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# RESEARCH ARTICLE

## SIMPLE METHOD TO AVOID LOSS OF DENTAL PROSTHESIS OF THE ELDERLY IN RESIDENCES

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**ABSTRACT**

**Background:** in nursing homes there are 50-80% of partial or total edentulous need prostheses. Loss of these dentures is frequent, so it is important to put an identification mark. This would also serve the purpose of forensic identification. The aim of this work is to collect different solutions to prevent the loss of dentures of elderly people in residences, and propose a new one. **Materials and methods**: a literature review of scientific papers on the loss of dentures of the elderly in residences has been made. **Results**: according to the bibliography consulted, a) the marking of the prosthesis can be on its surface (engraved, painted, barcode), b) it also be included in it (identification marks, lenticular card, barcode, microchip, photographs, code of data matrix, microlabels, memory card), or c) it can be marked outside the prosthesis (boxes with the name). **Conclusion:** a simple method is proposed to prevent the loss of dentures. A dental floss is attached to the prosthesis that is in the mouth and on the other hand it is attached to a safety pin that is fixed on the patient's clothes.

## INTRODUCTION

Currently, in developed countries there is a decrease in birth rate and an aging population. It has been described that in the year 2040 there will be 30% of the elderly population in Spain over 65 years old. A high percentage of these people live in residences or geriatric institutions. Many of them have oral problems, with high prevalence of caries and periodontal disease. In nursing homes there are 50-80% of partial or total edentulous in need of prostheses (Velasco *et al*., 1994). Some authors point out that in Spain 22% of subjects between 65-74 years wear a complete prostheses (upper or lower) and more than 54% wear both complete prostheses (upper and lower) (Cañada-Madinazcoitia *et al*., 1991). The lack of these prostheses leads to a decrease in people's quality of life, affecting their nutrition, speech, psychological health and their own image (Kalyan *et al*., 2014). A large study of toothless patients in nursing homes has allowed the maxillary and mandible to be classified according to their shape and size, concluding that the retention of removable prostheses is very different among edentulous people (Pietrokovski *et al*., 1993). If the prosthesis have greater retention, these people will remove them less from the mouth and therefore have less chance of losing them. In this sense, attempts have been made to retain removable dentures by means of dental adhesives (Grasso *et al*., 2000), magnetic anchors (Selva Otaolaurruchi *et al*., 1996; Highton & Caputo, 1990; Espias Gómez & Alonso Pérez, 1990), or the use of over dentures by balls and bars (Garea Goris & Llopis, 1996; Ayuso-Montero *et al*., 2015).

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In nursing homes, the loss of complete prostheses is an important factor (Velasco *et al*., 1994) and this can also happen in hospitals (González Villa, 2017). Previous authors describe the loss of 695 dentures in Surrey and Sussex hospitals between 2011-16, which represents an economic loss for the health system, if the State is forced to replace them (Mann & Doshi, 2017). In a study conducted with older people, after the great earthquake in eastern Japan in March 2011, it was found that 17.2% had lost their dentures and this had caused them difficulties to eat, talk, smile and social integration (Sato *et al*., 2015). Numerous authors indicate that prostheses must be marked to prevent their loss (Kalyan *et al*., 2014; Velasco *et al*., 1995; Cunningham & Hoad-Reddick, 1993). This identification is important to avoid change or loss, but it also serves forensic purposes to identify possible victims (Kalyan *et al*., 2014; Cunningham & Hoad-Reddick, 1993). In Sweden they use a marked metal band incorporated in acrylic that contains a personal number, which combines the date of birth and sex. Sometimes the information to be included on the label varies with the need, and can be the initials of the patient and the date of birth, a telephone number, the abbreviation of the dental clinic, the file number or even the driver's license number (Rashmi *et al.*, 2014). The manufacturer of dentures Nobilium offers a denture identification system consisting of a chip that uses frequencies of 13.56 MHz. On each chip should be a coded identification number linked to the identification of the patient, his dentist and the oral treatment date. The chip can be read with a specific reader connected to a computer through a USB port or through a smartphone (González Villa, 2017). The aim of this work is to collect different solutions to avoid the loss of dentures of the elderly in residences, and propose a new one very simple, consisting of joining that prosthesis with a dental floss to an outer garment worn by that person.

## MATERIALS AND METHODS

A bibliographic review of scientific works on the loss of dentures of the elderly in residence has been made, using various databases (Medline, Scielo) and Osint techniques on the Internet (open source intelligence techniques), to select those articles considered of most interest for this study.

## RESULTS

**The results are (Table 1):**

**Methods collected from the consulted bibliography:**

a) Surface marking on the prosthesis: they are simple and fast. However, they have the disadvantage of retaining food.

- Engraving method: letters and / or numbers are engraved on the prosthesis with a dental burr or laser. If the patient's name is scratched on the work model before processing, the letters and / or numbers highlight the prosthesis. The marked hollow area can be painted with graphite pencil and then covered with a dental sealant.
- Paint the mark: with an indelible marker on the denture, or also with invisible ink that becomes visible with ultraviolet light.
- Bar code: is a code readable by a series of bars and printed spaces in defined proportions. It is difficult to place on the curved surfaces of the denture.

b) Inclusion method: the mark is inside the denture.

- Identification marks: on paper, on a sheet of soft metal such as lead, on a stainless steel tape engraved with a dental burr, or marker pen is used to put the patient's name before covering the hole with sealant, or identification is written with permanent ink marker on methacrylate which is then inserted into the denture.
- Lenticular card: a lenticular image is made and inserted into the denture. The lenticular lens is used to produce images with an illusion of depth and have the ability to change or move as the image is viewed from different angles.
- Bar code: the bar code is placed in a denture recess and then covered with resin.
- Radio frequency identification tags: it is a wireless electronic communication technology. You need a specific reader of that information stored in a microchip.
- Photographs: a photograph of the patient with the name, age, location is embedded in the resin.
- Data matrix code: there is an array of light and dark colored data representing binaries 0 and 1. It is scanned and embedded in the prosthesis.
- Microlabelling: microlabels of various materials are made and inserted into the prosthesis.
- Memory card: it is an electronic storage device used to save data files, audio, video, images, text. The card is wrapped in cellophane for protection and placed on the outer surface of the palatal face of the dentures, then covered with polymerizable acrylic resin.

c) Methods outside the prosthesis:

- Boxes with the name: a container with the patient's name is used to keep the prosthesis in a humid environment, with or without antiseptic (Caballero García *et al.*, 1998).

**Method proposed in this work:**

A dental floss is attached (with a knot) on some hook of the prosthesis or in the resin itself through a small hole made for this purpose and on the other hand that floss is attached with a safety pin to patient´s clothes (Fig. 1).

**Table 1. Summary of denture identification methods**

| | | |
|---|---|---|
| Methods collected in the revised bibliography | On the surface of the prosthesis | Engraving<br>Painted Barcode |
| | Inclusion within the prosthesis | Identification marks<br>Lenticular card<br>Barcode<br>Radio frequency<br>Photographs<br>Data Matrix Code<br>Microlabels<br>Memory card |
| | Out of prosthesis | Marked boxes |
| Proposed method | Dental prosthesis-dental floss-clothing attachment with safety pin | |

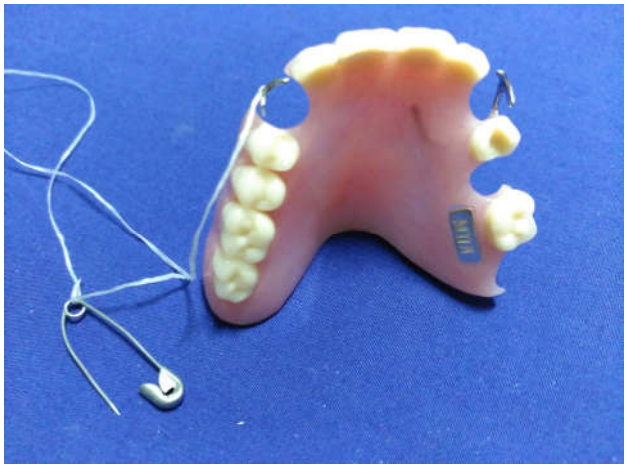

**Figure 1. A dental floss is attached on one side to the prosthesis and on the other to the patient's clothing with a safety pin**

## DISCUSSION

In nursing homes, their caregivers rarely take care of their dentures. Family members of the elderly are the ones who clean the dentures and stored them properly, but they are not always in the residence. That is why in many cases dentures are lost. Overdentures on implants give greater retention to removable prostheses (Bortheiry Schiafino, 2003; Pérez Pérez, 2001). When the prosthesis is prevented from moving, the person wears it better, removes it less and reduces the possibility of loss. In that retention the number of implants and their distribution influence (Pérez Pérez, 2001). A better option is fixed prostheses on implants (Garea Goris, 1995), but it is not always possible in all the elderly. The disadvantage of labeling dentures is that it can invade the patient's privacy, because by taking the name other people can find out that they wear dentures. Another drawback is that this label increases the cost of the prosthesis, but the dentist would have to transfer it to the patient (González Villa, 2017).

We agree with other authors that a prosthesis is an important element for the forensic identification of people, in case of massive disasters such as terrorism, bombing, earthquakes, hurricanes, typhoons, air accidents, identification of mutilated bodies, etc. (Kareker *et al*., 2014). However, it is difficult for the identification mark to resist fire. There are authors who

placed a titanium plate in 10 sample molars and only resisted the mark and sealing material up to 800 ° C (Martínez Maza, 2018). Other authors placed a passive RFID microchip at 10 molars during composite restorations and only resisted up to 300 ° C without alteration (Moreno Gómez *et al*., 2013). Any of the prosthesis identification systems described have some drawback. Surface marking methods and inclusion methods in prosthesis have an additional cost for the prosthetic laboratory and do not prevent the loss of these prosthesis. The microchip inclusion system requires a specific reading device. None of the labeling methods described are used for forensic identification in all cases, since at high temperatures they are affected. The method we propose does not avoid these inconveniences, but it is simple, cheap and easy to carry out in any nursing home. It is common for glasses to be attached with a drawstring to prevent loss. Laces are also used to fasten the pacifiers of children to their clothes to prevent their loss. These fasteners are external. In the method we propose the dental floss is inside the mouth, however, it could not be considered a "piercing", since dental floss only joins the prosthesis.

**Conclusion**

The method of fixing the dental prosthesis to an outer garment, by means of a dental floss, prevents the loss of the prosthesis of the elderly in residences and provides with respect to other methods the simplicity, low cost and safety for the caregivers and relatives of those people.

**Conflict of interests:** The author declares no conflict of interest.

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