Progressive Tunnelizations in Neck Face Lift Detachment

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KEYWORDS
- Neck face lift • Face lift detachment • Facial hematomas • Nerve injury • Facial tunnelization

KEY POINTS
- Bleeding and facial nerve lesions are the greatest obstacles to a safe postoperative recovery in patients who undergo face and neck lift surgery.
- Hematoma complications are directly proportionate to the volume of blood accumulated and the time elapsed between the hematoma formation and its drainage.
- Complications typically occur from simple ecchymosis to cutaneous necrosis caused by excessive cautery or tension on the closure.
- The Tunnelization in the subcutaneous plane technique emphasizes great attention to the liberation of the ligaments of the mandible, preserving the vascularity and the innervation in the ligament area. This is also performed in the middle third of the face.
- Patients who undergo face and neck lifting with detachment through progressive ‘tunnelizations’ show better recovery than those who undergo conventional rhytidoplasty, since they suffer less skin, vascular and nerve trauma performing cutaneous detachment with few cauteryizations.

A video of the author performing the progressive tunnelization technique accompanies this article online at http://www.plasticsurgery.theclinics.com/

Editor Commentary: I met Dilson while teaching in Brazil and was fascinated by his enthusiasm for a technique that seemed interesting and useful. Basically Dilson designed a series of dilators to perform blunt tunneling of the neck and face which allowed repositioning of soft tissues without extensive undermining with the added benefit of reducing the risk of hematoma formation. By squeezing the vessels in the flap, there is virtually no bleeding, explained in his section on physiology, and when I added this to my routine necklift technique, I enjoyed infrequent accumulations of blood and seroma fluid in the neck. I also found this step valuable in decreasing the risk of skin loss in smokers as I did not detach the neck flap, leaving important fasciocutaneous perforators to nourish a flap whose circulation may be compromised.

INTRODUCTION

Face-lifting surgery is progressing through clinical research and documentation of results as well as sequelae, complications, and longevity (Video 1). The round-lifting technique described by Pitanguy and colleagues1 and based on a directional study of the vector for the lifting of sagging skin, as well as the necessary skin incision, reflects the search for efficiency in facial surgery. The changes in incisions have shown vast progress, securely preventing the elevation of the sideburn with the peninsula technique idealized by Pontes.2 Mitz and Peyronie3 established the anatomic basis for the superficial musculoaponeurotic system (SMAS) treatment, additionally defining that the SMAS adherences to the parotid fascia form a fixed tissue
and that anterior to the parotid the SMAS is mobile. Hakme\textsuperscript{4} claims (and the author agrees) that the treatment of the SMAS (with imbrication or with SMASectomy) only maintains the results if the movable SMAS is sutured to a fixed base. There are instructions about how to avoid nerve lesions\textsuperscript{5} and precise anatomic descriptions for interventions in the premasseteric space (Mendelson and colleagues\textsuperscript{6}), collaborate in the prevention of complications. Vasconez and colleagues\textsuperscript{7} defined the basis for video-endoscopic facial surgery, and Badin and colleagues\textsuperscript{8} are credited with the surgery with vector modifications and wire traction. In addition, the critiques and evaluations of complications from the use of a barbed suture, mentioned by Paul,\textsuperscript{9} reflect the masters’ concerns in guiding the future generations with safety.

Despite so much research and technological innovations, the bleeding problems caused by surgery, as well as the attempts to minimize its complications, persist. The facial nerve lesions continue equally frequently, even in experienced hands and with the use of preventive procedures.

Based on the author’s experience and on extensive bibliographic research, he ascertains that bleeding and facial nerve lesions are the greatest obstacles to a safe postoperative recovery in patients that undergo face- and neck-lift surgery.\textsuperscript{10}

In order to have more dense and uniform skin flaps (because the subcutaneous vascular plexus is mostly responsible for skin irrigation\textsuperscript{11}), reduce bleeding during surgery, avoid immediate or late postoperative hematoma formation, and minimize the risks of facial nerve lesions, the author would like to present his technique, which is a pioneering effort in face and neck lifting: detachment with progressive tunnelizations using the Dilson Luz Vascular Dilation Wands (Mad Colant, Jaboatão, Pernambuco) (Fig. 1). This technique can be applied in other surgeries,
such as lipo-abdominoplasty, prosthesis inclusion in calves and breasts, inclusions of expanders, breast reconstructive surgery, and gluteal muscle lifts.\textsuperscript{12} This technique was used and reproduced with success.\textsuperscript{13}

In surgeries performed through classic techniques, the manual drainage of the collected blood from the hemifaces already sutured are common, and cases of the removal of stitches to check the hemostasis at the end of the surgery are not rare. It is common knowledge among surgeons that the return of patients to surgical centers to check for hematomas happens with a certain frequency. These patients are not always exempt from complications, which are directly proportionate to the volume of blood accumulated and the time elapsed between the hematoma formation and its drainage. Usually, complications occur from a simple ecchymosis to cutaneous necrosis, accompanied or not with neurologic lesions caused by cauterization or section of nerves.\textsuperscript{14}

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**Fig. 4.** (A) Amputation for pullout presents minimal blood loss. (B) Amputation via sharp object causes hemorrhage. (C) Concept of major bleeding applied to neck and face detachment.

**Fig. 5.** More dense flaps result from infiltration with greater tumescence.

**Fig. 6.** Excess skin managed with rods/dilators, completing the progressive tunnelizations on the entire neck, until total cutaneous stretch.
In the author’s technique, special attention is given to the ease of doing the detachment of the neck and of the middle third of the face (which is divided into superficial and profound), safely guiding the liberation of the zygomatic ligaments through the profound detachment supraperiostal tunnelized and progressive superficial detachment for the elevation of the malar fat pad. The author emphasizes the care for the liberation of the ligaments of the mandible, prolonging the detachment of the middle third superficial, tunnelizing progressively in the subcutaneous plane for these ligaments, observing the vascularization, the innervation, and the ligament area (Figs. 2 and 3) (becomes Fig. 2A, B), which was so well demonstrated by Furnas.\textsuperscript{15}

In 2003, the author presented his technique for the first time.\textsuperscript{16} In 2005, the author published his technique in \textit{Aesthetic Plastic Surgery}.\textsuperscript{17} In 2006, the author published it in a Brazilian Society of Plastic Surgery - Region São Paulo (SBCP) São Paulo book; in 2010, he edited his book on the technique.\textsuperscript{18}

**Technique Fundamentals**

The physiology is explained by the vascular intima section that provokes the platelet migration to the injured area, following the immediate coagulation within the vascular extremities, because these were submitted to a progressive stretching with large dilators in its lights before the section, obtaining trapped clots in the extremities of the sectioned vessels, which block the blood flow (see Fig. 3).\textsuperscript{19}

**Physiology**

The observation that, in emergencies, patients who underwent amputation of their hands by pull out presented minimum blood loss (Fig. 4A) and

![Fig. 7. Subcutaneous progressive tunnelizations performed on the lateral neck and extending to the clavicle region. (A) preoperative and (B) postoperative.](image-url)
that patients who suffered identical amputation but caused by sharp objects suffered from severe anemia (see Fig. 4B) raised the question of how to prevent hemorrhaging during the detachment of the face. The author transferred this idea to perform the neck-face detachment (see Fig. 4C).

**PATIENT SELECTION**

Currently, the author thinks that his technique is indicated in all patients submitted to face- and neck-lifting surgery and especially in those who present with acute cervical flaccidity extended to the clavicle region and in those that present risks of blood pressure variation during surgery.

**SURGERY DESCRIPTION**

**Preoperative Marking**

The markings of face and neck lifting are initially done with patients seated in the hospital room, according to the surgery plan previously discussed and analyzed in the consultation room. These markings are supplemented in the surgical center.

**Anesthesia**

All of the patients underwent surgery while under local anesthesia with sedation and monitored by an anesthesiologist. Using fine cannulas (1.0–1.5 mm), the infiltrations were done with lidocaine 0.5% and adrenaline solution 1/200,000 (1/400.00 for tumescence) in a variable volume of 200 to 300 mL for the entire neck and the face. The infiltrations were started previously in the areas where surgery was to take place. In thin patients, there was a need for infiltration with greater tumescence to obtain more dense flaps (Fig. 5). It was also noticed that the cannulas’ infiltrations reduce the amount of ecchymosis and prevent vascular penetration of the anesthetic, preventing blood pressure elevations and/or lesions of the facial nerve by needle trauma during surgery.

**Neck Treatment**

After blepharoplasty and eyelid elevation, when needed, the neck lift is initiated.

**Cervical Liposuction**

When necessary, cervical liposuction is done with 20-mL syringes and fine cannulas in the areas previously marked.

**Incision and Detachment**

With the cutaneous incision of 3 to 4 cm, parallel and below 2 to 3 mm from the submental fold,

![Fig. 8. Neck with acute flaccidity without fat to be aspirated, showing transversal wrinkles to the sternal notch. (A) preoperative and (B) postoperative.](image)
the detachment is initiated with progressive tunnelizations of the medial portion and the rest of the neck, previously aspirated, when needed. The author returns to the medial portion with larger rods/dilators until the platysmal bands are identified and performs the hemostasis immediately with few cauterizations.

After the plication, the author performs vertical ellipse and/or sections of the platysmal bands, with the excision of the subplatysmal fat and excessive bands, when necessary. When excess skin is present in the central region of the neck without cutaneous stretch (Fig. 6), this condition will be treated with rods/dilators, completing the progressive tunnelizations on the neck, until total cutaneous accommodation.

It was observed that the subcutaneous progressive tunnelizations can be done safely on the lateral neck and below, when necessary, extending to the clavicle region (Fig. 7). Doing so, it is possible to accommodate all the inferior cervical skin with small and medium rods/dilators. The larger rods/dilators are used to complete the lateral tunnelizations and the ones below the mandibular ramus, which will have continuity with tunnelizations in the middle third, avoiding the need for cauterization in the area where the rods/dilators are used (see Fig. 5). The procedure is completed with the suturing of the submental fold, through which a laminar drain is inserted.

In the case of a neck with acute flaccidity without fat to be aspirated, but showing transversal wrinkles until the sternal notch, the safe option for the procedure is to use rods/dilators to raise the cervical skin with progressive tunnelizations (Fig. 8).

The glabrous skin of the retroauricular region is detached through the traditional method, with scalpel or scissors, to get a denser flap of skin for cutaneous prophylaxis in this area. Immediately below,
the subcutaneous detachment is initiated with pro-
gressive tunnelizations until it has continuity with the detachments of the cervical portion (Fig. 9).

To clarify how the applications of these progressive tunnelizations complete the neck lift, the sur-
gery on the third middle of the face is described:

The detachment begins with the tunnelization of the supra-SMAS through the classic preauricu-
lar incision or from the short scar approach (Fig. 10A). The small rods/dilators penetrate the subcutaneous space forming tunnels, freeing above the masseteric ligaments’ adherences and below the mandibular ligament in its cutaneous insertions. The tunnels below overtake the inferior labiomental sulcus and, with small and medium rods/dilators, will have continuity with the previously detached neck tunnels (see Fig. 2).

After these tunnelizations, the author returns to the preauricular area marked for total detachment, which is achieved by inserting larger rods/dilators to rupture the trabeculars and make it possible to view the SMAS area for treatment (see Fig. 10B).

The area described by Aston,20 in Finger assisted malar elevation (FAME), will be profoundly tun-
elized supraperiosteally with small and medium rods/dilators, above the malar fat pad, and the periosteal insertion of the zygomatic ligament, leaving trabeculars and only sufficient tunnels for

Fig. 11. Elevation of the middle third of face via trabeculars and sufficient tunnels after profound tunnelization supraperiosteal with small and medium rods/dilators, above the malar fat pad. (A and C) preoperative; (B and D) postoperative.

Fig. 12. Patient with ptosis of the submandibular gland treated with platysmal plication. (A) preoperative; (B) postoperative.
the necessary elevation of the middle third of the face (Fig. 11).

TREATMENT OF THE SMAS

In conclusion, the treatment of the SMAS is usually done with imbrication, fixing the movable SMAS to fixed points with nylon sutures 3.0 and maintaining the malar fat elevated and fixed to the temporal fascia\(^8\) with nylon sutures 2.0. Hemostasis is obtained with few cauterizations; after the excision of extra skin, the author inserts laminar drains, sutures, and applies occlusive bandages.

DISCUSSION AND SUMMARY

Patients subjected to face and neck lifting with detachment through progressive tunnelization show better recovery than those subjected to conventional rhytidoplasty because they experience less trauma because of fewer cauterizations. Furthermore, patients show less vascular and nerve lesions because this technique leaves trabeculars that form tunnels resulting in less dead space. All of these factors result in less morbidity, enabling patients to return to regular activity sooner.

The learning curve is rapid, and the procedure using the rods/dilators is reproducible because the detachment is done in the same plane as the traditional way, except that there is no bleeding as is seen with the scalpel or scissors. A small adjustment is required for the facial detachment when using rods/dilators in a progressive manner, seeking to view the edge of the rods/dilators in all its subcutaneous extension, in the surface of the detachment with scissors, with exception to the malar region, where the tunnelizations are made in the profound surface.

The detachment with progressive tunnelizations applied to the neck becomes a unique process that is capable of safely treating the flaccidity of the inferior third, many times forming tunnels progressively until the clavicle region and largely eliminating cauterizations.

A total of 372 patients were subjected to this new technique since 1999; all of them were accompanied up until the present time with no irreversible cases of damage to the facial nerve. There were 2 cases of neuropathies that lasted from 4 to 8 weeks; after the author began using tumescent infiltrations, they no longer appeared. There were no patients with cutaneous necrosis and/or formation of hematomas during the immediate or late postoperative phases. Patients with ptosis of the submandibular gland were treated with platysmal plication and were satisfied (Fig. 12). Other plastic surgeons have reaffirmed that the technique described is reproducible, and they have reached results as satisfactory as the author’s.

SUPPLEMENTARY DATA

Supplementary data related to this article can be found online at http://dx.doi.org/10.1016/j.cps.2013.09.001.

REFERENCES


