

SmartLifting™: A New Surgical Technology for Facial Rejuvenation

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Introduction:

Less invasive procedures for facial rejuvenation are becoming more and more popular as prospective patients seek out treatment options that offer the best-possible results with the least amount of downtime. As the demand for procedures increases and patients spend more time researching options, more informed choices are being made and many times patients opt for technologically advanced procedures. Patients are more likely to undergo these types of procedures since they reduce risk, specifically anesthetic risks. One such option is Laser SmartLifting™, which utilizes the Smartlipo™ laser for laser lipolysis and skin tightening through tissue coagulation.



Figure 1A (left) & 1B (right). Patient is shown three weeks before and after SmartLifting of face and Smartlipo of neck.

SmartLifting™ is a new application designed as an adjunct to advanced surgical facial rejuvenation procedures such as Rhytidectomy. It provides a revolutionary and minimally invasive procedure using a high peak-powered laser to aid in tissue separation with simultaneous skin tightening through tissue coagulation. Procedures utilizing SmartLifting™ are associated with less downtime and side-effects due to reduced tissue trauma and surgical time.

Several patients were also treated with an even less invasive approach called the UltraMiniLift™. This procedure works well in the younger patient who is interested in a minimally invasive surgical approach to correct early jowling.

Until early 2008, most in office procedures which included Smartlipo techniques, were completed by using the laser for laser lipolysis and the concurrent tightening of the facial soft tissues through tissue coagulation that follows laser lipolysis. One patient in particular had a specific interest in receiving Smartlipo treatment to slim her neck which had quite a bit of pre-platysmal and sub-platysmal fat with concurrent laxity. When examined further a recommendation for a minimally invasive approach to tighten her mid and lower face in addition to a neck rejuvenation procedure was made. It was unknown whether or not the laser would effect her significant acne scarring (See Figure 1A). After fully disclosing the nature of the laser's use for these conditions, it was determined this patient's presentation represented an ideal candidate for a minimally invasive "Smartlipo" lift.

Over the past years the approach to the Superficial Musculo-Aponeurotic System (SMAS) in our Mini-Lift procedure was streamlined and we began implementation of the Quill-SRS sutures for a vertically oriented SMAS plication. We found the Quill-SRS sutures to be very helpful in correcting significant neck laxity as well as improving volume in the malar and submalar regions.

The combination of these two advancements, SmartLifting™ and Quill SRS sutures, provides the surgeon a more comprehensive set of techniques, which produce dramatically more efficient and effective clinical outcomes.

Methods

Cynosure's Smartlipo or Smartlipo MPX™, laser was applied subcutaneously prior to traditional facial flap elevation for rhytidectomy or forehead rhytidectomy and neck lifts. A 1064nm Nd:YAG Smartlipo system, was utilized in the initial stages of the study to irradiate the subcutaneous tissue, since the Smartlipo system is cleared by the FDA for subcutaneous use. A 600-micron optical fiber was introduced into a 1- mm diameter stainless steel micro-cannula of variable length. The laser was fired through the distal end of the fiber which protrudes

2 mm beyond the tip of the cannula. The distal end of the fiber interacts with the facial and neck soft tissue. For visualization purposes, an aiming laser source is provided in the beam path providing the precise location of the fiber tip,



Figure 2. SmartLifting™ through access site during Rhytidectomy.

indicating where the laser is working.

For most facial and neck anatomical regions, a 6W-12W, 100µs pulsed laser at 40 Hz and 150 mJ was used. The Smartlipo MPX laser, which is capable of blending both the 1064nm and 1320nm wavelengths was used in more recent studies. The Nd:YAG laser produced photomechanical and thermal effects, which dissected the tissue quickly and easily. In addition, the Nd:YAG laser's hemostatic properties allowed for the coagulation of small blood vessels in the subcutaneous plane with preservation of the dermal plexus of vessels. SmartLifting™ permitted flap separation in typically difficult to reach areas such as the nasal labial folds and the corner of the mouth when completing "full rhytidectomy".

The LaserSmartLift™ Technique

After local anesthesia with epinephrine was injected to the surgical site, the procedures began with a standard flap elevation of 5.5 cm from the tragus. A modified Klein's solution was used to hydro-dissect and further vasoconstrict the flap. The Smartlipo laser was then used to separate the skin and dermis from the SMAS by creating multiple "microdissection tunnels." Three portals, including the temporal, which is adjacent to the lobule and posterior auricular, were used to introduce the laser (See Figure 2). When the skin was noted to be mostly loosened from

the SMAS and the incisions were complete, the flap is easily dissected with minimal bleeding. The need to use the cautery during flap elevation was very rare. The flap was elevated in an average of 4 to 5 minutes and in some patients it was elevated in as little as 2 minutes. After the flap was adequately elevated and mobilized, Quill-SRS sutures were used to elevate the jowl and upper neck. Occasionally a small purse-string neck plication was used at the level of the mandibular angle. This technique termed a LaserSmartLift™ is a mini version of a standard lift with variable length incisions past the retroauricular sulcus.

The UltraMiniLift™ Technique

The incision for the UltraMiniLift™ was extended from the temporal hair tuft to the mid tragus level. LaserSmartLifting™ was conducted and Quill suturing was performed as described for the LaserSmartifting procedure. The improved hemostasis facilitated by SmartLifting the flap allowed the surgeon to address the SMAS through such an extremely small incision without significant concerns about such limited exposure for vessel coagulation.



Figure 3. SmartLifting™ technique used to lift the facial flaps.

Results

After the SmartLifting™ technique was used to lift the facial flaps, almost no bleeding on either side was encountered (See Figure 3). The first patient described also had significant dermal fibrosis from her extensive acne scarring (See Figure 1B). After the initial success of the first procedure, it was decided to utilize the SmartLifting™ technique in all facial rejuvenation procedures including forehead rhytidectomy and it continued to be significantly useful for all the procedures performed.



Figure 4. Patient shown before and after SmartLifting procedure

SmartLifting™ was also used for festoons and malar crescents as well as residual fullness after blepharoplasty procedures. A before and after view of a recent patient is shown in Figure 4.

The addition of the Smartlipo MPX laser resulted in less bleeding than traditional flap elevation techniques such as scissor vertical spreading techniques. Operating time for flap elevation decreased by more than 50%, according to a retrospective review of over 130 patients the preliminary study. Many patients also experienced less post-operative bruising and some were able to return to work in as little as three days.

The SmartLifting™ procedure disrupted the soft tissues usually in the area between the subcutaneous plane and the superficial muscular aponeurotic system (SMAS) or superficial fascial layers. Flap separation was also possible in typically difficult-to-reach areas such as the nasal labial folds and the corner of the mouth when completing full rhytidectomy.

The SmartLifting™ technique also facilitates tissue separation complicated by scar tissue and fibrosis during secondary rhytidectomy. Scar tissue and prior surgeries were also more easily completed with SmartLifting™ due to the ability of the Smartlipo laser to lase through scar tissue.

The Smartlifting™ technique has been utilized in over 130 procedures since early 2007 (Refer to Table 1). These procedures included face, neck and forehead treatments as well as concurrent use in sub-platysmal fat ablation and muscle ablation during endoscopic forehead procedures. There have been very few complications in the earliest

patients treated with the Smartlipo 6 and 18 W systems. The higher power and dual wavelengths available on the Smartlipo MPX, have increased the ablation capabilities of the laser, but lower power settings must be used to prevent complications. At the conclusion of this study, there has been one minor epidermal thermal injury during a procedure, which occurred adjacent to the lateral orbital rim, an area that was not injected with tumescent fluid.

Discussion and Conclusion

SmartLifting™ utilizing the Cynosure Smartlipo and Smartlipo MPX lasers promises to be very useful for Facial Plastic Surgery procedures such as facial, forehead and neck lifts. The primary utility of this technique results from the significant hemostatic effect the laser has when used to microtunnel the surgical plane between the dermal-subcutaneous plane and the SMAS. In addition to the substantial and beneficial hemostatic effects of the laser the thermodynamic changes induced by the laser in the dermis, Smartlipo MPX also contributes to a significant tissue tightening through tissue coagulation which is not possible in traditional face, forehead and neck lift procedures. The addition of state of the art self retaining sutures for jowl and neck correction to the increased hemostasis and tissue tightening effects of the laser constitutes the technical triad we have called the SmartLifting™ technique. Surgeons

Procedure Area	Times Performed
LaserSmartLift	46
UltraMiniLift	5
Forehead/Depressors	17
Neck	43
Festoons	3
Subplatysmal Fat	6
DAO Ablation	5
Lip Crease Sub-Surfacing	5
Total	130

Table 1. Smartlifting™ has been utilized in over 130 procedures since early 2007

and patients were very pleased with the natural results obtained (See Figures 5 and 6) from this procedure. In all patients studied the operating time for facial flap elevation was reduced by more than 50%. The reduction in procedure time was due to the decrease in bleeding from the flaps where the SmartLifting™ with Smartlipo MPX was used. Post operative bruising was also reduced. Smartlipo MPX is recommended as the preferred laser for SmartLifting™ procedures.

Looking forward, new protocols are being developed to maximize the enhanced coagulation properties inherent in the Smartlipo MPX laser while minimizing the potential for collateral thermal damage to the neural and cutaneous anatomy.

Since the LaserSmartLift™ technique requires just over an hour to complete and only mild sedation it can be a valuable tool for surgeons performing facial rejuvenation procedures. Surgeons considering adding SmartLifting™ procedures to their armament should be aware that the procedure requires advanced surgical skills in facial rejuvenation procedures such as rhytidectomy forehead rhytidectomy and neck lifts, and should not be attempted by surgeons not trained fully in advanced facial rejuvenation procedures.

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Figure 5-6. Side and front views of patient before and after SmartLifting™ procedure.