

KNOWLEDGE, ATTITUDE AND PRACTICE OF DENTURE MARKING SYSTEMS AMONG NEPALESE DENTAL PRACTITIONERS WITH POTENTIAL IMPLICATIONS IN HUMAN IDENTIFICATION.

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Abstract

Background: Denture marking not only aids in the recovery of lost dentures, but it also aids in the identification of the suspected deceased person. Many forensic experts have recommended that identity markers to be included in all dentures during their fabrication so that they can be used for forensic human identification in the event of a disaster.

Objectives : The study aims to determine the knowledge, attitude and practice of the denture marking system among dental practitioners of Nepal.

Methods: A pre-tested, self-administered questionnaire consisting of 9 close-ended questions was mailed to the participants. A total of 133 responses were recorded.

Results: According to the findings, 54.9% of the participants were aware of the denture marking system. The majority of the participants felt that denture marking is a valuable procedure that is frequently overlooked by Nepalese dentists. The majority of Nepalese dental professionals were aware of the forensic use of denture marking systems and how to use them. They also agreed that it should be included in undergraduate courses. While the majority of the participants disagreed that denture marking is a costly and common technique whose worth is recognized by the general public.

Conclusions: Based on the findings of this study, measures to raise awareness and update knowledge and skills on denture marking among Nepalese dental practitioners should be developed.

Keywords: Denture marking, Disaster victim identification, Forensic Odontology, Nepal

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INTRODUCTION

A multitude of physical and genetic features define each person, and these characteristics serve as the foundation for human identification. Among the three primary identifiers: finger print, DNA and odontological analysis in human identification; later is mostly preferred due to its low cost, quick process and precise identification.

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The identification is completely reliant on the availability of sufficient and acceptable antemortem (AM) dental records, the expertise

and methodology of the postmortem (PM) examination of the oral and paraoral structures, and, lastly, the successful reconciliation of these AM and PM findings.¹⁻³ Among the various types of dental records the denture marking could make a significant contribution if incorporated in dental practice. The availability of treatment records maintained by dental practitioners is required for the successful completion of a forensic dental identification.⁴ A dentist's ethical and professional responsibility to a patient includes preserving adequate dental records. One aspect of this job is denture marking, which has a significant potential for human identification after a catastrophe.^{5,6} The denture's built-in marking could help with identification in a shorter amount of time. The dead are identified quickly, easing the emotional strain on mourning families and allowing them to complete their final goodbye rites as soon as possible.⁷

Denture marking is not practiced routinely in Nepal, and various initiatives to promote it have met with limited success. The Department of Prosthodontics together with Oral Pathology & Forensic Dentistry recently undertook this study to determine the extent to which dentures are marked in Nepal, as well as the views of the dental profession in Nepal about the procedure.

METHODOLOGY

The ethical approval was taken from the Institutional Review Committee, Institute of Medicine, Tribhuvan University [No. 208 (6-11) E2 078/079]. A comprehensive, self-administered questionnaire-based study was conducted at the Department of Prosthodontics, Tribhuvan University Teaching Hospital, Institute of Medicine, from November 2021 to January 2022. The experts in Forensic Dentistry and Prosthodontics validated the questionnaire. It consisted of 9 closed-ended questions. All dentists registered in Nepal Medical Council were included in this study via various social media and personal email. The list of dentists was obtained from Nepal Dental Association (NDA) database available online on the official site of NDA. The dentists not willing to participate in the study were excluded from the study.

All of the responses were provided in the form of Yes/No questions, which assessed their knowledge, awareness and practice. A total of 133 responses were recorded. The data were then entered into a Microsoft Excel spreadsheet (Microsoft Inc.). Data were analysed using Statistical Package for Social Science Version 16 (SPSS Ver. 17). The descriptive statistics using frequency distribution and the percentage were calculated.

RESULTS

The study indicated that out of the 133 participants 73 (54.9%) were aware of the denture

marking system while 60 (45.1%) were unaware of the same indicated in figure 1.

Figure 1: Dental Practitioner responses on knowledge about denture marking system.

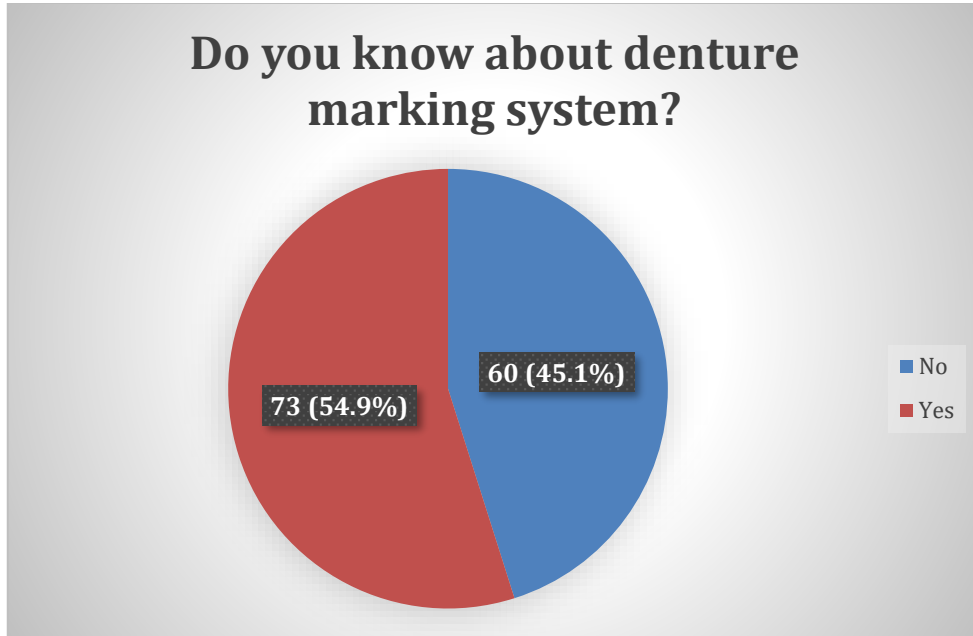


Table 1: Responses of dentists’ having knowledge about denture marking (n=73).

Question	No n (%)	Yes n (%)
Do you think that denture marking is a worthwhile procedure?	4 (5.5)	69 (94.5)
Do you do denture marking as a routine procedure?	43 (58.9)	30 (41.1)
Do you think the dental practitioners in Nepal overlook the value of denture marking?	18 (24.7)	55 (75.3)
Do you think the general public is aware of the importance of denture marking?	61 (83.6)	12 (16.4)
Are you aware of the forensic utilization of denture marking systems?	17 (23.3)	56 (76.7)

Do you know how to mark dentures?	22 (30.1)	51 (69.9)
Do you think that denture marking is an expensive procedure?	57 (78.1)	16 (21.9)
Do you think that it is necessary to teach denture marking procedures in the dental undergraduate course?	2 (2.7)	71 (97.3)

Table 1 describes the participants' knowledge and awareness of denture marking. Denture marking was considered worthwhile by 94.5% of participants, whereas 5.5% disagreed. Denture marking was a routine process for 41.1% of respondents, whereas 58.9% disagreed. Denture marking was undervalued by dental practitioners in Nepal, according to 75.3% of respondents, while 24.7% disagreed. The general population was aware of the importance of denture labeling, according to 16.4% of respondents, while 83.6% disagreed. The forensic use of a denture marking system was known to 76.7% of the participants while 23.3% disagreed. The process of dentures marking was known to 69.9% of those answered and unknown to 30.1% of the participants. Denture marking is an expensive operation, according to 21.9% of respondents while 78.1% of those polled disagreed. Denture marking processes should be taught at dental school, according to 97.3% of respondents while 2.7% disagreed.

DISCUSSION

Following significant disasters such as fire, flooding, and earthquake, as well as the visible and growing effects of global terrorism, precise and timely identification of the dead and injured becomes critical. Given that only one labelled denture can reveal a deceased person's identity when all other approaches fail, makes denture marking a worthwhile practice. Furthermore, the effectiveness of establishing denture ownership in long-term care homes and hospitals is well researched. Although many researchers have worked to find a solution to the problems stated above, very little have pointed the solutions to this universal problem.⁸⁻¹²

Denture wearers are mostly identified by their teeth. If a denture is "marked," it can be identified in the event of missing, or the wearer can be identified using the marked denture. Several methods of denture marking have been published in the literature so far, and they can be grouped into two categories: surface marking and preferred inclusion processes. The marks on one of the denture's surfaces are made by

"scribing or engraving" the denture itself in the surface marking process. These approaches are straightforward, low-cost, less technique-dependent, and rapid. The inclusion methods entail embedding the identity mark into the denture base material, making them reasonably permanent. Pre or post-fabrication processes can be used to incorporate various materials with patient details into the dentures.^{4,13-17} Any denture marking method must be sensitive, inexpensive, fire-resistant, not adversely affect the denture base material, and, most importantly, unobtrusive and cosmetically appealing to the denture wearer.¹⁶⁻¹⁹

The present study carried out to gauge the knowledge awareness and perception of the dentists found out that only half of the respondents were aware of denture marking which is almost similar to the study of Kannan et al. (60%).²⁰ However, the awareness of respondents was more than in the student-based research in India (22%).²¹ The variability may be due to the nature of the participants as dentists and specialists are more aware of the recent technology to be incorporated in the clinical practice than students.

The majority of the participants in the present study considered denture marking as a worthwhile procedure similar to the majority (81.0%) specialists in prosthodontics in the United Kingdom.²² A student-based study in India had 100%²¹ while dental practitioners-based study had 58% agreement.²³ The

variability may be due to the response given by the participants according to the context. In developed countries, not only the dentists, even the general public is also aware of the value of denture labelling. Other than human identification after death, the patients suffering from unconsciousness or psychiatric problems such as traumatic or senile memory loss may lose or misplace their dentures at home or during hospital admission.¹³ A high proportion of the participants in our study disagreed it to be a routine process and did not include it in their routine clinical practice. Although they were aware of the worth of the procedure, they did not incorporate it in their clinical practice reflecting a gap between best practice opinions and actual clinical practice. According, to the United Kingdom-based study 54.9% of the respondents did marking of the complete denture and 40.9% of the partial denture.²² A high proportion of the respondents agreed that dental practitioners of Nepal undervalued denture marking. It may be because it is not routinely done in clinical practices in Nepal. Due to the lack of specific guidelines by the Nepal Dental Association, the practitioners may have overlooked denture marking. The developed countries on the contrary have guidelines for the same. In the United States of America, legislation governs denture labelling in 21 states. Removable prostheses are required to be labelled in Iceland and Sweden, as well. Newly-made dentures should also be labelled, according to the American and Australian Dental Associations.

The policy makers in Nepal should probably look into this aspect in the future.²² As denture labelling is not offered as a choice by the dentists to their patients during the clinical visits or its fabrication. A high proportion of the patients in Cunningham and Reddick (85.5%) and Richmond and Sathe, et al. (99%) studies were in favour to get their dentures marked.¹⁸ Even if a significant number of patients may opt denture marking in future in Nepal. They should always be given a choice. As they have all the rights to refuse to owing to the preservation of their privacy.

Various people prefer various types of denture labelling. According to Cunningham and Hoad-Reddick⁴ patients were more in favour of having their name on the denture. Acharya indicated photographic marker was the most preferred while bar coding was the least preferred. As a result, patients should be offered the final choice of denture labelling together with an explanation of the benefits and drawbacks.²⁴

Due to a lack of understanding and awareness, dental practitioners undervalued the denture labeling system. A high proportion of them, however, agreed on its forensic value. This is most likely due to the numerous forensic situations in which dentures have been used to identify a person in the past. The murder cases such as Salisbury burned to death (1835), a body was recovered in Yorkshire, United Kingdom (1939), Durand dissolved in acid (1949), Professor George Parkman burnt in the furnace

(1849): utilized the victims' denture in identification. During the 19th and early 20th centuries, the letters and numbers were regularly punched into the gold part of dentures.²⁵⁻²⁸ The good practice initiated in the 19th and 20th centuries seem to be lost in the 21st century.

Although, a high proportion of the respondents were aware of the process of denture labelling, very little incorporated it in their clinical practice similar to the study by Seema et al. (84%).²¹ Also a high proportion of the respondents agreed it as an inexpensive procedure on the contrary to the study by Ahmed et al. (82%).²³ In Australia, 24.5% of all practitioners who provide detachable prostheses to their patients include an identifying label as part of their service on some occasions. They did not label the dentures routinely due to lack of awareness of standards and suggestions, cost, and a feeling that it was of little importance. According to the clinical dental technicians (53.8%) and specialists (50%) in Australia, the cost was one of the major reasons for not incorporating the denture marking. However, they also indicated a lack of instructions from the clinicians⁵ similar to the scenario in Nepal.

In the current study, the majority of respondents believed that denture marking should be taught in dental school, similar to the findings of Seema et al. (88%) and Ahmed et al. (75%)^{13,14} Although denture labeling is not yet part of Nepal's curriculum, other developed countries, such as the United Kingdom's dentistry schools

(67%) and the United States' dental institutions, are doing so (86%). The students in the undergraduate course should not only be taught to label the denture but also to examine it. If a denture is recovered, the examination of dentures should include the acrylic's hue and the presence of stippling, the tooth's size, and shape, initials, numbers, and marks from the lab, the shape of the relief area, presence or absence of a labial flange, retro-molar pads covered or uncovered and repairs, relining, and soft linings information. If this information is documented even unlabeled dentures can aid in the identification of victims by linking it to the quality of lab work done by the various labs. Specific denture attributes may be related to a specific dentist, dental technician, or laboratory^{26,28} which was utilized during Nepal Airlines and Sita airlines crash in Nepal.³

The American Dental Association has established specific criteria and other systems have been developed, each with its own set of benefits and drawbacks. The identification of the dentures should be specific. The technique should be simple. The mark should be fire and solvent-resistant. The denture should not be weakened. The mark should be cosmetically acceptable.⁶ Other than this patients' thoughts and attitudes about which method or system they prefer should be emphasized as well. Incorporation of all these valid points can develop a perfect denture marking system in Nepal.

The major limitation of this study was that the study was conducted among dentists only, excluding the technicians. So, drawing firm conclusions, and generalization of the study outcomes to the entire dental fraternity in Nepal was not possible.

CONCLUSIONS

Denture labeling has two purposes: 1) it aids in the recovery and return of a misplaced or improperly transferred denture; and 2) it aids in the identification of edentulous persons both alive and deceased. Every dentist must be aware of the legal implications of his or her practice. Unfortunately, they are less involved in forensic case work due to a lack of training, expertise, exposure, and other issues. However, the findings of this study suggest that denture labeling should be taught at the undergraduate level to be implemented in dental practices. Also, mandatory guidelines on denture marking should be created and implemented in the future.

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