Targeted Solutions in Submentoplasty

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ABSTRACT

Obtaining superior aesthetic results in the cervical-mental region requires accurately diagnosing the underlying anatomic abnormality. We have designed a comprehensive classification scheme based on diagnostic and surgical methods from a facial plastic surgical practice with 30 years of experience. Patients can be classified into the suggested system to determine the optimal rejuvenation technique.

KEYWORDS: Neck, submentoplasty, classification

The explosive demand for facial rejuvenation surgery has prompted a new set of standards. The demand has generated the development of new techniques; however, the margin of acceptance for less-than-perfect results has been narrowed. Achieving superior aesthetic results in neck rejuvenation is a necessary step to obtaining a favorable outcome in aging face surgery. The neck is composed of anatomic components that must be evaluated and treated individually.

As in all disciplines of medicine, the best outcome is predicated by the correct diagnosis. The patient requesting neck rejuvenation must undergo systematic critical facial analysis preoperatively followed by a method of treatment targeted accordingly. Others have developed classification systems of cervical abnormalities and have recommended specific treatments.1,3 We have developed a unique and comprehensive classification system (Table 1) based on commonly encountered defects observed over a 30-year span by the senior author. Aesthetically pleasing results are based upon treatments that are specifically directed to each deformity.

PATIENTS AND METHODS

The neck of each patient requesting rhytidectomy and/or submentoplasty is critically evaluated. Standard photographic representation for rhytidectomy is obtained.4 Diagnosis of specific defects of the cervical region may be aided by asking patients to grimace their face. This will accentuate the platysma muscle and highlight submental fat deposits. Postoperatively, patients are evaluated by standard photographic representation and physical exam.

Attention is focused on the following elements during physical examination:

1. Excess skin: (A) skin quality
2. Excess fat: (A) extraplatysmal, (B) subplatysmal
3. Platysma muscle abnormalities: (A) flaccid, (B) depressions/banding
4. Malpositioned tissues/unfavorable anatomy: (A) ptotic submandibular glands, (B) overdeveloped suprathyroid musculature, (C) abnormal hyoid position
5. Chin projection

TECHNIQUES

Treatments performed include

1. Skin excision: (A) T-Z plasty, (B) W-plasty
2. Lipectomy; (A) direct excision, (B) suction lipectomy
3. Platysma muscle alterations: (A) excision, (B) incision, (C) suture technique
4. Lifting procedures: (A) cervical, (B) superficial musculoaponeurotic system rhytidectomy
5. Chin alterations: (A) augmentation, (B) resuspension
Table 1 Targeted Solutions in Submentoplasty: Classification System

<table>
<thead>
<tr>
<th>Category</th>
<th>Anatomic Abnormality*</th>
<th>Surgical Treatment Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class I</td>
<td>Skin laxity only</td>
<td>Cervical-facial lifting or in select situations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Direct excision (T-Z plasty or W-plasty)</td>
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<tr>
<td></td>
<td></td>
<td>± Chin augmentation</td>
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<tr>
<td>Class II</td>
<td>Elastic skin</td>
<td>Submental stab incision and lpectomy</td>
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<td></td>
<td>Isolated submental ptosis</td>
<td>± Chin augmentation</td>
</tr>
<tr>
<td>Class III</td>
<td>Excess skin</td>
<td>Cervical-facial lifting only or combined with</td>
</tr>
<tr>
<td></td>
<td>Submental ptosis</td>
<td>Submental stab incision and lpectomy</td>
</tr>
<tr>
<td></td>
<td>Mild platysma ptosis and banding</td>
<td>Chin augmentation</td>
</tr>
<tr>
<td>Class IV</td>
<td>Excess skin</td>
<td>Cervical-facial lifting</td>
</tr>
<tr>
<td></td>
<td>± Submental ptosis</td>
<td>2- to 3.5-cm submental incision</td>
</tr>
<tr>
<td></td>
<td>Platysmal ptosis and banding moderate to severe</td>
<td>Submental lpectomy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Platysmal plication</td>
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<tr>
<td></td>
<td></td>
<td>± Chin augmentation</td>
</tr>
<tr>
<td>Class V</td>
<td>Short neck</td>
<td>Cervical-facial lifting</td>
</tr>
<tr>
<td></td>
<td>Excess skin</td>
<td>2- to 3.5-cm submental incision</td>
</tr>
<tr>
<td></td>
<td>Excess submental liposis</td>
<td>Submental lpectomy</td>
</tr>
<tr>
<td></td>
<td>Severely ptotic platysma</td>
<td>Platysmal excision and plication</td>
</tr>
<tr>
<td></td>
<td>Hypertrophic digastric muscles</td>
<td>Deep subplatysmal lpectomy</td>
</tr>
<tr>
<td></td>
<td>Ptotic submandibular gland</td>
<td>± Chin augmentation and/or suspension</td>
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<tr>
<td></td>
<td>Chin ptosis</td>
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<td></td>
<td>Low hyoid position</td>
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</table>

*Microgenia may be present in all classification levels, and treating it appropriately is a key component to obtaining a superior result.

Based on the aforementioned criteria, the treatments that were performed, and the results that have been achieved, patients are placed into a graduated classification system. The system is based on the anatomic level of the abnormality and to the degree of involvement for each component of the neck. Treatment guidelines were developed for each classification level. Following are a list of the classes that have been developed and their respective treatments.

Class I: Patients in this group have skin laxity only, ranging from mild to severe ("turkey gobbler"). Treatment: If mild, observation only may be sufficient; however, excess skin usually will require rhytidectomy with cervical-facial lifting. In very limited situations of overly redundant skin, direct surgical excision (T-Z plasty, W-plasty) may be warranted. The patient depicted (Fig. 1) was diagnosed with excess submental skin and early jowling. Submental fat was minimal, and she demonstrated favorable neck anatomy. A pleasing result was obtained with surgical treatment limited to cervical facial lifting only. At 1-year follow-up she maintains a well-defined cervical-mental angle (Fig. 2).

Class II: Patients have isolated congenital submental fat deposit and elastic skin. Treatment: In this class optimal results may be achieved with a 0.5-cm submental stab incision and cannula-assisted submental lpectomy. Skin excision is not necessary. The patient depicted (Fig. 3) displays the combination of excess submental fatty deposits with taut skin. Microgenia was included in her diagnosis. She underwent submental lpectomy and chin augmentation. At 2-year follow-up an improved submental region is apparent (Fig. 4).

Class III: This class is characterized by a ptotic platysma and/or mild banding, excess skin, submental liposis. Treatment: Improvement will require combined cervical-facial lifting. However, a submental incision may be unnecessary. All submental treatment can be performed through lateral rhytidectomy incisions. In cases of excess submental fat suction lpectomy can be done through a small 0.5-cm stab incision. The patient identified (Fig. 5) presents with a ptotic platysma muscle, excess skin, submental fat, and mild chin ptosis. Six months following cervical-facial lifting and chin augmentation an improvement in neck contour is evident (Fig. 6).
Figure 1  Class I patient preoperatively demonstrates excess submental skin laxity and early jowling.

Figure 2  Class I patient at 1 year following only a cervical-facial lifting procedure displays a well-defined cervical-mental angle.

Figure 3  Class II patient preoperatively demonstrates a combination of excess submental fat deposition with elastic skin and microgenia.

Figure 4  Class II patient 2 years following submental lipectomy and chin augmentation.
Class IV: Platysma banding moderate to severe, excess skin, ± submental lipotis is evident in this class. Treatment: Appropriate treatment will require a combined cervical-facial lifting procedure, in addition to a 2½–cm submental incision and plication of medial borders of the platysma. Noticeable platysma banding can be seen in (Fig. 7). Improvement in the submental area is achieved after cervical-facial lifting, submental lipectomy, and platysmal plication (Fig. 8).

Class V: This class is characterized by unfavorable anatomy (excess skin, excess submental lipotis, low hyoid position, hypertrophic digastric muscles, ptotic submandibular glands, and short and/or obese neck). Treatment: This class will require cervical-facial lifting in addition to directly addressing the submental area. Chin pad resuspension may be necessary. Excess skin, fat, and platysma in a patient with microgenia, short neck, and low hyoid position is demonstrated (Fig. 9). Although these patients present a challenge, satisfying results can be achieved. The patient (Fig. 10) underwent cervical-facial lifting, submental lipectomy, platysmal plication, and chin augmentation. An 8-month follow-up photograph is included.
Microgenia: Because it can occur with each anatomic defect, the chin is cross-referenced individually to each class.

COMMENT
The aging process can bring unfavorable changes to the neck, including redundancy of skin, accumulation of fat, laxity in the platysma, and ptosis of the underlying anatomy. Achieving an improvement in the cervical-mental region in aging face surgery is necessary to obtaining a youthful appearance. The surgeon who performs rhytidectomy without analyzing and addressing the cervical region may be forfeiting the best potential outcome.

It must be emphasized that the cervical-mental region is complex. To treat it in a standard "cookbook" fashion may offer less-than-ideal results. Proper facial analysis and accurate diagnosis preoperatively are crucial prerequisites. After an accurate diagnosis is made, treatment is tailored to the individual problem. A system that allows for analysis of commonly encountered defects in the neck and places them into classification levels can guide the surgeon in his or her approach. The following categories of cervical anatomic components...
are considered when evaluating the patient requesting neck rejuvenation.

Excess Skin
Excess skin in the neck common to the aging process is also associated with significant weight loss. Excess skin may range from a slight redundancy to the “turkey gobbler neck” (Fig. 11). Approach to these patients will vary depending on their individualized anatomy and desires.

In patients with a slight redundancy, who are also undergoing suction lipectomy, removal of skin may be unnecessary. After removal of fat, the skin contracts down over the lost volume. Extra skin is required for smooth redraping of this area, which then resolves the issue of redundancy. Although the treatment performed for excess cervical skin is often done in conjunction with rhytidectomy, there remain those patients who do not desire a lifting procedure. Additionally, the standard cervical-facial lifting procedure may not correct the excessively redundant neck skin. For patients with a large amount of excess skin who are not interested in a lifting procedure, direct excision has been a valuable technique. Patients must be informed that scar formation is inevitable; additionally, those with a history of hypertrophic scarring are unlikely to be good candidates for this approach. Skin excision with the T-Z plasty\textsuperscript{6-9} or W-plasty\textsuperscript{10} method has been used for over 25 years. Experience has proven that creating an inconspicuous scar is standard (Fig. 12). Often patients undergoing direct excision are males in which it is easier to camouflage irregular scars under the chin shadows of a bearded neck. Caution should be exercised; excess skin removal can lead to a vertical cutaneous band.\textsuperscript{5}

Excess Fat
Cervical fatty deposits may be hereditary or acquired.\textsuperscript{11} Frequently, it becomes concentrated in the submental region. In the remainder of the neck, cervical fat is more uniformly distributed. Fat is easily identified if patients are asked to alternately tighten and relax their neck muscles. Fat may accumulate at the extraplatysmal or subplatysmal level. On average 30% of submental fat is located below the platysma, but it can range to as much as 57%.\textsuperscript{12} Subplatysmal fat tends to be denser and more vascular.

Traditionally, sharp excision of fat under direct vision with scissors was the method of choice. With the advent of suction lipectomy, however, the use of scissors in this region has been deemphasized. Although in select situations, particularly in older individuals, a superior result can still be achieved with direct excision. Other indications for direct excision include fine sculpting of the anterior jawline or in secondary submentoplasty where there may be adhesions between the platysma and the dermis.\textsuperscript{13} Recently, a soft tissue shaving technique has been touted as a method to more precisely remove fat from this region in a minimally trau-

Figure 11 This patient demonstrates an extreme anatomic variant attributed to marked excess in submental skin commonly referred to as “turkey gobbler neck.”

Figure 12 Acceptable scar camouflaging following direct skin excision of redundant submental skin.
Malpositioned Tissues
Malpositioned tissues are often overlooked as a cause of the overly obese cervical-mental angle. During facial analysis, attention should be directed to the hyoid–thyroid complex as well as the suprathyroid musculature and the submandibular glands.

Hyoid position can be confirmed with xero- graphs, although this has not been found to be necessary. A low hyoid–thyroid complex will make it more difficult to obtain a sharp cervical–mental angle. However, success in elevating the hyoid position has been achieved with an extensive submental dissection and myotomy of the submental musculature.21 Well-developed digastric muscle may lead to fullness in the submental region. Having patients flex their neck with their mouth closed can identify this. Treatment, which has been advocated, includes excision of muscle and/or plication of the digastric bellies.22

Submandibular glands tend to become ptotic with aging and are easily identified with basic physical exam skills. Gortex grafts23 and imbrication24 of the platysma in the submandibular area has been suggested, although neither technique is widely practiced.

Microgenia
Elemental to the attractive youthful appearing neck is a low sweeping jaw line. The aging process results in ptosis of the chin pad. A subtle yet dramatic improvement in the neck contour of a deficient patient can be made with chin augmentation techniques. Considered separately, chin disharmony can be common to all the classification levels, irrespective of the class level. Accurate attention and treatment to the mandibular length is key to obtaining a superior result. Careful preoperative evaluation will determine proper position of the chin. On profile view, a line can be dropped vertically from the vermillion border of the lower lip. In men this line will be tangent to the pogonion; in women it may lie 2 to 3 mm anterior.25 The patient requesting facial and cervical rejuvenation often does not recognize the importance of a strong chin to a well-defined cervical–mental angle. Detailed consultation with photographs, three-way mirror, and computer video imaging can help to educate the patient.

If necessary a chin implant can be placed through the same incision used for submentoplasty. Occasionally, to obtain a more youthful appearance, cephalic repositioning of soft tissue and muscle may be necessary.

CONCLUSION
After separately evaluating the different components of the neck, a composite is formulated. Based on the composite, the patient is stratified into a classification system, and the most appropriate surgical approach is determined. Class I and II patients have mild submental deformity and can usually expect excellent results with minimal intervention. The exception is the excessively redundant neck skin ("turkey gobbler"). These patients will require a more extensive procedure. The majority of patients who request facial rejuvenation surgery are commonly identified to class III and IV. Class III and IV patients are distinguished by the degree of midline platysmal ptosis, the latter class displaying more prominent laxity and banding. These patients will require a submental incision and plication of the medial muscle borders. Prominent submental fat deposits may occasionally obscure platysmal banding. Thus, it is important to always consider and search for occult platysmal banding because it may influence the surgical approach. When excess submental fat or unfavorable anatomy (e.g., neck obesity, low hyoid position) exists, patients are designated as class V. In certain situations consideration should be given to delaying surgery until a weight loss program has been successfully implemented.

In addition to providing technical direction, other valuable information can be gleaned from a classification guide. In general, as the classes progress so does the complexity of the surgical procedures. Additionally, patients identified as class V should not expect the same results as will be attained for those patients designated as class I and II. This knowledge may be useful in preoperative consultations. It is recognized that in facial plastic surgery, as in other fields of medicine, a classification system can be beneficial. It serves to assist in diagnosis, proposes treatment guidelines, and offers a basis for prognosis.

Aesthetic improvement in the neck can be challenging, especially if the proper diagnosis is not made. Detailed preoperative assessment, which considers all the components of the neck, is necessary. Although it is important to understand the supporting principles behind the various techniques for treating the neck, it is equally important to recognize the situations in which to apply these methods. We propose a systematic approach to evaluating the aging neck. Commonly encountered combinations of defects are organized into a classification system. This scheme considers the superficial skin (class I) and extends to the deep anatomic structures of the neck (class V). Additionally, we have added treatment options for each classification that have withstood the test of time. Long-term follow-up is presented from a practice with more than 30 years of experience. The surgeon who preoperatively evaluates different units of the neck, treats accordingly, and allows them to blend together is likely to achieve the most promising results.
REFERENCES