

Silicone auricular prosthesis

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Skin cancer surgery of the ear may result in a large defect of skin and cartilage requiring a staged flap procedure for reconstruction. An alternative to surgical reconstruction is the creation of a silicone auricular prosthesis. These prostheses provide a cost-effective and cosmetically acceptable means of camouflage for patients who decline or postpone surgical reconstruction. The process of creating a silicone auricular prosthesis is discussed. (*J Am Acad Dermatol* 2000;43:687-90.)

Large auricular defects resulting from skin cancer surgery present reconstructive challenges. Smaller defects may be repaired by primary closure, wedge repair, skin grafts, advancement or transposition flaps, or the chondrocutaneous helical rim advancement flap.¹ Larger defects involving significant loss of cartilage often require staged island pedicle or interpolation pedicle flaps.²⁻⁴ Complete loss of the auricle may be reconstructed with the use of an autogenous rib cartilage graft in a multistaged procedure.⁵ However, some patients prefer not to undergo additional surgical procedures once the cancer has been extirpated. In addition, some patients may require a long delay before reconstruction because of an underlying medical condition or the need to monitor the area for recurrence of an aggressive skin malignancy. The creation of a silicone auricular prosthesis for a patient who refused surgical reconstruction after Mohs micrographic surgery is discussed.

CASE REPORT

A 73-year-old man was referred for Mohs surgery for a recurrent infiltrative basal cell carcinoma involving the left helix. Two years previously he had undergone electrodesiccation and curettage of a basal cell carcinoma involving the triangular fossa of the left ear. Since that time, he had noticed a visible thickening of the upper portion of the left ear but no visible surface changes. A small wedge biopsy specimen



Fig 1. Healed surgical defect after Mohs micrographic surgery.

demonstrated infiltrative basal cell carcinoma sandwiched between plates of cartilage. The patient underwent 5 stages of Mohs micrographic surgery, which required sacrificing the upper third of the ear. The patient declined auricular reconstruction and the wound was closed primarily, resulting in a large auricular defect (Fig 1). Although the patient was adamant about refusing additional surgery, he welcomed the idea of a prosthesis.

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Fig 2. Wax prototype on patient's surgical defect.

CREATION OF THE PROSTHESIS

Fabrication of a silicone auricular prosthesis is a time-consuming and tedious process.⁶ A wax prototype of the prosthesis was created with a plaster cast of normal ear used as a model. A plaster cast of the surgical defect was used as a platform on which to build the wax prototype. Once hardened, the wax prototype was sculpted and refined. The wax model was then placed on the patient's surgical defect and adjusted to match the proper angulation of the ear and the inclination from the head (Fig 2). The wax model was then carefully compared with the unaffected ear, especially in the frontal view, while in place on the patient. The patient offered feedback while viewing the wax model in the mirror. Final sculpting was performed to allow the prosthesis to rest on and gently engage the undercuts of the conchal cartilage. A groove on the medial aspect of the wax model was created to allow the patient's eyeglass earpiece to snap onto the final prosthesis, thereby supporting it without adhesives.

Waxing tools, bristle brushes, nylon mesh, and an alcohol torch were used to recreate the natural appearance and the surface texture of the wax

model. A 3-piece dental mold was poured around the wax model to create the final mold of the prosthesis. Medical grade silicone was painted into the cavity of the 3-piece stone mold as a thin semitransparent glaze to simulate superficial vasculature, pigmentation, and surface irregularities. A more opaque base color silicone mixture was then poured to fill the mold. The silicone polymerized at room temperature but may be warmed to accelerate the process. The newly formed silicone prosthesis was removed from the 3-piece stone mold (Fig 3) and was trimmed and positioned on the patient for final extrinsic coloration. Subtle, artistic color changes are painted on the prosthesis to mimic solar damage, telangiectases, and lentigines. This last stage in preparation often makes a dramatic improvement in the life-like nature of the prosthesis and the final cosmetic result (Fig 4).

DISCUSSION

Although our patient's silicone prosthesis could be worn without adhesives by snapping it onto his eyeglass earpiece, many patients require adhesives (eg, Hollister, Mastisol) or specially formulated facial prosthetic adhesives (Daro, Pros-Aide, Secure). Adhesives require patience and precision of the wearer to obtain correct initial placement of the prosthesis. This may be very difficult for older patients who have limited vision and dexterity in addition to the challenge of focusing on one side of the head while looking in the mirror. Silicone-based adhesives require solvents for cleaning the prosthesis, which accelerate deterioration of the prosthetic margins. Allergic contact dermatitis is known to occur with skin adhesives. Some prostheses may be lined with urethane to improve adhesion.⁷ Large silicone auricular prostheses can be attached to the head with the use of magnets when osseointegrated titanium implants are used, thus avoiding the need for adhesives.⁸

Four visits to the prosthetist over a period of 2 weeks are usually required to create a prosthesis. The cost may range from \$2000 to \$4000 with an average cost of \$2500. Medicare and other insurance carriers have been known to cover a large portion of the cost, including replacement prostheses.

The creation of a life-like prosthesis requires considerable skill and expertise. Most prosthetists document their results photographically and should have examples available for the referring physician to review. Often prosthetists are dentists who have completed a fellowship in maxillofacial prosthodontics. In the dental setting, however, the actual prosthesis may be manufactured by a dental technician. The American Academy of Maxillofacial Prosthetics



Fig 3. Unpainted silicone prosthesis on base of disassembled 3-piece stone mold.

(AAMP)* is an association of dental prosthetists whose mission is to promote education and research of the methods, techniques, and devices used in maxillofacial prosthetics. However, not all prosthetists are dentists or dental technicians. The University of Illinois offers an extensive program of facial prosthetics (nondental) through their department of Biomedical Visualization within the graduate school. The American Anaplastology Association (AAA)† is a nonprofit educational organization dedicated to the art and science of rehabilitating patients with facial or somato disfigurements. In addition to auricular prostheses, anaplastologists specialize in the creation of ocular and nasal prostheses. The AAA is a diverse group that incorporates health care providers and researchers from the fields of medicine, dentistry, allied health, medical art, materials research and development, psychology, and clinical cosmetology.

In summary, surgical reconstruction of large auricular defects involving significant loss of cartilage requires staged flap procedures. For patients who refuse further surgery or who otherwise are not good candidates for reconstruction because of underlying medical problems or the need to have the surgical site monitored for recurrence of a particularly aggressive malignancy, the silicone auricular prosthesis should be considered. Although at times

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Fig 4. Silicone prosthesis fitted to patient.

they are difficult for the elderly to apply, silicone prostheses offer a cost-effective, cosmetically elegant means to camouflage large auricular defects. Dermatologic surgeons should be familiar with this innovation.

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