ALTERNATIVE TECHNIQUES IN COSMETIC SURGERY

Isolated Cervicoplasty

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Isolated cervicoplasty is a surgical procedure that improves and/or rejuvenates the central submental/neck area maximally and the jowl and lateral submandibular area mildly to moderately. Maximum improvement and/or rejuvenation of the jowl and lateral submandibular area of the neck involves superior-*posterior repositioning of redundant facial tissue and requires a facelift concomitant with cervicoplasty. Isolated cervicoplasty is performed through a submental incision without pre- or postauricular incisions. In select patients, isolated cervicoplasty will give a very satisfactory result. A precise knowledge of the normal neck anatomy and the anatomy of the deformity of the neck is mandatory to determine the correct surgical procedure and to achieve the most acceptable result. Clinical evaluation and treatment planning for isolated cervicoplasty is discussed. Based on a thorough knowledge of neck anatomy, the surgical technique for isolated cervicoplasty is described. This usually involves conservative liposuction, accurate excision of lax neck fascia-platysma muscle complex and tension-free suture approximation of the central neck fascia-platysma complex from symphysis menti to the level of the thyroid or cricoid cartilage. The use of fibrin sealant has been found to be very helpful. When indicated, this surgical technique is a safe, uncomplicated method to produce a long-lasting, attractive neck.*

The goal of facial aesthetic surgery is to create a consistent, predictable, stable, natural, youthful, attractive appearance. This goal is accomplished by improvement and/or rejuvenation (*juvenis,* Latin for young) of the face and anterior neck.

The anterior neck boundaries are the inferior border of the mandible superiorly, the anterior borders of the sternocleidomastoid (SCM) muscles posteriorly, and the suprasternal notch inferiorly. The anterior neck is divided into a central submental/neck area and a lateral submandibular area (Figure 1).

Traditionally, the term "cervicoplasty" has been used by aesthetic surgeons to describe the surgical improvement or rejuvenation of the anterior neck. By definition, cervicoplasty is also used by gynecological surgeons to describe surgery of the cervical portion of the uterus (cervix). "Necklift" is a more appropriate term for surgical improvement or rejuvenation of the anterior neck; however, we shall bow to tradition.

Isolated cervicoplasty is a surgical procedure that improves and/or rejuvenates the central submental/neck area maximally and the jowl and lateral submandibular area mildly to moderately. Maximum improvement and/or rejuvenation of the jowl and lateral submandibular area of the neck involves *superior*-posterior repositioning of redundant facial tissue and requires a facelift. Isolated cervicoplasty is performed through a submental incision without pre- or postauricular incisions. If it is determined preoperatively that isolated cervicoplasty will not achieve an acceptable result, the patient is advised that a concomitant extended multiplanar multivector facelift (extended subsuperficial musculoaponeurotic system [subSMAS]) is required for an ideal result (Figure 2; all photos taken with horizontal plane parallel to floor). Often an acceptable aesthetic result in the lateral submandibular area can be obtained with isolated cervicoplasty (Figures 3–6). If a chin implant or orthognathic surgery is indicated, the result can be very acceptable (Figures 7–10).

In young patients, isolated cervicoplasty, when indicated, may give an excellent result. In young to middle-aged patients without the middle and lower third of the face aging, an endoscopic browlift and isolated cervicoplasty is often performed. In the typical aged face, regional surgery such as isolated cervicoplasty does not achieve the desired balance and harmony of the face and neck and gives an unnatural result. Typically, rejuvenation of the upper, middle, and lower thirds of the face and also the neck is required for a natural result.

This article will present the surgical anatomy, the anatomy of aging, clinical evaluation, treatment planning, and the authors' technique for cervicoplasty without facelift. It is our opinion that anterior cervical skin excision, posterior cervical skin excision, suspension sutures, hyoid bone surgery, Botox injections, and in most cases liposuction without platysmaplasty do not give an acceptable, consistent, predictable, stable, natural result.

A complete set of cervicoplasty references from 1963 through 2000 is presented for informational purposes.[1–68] The majority of these references consider

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cervicoplasty concomitant with facelift and do not address *isolated* cervicoplasty.

Cervicoplasty Surgical Anatomy

It is important for the surgeon to have a precise knowledge of the anatomy of the normal neck as well as the anatomy of the aging neck.

Normal Neck Anatomy

Since the surgical improvement or rejuvenation of the neck is mostly limited to the anterior neck, we shall only address the anatomy of this area.

We should be reminded that in vivo anatomy varies considerably from postmortem anatomy. Dry cadaver, fresh cadaver, and in vivo dissections yield different results. Newer histologic (large mount sections) and microdissection techniques, endoscopic in vivo dissections, and magnetic resonance imaging, coupled with recent well constructed studies, have helped to prove and disprove certain well established anatomic facts.

An important anatomic concept to understand is that the anatomic layers in the entire face and neck area, with the exception of the lack of a distinct deep fascia in the upper forehead and skull, are virtually the same: they just have different names (Figure 11). Anatomy in the superficial to deep dimension is almost constant except for thickness. Anatomy in the other 2 dimensions (anterior-posterior, superior-inferior) is variable in each individual.

Superficial Fat Layer (Fibro-fatty Layer)

The superficial fat layer is highly variable in thickness and distribution in each individual. Increased thickness of this layer may be the only causative factor in the unattractive neck of youth (Figure 12). Typically, the superficial fat layer is thicker in the central submental/neck area than in the lateral submandibular area. This is clinically significant because subcutaneous dissection in this fat layer must become more superficial in the lateral submandibular area, particularly inferior to the angle of the mandible.

There is often a fairly distinct line of demarcation between the smaller lobules of the immediate 3–5 mm of subcutaneous fat and the larger lobules of the remaining fat of the superficial fat layer. This is clinically significant because the smaller lobules of the immediate subcutaneous fat layer should never be removed (Figure 13). The deeper portion of this superficial fat layer is often histologically integrated with the superficial lamina of superficial cervical fascia and with the confluence of superficial fascia (aponeurosis) in the diastasis between the anterior borders of the platysma muscles (diastasis platysmae) (Figure 14).

In the typical youthful neck, multiple fibrous septae that traverse this fat layer from superficial cervical fascia to the dermis are evident. Condensation of these fibrous septae create the submental crease and the horizontal creases of the neck.

Superficial Cervical Fascia (Neck Superficial Musculoaponeurotic System, Panniculus Carnosus)

The superficial cervical fascia is a continuous layer of fascia. It is usually closely adherent to the investing layer of deep cervical fascia surrounding the sternocleidomastoid muscles in the lateral aspect of the neck. It splits into superficial and deep laminae to invest the platysma muscles and becomes confluent as an aponeurosis in the diastasis platysmae. This central aponeurosis is closely adherent to the superficial investing layer of deep cervical fascia of the anterior neck in youth (Figures 15 and 16).

This neck fascia-platysma muscle complex is consistent and confluent with the superficial musculoaponeurotic system (SMAS; platysma muscle) complex of the lower and middle face. The term SMAS has traditionally been given to the superficial facial fascia muscle complex of the middle third and lower third of the face that includes the superficial facial fascia and the invested risorius muscles and facial portion of the platysma muscles. This is how it was originally described by Tessier in a 1974 lecture and inconsistently described by Mitz and Peyronie in 1976. The term SMAS has been loosely used by many surgeons and anatomists to also include the superficial fascia-muscle complex in the upper third of the face (temple to forehead) and in the neck.

For purposes of this article, the superficial cervical fascia and its integrated fat (especially in the diastasis platysmae aponeurosis) and the invested neck platysma muscle will be called the neck fascia-platysma muscle complex.

Deep Fat (Areolar) Layer

The layer between the deep lamina of the superficial cervical fascia and superficial investing layer of deep cervical fascia, except for the aforementioned adherences, contains a variable amount of fat (especially centrally) and loose areolar tissue (Figure 17). This layer is clinically significant because the areolar tissue allows safe blunt subfascia-platysmae muscle complex dissection in the neck. It also contains the anterior jugular veins.

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Figure 1. *Division of anterior neck into a central submental/neck area and a lateral submandibular area.*
Figure 2. *Patient had cervicoplasty with liposuction and platysmaplasty, extended multiplanar multivector (extended subSMAS) facelift, and endoscopic browlift showing complete rejuvenation of the lateral submandibular area of the neck because of facelift. (a),(c) preoperative; (b),(d) postoperative.*

1

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2d

Deep Cervical Fascia

The only surgically significant portion of the deep cervical fascia is the superficial investing lamina that invests the SCM muscles and covers the suprahyoid and infrahyoid muscles of the neck. This fascia is not transgressed during a cervicoplasty.

Platysma Muscles

The platysma is a broad sheet of muscle that originates from the fascia covering the upper parts of the ipsilateral pectoralis major and deltoid muscles. The anterior portion of the platysma muscle in the neck is thicker than the posterior portion. The platysma muscle covers the neck and crosses the inferior border of the mandible. It divides into several insertions including (1) anteriorly to the contralateral platysma muscle posterior and inferior to the symphysis menti (decussation); (2) the lower border of the anterior mandible, anterior to the mandibular osteocutaneous ligaments, and called the pars mandibularis portion of the platysma muscle; (3) posterior to the mandibular osteocutaneous ligaments, it intermingles with the posterior fibers of the depressor anguli oris muscle and/or passes deep to the depressor anguli oris muscle to insert into the pars marginalis portion of the orbicularis oris muscle and is called the pars labialis portion of the platysma muscle; and (4) further posteriorly it passes over the inferior border of the mandible to intermingle with the risorius muscle and inserts into the modiolus, a fibromuscular condensation of the insertions of approximately 9 facial mimetic muscles located about 12 mm lateral to the oral commissure and is called the pars modiolus portion of the platysma muscle. Although the aponeurosis of the SMAS of the face is actually superficial facial fascia and involuted platysma muscle, this could also be considered to be another insertion of the platysma muscle (Figure 18).

The fact that there are variable insertions of the platysma muscles in the face is clinically significant. The pars mandibularis insertion to the anterior body of the mandible prevents significant soft tissue laxity of the chin area. The pars labialis and pars modiolus portions of the platysma muscle are not attached to the inferior border of the mandible and become lax with aging. This allows jowl formation and blunting of the inferior border of the mandible when the facial SMAS complex descends into the neck. The pars labialis is occasionally completely separate from the pars mandibularis inferior to the inferior border of the mandible. This is the anterior border of the jowl. If there is a separation below the inferior border of the mandible, this is the area that can develop an irregularity when an isolated cervicoplasty is performed with significant medial traction on the neck fascia-platysma muscle complex (Figures 19 and 20).

The insertion with the contralateral platysma muscle (decussation) is highly variable and has been studied extensively.[18,28,43] There is no real evidence that this variable decussation is clinically important (Figure 21).

Cervical Branches of the Facial Nerve

The motor innervation of the platysma muscle is by the cervical branch of the facial nerve, which divides into multiple branches that perforate either the deep facial fascia (parotid fascia) or the deep cervical fascia to enter the deep surface of the platysma muscle below the angle of the mandible. These branches are usually not involved in isolated cervicoplasty because subfascia-platysma muscle complex dissection is usually not performed that far posteriorly. Care must be taken with the subcutaneous dissection so that the thin posterior neck fascia-platysma muscle complex inferior to the angle of the mandible is not perforated, which will not only endanger the cervical branches but also the marginal mandibular branch of the facial nerve that variably also sends some small branches to the platysma muscle. The marginal mandibular branch exits the parotid gland and runs inferior to the angle of the mandible and then courses superiorly and becomes more superficial at the anterior border of the insertion of the masseter muscle, at the mandibular antegonial notch, where it runs superficial to the facial vessels and comes close to the deep surface of the neck fascia-platysma muscle complex at the inferior border of the mandible.

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Figure 3. *Patient had isolated cervicoplasty with liposuction and platysmaplasty, endoscopic browlift, and open structure rhinoplasty. Acceptable result in patient with low anterior hyoid bone. Fifty percent improvement in lateral submandibular area of the neck. (a),(c) preoperative; (b),(d) postoperative.*

Figure 4. *Patient had isolated cervicoplasty with liposuction and platysmaplasty, silicone augmentation malarplasties, and intraoral lower eyelid orbital fat redistribution. Acceptable result in patient with low anterior hyoid bone. Fifty percent improvement in lateral submandibular area of neck. (a),(c) preoperative; (b),(d) postoperative.*

Figure 5. *Patient had isolated cervicoplasty with liposuction and platysmaplasty and endoscopic browlift and mini-midfacelift. Acceptable result, with 70% improvement in lateral submandibular area of neck. (a),(c) preoperative; (b),(d) postoperative.*


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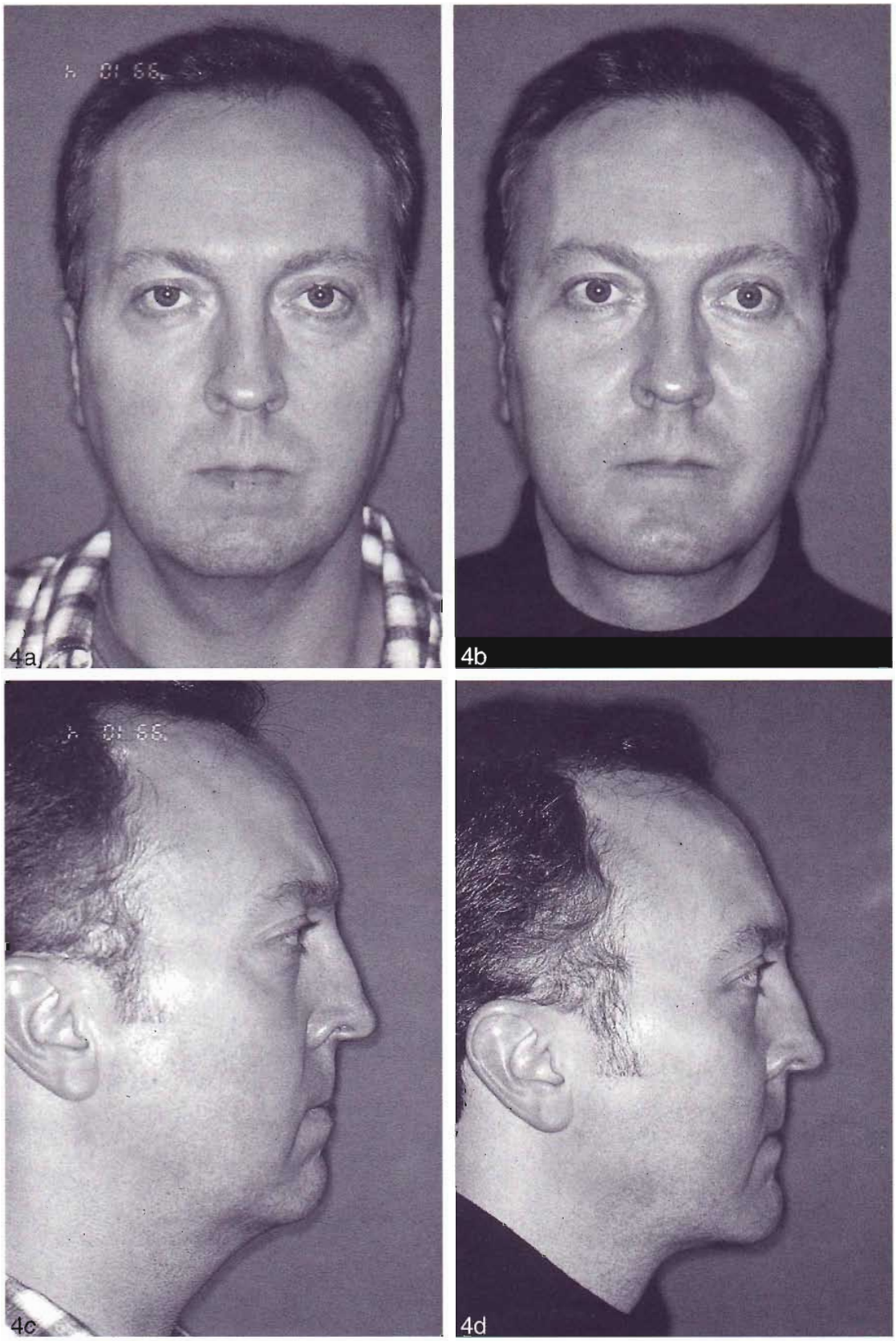
4a
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5a
5b
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Vasculature

The arterial supply to the anterior neck has been studied extensively in the head and neck cancer literature regarding platysma skin flaps.[68] Although there are multiple sources of arterial supply to the anterior superior portion of the neck, the dominant arterial supply is from branches of the facial artery, submental artery, and the superior thyroid artery. In the technically correct cervicoplasty, the branches of these arteries are rarely interrupted.

The venous drainage of the anterior superior neck is the external jugular, submental, and anterior jugular venous complex deep to the fascia-platysma muscle complex. Of clinical significance in an isolated cervicoplasty are the branches of the anterior jugular veins, which are interrupted during excision of the lax central portion of the neck fascia-platysma muscle complex (Figure 17).

Anatomy of the Aging Neck

Aging of the neck is variable from individual to individual and is multifactorial, multiplanar, and multivectorial. Knowledge of normal neck anatomy is important. Knowledge of the anatomy of the aging deformity is imperative in selecting the correct rejuvenative technique (Figure 22). Rejuvenative procedures must address the causes of aging, the anatomic area of laxity, muscle hyperactivity, lipomatosis, and/or atrophy.

In the neck, the area of greatest manifestations of the aging process is the central submental/neck area. Typically, this presents as laxity of the central portion of the neck and blunting of the cervical-submental angle associated with either lipomatosis or fat atrophy of the superficial fat layer (Figure 23), lipomatosis of the central portion of the deep fat layer (between anterior bellies of digastric muscles; Figure 24), platysma bands (Figure 25), and deeper horizontal rhytids. The causes of these clinical signs of the aging neck are multifactorial; however, the common denominator is the release of the area of central adherence between the superficial cervical and investing layer of deep cervical fascias. Therefore, the major plane of aging of the neck is the deep fat (areolar) layer (subfascia-platysma muscle layer). This layer of adherence in the central submental/neck area is areolar in nature and easily released, unlike the adherence between facial SMAS and parotid fascia, and superficial cervical fascia and investing deep cervical fascia over the SCM muscle, which is usually strictly adherent. The neck fascia-platysma muscle complex and skin increase in transverse surface area, fat accumulates or atrophies, and platysma bands occur in areas of increased separation of the superficial cervical and the investing layer of deep cervical fascias, probably caused by hyperactivity of certain areas of the platysma muscles (Figure 26). These bands are not necessarily the medial edges of the platysma muscles.

Aging of the lateral submandibular area of the neck is manifested by jowls and blunting of the inferior border of the mandible. These clinical signs are not from aging of the neck but from the aging process of the lower third of the face. The youthful face is supported by adherences between the facial SMAS complex and the deep facial fascia and by retaining ligaments. Release of these adherences, weakening of the retaining ligaments, and an increase of surface area of the facial SMAS complex and skin, lipomatosis or fat atrophy,

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Figure 6. *Patient had isolated cervicoplasty with liposuction and platysmaplasty and lower eyelid transconjunctival blepharoplasties with fat removal. Acceptable result, with 60% improvement in lateral submandibular area of neck. (a),(c) preoperative; (b),(d) postoperative.*

Figure 7. *Patient presented desiring a facelift. Patient with satisfactory occlusion had isolated cervicoplasty with liposuction and platysmaplasty, silicone augmentation malarplasties, and silicone augmentation genioplasty. Improved result because of genioplasty. (a) preoperative; (b) postoperative.*

Figure 8. *Patient with satisfactory occlusion had isolated cervicoplasty with liposuction and platysmaplasty, open structure rhinoplasty, and silicone augmentation genioplasty. Improved result because of genioplasty. (a) preoperative; (b) postoperative.*

Figure 9. *Patient with satisfactory occlusion had isolated cervicoplasty with liposuction and platysmaplasty, open structure rhinoplasty, and silicone augmentation genioplasty. Improved result because of genioplasty. (a) preoperative; (b) postoperative.*

Figure 10. *Patient with unsatisfactory occlusion had orthognathic surgery only, no cervicoplasty required. Satisfactory neck because of orthognathic surgery. (a) preoperative; (b) postoperative.*

Figure 11. *(a) Basic layered anatomy of the face and neck. (b) Layered anatomy of the neck with specific names of the various layers.*

Figure 12. *Cervical superficial fat layer.*

Figure 13. *(a) Smaller globules of superficial fat layer. (b) Typical dissection plane in typical cervicoplasty patient (deeper in patients with heavier facies). (c) Larger globules of superficial fat layer. (d) Superficial lamina of superficial cervical fascia over platysma muscle.*


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6c


6d


7a

7b


8a

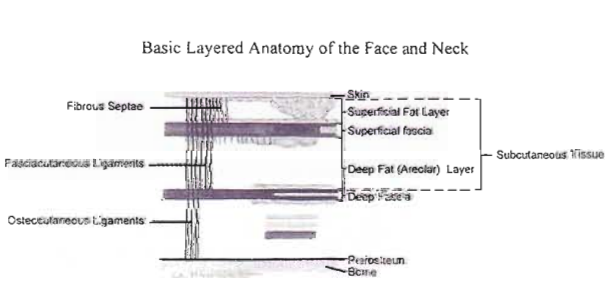

8b


9a

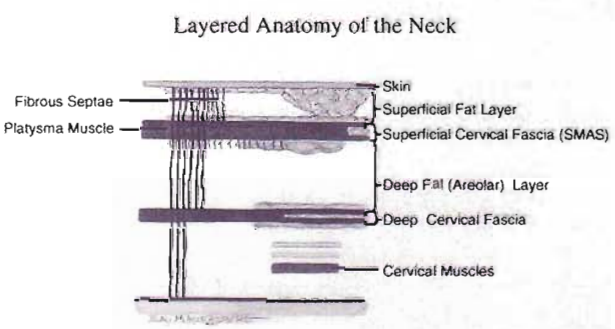

9b


10a

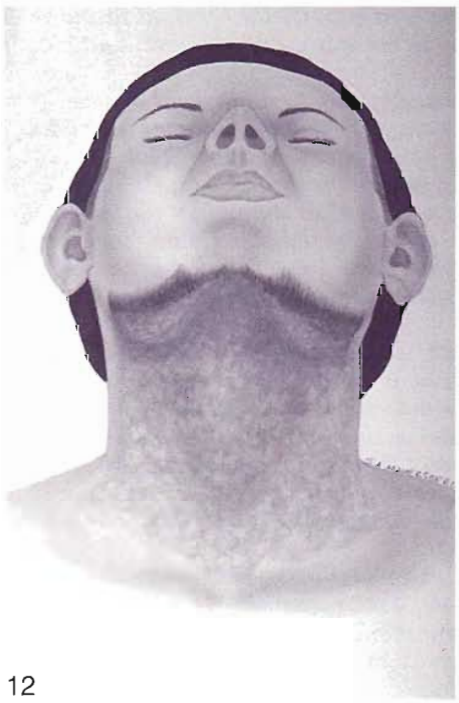

10b


Basic Layered Anatomy of the Face and Neck
Fibrous Septae
Fasciacutaneous Ligaments
Osteocutaneous Ligaments
Skin
Superficial Fat Layer
Superficial fascia
Deep Fat (Areolar) Layer
Deep Fascia
Subcutaneous Tissue
Periosteum
Bone

11a


Layered Anatomy of the Neck
Fibrous Septae
Platysma Muscle
Skin
Superficial Fat Layer
Superficial Cervical Fascia (SMAS)
Deep Fat (Areolar) Layer
Deep Cervical Fascia
Cervical Muscles

11b



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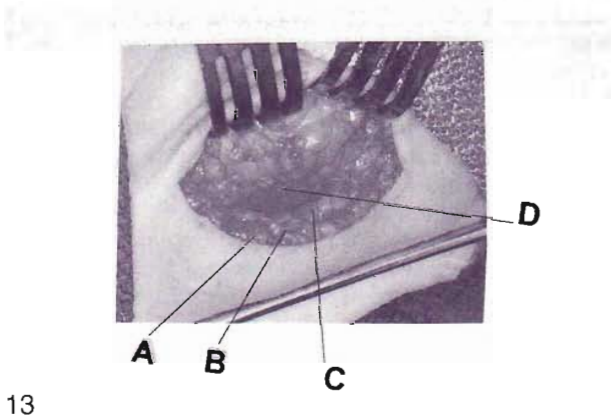
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along with other more complex factors cause facial aging. Because these clinical signs are from the lower third of the face, they are best corrected by *superior*-posterior correction of the lower third of the face and not by isolated cervicoplasty.

Evaluation

The youthful attractive neck has certain characteristics that have been described by several authors.[17,42] These include the following aesthetic observations:

1. Cervical-submental angle = 115° ± 10°.
2. Distinct inferior mandibular border.
3. Distinct anterior border of SCM muscle.
4. Distinct depression posterior and inferior to angle of mandible.
5. Gentle contours without bands or folds.
6. Smooth skin.
7. Proportionate length.
8. Slight prominence of thyroid cartilage in men.

There are certain limiting anatomic factors that prohibit these aesthetic conditions in both the youthful and rejuvenated neck (especially with isolated cervicoplasty):

1. Anterior-inferior positioned hyoid bone: It is our opinion that the benefit of hyoid suspension or release of suprahyoid muscles does not justify the surgery required.[20,38] This malpositioned hyoid bone often causes the anterior bellies of the digastric muscles to become more prominent. Occasionally, we will trim the superficial surfaces of at least 50% of the diameter of the digastric muscles using a radiofrequency unit and loop (Ellman, Hewlett, NY).
2. Large or ptotic submandibular glands: It is our opinion that the benefit of submandibular gland suspension (difficult to obtain long-term results) or partial excision of the submandibular gland do not justify the surgery required. Often what is diagnosed visually as a large or ptotic submandibular gland is really ptosis of the pars labialis and pars modiolus portions of the platysma muscle, fascia, and fat (anterior and posterior portions of the jowls in the neck) in the presurgical patient, or irregularities or inadequate relocation of these same anatomic structures in the postsurgical patient. Occasionally, we will partially reduce large submandibular glands in older patients who have previously had a cervicoplasty (with too much fat removal) and a facelift and there is significant prominence. We use a radiosurgery unit with a large loop to reduce the anterior-inferior portion of the gland from a submental approach after incising the capsule of the gland. The anterior-inferior portion of the gland is usually the prominent portion and is the safest to partially remove. The significant vascular structures (facial artery and anterior facial vein) are posterior and superior. The neck fascia-platysma muscle complex, if interrupted, must be repaired superficial to the gland.
3. Severe extrinsic damage to neck skin, loss of elas-

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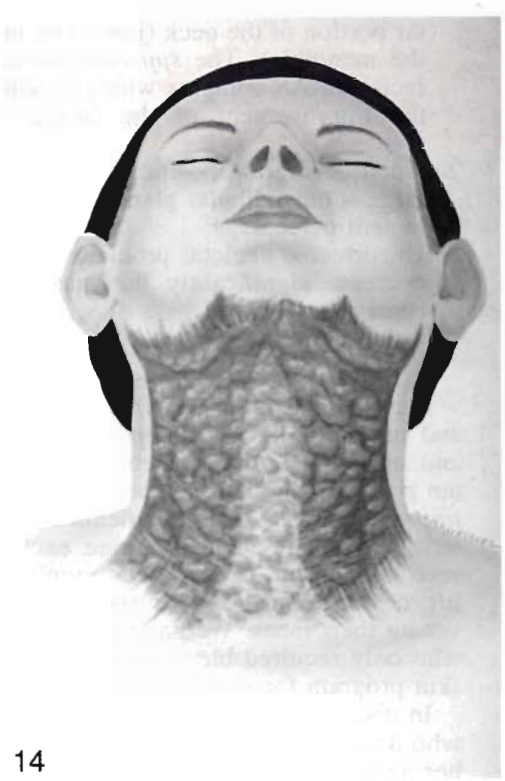
Figure 14. *Deeper layers of superficial fat layer is often integrated in superficial lamina of superficial cervical fascia. The confluence of superficial and deep investing layers of superficial cervical fascia in the diastasis platysmae (aponeurosis) is a composite fibrofatty layer that is comprised of collagen and elastin fibers interspersed with fat cells.*

Figure 15. *Paramedian sagittal section. (a) Sternohyoid muscle, (b) sternothyroid muscle, (c) thyroid cartilage, (d) hyoid bone, (e) geniohyoid muscle, (f) genioglossus muscle, (g) mentalis muscle, (h) mylohyoid muscle, (i) anterior belly of digastric muscle, (j) areolar adherence of deep lamina of superficial cervical fascia (green) and superficial (investing) lamina of deep cervical fascia (blue), (k) submental crease, (l) superficial fat layer with adherence of superficial lamina of superficial cervical fascia (green) to dermis by fibrous septae, (m) platysma muscle, (n) deep fat (areolar) layer, (o) areolar adherence of condensed superficial (investing) lamina of deep cervical fascia (blue) with deep lamina of superficial cervical fascia (green) interspersed with fat at cervical-submental angle, (p) superficial and deep laminae of superficial cervical fascia (green) investing platysma muscle, and (q) aponeurosis of diastasis platysmae.*

Figure 16. *Level of body of hyoid bone (cervical-submental angle, C4–5). (a) Stylohyoid muscle, (b) submental branch of anterior jugular vein, (c) geniohyoid muscle, (d) anterior belly of digastric muscle, (e) superficial cervical fascia (green) investing platysma muscle (deep lamina adherent in places to investing deep cervical fascia [blue]), (f) superficial fat layer, (g) aponeurosis of diastasis platysmae, (h) skin, (i) inferior border of anterior mandible, (j) platysma muscle, (k) mylohyoid muscle, (l) hyoglossus muscle, (m) body of hyoid bone, (n) greater horn of hyoid bone, (o) submandibular gland, (p) pre-epiglottic space.*

Figure 17. *Deep fat (areolar) layer. This layer contains the anterior jugular veins. The medial branches are interrupted during cervicoplasty.*

Figure 18. *(a) modiolus, (b) pars marginalis portion of orbicularis oris muscle, (c) pars labialis portion of platysma muscle, (d) depressor labii inferioris muscle, (e) depressor anguli oris muscle, (f) pars mandibularis portion of platysma muscle, (g) separation between pars mandibularis portion and pars labialis portion of platysma muscle, (h) body of platysma muscle in neck, (i) pars modiolus portion of platysma muscle (SMAS complex of face), (j) risorius muscle, (k) aponeurosis portion of SMAS complex of face (not completely drawn).*



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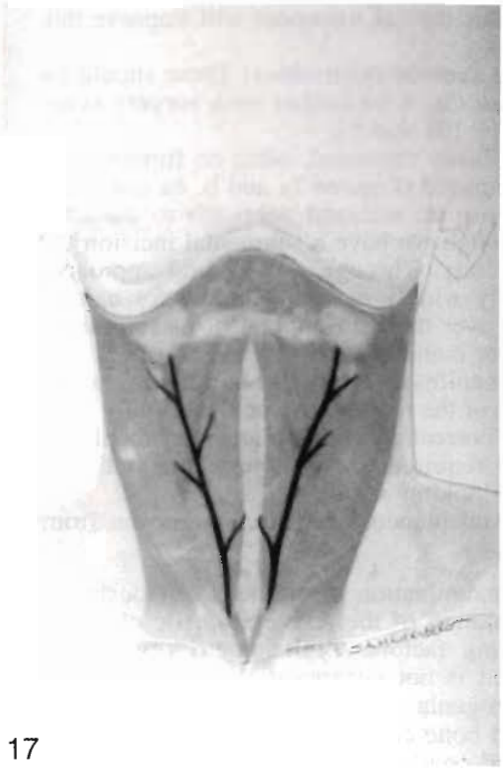

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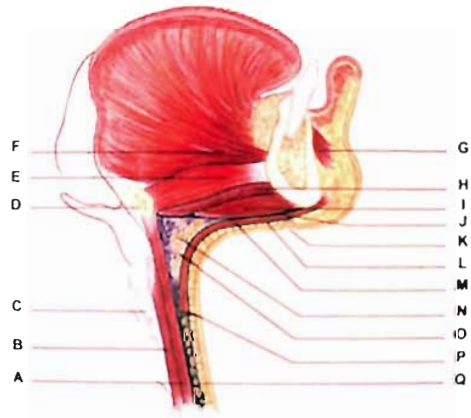

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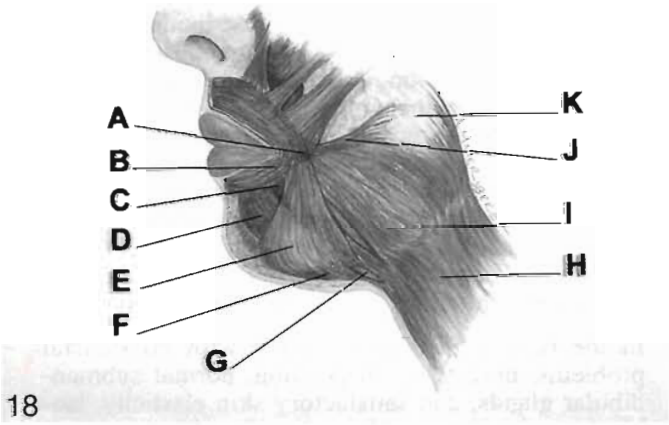

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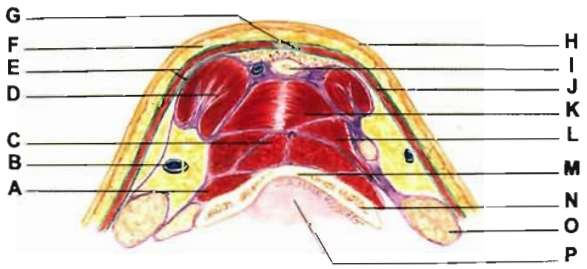

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ticity: Cautious topical treatment will improve this damage.
4. Orthognathic skeletal deformities: These should be corrected first. Often no further neck surgery is required (Figure 10a and b).
5. Retrogenia: Easily corrected, often no further neck surgery is required (Figures 7a and b, 8a and b, 9a and b). We use an intraoral approach to the chin area even though we have a submental incision for the cervicoplasty. Through an intraoral approach, we can safely widely dissect to allow for natural tissue drape over the chin implant or osteotomized antero-inferior mandible.
6. Aging face manifested by jowls and blunting of inferior border of the mandible: Can obtain only mild to moderate correction with isolated cervicoplasty. A facelift is required for an appropriate, satisfactory, natural-looking result.
7. Insufficient subcutaneous fat: Remove no fat from the neck.

The clinical examination of the neck obviously involves the evaluation of the above aesthetic observations and limiting factors. Cephalometric evaluation may be used but is not necessary except for orthognathic and retrogenia evaluation and in rare cases where the hyoid bone cannot be palpated. Most of the above-mentioned conditions can be examined visually or by palpation both in repose and with animation. The quality of the skin and amount and distribution of subcutaneous and often subfascia-platysma muscle fat can be assessed by palpation. Contracture of the platysma muscle and forcing the tongue against the palate to force the mylohyoid muscle inferiorly helps in evaluating bands, subcutaneous fat thickness and distribution, and subfascia-platysma muscle fat thickness and distribution. Bimanual palpation of the submandibular glands is imperative.

After thorough evaluation, the patient is advised of the following limitations of isolated cervicoplasty:

1. In the typical aged neck patient with no skeletal problems, normal hyoid position, normal submandibular glands, and satisfactory skin elasticity, isolated cervicoplasty without facelift will give a satisfactory result; however, the maximum benefit is usually not greater than 80%. We can only approach a 100% benefit with a simultaneous facelift to gain maximum improvement in the lateral submandibular portion of the neck (jowls and inferior border of the mandible). The *superior*-posterior pull on the facial SMAS complex with a facelift also increases the improvement of the central submental/neck area.
2. Anterior-inferior position of the hyoid bone and large submandibular glands decrease the maximum benefit percentage.
3. Uncorrected skeletal problems and retrogenia will decrease significantly the maximum benefit percentage.

Treatment Plan

Each patient is an individual and his or her facial and neck problems are dependent on many extrinsic and intrinsic factors. Genetics, environment, and age are probably the most important factors; however, it is impossible to categorize patients by any of these criteria because of the not-so-rare exceptions. We have seen 40-year-old patients who required browlift, facelift, necklift, and laser resurfacing to adequately rejuvenate their faces. We have seen 60-year-old patients who only required blepharoplasties and an aggressive skin program for satisfactory facial rejuvenation.

In discussing treatment plans for the typical patient who desires improvement and/or rejuvenation of his or her neck, we can offer the following basic philosophy. One builds or rebuilds a neck similar to the way one builds or rebuilds a house:

1. Build the "foundation" first—in the case of neck rejuvenation, orthognathic or chin surgery (horizontal osteotomy or implant) is performed first (or simultaneously), and this treatment alone may correct the problem neck.
2. Next, the "siding"—in the case of the neck, the siding is the tissue beneath the skin: the superficial fat layer, the fascia-platysma muscle complex, and the deep fat (areolar) layer. *Isolated* cervicoplasty is a siding operation; the skin is not involved (similarly, a correct facelift is a siding operation and the skin is only passively involved).
3. Last, the "paint"—finally the neck skin is addressed. In *isolated* cervicoplasty, we depend on inherent skin shrinkage. Although from the profile view (1 dimension) we are creating an apparent longer distance from the menton to the cervical-submental angle to the sternum (hypotenuse of a right-

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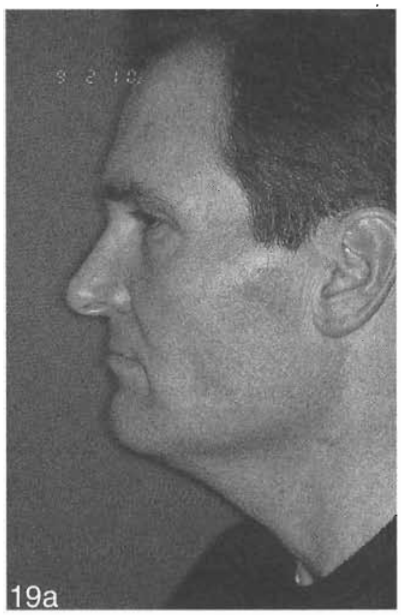
Figure 19. *Patient had isolated cervicoplasty with liposuction and platysmaplasty and open-structure rhinoplasty. Satisfactory result; however, pars labialis fold present due to separation from pars mandibularis inferior into neck. (a) preoperative; (b) postoperative.*
Figure 20. *Patient had isolated cervicoplasty with liposuction and platysmaplasty and upper eyelid transcutaneous blepharoplasties. Satisfactory result; however, pars labialis fold present due to separation from pars mandibularis inferior into neck. (a) preoperative; (b) postoperative.*
Figure 21. *Variable decussations of platysma muscles.*
Figure 22. *Illustration of layered anatomy of the neck demonstrating authors' concept of the aged neck.*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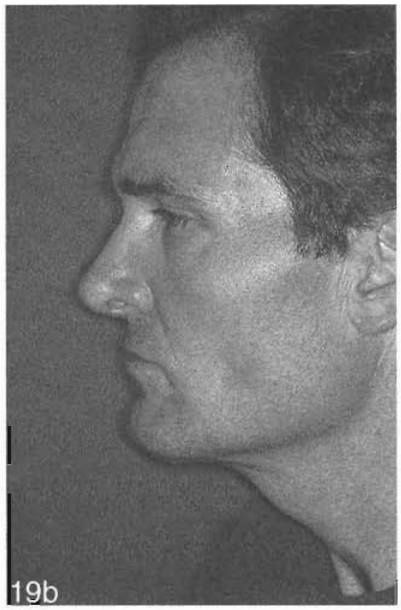
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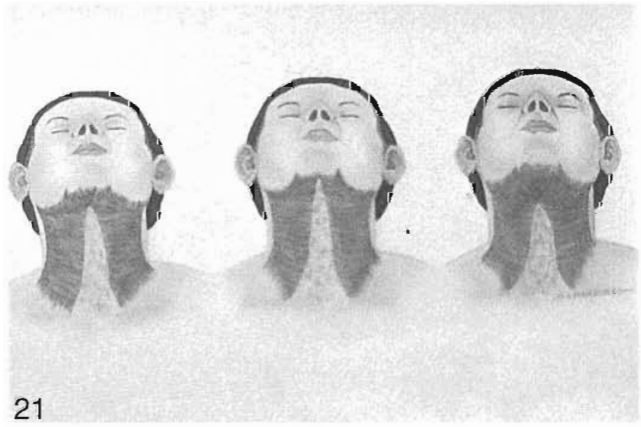
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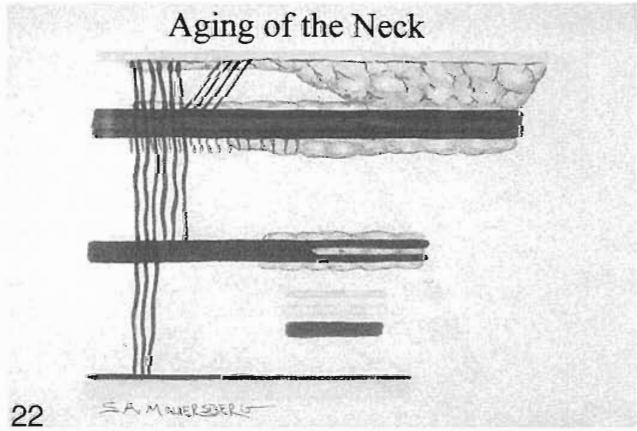

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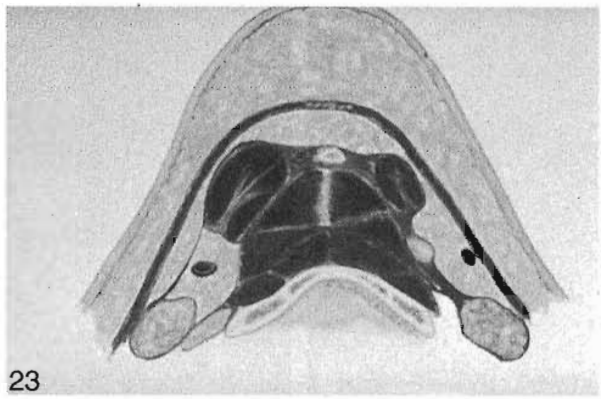

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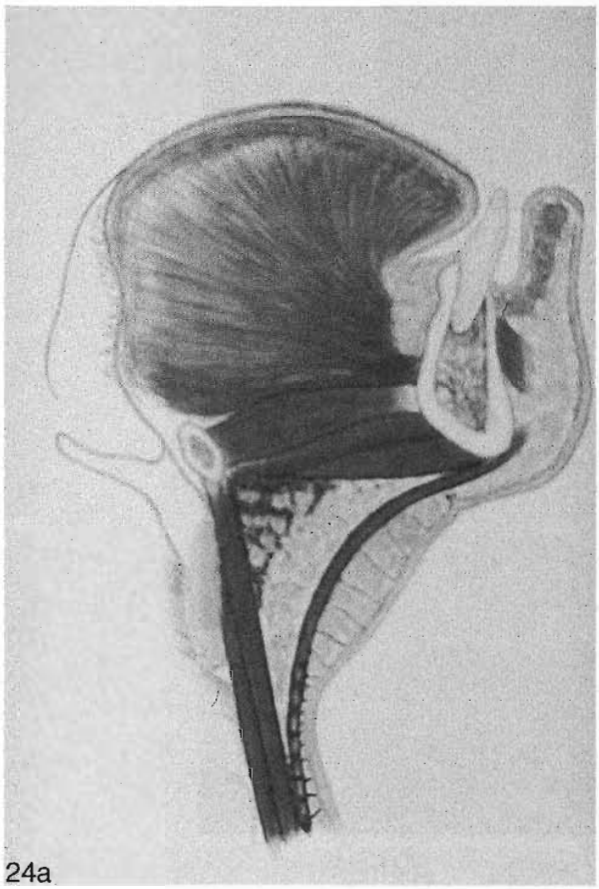

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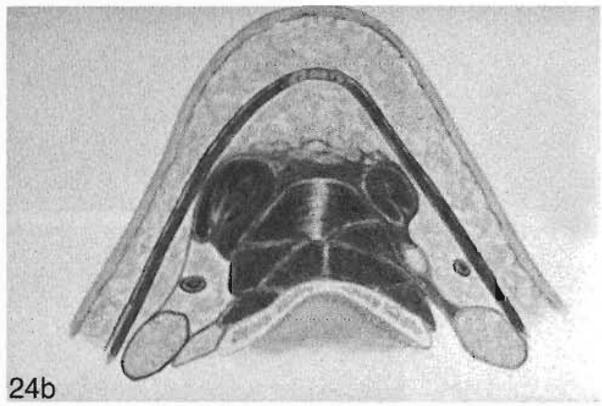

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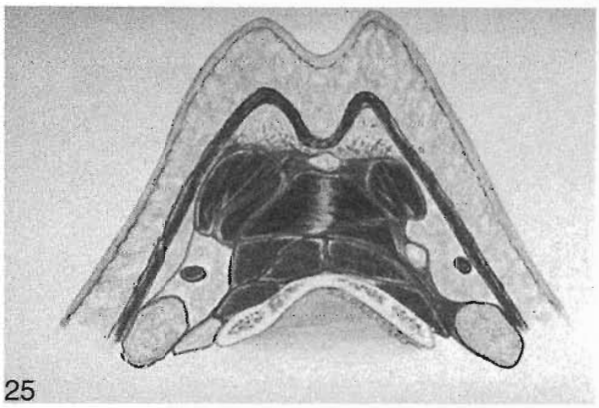

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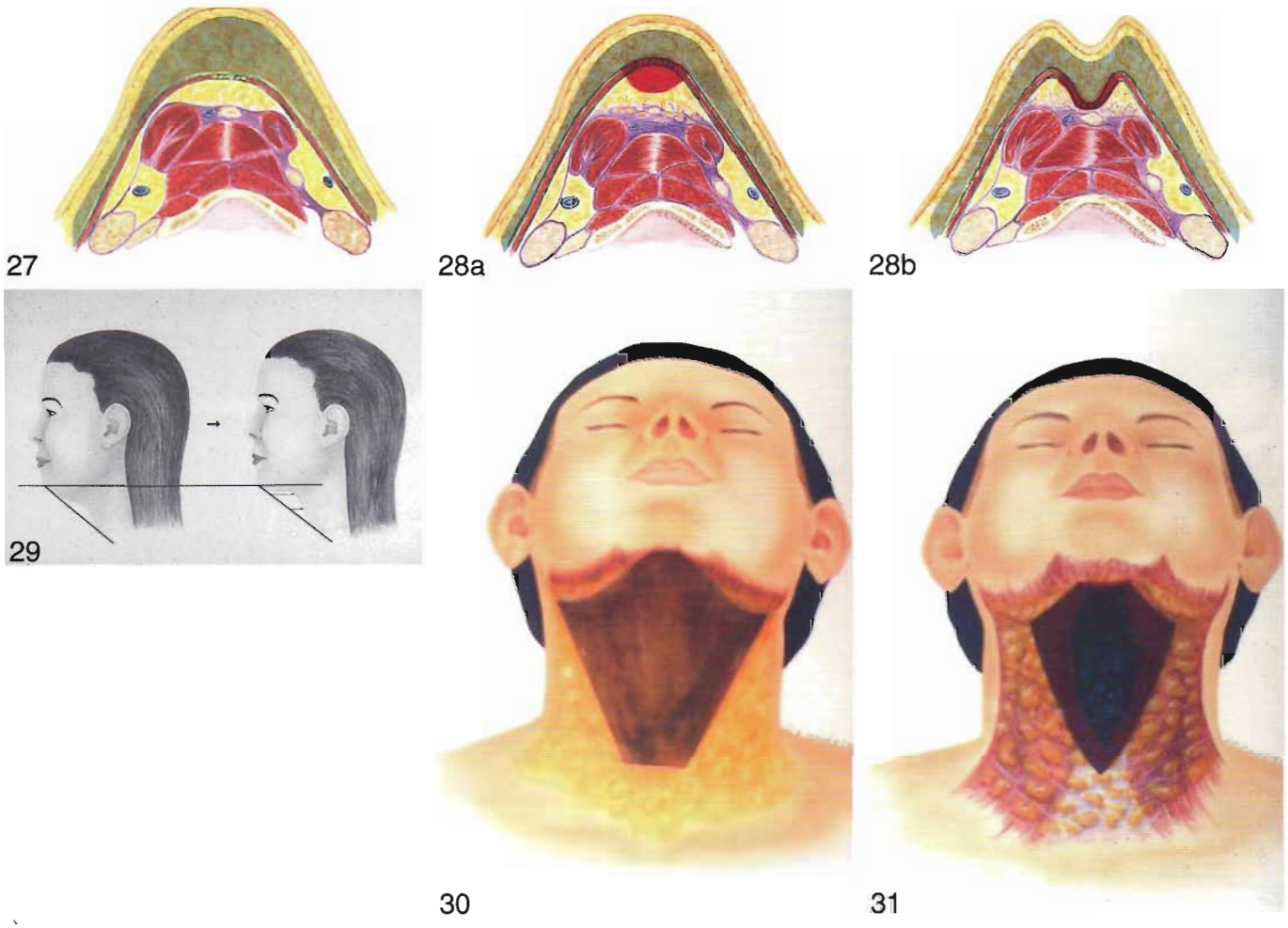

Figure 27. *Horizontal (C4–5) illustration demonstrating areas of liposuction alone (green) treatment of young unattractive neck.*
Figure 28. *(a),(b) Horizontal (C4–5) illustration of aged necks demonstrating areas of liposuction (green) and platysmaplasty of central portion of fascia-platysma muscle complex (dark red) with occasional removal of a portion of the deep fat layer between the anterior bellies of digastric muscles.*
Figure 29. *Isolated cervicoplasty will rejuvenate the central portion of the neck and re-establish an appropriate cervical-submental angle.*
Figure 30. *Illustration demonstrating extent of subcutaneous (and subcutaneous fat) dissection (brown).*
Figure 31. *Illustration demonstrating typical amount of subfascia-platysma muscle complex blunt dissection (purple) and typical amount (variable) of neck fascia-platysma muscle complex to be excised (blue).*

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Figure 23. *Illustration demonstrating lipomatosis of superficial fat layer in usually younger necks (very little neck fascia-platysma muscle laxity).*
Figure 24. *(a) sagittal (paramedian) and (b) horizontal (C4–5) illustrations demonstrating lipomatosis and neck fascia-platysma muscle laxity in aging neck.*
Figure 25. *Horizontal (C4–5) illustration demonstrating lipomatosis and neck fascia-platysma muscle laxity producing neck bands.*
Figure 26. *Clinical demonstration of neck bands.*

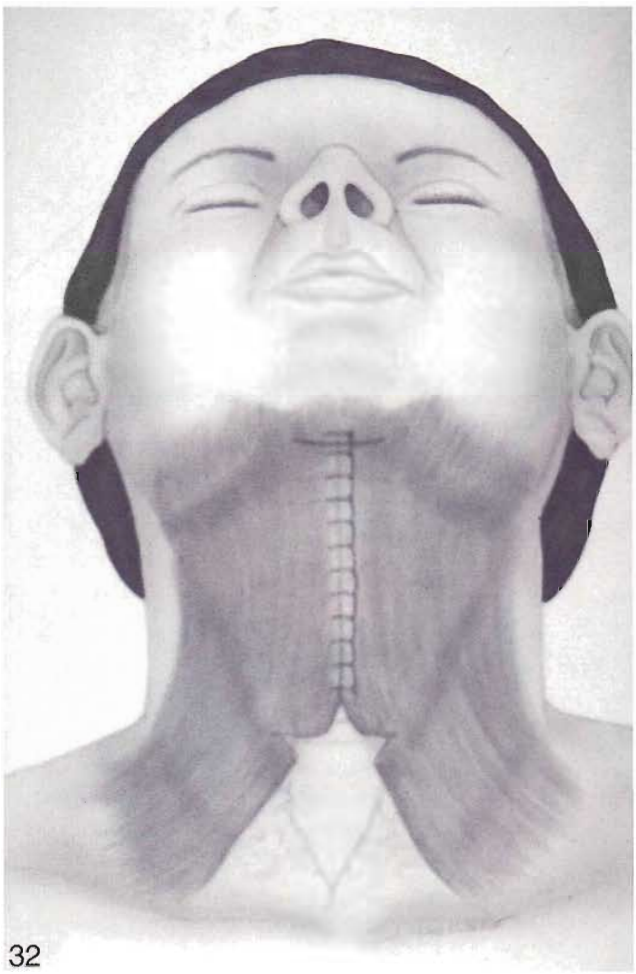

Figure 32. *Illustration demonstrating typical platysmaplasty with occasional inferior horizontal release incisions.*

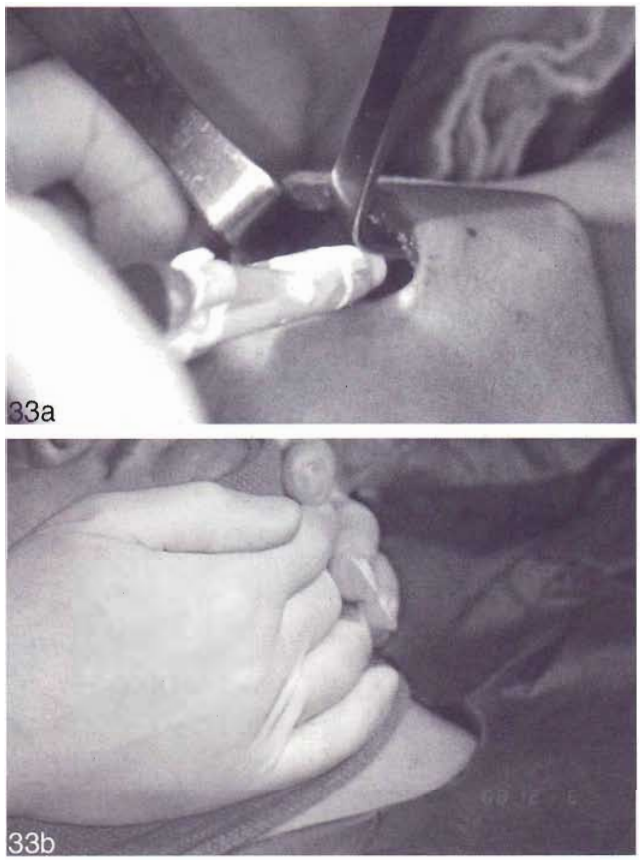

Figure 33. *(a) Tisseel (Baxter) sprayed between subcutaneous/fat flap and fascia-platysma muscle complex. (b) Uniform compression with smooth towel for 5 minutes.*

angle triangle is less than the sum of the other 2 sides), the entire transverse surface area of skin of an aged neck is greater than in youth. Cautious surface skin treatment (eg, superficial laser resurfacing, chemical peel, aggressive skin program, etc.) can be utilized to rejuvenate and possibly shrink the skin (paint). It has been our experience that the submental neck skin anterior superior to a line drawn from just below the angle of the mandible to the cervical-submental angle can be lasered with a CO_2 laser similar to facial skin to obtain shrinkage without complication.

It is our philosophy that in facial rejuvenation surgery, the only significant fat storage area above the clavicles is the neck. Therefore, with rare exceptions, we seldom remove fat from the face (including the lower eyelids), but we reposition facial fat. In the neck, we will cautiously remove fat.

In the younger patient with no limiting factors, the full central submental area and more obtuse cervical submental angle can be adequately corrected with liposuction alone. The cause is lipomatosis of the superficial fat layer (Figure 27). This is a very minor percentage of our isolated cervicoplasty patients.

Most of our patients have a release of the neck fascia-platysma muscle complex adherence to the investing layer of deep cervical fascia, which requires liposuction and platysmaplasty to correct (Figure 28a and b).

Those patients who have significant jowling and blunting of the inferior mandibular border are encouraged to have an extended multiplanar multivector (extended subSMAS) facelift along with a cervicoplasty. If the patient refuses the facelift, it is carefully explained that the maximum benefit we can obtain in the central submental area is 80%, and only 40–50% in the lateral submandibular area with an *isolated* cervicoplasty. Liposuction of the jowl area and inferior border of the mandible gives only minimal improvement because the redundant facial SMAS complex is not addressed. If the lateral submandibular area exhibits significant aging (laxity), we refuse to perform an iso-

Figure 34. *Supportive dressing that remains for 12–48 hours.*

lated cervicoplasty without a facelift to elevate the descended facial tissues back up into the face.

We do not believe a postauricular incision with dissection either subcutaneously or subfascia-platysma muscle complex is beneficial. The pull is posterior when it should be *superior*-posterior, and the result is not stable or natural looking.

Suspension sutures to the mastoids[13,14,41,45,62] do not improve the central submental/neck area if an appropriate platysmaplasty is performed. These sutures give an unnatural look to the lateral submandibular area, especially with animation and movement of the head. Suspension sutures are not a substitute for an appropriate facelift to correct the lateral submandibular area.

We believe that at least 5 mm of fat should remain deep in the dermis for a natural looking (nonskeletonized) result in any neck surgery. Laser to the undersurface of the skin-subcutaneous fat flap removes this fat and injures the subdermal vascular plexus, and there is no scientific evidence that it increases skin shrinkage.[49]

Botox injections[56,57] give an incomplete, unnatural, temporary result.

Very rarely in men usually because of cardiac, pulmonary, or financial considerations prohibiting an extended multiplanar multivector facelift, we will perform midline submental skin excision with Z-plasty at the cervical submental angle.[5,35,58,64]

Surgical Technique

The goal of isolated cervicoplasty is to correct the blunted cervical submental angle in the central submental/neck area and to restore youthful contour to the neck (Figure 29). It has been our experience that the correction of the lateral submandibular and jowl area without a facelift is less than 50%. In patients without significant laxity in this area, this amount of correction is usually acceptable.

We shall describe our technique for the typical aging cervicoplasty patient, which involves cautious conservative liposuction and also platysmaplasty. The ideal patient has midline neck ptosis with lipomatosis, elastic skin, and less than 1+ jowling or blunting of the inferior border of the mandible.

Marking of the patient is performed with the patient awake and either standing or sitting upright with the head in a neutral position. The anterior borders of the SCM muscles are marked. The inferior border of the mandible with particular attention to the angles of the mandible is marked. The inferior border of the neck ptosis is marked and a line is drawn 3 cm inferior to this mark. These marks outline the extent of subcutaneous (and at least 3–5 mm of subcutaneous fat) dissection to be performed (Figure 30). A 3–4 cm curvilinear incision is then marked, with the head in a neutral position, 3 mm posterior to the submental crease. The ends of the incision mark should not be visible from a lateral view. Any bands or cords are marked during repose and platysmal contraction.

The patient should be positioned on the operating room table so that the head is easily extended with the teeth in occlusion. It is mandatory that the suture closure of the platysmaplasty be performed with head extension. Overtightening over the cervical-submental angle with the head flexed will cause some postoperative blunting of the cervical-submental angle in neutral position and some banding during head extension.

In our practice, an isolated cervicoplasty is performed using general endotracheal anesthesia. A nasal endotracheal tube is preferred because of the ease in keeping the teeth together during extension of the head. This surgery can also be performed using only local anesthesia.

The neck and lower face is preprepped for the administration of Xylocaine 2% with Epinephrine 1:50 000 before scrubbing. This allows 10–15 minutes for hemostasis. Approximately 8 mL of this anesthetic solution is placed in the superficial fat layer at the periphery of the subcutaneous dissection and in the midline. The patient is then prepped and draped for the procedure.

A headlight is mandatory. The head is extended and an incision is made through the incision mark through the skin and superficial fat layer to the superficial cervical fascia and superficial to the decussation of the platysma muscles if present. Sharp dissection with a knife is then accomplished anteriorly in the superficial fat layer for approximately 1 cm to release the submental crease caused by a condensation of fibrous septae. Sharp dissection with a knife is then accomplished posterior-laterally and posterior-inferiorly for about 2 cm, establishing a plane and leaving at least 3–5 mm of fat attached to the dermis. This plane is often readily apparent as a junction between small fat globules and large fat globules (Figure 13). Obviously this plane will vary with the amount of superficial fat layer present. This plane also varies with the preoperative determination of how much fat should be left attached to the dermis according to the individual patient's facies. A heavy face will dictate that a greater amount of superficial fat layer should be retained in an isolated cervicoplasty to prevent disharmony between the neck and face. A common error is removing too much of the neck superficial fat layer.

The remainder of the subcutaneous/superficial fat layer dissection is accomplished with facelift scissors with the tips pointed deep to prevent dissecting too superficially. The same depth is maintained to the marked borders of the dissection. Caution should be observed posteriorly (laterally), especially inferior to the angle of the mandible, to keep the dissection plane slightly superficial. The superficial fat layer is often thinner in this area. The neck fascia-platysma muscle complex is also thinner posteriorly (laterally), and it is fairly easy to perforate and dissect deep to this complex, which endangers the marginal mandibular and cervical branches of the facial nerves. Care also should be taken in the midline dissection to maintain the correct plane, and therefore the correct thickness of skin/fat flap. Because the head is extended and this dissection is relatively blind, there is a tendency to dissect too superficially at the cervical-submental angle and inferior to this angle over the thyroid and cricoid cartilages. This results in a skeletonized, unnatural-looking central portion of the neck. Retraction with two 1-0 silk sutures through the lateral portions of the posterior flap combined with a Weider tongue retractor gives the best visualization. A Yankauer pharyngeal suction is used for suctioning.

Gentle open liposuction of the remaining superficial fat layer fat, if present, over the superficial cervical fascia is next performed. A large cannula with the port facing deep at all times is used. Care is taken not to injure the thin superficial cervical fascia superficial to the platysma muscles. Retention of the superficial and deep investing laminae of the superficial cervical fascia is imperative for support of the platysmaplasty sutures.

The amount of laxity of the central portion of the neck fascia-platysma muscle complex in the submental area, the cervical-submental angle, and in the lower neck is estimated. A 2 cm horizontal opening is made with facelift scissors in the neck fascia-platysma muscle complex just posterior to the symphysis menti. Blunt dissection *just deep* to the deep lamina and the central aponeurosis, if present, of superficial cervical fascia is accomplished. This dissection is easy because of the areolar tissue (and fat) between the deep lamina of superficial cervical fascia and the superficial investing lamina of deep cervical fascia. This initial blunt dissection extends approximately 6 cm posteriorly (laterally), just inferior to the inferior border of the mandible, which approaches the anterior borders of the submandibular glands. It also extends approximately 4 cm posterior-inferiorly just deep to either the neck fascia-platysma muscle decussation or the superficial cervical fascia aponeurosis between the anterior borders of the platysma muscles, whichever is present. This amount of initial dissection usually will not interrupt the peripheral branches of the anterior jugular vein and can be performed blindly through the 2 cm incision.

The appropriate amount of central neck fascia-platysma muscle complex/aponeurosis, as *previously* determined, is incised bilaterally to the inferior extent of the previous blunt dissection. Care is taken not to excise fat from the deep fat (areolar) layer between the anterior bellies of digastric muscles. Removal of this fat is seldom necessary except when present in excessive amounts, and even then only a small amount should be removed for a more natural result. The sutured platysmaplasty will support this subfascia-platysma muscle complex/aponeurosis fat and give contour to the submental area.

Blunt dissection is then again carefully performed posterior-laterally and posterior-inferiorly, and the excision of the central aponeurosis/fascia-platysma muscle complex is continued inferiorly to the level of the middle of the thyroid cartilage or to the cricoid cartilage, whatever is indicated by the amount of central redundancy. The amount of tissue excised becomes narrower as one proceeds inferiorly and ultimately comes to a point. The blunt dissection prior to the excision should remain just deep to the superficial cervical fascia aponeurosis. This aponeurosis will almost always contain incorporated fat (Figure 31).

Small branches of the anterior jugular veins are often interrupted as one proceeds inferiorly. These are typically either clamped with a long hemostat and coagulated or bipolar coagulating forceps are utilized. Because the excision becomes narrower as one proceeds inferiorly from the cervical-submental angle, bleeding is usually only a minor inconvenience.

The platysmaplasty is completed by suturing the edges of neck fascia-platysma complex/aponeurosis with a continuous-locking 2-0 PDS suture (Ethicon, Somerville, NJ). Suturing begins at the symphysis menti and continues inferiorly to the middle of the thyroid cartilage or cricoid cartilage and then is reversed to end at the symphysis menti. The edges are

brought together with *minimum tension* if the excision was performed accurately (Figure 32).

If the edges of the neck fascia-platysma complex inferior to the sutured platysmaplasty are stretched and tight, 2–3 cm horizontal releasing incisions are made. This is rarely required. The neck fascia-platysma muscle complex is never completely transected horizontally.

The area of surgery is inspected for bleeders. Tisseel (Baxter, Deerfield, Ill), 1 mL, is sprayed in all areas and the skin/fat flap is appropriately positioned. Compression is applied for 5 minutes (Figure 33a and b).

The submental incision is carefully reapproximated with an interrupted 5-0 Vicryl suture (Ethicon, Somerville, NJ) in the subcutaneous tissue, and the skin is closed with a continuous 6-0 Neurolon suture (Ethicon).

A cotton Universal Facial Band (Design Veronique, Richmond, Calif) dressing is placed around the submental area and over the crown of the head for support and to inhibit movement of the neck (Figure 34). This typically remains for 12–48 hours. The patient is instructed not to vigorously contract the platysma muscle and not to turn or hyperextend the head to extremes for 1 month after the surgery. The submental skin sutures are removed 4 days after the surgery.

Complications

Complications from isolated cervicoplasty are rare in the typical normotensive healthy patient. Cautious subcutaneous dissection posteriorly (laterally), especially near the angle of the mandible, prevents neuromotor problems. Accurate excision of the midline neck fascia-platysma complex prevents excessive tension, causing either suture dehiscence or irregularities from folding of a separated pars labialis portion of the platysma muscle.

We have been using Tisseel (Baxter, Deerfield, Ill) for all of our browlifts, facelifts, and necklifts for over 2 years and have not had a hematoma formation. We do place a compressive dressing for at least 12 hours after surgery.

It is imperative not to remove too much neck fat (in thin necks, no fat) to prevent a skeletonized neck.

Compromised results come from compromised surgery because of poor patient selection. It is difficult to achieve a greater than 80% benefit with cervicoplasty without a facelift in most patients. An 80% improvement is usually acceptable.

Conclusions

As with any facial aesthetic surgery procedure, a thorough knowledge of anatomy is mandatory to obtain the maximum result with an isolated cervicoplasty. With this knowledge and cautious precise surgical technique, this procedure can produce very satisfactory results with no morbidity and minimal postoperative recovery to full activity.

An unattractive neck in a young person can often be improved significantly with liposuction alone. The maximum rejuvenation of the aged neck requires both a necklift and a facelift; however, in select patients, isolated cervicoplasty with liposuction and platysmaplasty will give an acceptable result.

Correction of the aged neck with a facelift alone with lateral traction on the neck fascia-platysma complex gives only a temporary improvement of the anterior neck. In most patients, manifestations of the aged neck will return in less than 1 year, requiring an isolated cervicoplasty. In our practice, a cervicoplasty from a submental approach is performed with every facelift.

The goal of a consistent, predictable, stable, natural, attractive neck can be accomplished with isolated cervicoplasty in select patients.

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