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Labelled prosthesis linked to aadhaar card id- a reliable method of human identification in forensic odontology

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Abstract

Personal identification in natural and manmade disasters can be made by using methods like DNA analysis, finger prints, carbon 14 enamel dating, rugaescopy, cheiloscopy, skull shape and size, dental structure chart and various denture labeling methods. Implementations of labelled dentures system linked with AADHAAR CARD, a unique identification card of India citizen can be important in identifying people who have lost their memory or in states of unconsciousness or in identifying the bodies of those who have died in natural calamity, disasters, accident etc. Identification is an essential issue in all medico legal investigation because a wrong identity may pose a problem in delivering justice. Positive identification through labelled dentures plays a key role in forensic odontology. A number of labeling systems are available and are broadly classified into either surface marking methods or inclusion methods. This article describes various methods involved in labeling dentures and suggests unique method of labelling dentures linked with Aadhaar ID card in India.

Keywords: Denture labeling, Surface methods, Inclusion methods, Aadhaar card ID.

Introduction

Personal identification in natural disasters like tornados, hurricanes, wild fire, earthquake, undersea earthquake (Tsunami), volcanic eruption, landslides, floods and manmade disasters like air crash, train accident, bomb blasts, fires, industrial accidents, nuclear explosions/ radiation can be made by using methods like, DNA analysis, finger prints, carbon 14 enamel dating, rugaescopy, cheiloscopy using Suzuki's classification, skull shape and size, like European (Caucasoid), African (Negroid), Asiatic (Mongoloid), Amerindian, and Australoid, dental structure chart showing the eruption stages of teeth as suggested by different denture labeling methods.[1-6] Identification is an essential issue in all medico legal investigations because a wrong identity may create a problem in delivering justice. Identification provides several benefits like providing financial and other claims to family members of victims. At times the only identifiable remains are a victim's partial or complete dentures.[7] 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.[8] In world trade centre terrorist attack in USA; number of bodies was identified using dental records. In India, as there is no legislation of denture labeling it is neither taught nor practiced in any dental college on routine basis. As number of Indians wear some or other type of dental prosthesis there is need of labeling prosthesis. Labeling helps in easy identification in natural or manmade disasters or people who have lost their memory or in states of unconsciousness in road side accident or hospitalized by others. Linking of denture labeling system to unique ID, AADHAR CARD in India not only fulfil all standard requirement of denture labeling but can set ideal example of denture labeling in front of entire world.

The standard requirements for denture labeling are:

1. They should be biologically inert when incorporated into the denture.
2. Inexpensive.
3. Easy and quick to apply.
4. Possible to retrieve after an accident.
5. Acid resistant.
6. Survive at elevated temperatures.
7. Marking must also be aesthetically acceptable.
8. Visible/readable.
9. Durable without jeopardizing the strength of the prosthesis.
10. Marking should be permanent.
11. Resistant to everyday cleansing and disinfecting agents.

The recommended areas for labeling therefore are the posterior regions of the lingual flange and the palate.[9]

Various methods of denture labeling

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

Surface Methods

1. **Scribing or engraving method:** Letters or numbers are engraved on the denture surface with the help of a small round dental bur is easy to operate and is economical but poses problems like food entrapment, bacterial infection and irritation.

2. **Embossing method:** Name and other particulars of the patient scratched on the master cast produces stamped or embossed letters on the impression surface of dentures after processing. Technique is economical but has been associated with malignancy due to continuous irritation of tissues.

Inclusion Methods

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.[10] Method is expensive, needs special marking device and equipment's.
2. **Lenticular card method:** 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. The proposed method is simple, cheap, and can store a large amount of information, thus allowing quick identification of the denture wearer.[(11)] Although labels showed no sign of fading or deterioration, but cannot withstand higher temperatures.
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.[(12)] The band is covered with clear acrylic resin, trimmed and finished in the usual manner. Method is useful only if linked with any unique identification system of that particular country.
4. **Paper strip method:** It is more economical than ID band method and utilizes onion skin paper.[(13)] But method cannot withstand higher temperatures in disasters like bomb blast, plane crash etc.
5. **T bar method:** A T-shaped clear PMMA resin bar is constructed by cutting base plate wax and then is processed and finished in clear PMMA.[(14)] 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 but again cannot withstand higher temperature.
6. **Laser etching:** Copper vapour laser is used to etch the non-impression surface of denture with patient's information.[(15)] Method is expensive and also requires specialized equipment and technicians to perform the procedure.
7. **Electronic microchips:** With the value of denture labeling gaining better understanding, high end technology was tried to label dentures. However, the main disadvantage of the chip was that it could be inscribed only by the manufacturer and not by the dentist.[(16)] 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.[(17)] 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 label 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. This chip is resistant to disinfectants and solutions of 1% hypochlorite, 4% chlorhexidine, and 4% sodium perborate but method is expensive.[(18)]
10. **2D bar code:** 2D bar can hold a substantial amount of information as data is coded across both length and width.[(19)] But like other methods cannot with stand higher temperature, more space is occupied in prosthesis moreover bending while luting may damage the card.

Mentioned methods cannot fulfil all the standard requirements for denture marking and therefore unique system of marking dentures for particular nation which is universally accepted is needed. We suggest linking of denture marking system with AADHAAR CARD, a citizen's unique identification card in India.

Rationale and goals of Aadhaar card

1. Provide identity.
2. Provide social security benefits.
3. Financial inclusion.
4. Aadhaar-enabled service delivery.
5. Aadhaar-DBT. (DBT-Direct benefit transfer).
6. E-governance.
7. Prevention of corruption.
8. Prevention of identity fraud.
9. Ghost Employees.
10. Forensic odontology (suggested in this article).

Information in Aadhaar card system: Unique identification authority of India issues AADHAAR CARD having information stored in there digital library.

1. Face photo.
2. Finger print.
3. Iris scans.
4. Body identification mark.
5. Demographics like- name, age, gender, address etc.
6. Bar code.
7. 2-D bar code.
8. Aadhaar card 12 digit number.

Suggested Method of Denture Labeling

Denture ID metal band linked to Aadhaar Card: A digital computed system with appropriate software and mandatory for all enrolled dentist of India is suggested. Every dentist will be given pass word to get access to the system via internet. Appropriate software will link patients and dentist information to Aadhaar card software, this method is known as merging of two softwares.

Procedure: Uploading of dentist information like-

1. DCI registration number.

2. Qualification, BDS/MDS/MS/PhD.
3. Address of clinic/hospital. If dentures are fabricated in hospitals, then registration number of hospital.

Uploading of patients information like-

1. Adhar Card number and scan copy.

Other information if available which will provide additional clues like-

2. Radiographic records, RVG, IOPA, OPG, and CBCT scan etc.
3. Digital intraoral impression, dental model scan, dental impression scan etc. used with CAD/CAM technology.

Record of each patient and dentist will go in the digital library and ID band code will be automatically generated by software. System will allot unique ID code for each patient to be engraved/ emboss in stainless steel metal band of specific size and shape having maximum of six digits in which small and capital alphabets and numerical will be used in various combination. ID metal band is then luted, trimmed, polish in usual manner in a shallow recess made adjacent to first molar on palatal aspect of prosthesis with autopolymerizing clear acrylic resin (Fig. 1 and Fig. 2).

Fig. 1 & 2: ID metal band is then luted, trimmed, polish in usual manner in a shallow recess made adjacent to first molar on palatal aspect of prosthesis with autopolymerizing clear acrylic resin

Fig. 3 & 4: Aadhaar card 12 digit number are incorporated in single system via Aadhaar card

Advantages of suggested system:

1. Satisfies all the standard requirements for denture labeling.
2. Maintenance of patient record is done automatically.
3. Ban to quack practices (only registered dentist will be enrolled in system).
4. Useful in income tax assessment for practitioner.
5. All type of markers/ labels like patients face photo, finger print, iris scan, body identification mark, demographics like- name, age, gender, address, bar code, 2-D bar code, Aadhaar card 12 digit number are incorporated in single system via Aadhaar card [Fig.3 (a) & (b)].

Discussion

Among the techniques discussed, the surface method seemed easy to apply and relatively inexpensive, but unhygienic. The inclusion methods are definitely more permanent and provided a good result, but it weakens the denture structure and creates porosity. Some of them are more expensive and trained personnel in well-equipped dental laboratories are needed. At times the only identifiable remains are victims marked partial and complete dentures when all other methods fail to do so. This it is the reason enough to justify the implementation of ID-marking of dentures.[20] The dentist should always inform the

patient clearly the benefits of denture labelling and motivate the patient for the same. National Health Service in United Kingdom provides a fee to the dentist to label patients who are in care homes. In USA, denture marking is mandatory in 21 states, 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 labelled. In India, Denture ID metal band linked to unique AADHAAR CARD can set an ideal example in front of entire world in denture labelling system if made mandatory by legislation.

Conclusion

Denture ID metal band linked to unique AADHAAR CARD system of labeling dentures can be beneficial to patients and dentist both. Government of India make mandatory of linking Aadhaar card in various schemes which includes, linking of Aadhaar card to LPG cylinder distribution system. Similarly there is need to implement this strategy by Government also in the field of dental sciences in labeling prosthesis. Dental council of India can suggest Government of India to make necessary legislations regarding compulsory denture labeling system in India linked with Aadhaar card ID.

References

1. Montelius K, Lindblom B. DNA analysis in disaster victim identification. J Forensic Sci Med Patho 2012;8(2):140-7.
2. Wang N, Shen CD. Improved application of bomb carbon in teeth for forensic investigation. J Radiocarbon 2010;52:706-16.
3. Caldas IM, Magalhaes T, Afonso A. Establishing identity using cheiloscopy and palatoscopy. Forensic Sci Int 2007;165:1-9.
4. Blumenfeld J. Racial Identification in the Skull and teeth. The University of Western Ontario Journal of Anthropology 2000;8(1):20-36.
5. Halcrow SH, Nancy T, Buckley HR. Age estimation of children from prehistoric Southeast Asia: are the dental formation methods used appropriate? J Archaeol Sci 2007;34:1158-68.
6. Bali SK. Denture Identification Methods: A Review**.** Int J Health Sci Res 2013;3(4):100-4.
7. Berry FA, Logan GI, Plata R, Riegel R. A post fabrication technique for identification of prosthetic devices. J Prosthet Dent 1995;73(4):341-3.
8. Alexander PM, Taylor JA, Szuster FS, Brown KA. An assessment of attitudes to, and extent of, the practice of denture marking in South Australia. Aust Dent J 1998;43:337-41.
9. Wilson HJ, Mansfield MA, Heath JR, Spence D. 8th ed. London: Blackwell Scientific Publications; 1987. Dental technology and materials for students; pp. 397–401.
10. Aguloglu S, Beydemir ZM. Denture barcoding: a new horizon. Br Dent J 2009;206(11): 589-0.
11. Colvenkar SS. Lenticular card: A new method for denture identification. Indian J Dent Res 2010;21:112-4.
12. Stavrianos CH, Petalotis N, Metska M, Stavrianou I, Papadopoulos CH. The value of identification marking on dentures. Balk J Stom 2007;11:212-6.
13. Thomas CJ. The role of the denture in identification: A review. J Forensic Odontostomatol 1984;2:13-6.
14. Ryan LD, Keller JB, Rogers DE, Schaeffer L. Clear acrylic resin T-bar used in denture identification. J Prosthet Dent 1993;70:189-0.
15. Ling BC, Nambiar P, Low KS, Lee CK. Copper vapour laser ID labelling on metal dentures and restorations. J Forensic Odontostomatol 2003;21:17-22.
16. Richmond R, Pretty IA. Contemporary methods of labeling dental prostheses-A review of the literature. J Forensic Sci 2006;51:1120-6.
17. Anehosur GV, Acharya AB, Nadiger RK. Usefulness of patient photograph as a marker for identifying denture-wearers in India. Gerodontol 2010;27:272-7.
18. Mandrid C. RFID of dentures in long term care facilities. J Prosthet Dent 2012;7(3):199-206
19. Rajendra V. Denture marking using two-dimensional bar code. J Prosthet Dent 2012;107(3):207-8.
20. Bushick RD. Forensic dentistry: An overview for the general dentist. Gen Dent 2006;54:48-52.