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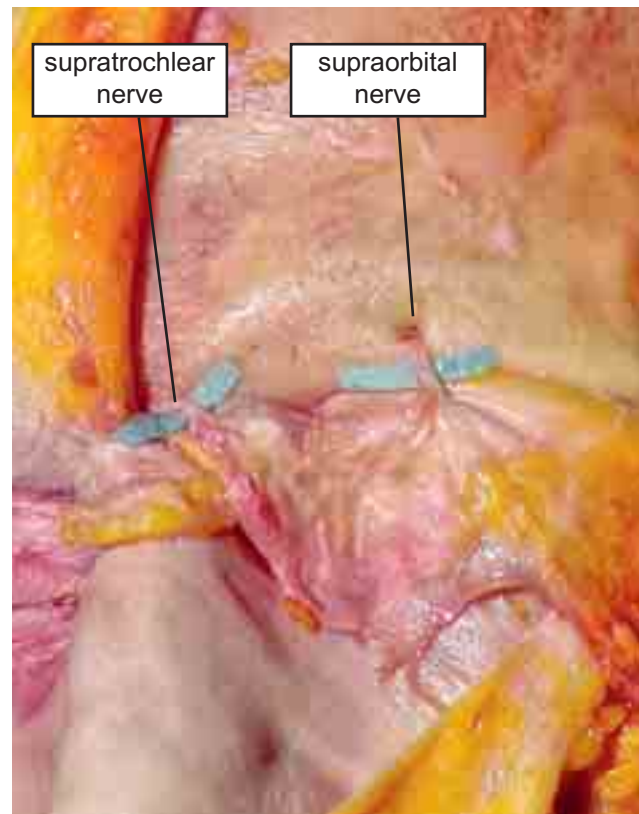
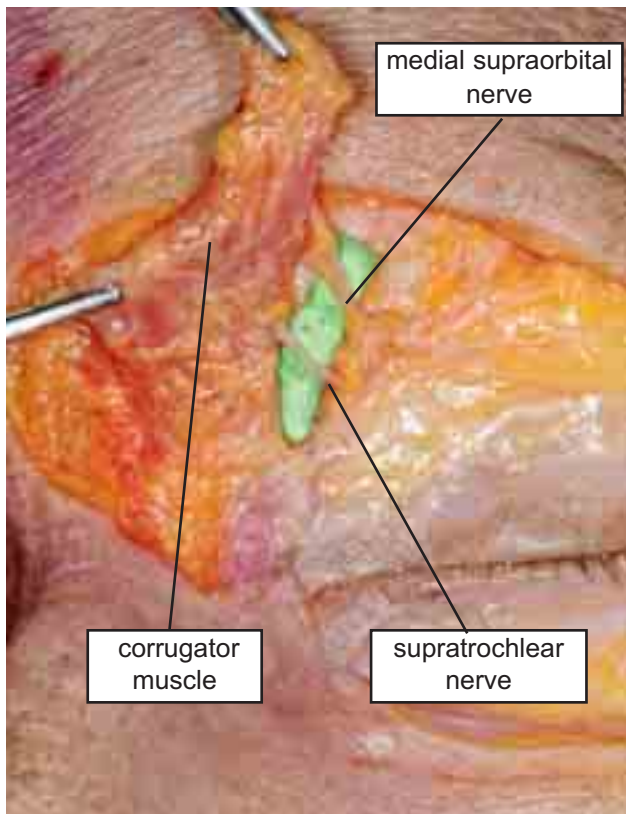
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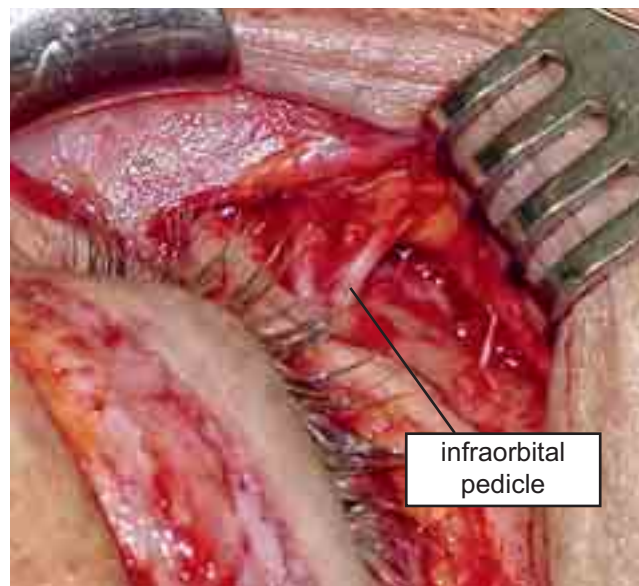
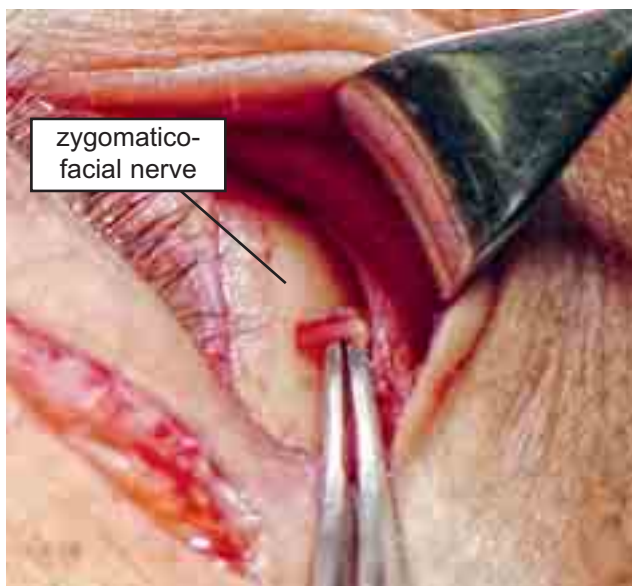
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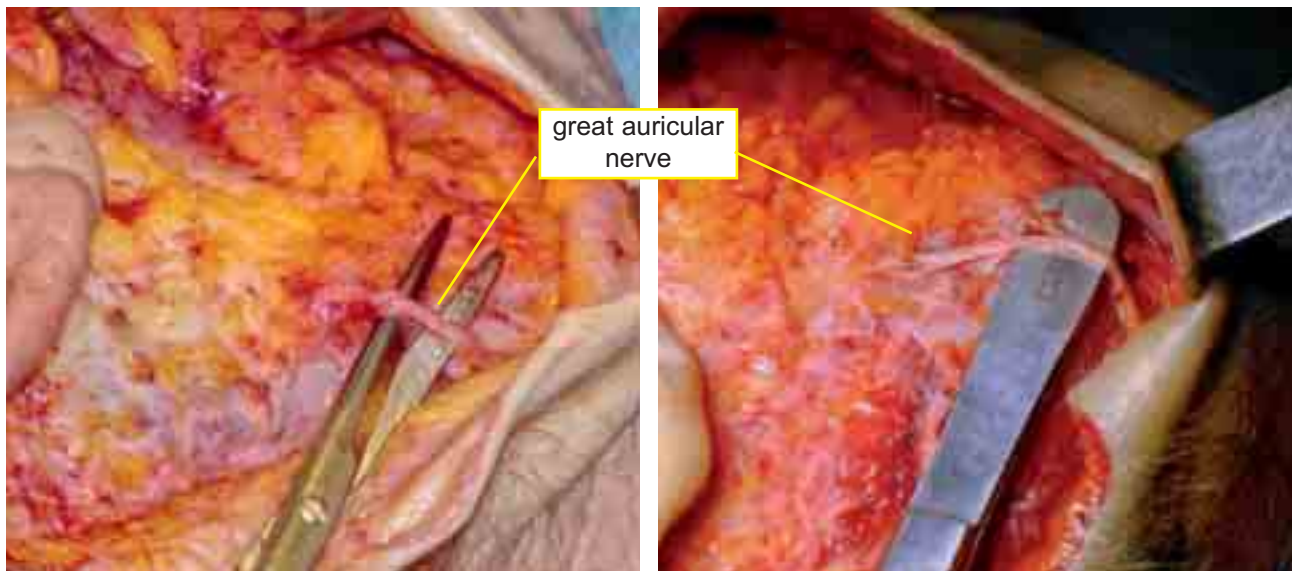
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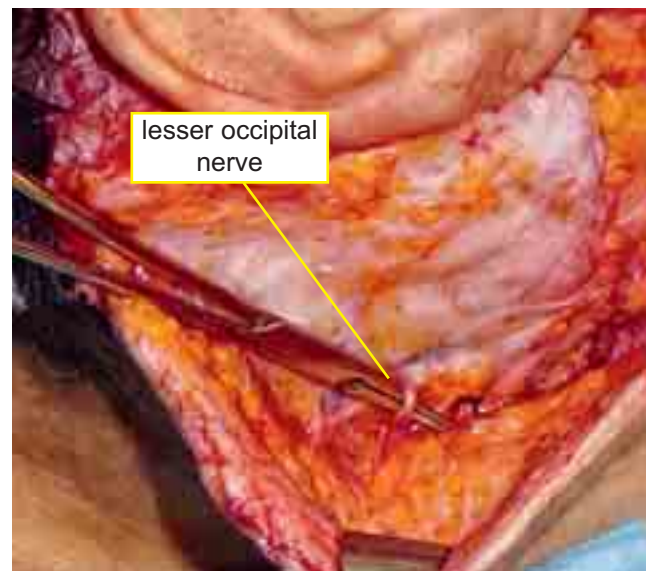
Sensory nerves in the forehead of a cadaver. In both dissections we have uncovered the two main branches of the ophthalmic nerve. In the picture on the left, forceps raise the (left) corrugator muscle, exposing the supratrochlear nerve (lower down and medial) and the supraorbital nerve (probably the most medial branch). On the right, in another anatomical preparation, the periosteum has been undermined and the supratrochlear branch and the major supraorbital branch (situated more laterally than the other one, at about 3,5 cm from the midline) are identified. The supraorbital nerve emerges through the homonymous foramen situated, in this case, at about 8 mm above the orbital rim. Note how the supratrochlear must always go through the corrugator to reach the surface of the skin.



Sensory nerves during a face lift: on the left the zygomatico-facial nerve and on the right the infraorbital nerve. The zygomatico-facial nerve has moderate practical importance. Its interruption barely affects local sensation, and is often not even perceived by patients because of the numerous anastomoses it has with the surrounding sensory nerves. On the contrary, any injury to the infraorbital nerve determines total or partial anesthesia of the entire infraorbital area (including teeth, lips, and alae of the nose) which can last several months or, in most severe cases, permanently. On this basis, if this nerve is unintentionally sectioned it is advisable to repair it immediately.



Sensory nerves shown during face lift surgery: in the two pictures at the top, the **great auricular** and in the picture at the side, the **lesser occipital** nerves are indicated. In both top pictures the great auricular nerve found on the SCM body (usually beneath its fascia), about 6-8 cm below the external auditory meatus, can be seen. In another patient, here on the right, the lesser occipital nerve having a more posterior position, is identified. It is critical to know where these important nerves are situated to avoid injuring them unintentionally or pinching them with sutures when repositioning the SMAS.

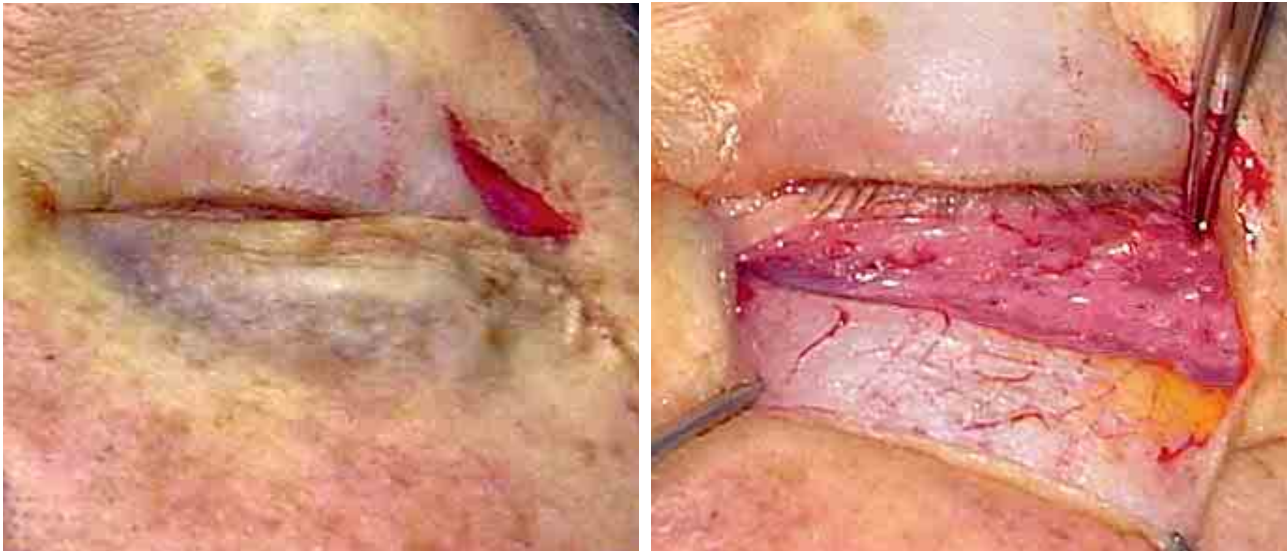


sa, the buccal nerve also innervates the skin of the chin which it reaches by crossing the buccinator. The auriculo-temporal nerve comes to the surface in front of the external auditory canal and after it has crossed the parotid, it innervates the skin of the external auditory meatus, the anterior part of the auricle, and the lower portion of the temple which it reaches by passing through the superficial temporal fascia together with the superficial temporal vessels. The mental nerve, terminal branch of the inferior alveolar nerve, runs inside the mandible and comes out of the bone through the homonymous foramen situated a few mm below the line joining the root apices of the two premolars. This nerve supplies sensation to part of the caudal area of the face, in particular to the lower lip and skin of the chin and its surrounding areas.

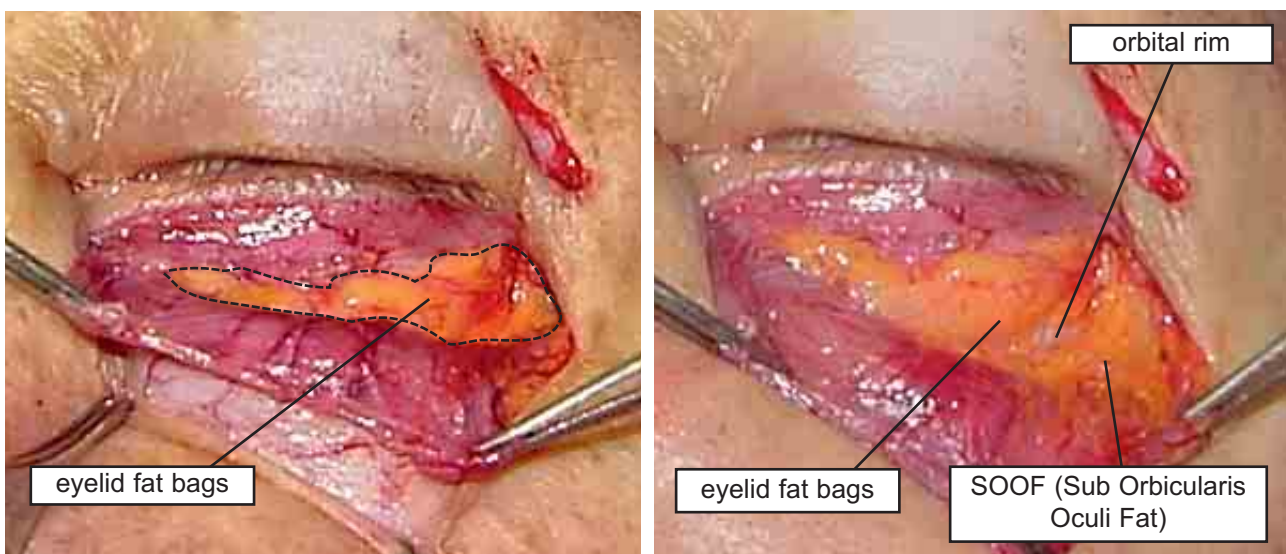
The cervical plexus

Three nerves, that are part of the cervical plexus, supply sensation to the neck and the postero-inferior area of the face: **the great auricular**, the **lesser occipital** and the **transverse cervical nerve**.

The great auricular nerve, originating from C2 (and in part from C3), comes to surface at Erb's point, which is found roughly in the middle of the posterior border of the sternocleidomastoid muscle, about 8-9 cm below the external auditory meatus. Once it has crossed the SCM body in an anterosuperior direction, it separates into its two main branches: an anterior, thinner one destined to the skin of the earlobe and the inferolateral area of the cheek, and a larger posterior one



Superficial anatomy of the lower eyelid (transcutaneous blepharoplasty). In the picture on the left: the subciliary incision carried out to raise the skin covering the lower eyelid and expose the orbicularis muscle (picture on the right). The eyelid skin often looks bluish because it is so thin that it allows the underlying darker muscle tissue to be seen as if the skin were transparent.



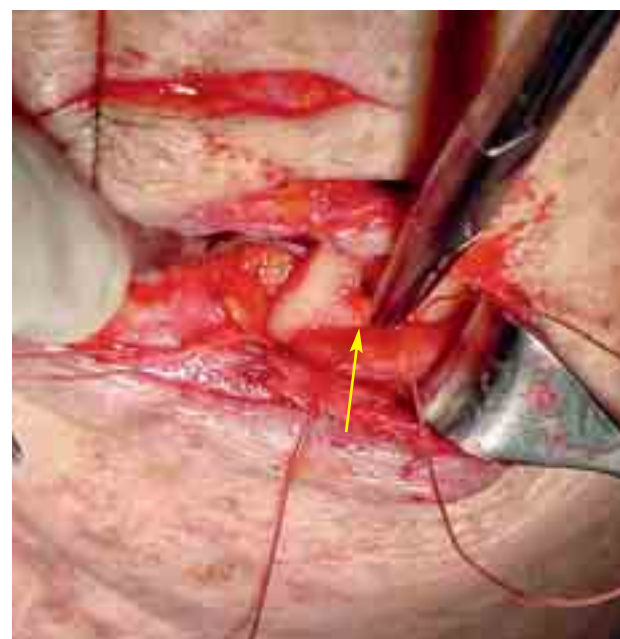
Anatomy of the anterior lamella. The orbicularis has been incised and raised exposing the septum, a very thin fibrous lamina covering the eyelid fat bags. In the picture on the right: also the extraorbital fat (SOOF) lying between the muscle and the periosteum can be seen. The orbicularis muscle is profusely vascularized, and therefore different kinds of flaps can be made in it with very little risk of vascular complications, as long as the proper relation between the width of its base and its length is maintained.

which corresponds to the ROOF in the upper eyelid. The **palpebral septum** inserts higher up into the tarsus, whilst caudally it is firmly anchored to the periosteum of the orbital rim (arcus marginalis), even though it often has an external downward deflection in its lateral portion. The **periocular fat pad** lies beneath the septum. When it protrudes from the eyelid wall, so-called **fat “bags”** develop. Classic anatomy divides this deep fat “herniation” into three bags, even though it is actually one whole big pad that lines the orbital cavity, enveloping and protecting the eye. When exposed during surgery it is actually found in three separate compartments. The most medial one, characterized by a whitish colour, is situated below the internal canthus. The middle, yellowish one is often more abundant and lies below the cornea (in primary position) and finally, the lateral one is found below the external commissure and remains a little higher than the first two. The **tendon of the lower oblique muscle**, which must not be injured during surgical manoeuvres excising fat, is almost always found between the



Anchoring techniques: taking hold of the flap. Picture on the left with a Reverdin needle: pierce the flap and the anchorage thread (in this case Goretex 3/0). First push the needle through the skin at the base of the undermined area and pull it out through the palpebral incision. Thread the Reverdin through the eye in its tip and pull the Reverdin back a little, and then push it through the flap so to penetrate the whole thickness of the midface soft tissues. At this point pull the needle out from the wound, retrieve the thread and finally secure it either to the orbital rim or to the temporal aponeurosis. Do not apply this suture too close to the surface of the flap otherwise a depression can be seen from the outside.

Like in the picture on the right, clasp you can the flap directly with the suture so it is at hand to be anchored. In order to do this, the breach in the muscle needs to be wide enough to be able to rotate the needle.



“Belt-like” anchorage. On the left, the suture hooks onto the midface flap, piercing the periosteum, fat and muscle tissue, whilst on the right, the same thread goes through the hole made in the orbital rim. This kind of fixation is one of the steadiest methods for keeping flaps in their new position. Moreover, it enables to efficaciously place soft tissues along the tear trough as well.

Midface lift without an orbicularis muscle subciliary incision

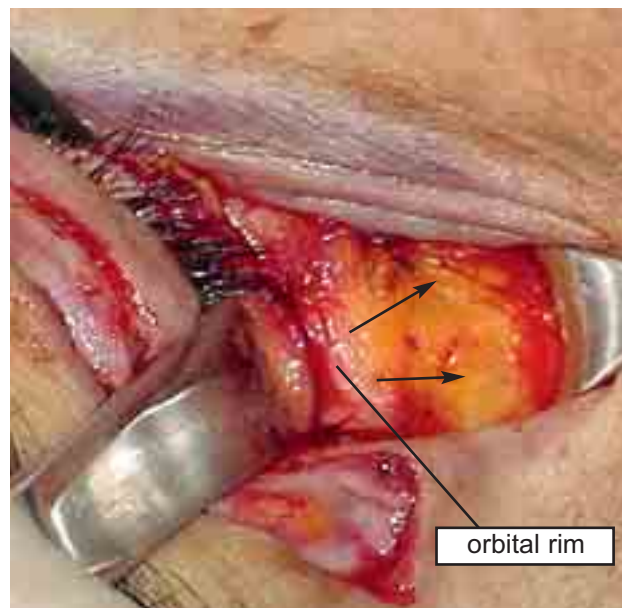
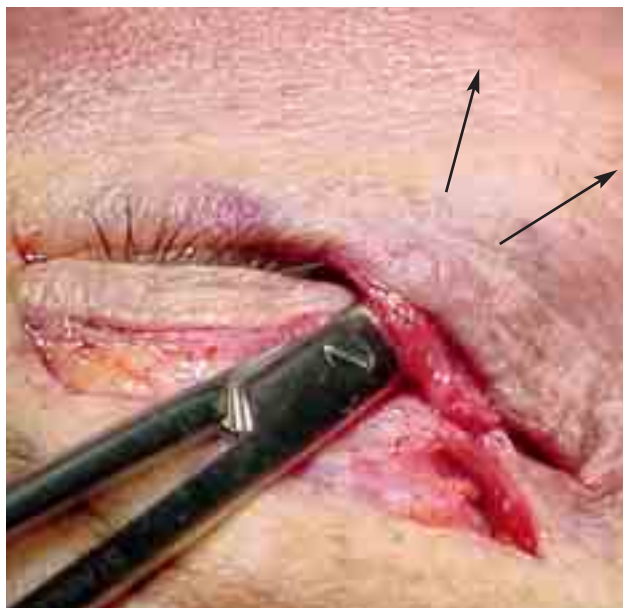


Midface lift without inferior orbicularis incision. If moving the midface soft tissues along a superolateral vector is sufficient, this simplified technique is the best to use. First, carry out a transvestibular, subperiosteal undermining (above) in the midface area, and create a subfascial tunnel in the temporal area (centre left). At this point, make a breach in the orbicularis through the upper eyelid and here complete the infrorbital dissection (centre right and bottom left). Pass a Reverdin needle through the vestibular incision, and pull its end out from the upper eyelid incision. Then thread the needle through its eye in the free extremity (bottom right).

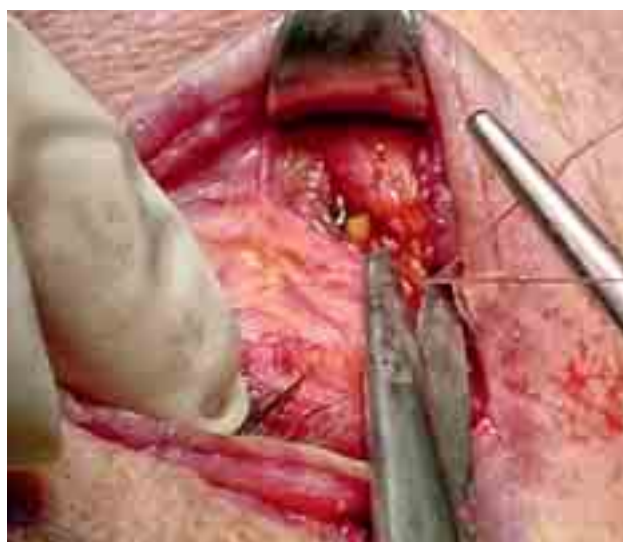
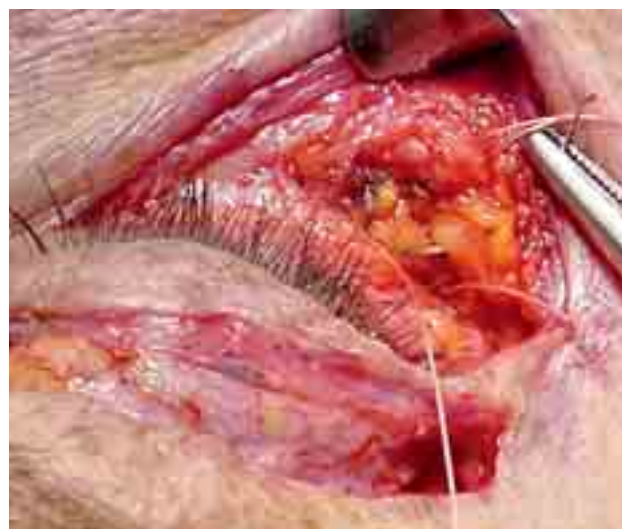


Midface lift without lower orbicularis incisions (continued). Pull the suture downwards with the Reverdin needle in which it was threaded, until emerging from the vestibular breach (above on the left). Then push the needle through the same incision again, but direct it more superficially, so as to go through the entire layer of soft tissues (above on the right). Pull the needle out from the upper eyelid incision and unthread it (centre picture). Push a needle holder through the temporal incision until reaching the upper eyelid incision, and use it to clasp the thread which is pulled upwards (picture below), and finally passed through the aponeurosis with a needle fitted onto the suture, to attach the midface flap at the desired level.

Superficial suborbicularis undermining

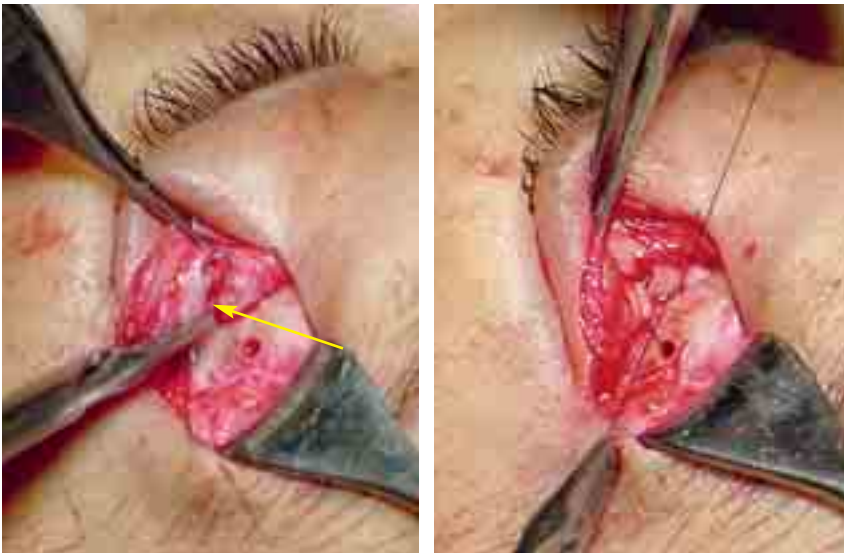


The alternative: suborbicularis undermining (sub-SOOF) If a less evident change is desired, a midface lift with a “prezygomatic” plane dissection (Mendelson), can be considered. Instead of carrying out an ample subperiosteal dissection, the orbicularis is undermined from the plane found under the SOOF, and continued below between the subcutaneous fat pad and the elevator muscles.



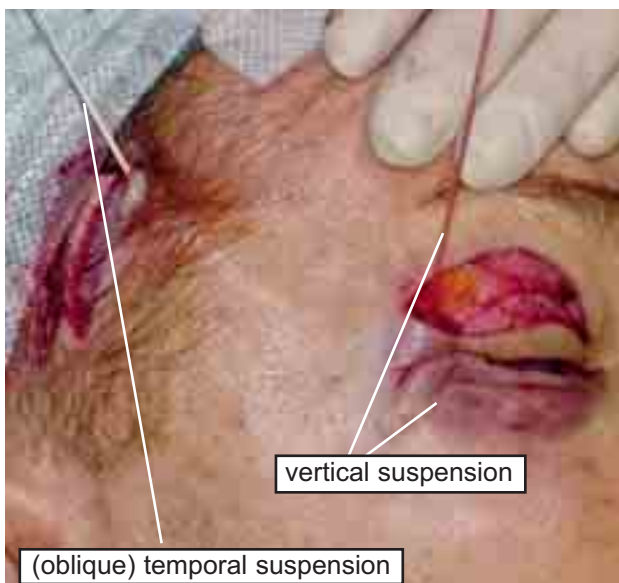
Midface lift with a suborbicularis dissection (sub-SOOF). The flap must be anchored after having extended the dissection further down to the nasolabial groove and laterally to about midway of the malar. Now it is usually easily mobilized. With a Vicryl 2/0 suture the orbital rim periosteum is grasped (above left). The same suture goes through the flap (top right) and then is tied (here on the left). This kind of dissection allows to achieve adequate results in the correction of malar bags, but more often the quality of the improvement is rather modest and unstable. In fact, in midface lifting, this dissection has more limits than the subperiosteal one. Furthermore, a weaker adherence forms compared to the one where a flap from a subperiosteal dissection is anchored further up. In synthesis suborbicularis midface lift entails limited dissection and weaker fixation.

tant that also a **canthopexy** suture be added. Canthopexies, which will be fully described in the specific paragraph, have in fact the role of putting the posterior lamella of the lower eyelid back into tension. In particular, the canthal ligament, basically made up of the lateral thickened portion of the eyelid septum, can be plicated and anchored to the orbital rim. Alternatively, it can be dissected either at the level of its periosteal insertion and anchored once again back into the same place (static canthopexy), or higher up (dynamic canthopexy). The ligament can be fixed either to the orbital rim periosteum or directly to the bone, which has to be perforated a few millimetres from the margin for this reason.



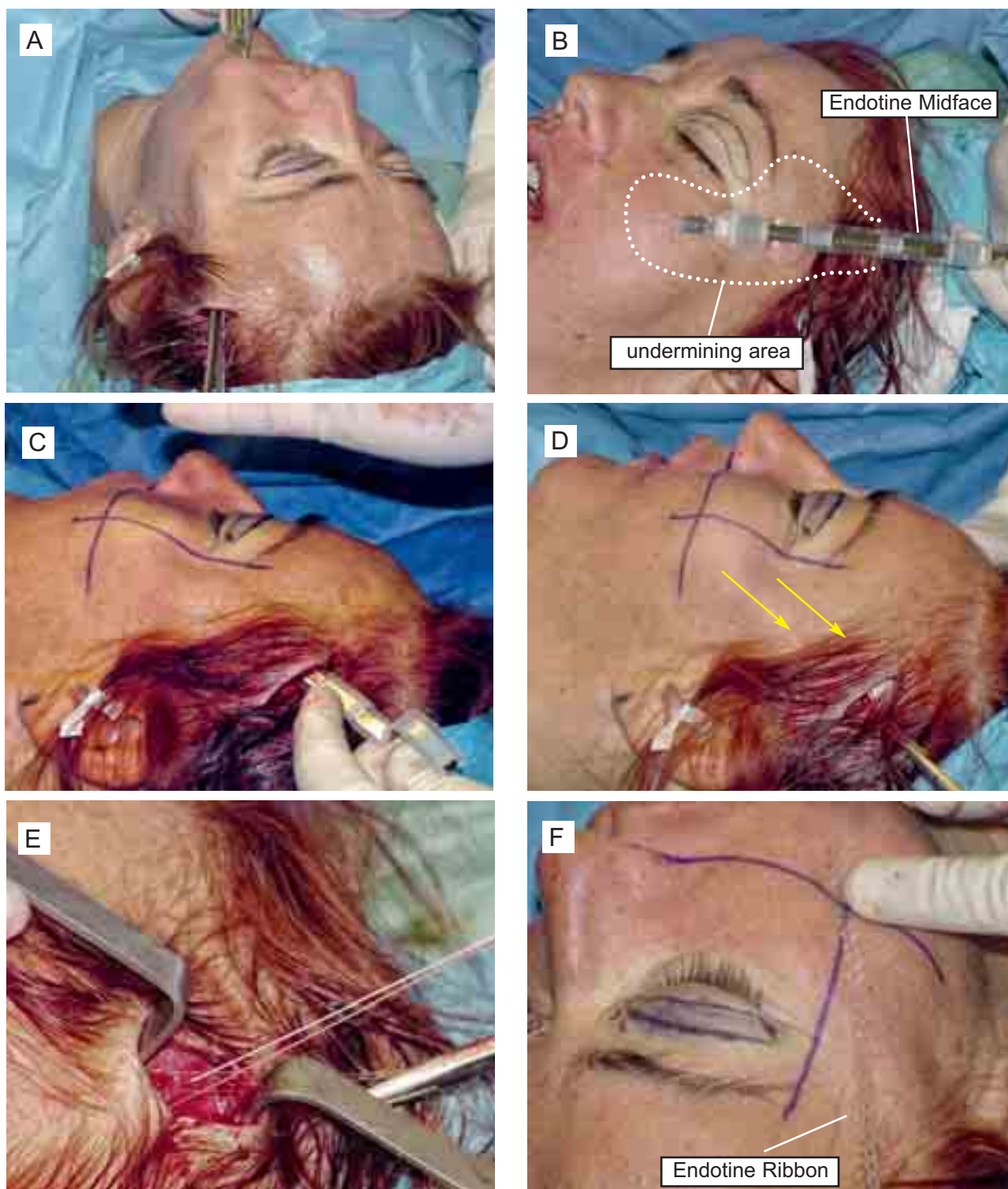
Canthopexy. A canthopexy is an efficacious procedure for correcting lower eyelid hypotone. It can be *static* if one wishes to keep the canthus in its original position, or *dynamic* if one wants to raise it. In the picture on the left: the canthal ligament is anchored with a Nylon 5/0 suture (arrow), whilst on the right: the same thread goes from the inside to the outside through a small hole made in the orbital frame. In this way the eyelid margin will not tend to detach from the eye.

As a completion or as an alternative to the periorbital fixation, long “**suspender**” sutures anchoring the midface flap to the temporalis muscle aponeurosis through a subfascial confluent tunnel, can be used. This tunnel is created by incising the scalp about 3 cm behind the hair line, through which it is also possible to carry out the anchorage as well. Special devices such as the **Endotine Midface**, etc. can have the same role as *suspender sutures*, as already explained.



Suspenders. The midface flap can be anchored with long suture threads to the temporal aponeurosis with an upper-lateral pull. In many cases this kind of suspension (visible in both pictures) is not sufficient for obtaining optimal results, and it is advisable to combine at least a second, more vertical anchorage. So, the entire midface flap, or an orbicularis flap, is hooked onto with a suture, and it is anchored to the periosteum or to the bone along the orbital rim or directly onto the frontal calvaria (Besins).

Endotine Midface



Endotine. Amongst the midface lift methods without subciliary incisions, the one based on the employment of Endotine midface seems particularly interesting. This device is made up of a long arm with a few hooks on its lower end. These hook onto the midface soft tissues. On the top end there are a series of holes, one of which is used to suture the device onto the temporal aponeurosis. In order to put the Endotine in the correct place, both a subfascial dissection through an incision in the scalp in the temporal area, and a subperiosteal undermining in the malar/infraorbital area through an incision in the oral vestibular must first be carried out (A). Then, the device is inserted (B, C) by its head: finally, the undermined tissue is lifted by pulling the Endotine upwards (D) and its upper arm is fixed onto the temporal aponeurosis (E). The operation is finished off by suturing the external incisions. As an alternative to the “Midface” also the cheaper “Ribbon” can be used with its cogs turned outwards (F).

The operation is finished off with **sutures**. Any temporal incisions are closed with a few deep (fascia-to-fascia) and intradermal stitches or with staples. The incision of the upper eyelid is sutured with a Nylon 6/0 running suture the external part of which is generally an everting mattress suture. Sometimes the margins of the orbicularis should be joined with Vicryl or Monocryl 5/0 thread before suturing the skin of the upper eyelid, so that the surface is more even though the knot of this suture might bother the patient at the beginning of the post-operative period.



Sutures. The eyelid skin sutures finishing off midface surgery are the same as those in all blepharoplasties. Obviously, the most important ones are the deep anchorage sutures, but also this final stage of the operation must be carried out with extreme care: scars are a surgeon's "signature"! The incisions can be more or less long or short depending on the necessity of removing either lesions or just excess skin from the paracanthal area. The scars in the pictures at the top, which pertain to routine midface lifts, are relatively short. Whereas those in the bottom pictures, which are required in operations excising large amounts of skin, including, on the right, massive granulomas caused by foreign bodies, are longer. Notice how in the extraorbital portion the everting sutures are applied.

The suturing of the lower eyelid is done with single stitches with softer Silk 6/0 to avoid irritating the eye. The ends of a stiffer thread, like Nylon, could in fact enter the eye and irritate the conjunctiva and cornea. If such kind of stiffer suture is used it would be best to leave its extremities long, and to secure them to the underlying skin the skin with some tape.

A slightly compressive dressing with sponges and tapes is applied to the undermined area once the suturing has been completed.

The Case



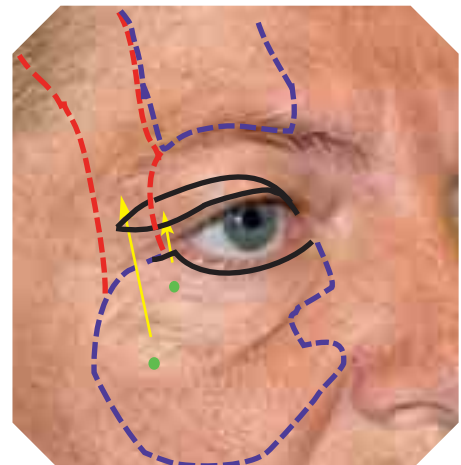
The Result



Hollow lower eyelid area with deep nasojugal grooves, scleral show, light malar bags and superior dermatochalasis. The patient wanted the listed defects to be corrected without distorting her face's features. So, we suggested a midface lift with a superolateral traction and an upper blepharoplasty. The operation repositioned the global soft tissues in the infraorbital and malar region, filling the eyelid area and improving the shape of the cheekbones.

Pre-operative markings

Eyelid incisions (black); subperiosteal undermining (blue); subfascial undermining (red); the points where the main sutures are applied (green); traction vectors (yellow arrows).



The surgical technique employed is illustrated on page 162

The technique illustrated step by step



Local anesthesia in the temporal and upper eyelid areas. Infiltrate the temporal area circumscribed by the markings with a cocktail of local anaesthetic and vasoconstrictor diluted in saline solution (Mepivacaine 0,3% with Adrenaline 1:600.000). Also inject this solution at the subcutaneous level in the area above and in front of the temporal incision and the in upper eyelid.



Local anaesthesia in the lower eyelid and midface area. By inserting the needle into the already anaesthetized area infiltrate the solution at the side of the lateral canthus and into the lower eyelid. Here the anaesthetic should be injected at the subcutaneous level, as was done in the upper eyelid. Whereas it is advisable to infiltrate as deep as possible in the infraorbital and malar area.



Incision at the side of the lower eyelid and in the upper eyelid. To avoid rubbing off the pre-op markings during surgical manoeuvres, begin incising at the side of the lower eyelid before continuing on to the upper eyelid. The incision only concerns the skin and must be carried out with a blade 15. Neither lasers nor radioscalpels offer any particular advantages compared to cold steel blade.



Excising redundant skin. Excise the skin defined by the surgical markings on the upper eyelid with a scalpel or scissors. If you wish to create a deep eyelid crease, a strip of orbicularis muscle must be removed as well. In order to accelerate the procedure the orbicularis and the skin can be removed together, but care must be taken to keep the orbicularis strip down to a few millimetres.



Resecting the orbicularis and sculpting the ROOF. In this patient, after having removed the excess skin, a strip of orbicularis is excised (picture on the left). It's not bigger than 2-4 mm and extends from one edge of the wound to the other. Then a moderate amount of ROOF (fat lying between the orbicularis and periosteum) ,which often tends to penetrate the eyelid, is removed.



Sculpting the eyelid fat. Release the retroseptal fat pad by opening the septum, which is a thin fibrous membrane below the orbicularis and "sculpt it" (picture on the left). First separate it from the underlying elevator aponeurosis (picture on the right) and then excise the excess. Care is needed not to exchange the lacrimal gland, lying laterally, for the fat.



Skin dissection and incision. Gradually extend the subdermal undermining to the whole eyelid including the area situated inferolaterally to the external canthus where, at the end of the operation, maximum traction is exerted on the orbicularis. Then, carry out an incision along the eyelid margin with sharp scissors or scalpel at about 1-2 mm from the lashes to prevent harming the follicles.



The orbicularis muscle. Expose the orbicularis, which should still be intact, by lifting the amply undermined skin (picture on the left). In its lateral portion, at about 8 mm from the lashes, carry out a small transverse incision approximately 1 cm long (picture on the right) parallel to the muscle fibres which, alternatively, can simply be spread apart with the help of a pair of scissors.



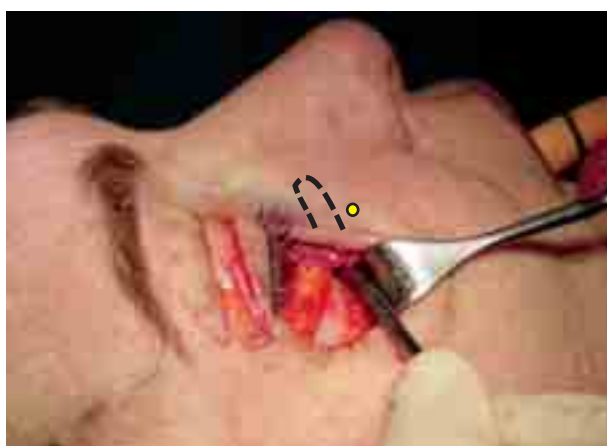
Dissection between orbicularis and palpebral septum. Enter the preseptal space through the small incision in the orbicularis and continue dissecting towards the orbital rim with the help of either a pair of scissors, a compress, or by cautery. This undermining between the orbicularis and septum is simple and generally bloodless. Once you reach the orbital rim expose it by using a flat instrument (on the right).



Incising and undermining the periosteum. Excise the periosteum along the orbital rim by cautery (the blade of a cold scalpel or periosteal elevator can also be used). Begin the subperiosteal undermining of the malar and infraorbital area through this incision so that in this way the thick flap of soft tissues of the midface area lifts from the bone.



Subperiosteal dissection. Undermine the soft tissues from the skeletal plane with a very sharp 6 mm periosteal elevator. You must avoid changing dissection level, which will occur if you go too far towards the surface; so be careful to always remain close to the bone. First undermine the malar area all the way to the masseter insertion and then continue on to the infraorbital region.



The corridor between the arcus marginalis and the infraorbital pedicle. After having found and protected the pedicle with your finger, extend the subperiosteal undermining also to the corridor between the arcus marginalis and the infraorbital pedicle to lift the midface soft tissues in the medial portion of the eyelid and in the immediate subpalpebral area.