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Aesthetic Plastic Surgery

Combination of Different Techniques for the Treatment of Earlobe Keloids

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Abstract. Management of keloids is still controversial. Many different treatment modalities may be used for this purpose, however, no one method has been found completely successful. Therefore, we combined these techniques to improve therapeutic outcomes for earlobe keloids. Nine patients with earlobe keloids of a total number of 12 with auricular keloids were treated with a combined approach between 1995 and 2001. The keloids varied in size 2×1 to 5×3 cm and the patient age ranged 15–63 years. The patient group consisted of nine females, three males. Ear piercing was the main etiological factor for females. In the first session, surgical excision of the keloids was performed. It was followed with triamcinolone acetonide injection to the surgical field on the postoperative second week. Slight pressure was applied by silicone gel sheet coated earring for four months. No recurrence was noted in eight patients over longterm followup. One of nine patients had keloid recurrence. The authors found the results promising a combination of four techniques for treatment of ear lobe keloids is recommended even for recurrent lesions.

Keywords: Keloids—Ear lobe—Combined treatment

Keloids and hypertrophic scars are benign growths characterized by an overabundance of collagen deposits [6]. In such cases, too much collagen is produced and degraded, causing the scar to expand in all directions and become elevated. Keloids tend to be pruritic; raised and erythematous nodules, that extend beyond the confines of the original wound and have propensity to recur after excision [26,29].

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The incidence of keloid formation is difficult to assess, varying from 4.5% to 16% in Black and Hispanic populations. Incidence is higher during times of hyperactivity of the pituitary gland, such as puberty and pregnancy [9,17,24]. Wounds in the presternal and deltoid regions, wounds that cross the skin tension lines, wounds closed under tension, and wounds in thicker skin have a greater tendency to heal with an abnormal scar [11]. The external ear is the anatomic site most prone to unfavorable wound responses such as keloids [13]. Earlobe keloids are common response to ear piercing, especially in darker skin types [30]. The aesthetic considerations of earlobe keloids are serious and their treatment is difficult [4]. Several treatment modalities such as surgery alone or surgery combined with steroid injection or silicone gel sheeting have been used with varying success rates. Today there is not consensus about which treatment modality will significantly solve the problem [20].

In this study we present our experience of treating 12 patients with auricular keloids with a combined approach. Our treatment consist of excision, early postoperative steroid injection, and pressure applied by an earring covered with a silicone gel sheet.

Materials and Methods

Between 1995 and 2001, 12 patients with auricular keloids were treated with combined approach. Keloids were located on the earlobe in nine patients and on other parts of auricula in the remaining three patients (Figs. 1–3). The keloids varied in size 2×1 to 5×3 cm. Patient age ranged 15–63 years. The patient group consisted of nine women and three men. The lesions had been present five months to three years and were secondary to surgery (two patient), ear piercing (nine patient), and trauma (one patient). In eight patients, previous treatment had been given (Fig. 4). All female patients had bilateral earlobe keloids.

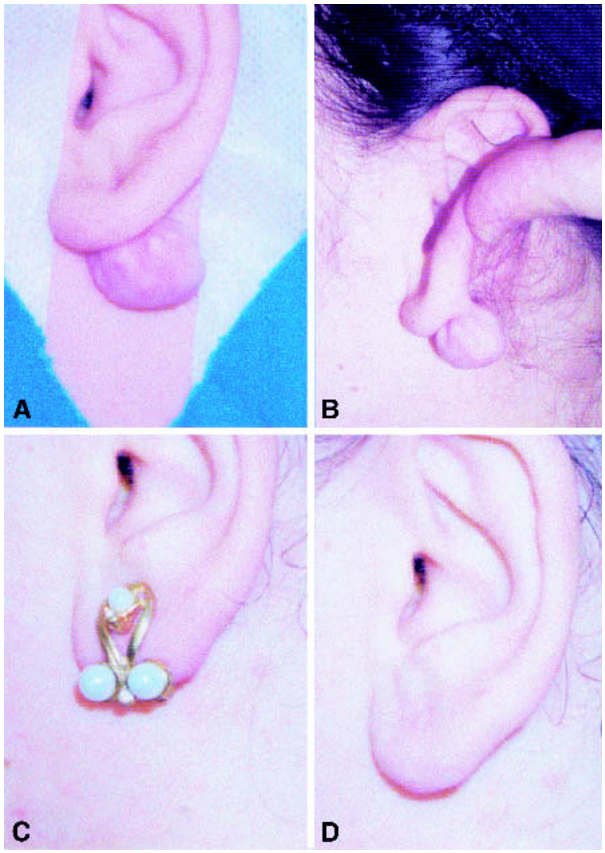

Fig. 1. **(A)** Ear lobe keloid secondary to piercing. **(B)** Keloid extended beyond the borders of the original wound, and looked pedunculated. **(C)** During the treatment period, the patient was using an earring whose posterior surface was covered with a silicon gel sheet. **(D)** No recurrence during the follow up (twelfth month). Piercing was forbidden for these patients.

First of all, surgical excision was applied to auricular keloid of the patients. After that, the wound was closed primarily without tension with 5/0 polypropylene. Sutures were removed in the seventh postoperative day. Simultaneously, pressure was applied with a silicone gel sheet coated earring and used for four months. On the fourteenth postoperative day, triamcinolone acetonide (20–40 mg/ml) was injected to wound edges. Patients were regularly followed up over a period ranging from 11 to 60 months with a mean of 28 months. All patients were evaluated for objective findings such as raised scar and erythema and such as pain and pruritus.

Results

All patients were highly satisfied with the results and surgeons found the results successful (Fig. 4). Two of patients complained about pruritus (16.7%) and three of the patients complained about pain (25%), two of whom also complained about pruritus, in the first postoperative week. These symptoms disappeared in the third postoperative week. In two of patients, who also complained about pruritus, erythema was observed and these also disappeared in the third postoperative week. All patients except one showed no evidence of recurrence at a followup about 28 months later. Clinical response after combined approach was noted in 89% of patients. Recurred lesion was treated with our standard approach, plus radiotherapy.

Discussion

The incidence of keloid formation varies from race to race. Black people and Asian people are more likely to develop these lesions than Caucasians, the incidence varying from 5:1 to 15:1 [2,15]. In the second decade of

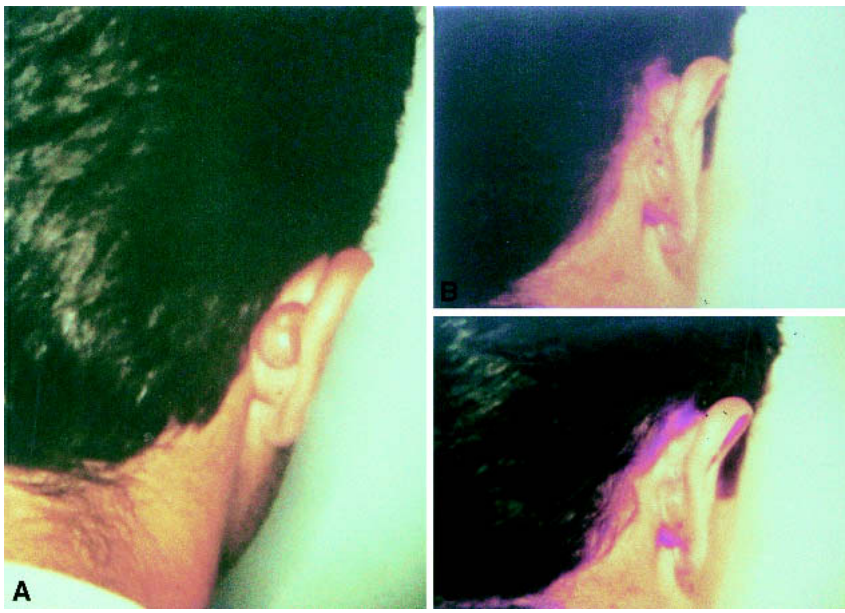

Fig. 2. **(A)** The keloid was seen on the posterior surface of the auricula. That patient had a surgical excision of skin lesion previously. **(B)** Early period after treatment with combined different techniques. **(C)** Late period after treatment.

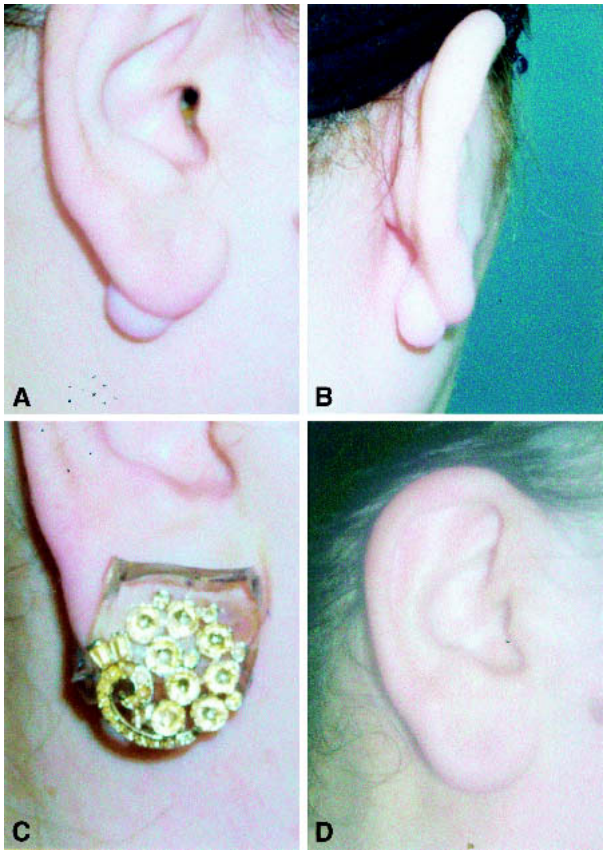

Fig. 3. (A) Keloid on the posterior surface of the earlobe. **(B)** Posterior view of the lesion. **(C)** After excision, light pressure was applied with silicon sheet-covered earring. **(D)** In the post-treatment twelfth month, there was no recurrence on the earlobe.

life it is more likely to see keloid or hypertrophic scar formation due to a more active fibroblastic phase during wound healing [29].

Although there are many theories about keloid formation, their etiology is still unknown. Osman et al. claim that an autoimmune response to sebbum trapped deep in dermis may lead to keloid formation [25]. A disorder of the hormone that stimulates melanocyte is one of the factors that is accused of causing keloid formation [17]. In a recent study it is reported that cyclooxygenase (COX) 2 enzyme gene expression is absent in abnormal scar-derived fibroblasts and may contribute to the development of fibrotic scars, and that COX gene expression could be modulated by hexose sugars and sucrose, especially in normal granulation tissue fibroblasts (about 90% decrease at maximum) and hypertrophic scar fibroblasts (almost sevenfold increase) [18]. It has also been shown recently that sucrose slows type 1 and type 3 collagen metabolism in granulation tissue fibroblast cultures, but it regulates type 1 and type 3 collagen metabolism in fibroblast cultures derived from fibrotic skin lesions differently, changing the collagen metabolism toward normal [19].

These lesions have been the subjects of an extensive discussion regarding their pathogenesis and treatment. Many treatment modalities have been advocated, but none have been universally successful. Surgical excision of keloids alone has a poor success with a high recurrence rate of 55% [10]. In the previous literature, surgical and adjuvant therapy is recommended [22]. In a recent study, Lee et al. propose a new surgical technique to treat keloid without adjuvant therapy after surgery and called it keloid core extirpation. They found this technique to be excellent in preventing keloid recurrence [21]. But as they mentioned, this technique produces less aesthetically pleasing results, so that its usage in auricular keloids is limited compared with our technique. Radiation

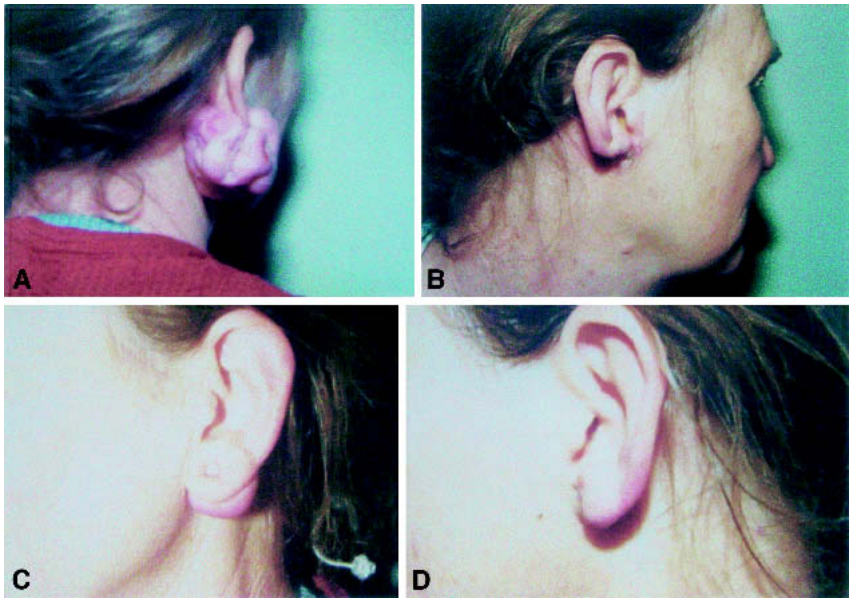

Fig. 4. (A) The patient had been previously treated and was seen with a huge auricular keloid on the right earlobe. **(B)** After excision, the earlobe was reconstructed with a preauricular flap. However, steroid injections and pressure application caused tissue atrophy on that side. But the patient found the result successful in the second year after treatment. **(C)** Earlobe keloid on the left side of same patient. **(D)** The result was promising in the twenty-fourth month. [Reprinted with permission from Aköz, T, et al.: Combined approach to the treatment of earlobe keloids. (Letter) *Plast Reconst Surg* **101:**857–858, 1998.]

therapy is another therapy of choice, often combined to surgery. Wagner et al. reported 82.4% recurrence free response rate in male and 71.8% in female by radiation combination therapy [31]. Besides this, they did not find a correlation between success rates or recurrence rates and total doses, but they found that there was correlation with etiology and localization. Patients with keloids in the region of face and neck had a response rate nearly 100%. In contrast, the thorax had a 51% rate and keloids resulting from burns had a poorer outcome than keloids developing surgical intervention and trauma. But the hazards of this therapy (such as atrophy, lack of growth, and increased incidence of malignancy) limit its usage in contrast with our technique [5]. Cohen and McCoy strongly recommended that radiation therapy should be used only in treating keloids in the elderly and when all other methods have failed [8]. Intralesional injection of corticosteroids is one of the mainstays of keloid treatment. Corticosteroids are believed to act by decreasing the level of collagenase inhibitors, thereby increasing collagen degradation [7]. The preferred drug is triamcinolone acetonide with dose of 20–40 mg/ml as we used in our study [29].

Although success rates increase with combination of two treatment modalities, an expected rate can not yet be obtained. Even the success rate of the most popular two-treatment modality, which is combination of surgery and triamcinolone acetonide injection, shows great variation across different studies and most of them are not satisfactory [20].

Our study consists of four treatment modalities. Surgery was used for excision of keloid. In order to prevent recurrence, triamcinolone acetonide injection and silicone gel sheeting pressure by clipped earrings were applied. The reason for the early application of triamcinolone acetonide in our study is the anti-inflammatory effect of this substance has, which decreases fibroblast and collagen release [14].

Another treatment modality is silicone gel sheet application. Various theories have been proposed over the years as to mechanism of action for how pure silicone gel sheets act to reduce keloids. Early investigations revealed the silicone gel sheets had no effect with regard pressure, change in scar temperature, or oxygen tension within these scars [27,28]. A decrease in evaporative water loss, up to one-half of that of normal skin, was seen with the stratum corneum providing the fluid reservoir. The silicone gel sheet is impermeable to water and has been described as acting like stratum corneum, reducing homeostasis, decreasing any of the associated hyperemia and fibrosis, and thus leading to alteration, that is, flattening of the raised scar [12]. In the literature, silicone gel sheet is usually used directly on keloids without any combination with other methods as a therapeutic agent. When silicone gel sheet is used alone, two to three months, at least, should be allowed in order to obtain results [23]. This is an important disadvantage for this treatment modality.

It is shown that there is a role of hypoxia in hypertrophic scars and keloids and in scars treated with compression by the time oxygen tension becomes normal. Besides this, it is claimed that mechanical pressure changes glicoseaminoglican levels and capillary permeability during early phase of wound healing causing shortening in scar formation time. Furthermore, in other studies, an increase in collagenase activity has been reported because of pressure. Long term (4–12 months) pressure treatment has been successful in preventing abnormal scar formation after burns [1,3,16]. It can be said that collagen fibers reorient becoming parallel to the skin surface, and mature by pressure. Pressure also decreases condroitin sulphate levels which accompany abnormal scar formation and increases hyaluronic acid levels up to normal [27]. Due to these beneficial effects, pressure became a part of our treatment modality. But the most important disadvantage of pressure therapy is that it requires a long interval of application. If the therapy is ended prematurely, lesions may recur.

In conclusion, our treatment modality consists of four-treatment techniques (surgery, steroid injection, silicone gel sheeting, and pressure application). This means that it has all advantages of the mechanisms. Besides that it has synergism of the combinations. As a result of combination of different techniques, auricular keloids can be treated with almost 90% success rate without any side effects.

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