ACP AMERICAN COLLEGE OF PROSTHODONTISTS
Your smile. Our specialty.

Prosthetic Conformer as a Pressure Device in the Prophylactic Management of Postsurgical Auricular Keloid Formation: A Clinical Report

Gurkaran Preet Singh, MDS, Pradeep Sherrigar, MDS, Veena Hegde, MDS, & Gagain Khanna, MDS

Department of Prosthodontics, Manipal College of Dental Sciences, Manipal, India

Keywords
Scar; disfigurement; conservative; prevention; custom-made; prosthesis; innovative.

Correspondence:
Gurkaran Preet Singh, Dept. of Prosthodontics, Manipal College of Dental Sciences, Manipal, Karnataka 576119, India.
E-mail: gurkaran_preet@yahoo.co.in.

The authors deny any conflicts of interest.

Accepted March 4, 2012

doi: 10.1111/j.1532-849X.2012.00900.x

Abstract

Keloids form as a result of aberrations of physiologic wound healing and may arise following any insult to the deep dermis. By causing pain, pruritus, and contractures, keloids significantly affect the patient's quality of life, both physically and psychologically. Multiple studies have been conducted for decades and have led to a plethora of therapeutic strategies to prevent or attenuate keloid formation, of which no single treatment has proven to be widely effective. Also, there is a dearth of information in the prosthodontic literature regarding appropriate management of such cases, especially when located in cosmetic areas. This clinical report presents an interdisciplinary cooperative approach between maxillofacial prosthetics and dermatology in prophylactic management of postsurgical auricular keloid. A new and an innovatively designed custom prosthesis for the management of the same is presented.

Any insult to the deep dermis elicits an immediate initiation of repair processes, aberration of which could impair wound healing drastically, resulting in two pathological extremes: chronic wounds and keloids.[1,2] Estimated to occur among 15% to 20% of Blacks, Hispanics, and Asians,[1] keloids are characterized by multiple, painful scars.[1,3-8] Locations such as anterior chest and upper arms have a higher predilection for keloid formation.[1,8] An ear keloid is distinctive because of its cosmetic complications and difficult mode of treatment.

A variety of pressure devices and procedures have been developed[9,10] in the form of clips, buttons, and earrings.[11-14] However, most of them are designed for the earlobe region, whereas others are bulky and have poor patient compliance.[11]

Clinical report

A 42-year-old male patient was referred by the department of dermatology for the construction of a custom-made pressure device to prevent recurrence of bilateral post auricular keloid secondary to surgical excision. It was located bilaterally, posterior to the respective helices extending from the superior aspect terminating just beneath the earlobe (Fig 1).

The patient was also put on adjuvant therapy, which included regular intralesional corticosteroid injections and silicone gel sheeting for prophylaxis. In view of the rarity of such cases reported, a custom-made prosthesis was designed with a novel approach for both the right and left anatomic locations. The treatment sequence was divided into two parts: impression making of the surgically treated ear followed by the laboratory procedure involved in the construction of the prosthesis.

Impression making

1. The area was isolated with gauze pads, and a lubricated cotton pellet was placed in the external auditory meatus (Fig 2).
2. Irreversible hydrocolloid (Zelgan Plus™, Dentsply India Pvt Ltd, Gurgaon, India) was manipulated using 50% more water than indicated in the manufacturer's instructions. Some of the hydrocolloid was loaded in a disposable syringe and the material injected from the folds or undercuts to the external regions of the ear (Fig 3A). Additional material was then added with a spatula. Boxing wax or an old unexposed panoramic film adequately secured to the adjacent soft tissues can be used to hold the impression in place during maturation.
3. After partial set of the impression, paperclips were inserted into it and acted as retentive tags. Then, fast-setting type II dental plaster was poured over the impression material to cover it completely (Fig 3B).
4. The impression was removed and carefully examined to check for any faults and inadequacies.
5. Subsequently, the impression was poured with improved stone and allowed to set (Fig 4).
6. The aforementioned procedure was repeated for the contralateral ear and master cast obtained.

Figure 1 Post-auricular region with excised area covered by silicone-gel sheet.

Laboratory procedure

1. Master casts were trimmed to shape, and the area was outlined on both casts.
2. A wax pattern of the prosthesis was fabricated using modeling wax, and orthodonticwire was used to connect the earplug with the remainder of the prosthesis (Fig 5).
3. Wax patterns for the right and left side were invested separately, and a conventional compression molding procedure using thermal-polymerized acrylic resin was followed.

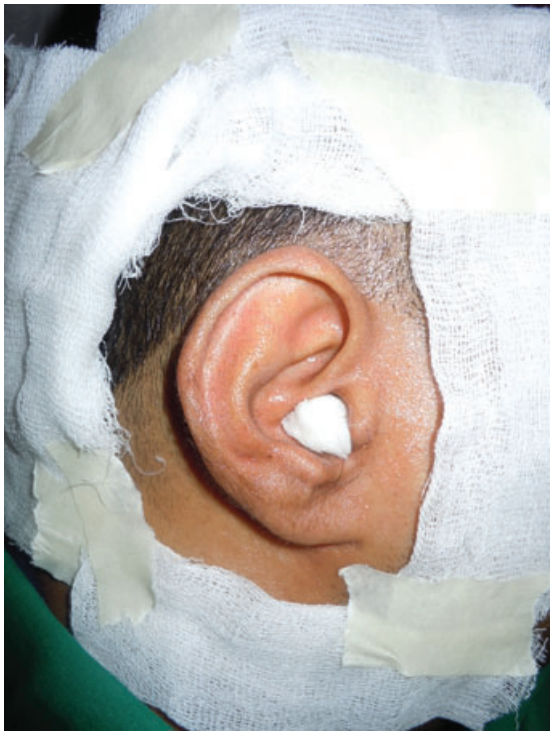

Figure 2 Right auricular region isolated with sterile gauze pads.

4. The processed prosthesis was retrieved, finished, and polished and delivered to the patient (Fig 6).

Discussion

First described in the Smith papyrus about 1700 BC, excessive scarring was differentiated into hypertrophic and keloid scar many years later by Mancini and Quaife[15] and Peacock et al.[16] Hypertrophic scarring usually occurs within 4 to 8 weeks following wound infection, wound closure with excess tension, or other traumatic skin injury. It has a rapid growth phase for up to 6 months, and then gradually regresses over a period of a few years, eventually leading to asymptomatic flat scars.[2]

Keloids, on the other hand, are indefinitely progressing scars with equal sex predilection and highest incidence in the second to third decade of life. The resulting disfigurement not only becomes a cosmetic nuisance, but also results in a significant burden for the patient.[1,3,4,17,18] An earlobe keloid presents a technically challenging task to the most experienced clinician. Although related primarily to earlobe piercing and trauma from contact sports,[11] the patient in this report was referred for the fabrication of a custom prosthesis to prevent recurrence after surgical excision of bilateral post auricular keloids. Management of earlobe keloids primarily falls into two categories: treatment of the overgrowth and prophylactic management to prevent recurrence.

Superficial x-rays, electron-beam therapy, and brachytherapy apart from 585-nm pulsed-dye laser (PDL)[19] have been used with good results in scar reduction protocols. Nonetheless, surgical repair of earlobe keloids with intralesional corticosteroid injections and postoperative pressure on the incision site has been shown to provide good cosmetic results.[20]

In the present report, in accordance with the aforementioned norm, intralesional triamcinolone acetonide 40 mg/ml along with surgical excision of the keloid was performed as the definitive modality of treatment. With the new area of trauma prone to an even larger keloid and a high post-excisional recurrence rate of keloid documented,[21,22] it was deemed imperative to substantiate the primary definitive treatment with a more conservative prophylactic modality.

Both pressure therapy and topical silicone gel sheeting have been the preferred conservative modes of management for prophylaxis of keloids. Thus, a silicone gel sheet was placed on the healed postoperative site, and a custom device to apply positive pressure on the previously mentioned area was fabricated.

Due to a scarcity of literature on management of postsurgical auricular keloid, an innovatively designed prosthesis was fabricated. It was made of two parts, with the first part closely adapting to the excised site behind the helix of the ear and the second part, in the form of an acrylic extension into the external auditory canal, which acted as its main mode of retention. The acrylic extension/earplug had two to three openings for unhampered audition.

The greatest asset to the prosthesis was its light weight and superior cosmetics. It was designed in a way that it could be inconspicuously hidden behind the helix of the ear and yet apply constant pressure on the desired region. Since it does not

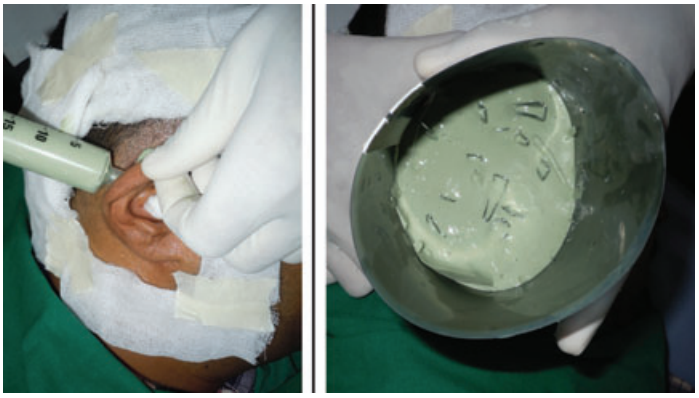

Figure 3 A (left): Impression material injected to record the defect area. B (right): Retentive tags for plaster backing.

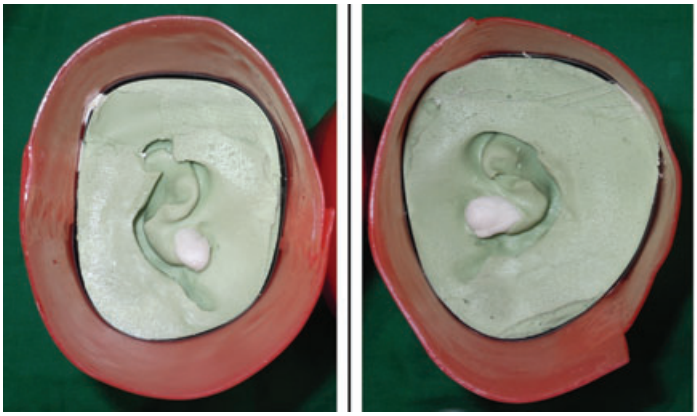

Figure 4 Left and right auricular impressions boxed with modeling wax.

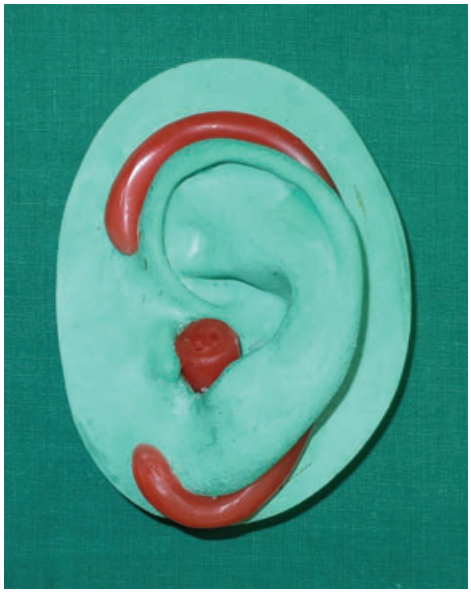

Figure 5 Master cast with carefully prepared wax pattern of the planned prosthetic conformer.

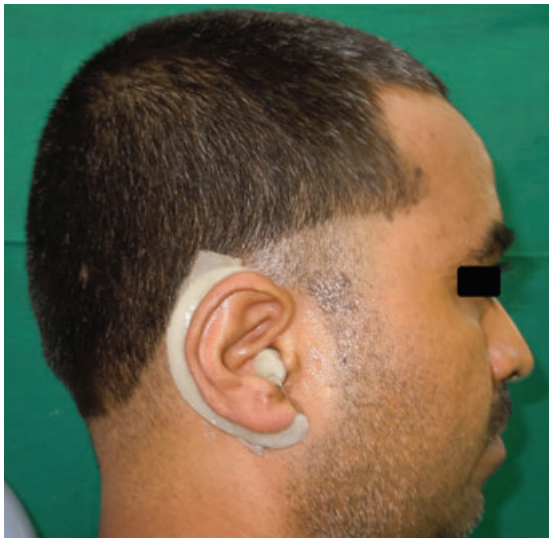

Figure 6 Prosthetic conformer in place.

incorporate any prefabricated attachments, clips, or buttons, it is economically favorable as well. Moreover, it does not demand much laborious laboratory work and can be easily fabricated using commercially available thermal-polymerized denture base resin.

Summary

This clinical report exemplifies an interdisciplinary cooperative approach between maxillofacial prosthetics and dermatology in prophylactic management of postsurgical auricular keloid. A new and an innovatively designed custom prosthesis for the management of the same is presented. Two main pitfalls of the methods documented in the literature, namely bulkiness and poor patient compliance, can be overcome by our simple, efficient, and inexpensive approach.

References

1. Bran GM, Goessler UR, Hormann K, et al: Keloids: current concepts of pathogenesis. Intl J Mol Med 2009;24: 283–293
2. Gauglitz GG, Korting HC, Pavicic T, et al: Hypertrophic scarring and keloids: pathomechanisms and current and emerging treatment strategies. Mol Med 2011;17:113-125
3. Al-Attar A, Mess S, Thomassen JM, et al: Keloid pathogenesis and treatment. Plast Reconstr Surg 2006;117:286-300
4. Tuan TL, Nichter LS: The molecular basis of keloid and hypertrophic scar formation. Mol Med Today 1998;4:19-24
5. Cosman B, Crikelair GF, Ju DMC, et al: The surgical treatment of keloids. Plast Reconstr Surg 1961;27:335-339
6. Murray JC: Keloids and hypertrophic scars. Clin Dermatol 1994;12:27-37
7. Murray JC, Pollack SV, Pinnel SR: Keloids: a review. J Am Acad Dermatol 1981;4:461-470
8. Muir IF: On the nature of keloids and hypertrophic scars. Br J Plast Surg 1990;43:61-69
9. Vachiramon A, Bamber MA: A U-Loop pressure clip for earlobe keloid. J Prosthet Dent 2004;92:389-391
10. Brent B: The role of pressure therapy in the management of earlobe keloids: preliminary report of a controlled study. Ann Plast Surg 1978;1:579-581
11. Hurtado AJ, Crowther DS: Methyl methacrylate stent for prevention of post excisional recurrent ear keloid. J Prosthet Dent 1985;54:245-250
12. Anyswe GB: Button compression for keloids of the lobule. Br J Plast Surg 1974;27:186-187
13. Yeschua R, Wexler MR, Neuman Z. Le clips: traitemenet des cheloides du lobe de l'oreille par compression continue prologee. Ann Chir Plast 1976;21:277-278
14. Sela M, Taicher S: Prosthetic treatment of earlobe keloids. J Prosthet Dent 1984;52:417-418
15. Mancini RE, Quaife JV: Histogenesis of experimentally produced keloids. J Invest Dermatol 1962;38:143-181
16. Peacock EE, Jr, Madden JW, Trier WC: Biologic basis for the treatment of keloids and hypertrophic scars. South Med J 1970;63:755-60
17. Bock O, Mrowietz U: Keloide - Eine dermale fibroproliferative Erkrankung unbekannter Ursache. Der Hautarzt 2002;53:515-523
18. Robles DT, Moore E, Draznin M, et al: Keloids: pathophysiology and management. Dermatol Online J 2007;13:9
19. Alster TS, Handrick C: Laser treatment of hypertrophic scars, keloids, and striae. Semin Cutan Med Surg 2000;19:287-292
20. Zuber TJ, DeWitt DE: Earlobe keloids. Am Fam Physician 1994;49:1835-1841
21. Robles DT, Berg D: Abnormal wound healing: keloids. Clin Dermatol 2007;25:26-32
22. Poochareon VN, Berman B: New therapies for the management of keloids. J Craniofac Surg 2003;14:654-657