

Review Article

Dental Tags

Saranya Dhanapal, Jayaprakash MJ Divyanand

From the Department of Conservative Dentistry and Endodontics, Saveetha Dental College, Chennai, Tamil Nadu, India

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ABSTRACT

Dental professions have a major role to play in keeping accurate dental records and providing all necessary information, so that legal authorities may recognize negligence, fraud or abuse and identify unknown human. Forensic organizations worldwide have recommended that dental prosthesis should be labelled with at least the patient's name and preferably with further unique identifiers such as serial number etc. Serial numbers can be suggested in the following dental prosthesis like Crowns, Dentures, and Implants.

KEY WORDS: Denture identification, forensic dentistry, forensic odontology, identification tags

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 and early identification of the dead and injured becomes least important. At times, the only identifiable remains is a victim's partial or complete dentures.^[1]

According to the guidelines of the American Board of Forensic Odontology, most dental identifications are based on dental restorations, carious tooth, missing tooth, and prosthetic devices. Thus, the denture marking purpose not only helps in identification of missed dentures but will also facilitate to identify if the person is alive or dead.

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]

This review article describes the use denture marking in various dental prosthesis and its importance in forensic investigatory purposes. The last recommendations issued by Sweden the National Board of Health and Welfare states "Denture marking is not permitted if the patient refuses it."^[3]

The American Dental Association have specified certain criteria for denture marking.^[3]

- The identification 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.

DENTURE MARKING IN VARIOUS DENTAL PROSTHESIS

Denture markings can be used in complete or partial removable dentures, single or multiunit fixed partial dentures, implants, orthodontic appliances, etc.

TYPES OF DENTURE LABELING SYSTEM

They can be broadly classified into:

- Surface method
- Inclusion method.

SURFACE METHOD

It is easy to apply, simple, and inexpensive, but the disadvantage is it will wear off in a short duration.^[4]

They can be subdivided into:

- Scribing or engraving method
- Embossing method.

SCRIBING OR ENGRAVING METHOD

Using small round bur, letters or numbers are engraved on the denture surfaces. They are easy to operate and is inexpensive.^[5]

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.^[6]

Address for correspondence:

Dr. Saranya Dhanapal, E-mail: Saranyadhanapal22@gmail.com

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INCLUSION METHOD

The markings are embedded in denture without affecting its resistance and are usually not visible.^[4]

The various inclusion methods are:

DENTURE BAR CODING

It consists of a machine-readable code of a series of bars and spaces printed in defined ratios and can survive temperatures above 600°C, which can be encountered in plane crashes. This method is easy to perform and not very expensive, especially if a special marking device can be improved. However, it requires expensive special equipment.^[7]

LENTICULAR CARD METHOD

It was introduced by Colvenkar in the year 2010. It is a simple and quick methods in which lenticular lenses are to produce images with an illusion of depth, morph, or the ability to change or move as the image is viewed from different angles. The lenticular technology allows images to be printed on the back of the synthetic paper and laminated on the lens. The disadvantage is image cannot be changed, and it cannot withstand fire.^[8]

ID BAND METHOD

It is a stainless steel band containing coding system representing patient details placed in a shallow recess prepared in denture base. The band is covered with clear acrylic resin, trimmed and finished in the usual manner.^[4]

PAPER STRIP METHOD

This method utilizes onion skin paper. 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.^[9]

T-BAR METHOD

This method was introduced by Ryan *et al.* in the year 1993. A T-shaped clear polymethyl methacrylate (PMMA) resin bar is constructed by cutting baseplate wax and then is processed and finished in clear PMMA. 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.^[10]

LASER ETCHING

This method utilizes copper vapor laser that allows etching of patient's information on the nonimpression surface of denture. It is expensive and requires expertise to perform it.^[11]

ELECTRONIC MICROCHIPS

Cotter and Chaney, in the year 1988, used the small round metal microchip embedded in denture in covered by acrylic resin.^[12] This method is cosmetically discrete, and the chip is readable after burning for 1 h at 1500°C. The disadvantage is the chip will be inscribed only by the manufacturer and not by the dentist.^[13]

PHOTOGRAPHIC METHOD

Patients photograph is embedded in denture with the help of clear acrylic resin. 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.^[14]

RADIO-FREQUENCY IDENTIFICATION TAGS

Radio-frequency identification (RFID) technology was first introduced in 1940, during World War II, and used to identify airplanes belonging to the Royal Air Force.^[15] RFID tags are small electronic devices working in the radio-frequency range. They use wireless radio communications to automatically identify objects or people without the need for line-of-sight or contact and have the advantage that they can be read through a variety of visually and environmentally challenging conditions.^[16] They are preferred because of their small size (8.5 mm × 2.2 mm) and the large amount of denture user data that can be stored in them. 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.^[5]

LEAD PAPER LABEL AND RADIOGRAPH

El-Gohary *et al.* in the year 2009 used lead foil paper in intraoral X-ray film to type the patient's information with any manual ribbon typewriter, during trial closure stage reopen the flask, incorporate the identification label. When periapical radiograph is taken, the patient's information will be clearly revealed.^[17]

USE OF MEMORY CARD

A memory card is an electronic data storage device used for storing a wide range of data files. Luthra *et al.* evaluated the feasibility of using memory card for forensic identification of dentures. The memory card was programmed with all the relevant information regarding the patient identification and the photograph of the patient. A recess was made in the maxillary denture's polished surface on the palatal aspect. The card was wrapped in cellophane, placed in the recess, and then covered with pink auto polymerizing acrylic resin.^[18]

DISCUSSION

In major disasters, identification of humans is difficult. Therefore, forensic odontology plays a vital role in these circumstances. As teeth, restorations and dental prostheses are quite resistant to high temperatures; they could be used as aids in the identification process.^[19]

Among the two techniques, the surface marking methods are easy, but it get easily worn off. On the other hand, the inclusion method is permanent but it is more expensive and require well-trained personnel.

Five requirements of denture markings were suggested by Kruger–Monson. They are as follows:^[20]

- The strength of prosthesis must not be jeopardized
- It must be easy and inexpensive to achieve
- The identification must be efficient

- The markings must be durable and visible
- The marking must withstand fire and humidity.

An awareness must be created among the patients about denture labeling and motivate them for the same. However, the patient has a right to refuse. 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 a routine basis.^[5]

CONCLUSION

From the overview, it was clear that the denture appliances with identification marking can be taken as important evidence in the forensic investigation and in various medico-legal issues. The need of an international consensus about denture marking for clinical and forensic purposes become obvious.^[21] At the same time, esthetically acceptable denture marking that is also inexpensive should be offered to the patient.

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CONFLICTS OF INTEREST

There are no conflicts of interest.

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