



Review Article

Denture Identification Methods: A Review

Sandeep Kaur Bali¹, Talib Amin Naqash^{2*}, Sabzar Abdullah², Shazia Mir³, Shazana Nazir³, Ashfaq Yaqoob⁴

¹Professor and Head, ²Resident, ³Assistant Professor, ⁴Registrar
Department of Prosthodontics, Government Dental College, Srinagar, J&K

*Correspondence Email: go4talib@yahoo.com

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ABSTRACT

Labeled dentures can be important in identifying people who have lost their memory, states of unconsciousness or in identifying the bodies of those who have died in accidents, disasters and natural calamity. A denture, like all personal items, can be lost or misplaced in a hospital or nursing home thus needs to be labeled for future identification. Identification is an essential requirement of any medico legal investigation because a wrong identity may pose a problem in delivering justice. Positive identification through labeled dentures plays a key role in forensics. A number of labeling systems are available and can be broadly classified into either surface marking methods or inclusion methods. This article reviews various methods involved in labeling dentures.

Keywords: Dentures, Surface methods, Inclusion methods

INTRODUCTION

Denture identification systems are important for hospitalized patients, patients in long-term care facilities, for forensic identification purposes and other social reasons. After major disasters such as earthquakes, fires or floods, accurate & early identification of the dead & injured becomes of utmost importance. At times the only identifiable remains are a victim's partial or complete dentures. ^[1]

According to American Board of Forensic Odontology guidelines, most dental identifications are based on restorations, caries, missing teeth and/or prosthetic devices. The purpose of denture marking therefore not only helps in the return of a lost denture, but also it facilitates the

identification of edentulous persons who are either living or deceased.

Labeling of all dentures is recommended by most international dental associations and forensic odontologists. In fact, in some countries and certain states of the USA, the labeling of dentures is regulated by legislation. ^[2]

Forensic dentistry is one of the most innovative branches of dentistry which helps identify victims in mass disasters and in many medico legal investigations. Various recommendations have been made concerning the importance of denture identification. Prosthodontists are playing a very important role in forensic dentistry as they are concerned with fabrication of

various prostheses, which can serve as an important tool of identification.

The standard requirements for denture markers are that they should be biologically inert when incorporated into the denture, inexpensive, easy and quick to apply, possible to retrieve after an accident, acid resistant and survive elevated temperatures. The marking must also be esthetically acceptable, visible (readable) and durable without jeopardizing the strength of the prosthesis. In addition, the marking should be permanent and resistant to everyday cleansing and disinfecting agents. The recommended areas for marking therefore are the posterior regions of the lingual flange and the palate.^[3]

Various methods of denture marking have been reported in the literature. However, there are two main methods in marking dentures, namely the surface method and the inclusion method.

Surface Methods

1. **Scribing or engraving method:** In this method letters or numbers are engraved on the denture surface with the help of a small round dental bur. This technique is easy to operate and is economical but poses problems like food entrapment, bacterial infection and irritation
2. **Embossing method:** In this technique name and other particulars of the patient are scratched on the master cast. After processing it produces stamped or embossed letters on the impression surface of dentures. This technique is economical but has been associated with malignancy due to continuous irritation of tissues.

Inclusion methods

As compared to surface methods, inclusion methods are permanent but require more

skills and are time consuming. Various inclusion methods are:

1. **Denture Bar coding:** A bar code applicable to dentures consists of a machine-readable code of a series of bars and spaces printed in defined ratios.^[4] Denture bar coding can be used with crown and bridge restorations and can survive temperatures 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. Denture bar coding is easy to perform and not very expensive, especially if a special marking device can be improved. However, it requires expensive special equipments.
2. **Lenticular card method:** Lenticular printing is a simple, cheap and quick method in which a lenticular lens is used to produce images with an illusion of depth, morph, or the ability to change or move as the image is viewed from different angles.^[5] The proposed method is simple, cheap, and can store a large amount of information, thus allowing quick identification of the denture wearer. 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.
3. **ID band method:** In this method stainless steel metal band containing an identifiable coding system representing patient details is placed in a shallow recess prepared in the denture base.^[6] The band is covered with clear acrylic resin, trimmed and finished in the usual manner.

4. **Paper Strip method:** It is more economical than ID band method and utilizes onion skin paper. [7] The acrylic resin fitting surface situated adjacent palatally between the ridge and the center of the palate is moistened with monomer on a small brush. The strip of typed paper is laid on this surface and the paper is moistened with the monomer. Clear resin is then placed over the paper before final closure of the denture flask.
5. **T bar method:** A T-shaped clear PMMA resin bar is constructed by cutting baseplate wax and then is processed and finished in clear PMMA. [8] An identification printed label (reduced in size, print-face inward) against the flat section of the bar is fixed. It is then surface polished to produce a clear window displaying the ID label. This procedure is easy, inexpensive and time-effective.
6. **Laser etching:** Copper vapor laser is used to etch the non impression surface of denture with patient's information. [9] This method is not only expensive but also requires specialized equipment and technicians to perform the procedure.
7. **Electronic Microchips:** With the value of denture markings gaining better understanding, high end technology was tried to label dentures. The patient's information was etched onto a chip measuring 5×5×0.6 mm. Tests conducted on chips embedded in acrylic resin performed well under high temperatures (600°C), had excellent acid resistance, was radio-opaque and bonded well with acrylic resin. However, the main disadvantage of the chip was that it could be inscribed only by the manufacturer and not by the dentist. [10] Further attempts included refining this method with additional equipment to transfer details to a computer.
8. **Photographic method:** In this technique patients photograph is embedded in the denture with the help of clear acrylic resin. [11] The marker is particularly useful in the countries with low literacy rate where a photograph is the easiest method of identification. However, thermal tests revealed that the photographic marker and bar code were only resistant to around 200–300°C.
9. **RFID Tags:** The inclusion of radio-frequency identification (RFID)-tags within dentures is a cosmetic, effective labeling method permitting rapid and reliable identification of the wearer. They are preferred because of their small size (8.5×2.2 mm) and the large amount of denture user data that can be stored in them. Their RFID system consisted of a data carrier, or tag, and an electronic handheld reader that energizes the transponder by means of an electromagnetic field emitted via the reader's antenna. It then receives the coded signal returned by the transponder and converts it into readable data. No special training is required to set the tag in the denture. The chip is resistant to disinfectants and solutions of 1% hypochlorite, 4% chlorhexidine, and 4% sodium perborate.

DISCUSSION

Among the techniques surveyed, the surface method seemed easy to apply and relatively inexpensive, but they worn off very easily and needed to be reapplied. The

inclusion methods were definitely more permanent and provided a positive result, but it tended to weaken the denture structure and create porosity. It was also found to be more expensive and trained personnel in well-equipped dental laboratories were needed, if any of the inclusion methods were to be chosen.

Several situations demand that the individual be identified. It is obvious that only marked dentures can reveal the positive identity of a person when all other methods fail to do so. This itself is the reason enough to justify the implementation of ID-marking of dentures. ^[12] The dentist should always inform the patient clearly the benefits of denture labeling and motivate the patient for the same. However, the patient has a right to refuse. Some of the procedures for dental labeling may be too expensive for the patient. In the United Kingdom, the National Health Service provides a fee to the dentist to label patients who are in care homes. In the USA, denture marking is mandatory in 21 states only, and the social security number of the individual is marked. In Australia, the tax file numbers are used, whereas in Sweden, the unique personal identity of the person is labeled. In India, denture marking is neither taught nor is it practiced in any dental college on routine basis.

CONCLUSION

The major reasons for not marking dentures are cost, lack of awareness of the various methods and a belief that it is of little importance. Needless to say, that the value of labeling dentures is immense when a positive identity of an individual is required. This has been stressed by forensic odontologists worldwide. Hence, an appropriate framework within dental education is required to ensure that both student dentists and student dental technologists are exposed to denture

marking methodologies. There is a need to offer patients an esthetically suitable denture marking system that is also inexpensive and permanent.

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