Massive weight loss surgery patients in general have a large amount of redundant skin and soft tissue. Skin redundancy typically exceeds superficial musculoaponeurotic system (SMAS) laxity, and what prevails is a “droopy” face and “turkey” neck. After loss of massive amounts of fat, there is generally a mismatch between the amount of skin and superficial muscles and the body habitus of the patient. Patients are particularly displeased with their post–massive weight loss face and neck because they cannot camouflage this area with clothing. Surgical goals of facial and neck rejuvenation are to redrape skin and restore the jawline and neck, and to harmonize the facial contouring with other areas of the body.1

In addition, volume deflation is typically present. Volume deflation–related deformities in the mid and upper face include temporal hollowing and accentuated prominence of the lateral orbital rim. Each face is different, and areas of inadequate volume have to be carefully noted in our patients.2

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The objectives of our study were to evaluate our experience with facial rejuvenation in the massive weight loss patient. Specifically, we sought to assess techniques that are effective in addressing the deflation and skin laxity that are unique in these patients and describe the nuances in our standard face-lift technique for the massive weight loss population.

PATIENTS AND METHODS

After obtaining institutional review board approval, we performed a retrospective chart review of our senior author’s (R.J.R) face-lift patients and collected data on demographics, including age and body mass index of the patient, surgical techniques used (when available), and intraoperative and postoperative complications. With this information, we evaluated the modifications of our current face- and neck-lift technique that we make in the massive weight loss patient. Patients we included in the study were those that had documented evidence of bariatric surgery through laparoscopic banding procedures, Roux-en-Y, or gastric bypass, and/or patients on a diet and exercise weight loss regimen who lost at least 100 pounds or greater than 50 percent of their body weight. In nine patients, we were actually able to determine preoperative and postoperative body mass index and weight loss information after bariatric surgery. The other patients either lost their weight through diet and exercise, or had other procedures for massive weight loss, including lower body lift or upper body lift, for deflated skin and soft tissue, with comments in the notes about the patient being a massive weight loss patient.

RESULTS

Demographics

For our data collection, we reviewed our senior author’s face- and neck-lift 25-year database of 1089 patients. A total of 22 patients were identified. Of these, 15 (68 percent) were women and seven (32 percent) were men. Nineteen of the patients had primary face lifts performed, and three patients were secondary cases. Average age at face lift was 52.7 years (range, 41.0 to 67.0 years). Body mass index at the time of surgery was 26.0, with an average height of 5 feet 3 inches and weight of 147 pounds. Weight loss and bariatric surgery information was found in nine of the patients in our study. In these patients, the preoperative body mass index was 38, and on average, when down to 27, an average of 145 pounds was lost since the original bariatric operation. Our patients’ weight was stable for a minimum of 6 months before face-lift surgery. Average follow-up of our patients was 2.3 years in the 20 of 22 patients for whom we were able to find these data. All patients were followed for at least 1 year.

Complications

A review of complications included no intraoperative complications. Postoperative complications included one hematoma that responded to drainage. There were no nerve injuries. One neck revision operation was performed to reapproximate platysmal bands.

Facial Analysis

Based on preoperative photographs and clinic notes, we noted that 19 of 22 patients (86 percent) had volume loss in the midface and nasolabial groove regions. Thirteen patients (59 percent) had perioral volume loss, all patients (22 of 22) had skin excess and redundancy in the jowl and submental region, and 18 patients (82 percent) had documented platysmal bands (Fig. 1).
Technique

The surgical technique for primary face lift of the senior author has been described in detail in previous literature and consists of an SMAS-based face lift performed with SMAS stacking plication or SMASectomy, with an overall aesthetic goal of facial “shaping” and “filling” by means of autologous fat grafting. Facial analysis for preoperative planning addresses midface width, facial length, and facial fullness, and dictates an operative plan with specific endpoints based on degree of skin undermining, angle of SMAS shaping, and decision to perform an SMAS stacking or SMASectomy technique.

In all patients, a bilamellar approach was used, separating skin and SMAS dissections. We believe this helps address discrepant skin excess, especially in the post–massive weight loss population. On average, 3 cm of skin was removed in a horizontal direction, as opposed to only 1.5 cm on average in the non–massive weight loss patient. The SMAS was addressed in 20 of the 22 patients (91 percent) by performing an SMASectomy, which better addresses the redundancy of the SMAS.

The standard incisions were also modified in this unique population. Although the senior author usually prefers to extend postauricular incisions into the hairline in a non–massive weight loss patient, in massive weight loss patients, the technique was modified to carry down the incision along the hairline to better address excess skin in 15 of these patients (68 percent).

In addition, fat augmentation was performed in 100 percent of patients. On average, almost twice as much fat was used, 22 ml on average in massive weight loss population patients versus only 12 ml in non–massive weight loss patients.

In the neck area, 100 percent of patients had open access to the submental area with direction plication of midline platysmal bands. Lateral plication was performed by means of a platysma window technique, described in previous literature. Interestingly, in six of seven male patients in our study, a submental spanning stitch was used to improve the contour of the jawline, as these patients are thicker skinned. A 3-0 Vicryl suture (Ethicon, Inc., Somerville, N.J.) was used as a spanning stitch from the submental region to the mastoid fascia. Twenty-one of the 22 patients had some type of concomitant procedure, which usually included some element of lower and upper lid blepharoplasty, brow lift, or facial resurfacing (laser or peel).

Case 1

The patient in case 1 had a 140-pound weight loss after a gastric bypass operation. Preoperative and 2.5-year postoperative photographs were obtained after SMASectomy with fat augmentation of the malar and nasolabial regions, and platysmal medial and lateral plication. Bilateral upper and lower lid blepharoplasty was also performed. Facial fullness and shape were improved (Figs. 2 and 3).

Case 2

The patient in case 2 underwent gastric band surgery. SMASectomy, fat augmentation, and medial and lateral platysmal plications were performed. Two years postoperatively, the patient has an improved jawline, volume replacement, and neck contour (Figs. 4 and 5).

DISCUSSION

Clearly, our understanding of facial aging is more evolved than our understanding of massive weight loss changes in the skin and soft tissue. However, gross changes in massive weight loss patients do mimic age-related changes. There appears to be decreased turgor, loss of subcutaneous fat, and diminished skin thickness. Although not completely understood, histologically, massive weight loss skin may also be similar to aging skin, which demonstrates loss of collagen cross-links and enzymatic degradation of soft tissue. Massive weight gain, with adipose proliferation, creates skin expansion, and sudden loss of fat creates laxity as the skin never contracts sufficiently to redrape over the neck. One exception may be patients younger than 40 years, because skin contraction and elasticity may be sufficient.

Past literature on the subject of facial rejuvenation in the massive weight loss patient is scarce. Sclafani has described his technique. His modifications of the SMAS face lift differ in massive weight loss patients in several ways. Skin incisions are made into the temporal hairline above the helical root and postauricularly, typically onto concha. More skin is undermined to restore contour, and less SMAS elevation is performed. His technique involves SMAS plication, platysmaplasty, and suction-directed lipectomy in the jowls and submental area.

Strauch and Herman use a weave suture technique in which the midface is suture anchored to the deep fascia. The authors use this minimally invasive technique using a monofilament nylon without extensive skin undermining. It is often performed under local anesthesia in the office. Strauch and Herman also use their weave technique in the neck to anchor the platysma to the mastoid fascia.
laterally. They feel this avoids the need to necessarily open the neck and can also help redrape the skin. Another technique in the massive weight loss patient includes malar fat elevation in a vertical vector to the deep temporal fascia. The authors feel that, unlike other subcutaneous fat deposits, the malar pad is more dense and robust and thus more amenable to suture suspension.

Pitanguy et al. espouse their round lifting technique for the massive weight loss patient, as the vectors of traction do not cause distortion despite the excess redundancy of skin that is removed. Although their classic incisions go into the hairline, much like our design, in the massive weight loss patient, the incision goes along the anterior temporal hairline. Also similar to our technique is the undermining of skin to the zygomatic prominence and a plication of the malar fat pad to the zygoma.

Our operative technique is unique several ways. Our standard technique of facial rejuvenation

![Fig. 2. Case 1. Frontal (above) and oblique (below) preoperative and 2.5-year postoperative views of the patient after SMASectomy with fat augmentation of the malar and nasolabial regions, and platysmal medial and lateral plication. Bilateral upper and lower lid blepharoplasty was also performed. These maneuvers can markedly improve contour and shape of the cheek and neck.](image)
involves skin undermining, submental access to the neck (in most cases, for access to platysma and accompanying fat), lateral platysma window, and SMAS redraping by means of an SMAS-stacking plication or an SMASectomy. These principles have ensured that we can achieve sound realignment of the aging face and neck. Compared with our non–massive weight loss patients, in the massive weight loss population, the following steps are modified.

Fat Injection

We believe that all facial rejuvenation procedures should integrate this aspect to some degree; however, in the massive weight loss patient, this is vital, and on average more fat is necessary. In general, the subcutaneous cheek mass deflates and becomes more prominent anteriorly over the anatomical shelf of the nasolabial fold, and this produces a nasolabial crease depth and a lateral nasolabial or midmalar fold of subcutaneous tissue.9

Facial aging renders disproportionate changes in each patient. This may be attributable in large to many “facial fat compartments.” As we age, our individual fat compartments deflate differentially.

As facial fat deflates with age, facial volume decreases, particularly in areas that signify youth and beauty, such as the midface. This presents as a loss of soft-tissue fullness in the malar region and an increase in soft-tissue volume in the submalar and mandibular areas. This produces a more round or square facial structure.10

We routinely use fat compartment augmentation to the deep malar, nasolabial, and oral commissure/marionette areas as a routine adjunct to rhytidectomy (Fig. 6). In the massive weight loss patient, there is more fat compartment loss in the midface. Thus, we often use nearly twice as much fat in the deep malar fat compartment. This increases the volume in this region and blends and smooths the often harsh transition between lid and cheek.7

Extended Undermining of the Skin in the Cheek and Neck

This is vital and most often is performed to just lateral to the zygomaticus major to allow access to the mobile SMAS. Limited skin undermining, as our individualized components article describes, cannot be used in the massive weight loss patient. In the neck, we perform generous undermining to allow access to the platysma laterally and at the midline. We join these skin flaps in the submental area. All dissections are performed under direct vision using a fiberoptic retractor and manual countertraction.

In the massive weight loss patient, we remove substantially more skin. This is addressed by altering our standard high-hairline postauricular incision to one that follows the posterior hairline. Three centimeters is routinely removed versus only 1.5 cm in the non–massive weight loss patient.

Universal Submental Access to the Neck

In the massive weight loss patient, the neck midline is accessed through an incision placed 1
to 2 cm behind the submental crease. Lipodystrophy of the suprplatysmal fat is universal in these patients; thus, through the submental approach, this can be sharply excised. We always identify the platysma under direct vision and defat toward the midline.

Platysmal bands are then plicated in the midline. The inferomedial fibers of the platysma are incised transversely for a distance of 1 to 2 cm. Free medial platysmal muscle edges can eventually result in recurrent banding if left untreated. Thus, the free medial edges are approximated with interrupted 4-0 Mersilene (Ethicon) sutures. This helps tighten the muscular sling and sharpen the submental angle.

**Lateral Tightening by Means of a Platysma Window**

This technique has been described in previous studies. The platysma shaping occurs through the

![Fig. 4. Case 2. Frontal (above) and oblique (below) preoperative and 2-year postoperative views of the patient after SMASectomy and fat augmentation of the malar and nasolabial regions, and platysmal medial and lateral plication. Bilateral upper and lower lid blepharoplasty was also performed. She possesses more fat in the neck and jowl than the patient in case 1. This was addressed through direct excision through both submental and lateral approaches to the neck.](image-url)
Fig. 5. Case 2. Lateral preoperative and 2-year postoperative views of the patient.

Fig. 6. Illustration of the SMASectomy technique, which involves an oblique excision of redundant SMAS typically present in the massive weight loss patient. SMASectomy is typically parallel to the nasolabial groove and extends from the region to the malar eminence to the angle of the jaw. In addition, this maneuver is combined with fat injection of primarily the cheek and nasolabial areas. DM, deep malar fat; DN-L, deep nasolabial fold.
window technique, which involves plication to the posterior mastoid fascia from a point one finger-breadth below the angle and one fingerbreadth anterior to the sternocleidomastoid muscle. Lateral platysmal plication also repositions soft tissues away from the jowls.

**Submental Spanning Stitch**

In massive weight loss patients with thicker skin, particularly men, a submandibular spanning stitch from the submental platysma along the mandibular border to the mastoid fascia is used to help define the neck and cheek. In addition, the stitch reestablishes contour. A 3-0 Vicryl suture is routinely used.

**Redraping of the SMAS and Skin in the Appropriate Vector**

The SMAS is reshaped and elevated to establish the midface ideal for each individual patient. The SMAS vector is in either an oblique or a vertical direction based on facial analysis of the patient’s length and width. SMAS elevation also reestablishes fat compartment position, rejuvenates the submalar hollow, and defines the jawline. Massive weight loss patients typically require an SMASectomy to remove redundant SMAS; the mobile SMAS can then be anchored to nonmobile SMAS (Fig. 6).

The skin in the face is repositioned in a mainly vertical vector, with the neck skin in a posterosuperior vector. Along with this, release of the mandibular septum and mandibular ligament is often required. The mandibular septum is adherent to the mandible as a unified continuous structure in the subcutaneous layer. Sharp dissection is required to dissect the septum from the angle of the mandible toward the menton, 1 cm above the inferior mandibular border. This final step can allow for skin redraping without scalloping or tethering along the jawline. Figure 7 demonstrates

![Image of the sequence for face lifting in the massive weight loss patient.](image)

**Fig. 7.** Sequence for face lifting in the massive weight loss patient. Typically, we start with fat injection after abdominal harvest and augment areas of greatest deflation, typically deep malar, nasolabial, and occasionally jowl regions. The face lift then begins with wide skin undermining, over the entire lateral neck and in the cheek all the way to the zygomaticus. Submental access addresses fat irregularities and platysmal bands, and helps undermine the region. The lateral plication or platysma window helps to define the jawline. In male or thicker-skinned patients, a spanning stitch from the submental region to the mastoid can improve contour. This is followed by final SMASectomy and redraping of skin (modified from Narasimhan, K, Stuzin J, Rohrich, R. Five-step necklift—Integrating anatomy with clinical practice to optimize results. *Plast Reconstr Surg*. August 2013).
the sequence of successful facial rejuvenation in the massive weight loss patient.\textsuperscript{11}

Although our strategy appears effective to the massive weight loss patient, only a prospective study comparing results from massive weight loss and non–massive weight loss patients would verify the effectiveness of our individualized strategy. This type of case control is challenging in cosmetic surgery. However, to his surprise, the senior author (R.J.R.) notes that his results in massive weight loss patients have shown similar aesthetic longevity compared with results in his non–massive weight loss patients. This is only after his modifications in the massive weight loss patient that include nearly double the fat augmentation and almost universal open submental platysmaplasty and platysma window suture suspension. This technique has evolved over time, much like his technique of standard face lifting, to adjust to the anatomy of the patient.

Another important point is that nearly all (21 of 22) of our patients underwent concomitant procedures such as blepharoplasty, brow lift, and sometimes even rhinoplasty. Although not a focus of our article specifically, this only supports the point that anatomically there is little subcutaneous tissue in the eyelids and forehead in massive weight loss patients, although changes in these areas rarely truly differ from non–massive weight loss patients.\textsuperscript{2}

**CONCLUSIONS**

We believe the approach to the face lift should be tailored in all patients. This is the crux behind our studies on the fat compartments and the individualized components facial analysis.\textsuperscript{2,7} In the massive weight loss population, this tailoring is no different; however, there are common techniques that we feel can enhance the results in these patients based on their anatomy. The faces of these patients are routinely deflated and the SMAS more lax than in the average face-lift patient. Key points to remember are as follows: (1) the individualized components analysis can be used and common features are apparent; (2) faces tend to have more laxity of skin and deflation of fat compartments; (3) the SMAS technique tends to be SMASectomy because of redundant SMAS, and bilamellar to remove redundant skin; and (4) neck suspension sutures are used in thicker-skinned patients. These strategies help achieve the goals we all strive for in this unique population.

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**PATIENT CONSENT**

Patients provided written consent for the use of their images.

**REFERENCES**

AUTHOR QUERIES

AUTHOR PLEASE ANSWER ALL QUERIES

AQ1—Per Journal style, the abstract should not exceed 250 words and abbreviations and acronyms should be avoided. After acronyms were spelled out, the current abstract was shortened from 449 words to about 258 words. Correct as edited, particularly the Conclusions paragraph? If not, please revise as needed, keeping in mind Journal word limits and preferences.

AQ2—three-item list correct (“lower and upper lid blepharoplasty, brow lift, or facial resurfacing”)? Please advise/revise as needed.

AQ3—Legend to Figure 6: DM and DN-L defined correctly? If not, please provide the correct definitions.

AQ4—SCM spelled out correctly as “sternocleidomastoid muscle”? If not, please provide the correct expansion.

AQ5—Legend to Figure 7: Last sentence correct as completed (“This is followed by final…”)? Please advise/revise as needed.

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