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ENDOLIFT®
LUNCH-TIME LIFTING WITH NO DOWNTIME

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INTRODUCTION

More and more patients are demanding an outpatient procedure that can achieve the same, or similar results to a surgical lift, but not accompanied by the risks and potential complications associated with surgery. Until the beginning of the millennium, it was difficult to perceive achieving a good cosmetic result without undergoing surgery, but techniques such as botulinum toxin, thread lifts, radiofrequency or more recent ones such as the microfocalised ultrasound, have proved to be breakthrough treatments in achieving 'soft' lifting and rejuvenation. Only after the introduction of the last generation fiber lasers, we have been able to truly achieve excellent results, very hard to imagine in the years before. Following this trend of success, Endolift® represents an innovative technique which has been growing in popularity within the global market due to the fact that is a relatively simple and safe procedure which produces immediately visible results whilst also being reproducible and repeatable [1,2].

Buttocks lifting

Buttocks lifting

The procedure is a brainchild of Dr. Roberto Dell'Avanzato together with some of the top lasers experts, whom has developed and improved it since 2005, calling it "Endolift®". The name reflects the basic distinctive concept of the methodology; ENDO meaning 'internal' and LIFT 'to raise'. In such way, the technique aims to lift tissues within the skin, using an optical fiber as thin as human hair.

This fiber is inserted under the skin for the needed time in order to deliver the laser energy directly to the subcutaneous, without the need to cross the superficial layers of the skin (epidermis and dermis). This is one of the many advantages which the procedure has, compared to its counterparts such as radiofrequency or transdermal lasers, which deliver targeted energy through the skin's superficial cutaneous layers. This therefore undergoes dispersion of energy as well as causing increased pain. More recently some have attempted to convey energy through a micro-cannula, but with a much more invasiveness and risk than using a simple and thin fiber as with Endolift®.

Furthermore, over the last 20 years, various scientific papers have been publishing results of laser in liposculpture. Laser-liposculpture results were first shared by Apfelberg and colleagues[3] in 1994. Subsequently, in 2006, the American FDA demonstrated that approximately 50% of patients (n=2200) referred superior 'skin tightening' after laser-liposculpture treatment, than patients treated with traditional liposuction. The American FDA also established that, the laser, is more effective than other energies, such as radio frequency or ultrasound, in fat destruction and in the retraction of the skin[4]. In conclusion, it is well established in the literature, that it is possible to obtain excellent results with the primary aim of achieving skin remodeling and retraction, using laser energy [5-7].

Thanks to these findings, a specially manufactured optical fiber (FTF-fiber) was introduced in the market in 2005 from an Italian company based in Trieste (Italy) connected to a 808nm diode laser. In 2009 this optical fiber was adjoined to a 1470nm solid state laser creating a technique, Endolift® known as "Dr. Dell'Avanzato Technique", which can be performed without the use of anesthesia and with almost non-existent recovery time. With the use of the 1470nm, compared to the other wavelengths, less energy (Watt) is needed. This results in a higher tightening effect and a lipolytic effect, if needed, with a lower thermal risk, as Youn[8] showed in 2009.

The technique is nowadays used in different parts of the face and of the body giving safe, reproducible and proven results. The areas of skin laxity where Endolift® can be successfully performed include the following:

- *mandibular border and marionette lines*
- *double chin*
- *midface and naso-labial folds*
- *lower eyelids*
- *eyebrows*
- *neck*
- *inner arms*
- *abdomen*
- *inner thighs*
- *knees*
- *ankle*

Lower eyelid

Lower eyelid

MATERIALS AND METHODS

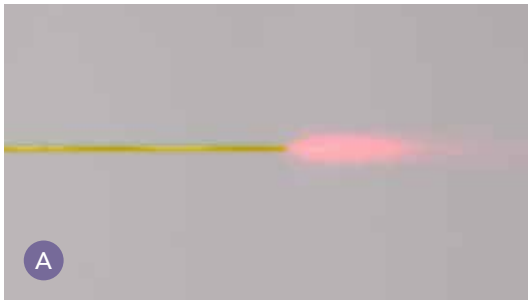
Dr. Roberto Dell'Avanzato, has 15 years of personal experience with the Endolift® procedure, and has successfully performed more than 15.000 procedures treating skin laxity of the face, the neck and the body. A 200 or a 300 micron FTF-fiber is used for the face and the neck while a 300, or a 400 or a 600 micron FTF-fiber is used for the body areas.
The fiber is easily inserted, without any incision or anesthesia, directly into the superficial hypodermis[9]. Once the fiber has been inserted into the correct plane which is represented by the superficial and medium hypodermis, the positioning of the fiber is identifiable due to a Light Emitting Diode (LED) that is visible through the skin. The fiber is moved throughout the intervention area in a fan-like pattern, delivering energy firstly in a retrograde then anterograde way, creating micro-tunnels oriented mainly along the anti-gravitational vectors.

The FTF-fibers can differ in caliber and emission type. The 200 micron fibers are used to treat the eyelids, whereas the 200 or the 300 micron fibers are used in the face and neck, reflecting the use of lower micron fibers in areas involving thin skin and adipose tissue or vice versa. The 300, the 400 or the 600 micron fibers are used to treat areas of the body where the skin is thicker and where fat deposits are more significant. In such parts of the body, radial emission fibers are also suggested.

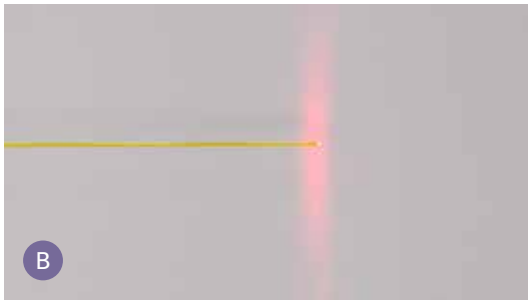
Endolift® is normally performed without anesthesia but, if treating particularly sensitive areas, an air-cooling system can be used as well as anesthesia at the choice of the operator. Only in selected cases, where the use of fibers of greater diameter is best, is it preferable to use local anesthesia with lidocaine. The infiltration of an anesthetic agent must never be excessive since a considerable amount of liquid penetrating the tissues can cause dispersion of heat and therefore alter the photo-thermal effect of the laser.

The use of local anesthesia, could on one side reduce the amount of pain perceived by the patient, but on another side decrease the visibility of the treatment as well as increasing the risk of nerve injury.

Post-procedure, the patient is able to immediately resume their activities of daily life. In our expercience there are no major cutaneous marks or signs, only a moderate erythema and oedema which naturally resolve in a few hours. We usually recommend that patients undergo sessions of lymphatic drainage commencing a few days post-procedure.



FTF Flat Fiber



FTF Ring Fiber

DISCUSSION

Endolift® remodels the collagen and stimulate the photobiomodulation of connective tissue, resulting in the 'skin tightening' effect. This method reduces skin laxity smoothening superficial wrinkles, resulting in an overall compaction of the skin which is immediately visible and that continues to progress over weeks, following the treatment.

When, in the area treated, there is also extra fat, changing the position of the fiber and the setting of the laser makes the selective absorption of the laser beam from the adipose tissue create the emulsification of fat. The laser acts simultaneously to this while working on the collagenous fibrous septa, which further results in skin retraction and tissue compaction.

The objective of the procedure is to achieve homogenization of overlying tissue within the area of treatment. The operator should feel resistance lessen throughout the procedure as well as a change in the texture and shape of the area itself.

During the procedure the skin surface temperature should never exceed 40° (this can be measured through an external thermal sensor). Treatments at this temperature result in no downtime for the patient. A multicenter research trial[10] aims to evaluate the results of this mini-invasive technique and demonstrate that mild-to-moderate excess fat and skin 'flabbiness' of the face, neck and body can significantly benefit from laser treatment. This helps to achieve skin remodeling, stimulate neocollagenesis and, if necessary, selectively reduce fat, resulting in an immediate, visible and long-lasting skin-lifting.

The peculiarity of the treatment is that it can be customized in relation to the imperfection which concerns the patient by varying parameters such as:

- the thickness of the optical fiber;

- the power or the flow of energy transferred through the optical fiber;

- the duration of the impulse; the flow in which the energy comes into contact with the tissue specified by the pulse emission time and the pause time;

- the depth to which the optical fiber is moved within the tissue (working more superficially results in a greater firming effect of the skin).

The quantity of Joules delivered in the treatment represents one of the indicators of the clinical end point. This should be a secondary end-point (with visual and manual changes being the first) and is mainly employed when treating sites where maintaining symmetry using the human eye alone may be difficult. Natural physiological differences between the two sides of the body must always be considered. In order to improve furthermore the texture and the tone of the skin, a non-ablative fractional resurfacing tool can also be used, connecting a fractional scanner (LIGHTSCAN) to the same device with a micro-spot of 200 microns. An important feature of this wavelength is the high coefficient of penetration into the tissue.

The wavelength of 1470nm penetrates deep into the dermis creating thermal columns. The average penetration exceeds 3-4 mm crossing the stratum corneum of the skin and interacting with the interstitial water of the deeper dermis. The final result is a rejuvenation of the skin, offering excellent synergy with Endolift® performed in the same session as one works from the outside while Endolift® from the inside [11-14].

The duration of the entire treatment depends on the size of the area and can vary from 15 to 45 minutes. Results are immediate, although the final result is visible after 2-3 months from the first treatment. Following these initial results, the tissue remodeling process becomes more evident even after 6 or 12 months.

The treatment can be repeated every 6 to 12 months, depending on the treated area, the amount of skin laxity and the patient's biology. There are no particular post-procedure contraindications and the patients can immediately return to their daily life.

Complications and their severity are usually assessed from both the patient's and the surgeon's perspectives. Most complications reported by the patient are perceived to be moderately bothersome and hence are inconsequential. When the fiber (mainly with medium/high caliber) enters into the skin with "emission ON", it can create a small superficial first-degree burn and cause skin redness. Both have a natural complete recovery of 7 to 15 days, eventually with the support of a soothing cream and sun-block 50+. Rarely, the procedure can create a very small vascular injury as a hematoma or a bruise, also with a complete solution of 7 to 15 days speeded with the support of heparinoid 0.3% w/w cream and sun-block 50+.

The most feared complication by both patients and doctors is the nerve injury. It rarely appears as: paresthesia (altered sensitivity), hypoesthesia (decreased sensitivity) or hyperesthesia (heightened sensitivity); very rarely dysesthesia (altered sensitivity associated with pain/sting) or neuropraxia.

These complications have a total solution time of an average 7 to 15 days, more rarely 1 to 3 months together with adequate therapy. Another possible complication, which was reported only in 3 cases described in literature, is the fiber breakage. Two of the three cases have been easily resolved using the manual hand removal, but in the third case the manual removal was impossible. The fiber is still totally invisible to the ultrasound (US), X-ray and Magnetic Resonance Imaging (MRI) and the patient is completely symptomless after 2 years.

PRE

Double chin and mandibular border

POST

Double chin and mandibular border

CONCLUSIONS

Over recent years, the laser has become one of the most important innovations in medical and surgical fields, at the same level of laparoscopic or robotic-assisted surgery. It is indicated for many different pathologies and aesthetic indications, thanks to the fact that devices and techniques are becoming more easily reproducible, safer and minimally invasive for the patients. Endolift® represents a breakthrough treatment aimed for lifting tissues directly within the skin. Thanks to the potentialities which can be obtained through this laser procedure, it is possible to achieve exceptional results when treating mild-to-moderate skin laxity and to reduce the fat in excess if needed. Indeed, the effects which patients look for in the laser treatment are mainly the reduction of skin laxity but also the reduction of fat deposits by laser lipolysis if needed. In conclusion Endolift® has a significant role in achieving the desired 'soft' rejuvenated skin of the face, neck and body, which is increasingly demanded in today's society.

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