

A Case of Denture Marking: A Tool in Forensic Dentistry

NAMITA RAJESH ZILPILWAR¹, SHARAYU VINOD NIMONKAR², SUREKHA GODBOLE DUBEY³,
ARTI S AGRAWAL⁴, VIKRAM BELKHODE⁵



ABSTRACT

Dr. Robert H. Griffiths, while serving as the president of the American Dental Association, highlighted the need for denture identification. Compared to tagging already existing dentures, adding identification during the denture packaging and processing is relatively simple. Identifying a body that has been retrieved following an accident or natural disaster is crucial. In medical malpractice lawsuits, denture marking plays an important role in the administration of justice. Essentially, denture marking serves identification purposes, including engraving distinctive and differentiating marks on the dentures. Dental prosthesis marking has long been regarded as a crucial component of forensic dentistry. Denture identification systems are beneficial for patients in medical-legal cases as well as for those receiving treatment in hospitals, assisted living centers, and other healthcare settings. This case report describes a straightforward technique for incorporating a QR code in dentures. After scanning the QR code, it provides important patient details such as name, address, emergency contact number, etc.

Keywords: Denture identification, Forensics, Geriatrics, Surface marking

CASE REPORT

A 70-year-old male patient reported to the Department of Prosthodontics, Crown, and Bridge with the chief complaint of edentulous maxillary and mandibular arches. The medical history revealed that the patient had been suffering from Alzheimer's disease for 4-5 years and had been living in an old age home for 10 years. A complete denture with denture identification was planned, taking the patient's condition into consideration. The process was explained to the patient, and his consent was obtained.

Technique

Numerous Quick Response (QR) code generator websites (such as qr.io) are available on the internet. Since QR code technology is openly licensed, the majority of these generators are available at no cost if the relevant standards are followed. Information about the patient was added, including the patient's name, age, address, emergency contact number, and for additional detail, the Aadhaar card number was also included, as Aadhaar is the single most important government-issued document an Indian individual should possess. With this information, the QR code was generated and printed with a size of 9×9 mm for both the maxillary and mandibular dentures. The size of the QR code should depend on the length of the lingual flange for the mandibular denture. These measurements are necessary because a particularly large code can bend on the convex intaglio of the denture, compromising readability. Significantly smaller codes can also encounter issues with scanning.

The code was printed using an inkjet printer, as laser prints may smudge due to the monomer. The code was then laminated with cellophane to prevent smudging from the monomer. At this stage, it was important to verify that the QR code was readable with a smartphone. The denture was fabricated in the conventional manner, finished, and polished. A polished surface slot for the denture was created with dimensions of 10×10 mm and a depth of 12 mm using acrylic trimming to accommodate the laminated QR code, as shown in [Table/Fig-1]. A maxillary denture slot was made on the polished surface of the denture in the posterior palatal seal area, and in the distolingual flange of the mandibular denture base, as depicted in [Table/Fig-2]. The laminated sheet was precisely

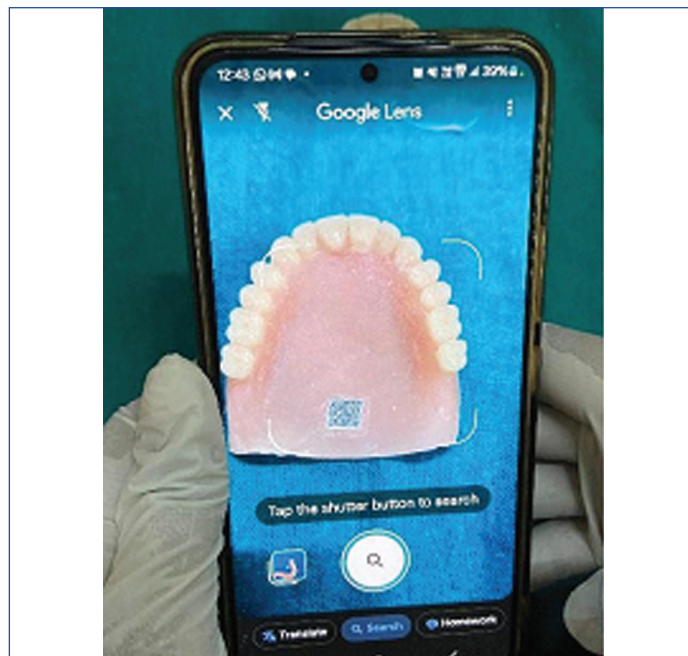
fitted into the prepared slot without any discrepancies and filled with clear self-polymerising acrylic resin (DPI-RR Cold Cure, DPI Products and Services Ltd., Mumbai, India), mixed according to the manufacturer's instructions, and allowed to set in the posterior palatal seal area for the maxillary denture base. The same procedure was followed for the mandibular denture base in the distolingual flange, as shown in [Table/Fig-3]. To improve the clarity of the embedded QR code, the denture was polished once again [Table/Fig-4]. When the QR code was scanned with a standard smartphone scanner or a downloaded QR scanner app, all of the data, including name, Aadhaar card number, age, sex, and address, was readily obtained [Table/Fig-5-8].



[Table/Fig-1]: Slot accommodate in maxillary denture.



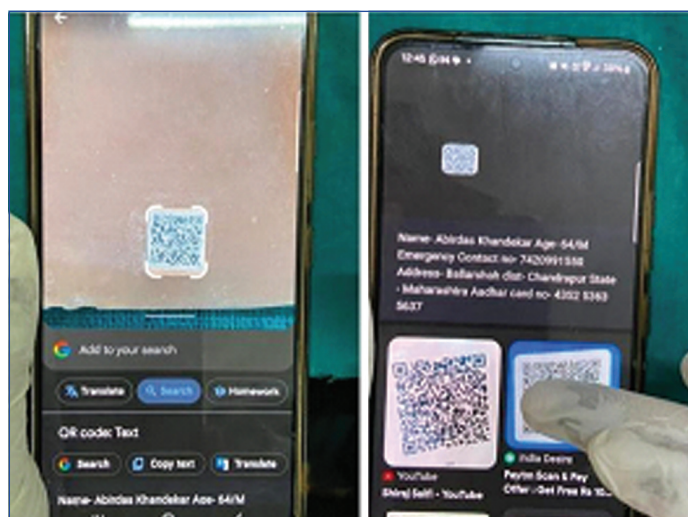
[Table/Fig-2]: Slot accommodate in mandibular denture.



[Table/Fig-5]: Google scanner to encrypt the QR code.



[Table/Fig-3]: QR code embedded in maxillary and mandibular dentures.



[Table/Fig-6]: Information generated by scanning the QR code.



[Table/Fig-4]: Polished denture with embedded QR code.



[Table/Fig-7]: Postoperative view showing maxillary denture.

DISCUSSION

Denture marking is an important aspect of complete denture prosthesis, as it facilitates identification and enhances the security of dentures for both the patient and the dental team. The significance of denture marking in clinical practice lies in its ability to aid in the identification of lost or misplaced prostheses, enhance patient safety by preventing misidentification, and contribute to forensic investigations, while also improving overall patient care by ensuring personalised and secure prosthetic management [1].

Denture marking is recognised as a means to identify dentures and individuals during postmortems or in geriatric facilities during times of natural disasters, civil unrest, war, and criminal activity. Different countries implement denture identification methods in varying ways [2]. In some locations, these methods are necessary, while in others, they are rarely performed. It is believed that the reason their use is not more common is that people do not fully understand how



[Table/Fig-8]: Postoperative view showing mandibular denture.

to conduct rapid and economical labelling. Marking dentures is essential to confirm the wearer's identification [3].

Numerous denture labelling techniques, each with its benefits and drawbacks, have been documented in the literature. Two common techniques of denture marking are the surface marking and inclusion methods [4]. The surface marking method is inexpensive, simple to use, and does not require any special skills. In this technique, before being covered with a clear denture base polymer, ID marks are inked, engraved, or scratched onto the denture's surface using a spirit-based pen or pencil submerged in chloroform. The main drawback of this technique is that these marks wear off easily [5]. In contrast, the inclusion method offers relatively permanent results but may introduce porosity, which could weaken the denture. Additionally, this inclusion technique is generally more expensive and usually requires more skilled personnel in dental laboratories to execute.

Methods to achieve denture marking include printing the patient's name on a piece of parchment or laminated paper, using labels, stainless steel strips, lenticular cards, Polymethyl Methacrylate (PMMA) bars, laser etching, electronic microchips, photos, radio frequency identification tags, or lead foil. Any of these objects can be inserted into the denture base and covered with transparent auto-polymerising resin or heat-cured acrylic during the denture processing phase [6].

Barcode technology has become more accessible in recent years, with widely available barcode generator apps online. This technology allows for quick optical scanning using smartphones. Standard Universal Product Code (UPC) barcodes and QR matrix barcodes can store significantly more information than plain text, making them well-suited for denture labelling. As a result, they have been used for several years [7].

Most people encounter QR codes in the media daily, and they are widely used in everyday life. The two-dimensional barcode known as a QR code was developed in Japan in 1994 specifically for the automotive sector. It consists of black squares arranged on a square grid with a white background and can be easily read optically using image devices, such as a smartphone camera with the appropriate app installed. It can store up to 4,296 alphanumeric characters, which is a substantial amount of data. This feature, along with the ease of generation and readability, makes it ideal for denture labelling [6].

The posterior palatal surface of the maxillary prosthesis and the distolingual surface of the mandibular prosthesis are the best places for dental marking. These locations are ideal because they are the easiest to read, have the least impact on the prosthesis's aesthetics,

and possess sufficient acrylic resin thickness for slot and marking placement [8].

Currently, forensic odontology is considered a specialised and reliable technique for identifying the deceased, especially in cases involving multiple fatalities. Forensic odontologists are involved at every stage of the identification process for victims of disasters. This reputation has been built over many years through the use of forensic odontology in both individual identifications and catastrophic circumstances, as well as through the contributions and discoveries of prominent researchers and dentists [9]. Regulatory organisations have recommended that all prostheses be marked with an identification system due to these concerns. Additionally, elderly individuals often encounter difficulties in adapting to new prostheses [10]. It is reported that 81% of elderly individuals reside with their families, while 18.4% are widowed and only 0.6% are unmarried. The rate of widowhood is higher in rural areas compared to urban areas, with 24.8% in rural areas and 13.7% in urban areas [11].

Denture marking systems offer various advantages, such as identifying patients in cases of natural and mass disasters, as well as locating prostheses in geriatric institutions. They also aid in the reconstruction of dental records in the event of accidents or other misfortunes. Labelling dentures facilitates diagnostic and decision support in medico-legal cases; therefore, all key details of patients can be recorded and stored in an easily accessible system when needed [9].

This article explores a method for incorporating QR codes, which offer distinct advantages over existing denture marking techniques. QR codes can store a substantial amount of information, making them a highly efficient tool. Since many dentists already possess smartphones, they can easily utilise QR codes to quickly access patient information directly within the clinic. This not only streamlines the process but also ensures that critical data is readily available at the point of care, thus improving both convenience and efficiency in patient management.

CONCLUSION(S)

Denture marking is essential for social and forensic purposes, particularly when a patient's identity needs to be verified on an individual basis. This article explains a straightforward, affordable, and long-lasting denture marking technique that can hold a significant amount of data. An on-site forensic investigator can quickly identify the denture wearer using any smartphone to decipher the label. All dentists should be encouraged to adopt this practice to make it a required standard in dental treatment across the nation. A global policy for denture marking is necessary, and international cooperation should be promoted. Divergent viewpoints from the global community of forensic odontologists should be considered in order to reach a consensus for the future.

REFERENCES

- [1] Colvenkar S, Alwala AM, Kunusoth R, Sampreethi S, Shetty SD, Deverashetty S. A simple denture-marking technique for patients residing at old age homes. *Cureus*. 2022;14(10).
- [2] John J, Mani SA, Nambiar P, Sulaiman H. Denture marking: A mandatory procedure to aid forensic identification. *Disaster Prevention and Management: An International Journal*. 2011;20(4):378-85.
- [3] Stavrianos CH, Petalotis N, Metska M, Stavrianou I, Papadopoulos CH. The value of identification marking on dentures. *Balk J Stom*. 2007;11(3):212-16.
- [4] Mohan J, Kumar CD, Simon P. "Denture marking" as an aid to forensic identification. *J Indian Prosthodont Soc*. 2012;12(3):131-36.
- [5] Babu JK, Mohan TK. Role of dentists in manmade disasters-a review. *Indian J Med Forensic Med Toxicol*. 2014;8(1):06-11.
- [6] Jiménez RA. Denture labeling using QR codes. A simplified technique. *Odvotost-Int J Dent Sci*. 2018;20(3):11-15.
- [7] Nalawade SN, Lagdive SB, Gangadhar SA, Bhandari AJ. A simple and inexpensive bar-coding technique for denture identification. *J Forensic Dent Sci*. 2011;3(2):92.
- [8] Ryan LD, Keller JB, Rogers DE, Schaeffer L. Clear acrylic resin T-bar used in denture identification. *J Prosthet Dent*. 1993;70(2):189-90.
- [9] Kareker N, Aras M, Chitre V. A review on denture marking systems: A mark in forensic dentistry. *The Journal of Indian Prosthodontic Society*. 2014;14(Suppl 1):04-13.

[10]

Baad RK, Belgaumi U, Vibhute N, Kadashetti V, Chandrappa PR, Gugwad S. Proposing national identification number on dental prostheses as universal personal identification code-A revolution in forensic odontology. J Forensic Dent Sci. 2015;7(2):84-89.

[11]

Shah N, Parkash H, Sunderam KR. Edentulousness, denture wear and denture needs of Indian elderly—a community-based study. J Oral Rehab. 2004;31(5):467-76.

PARTICULARS OF CONTRIBUTORS:

1. Postgraduate Student, Department of Prosthodontics Crown and Bridge, Sharad Pawar Dental College, Sawangi, Wardha, Maharashtra, India.
2. Associate Professor, Department of Prosthodontics Crown and Bridge, Sharad Pawar Dental College, Sawangi, Wardha, Maharashtra, India.
3. Head, Department of Prosthodontics Crown and Bridge, Sharad Pawar Dental College, Sawangi, Wardha, Maharashtra, India.
4. Postgraduate Student, Department of Prosthodontics Crown and Bridge, Sharad Pawar Dental College, Sawangi, Wardha, Maharashtra, India.
5. Associate Professor, Department of Prosthodontics Crown and Bridge, Sharad Pawar Dental College, Sawangi, Wardha, Maharashtra, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Namita Rajesh Zilpilwar,
Sharad Pawar Dental College, Sawangi, Wardha-442001, Maharashtra, India.
E-mail: dzilpilwar@gmail.com

PLAGIARISM CHECKING METHODS: [\[Jain H et al.\]](#)

- Plagiarism X-checker: Jan 06, 2025
- Manual Googling: Apr 19, 2025
- iThenticate Software: Apr 22, 2025 (14%)

ETYMOLOGY: Author Origin

EMENDATIONS: 7

AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: [Jan 03, 2025](#)

Date of Peer Review: [Feb 13, 2025](#)

Date of Acceptance: [Apr 24, 2025](#)

Date of Publishing: [Oct 01, 2025](#)