

A Simple and Inexpensive Technique for Denture Identification: A Forensic Aid



Medical Science

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ABSTRACT

Denture labeling has proven to play a vital role in accordance with forensic dentistry which continues to seek means for positive identification. This article describes a technique for denture labeling involving incorporation of lead foil in the acrylic resin at the time of denture processing. This procedure is observed to be fulfilling all the ADA specifications and is an easy, quick and esthetically acceptable for marking accurate identification marks on a denture.

Introduction

With rapidly advancing research in the field of forensic dentistry, Denture labeling has nowadays gained more popularity and significance in prosthetics than before. Identification by dental means has been recognized as a valid reliable scientific procedure by law enforcement agencies and courts all over the world.¹ The first identification for administration of law and justice using human teeth occurred in 1477.² It is fairly easy to add identification during denture packing and processing compared with marking existing dentures. The importance of denture identification was brought into focus by Dr. Robert H. Griffiths during his tenure as president of the American Dental Association.³ Denture marking basically serves two purposes: it facilitates the return of dentures that are lost or accidentally misplaced which frequently occurs in hospitals, nursing homes and other long-term care institutions.⁴ It also facilitates the postmortem identification of unidentified badly mutilated bodies of edentulous patients or bodies burned beyond recognition in some disasters and can be made possible if dentures are present. The dentures generally do not get damaged because of the protection afforded them by the tissues of the head.⁵ From a purely identification point of view, marked dentures may be even more important, as a number of serious medico-legal problems occur if an unknown person cannot be identified. These considerations should be strong enough to prompt any National Board of Health and Welfare to establish requirements concerning denture marking.⁴ Denture identification also holds importance in geriatric institutions wherein identification of the people can be done for who have lost their memory.^{6,7} Although, loss or confusion of dentures is not uncommon, particularly during cleaning by the nursing staff but the loss is of greater consequence to the elderly patient who may have difficulty learning to control new dentures.⁸ Recently, several states have passed legislation requiring names of patients to be placed in new removable prostheses.⁹ Over the years, various denture marking systems have been reported in the literature, but none till date fulfills all the prescribed ADA specifications.¹⁰ The two most commonly employed identification marking methods in scientific literature are namely surface marking and inclusion methods. With surface marking, the patient's name is scratched on the cast before processing. It includes scribbling on dentures/writing on the denture surface¹¹, engraving, embossing etc. Surface markings on the tissue surface of the denture although helpful but may cause food lodgment, bacterial colonization and lead to infection. Emboss-

ing methods may constantly irritate the underlying tissue that may lead to malignancy. In addition, the surface markers (spirit pens, various sealants) can get rapidly removed by one or more abrasive, denture cleansers, antiseptic/mouthwash agents.¹¹⁻²⁰ Inclusion methods include identification labels in the denture acrylic resin. This can be done through creating a recess in the denture base after denture fabrication, then placing a label in the recess and sealing it with auto-polymerizing acrylic resin. Alternatively, labels or other devices can be incorporated directly into the base plate during packing and processing of the denture like ID bands, paper strips, T bar, laser etching, electron microchips, radiofrequency identification tags, lenticular system, denture bar coding, photographs.¹⁷⁻²⁰ The majority of these techniques are not simple or straight forward and often involve equipment not readily available in the small commercial dental laboratory. A wide range of commercial methods are being available for identifying dentures but many of these involve sending the denture to a dental laboratory, following which patient has to stay without the denture for some period of time with a small risk involved as the denture may be lost or broken in transit.³ The inclusion methods although are permanent, but still remain technique sensitive, time consuming and economically challenging with chances of displacement being reported during processing and weakening of the dentures. Moreover, all the above mentioned methods will not withstand high temperatures.^{11-16,20} Keeping in mind the disadvantages involved with the denture marking inclusion methods, a simple, easy, inexpensive procedure for marking accurate identification marks on dentures with incorporation of a lead foil is being described here. The label carrying the patient information is incorporated in the acrylic resin during the denture processing.

Step-by-step clinical procedure is described below:

- Complete denture trial is done in a routine manner and then laboratory procedures are initiated.
- Seal the trial denture to the master cast [Figure 1] and do the flasking till the dewaxing stage [Figure 2].
- Take a used IOPA radiographic film and cut a piece of lead foil from it with the dimension 2.5- 0.6 cm. Write the patient detail (name, hospital/OPD no., name of the hospital, and the place where the work is done) with a ball tipped pen [Figure 3].

- Mix small amount of heat-cure acrylic resin and place it in the posterolateral region of the palate (in maxilla), in the lingual flange (in mandible).
- Place the lead foil (carrying patient detail) in the specified areas and again cover it with mixed acrylic. The idea is to sandwich the lead foil in layers of acrylic [Figure 4].
- Lightly chip blow the acrylic 2 to 3 times with the blow torch. Care should be taken so that the acrylic is not burnt or overheated. This is done to prevent the shifting of the acrylic and lead foil during the trial closures.
- Measured polymer/monomer mixture should be packed into the mould in the dough stage.
- Do the trial closures till no flash appears.
- Bench cure/polymerize the dentures.
- Deflask, trim, and polish the dentures to a good finish [Figure 5].

If an IOPA radiograph is exposed in the area where the lead foil is placed, the complete detail of the patient will be revealed in its mirror image.

Discussion

Denture marking or labeling is not a new concept in either prosthetic or forensic dentistry, and its routine practice has been urged by forensic dentists internationally for many years.^{21,22} Carlsen and others reported the advantages of identifying dentures by names or numbers. He suggested that a metal plate bearing the dentist's mark and number be vulcanized into the denture.²³ Denture identification is important for forensic²⁴ and social reasons²⁵, and the commoner methods have been reviewed by Heath.²⁶ The importance of denture marking has long been acknowledged by the dental profession.^{27,28,11} It is shown by the fact that 20-25% of the adult population of the Western world who are older than 40 wear dentures.²⁹ Not all patients who have dentures will enter a nursing home or hospital facility, so marking dentures may not be absolutely necessary. However, it is possible that patients will eventually require a care facility, even many years after they receive their dentures. Having them marked for identification is in the best interest of the patient and may actually save money in the long run because it is very expensive to replace lost dentures. Adopting denture identification marking as standard practice with a set and affordable cost might increase the use of this safeguard and benefit patients. Patients should be informed of the option and given the choice in any case.³⁰

One absolute requirement for marking dentures is that the mark has to be permanent and fully legible to the naked eye and for the person wearing the dentures who has aged, vision-corrected eyes. The marking must also be capable of withstanding high temperatures. This enables identification after a fire, which would cause the dentures to burn or melt. The marking should be radiopaque. In severe fires, after which only fragments of bodies remain, remnants can be detected with X rays.^{29,31} With these requirements in mind, six basic criteria have been established : marking must be simple and inexpensive; the mark must be permanent and resistant to abrasion, adjustment, and external shock; acid and base resistant; capable of withstanding high temperatures; easy to read with the unaided eye; and esthetically acceptable.²⁹ The Swedish identification band was found to be of international standard accepted by FDI, researchers have shown that the metal band is not resistant to very high temperatures.¹¹

A number of denture-marking systems that make use of direct or indirect techniques have been reported.⁸ It is a well-documented practice to mark dentures with surface inscription and inclusion markers.^{32,33,34,11,20} Although these systems help ensure the identification of misplaced prostheses, the marked materials are vulnerable to chemical and physical degradation.⁸ Most of these techniques may be time-consuming, may not be esthetic and withstand high temperatures, and do not permit the incorporation of a large amount of information. Moreover, these methods require equipments not readily available in the dental laboratories.^{11-20,35} Thereby, an easy and inexpensive method fulfilling all the required ADA specifications for denture marking has been proposed in this article. The label here is durable and can withstand high temperature also. The label shows no sign of deterioration/fading, is cosmetically appealing, and can satisfy all the forensic requirements of a suitable prosthesis. The routine marking of all dentures by this method is advocated.

Some patients object to their dentures being marked because of the visibility of the printing and having one's name or social security number in an artificial device. Even large printing on a denture can be unsightly and requires additional laboratory time and expense.⁹ Standardized identification for complete dentures in such cases can easily be accomplished by placement of an "invisible" number within the denture. The patient does not necessarily object to this means of identification because of its "invisibility."³⁶

Conclusion

Despite the relevance of placing identification marks on dentures has long been acknowledged by the dental profession, still no standard method has been developed so far. To overcome this setback, an easy, quick, and esthetically acceptable procedure for marking accurate identification marks is described in this article, requiring no additional armamentarium, apart from the one that are readily available in a dental laboratory. An additional benefit is the incorporation of a radiographic substance to help locate an aspirated temporary partial denture.



Figure 1 : Wax up denture

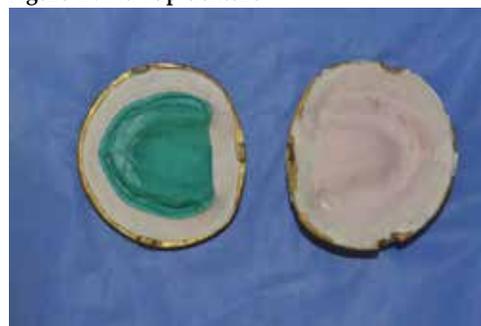


Figure 2: After dewaxing

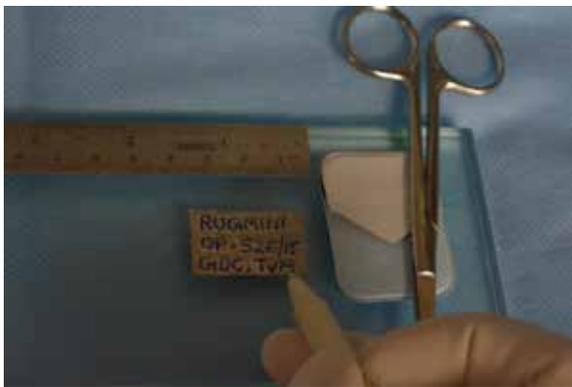


Figure 3: Armamentarium



Figure 4 a : Label sandwiched in layers of acrylic



Figure 4 b : Label positioned



Figure 5: Finished denture

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