

## Minimal-Invasive Technology

From Liposuction to Adipose Tissue Lipofilling



## LipoLife® - Advanced laser-assisted liposuction, lipo-harvesting (LipoFlow®) & lipofilling for aesthetic face and body augmentation

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## Introduction

Autologous fat grafting is a rapidly evolving technique in the field of Plastic and Reconstructive Surgery where it has become increasingly popular for the correction and augmentation of soft tissue deficits at many sites throughout the face & body (Table 1). The use of autologous fat endures as a commonly accepted transplant material for correction of a wide variety of soft-tissue defects because of its biocompatibility, versatility, availability, similarity to like-tissue replacement, and point-of-care delivery in reconstructive and aesthetic surgery (1-3).

The benefits of adipose tissue for face and body augmentation are numerous; it is harvested with minimal donor site morbidity, autologous, and is easily contoured to match the native architecture. As a dermal, facial-filler, AFT seems to have real potential because of the biocompatibility of adipose tissue besides being a procedure with few and primarily minor complications. As a result, it was not long before AFT or lipofilling found its way as a potentially superior facial filler with numerous studies reporting on the promising results besides minimal side effects (4-6).

### Fat grafting aesthetic applications

- Gluteal augmentation and repair of contour deformities
- Facial augmentation and correction of defects
- Hand rejuvenation
- Lip augmentation

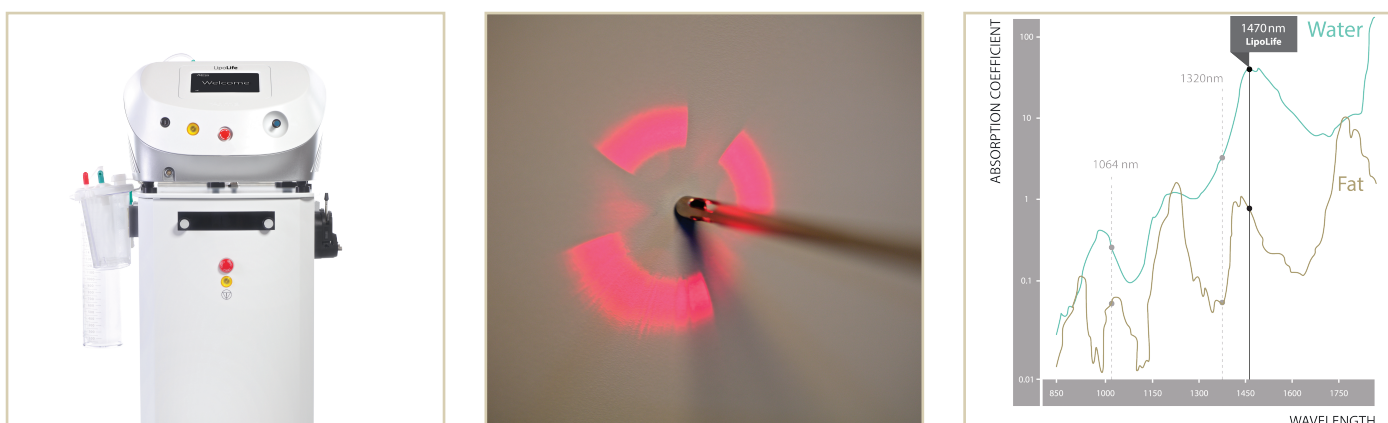
## LipoLife® – Laser-assisted liposuction

LipoLife® (Alma Lasers Ltd.) is all-in-one, multi modal, minimally-invasive device for liposuction, lipo-harvesting (LipoFlow®) and lipo-filling with on-line infiltration and suction functions, simultaneous lasing and suction (Integrated cannula and radial fiber interface) and sterile canisters for fat harvesting and transfer (Figure 1).

Briefly, the LipoLife device is operated with a thin radial fiber laser (400 or 600  $\mu\text{m}$ ) at 1,470nm wavelength that targets water and is integrated into a small suction cannula using an Angel tip (360° annular probe) for combined gentle laser treatment and careful suction in a single-in-serial steps. the LipoLife device involves simultaneous work of laser (CW mode) and suction. Power settings is a function of the liposuction area: 10-13 W (chin, arms and knees), 13W (abdomen, back), and 15W (thighs, hips and buttocks). The laser energy is conveyed into the fat layer using a 3 or 4 mm cannula which incorporates a 400 or 600- $\mu\text{m}$  optical single-use fibre (Angel). Given its water absorption, radial emission and relatively low irradiance on the fat tissue channeled via Mercedes perforated-tip canula, the 1470 nm wavelength laser fiber enables gentle fat tissue

collection/yield and provide increased relative ratios of viable adipocytes in the harvested tissue. The LipoLife device incorporates aspiration system features three pumps for high powered operation: a peristaltic pump for infiltration of tumescent anesthetic mixtures and two aspiration pumps for fat suctioning.

The LipoLife 1470 nm laser-assisted liposuction device has been designed to enable gentle fat tissue collection and to provide for increased relative ratios of viable adipocytes in the harvested tissue. The phase separation of the collected sample in the LipoLife involves: 1. Adipose tissue phase: Uniform, yellowish-pink adipose tissue; consisted primarily of adipose cells and a minimal amount of connective tissue (98.9%); and 2. Blood phase: contained only a small amount of blood (1.1%). In a recent study evaluating the effectiveness of the device, laser-collected samples presented a significantly larger and more homogenous adipose phase fewer contaminants as compared to samples collected using a standard mechanical liposuction device. Moreover, laser-assisted liposuction more effectively preserved preadipocyte viability (3).



**Figure 1.** LipoLife system: integrated LipoDiode (left), Angel radial emission fiber (middle) and selective absorption of the 1470 wavelength in water compared to fat.

## Protocol

### Liposuction & fat harvesting

Oral midazolam was administered 20 min before the local application of 18% EMLA to the recipient site and infusion of a mixture of lidocaine 4% (400mg per liter saline) and adrenaline (0.5 ml per 0.5mg liter saline) to both the donor and recipient sites.

Standard puncture holes were made at the donor sites with a #11 surgical blade, to allow fat laser aspiration. Tumescence solution was injected at a 2:1 ratio to aspirated volume. Fat aspiration was performed using Mercedes 4 mm cannulas (blunt) specially designed with a swivel handle (LipoLife, Alma Lasers Ltd.), through which the 1470nm, 600 micron, radial emitting laser fiber (Alma Lasers, Ltd.) was advanced and applied with continuous wave (CW) mode. The lipoaspirate was transferred from the collection canister to a 5-10 cc syringe. The fat content was then ready for injection into the recipient site.

### Adipose tissue injection

Fat was injected into the subcutaneous fatty tissue, using a 5-10 cc syringe, equipped with a 16 gauged cannula and a crosshatching/ fanning fat pearl injection technique. To avoid asymmetry, care was taken to fill both treated sides equally. Overfilling was avoided to prevent formation of clumps. Fat injection is the last critical step of the lipofilling procedure and before injection clinician should consider the following: Injection with a "retrograde" method (e.g., removal of the cannula during injection, in order to apply low pressure on the tissue); injection of the tissue in different layers to create a three-dimensional network; injection of very small quantities of tissue per passage (small amount by small amount) and at regular intervals, and for the face, a limited number of passages (tunneling) should be performed in order to decrease inflammation, edema, and fibrosis.

## Postoperative care

Treatment body site remained bandaged for a period of few of weeks to make sure that the fat transplant stayed in the injection site. Face site was not bandaged.

### Cases #1 – Face

Apparently healthy 50 year-old woman. heavy smoker. She complained on forehead lines and wrinkles and orbital rings and hollowness appearance. Physical examination revealed: 1. prominent cross-section forehead lines with concave forehead above the orbitals; 2. temporal wasting; 3. bilateral crow-feet; 4. tear trough hollowness; 5. Naso jugal groove and nasolabial folds; 6. marionette lines and submental fullness. Local anesthesia with standard tumescent solution. Laser-assisted liposuction was applied on the waist area using energy at 10W with 600 micron, radial laser fiber where 150mL fat was removed and harvested in a special canister. Harvested fat was injected to the forehead (15mL), temple (3mL), tear trough (2mL), lower orbital border (2mL); zygomas (5mL); eyelid (2mL); nasolabial fold (2mL); cheek (5mL); upper lip (3mL). Injections were done with 16g cannula using fanning technique on a new skin layers on the entire face area. In addition patient underwent upper and lower blepharoplasty. No side effects were noted. No other procedures were done including Botox! No skin incision or wires were used elsewhere. Before and after reveals impressive improvement in the forehead, temple, tear trough and infraorbital area as well as improvement in the skin texture and in the jaw line.

**Figure 2.** Before and 3 months after (Left side) and after 1 year (right side).



## Case #2 – Face

Apparently healthy 45-year-old woman. She complaint on aged skin appearance, hollowness and rings around the eyes. Physical examination revealed: 1. prominent cross-section forehead lines with concave forehead above the orbitals; 2.modest temporal wasting; 3. Severe tear trough hollowness; 4. Crow feet; 5.naso jugal groove and nasolabial folds; 6.permanenet tattoo on both eyebrows; 7. Naso jugal groove and nasolabial folds; 6. Moderate marionette lines and submental/jowls fulness. Local anesthesia with standard tumescent solution. Laser-assisted liposuction was applied on the waists area using energy at 10W with 600 micron, radial laser fiber where 150mL fat was removed and harvested in a special canister. Harvested fat was injected to the forehead (15mL), temple (3mL), tear trough (2mL), lower orbital border (2mL); zygomas (5mL); eyelid (2mL); nasolabial fold (2mL); check (5mL); upper lip (3mL).

Injections were done with 16g canula using fanning technique on a new skin layers on the entire face area. In addition, patient underwent upper and lower blepharoplasty. No side effects were noted. No other procedures were done including Botox! No skin incision or wires were used elsewhere. Before and after reveals impressive improvement in the forehead, temple, tear trough and infraorbital area as well as improvement in the skin texture and in the jaw line.

**Figure 3.** Before and 4 month after (left) and 1 year after (right)

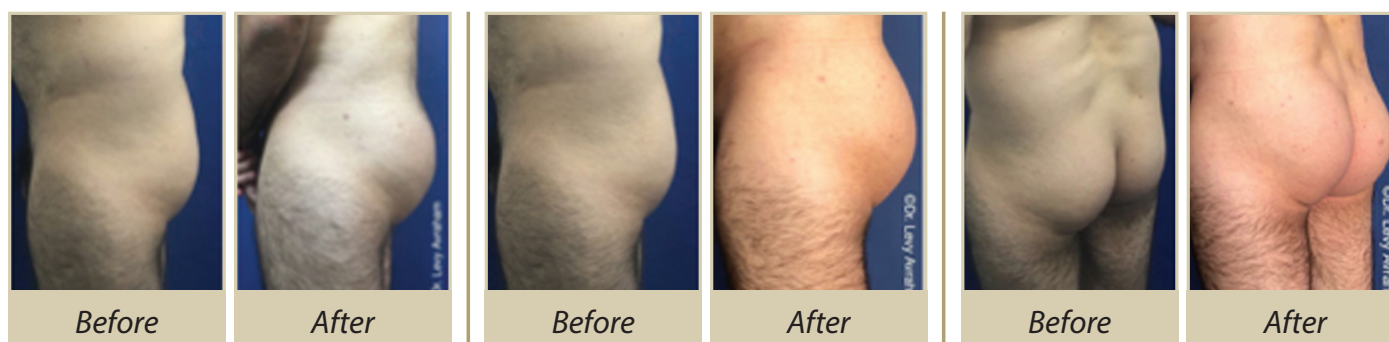




### Case #3 – Buttocks

Apparently healthy 23 year-old male. Patient complaint on small buttocks area he wanted to enlarge. Physical examination revealed small and flat buttocks with 5cm pinch thickness and obese and full abdomen. Good skin quality without spare skin 4cm pinch. Patient underwent general anesthesia. Local anesthesia with standard tumescent solution was infiltrated in the waist and abdomen areas. Laser-assisted liposuction was applied on the waists area using energy at 15W with 600 microns, radial laser fiber where 600mL fat was removed from the waist at each side, 300mL from the chest and additional 600mL from the abdomen. 600mL of harvested fat was injected to each of the buttocks using 4mm canula using fanning technique in particular to the upper apex of the buttock for lifting and volumizing. No adverse side effects were noted. Before and after photos reveal significant improvement in the buttock size and volume.

**Figure 4.** Before and 3 months after (Left side) and after 1 year (right side).



### Case #4 – Buttocks

Apparently healthy, 21 year-old woman, HIV+ carrier. Patient is treated with "cocktail" and undetectable. Patient is interested in buttock enlargement. In addition, patient complained on excessive adiposis in the waists, abdomen and the submental area. Physical examination resulted in waists fullness and pinch thickness of 4.5cm. Abdomen fullness everywhere. Good skin quality without excessive skin upon pinching (4cm). Moderate cellulite in the posterior thighs & buttocks. Patient underwent general anesthesia. Local anesthesia with standard tumescent solution was infiltrated in the waist and abdomen areas. Laser-assisted liposuction was applied on the waists area using energy at 15W with 600 micron, radial laser fiber where 600mL fat was removed from the waist at each side, 50mL from the submental area and additional 200mL from the abdomen. 600mL of harvested fat was injected to each of the buttocks using 4mm canula using fanning technique in particular to the upper apex of the buttock for lifting and volumizing. No adverse side effects were noted. Before and after photos reveal significant improvement in the buttock size and volume.

**Figure 5.** Before and 4 months after (left side) and 9 months after (right side).



## Discussion

Autologous fat grafting is the method of choice for soft tissue filling in aesthetic and reconstructive surgery. The LipoLife device offers, inter-operative, all-in-one, single session solution for autologous fat transfer and soft tissue filling by using an advanced laser-assisted liposuction (LipoDiode), lipo-harvesting and injection/lipofilling (LipoFlow) intended for minimally-invasive procedures in the face and body areas for aesthetic tissue correction and augmentation.

the LipoLife technology is particularly amenable for patients with face and body imperfections due to loss of volume and skin aging atrophy and laxity. Whereas, existing modalities of suction-assisted lipoplasty cut and shear tissue at some point during adipose extraction, leaving the patient vulnerable to development of pain, ecchymosis, seroma, and hematoma., the LipoDiode 1470nm laser procedure offers minimal bleeding and bruising, resulted in shorter patient recovery time. The LipoFlow technology with its aspirated fat harvesting station proved more effective in

preserving preadipocyte viability.

The LipoLife 1470 nm diode laser wavelength has high water absorption in the soft tissue allows optimal fat removal with minimal fat tissue damage. The parallel/ simultaneous action of lasing and suction reduces the chance of adipocytes overheating and thereby increase their survival rate. In addition, the 360° radial laser fiber emission creates low-power density while distributing energy evenly circumferentially while minimizing the risk of "hot spots" burns or internal scarring while the rounded cannula no blunted tip minimizes tissue trauma.

Based on my clinical experience, the LipoLife provides to my patients most safe and effective minimally-invasive aesthetic solution for the purpose of face and body augmentation and correction via a single working station with 3 steps of lipo-aspiration, lipo-harvesting and lipo-filling resulted in excellent adipocytes viability/quality and survival, leading to high retention rate with long-term clinical results.

## Conclusion

The method of autologous fat grafting by laser-assisted liposuction is suitable for soft tissue defects correction or volume augmentation. It is widely used for esthetic indications - esthetic surgery of the face, aging hands corrections etc. AFT continues to increase in popularity as a powerful

tool to revise the contour of the face, trunk, and extremities. Combining surgical repositioning of fat with fat grafting offers surgeons a greater degree of aesthetic control for correcting contour in the aging face and body.

## References

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