



DENTURE IDENTIFICATION- A REVIEW

Dental Science

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ABSTRACT

The presence and absence of dentition plays an important role in the identification of individuals in forensic odontology. The marking of dentures makes it easy to be traced to the owners. The fabrications of dentures with durable materials render it mostly intact even when the victim suffers a violent trauma. If there is a lack of fingerprint data, dental identification is using as an essential part of forensic investigation. The role of prosthodontist is significant in forensic odontology as they deal with the fabrication of prosthesis which can be pivotal in identification. There are many reasons for the failure of practicing denture marking. This article aims at reviewing the different methods of denture marking and its importance in forensic investigatory purposes.

KEYWORDS

Forensic Odontology, Denture Marking

INTRODUCTION

The ability to collect, identify study and compare information from oral and facial structures forms the base of forensic odontology. All possible means should be applied to achieve a scientific identification.

Keiser Nielsen¹ defined Forensic odontology as 'that branch of odontology which is concerned with the proper evaluation, interpretation and presentation of dental findings in the interests of justice'. The presence and absence of dentition plays an important role in the identification of individuals in forensic odontology. In older age groups the identification becomes more difficult due to absence of dentition. In identifying dentures and individuals in post mortem, civil unrest, amnesia, plane crashes, explosion, psychiatric cases, crimes or natural disasters, the acceptance of denture marking is markedly increasing. If there is a lack of fingerprint data, dental identification is using as an essential part of forensic investigation. The fabrications of dentures with durable materials render it mostly intact even when the victim suffers a violent trauma. They don't decompose even if the individual is buried and can be retrieved post mortem without many changes. The role of prosthodontist is significant in forensic odontology as they deal with the fabrication of prosthesis which can be pivotal in identification.

There are many techniques for marking of dentures, some ideal requirements for denture markings are:

- The strength of the prosthesis must not be jeopardized.
- It must be easy and inexpensive to apply.
- The identification system must be efficient.
- The marking must be durable.
- the marking must be aesthetically acceptable.
- 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).²

DIFFERENT TYPES OF DENTURE IDENTIFICATION SYSTEMS

Two methods of denture marking were proposed over the years. They are:

- The surface marking method- Relatively inexpensive and easy to apply. They wear off very easily.
- The inclusion method- The marks are enclosed in the denture. Without affecting the resistance of the denture, the mark should be placed in the denture. It should not be visible when the patient wears them. The placement of the mark aids in the relative

protection of the mark in case of a fire. The most recommended areas are the posterior regions of the lingual flange and palate.^{3,4,5}

SURFACE METHODS

Scribing or Engraving the denture

In this method numbers or letters are engraved on the fitting surface of the denture using a small round dental bur. Its advantages are it is less technique sensitive, economical and quick. On the other hand, it can cause food entrapment, irritation or bacterial infection.⁶

Embossing

In this technique name and initials of the patient are scratched on the master cast. In this technique embossed or stamped lettering will be there on the impression surface of the dentures. Advantage of this technique is economical. And dis-advantages is this technique has been associated with continuous irritation of tissues even with malignancy.⁷

Writing on the denture

In this technique, patient's name, number, initials or any other details are written on the intaglio surface of the finished denture by using a fibre-tip pen.⁸ The mark is then protected against any scratches or abrasions by applying at least two layers of varnish. While applying the varnish, 5 gram of acrylic resin polymer in 20 ml of chloroform is dissolved in varnish as it have an excellent resistance to abrasion, cleaning and disinfecting agents. It does not affect the strength of the denture.⁸

INCLUSION METHODS

Denture bar coding

A bar code consists of a machine readable code of a series of bars and spaces printed in defined ratios. Bar coding is done on a printed paper of 15 × 25 mm, which is further laminated and then incorporated in a maxillary complete denture. Basic requirements of denture bar coding are; it must be easy to incorporate, it should provide accurate information, it must not affect aesthetics, and it should not alter the structure while incorporating it to the denture. The bar code is placed into a recess made in the denture base finally covered with auto polymerising resin.⁹ As a disadvantage it requires expensive special equipment.

Computer-printer Denture Micro-labelling System

Berry et al (1995)¹⁰ suggested a technique that, the computer generated identification label bearing the patient's details was placed in a slot in the denture. Saturated clear resin polymer applied to seal it & cured in a pressure pot. Ling et al (1998) suggested a computer-printer denture micro labelling system in which patient's details was computer printed

& then photocopied on to a transparency sheet in 50% reduced size. The micro label was then incorporated into the denture during the packing stage. This is done after treating with cyanoacrylate acid esters adhesive solution.¹¹

Resin-bar

A T-shaped clear poly methyl methacrylate resin bar is used which acts as a convenient vehicle for embedding the label in the prosthesis with light-cured acrylic resin. This results in a finished and polished surface which acts as a protective cover and ensures a clear window for viewing the ID label. This procedure is easy, time effective and inexpensive.¹²

Laser Etching

A copper vapour laser is used to etch the patient's identification into the metal surface of a partial denture. The font size of the data can be reduced in this technique. As a drawback, special equipment and trained technicians are needed for this technique and also it is expensive.¹³

RFID-TAGS: (Radio-frequency Identification)

The RFID system consists of a data carrier, It referred to as tag or transponder, and an electronic handheld reader. The information is stored in the chip, and the hand held reader can obtain all data from the chip. 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. RFID method is a cosmic, effective labelling method permitting rapid and reliable identification of the denture wearer. RFIDs are not widely used as it is high expensive to manufacture. Another disadvantage of the technique is that the tag is not fireproof.¹⁴

ID band method

In this technique stainless steel metal band containing an identification coding system having patient details is placed in a shallow recess prepared in the denture base. The band is covered with clear acrylic resin, trimmed and finished in the usual manner.³

Denture ID metal band linked to AADHAAR Card

This method refers to linking of all the details of a person in the denture marking system with AADHAAR CARD, a unique identification card for an individual in India. AADHAAR CARD provides name, age, gender, address, bar code, iris scans, finger print, aadhaar card 12 digit numbers, 2-D bar code, body identification mark and face photo. Technique is carried out by, Aadhaar number is incorporated in ID metal band. After making a shallow recess on the palatal aspect of the denture, ID metal band can be luted, trimmed and polished in usual manner with autopolymerizing clear acrylic resin.¹⁵

QR code denture labelling technique

Quick Response (QR) Code can be enclosed into dentures and the code can store a large amount of patient detail. QR codes were generated using QR barcode generator software, at the dental office or laboratory. The size of the QR Code printed is directly proportional to the amount of information incorporated in the QR Code. The area for marking is the posterior regions of the lingual flange in the mandible and the palate of the maxillary denture. Effectiveness depends on the level of distortion happening to the code. Thus many authors consider QR Code to be an effective and simpler denture labelling method. QR Code could be read up to 370°C but would be burnt nearing 500°C.¹⁶

Memory card

Memory card is an electronic data storage device used for storing a wide range of data files. Memory cards available in market with variable sizes and storage capacities. The data in the card can be read on any personal computer with the help of a memory card reader. Incorporation of memory card by keeping the card in cellophane sheet and it can be kept in the recess on the denture and cover with pink auto polymerizing acrylic resin. Denture can be finished and polished in usual manner.¹⁷

Lead paper label and radiograph

Some authors have proposed using a lead foil paper found in the intra-oral x-ray film to type the patient's data with any manual ribbon type writer.¹⁸ Identification label has to be incorporated during the trial closure stage by re opening the flask. The label could also be incorporated after the denture is processed by cutting a depression than with light cured acrylic resin of the same colour. This method is comparatively easy to operate and economical.¹⁹

Lenticular System

Lenticular printing is a technology 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. It includes creating a lenticular image from at least two or more existing images. These images are then printed on the back of a synthetic paper and laminated on the lens. These images are simple to be read. In this technique, the information can never be changed and it may not withstand a fire.²⁰

Photograph

Patient's photograph can be embedded in clear acrylic denture base. It is useful in areas with low literacy rates. But thermal tests of photographic label and bar code were only resistant to around 200-300°C.²¹

CONCLUSION

In the current world of advancing technology, denture marking holds much relevance. There are many reasons for the failure of practicing denture marking. The high cost involvement and lack of awareness of the methods stand foremost in the list. There is also a belief that it is of little importance or no importance. The labelling denture is of immense importance when identity of an individual is required. Forensic odontology stresses on dental marking and its increasing practice. Lack of awareness can be reduced by providing dental education. It ensures that student dentists, dental technicians and practicing dentists are exposed to denture marking methodologies. Furthermore studies could be conducted in establishing an esthetical and efficient denture marking system, which is also inexpensive, simple and permanent.

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