

CASE REPORT: Laser Assisted Earlobe Repair

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ABSTRACT

The increasing practice of ear piercing has resulted in more and more requests for ear lobe repairs in surgical practice. A variety of techniques have been described in literature for the correction of earlobe deformities. All involve surgical removal of the epithelium followed by different methods of suturing to close the tear and restore the earlobe architecture. Surgical incision or de-epithelialization results in relatively large post-operative scars counteracting the aesthetic effect of the procedure. We have aimed at evaluating an alternative approach to this first step of de-epithelialization with an ablative laser procedure, in order to minimize the extent of tissue removal, thus achieving more favorable aesthetic results. This paper reports on 5 cases of treatment of various ear lobe deformities, utilizing a 2940 nm Er:YAG laser (Dualis SP, Fotona). Efficient de-epithelialization can be performed using a combination of planar and fractional ablative Er:YAG short pulses, allowing for a fast healing process and comfort for the patient. This approach however still requires suturing of the wound edges to avoid bleeding and promote healing. Furthermore, laser excision combined with topical corticosteroid revealed to be successful in earlobe keloid removal.

Key words: earlobe deformity, earlobe tear, gauge piercing, keloid, Er:YAG.

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I. INTRODUCTION

Earlobe piercing is universally widespread, associated either with cultural customs or societal trends. Concomitantly to an increase in the piercing practice, there is an increase in patients with complications resulting from these procedures. Such complications may arise from wearing heavy earrings, incidental pull on the earring, but also due to poor piercing technique, and can vary from simple

elongated partial tear deformities to complete tears and hypertrophic scar or keloid formation. The most frequent deformities we meet in our practice are enlarged piercing holes resulting from long-standing use of heavy earrings, multiple holes, dilated ear lobules with large holes after gauge ear piercing, hypertrophic scars and earlobe keloids.

A variety of techniques have been described in literature for the correction of earlobe deformities, which mainly depend on the type and extent of the deformity (1-6). Generally, these methods involve surgical removal of the scar epithelium or damaged area and approximation of the fresh edges by various methods of suturing. The first partial earlobe defect treatment was reported by McLaren, who did a simple linear closure of the defect (1). Tan introduced the punch technique, whereby a punch biopsy instrument is used for excision of the epithelial margins before closing the deformity with a straight-line suture (2). Further methods were developed to prevent distortion of the lobe, such as the half Z-plasty (3) and complete Z-plasty (5). Vujevich and Obagi described the closure of partial clefts using a 'purse string' repair technique, whereby the margins of the defect are de-epithelialized and sutures are placed in a purse-string manner through the defect margins and tied (6). Healing time using the described methods varies from 4-6 weeks. Complications are infrequent and usually minor. Nevertheless, the surgical site should be monitored and appropriately managed for possible infection, hypertrophic or depressed scarring, keloids, notching, flap necrosis, wound dehiscence and bleeding (7, 9). In order to avoid extensive excisions and thus minimize the probability of such complications, we have evaluated here a laser assisted method for earlobe repair.

Cold ablative laser treatment using a 2940 nm Er:YAG laser (Dualis SP, Fotona) has been used for the first step of de-epithelialization avoiding the need for surgical resection. 5 cases with different earlobe defects are presented. The method is completely painless and comfortable for the patient since no bleeding occurs and wound healing is accelerated.

II. CASES

a) Case 1

The first patient presented with an elongated tear in the left ear lobe, occurring as a consequence of long-term wearing of heavy earrings and chronic inflammation (Fig. 1a). Following application of 4% Ultracaine, treatment with Er:YAG laser (Dualis SP, Fotona) was performed inside the tear, on the tear margins (1 cm) and on the inner side at the periphery of the auricle. The R04 handpiece was used with 700 mJ energy, short pulse and 15 Hz frequency. Using these settings 4 to 5 passes were made to reach the deep epidermal layer, i.e. until the appearance of a yellowish coloring of the skin, but without reaching the papillary layer. Wound edges were sutured with Ethilon 6.0 sutures, as shown in Fig. 1b. At day 7 post-treatment, the tear was completely closed (Fig. 1c). Fig. 1d shows the results at 2 years post-treatment. Re-piercing was possible on the repaired earlobes.

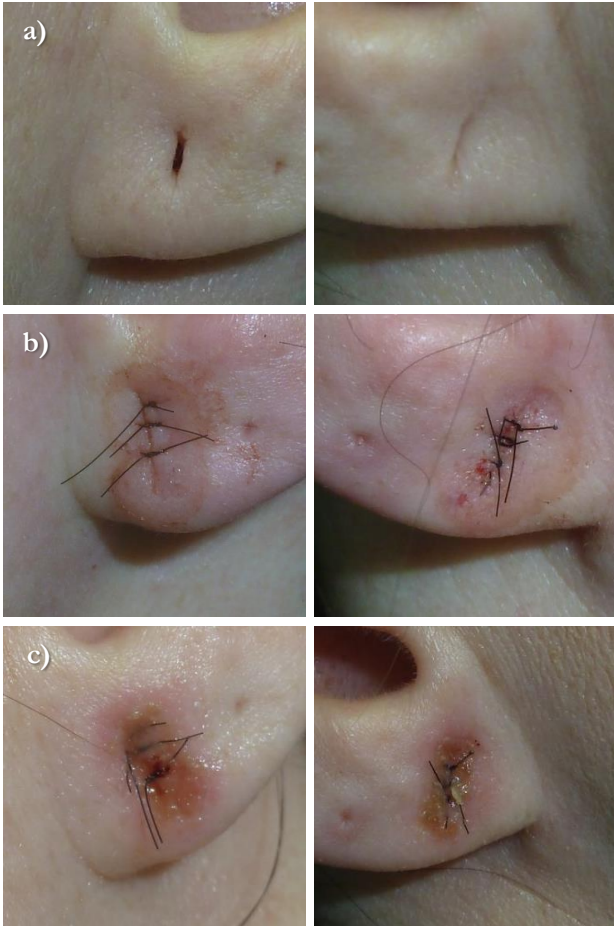
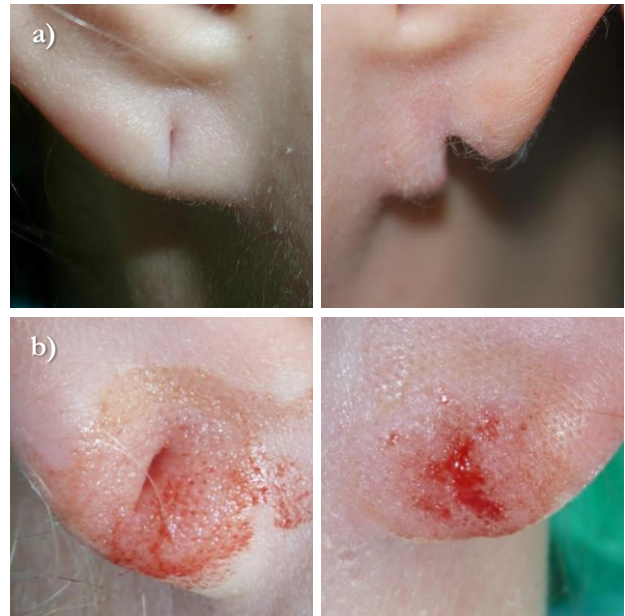


Fig. 1: a) Large hole in the left ear lobe and an elongated hole with closed ends and a trace of an additional piercing in the right ear lobe before treatment; b) after laser treatment wounds were sutured using Ethilon 6.0 sutures; c) earlobe repair at day 7, before suture removal, and (d) at 2 years post-treatment, when elongated partial tears were completely healed. New piercing holes are visible.

b) Case 2

The second patient presented with an enlarged partial tear in the right earlobe and a complete tear in the left earlobe (Fig 2A). Following injection of local anesthetic, laser treatment was performed in the right earlobe with Er:YAG laser (Dualis SP, Fotona) inside the tear and behind the ear lobe with short pulse at 700 mJ energy, performing 4 to 5 passes, and an additional treatment over the whole surface with a PS02 handpiece with 5.0 mm spot size, short pulse, 700 mJ energy (Fig 2b). The wound edges were sutured with Ethilon 6.0 sutures. The same approach was applied to the left ear lobe. 14 days after treatment both earlobes were cured, as seen in Fig. 2c.



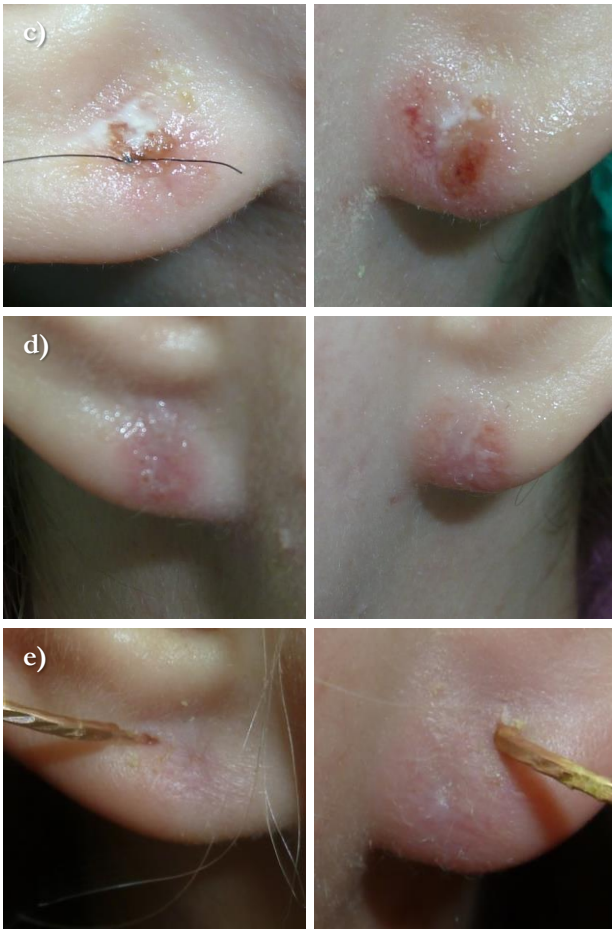


Fig. 2: a) Enlarged hole in the right earlobe and complete tear in the left earlobe; b) right and left earlobes after laser treatment; c) right earlobe before suture removal and left earlobe directly after suture removal; d) right and left earlobes at 14 days post-treatment; e) right and left earlobes at 2 months post-treatment.

c) Case 3

The third patient presented with an elongated tear in the left earlobe (Fig 3a). The same procedure as in Case 2 was used and a completely closed tear and healed earlobe could be observed at day 30 post-treatment (Fig. 3c).



Figure 3: a) Elongated hole in the left earlobe; b) anterior and posterior view of the left earlobe after suture removal; c) completely healed and re-pierced earlobe at 30 days post-treatment.

d) Case 4

The fourth patient presented with an earlobe tunnel defect as a consequence of large gauge piercing (Fig. 4a). Laser treatment was performed using the same settings as in Case 2 and suturing was performed on the anterior aspect of the lobule (Fig. 4b). Using this method a good aesthetic result was obtained without excision of the lobe. Fig. 4c shows the tunnel defect repair at 14 months post-treatment with minimal scar formation which could have been repaired with an additional Er:YAG treatment. However, due to the patient's satisfaction with the repair result, this was not performed.

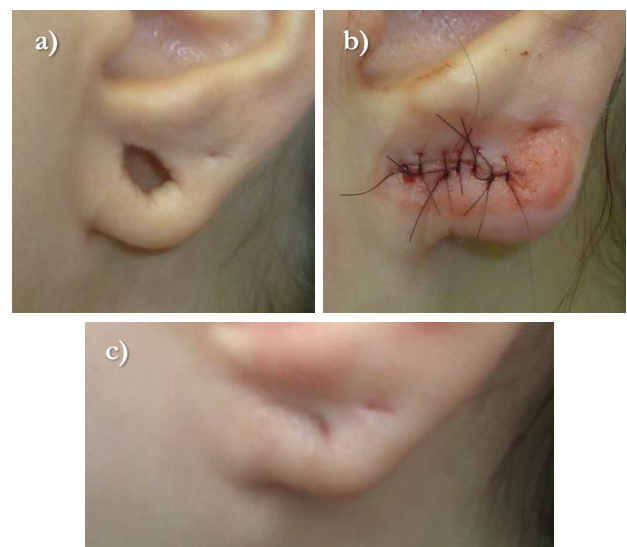


Figure 4: Tunnel earlobe defect in the left earlobe before (a) and after (b) repair; c) left earlobe 14 months after repair.

e) Case 5

The fifth patient presented with keloids at both earlobes (Fig. 5a). The treatment included laser dissection of keloids using Er:YAG laser (Dualis SP, Fotona) with a R04 handpiece, 400 mJ, frequency 20 Hz, micro short pulse, followed by additional ablation step (same handpiece, 700 mJ, 15 Hz, short pulse). After 14 days Diprosan injection was applied. Excellent aesthetic results were obtained with no recurrence at the 2-year follow-up.

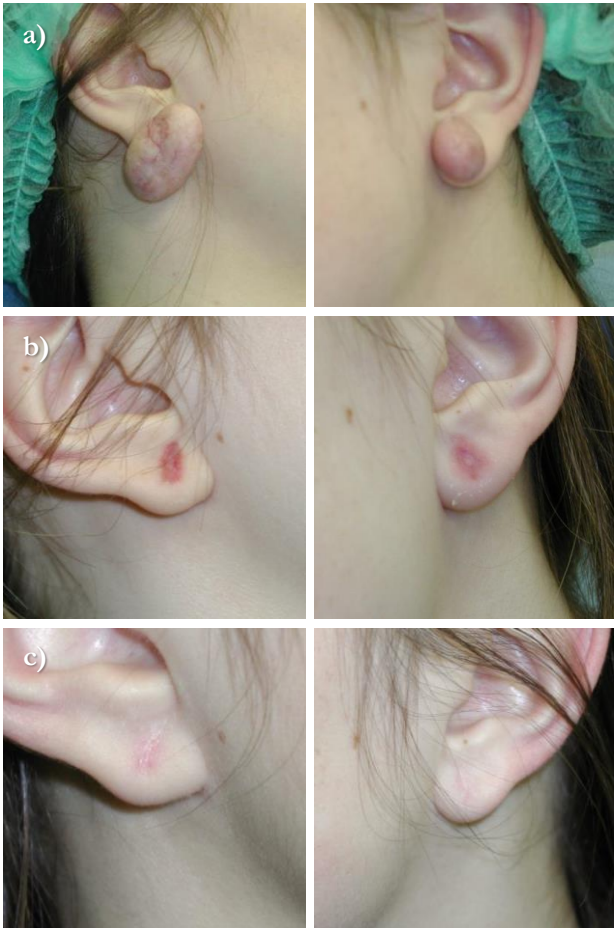


Fig 5: a) Earlobe keloids present on right and left earlobes; b) complete removal of the keloid 2 months after treatment with Er:YAG laser followed by 2 injections of Diprosan; c) no recurrence of keloids at 2 years post-treatment.

III. DISCUSSION

The number of patients requesting correction of earlobe deformities as a consequence of piercing is increasing. Standard treatment of earlobe deformities involves surgical removal of the scar epithelium or damaged area and approximation of the fresh edges by various methods of suturing. Radiofrequency and CO₂ laser treatment have been reported, too (9, 10, 11). We report here on the treatment of five cases of different earlobe deformities using laser Er:YAG laser (Dualis SP, Fotona). For elongated partial tears or complete

tears, the most successful method was the combination of planar and fractional laser treatment of the deformity and of the 1 cm margin, followed by suturing of the fresh edges. The PS02 handpiece allows a minimally ablative, fractional treatment effect to the basic Er:YAG ablative treatment regimens, resulting in the decreased healing times seen in Cases 2-4.

For larger defects, such as dilated ear lobules after gauge ear piercing, earlobe reconstruction may be performed by creating flaps, the mobilization of the dermal layer, separating it from the hypodermis and closure of the large hole, including reconstitution of the pre-piercing lobule architecture. Reported methods usually recommended conversion of partial tears to complete tears before attempting closure, however, this may lead to scarring on the margins. We have obtained adequate functional and cosmetic results with the combination of planar and fractional laser treatment before suturing without the need to form a complete tear of the lobule.

To improve wound healing following laser treatment, PRP (platelet rich plasma) ointments may be applied as well as silicone adhesives in the phase of the fibrotic tissue formation.

Keloid formation is a relatively rare complication of ear piercing, however, due to high recurrence rates, ranging from 50% to 100% following surgical excision without adjuvant therapy, this complication may remain permanent (12). Standard treatments therefore consist of excision of the keloid and adjuvant therapy, most commonly corticosteroid administration (e.g. Diprosan) and radiotherapy. We have obtained excellent results using Er:YAG laser excision followed by 2 injections of Diprosan, with no recurrence at 2-year follow-ups. Carbon dioxide laser ablation of earlobe keloids has been reported, however, recurrence rates at one year were unacceptably high, i.e. from 30-95% (13, 14). A more recent case report has shown good aesthetic results with carbon dioxide laser without recurrence at relatively short follow-up, i.e. 6 months (10). Based on our results the combination of Er:YAG laser treatment followed by adjuvant Diprosan administration seems to be a promising combination.

The settings of the Er:YAG laser used in the presented cases, combined with the VSP (Variable Square Pulse) technology incorporated in Fotona's Er:YAG laser, allow for very precise cold ablation of the skin with very little thermal conduction. This in turn results in short recovery times and excellent aesthetic results that can be successfully applied in earlobe repair procedures.

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