

ALTERNATIVE RETENTION FOR AN IMPLANT-RETAINED AURICULAR PROSTHESIS

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KEY WORDS

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The introduction of intraoral endosseous implants was inevitably followed by their external use in maxillofacial prosthodontics. Bar and clip attachments provide satisfactory retention for auricular prostheses, although the bar may inhibit patient hygiene by limiting access to the defect area. A simple clinical and laboratory technique to enhance the retention of an implant-retained auricular prosthesis is described, with custom-made stud attachments used for retention. Improved access for hygiene is provided. A clinical case is presented.

INTRODUCTION

Facial prostheses in the past have been retained primarily by skin adhesives, even when tissue undercuts and/or mechanical means were available to improve retention and stability. Medical-grade adhesives include double-sided tapes, glues, and spray-on silicone preparations.^{1,2} Tapes must be trimmed and can make a prosthesis thicker and less elastic. Damage to the customized surface of the prosthesis can occur when removing glue from the skin surface. Spray-type silicone adhesives require the use of adhesive removers, which can have adverse effects on silicone prostheses.²

Other disadvantages of skin adhesives are inadequate retention due to perspiration, gravity, or skin movement; contact dermatitis as a result of long-time use; and progressive discoloration and breakdown of the elastomeric maxillofacial restorative material. Auricular prostheses have been used in conjunction with eyeglass frames, but this approach can be prob-

lematic when the frames are removed or dislodged. All of the adhesive techniques are unable to provide rigid fixation of facial prostheses. A long-time hope of maxillofacial prosthodontists has been the development of improved methods of retention of facial prostheses.

The introduction of intraoral endosseous implants was inevitably followed by their external use in maxillofacial prosthodontics. Tjellstrom et al,³ in 1985, reported data on their early years of success with implant-supported auricular prostheses. Tjellstrom⁴ provided a more detailed description in 1990 of his technique and additional clinical results. Tolman and Taylor⁵ described a prospective study involving 24 centers and 145 patients that evaluated the long-term osseointegration survival rate for titanium implants anchoring a craniofacial prosthesis. Auricular prostheses were supported by 318 implants in 102 patients (98 not irradiated, 4 irradiated) over varying periods of time. The results of

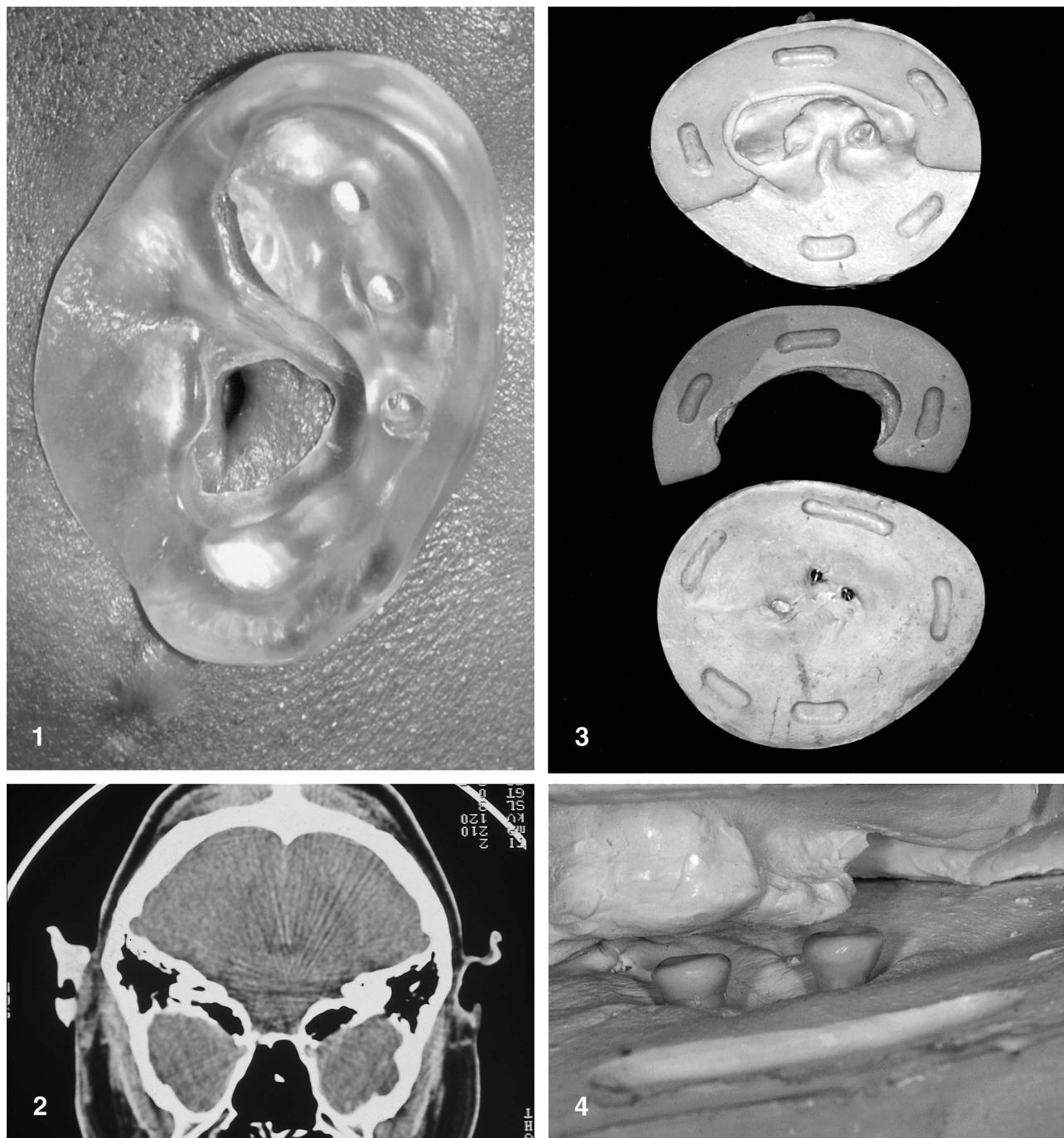


FIGURE 1. A clear acrylic resin auricular prosthesis is used as an imaging and surgical guide.
 FIGURE 2. Preoperative CT scan with the surgical guide in place.
 FIGURE 3. Three-piece mold of dental stone and acrylic resin for the auricular prosthesis.
 FIGURE 4. The mold was used as a guide for waxing the 2 mushroom-shaped stud attachments.

the investigation suggested that the bone-anchored craniofacial prosthesis system utilized in the study is a viable alternative to conventional reconstructive surgery and offers significant improvement in the quality of life when

compared with previously available support systems. Schaaf and Kielich⁶ listed the advantages of implant support for facial prostheses as convenience and security, consistent retention and positioning,

elimination of adhesive problems, retention of intact margins, positive marginal pressure, support of adjacent prostheses, wax pattern try-on, and maintenance of marginal translucency. Implants for facial prosthesis sup-

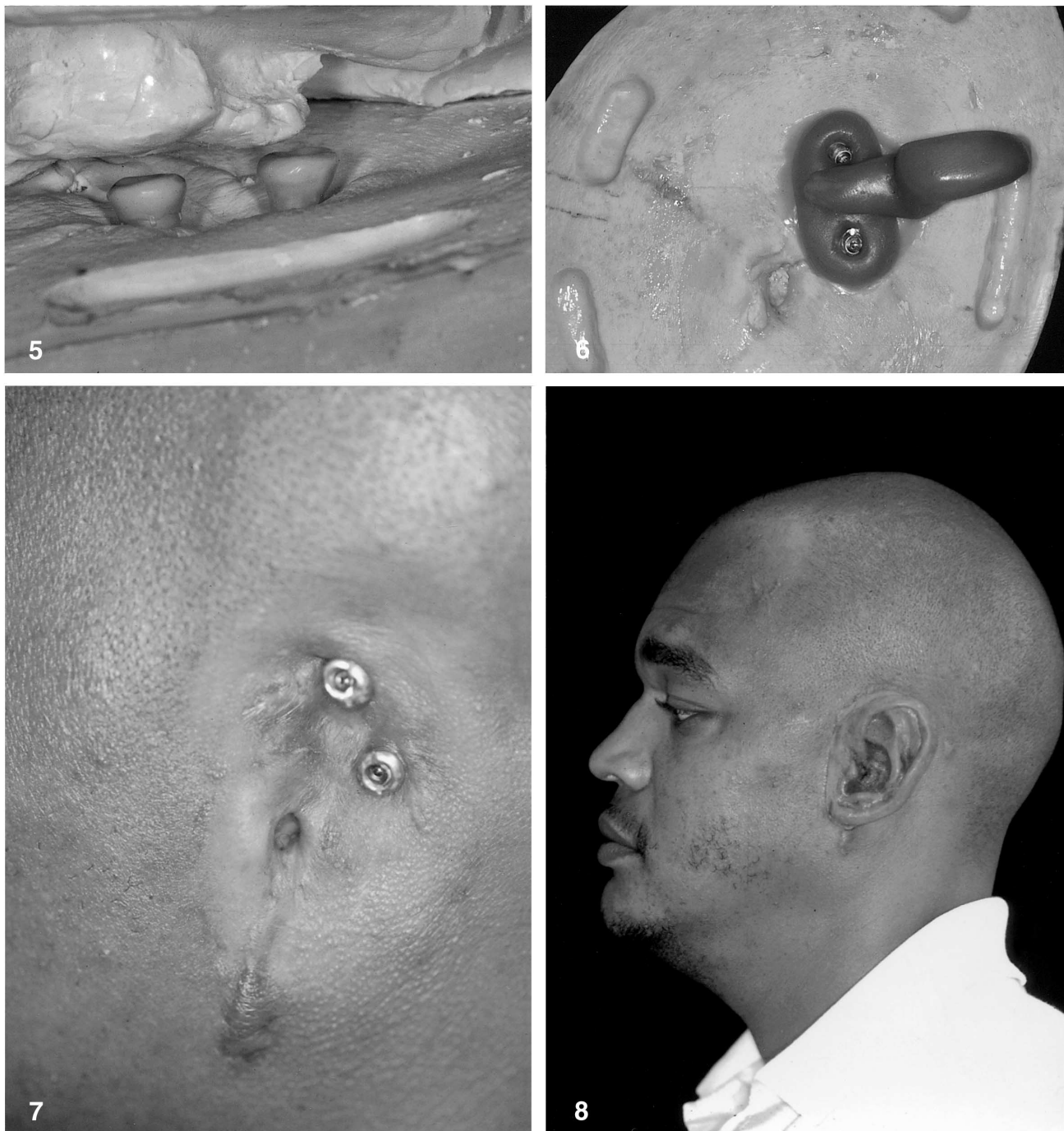


FIGURE 5. A small groove was made on each stud with a thin carborundum disk.
 FIGURE 6. A customized acrylic resin index was used to secure the position of the studs.
 FIGURE 7. The studs were tried on the patient to verify fit and were connected to the abutments.
 FIGURE 8. Auricular prosthesis in place.

port should be placed to permit sufficient room for the abutments and retentive mechanism within the confines of the shape of the prosthesis. For an auricular prosthesis, it would be in the area of the antihelix or outer aspect of

the conchae, which correlates well with the mastoid region of the temporal bone.⁷ Two implants generally will provide adequate retention, with more used if necessary. A surgical template is used to obtain accurate implant

placement. The use of a CT scan allows preoperative determination of temporal bone thickness and proper positioning of the implants in relation to prosthesis location.⁸

Patients with auricular prostheses

can have difficulty with hygiene because of prosthesis location, which can lead to implant failure.^{5,9}

A clinical report is presented that provides an alternative retention technique for an implant-retained auricular prosthesis with customized stud attachments connected to the implant abutments.

PATIENT REPORT

A 38-year-old African American man, who had lost the left auricle of his ear in a motor vehicle accident, was seen at the maxillofacial prosthodontic clinic at Louisiana State University Medical Center. A conventional auricular prosthesis was fabricated and duplicated in clear acrylic resin to create an imaging and surgical guide (Figure 1). The patient was evaluated for craniofacial implants with preoperative CT scans with a surgical/imaging guide in place used to determine bone depth in the areas of possible implant placement (Figure 2).

Three 8-mm × 3.5-mm hydroxyapatite-coated cylindrical implants (Sulzar Calcitek, Carlsbad, Calif) were placed in the left mastoid area with the aid of a surgical guide. The 3 predrilled implant sites were marked with methylene blue dye (3-cm³ syringe and 27-gauge needle), which was percutaneously passed down to the outer cortex of the mastoid bone. The surgical site was sutured and a dressing placed over the auricular area with a pressure bandage.

Second-stage surgery was performed 5 months later in conjunction with tissue reduction around each implant to accommodate 5-mm healing abutments. Two implants were selected to retain the auricular prosthesis with custom-made stud attachments. After the surgical site had healed sufficiently, an impression was made of the defect area and a working model produced with the abutment analogs in place.

A wax ear was sculptured, using the normal ear as a model, and embedded in a 3-piece mold of dental stone

and acrylic resin (Figure 3). The wax was removed with boiling water and the mold used as a guide for waxing the customized stud attachments (Figure 4).

Waxing sleeves were placed on the abutment analogs of the working cast and mushroom-shaped wax patterns were made, which created retention under the height of the contour. The wax patterns were invested, burned out, the attachment cast, and the castings carefully checked on the working model.

A small groove was made on the studs with a thin carborundum disk (Figure 5). The groove was used to align 2 studs in the same position during the transfer from the working cast to the patient. An acrylic resin index was fabricated for securing the position of the 2 studs (Figure 6). The studs were tried on the patient to verify fit and then connected to the abutments (Figure 7).

The tissue side of the mold was lined with a 0.002-inch polyurethane sheet and filled with RTV (room-temperature vulcanizing) silicone (Factor II, Lakeside, Ariz). After the silicone cured, the auricular prosthesis was carefully removed from the mold and trimmed. The silicone was colored to match the patient's skin and the prosthesis delivered. The patient was instructed in the care of the skin around the abutments and the auricular prosthesis (Figure 8).

DISCUSSION

Bar and clip attachments provide satisfactory retention for auricular prostheses, although the bar may inhibit patient hygiene by limiting access to the defect area. Technical problems of the described technique include initial difficulty in placing the auricular prosthesis and separation of the silicone from the acrylic keeper if the clips are set too tightly. Magnets can be used in conjunction with a bar splint for retention of an auricular prosthesis, but the problem of hygiene is still present

along with the corrosive potential of the magnetic components.¹⁰

Auricular prostheses retained by custom-made stud attachments offer the following advantages: (1) improved access for hygiene, (2) reduced space required behind the prosthesis, (3) parallel and nonparallel abutment use, (4) accurate and repeatable prosthesis placement, (5) expensive attachment components eliminated, (6) ease of fabrication, (7) reduced stress on the implants due to the resiliency of the silicone around the implant, and (8) advantageous use of a polyurethane liner for reducing premature wear of the silicone.

CONCLUSION

A simple clinical and laboratory technique to enhance the retention of an implant-retained auricular prosthesis is described, with custom-made stud attachments used for retention. A clinical case is presented.

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