Case Series
Journal of Pierre Fauchard Academy (India Section), *Vol 35(3), DOI: 10.18311/jpfa/2021/28208, September 2021 p. 93-96*
ISSN (Print) : 0970-2199
ISSN (Online) : 2405-772X

Denture Markers as Identification Tools in Forensic Odontology: A Case Series

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Abstract

Forensic odontology is defined as "the branch of forensic medicine that deals with teeth and dental findings which helps in identifying the remains of a dead person. Increase in life expectancy has increased number of geriatric patients with denture wearer. Several well-documented methods of denture labeling have been reported in the literature, which include surface marking, incorporation techniques using metal or nonmetal materials, and engraving. This case series highlights the rehabilitation of completely edentulous patients using conventional complete denture prostheses equipped with these identification devices, which would be a critical contributor in determining the individual's identity. All of these denture marking methods were simple, inexpensive, time-saving, less technique sensitive, fire resistant, and aesthetically pleasing to the individual patient.

Keywords: Denture Markers, Engraving, Forensic Odontology, Quick Response (QR) Code, Unique Identification Number

1. Introduction

Natural disasters and calamity have become more common in recent decades, resulting in many unnatural deaths. Identification of deceased victims and establishing ownership becomes challenging. With the above perspective, medical and dental records for forensic science can be a ray of hope to identify innocent victims. Forensic odontology is defined as "the branch of forensic medicine that deals with teeth and dental findings which helps in identifying the remains of a dead person. Identification is a necessary component of any medico-legal investigation because a wrong identity or delay in identification can impede the delivery of justice. Prosthodontists hold a central role in forensic dentistry.

Forensic odontologists and the majority of International Dental professionals have recognized denture markers' significance. It aids in the identification of mutilated bodies during disasters, war victims[1], and the identification of dentures in the elderly population in nursing homes or hospitals.

Several well-documented methods of denture labeling have been reported in the literature, which include surface marking, incorporation techniques using metal or nonmetal materials, and embossing[2].

This case series highlights the rehabilitation of completely edentulous patients using conventional complete denture prostheses equipped with these identification devices, which would be a critical contributor in determining the individual's identity.

In the first patient, an engraving method was used wherein the name of the patient was engraved on the palatal surface of the maxillary denture. In the second patient, the Unique Identification Number of Aadhaar was used as a denture marker. Lastly, in the third patient, a QR code was incorporated into the denture which has patient's information. All of these denture marking methods met the Vestermark[3] criteria of being simple, inexpensive, time-saving, less technique sensitive, fire resistant, and aesthetically pleasing to the individual patient.

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2. Clinical Summary

2.1 Case 1

A 68-year-old male patient, presented to the prosthodontics department with the chief complaint of a lost upper denture for the past month. The patient has no relevant medical or dental history. The residual ridge showed normal morphology. A treatment plan of the upper complete denture on the lower existing denture was planned. As the patient was unable to recall misplacing of his denture, the only way to identify him would be through identification marks on the denture. As a result, we chose to use the engraving method in the palatal aspect of maxillary complete dentures.

The treatment sequence comprised of the following steps

- A routine denture trial is performed, and then laboratory procedures are initiated until the denture is acrylized.
- Final finishing and polishing of denture was carried out.
- The patient's name was then engraved on the palatal aspect of the maxillary complete denture with a small round bur.
- Dental stone was mixed to form a thick paste and was filled into the indentations created by Bur.
- After it had set, a mix of clear self-polymerizing acrylic resin was placed over this embossing area and was allowed to set.
- The denture was polished once again for enhanced clarity of the name (Figure 1a).

2.2 Case 2

A 54-year-old male patient came in with the primary complaint of "I need teeth." He'd been edentulous for 6 months. There was no significant medical or dental history reported. The morphology of the residual ridge was normal. Our treatment plan was the fabrication of a complete denture prosthesis. As the patient stayed in an old age home, there were chances of denture getting mixed up. With the above perspective, a unique 12 digit citizen identification number issued by the government of India was used as a denture marker. It contains all the demographic data that locates the exact identity of a person.

The treatment sequence comprised of the following steps

- The treatment sequence was similar to the previous case until the fabrication of the conventional denture.
- The unique identification number was printed on a photographic sheet (30 mm × 40 mm and 1.5 mm deep) and was laminated to make it waterproof from oral fluid.
- A slot was cut into the polished surface of the posterior palatal region of the maxillary denture and the distolingual flange of the mandibular denture base, both of which were at least 1-2 mm larger than the photographic template.
- The laminated printed photographic sheet was inserted into the created space and sealed with clear self-polymerizing resin (Figure 1b).
- Final finishing and polishing was done for better clarity of the number.

2.3 Case 3

A 58-year-old, women presented with a broken ill-fitting denture. Her chief complaint included replacement dentures. The patient gave a relevant medical history of memory loss or dementia. The morphology of the residual ridge was normal. Our treatment plan was the fabrication of a complete denture prosthesis with QR code which consists of patient related relevant details.

The treatment sequence comprised of the following steps

- The treatment sequence was similar to the previous case until the fabrication of the conventional denture.
- QR code consisting of patient details was made online using QR generator applications available free online.
- This QR code was printed on a photographic sheet (15 mm × 15 mm and 1.5 mm in thickness) and was laminated to make it waterproof from oral fluid.
- A slot was cut into the polished surface of the palatal region of the maxillary denture and the distolingual flange of the mandibular denture base that was at least 1-2 mm larger than the photographic template.
- The laminated printed photographic sheet was inserted into the space created and sealed using clear self-polymerizing resins (Figure 1c.)

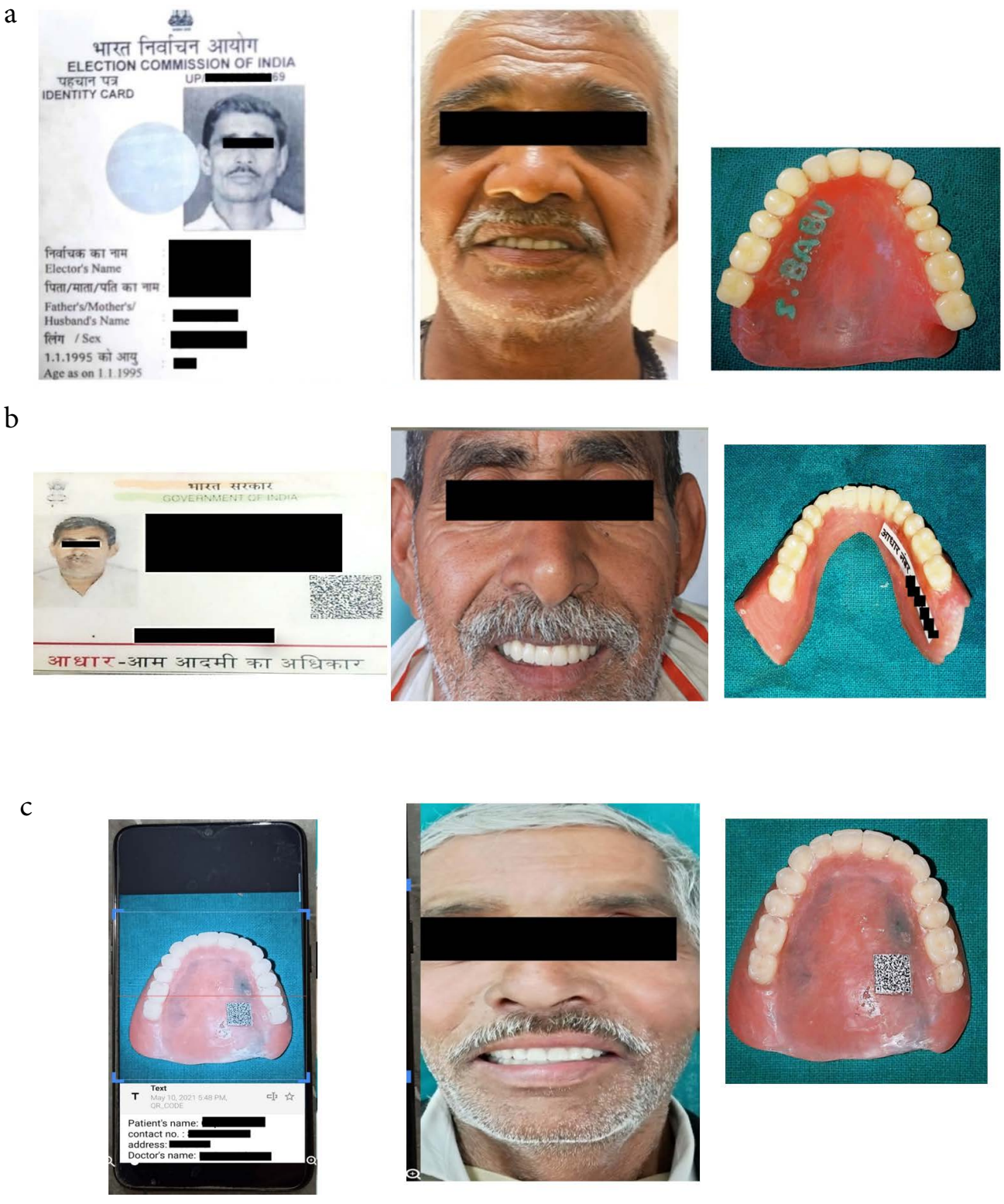


Figure 1. a) Polished denture with engraved name. b) Mandibular prosthesis with Aadhaar number and patient personal details. c) Maxillary prosthesis with QR code. Scanning of a QR code with a mobile app and details decrypted.

Table 1. Feature of various denture identification markers

	Engraving	Unique identification number Labeling	QR code
Readability	Clear	Clear	Not so clear
Amount of details	Limited to just name	All personal details with patient's image	Personal details without patient's image.
Fabrication ease	Simple	Simple	Technique sensitive (QR code generation).
Cost	Inexpensive method	Very minimal cost of printing	Very minimal cost of printing

- Final finishing and polishing was done. When a QR code was scanned with a mobile app, it was discovered that the code had been decrypted (Figure 1c.)

3. Results

Comparison of denture marking systems used in case series.

4. Discussion

Denture labeling was introduced in prosthetic dentistry due to the need of forensic experts. Distinguishing devices or markers embedded in prostheses play an important role in an individual's forensic identification. Forensic odontology, which makes use of dental records, aids in the identification of a deceased victim[4]. However, dental identification procedures must adhere to the country's legal framework. The technique described in this article requires no additional armamentarium, aside from what is readily available in a dental laboratory (Table: 1). Tax file numbers are used in Australia, whereas in Sweden, the person's unique personal identity is labelled[5].

There is a strong need to adopt an international policy mandating the use of denture marking systems in routine dental procedures. There are various well known existing parameters in forensic odontology, which work quite well. However, incorporation of additional parameters by prosthodontists has made the identification process more accurate, less time consuming and, of course, cost effective[6].

5. References

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