

Case Article,

1470 Nm Diode Laser Effectiveness in Facial Fat Reduction with the Endolifting Technique: Pilot Study

Layla Dias¹, Denise Almeida², Fábio dos Santos Borges³, Clarissa Bravin⁴, Sonia Cruz⁵, Priscila Caruso⁶, Derby Almeida⁷, Carin Bogado⁸

¹Tereza Scardua Institute, São Paulo – SP, Brazil.

²Almann Clinic, Minas Gerais-MG, Brazil.

³Postgraduate, Fisepe College, Passo Fundo-RS, Brazil.

⁴Postgraduate, UNIFESP University, São Paulo-SP, Brazil.

⁵Sonia Sten Clinic, Rio de Janeiro-RJ, Brazil.

⁶Facelift Clinic, São Paulo-SP, Brazil.

⁷Sorrider Clinic, Goiás-GO, Brazil.

⁸Carin Bogado Clinic, Rio Grande do Sul-RS, Brazil.

Abstract:

Introduction: Endolifting technique, also known as Endolaser or Endolift, consists of using a laser beam with a wavelength of 1470 nm emitted through an optical fiber inserted into the subdermal tissue in order to reduce subcutaneous fat and tone the skin through the intense production of collagen.

Objective: This study aimed to collect preliminary results about the effectiveness of the 1470 nm diode laser in reducing facial fat with the endolifting technique.

Material and methods: 10 patients were assisted with just one endolifting session, where the mandibular and submental regions were treated. It was by using 400 micron optical fiber, power ranging from 4 to 8 W, in continuous mode. After the procedure, patients were instructed to remain with a bandage on the treated area for 4 days and. Then, after this period they received 4 sessions of manual lymphatic drainage, which was performed once a week.

Results: After treatment and reassessment at the end of 60 days, it was noticed a clear decrease in fat in the cheeks, as well as in the submental region. Also, the skin where the jowl fat was removed underwent intense retraction, as it was seen a decrease in flaccidity and wrinkles.

Conclusion: It was concluded that the endolifting technique is extremely effective in promoting the reduction of unsightly subcutaneous fat on the face and neck, as well as indirectly intervening in the skin to promote rejuvenation to varying degrees. Likewise, this technique can be attested as a safe method due to the absence of complications or interurrences throughout the care and follow-up of patients after treatment.

Key-words: endolifting, endolift, endolaser, localized fat, rejuvenation, skin sagging, wrinkles.

Introduction:

Nowadays, many people have complained of excess fat in regions of the face, mainly associated with aging. For example, the adipose tissue present in the cheeks has six extensions distributed throughout the regions of the masseter, the superficial and deep temples, the pterygomandibular, sphenopalatine and inferior orbital regions. And, it is structured as an adipose mass located between the masseter and buccinator

[1]. Although this adipose structure has histological similarity to some regions of body fat, the adipose tissue located on the cheeks normally does not undergo a decrease in volume due to body metabolism. In some people, accumulating this type of localized fat can give to face a more rounded appearance, showing facial disharmony [2].

Even though liposuction is one of the most popular surgical treatments for reducing body

subcutaneous fat, when on the face, the surgeon finds some limitations for being successful in this kind of surgery. Such difficulties are due to the segmentation of adipose tissue into superficial and deep compartments and the presence of noble structures in intimate touch with adipose tissue. In addition, postoperative recovery and possible complications have led some clients to seek treatments with lower cost, short recovery time and, mainly, minimal risks [3]. Thus, the use of lasers to remove adipose tissue has been noted in recent years through reports explaining use of equipment being utilized in a non-invasive [4, 5] or minimally invasive way [6, 7].

Lately, the 1470 nm wavelength laser has started to be actively used in surgical procedures. Laser equipment with a wavelength close to 1500 nm has its absorption in water as a predominant characteristic generating specific biological effects. These lasers are water-absorbable or water-specific and are mainly used in urology and for endovenous obliteration of veins [8]. However, authors reported that the 1470 nm diode laser is able to deeply penetrate into tissues due to its high affinity for water and also acting on fat. All due to it is understood that the richer a tissue is in water and fat, the better it will be. the transmission of this kind of laser and the smaller its dispersion [6]. Therefore, using 1470 nm wavelength in non-surgical endolifting procedures has become very common nowadays.

The possibility of applying 1470 nm laser radiation for clinical interventions in other medicine areas such as those seeking aesthetic results in the reducing unsightly fat, has already been reported by some authors since the early 2000s [9-11].

Endolifting technique is based on the concepts initially reported as endolaser [10, 12] or endolift, [3-7] and consists in using a laser beam with a wavelength of 1470 nm emitted through an optical fiber inserted in the subdermal tissue to reduce subcutaneous fat and tone the skin through neocollagenesis.

Since this technique is a minimally invasive procedure, has still a quick recovery and no period out of from work activities, it has become popular in recent years and also becoming spread in several places where aesthetic treatments are performed. Based on that all, this study aimed to collect preliminary results about the effectiveness

of the 1470 nm diode laser in the reduction of facial fat, with the endolifting technique.

Material and Methods:

Patient Selection

Fifty patients, men and women over 18 years of age, complaining about loss of facial contouring were selected for the study. As inclusion criteria, patients with mild to moderate flaccidity and/or increased adipose tissue in the mandibular and/or submental region were admitted. Written and verbal informed consent was signed by each of the study participants. Patients excluded from the study were those who: a) showed a trace of sensitivity to lidocaine; b) pregnant or lactating women; c) patients with a decompensated disease or undergoing medical treatment; d) cardiac or immunological problems; e) diabetes; f) cancer background or; g) with any synthetic material on the face or neck such as metallic implants or non-absorbable filler.

Study design

Patients were treated with the DELIGHT 1470 equipment (VYDENCE Medical), consisting of a diode laser with a wavelength of 1470 nm, delivered through an optical fiber introduced under the skin through holes made in the region to be treated.

All patients received only one endolifting session for treating the mandibular and submental regions using 400 micron optical fiber, power ranging from 4 to 8 W, in Continuous mode. After the procedure, patients were instructed to remain with a bandage on the treated area for 4 days and, after this period, they received 4 sessions of manual lymphatic drainage which were performed once a week.

Treatment

Patients were treated at the outpatient clinic of the Hospital Blanc located in São Paulo-SP, Brazil. Before treatment, they received an initial assessment using the following assessment methods: photographic images in frontal position (at 45°) and profile, (A73 camera, 50mm 1.8 lens, made by Sony); ultrasound (linear ultrasound b23a, Onetech); adipometry (Innovare4, Cescorf); and satisfaction survey based on the Likert Scale [13] as follow: 1- totally dissatisfied; 2- dissatisfied; 3- neither satisfied nor dissatisfied; 4- satisfied; 5- fully satisfied.

All patients received 1 tablet of Toragesic sublingually 30 minutes before the procedure.

For the treatment, the skin region to be treated was cleaned up receiving asepsis with 70% alcohol, and then was appropriated highlighted to indicate the place of introduction of the optical fiber for laser irradiation. For this, diagrams were drawn in the form of a “fan” with the vectors about 1-2 cm

apart (Figure 1). Then an anesthetic button was applied at the convergence point of the vectors using Xylestesin with a 2% vasoconstrictor, in order to allow the creation of the orifice, by using a 30 G orifice needle.



Figure1. Highlight of the necessary vectors for signaling the direction of the optical fiber movements.



Figure 2. Practical endolifting procedure in the submental region where the guide laser beam can be seen (wavelength in the red spectral range) indicating the location of the optical fiber end.

After creating the orifice, a 22G/50mm cannula was introduced to create the fiber optic channels for passing and introducing the anesthetic (0.1 ml of Xylestestin with 2% vasoconstrictor) toward each vector. Still with the laser off and after anesthesia of the entire target area, the optical fiber was introduced up to the distal limit of the vector drawn on the skin. After, laser was turned on and the optical fiber was slowly removed from the subdermal region. Three to six turns were performed with the laser turned on (Figure 2).

After the entire region had been irradiated with the laser, massage handling was performed in order to drain the emulsified fatty tissue through the orifice. Then, asepsis of the entire treated region was performed and a bandage with 50mm micropore, manufactured by 3M was applied.

After treatment, patients were followed up for 4 months and during this period they were reevaluated twice. First, just after the second month of treatment, and the other, at the end of the fourth month. As a methodology for reassessing the results, the same resources employed in the pre-treatment assessment were used, and additionally, patients had to respond to the satisfaction survey.

Results and Discussion:

This pilot study was based on reported results from 10 patients after a single endolifting procedure.

After treatment and reassessment at the end of 60 days, it was noticed a clear decrease in cheeks fat, as well as in the submental region. Also, the skin where the jowl fat was removed underwent intense retraction being possible to notice a decrease in flaccidity and wrinkles.

Authors [3,4,7] attested the action of laser through the optical fiber in the reduction of the subcutaneous tissue located on the body and face for aesthetic purposes. By the biometric analysis, Nilforoushzadeh et al [4], showed the effectiveness of endolifting for fat reduction in the submental region.

Corroborating these findings, in the anthropometric analysis (adipometry) from this study, it was measured the central crease of the double chin three times to obtain the mean measure of the crease in this region, and was

found an average reduction of 9,57 % in the subcutaneous tissue regarding treated patients.

Ultrasonographic analysis proved the results verified in the adipometry, as it was verified an average reduction of 10,05% of the fat in the submental region. In figures 3 to 5 it may be seen this punctual effect through the decrease in the volume of the double chin.

Although the wavelength of 1470 nm has preferential absorption by water, results found in this work are also justified by studies which used this wavelength in the surgical lipolaser technique and showed great action in the treated fatty tissue [11, 14, 15].

Autores [16, 17] identificaram um aumento da espessura da derme pós-Endolifting. María & Oscar [16] relataram que o aumento da espessura da derme foi caracterizado na imagem ultrassonográfica por trabéculas mais espessas, e que houve aumento da espessura da hipoderme, identificado pela imagem de trabéculas onduladas entre as células adiposas com aumento de espessura tecidual. Alguns autores relataram que o aumento da espessura da pele se manteve por pelo menos 6 meses após o tratamento com Endolifting.

Authors [16, 17] identified a rise in the thickness of the post-endolifting dermis. María & Oscar [16] reported that the increment in the thickness of the dermis was characterized on the ultrasound image by thicker trabeculae, and that there was also an raise in the thickness of the hypodermis, identified by the image of wavy trabeculae between the adipose cells with increased tissue thickness. Some authors reported that the increase in skin thickness was maintained for at least 6 months after treatment with Endolifting.

Results presented by this clinical experiment showed through ultrasound imaging, that there was an increase in skin density and thickness. The mean increase in skin density was 12.38%, and in thickness was 2.61%.

The results of increased dermal thickness and density, as well as localized fat reduction, may justify the high level of patient satisfaction of 90%, seen through the Likert Scale. This is corroborated by the reports of some authors who attested the satisfaction of treated patients when observing an improvement that varied from 91% for wrinkles and 90% for skin tone [4]; however,

other authors [17] found 100% improvement in their patients.

Patients' satisfaction is also justified by the improvement in the aesthetic aspect identified in the photographs taken before and 60 days after the treatment. To assess this enhancement, it was used the Merz Scale which is a proved and globally accepted tool for adequate assessment of volume loss in the middle third of the face: infraorbital cavity, upper and lower cheek filling, and nasolabial lines [18].

Aiming to analyze the effects of post-treatment rejuvenation, it was used Baker's Classification as a basis [19] which described the aspects of facial and neck aging, associating the age group, in order to classify their patients who were possible candidates for SMA Sectomy, separating them into: ideal, good, fair and poor candidate.

In this pilot study, after treatment with endolifting, it was evaluated the result of rejuvenation through photographs of patients based on the Merz Scale [18] and Baker's Classification [19].

In the patient showed in figure 3, after treatment it was noticed a smoothing of the nasolabial folds from 2 to 1, of the cheeks from 3 to 1, as well as a drop in the corner of the mouth from 2 to 1 and improvement in the facial and mandibular

contouring. Also, significant reduction of double chin from 3 to 1 and an overall improvement in skin tone and elasticity.

In figure 4, after analysis patients' photos, it was identified that there was smoothing of the nasolabial folds from 4 to 3, of the cheeks from 4 to 3, corner of the mouth from 4 to 2, improvement of facial and mandibular contouring, and significant reduction of double chin from 4 to 3. There was also a whole improvement in skin tone and elasticity, as well as a significant reduction in facial volume.

In figure 5, it is possible to notice there was smoothing of the nasolabial fold from 4 to 3, and on the cheeks, from severely sunken it changed to moderately sunken. It was also noticed that in the corner of the mouth the assessment changed from moderate to a slight fall. Finally, it was also found that there was an improvement in the facial and mandibular contouring due to the significant reduction in the jowls and skin sagging. Those were quite flaccid, with apparent double chin and significantly marked jowls, changing flaccid skin and jowls to moderate (from 4 to 2). Still, there was also an overall improvement in skin tone and elasticity.



Figure 3. Result showing smoothing of the nasolabial folds and cheeks as well as the drooping of the mouth corner, improvement in facial and mandibular contouring, and a significant reduction in the double chin.



Figure 4. Result showing smoothing of the nasolabial folds, cheeks, mouth corner, improvement in facial contouring and mandibular contouring, and significant reduction in the double chin.



Figure 5. Result of nasolabial folds softening, reduction of the depression of the cheeks, softening of the drooping of the corner of the mouth, and improvement of the facial and mandibular contouring due to the significant reduction of the jowls and skin sagging, as well as the decrease volume in the jowls region.

Some authors [3, 20, 21] reported that no adverse effects or residual pain were reported by any patient during the use of this technique. In this work, there was no patient who was reached by important adverse effects during or after treatment with endolifting, but some of them reported hyperemia and discreet edema. This corroborates reports from studies [5, 6, 22] that identified only mild post-treatment edema and erythema solved within a few hours or within 3 days.

Conclusion:

Based on the preliminary results showed in this study, it is possible to concluded that the endolifting technique is extremely effective in

promoting reduction of unsightly subcutaneous fat on the face and neck as well as indirectly intervening in the skin to promote rejuvenation in different degrees. It is clear its contribution to promoting the improvement of the overall aesthetic appearance of facial and neck regions. In addition, this technique can be attested as a safe method due to the absence of complications or interurrences throughout the care and follow-up of patients after treatment.

In summary, these results are not conclusive; however express an important initiative in this field of study, in order to collect data which allow continuing studies with a larger sample of patients

and using the 1470 nm diode laser with the endolifting technique. Thus, seeking to promote an effective and safe alternative for treating facial aesthetic disorders especially those described in this pilot study.

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