

CASE REPORT

The Role of Complete Dentures in Forensic Identification using Memory Card

¹Rahul Tyagi, ²Sandeep Shukla, ³Harpal Singh, ⁴Chandana Nair, ⁵Swrajya Bharathi

ABSTRACT

Identification of individuals in crime or mass disaster is a daunting task for the forensic experts, especially while carrying out a medicolegal investigation as in identifying bodies in a natural calamity or, in cases of accident, loss of memory, states of unconsciousness or being inadvertently misplaced during admission to a hospital. The purpose of this study is to evaluate the feasibility of using a memory card for the 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 autopolymerizing acrylic resin. On retrieval of the card from the denture, the entire data could be read as before without any distortion. The identification cards did not pose any problems in function and speech and were esthetically acceptable by the patients.

Keywords: Forensic identification, Memory card, Denture, Bacterial infection.

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INTRODUCTION

Identification of the dead is essential in casualties associated with fire, aircraft crash, railroad accidents, dreaded natural disasters, like tsunami, earthquakes, etc. The ramifications for the victim range from making a reliable identification to avoiding legal hassles during death certification, or disposal of property toward the kith and kin and claiming insurance benefits, etc.¹ The benefits of teeth as a tissue aiding in forensic identification has gained popularity as it is a tissue that can withstand

high temperatures, putrefaction to which other tissues are susceptible. The edentulism is a concern as the loss of teeth provides a challenge to the forensic expert in identifying the victim. While treating patients with oral diseases, it is equally important to prepare the detailed records of the patients, maintain them for longer durations and be able to retrieve them as and when required. These records include detailed personal history, like patient's name, date of birth, address, contact numbers, e-mail, contact numbers of spouse or close relatives, treatment records with photographs and the X-rays, names and contact numbers of the family physician and the treating dentist. Advancement of the computer technology has made it possible to store the data of a large number of patients for long periods of time.²

The previously listed methods have been divided into surface engraving, e.g. engraving the cast/scribbling of dentures and writing on denture surface and inclusion methods, e.g. incorporation of chips, lenticular cards and radio based tagging transponders, etc. The surface engraving can cause detrimental effects such as lodgement of food debris leading to bacterial infection and decreased strength of denture. The inclusion methods are more permanent but require skills, time and equipment not readily available at the dental laboratories.^{3,4}

CASE REPORT

A 55-year-old male patient reported to the department with a chief complaint of difficulty in chewing food since past 6 months. The medical history was non-contributory and intraoral examination revealed completely edentulous maxillary and mandibular arches. The patient was a cab driver by profession. Treatment plan was to fabricate a complete denture incorporating with the identity of the patient for future identification in case of any mishap to aid in forensic study. All the relevant information regarding the patient identification and the photograph of the patient were stored in the memory card. The memory card with the patient details was inserted in dentures of the patient. The technique of insertion is described below:

- For the selected patient, the complete dentures were fabricated following the routine standard clinical and laboratory procedures (Figs 1 to 6).
- The routine denture insertion process was completed.

^{1,2}Postgraduate Student, ³Professor, ⁴Reader
⁵Professor and Head

¹⁻⁵Department of Prosthodontics, Institute of Dental Sciences Bareilly, Uttar Pradesh, India

Corresponding Author: Rahul Tyagi, Postgraduate Student Department of Prosthodontics, Room No. 141, New Resident Hostel, RMCH Campus, Near Pilibhit Bypass, Bareilly-243006 Uttar Pradesh, India, e-mail: rahultyagi_369@yahoo.com



Fig. 1: Maxillary primary impression



Fig. 2: Mandibular primary impression



Fig. 3: Maxillary secondary impression



Fig. 4: Mandibular secondary impression

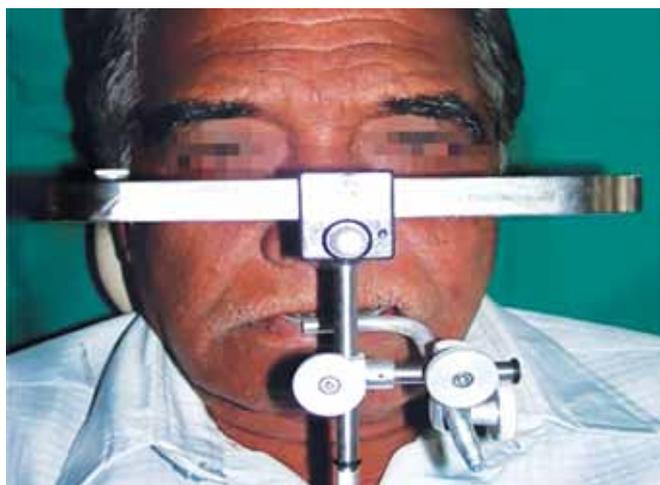


Fig. 5: Jaw relation



Fig. 6: Trial of waxed up denture

- The prosthesis was cleaned, disinfected and dried before beginning the incorporation process (Fig. 7).
- A (18.9 × 15.9 × 1 mm) recess was made in the maxillary denture's polished surface on the palatal aspect with a carbide bur. This dimension is required

- to incorporate the card (15.9 × 11.9 × 0.7 mm) without structurally weakening the denture (Fig. 8).
- The previously programmed Sandisk memory card (2 GB) containing patient details was wrapped in a thin cellophane sheet to protect it from polymer



Fig. 7: Final denture



Fig. 8: A recess made on palatal aspect



Fig. 9: Memory card with complete details of patient

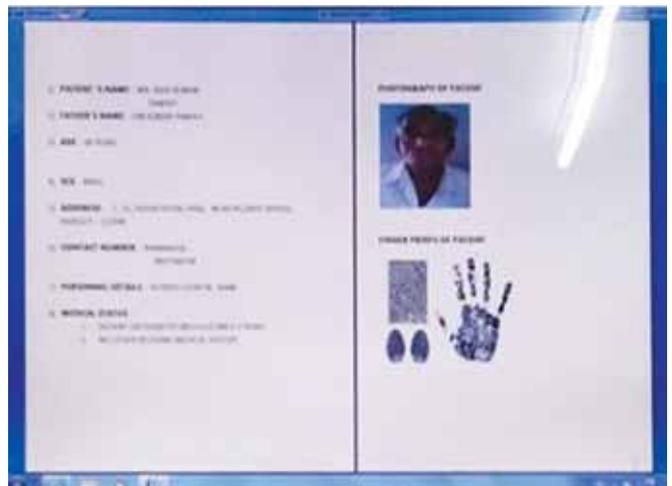


Fig. 10: Details of the patient being displayed on computer

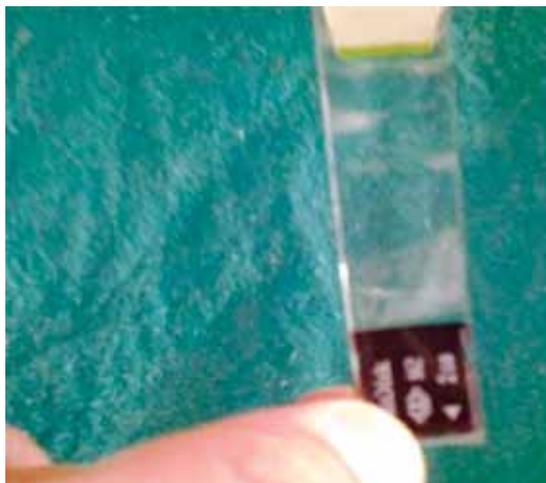


Fig. 11: Memory card wrapped in cellophane



Fig. 12: Memory card inserted in recess in denture

powder and liquid. Care was taken not to increase the thickness (Figs 9 to 11).

- The card wrapped in cellophane was placed in the recess and covered with clear autopolymerizing acrylic resin (DPI-RR Cold Cure, Dental Products

of India Ltd, Mumbai) eliminating any trapped air bubbles (Fig. 12).

- The denture was then processed in a pressurized container with warm water (40°C, 25 psi) and was finished and polished (Fig. 13).



Fig. 13: Memory card covered with clear acrylic resin

DISCUSSION

There are several advantages in using this labeling system. It does not interfere with the oral function or the strength of the denture because of its small size. There is often sufficient thickness of resin for the card to be incorporated without any technical difficulties. No special training or a dental technician is required, and the device incorporation can be made in the dental office. Finally, the cost of a 2GB memory card is around 250 Indian rupees making the procedure a viable option. The data will remain stable in the card. In the event of a disaster, the card can be retrieved from the denture and read on any computer using a card reader which is easily available.² Five recommendations were made by Kruger Monson as regards the marking of dentures:

1. The strength of the denture must not be jeopardized.
2. It must be easy and inexpensive to achieve.
3. The identification system must be efficient.
4. The marking must be durable and visible.
5. The marking must withstand fire and humidity.

In addition, radiopacity of the label should be among this list.⁵

There are certain limitations to the use of memory card as a denture marking system. In the event of excessive impact which can damage or fracture the denture, the card can also be damaged which otherwise is cushioned by the dentures and the tissues of the head and mouth. Samsung has announced a line of memory cards that are shock proof and resistant to water.⁶ The heat resistance of these cards has not been established. Sony micro SD memory cards claim to be both shock resistant

and temperature tolerant from -25 to 85°C .⁷ Exposure to fire can cause damage to the card. In a study conducted by Rotzcher et al,⁷ it was found that if the acrylic dentures in the skull were heated at 400 to 600°C for 30 minutes, only the front teeth of the acrylic dentures were burned after 10 minutes and after 16 minutes anterior parts of dentures until premolars were burned. In fire accidents or aviation disasters, temperatures of 600°C are usually encountered.⁹ The memory card is inserted in the lateral slope of palatal aspect of the maxillary denture. Hence, it is afforded some protection in case of fire. However, in extreme cases the card will get burnt and may not provide the necessary link to prove identity. Another limitation of using a memory card for denture marking is that retrieval of the card is done by a dentist or a trained dental technician with a laboratory micromotor using a straight handpiece which may not be always available at the site of the disaster. Further, research should be carried out into improving and simplifying methods of labeling dentures. Advantages of the denture marking should be presented to all patients. The profession must be encouraged to routinely mark all dentures.¹⁰

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