forensic odontology. The findings underscore the importance of addressing this gap through targeted educational initiatives.

Keywords. Denture marking, Denture labeling, Forensic dentistry, Coding of prosthesis, Undergraduate dental students, Awareness, Acceptance.

I. Introduction

Forensic odontology, the intersection of dentistry and legal investigations, plays a crucial role in the identification of human remains in various catastrophic scenarios such as earthquakes, tidal bore, airplane crashes, and acts of terrorism. Among the myriad techniques employed in forensic odontology, the recognition of dentures stands out as a significant aspect, particularly concerning ailing patients or those in geriatric associations. Denture marking, a well-documented but not extensively practiced procedure, emerges as a potential tool in the meticulous process of identifying mortal remains.

The primary objective of this survey-based study is to delve into the awareness and acceptance of denture marking procedures among undergraduate dental students. As the next generation of dental professionals, their understanding and acknowledgment of forensic odontology practices are pivotal for the advancement and integration of such techniques into mainstream dental education.

a. The Significance of Forensic Odontology:

Forensic odontology, often referred to as dental forensics, encompasses the application of dental knowledge to legal issues. In scenarios where traditional methods of identification are compromised, such as in mass disasters, dental records become invaluable. The uniqueness of dental features, coupled with the durability of dental structures, makes them reliable markers for identification. In catastrophic events, when other means of identification may be obliterated, dental records, including dentures, become critical in reuniting remains with their identities.

b. Denture Recognition in Forensic Odontology:

Among the various facets of forensic odontology, denture recognition assumes a particular importance. Dentures, being common prosthetic devices used by a significant portion of the population, provide a distinct opportunity for identification. Labeling dentures with some form of identification becomes an essential practice in forensic investigations, ensuring that even in the absence of other identifiable features, the person's denture can serve as a key to unlocking their identity.

c. Denture Marking: A Documented but Underutilized Practice:

While it is well-documented that marking dentures is a prudent practice, the implementation of this technique remains less widespread. The reasons for the underutilization could range from a lack of awareness among dental practitioners to the absence of comprehensive education on forensic odontology during their formative years. This study aims to bridge this gap by assessing the awareness and acceptance levels of denture marking procedures among undergraduate dental students.

II. Literature Review: Denture Marking in Forensic Odontology

Forensic odontology, an interdisciplinary field that merges dental science with legal investigations, plays a pivotal role in the identification of individuals in various scenarios, particularly mass disasters. Denture recognition, within the broader context of forensic odontology, has emerged as a significant avenue for identifying remains when traditional methods may fail. This literature review aims to explore the existing body of knowledge regarding denture marking practices, their significance, and the level of awareness among dental professionals, with a focus on undergraduate dental students. Forensic odontology's importance lies in its ability to provide crucial information for the identification of individuals in situations where other means may be compromised. Dental features, including natural dentition and prosthetic devices like dentures, are known for their uniqueness and durability, making them reliable tools for identification.

Dentures, as widely used prosthetic devices, offer a unique opportunity for identification in forensic investigations. The distinctive characteristics of dentures, such as customized fittings and unique markings, can contribute significantly to establishing the identity of an individual when other means are unavailable. Denture marking, as a practice within forensic odontology, involves labeling dentures with specific identification information. This may include engraved codes, microchips, or other means of marking that ensure traceability back to the individual. Despite its documented importance, the literature suggests that denture marking is not as widely practiced as it could be.

Several factors contribute to the underutilization of denture marking. Lack of awareness among dental professionals, limited education on forensic odontology during their training, and a general absence of standardized practices are identified as barriers. Research indicates a need for increased awareness and education to promote the integration of denture marking into routine dental practices. Studies examining the awareness levels of denture marking among dental professionals, including undergraduate students, reveal varying degrees of knowledge. While some practitioners recognize the importance of denture marking, a significant portion remains unaware or insufficiently informed about the practices and their implications in forensic identification. Efforts to enhance denture marking practices involve advocating for increased education and training in forensic odontology. Integrating forensic dentistry components into undergraduate dental curricula is proposed as a means to address the current gaps in knowledge and awareness.

The existing literature underscores the vital role of denture marking in forensic odontology and the challenges associated with its underutilization. Addressing these challenges requires a multifaceted approach, including increased awareness, education, and the establishment of standardized practices. This review sets the stage for the current study, which aims to contribute valuable insights into the awareness and acceptance of denture marking procedures among undergraduate dental students. Through the survey findings, we hope to inform

future initiatives that promote the integration of denture marking into routine dental practices, ultimately enhancing forensic odontology's effectiveness in identification processes.

III. Materials and methods

In the Department of Prosthodontics at Karad's School of Dental Sciences, a survey research study was carried out. investigation participants were 114 undergraduate students (Final year and interns) who volunteered their time to take part in this investigation. The purpose of our research was to determine whether or not they were aware of denture tagging and whether or not they accepted it. Regarding denture indicators, each student filled out a questionnaire that they administered to themselves. The questionnaire had 10 questions, and in addition to inquiries regarding denture indicators, it inquired into fundamental demographic particulars. Both open-ended and closed-ended questions have been included in the questionnaire. There were eight questions with predetermined answers and two questions with no predetermined answers. The replies of the participants were evaluated largely with regard to the frequency distribution of the various 'Yes/No' answers.

IV. Statistical analysis:

Statistical analysis was done by using descriptive and inferential statistics using z-test for single proportion and software used in the analysis was SPSS 22.0 version and $p < 0.05$ is considered as level of significance. If $Z > 1.96$, it is considered as significant.

1) Are you aware of the use of denture marking in the field of forensic dentistry?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	30	26.32	26.32	26.32
	Yes	84	73.68	73.68	100.0
	Total	114	100.0	100.0	
If no, then do you feel that denture marking is a worthwhile process in forensic dentistry?					
		Frequency	Percent	Valid Percent	Cumulative
Valid	No	18	60	60	60
	Yes	12	40	40	100
	Total	30	100	100	

Table 1. Statistical Analysis Questionnaire-1

2) Does denture marking procedure included in your curriculum?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	31	27.19	27.19	27.19
	Yes	83	72.81	72.81	100
	Total	114	100	100	
If no, then do you think that it should be included in your curriculum?					
		Frequency	Percent	Valid Percent	Cumulative Percent
valid	No	0	0	0	0
	Yes	31	100	100	100

	Total	31	100	100	
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Table 2. Statistical Analysis Questionnaire-2

3)Do you have demonstrations in your college performing denture marking procedure?					
		Frequency	Percent	Valid Percent	Cumulative Percent
VALID	No	73	64.2	64.2	64.2
	Yes	41	35.8	35.8	100
	Total	114	100	100	
If yes ,then have you performed denture marking procedure in your college?					
		Frequency	Percent	Valid Percent	Cumulative Percent
VALID	No	22	54.80	54.80	100
	Yes	19	45.20	45.20	45.20
	Total	41	100.0	100.0	

Table 3. Statistical Analysis Questionnaire-3

4)Is your laboratory in the college well equipped for the procedure?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1	.9	.9	.9
	No	33	28.9	28.9	29.8
	Yes	80	70.2	70.2	100.0
	Total	114	100.0	100.0	

Table 4. Statistical Analysis Questionnaire-4

5)Which method are you aware about denture marking procedure?(Tick more than one answer if required)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1	.9	.9	.9
	ID-Band	4	3.5	3.5	4.4
	Inclusion method	6	5.3	5.3	9.6
	Inclusion method, ID-Band	2	1.8	1.8	11.4
	Inclusion method, None of the above	1	.9	.9	12.3
	None of the above	21	18.4	18.4	30.7

	Surface method	14	12.3	12.3	43.0
	Surface method, Inclusion method	5	4.4	4.4	47.4
	Surface method, Inclusion method, ID-Band	51	44.7	44.7	92.1
	Surface method, Inclusion method, ID-Band, None of the above	8	7.0	7.0	99.1
	Surface method, Inclusion method, None of the above	1	.9	.9	100.0
	Total	114	100.0	100.0	

Table 5. Statistical Analysis Questionnaire-5

6)Do you think guidelines are necessary to promote denture marking within India?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1	.9	.9	.9
	No	22	19.3	19.3	20.2
	Yes	91	79.8	79.8	100.0
	Total	114	100.0	100.0	

Table 6. Statistical Analysis Questionnaire-6

7)Why there is a need of education of forensic prosthodontics?(Tick more than one answer if required)

		Frequency	Percent	Valid Percent	Cumulative
					Percent
Valid	Identification of edentulous person who are living/deceased	6	5.3	5.3	5.3
	Identification of edentulous person who are living/deceased, Medicolegal Investigations	16	14	14	19.3
	Medicolegal Investigations	10	8.8	8.8	28.1
	Return of lost dentures	5	4.4	4.4	32.5

	Return of lost dentures, Identification of edentulous person who are living/deceased	5	4.4	4.4	36.8
	Return of lost dentures, Identification of edentulous person who are living/deceased, Medicolegal Investigations	70	61.4	61.4	98.2
	Return of lost dentures, Medicolegal Investigations	2	1.8	1.8	100
	Total	114	100	100	

Table 7. Statistical Analysis Questionnaire-7

8)What is reason/reasons for not performing denture marking procedure?(Tick more than one answer if required)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less equipped laboratories	9	7.9	7.9	7.9
	Less equipped laboratories, Less knowledge/experience in performing the procedure	9	7.9	7.9	15.8
	Less equipped laboratories, Limited patient cooperation	7	6.1	6.1	21.9
	Less equipped laboratories, Limited patient cooperation, Less knowledge/experience in performing the procedure	13	53.5	53.5	75.4

	Less knowledge/experience in performing the procedure	61	11.4	11.4	86.8
	Limited patient cooperation	10	8.8	8.8	95.6
	Limited patient cooperation, Less knowledge/experience in performing the procedure	5	4.4	4.4	100
	Total	114	100	100	

Table 8. Statistical Analysis Questionnaire-8

9)Have you attended any CDE programme /workshop regarding denture marking procedure ?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	72	63.2	63.2	63.2
	Yes	42	36.8	36.8	100
	Total	114	100.0	100.0	

Table 9. Statistical Analysis Questionnaire-9

10)Do you create awareness among patients regarding denture marking procedure in clinics/camps?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	82	71.7	71.1	71.1
	Yes	32	28.3	28.3	100.0
	Total	114	100.0	100.0	

Table 10. Statistical Analysis Questionnaire-10

V. Results

Out of 114 under graduate students 84 students responded of being aware &having carried out denture marking in some of the cases (Q1)30 students were unaware of the procedure among them 18 student felt that it is a worthwhile procedure.83 students said that study denture marking procedure in their curriculum itself.Remaining 31students want it to be included in curriculum. 41students are being demonstrated & out of 41 students 19 students perform denture marking(Q3). Out of 114 students 80students said that laboratory in their college is well equipped for the procedure.79.8% students felt that guidelines are necessary to promote denture marking within india. Only 36.8% students attended any CDE programs/Workshops regarding Forensic Odontology while 63.2% did not have a exposure of the same.Only 28.3% students create awareness among patients regarding denture marking procedure in clinics/camps.

VI. Discussion

The survey outcomes offer a nuanced understanding of the awareness and practices surrounding denture marking among undergraduate dental students. A substantial portion of the respondents (84 out of 114) demonstrated an awareness of denture marking, underscoring a baseline knowledge within the student community. However, the transition from awareness to practical application reveals a gap; while 41 students

were demonstrated the denture marking procedure, only 19 actively performed it. This suggests a need for more hands-on training opportunities and practical experiences in forensic odontology within the dental curriculum.

The feedback on curriculum integration is twofold. While a considerable number (83 students) reported studying denture marking in their curriculum, an additional 31 students expressed a desire for its inclusion. This dual perspective indicates a recognition of the current efforts and an eagerness among students for more comprehensive coverage of forensic odontology in their education. These findings underscore the importance of refining curriculum content to align with the evolving needs and expectations of dental students.

The feedback on laboratory preparedness is crucial. Only 8 students considered their college laboratories well-equipped for the denture marking procedure. This points to a potential need for institutions to invest in resources and infrastructure, ensuring that students have access to the necessary tools for practical training. Improving laboratory facilities can significantly enhance the hands-on learning experience and better prepare students for real-world forensic scenarios.

The overwhelming consensus (79.8%) on the necessity of guidelines for promoting denture marking within India is a significant revelation. Standardized guidelines can provide a framework for consistent and effective denture marking practices. Collaborative efforts between dental associations, forensic experts, and educational institutions are essential in developing and disseminating such guidelines.

The low attendance (36.8%) in Continuing Dental Education (CDE) programs or workshops related to Forensic Odontology indicates an opportunity for both educational institutions and professional associations to actively encourage and facilitate student participation in these programs. Bridging this gap can expose students to the latest advancements, best practices, and emerging trends in forensic odontology, enriching their knowledge base.

Lastly, the modest percentage (28.3%) of students actively creating awareness among patients regarding the denture marking procedure suggests a potential area for improvement in communication skills and patient education. Integrating communication training into dental education can empower students to educate their future patients about the importance of denture marking and its role in forensic identification. While there is a commendable baseline awareness among undergraduate dental students regarding denture marking, addressing the identified gaps in practical application, curriculum content, laboratory facilities, and communication skills can contribute to a more robust and holistic approach to forensic odontology education. Collaborative efforts between educational institutions, dental associations, and forensic experts are pivotal in effecting these enhancements and preparing future dental professionals for the intricate challenges of forensic identification.

VII. Conclusion

In conclusion, our survey illuminates the current landscape of awareness and practices regarding denture marking among undergraduate dental students. While a majority demonstrate awareness of the procedure, the transition to practical application reveals areas for improvement, emphasizing the need for more hands-on training opportunities within the curriculum. The dual perspective on curriculum integration, with a significant number studying denture marking but an additional cohort expressing a desire for inclusion, underscores the evolving expectations of dental students. The feedback on laboratory preparedness highlights a crucial need for institutions to invest in resources and infrastructure, ensuring that students have access to well-equipped facilities for practical training. Standardized guidelines for denture marking, as overwhelmingly supported by the respondents, are vital for promoting consistency and efficacy in forensic odontology practices. Collaborative efforts between dental associations, forensic experts, and educational institutions are imperative for developing and disseminating such guidelines. The findings also spotlight the opportunity to enhance student exposure through increased participation in Continuing Dental Education programs and workshops related to Forensic Odontology. Bridging this gap can enrich students' knowledge base with the latest advancements and best practices in the field. The modest percentage of students actively creating awareness among patients about denture marking suggests a potential area for improvement in communication skills and patient education.

Integrating communication training into dental education can empower future dental professionals to educate patients about the significance of denture marking in forensic identification. In essence, addressing these identified gaps—through curriculum refinement, improved infrastructure, standardized guidelines, increased exposure to continuing education, and enhanced communication skills—can foster a more comprehensive and effective approach to forensic odontology education. These steps are crucial in preparing the next generation of dental professionals to navigate the complexities of forensic identification, ensuring their readiness to contribute meaningfully to this vital aspect of dental science.

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