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Reduction of the Volume and Wrinkles under the Eyes using Non-Ablative 2940 nm Er:YAG Laser on the Lower Eyelid Palpebral Conjunctiva

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ABSTRACT

Reduction or elimination of rhytides and excess volume in the periorbital region is one of the most sought after treatments for periorbital rejuvenation. Treatments that offer less or no downtime and faster return to a patient's everyday routine have become the norm. The aim of this study is to present a novel method where a super-long, non-ablative mode of Er:YAG (2940 nm) is used over the lower eyelid conjunctiva. The study included 30 patients with skin type III to VI. It is a zero downtime procedure with 87% of patients being satisfied in this study. The average pain VAS score was 2 (at 0-10 scale). Additional studies on larger pools of patients of different ethnicities are needed to determine the long-term effectiveness of this novel method.

Key words: eyebags, trans-conjunctival, wrinkles.

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I. INTRODUCTION

The periorbital region plays an important role in overall facial appearance and is one of the first areas to reveal signs of ageing. The eyes in particular are often used as an immediate gauge of chronological age. Consequently, there are many different treatment modalities currently available for use or undergoing clinical investigations. The main targets of the treatments are improvement, if not elimination, of rhytides and replacement of lost volume or removal of excess volume in what is known as the tear trough region. Other characteristics of ageing skin include rough, leathery and uneven skin texture, changes in pigmentation and dryness. [1] Histologically, dyskeratotic keratinocytes are present with evidence of epidermal atrophy and flattening of the dermo-epidermal junction.[2] The delicate nature and very important function make the region around the eyes difficult to treat. Eyelid skin is the thinnest in the body, with the epidermis measuring only 0.04 mm. [3]

Anatomical factors, patient demand for minimal downtime procedures and new advancements in aesthetic and laser medicine have changed the treatment trends in recent years. Nonsurgical and minimally invasive procedures have become first-line treatment options because they offer less downtime and faster return to a patient's everyday routine. Treatments that are commonly used today include topical therapies, chemical, mechanical or laser resurfacing techniques, use of fillers, neuromodulators and radiofrequency devices. [4] However, in some cases these treatments produce unwanted adverse effects such as dyspigmentation, pain or a long recovery time. Therefore, a novel treatment method to reduce the wrinkles and reshape the tissue below the eyes may be needed.

This study presents a unique treatment option using non-ablative Er:YAG (2940 nm) SMOOTH mode and a trans-conjunctival approach that has not been tried before to our knowledge. The treatment tightens the periorbital skin below the eye, which results in wrinkle and eye bag improvement.

II. MATERIALS AND METHODS

Data was retrospectively collected from the records of 30 patients that were treated at our clinic (Oracle Dermatology Clinic, Cheonan, Korea) between September 2014 and January 2015. The patients' age was from 28 to 68 with a mean of 48 years, consisting of 4 males and 26 females with phototypes ranging from III to VI (see Figs. 3, 5). All patients were seeking the reduction of volume and wrinkles in the area below the eyes. All patients provided written informed consent for treatment. No patients had any previous treatments to the periorbital area.

The Variable Square Pulse Er:YAG laser (SP Dynamis, Fotona, Slovenia) was used with a non-ablative pulse (Fotona SMOOTH®) mode with patterned handpiece (PS03) and spotsize of 7 mm. The lower eyelid was everted and laser light was applied to the presented lower palpebral conjunctiva that is normally hidden from sight (when the eyelid is not everted). Therefore, this kind of approach allowed us to

affect the target tissue in the area below the lower eyelid while still offering minimal downtime.

We used topical anaesthetic eye drops (Alcaine 0.5%, Alcon-Couvreur, Belgium); 1 drop was applied in each of the eyes immediately before inserting the metallic intraocular shields that protected the patients' eyes. Another drop was applied in each of the eyes after placement of the shields. If the patient felt uncomfortable during the treatment, we reapplied the eye drops.

Treatment consisted of 12 non-overlapping passes with increasing fluence from 3 to 4.5 J/cm2 and number of stacks from 2 to 5. Frequency of 1.8 Hz was used. Same protocol was used for all patients, 3 treatments with 2-week intervals were performed. There was no clinically evident endpoint of the treatment and no specific post-treatment; the patients were encouraged to use high quality moisturizer.

High resolution photographs were taken before and after each session and 1 month after the final session. The photographs were then evaluated and graded by an independent investigator on a five point scale: I (no improvement), II (minor improvement, <25%), III (moderate improvement, 26%–50%), IV (marked improvement, 51%–75%) and V (very significant improvement, 76%–100%). Patients were also asked about discomfort, potential adverse effects and their general satisfaction with the treatment (dissatisfaction, moderate, good or excellent). Patient tolerability of the treatment was also evaluated on a pain Visual Analog Scale (VAS; 0 to 10).

III. RESULTS

The treatment had no downtime; minimal oedema was observed in some of the patients for up to a week. Some of the patients reported foreign body sensation in the eyes for a day or two. There is no specific post-treatment needed; patients are encouraged to use high quality moisturizer.

The improvement was graded after the 3rd session as very significant in 14% (4 patients), marked in 30% (9 patients), moderate in 43% (13 patients), minor in 10% (3 patients) and there was no improvement in 3% (1 patient). Satisfaction scores according to the age group are seen in Table 1. Overall, 2 patients (7%) evaluated the results as excellent, 11 patients (37%) as good, 13 patients (43%) as moderate and 4 patient (13%) were not satisfied with the outcome. The highest VAS score was 4 (2 patients, 7%), but most of the patients scored their pain level as VAS 2 (14 patients, 47%). All VAS scores are shown in Table 2.

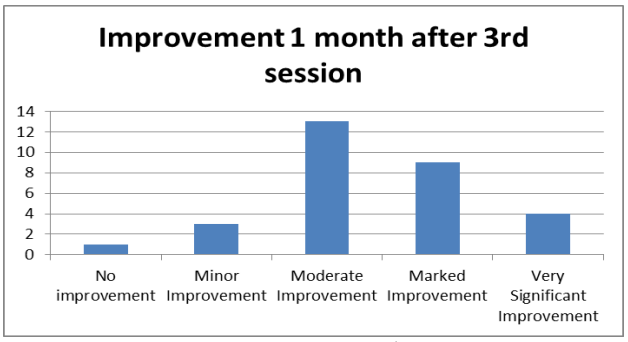

Fig. 1: Improvement 1 month after 3rd session

Table 1: Patient satisfaction

	N
Dissatisfaction	4
Moderate	13
Good	11
Excellent	2

Table 2: Pain level (VAS)

VAS score	Number of Patients
0	3
1	7
2	14
3	4
4	2
5	0
6	0
7	0
8	0
9	0
10	0

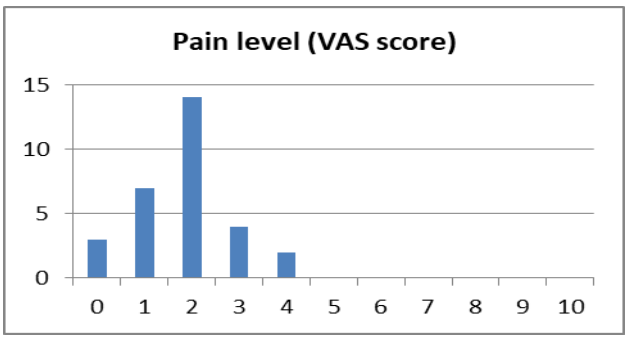

Fig. 2: Pain level on 10-point Visual Analog Scale (VAS)

IV. DISCUSSION

There is a variety of treatment options that can be used for periorbital rejuvenation including invasive surgical procedures like upper blepharoplasty – with downtime of about 2 weeks – and/or lower blepharoplasty with about 3 weeks of downtime. There are also less invasive treatment options such as different chemical or laser peels that have variable downtime depending on the chemical or parameters used, as well as

botulinum toxin or filler injections that offer the shortest downtime [1,4–6]. The fast pace of modern life is increasing the demand and need for procedures that are even less invasive and therefore have no or minimal downtime. To successfully navigate through all of these treatment options and offer the patient exactly what they want in terms of effect and downtime, proper patient selection and assessment of aging severity is crucial.

This paper demonstrates the use of a novel method with zero downtime and a high satisfaction rate. The method is appropriate for patients with a low or moderate grade of aging severity and excess volume in the periorbital area. The procedure is done using a unique super-long nonablative mode of Er:YAG laser; i.e. Fotona Smooth®. This mode enables gentle heating of the conjunctiva and underlying tissue (inferior orbital septum and orbital/postseptal fat pads) without any significant ablation of the superficial layers. The procedure offers zero down time because only the lower palpebral conjunctiva – hidden from sight when not everted – is directly exposed to the laser light. A trans-conjunctival approach, where conjunctiva is cut or punctured, has been used before by surgeons [7,8] but as far as we know this is the first time laser light was applied through the intact lower palpebral conjunctiva.

According to the results this treatment reduces the volume of eye bags and the severity of wrinkles below the eye with high efficacy (see Fig. 4, 6). Only 13% of the patients were not satisfied with the treatment and almost none experienced discomfort during the treatment; the average pain VAS score was around 2. The procedure truly is a lunch break procedure that enables patients to return to their daily routine immediately after a short stop in the clinic. The study also demonstrated the safety of this therapy, since none of the patients experienced any long-lasting side effects. A few of the patients reported a feeling of foreign body sensation, which resolved in a few hours and was related to the use of the intraocular shields and not the effect of the laser itself.

All the patients in the study were Asian, so the efficacy in other populations should be determined in additional studies. Future studies should also include a control group and have a longer follow up to determine the appropriate time for a touch-up procedure.

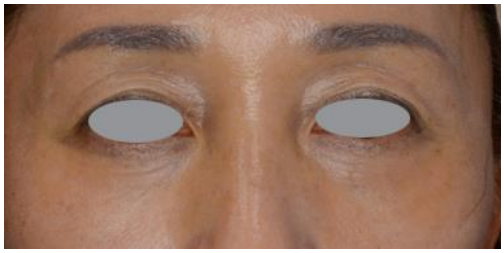

Fig. 3: Female patient before the treatment

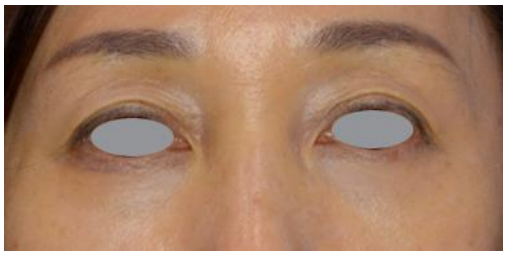

Fig. 4: Female patient after 3rd treatment

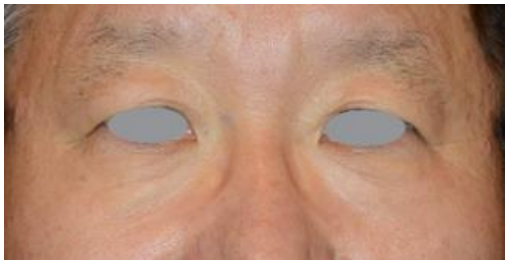

Fig. 5: Male patient before the treatment

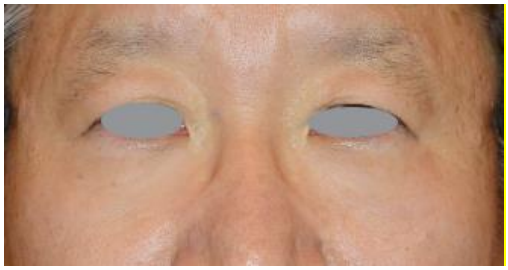

Fig. 6: Male patient after 3rd treatment

REFERENCES

1. Glaser DA, Patel U. Enhancing the eyes: use of minimally invasive techniques for periorbital rejuvenation. J Drugs Dermatol. 2010 Aug;9 (8 Suppl ODAC Conf Pt 2):s118-28.
2. Lavker RM. Cutaneous aging: chronologic versus photoaging. In: Gilchrest B, editor. Photodamage. Cambridge: Blackwell Science Inc.; 1995. p. 123–31.
3. Ackerman A. Embryologic, histologic and anatomic aspects. In: Ackerman A, editor. Histologic Diagnosis of Inflammatory Skin Disease. 2nd ed. Baltimore: Williams and Wilkins; 1997. p. 3–56.
4. Glaser DA, Kurta A. Periorbital Rejuvenation. Overview of Nonsurgical Treatment Options. Facial Plast Surg Clin North Am. 2016;24(2):145–52.
5. Manaloto RMP, Alster TS. Periorbital rejuvenation: A review of dermatologic treatments. Dermatologic Surg. 1999;25(1):1–9.
6. Rostami S, Torre J de la. Blepharoplasty, Lower Eyelid. [Internet]. Treasure Island (FL): StatPearls Publishing; 2017.
7. Ed FRCS. Extended Transconjunctival Lower Eyelid Blepharoplasty with Release of the Tear Trough Ligament and Fat Redistribution. 2017;273–82.
8. Zhang Y, Zhang L, Sun X, Zhu Y, Jin R, Sun B, et al. Evaluation of lower blepharoplasty treated with the SmartLipo 1064-nm system and its clinical implications: A retrospective review. J Cosmet Laser Ther. 2016;18(7):376–80.