

Modern Laser Lipolysis in the Neck Region

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Laser lipolysis has established itself for some time as a minimally invasive method for improving the appearance of the neck. Recently, new laser techniques, which ideally combine fat melting and skin tightening capabilities, are prompting an upward trend for this procedure. Therapeutic indications range from neck lipomatosis to moderate chalasis. Against this background, classic lifting techniques should also be reevaluated.

All too often, neck aging involves a loss of contour caused by dermatochalasis (intrinsic elastosis), subcutaneous fat accumulation (lipomatosis), or fat displacement (sagging). The effects of these processes on the jawline and the chin-neck angle are especially pronounced. The surgeon's pre-operative appraisal of the severity of the aging process and the anatomical situation is of crucial importance.¹ For many years, techniques such as combining face and neck lifting with liposuction have been successfully applied in neck rejuvenation. Newer lifting techniques such as MACS (minimal access cranial suspension lifting) use a vertical vector to provide targeted neck tightening. These stand in contrast to other popular lifting techniques, which concentrate on modification of the SMAS and platysma, fixation of the submental fascia (according to Loré), or suturing.²

In mild and moderate cases of focal lipomatosis on the neck, smaller liposuctions

combined with laser lipolysis under tumescent local anesthesia have gained popularity, not least because of their tightening effect.³ While the effects of laser lipolysis were initially difficult to evaluate due to its thermal (side) effects, today it has come to be used as a minimally invasive procedure for the pre-platysmal region of the neck. In particular, newer laser lipolysis techniques with wavelengths of 1,440 nm or 1,470 nm are becoming more widespread.⁴ While the superiority of classic surgical lifting procedures over laser lipolysis remains undisputed in terms of lasting effects, laser lipolysis displays an interesting interim solution to postponing major cosmetic surgery.

Technical prerequisites of modern laser lipolysis

With LipoLife®, Alma Lasers has successfully developed a powerful diode laser with a specific wavelength of 1,470 nm. For the first time ever,

Fig. 1a and b: Laser lipolysis 1,470 nm (LipoLife®) on the neck: female, 50 yrs, suction with integrated Angel bare-tip fiber, 8 W pulsed mode, 2 kJ/100 cm². Before (a) and one month after treatment (b).





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a thin laser fiber (400 μ m bare-tip fiber) has been integrated into a small suction cannula using an Angel tip (360° annular probe) for combined gentle laser treatment and careful suction in a single step. There is also a mode for pure laser lipolysis using a flat straight fiber and the 45° “Sidefire” (bended radial emission fiber), which is particularly useful for convex surfaces such as the neck.⁴

The potential of laser lipolysis: surgical fat reduction and skin tightening

Laser lipolysis in the neck region (980 nm and 1,470 nm) has been successfully performed at our center for more than seven years. To date, we have already documented 12 cases treated with the modern LipoLife® laser (Picture 1a and b, 3a–d), using pre-platysmal or submental surgical techniques. Impressive results can be seen within two to four weeks, which continue to improve for up to three months. Monitoring of treated patients (then still using the FOX® 980 nm from ARC Laser) has provided photo-documentation of effects lasting three to five years or more. This seemingly does not apply to the 70+ age group, which only benefited from limited skin tightening effects.

While suction procedures in the neck region could

achieve acceptable results, post-operative skin tightening remains difficult to evaluate. Patients with moderate and severe chalasis in the neck region must therefore be properly informed about lifting procedure options. The combination treatment with liposuction and laser lipolysis, on the other hand, is very promising for optimizing results on necks with mild to moderate chalasis.^{3,4} The reason for this is the refined development of laser lipolysis, with the newest laser wavelengths of 1,440 nm or 1,470 nm, providing heat absorption that is approximately 40-fold higher in fat and 70-fold higher in water, respectively, compared to diode lasers with wavelengths of 924 nm or 980 nm (the previous most frequently used method).⁵ Modern laser lipolysis (with or without suction) is well-suited for neck rejuvenation from two perspectives. With the help of the laser procedure, subcutaneous fat deposits in the neck can be selectively melted away, while cutaneous and subcutaneous connective tissue structures can be simultaneously tightened due to the thermic effect. This predominantly shortens the septa and ligaments between the dermal skin and the platysma after they have been freed from the fatty tissue. The tightening is caused primarily by collagen shrinking induced by the heat reaction in the water-rich tissue when treated with laser wavelengths of 980 nm to 1,470 nm.^{3,6} In addition,

Fig. 2: LipoLife 3G offers a special cannula for tightening with a fine laser fiber, specifically developed for treating the face, chin and neck.

Fig. 3a–d: Laser lipolysis 1,470nm (LipoLife®) on neck: female, 48yrs, laser assisted liposuction: 7 W pulsed mode, approx. 3kJ/100 cm². Before (a and b), three months after treatment (c and d).



delayed tightening effects (in the sense of remodeling) are achieved via collagen stimulation and increased fibroblast activity up to six months post-operatively.^{3,7} Moreover, the sustainability of the results of laser lipolysis points to the impact of additional bioactive mechanisms. It is possible that this specific form of

fat melting plays a special role, as after selective lipolysis of the mature fat, stromal vascular fraction (SVF) cells still remain in the treated fatty tissue and facilitate skin regeneration over the long term. This assumption is based on data collected from a fat graft that underwent laser lipolysis, which displayed high vitality (95%) of small fat cells or SVF cells (10–30 µm).⁸

In the years since laser lipolysis was introduced, the following applications have been developed for the neck area: focal lipomatosis on the neck or the submental region with minor to moderate chalasis; benign lipomatosis such as Madelung's deformity, and localized lipodystrophy (e.g., "buffalo hump").^{3,4,6}

Moreover, it is possible to use laser lipolysis as a combination treatment for a face-neck lift. Laser lipolysis is of course also an option for detail correction after lifting (e.g., problems with submental tightening with severe chalasis) or for refreshing an outdated lift.

Risk assessment

Common possible side effects include hematomas, secreting wounds and edematous swelling. Rare side effects include subcutaneous scars such as armor-like fibrosis, which may last for one to three months before it subsides.^{4, 6} Very rarely, muscle contractions of the platysma horns or the suprahyoid muscle can also occur, which must be treated with massage and targeted botulinum toxin injections.

Fig. 4: LipoLife 3G from Alma Lasers offers a comprehensive solution for all applications of laser lipolysis, liposuction, skin tightening and fat transplantation in one compact system.



III. 4

Other complications, such as infections, necrosis, or nerve damage, are also very rare. There is a concern that damage can occur to the facial nerve (e.g., the marginal mandibular branch of the facial nerve) when applying the bare-tip fiber technique to the jowl area without the suction cannula. This generally results in myelination damage due to heat, and rarely causes direct axonal nerve damage, so the impacted nerve can fully regenerate within three months.

The risk of neck skeletonization is comparable to that of classic suction procedures, but can mostly be avoided through proper use of laser lipolysis. Slim elastotic regions of the neck skin should not be further suctioned and must instead be stimulated thermally using the bare-tip fiber technique (e.g., the "Sidefire" fiber).

Conclusion

Modern laser lipolysis in the neck region can be performed as a minimally invasive procedure in the doctor's office, and offers an improved alternative to classic liposuction procedures. The laser procedure is considered highly effective and safe owing to the specific heat absorption of fat and water. The spectrum of possible side effects is easily manageable by observing each patient's specific anatomy. Laser lipolysis is particularly suited for patients with focal lipomatosis on the neck and the submental region, wherein mild and moderate chalasis of the affected region also benefits significantly. In some cases, more extensive plastic surgery can thus be avoided or postponed.

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Literature



