How Minimally Invasive Treatments Can Render a Subsequent Face Lift More Difficult

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Background: Minimally invasive antiaging procedures are often misused or overused, creating difficulties when the patient later decides to have a face lift. The goal of this study was to examine the most common problems that the senior author (G.S.) faces in his face lifts because of these noninvasive interventions and to demonstrate the methods he uses to solve them.

Methods: A review of rhytidectomy cases from 2012 to 2017 performed by the senior author was conducted. All patients who had undergone any type of minimally invasive procedure before they had a face lift with the senior author were included in the study. The aim of the authors' study was to examine their face lifts regarding the problems created by minimally invasive interventions that the patient had undergone in the past.

Results: During the 5-year study period, the senior author performed 552 face lifts. By analyzing these patients, we found that 207 of them had previously undergone one or more minimally invasive procedures, in an effort to delay or avoid a face lift. The problems frequently encountered by the senior author in these patients were the following: (1) cheek fat atrophy because of previous energy-based treatments; (2) significant scar tissue formation because of previous energy-based treatments or thread lifting; and (3) large-volume injectables. In all the above-mentioned cases, the surgeon had to modify his basic surgical plan accordingly.

Conclusion: Plastic surgeons today must be perfectly trained to evaluate and solve any of the problems caused during a face lift by misused or overused minimally invasive treatments performed in the past. *(Plast. Reconstr. Surg.* 152: 76, 2023.)

CLINICAL QUESTION/LEVEL OF EVIDENCE: Therapeutic, IV.

Video DISCUSSION

4 THERAPEUTIC

Over the past two decades, there has been a remarkable shift in the way skilled plastic surgeons address aging concerns without surgery. Now, not only are there many more devices and products to smooth out wrinkles and improve the quality of the patient's skin, but also injectable fillers can replace lost volume and botulinum toxin type A can erase wrinkles.

This has led to a rise in the demand for noninvasive and minimally invasive procedures within the aesthetic world. Although these treatments will not replace surgery, a growing patient population is seeking results through low-risk procedures with associated minimal downtime.

There is an array of such nonsurgical cosmetic treatments. Any procedure that can be offered without a skin incision falls into this category. These

From the SkourasMed Clinic.
Received for publication April 6, 2020; accepted May 26, 2022.
Presented at the Live Makeover 5 Aesthetic Surgery Symposium, in Athens, Greece, August 31 through September 2, 2018; Live Makeover 6 Aesthetic Surgery Symposium, in Athens, Greece, June 21 to 23, 2019; and the Aston Baker Cutting Edge Aesthetic Surgery Symposium, in New York, New York, December 5 through 7, 2019.

DOI: 10.1097/PRS.0000000000010149

Disclosure statements are at the end of this article, following the correspondence information.

Related digital media are available in the full-text version of the article on www.PRSJournal.com.

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procedures are further divided into those that are truly noninvasive (no skin penetration) and those in which a needle or laser is used to penetrate the skin. Examples of truly noninvasive procedures are facials, light peels, and microdermabrasion. Examples of the most common minimally invasive antiaging procedures used today are botulinum toxin type A and filler materials, invasive lasers, energy-based devices [radiofrequency (RF) and ultrasound (US)], and thread lifts.[1]

Most of the noninvasive and minimally invasive treatments have proven their efficacy, and their value and advantages are unquestionable. They can be used as the primary treatment or as an adjunct to open surgical procedures. These procedures are also "practice builders," because the young patient undergoing a nonsurgical treatment today may be tomorrow's face-lift patient.

Although these treatments are generally considered safe, there have been reports in the medical literature about adverse effects and complications of many of them. The most common adverse effects associated with fillers are the local injection-related effects manifesting as bruising, swelling, edema, infections, lumps and bumps, skin discoloration, and biofilm formation. More serious complications have also been associated with fillers, including vascular compromise and visual loss.[2–8]

Dimpling, thread exposure, alopecia, undercorrection, asymmetry, and parotid gland injury have been identified as early complications of thread lifting. Multiple palpable masses, chronic inflammatory reactions, hematoma, and infection in the thread-lifting area have also been reported.[9–18]

Regarding energy-based devices, there are articles in the medical literature reporting minor side effects, such as transient erythema and edema,[19–22] or major complications.[23,24] However, there has been no study to the senior author's (G.S.) knowledge regarding the problems that can occur when a patient who has undergone noninvasive treatments later decides to have a face lift. A comprehensive review was performed on a large number of the senior author's patients, to examine the most common problems that he faced intraoperatively in this group of patients who had previously undergone minimally invasive treatments, the reasons that caused them, and the methods that were used to solve them.

PATIENTS AND METHODS

A study of a retrospective series of cases in rhytidectomy performed by the senior author from 2012 to 2017 was conducted. All patients who had had any type of minimally invasive procedure before they had a face lift with the senior author were included in the study. All the procedures where there was skin penetration of any degree, through a needle or some type of energy, were considered minimally invasive. The types of such treatments that we encountered in our patients are fillers and botulinum toxin type A, lasers, energy-based devices, and threads. Patients who underwent noninvasive treatments were not included in the study, because, in our experience, previous truly noninvasive treatments (no skin penetration, such as facials, light peels, and microdermabrasion) never caused any intraoperative difficulties. Secondary and tertiary face lifts were included in the study. The aim of our study was to examine the senior author's face lifts, regarding the problems created by minimally invasive interventions that the patient had undergone in the past. In some cases, these problems were known preoperatively, as they were visible; therefore, the senior surgeon had preoperatively evaluated them. In other patients, the minimally invasive procedures had caused nonvisible deformities, such as subcutaneous scarring, which were discovered intraoperatively, increasing the level of difficulty and the operative time.

The senior author's basic surgical technique consists of superficial musculoaponeurotic system (SMAS)-ectomy or SMAS plication, and lateral platysmaplasty. In all cases where there are significant medial platysma bands or excessive skin laxity in the neck, the neck is opened as well and a medial platysmaplasty is performed. As is discussed in the Discussion section more thoroughly, the author modifies several operative steps when he encounters stigmata caused by noninvasive therapies that the patient has had. However, the vector of SMAS plication or SMASectomy does not change. The direction in which the SMASectomy is performed is oriented so that the vectors of elevation following SMAS closure lie perpendicular to the nasolabial fold, thereby producing improvement not only of the nasolabial fold but also of the jowl and jawline, as Baker had described it.[25]

The senior author does not perform any subplatysmal modification to either primary or secondary cases, with the exception of conservative subplatysmal fat reduction, when indicated. In all cases, there are two critical tension sutures: one in the temple area at the lower border of the temporal hairline and one in the upper border of the postauricular incision. Nylon 2-0 is used as suture material.

Table 1. Characteristics of Patients

Characteristic	Value (%)
Patients who underwent minimally invasive treatments before the face lift	207
Age, yr	
Median	60
Range	49–72
Sex	
Male	25 (12)
Female	182 (88)

RESULTS

During the 5-year study period, the senior author performed 552 face lifts. By analyzing these patients, we found that 207 of them had previously undergone one or more minimally invasive (not noninvasive) procedures, in an effort to delay or avoid a face lift. Of these, 182 were women (88%) and 25 were men (12%) (Table 1). The percentage of men in the total number of patients (552 patients) who were operated on during these 5 years was 20% (110 men and 442 women, significantly higher). That is because, according to our experience, men generally are more skeptical about the results of minimally invasive treatments, and they usually come requesting an immediate surgical solution. The average age of the 207 patients included in our study was 60 years. Of the minimally invasive procedures that were studied (those 207 patients), there were three types of treatments that frequently caused issues.

Energy-Based Devices, Threads, and Fillers

The problems and complications encountered included those listed in Tables 2 through 6.

Cheek Fat Atrophy Because of Previous Energy-Based Treatments

Cheek fat atrophy because of previous energy-based treatments occurred in 15 cases (Figs. 1 through 4).

Table 2. Problems Most Commonly Encountered in Face Lifts Because of Previous Minimally Invasive Treatments

Problem	Value (%)
Cheek fat atrophy because of previous energy-based treatments	15 (7)
Significant scar tissue formation because of previous energy-based treatments or thread lifting	58 (28)
Large-volume injectables	36 (17)

Table 3. Problems Most Commonly Encountered in Face Lifts Because of Energy-Based Devices

Problem	Value (%)
Cheek fat atrophy	15 (7)
Significant scar tissue formation	27 (13)

Table 4. Problems Most Commonly Encountered in Face Lifts Because of Threads

Problem	Value (%)
Significant scar tissue formation	31 (15)
Symphysis between different anatomical planes	29 (14)

Table 5. Overfilled Faces: Type of Filler Used

Type of Filler Used	Value (%)
Silicone	18 (50)
Hyaluronic acid	16 (44)
Fat	2 (6)

Table 6. Complications Most Commonly Encountered in Face Lifts Because of Previous Minimally Invasive Treatments

Complication	Value (%)
Fat reabsorption when treating fat atrophies attributable to energy-based treatments	7 (3)
Postoperative skin ischemia attributable to energy-based devices	15 (7)
Postoperative skin necrosis	2 (0.9)
Prolonged postoperative swelling because of multiple filler injection	17 (19)
Inability to proceed with the dissection because of previous silicone injection the face	1 (0.4)

Significant Scar Tissue Formation Because of Previous Energy-Based Treatments or Thread Lifting

Significant scar tissue formation occurred because of previous energy-based treatments or thread lifting in 58 cases (Figs. 5 through 8). [**See Figure, Supplemental Digital Content 1**, which shows a preoperative left profile view of the same patient, ***http://links.lww.com/PRS/F864***. **See Figure, Supplemental Digital Content 2**, which shows a 6-month postoperative photograph of the same patient (lateral view), ***http://links.lww.com/PRS/F865***.]

Compromised Blood Supply of the Flap, Ischemia, and Skin Necrosis Because of Previous Energy-Based Treatments

We encountered 15 cases of localized flap ischemia (10 bilateral and five unilateral). Two

Fig. 1. Preoperative photographs of a 67-year-old patient with a severe bilateral cheek fat atrophy caused by energy-based treatments he had undergone 5 years earlier (the patient said it was an ultrasound-based device). The patient presented to the senior author's office complaining about the fat atrophy, and the laxity in his face and neck. On examination, scar tissue was also observed superficially, as a result of the heat delivered by the device. (*Left*) Frontal, (*center*) right profile, and (*right*) left profile views.

Fig. 2. The author decided to stage the procedure. At the first stage, he performed a face lift with a very wide skin undermining to break the scar, correct the laxity, and also create a tighter pocket in which he would later graft fat.

Fig. 3. At the second stage, 6 months after the face lift, the surgeon fat-grafted both cheeks, using both an external and an intraoral approach.

of them resulted in an area of unilateral localized skin necrosis.

Problems Caused by Fillers

Several problems were caused by fillers. [**See Figure, Supplemental Digital Content 3**, which shows preoperative image of a 75-year-old patient severely deformed because of liquid silicone that was injected into her face at the age of 50, ***http://links.lww.com/PRS/F866***. **See Figure, Supplemental Digital Content 4**, which shows the patient was mostly concerned about her platysma bands, ***http://links.lww.com/PRS/F867***. **See Figure, Supplemental Digital Content 5**, which shows a preoperative photograph of the same patient (left profile view), ***http://links.lww.com/PRS/F868***. **See Figure, Supplemental Digital Content 6**, which shows a 2-year postoperative photograph of the same patient. There was no significant improvement in her facial contours, as the skin undermining was limited by the silicone, ***http://links.lww.com/PRS/F869***. **See Figure, Supplemental Digital Content 7**, which shows a 2-year postoperative photograph of the same patient. The patient was satisfied with the result in the neck,

Fig. 4. The patient shown in Figures 1 through 3, at 7 months after the second stage. (*Left*) Frontal, (*center*) right profile, and (*right*) left profile views.

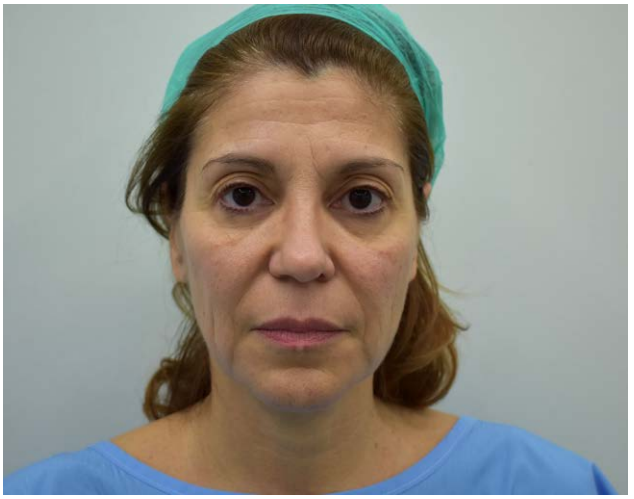

Fig. 5. Preoperative photograph (frontal view) of a 52-year-old patient who had undergone a thread lift 3 years ago, with disappointing results. The patient presented to the senior author's office requesting a face lift, as she was bothered by the laxity in her face and neck. On examination, there were no visible scars or bumps related to the threads.

Fig. 6. Intraoperatively, after the surgeon performed his SMAS plication, he observed abnormal dimpling at the level of the left nasolabial fold. This unusual dimpling was associated with the symphysis between different anatomical planes of the face, produced by the previous thread lifting.

http://links.lww.com/PRS/F870. **See Figure, Supplemental Digital Content 8**, which shows a 2-year postoperative photograph of the same patient (left profile view), *http://links.lww.com/PRS/F871*.] When fillers have been injected into the face lift's area of dissection, they make the dissection harder, the plane having a gray, translucent color. These injectables are often encountered during surgery, popping out when gentle pressure is applied by the surgeon. They can be encountered not only subcutaneously, but also sub-SMAS, especially in the malar area. Granulomas because of filler injection are also often encountered. However, the most significant problems attributed to fillers are caused by large-volume injectables (especially nonabsorbable). In the optimal cases, patients admit to it upfront, and then the surgeon can try to dissolve it 1 or 2 weeks before surgery. However, often patients do not know what product or combination of products they have had injected into their face.

The senior surgeon performed revision face lifts on 36 patients who had distorted facial features because of large-volume injectables. Eighteen of these patients had had silicone injected into their face, 16 had had multiple treatments of hyaluronic acid, and two patients had distorted

Fig. 7. This skin tethering required further excessive skin dissection to be released.

Fig. 8. Six-month postoperative photograph (frontal view) of the patient shown in Figures 5 through 7. The end result of the operation was satisfying; however, the patient presented prolonged swelling at the area of the left nasolabial fold and jowls, because of the excessive intraoperative skin undermining that was required.

facial features because of previous fat injections (Table 5). In most of them, the result of the face lift was not optimal. In one of these patients, the surgeon had to stop the dissection in the cheek area approximately 2 cm in front of the tragus on reaching the nonabsorbable substance (silicone), because it felt like cutting on stone.

DISCUSSION

Minimally invasive treatments often alter the anatomy of the face, causing atrophies; scars; and in some cases, even severe, permanent deformations. To correct these problems, the surgeon has to differentiate the usual pattern of surgical steps. The surgical maneuvers that the senior surgeon performs, according to the way we categorized those problems, are the following.

Fat Atrophy

Fat atrophies caused by previous energy-based treatments are corrected with fat grafting. However, these treatments compromise the microcirculation, and this can have a negative effect on fat survival. The patient should be informed about this fact preoperatively. We observed fat reabsorption with recurrence of the fat atrophy in seven of our 15 patients.

Scar Tissue

Significant scar tissue can form because of previous energy-based treatments or thread lifting. The term "significant" was determined clinically, by the higher dissection level of difficulty. It should be noted that, in cases where submental liposuction in combination with RF devices had been previously performed (as the submental area is a common area of focus for RF treatments), the plane was very stiff and the dissection was more difficult, in comparison to patients who had plain liposuction in their submental area in the past.

All nonsurgical devices that tighten the lower third of the face, jawline, and neck work using the same principle: they deliver thermal energy to the layers of the face and the neck (skin, muscle, and fat), causing them to contract and tighten. This thermal energy also stimulates collagen production in the deep layers of the skin (the dermis) while leaving the skin's surface (epidermis) relatively untouched. There are two main sources of energy used to impart this thermal effect: RF and US.

It is thus claimed that these treatments trigger collagen production. It is claimed that RF and US build collagen. Scar tissue is composed of collagen, so all these noninvasive treatments cause the production of scar tissue under the facial skin.

Threads, in contrast, do not usually limit the ability to finish the flap release. The problem is they cannot always be removed. They can either be stuck to the skin or wrapped around vital structures.

Significant scar tissue makes the dissection tedious and tricky. The surgeon can easily get too deep and injure a nerve branch or too superficial and harm the blood supply of the flap. The surgeon must be very careful and patient during the dissection of the flap.

In one case of a patient who had had permanent threads placed subcutaneously, the surgeon tried to completely remove a thread placed on the undersurface of the skin flap, thinning the flap and harming its blood supply, which resulted in a postoperative linear skin necrosis. One year after the operation, the linear scar was revised by the senior surgeon.

In some other cases, the scar tissue was produced by threads placed in the past. In general, the threads the surgeon comes upon should be removed if possible; otherwise, he or she should just work around them. Some of them are going to extrude later on, when they break. Taking into consideration that they might be wrapped around a vital structure, it is important that they are not forced out, as this might cause a severe injury (eg, to the parotid duct).

It is of the essence to say that in 29 of the patients in our study, there were symphyses between different anatomical planes of the face because of previous thread lifting. This manifested as abnormal dimpling during our SMAS or platysma plication intraoperatively, requiring excessive skin dissection to release the tethering.

Skin and Soft-Tissue Ischemia

Energy-based devices result in skin and soft-tissue ischemia, and the patients who have had them are somewhat similar to smokers. As a result, the surgeon should be sure to keep a robust skin flap and sometimes even limit the skin undermining. Interestingly, these patients often have four or five such treatments and years of filler injections to their face. Thus, in these cases, we are dissecting through a lot of compromised areas.

It is interesting to say that the scar in these cases often extends in the sub-SMAS plane as well, and becomes white and fibrous, instead of diaphanous as in a patient who has not undergone any related procedure. It would be very useful to mention that in patients who have undergone noninvasive dermal tightening, we have routinely noted that undermining the cervical skin flap to address the medial platysma is more precise if the dissection proceeds from the lateral face-lift access incision rather than the submental incision, as it provides wider exposure to define the plane between the platysma/cicatrix interface. In all patients, the surgeon is advised to be very cautious, proceed very slowly with dissection, and stop often to palpate and assess manually the thickness of the skin flap.

In our study, we observed skin ischemia on 15 patients postoperatively. These patients were treated conservatively with close follow-up, and the patients were encouraged to massage the compromised areas with antibiotic creams, and to apply hot compresses to improve the blood supply. Two of them developed a localized area of skin necrosis unilaterally. The scar was revised in both cases 1 year after the face lift.

Eight of these patients (including the two who developed skin necrosis) were smokers. Both smoking and energy-based devices produce skin and soft-tissue ischemia, so patients are informed thoroughly preoperatively about the increased risk of healing abnormalities.

The Operative Plan Is Dependent on the Type of Injectable Filler Used

In cases where the surgeon was operating on overfilled faces, the operative plan depended on the type of injectable filler used. When it was fat, liposuction was used in conjunction with the face lift. When it was hyaluronic acid, hyaluronidase was used 2 to 3 weeks before the procedure to dissolve it. When it was silicone, there was nothing to be done, and in some cases, this significantly limited the dissection intraoperatively. Despite any efforts, to our experience, overfilled faces never go back to normal.

It should be mentioned at this point that in our series, we did not encounter cases of distortion associated with semipermanent fillers such as *poly-L-lactic acid* or hydroxyapatite. It is our belief that this is because these fillers are much less popular in our country in comparison to the ones already mentioned.

In the patients with overfilled faces, we are always very cautious in the preoperative consultation. It is important for them to understand the limitations of this surgery, with regard to the correction of their facial laxity. Almost all of these patients operated on by the senior author were mostly concerned preoperatively by the laxity in the neck, and that is what they wanted to correct with the surgery. Thus, the laxity in the neck is mostly addressed in this group of patients.

Another common finding in patients with multiple injectable treatments is the prolonged postoperative swelling, which is attributed to the lymphatic blockage that the fillers cause. This is even more excessive in patients with overfilled faces.

By reviewing the overall results of the patients included in our study, we can come to the following conclusions: noninvasive treatments can render a subsequent face lift much more difficult and even affect its outcome. Fat grafting in cases of fat atrophy caused by energy-based devices may fail,

Table 7. Average Operative Time

Type of Intervention	Average Operative Time (hr)
No previous intervention	2.50
Previous energy-based treatments	3.20
Previous thread lifts	3.30
Previous multiple filler injections-overfilled faces	3.30
Previous energy-based treatments and thread lifts	3.50
Previous energy-based treatments, thread lifts, and fillers	4

because of fat reabsorption. Scar tissue produced by energy-based devices or threads may limit the flap release. Last but not least, as has been already mentioned, overfilled faces never go back to normal.

It is important to say, at this point, that we also studied the duration of surgery to connect it to the nature of the intervention. As demonstrated in Table 7, the operative time increased with all types of previous interventions.

CONCLUSIONS

Nonsurgical aesthetic devices intended for treatment of lax and loose skin have gained popularity because of their ability to noninvasively improve the patient's aesthetic condition and because of their low side-effect profile. These devices have emerged as popular alternatives to surgical rhytidectomy because of their efficacy, favorable safety profile, minimal recovery time, and reduced cost. Although they do not achieve the same results as a face lift, they are an attractive alternative for patients who do not want the risks or costs associated with surgery.

Injectable fillers and neuromodulators have long established their efficacy and are used for a wide range of indications pertaining to the correction of facial aging and disfigurement. Fillers can correct soft-tissue loss, depressed scars, and atrophy or asymmetry induced by systemic or local disease. Neuromodulators correct muscle-mediated skin creases, reshape the face, and address right-left functional asymmetry. Over the past decade, several methods of minimally invasive thread-mediated lifting have also been widely adopted in aesthetic surgery. When used appropriately and correctly, the above-mentioned minimally invasive procedures have demonstrated excellent clinical efficacy and safety.

However, the wrong or abusive way they are often used leads to scar formation, granulomas, or even distortion of facial features. All of these complications pose serious challenges to the plastic surgeon if these patients later decide to have a face lift. In all of these cases, by performing a thorough preoperative examination and diagnosis and by setting realistic expectations for the patient, the surgeon lays the foundation of a successful result. Excellent surgical training and surgical experience will do the rest.

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DISCLOSURE

The authors have no financial interests to disclose.

PATIENT CONSENT

Patients provided written informed consent for the use of their images.

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