

Denture Identification: A Journey Through Time

Puneet Sharma^{1*} Ajay Gupta² Vijay Prakash³ Gitanjali Mago⁴ Wasim Hussain⁵ Satvik Singh⁶

¹PG Student, Department of Prosthodontics & Implantology, DJ Dental College, Modinagar, Uttar Pradesh, India.

²Professor and Head, Department of Prosthodontics & Implantology, DJ Dental College, Modinagar, Uttar Pradesh, India.

³Professor, Department of Prosthodontics & Implantology, DJ Dental College, Modinagar, Uttar Pradesh, India.

⁴Post Graduate Student, Department of Prosthodontics & Implantology, DJ Dental College, Modinagar, Uttar Pradesh, India.

⁵Post Graduate Student, Department of Prosthodontics & Implantology, DJ Dental College, Modinagar, Uttar Pradesh, India.

⁶Post Graduate Student, Department of Prosthodontics & Implantology, DJ Dental College, Modinagar, Uttar Pradesh, India.

ABSTRACT

Background: The dental profession has long acknowledged the importance of placing identification marks on dentures. Denture marking is accepted as a means of identifying dentures and persons in geriatric institutions, during war, crimes, and civil unrest, natural and mass disasters, post mortem and medico-legal investigations. A number of labelling systems are available but majority of the methods are expensive, time consuming, and may not be suitable for all dental practitioners to use. The labelling systems can be broadly separated into either surface marking methods or inclusion systems. The value of labelling dentures is immense when a positive identity of an individual is required. This paper reviews the various methods of denture marking and highlights the significance of placing identification marks on dentures.

Keywords: Denture identification, Labelling, Bar coding.

INTRODUCTION

Now a day's with increasing technology, crime rates like homicide, burglary, disasters, mass attack, robbery etc. are typically conjure up thoughts of our lives. Not only the man-made but the natural disasters are also have great impact on or day to day lives. So human identification play an important role in identifying the victims in today's era¹.

Moreover as the population ages which further results a greater proportion of elderly patients with missing one or more teeth and it will lead to difficulties in identification of a body. Human Identification is a prerequisite for personal, legal and social reason². Forensic dentistry is one of the most innovative branches of dentistry, which helps identify victims in mass disasters and in many medico legal investigations through many of the scribing or engraving methods³. Because of personal, legal and social reason denture

identification marking is one of the most popular and advanced technique in field of dentistry which makes the identification of human body's easier^{1,4}. The importance of denture identification was brought into focus by Dr. Robert H. Griffiths during his tenure as a President of American Dental Association. Hence an attempt has been made through this review which highlights about the denture identification marking technique⁵.

Surface marking methods or inclusion systems are one of the labelling systems of denture which are available and surface marking is usually achieved by scratching the name of patient on the cast before processing⁶. But in case of inclusion method, placement of labels is done on the dentures for denture identification with acrylic resin in two ways. In this process after he fabrication of denture, a small space in the denture base is created, afterwards placement of label which has to be sealed with autopolymerising acrylic resin^{3,6}.

Received: Feb. 17, 2017; Accepted: Apr. 9, 2017

*Correspondence Dr. Poonam M Singh.

Department of Prosthodontics & Implantology, DJ Dental College, Modinagar, Uttar Pradesh, India.

Email: drpoonamm.singh@gmail.com

The necessary requisites for denture markers as per Council on Prosthetic Services laboratory Relations for ideal standards for identification are as:

- The strength of the prosthesis must not be jeopardised.
- It must be easy and inexpensive to apply.
- The identification system must be efficient.
- The marking must be visible and durable.
- The identification must withstand humidity and fire.
- The identification mark should be cosmetically acceptable.
- The identification mark should be biologically inert (when incorporated into the denture).

HISTORY

Identification of denture is not a new method; it has been started years ago because of its greater role in provision of clues in case of various manmade and natural accidental wars. During the 17th century, Paul Revere was the one who identified the body of General Joseph Warren because of his missing maxillary canine tooth⁷. Even the Turner in 1835 said that the Countess of Salisbury which was burned to death; later on she was identified by her gold denture. Then in 1969, the American Academy of Forensic Sciences was established. In 2008 the Swedish ID-Band has become the international standard and denture marking system was declared as accepted method for denture identification according to Federation Dentaire Internationale (FDI)⁸. Adolf Hitler and Eva Braun also said that under extreme circumstances dental identification is possible as teeth are extremely resistant to destruction and decomposition².

TYPES

- Surface marking methods
- Inclusion methods

Scribing or Engraving method: In this method the labelling are placed on one of the denture's surface by scribing or engraving on the denture directly⁸. With the help of small round bur numbers or letters are easily engraved on the fitting surface of the maxillary denture.

Embossing method: In this method the surname and initials of the patient is scratched on the master cast, and then transferred this on to the intaglio surface of the denture.

Surface marking methods:	Inclusion methods:
• Engraving Method	• ID-band
• Embossing Method	• T-bar
	• Laser etching
	• Electron microchips
	• Radio-frequency identification (RFID)-tags
	• Lenticular system
	• Denture bar coding
	• Photographs.

ID-band: This technique involves the labeling of the dentures with an identifiable coding system which contains the patient's details on Titanium foil or Ho Matrix band and that is incorporating into the denture base. Around length of 6 mm longer than the identification band, a shallow recess in the desired location is prepared for the metal band with 3 mm deeper than the thickness of the metal band⁹.

T bar: By cutting of the base plate wax, T-shaped clear PMMA resin bar is constructed afterwards process and finish it in a clear PMMA. For the identification purpose fix the printed label against the flat section of the bar and to produce the clear window displaying the ID label surface polishing is done².

Laser etching: A patient's identification on metal surface of a partial denture can be done by laser process i.e. etching on to the denture metal by copper vapour laser (CVL)¹⁰. A CVL is used because it can easily, freely label the cobalt-chromium components of dentures. Moreover CVL is legible and can reduce the font size of the data easily.

Electron microchips: Radio-opaque chip is used here on which patient's information is etched and afterwards it will be bonded with acrylic resin in

well fashioned manner. Many of the studies conclude that chips embedded in acrylic resin shown the positive results along with their resistance to higher temperatures and acids.

Radio-frequency identification tags: In this technique reader's antenna is used to emit the electromagnetic field energizes the transponder through an electronic handheld reader and The RFID system consists of a data carrier, or tag which are in smaller size (8.5 mm × 2.2 mm) where larger amount of data can be stored. Even the strength of denture is not compromised because of its smaller size^{7,9}.

Lenticular system: Here lenticular lens is used to produce images which can further modify with an illusion of depth or morph. Moreover it has the ability to change or move the image direction by viewing it from different angles⁹. This process involves a polyethylene terephthalate lenticular card with dimensions of 13 mm long, width of 10 mm and thickness of 0.5 mm and it carries the patient's details. It gave us the two images where first flip image consisted of information of patient such as name, gender and age. Second flip image consisted of his/ her living address with driving license number¹⁰. This happens when it will be viewed from a different angle. Lenticular printing is a simple, cheap and quick method.

Denture bar coding: It's a type of method which involves a bar code consisting of the code of series of bars and spaces⁷. These bars and spaces are machine-readable and printed in defined ratios and further it can be used for denture labelling. This process involves two steps; in first step there is a generation of two-dimensional (2D) barcode which should have details of patient such as name, age, gender, address, phone number, and social security number with a code generator¹⁰. The 2D barcode label should be 10 mm × 10 mm in size and square in shape so that it can be used to decode the recorded information with ease by transferring data from the camera attached mobile. Here we can obtain data's like name, sex, age, occupation, phone number, address, and nationality of the patient, which further can be scanned for necessary work.

Photograph: A newly developed technique through which photograph of patient can be embedded in clear acrylic denture base⁷. In this technique

patient's photograph is taken and covered with blank transparent sheet¹¹. Then it has two phases prefabrication as well as post fabrication phase. In prefabrication technique place the photograph over denture base resin after the closure of trail whereas in post fabrication, there is preparation of 1mm slot on which further the photo is placed and clear acrylic resin is used for the covering.

BENEFITS OF DENTURE MARKING

Denture marking is a very helpful technique and proves to be worthy for patients as well as for forensic team. It enables the identification and return of lost or misplaced dentures, which is essential in institutions such as hospitals and residential care homes².

Secondly, it is beneficial in post-mortem identification of the denture wearer. Denture marking is accepted as a means of identifying recovered bodies of those killed in accidents, aviation disasters, and/or cataclysmic holocausts. It also helps in identifying an unconscious person as well as identifying misplaced dentures in geriatric institutions.

Denture bar coding can be used with crown and bridge restoration and can survive temperature above 600°C, which can be encountered in plane crashes. Denture bar coding gives exact information in every situation regardless of whether fire or water is involved. Lenticular printing can store a large amount of information². The labels showed no sign of fading or deterioration. The lenticular card stores the patient's information has two or more images that can be viewed by changing the angle of view. The ID band method can withstand deterioration by fire.

DRAWBACKS

Patients need to carry their dentures wherever they go. Denture incorporated with a barcode if not in use should be thoroughly discarded on medico legal grounds. Embossing technique has been associated with malignancy due to continuous irritation of tissues². Surface scribing cause food entrapment, bacterial infection and irritation. Denture Bar coding requires expensive special equipment's.

CONCLUSION

With any major disaster, the reliance on dental identification becomes essential because teeth and restorations are the most lasting parts of the human bodies.^{31,32} this paper reviews the various methods of denture marking and highlights the significance of placing identification marks on dentures. Various methods have been proposed for denture marking but it is important to use a method that is simple, practical, affordable and universally acceptable. The identification of unknown or missing persons by means of denture marking is a very successful method of identification in forensic investigation. It is also useful for patients residing in hospitals and community homes where dentures could be misplaced, particularly during cleaning by personnel where there is a chance of loss or mix-up. The importance of denture marking should be emphasized by all law-enforcing authorities and should be promoted among all dentists, towards making it a compulsory routine dental procedure throughout the world. The dentist should always inform clearly and motivated the patient as to the benefits of the denture marking. The denture marking may not be inserted if the patient refuses.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES

1. Kalyan A, Clark RK, Radford DR. Denture identification marking should be standard practice. *British dental journal*. 2014 Jun 13;216(11):615-7.
2. Rathee M, Yadav K. Denture Identification Methods: A Review. *J Dent Med Sci*. 2014;13:58-61.
3. Dineshshankar J, Ganapathi N, Yoithaprabhunath TR, Maheswaran T, Kumar MS, Aravindhana R. Lip prints: Role in forensic odontology. *J Pharm Bioallied Sci* 2013;5:S95-7.
4. Mahoorkar S, Jain A. Denture identification using unique identification authority of India barcode. *Journal of forensic dental sciences*. 2013 Jan; 5(1):60.
5. Stavrianos C, Stavrianou I, Kafas P. Denture identification system based on Swedish guidelines: a forensic aspect. *Internet J Forensic Sci*. 2008; 3(1):1-4.
6. Colvenkar SS. Lenticular card: A new method for denture identification. *Indian Journal of dental research*. 2010 Jan 1; 21(1):112.
7. Kareker N, Aras M, Chitre V. A Review on Denture Marking Systems: A Mark in Forensic Dentistry. *The Journal of Indian Prosthodontic Society*. 2014 Dec 1; 14(1):4-13.
8. Mohan J, Kumar CD, Simon P. "Denture Marking" as an Aid to Forensic Identification. *The Journal of Indian Prosthodontic Society*. 2012 Sep 1; 12(3):131-6.
9. Datta P, Sood S. The various methods and benefits of denture labeling. *Journal of forensic dental sciences*. 2010 Jul; 2(2):53.
10. Colvenkar SS. Lenticular card: A new method for denture identification. *Indian Journal of dental research*. 2010 Jan 1; 21(1):112. Colvenkar SS. Lenticular card: A new method for denture identification. *Indian Journal of dental research*. 2010 Jan 1; 21(1):112.
11. Shah S. Fabrication of photo identification denture. *Guident*. 2014 Dec 1; 8(1).