Long Term Use of Fogli's Temporal Lift Technique

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Abstract— The temporal lift by galeapexy is a short scar lifting of the lateral third of the eyebrow and temporal region described in 2003 by Alain Fogli. The senior authors have been early adopters of this technique, albeit with some modifications. The technique was used in 923 cases, of which 20% were performed as an isolated procedure and 80% in combination with a MACS-lift.

Over eight years of experience with the technique has proven a good reliability of the technique, which is predictable and safe. Patients with 5 years or more follow up were reviewed , and showed a marked improvement of both lateral hooding and eyebrow position in more than 90% of cases, with a relapse of less than 10% after 5 years. The complication rate was below 5%. Both surgeon's and patient's satisfaction with this technique is high.

I. Introduction

The "Temporal Lift by Galeapexy" as described by Alain Fogli (1) has for over a decade been the perfect addition to any short scar vertical facelifting technique, and specifically to the MACS-lift technique described by the senior authors (2). Not only Fogli's technique is easy and reproducible, but also the concept of lifting the tail of the eyebrow rather than the whole eyebrow makes aesthetically more sense.

Similar to most "minimally invasive" or "short scar" techniques the Temporal lift had to endure early criticism about efficacy and estimated longevity.

As early adopters of the technique, albeit with some modifications, we have the experience that both efficacy and longevity of Fogli's technique is at least comparable to more traditional brow lifting techniques.

II. Patients and methods

A retrospective review was made looking for patients who underwent modified Fogli's technique of temporal lifting by the senior authors. . A follow up time of more than 5 years was registered in 151 patients, of which 34 accepted to participate to the study for clinical evaluation.

The data of these 34 cases were reviewed in order to evaluate long-term results. An assessment of the clinical preoperative, short and long-term postoperative pictures was requested from a panel consisting of five lay persons and five plastic surgeons

Pictures of the preoperative situation, one year postoperatively and 5 years postoperatively were assessed. The panel was requested to score for two criteria: eyebrow position and lateral hooding. Each criterium had to be scored from 1-4, where 1 was "worse than preoperative", 2 was "no difference", 3 "somewhat better", and 4 "markedly better".

Surgical Technique

Since we had adopted the Fogli's technique this method was applied to a great majority of patients undergoing MACS-lift surgery. The MACS-lift is a short-scar vertical face lifting technique involving suspension of the platysma muscle and SMAS with slow resorbable purse-string loops anchored to the deep temporalis muscle fascia. The Extended MACS-lift also involves a third purse-string loop suspending the malar fat pad. In any vertical short scar facelifting, but especially in conjunction with the Extended MACS-lift where a significant mid-face lifting causes shift of cheek skin into the temporal region, the temporal lifting was a systematic addition. The temporal lifting was indicated in every vertical short scar facelift and, in particular, when a significant mid-face lifting causes shift of cheek skin into the temporal region such as in case of Extended MACS-lift. In addition the short-scar temporal lifting was frequently applied separately, as an isolated correction or in conjunction with an upper and/or lower blepharoplasty.

Two essential technical modifications were applied early in the series.

–Incision: Convinced of the rejuvenating power of the vertical vector we changed the angle of the incision from oblique into a purely horizontal incision. This allows a more vertical redraping of skin than the slightly oblique vector of Fogli's original technique.

- Dissection plane: Fogli describes a dissection in three planes (1) : a subgaleal, a subcutaneous and a subperiosteal plane. The first two are reproduced in the author's technique, the latter has been abandoned early in the series. As essentially the short-scar temporal lifting is a subcutaneous lift, we did not see the benefit of adding an extra dissection cavity in the subperiosteal plane, which is not entirely free of morbidity, as the frontal branch passes in the thin connective tissue bridge between the subcutaneous and subperiosteal dissection planes.

- Markings : The markings of the short-scar temporal lift as nowadays applied by the authors are : a 4-5 cm long horizontal incision in the temporal hair, located at the anteriormost extension of the temporal hair (**fig 1**).
Parallel to the incision, a second horizontal line is drawn at a level 2 cm cranial to the tail of the eyebrow, to mark the level where a transition is made from the subgaleal plane cranially to the subcutaneous dissection plane caudally. The transition into the subcutaneous plane is made no more caudally to safeguard the frontal branch of the facial nerve, which runs just beneath the temporoparietal fascia, an extension of the galea aponeurotica. The extent of the subcutaneous dissection is marked from this line down, including the lateral 1/3rd of the eyebrow and the paracanthal skin down to the level below the lateral canthal ligament. Dorsally the subcutaneous dissection extends to the sideburn. When associated with a MACS-lift, this subcutaneous dissection is performed from the facelift incision

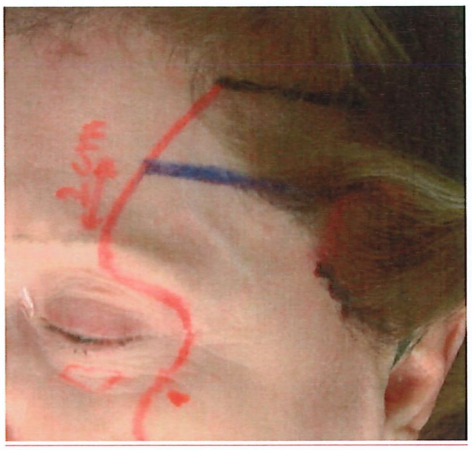


Figure 1: Markings :
the skin incision is 4-5 cm long inside the temporal hair, and horizontally oriented, reaching anteriorly to the anterior most extension of the temporal hair. Parallel with the incision, a second horizontal line is drawn at a level 2 cm cranial to the tail of the eyebrow, to mark the level where a transition is made from the subgaleal plane cranially to the subcutaneous dissection plane caudally. The subcutaneous dissection is either marked in continuity with the facelift undermining (picture), or ends caudally just below the level of the lateral canthus. Note that the undermining extends underneath the tail of the eyebrow

- Dissection : After infiltration of the surgical plane with local anaesthetic solution the skin incision is made parallel to the hair shafts, and brought down to the periosteum and deep temporalis muscle fascia. From there the dissection is carried on with facelift scissors in a caudal direction in a subgaleal plane, down to the second horizontal marking, 2 cm above the eyebrow. There, the tips of the scissors are oriented towards the skin surface, and the fibers of the galea are transected upon tactile control of the middle finger resting on the skin surface. This brings the dissection into the subcutaneous plane, which is further developed in a caudal direction, until the undersurface of the lateral eyebrow and down to the paracanthal area (**fig 2, point "sq"**). The dissection plane remains superficial to the orbicularis oculi muscle.

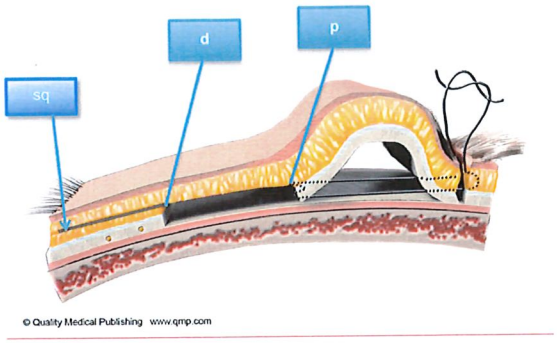


Figure 2: Saggital section of the forehead at the level of the lateral eyebrow. The eyebrow is on the left side of the image, the scalp hair at the right side. The suspension suture is tied between the galea at the skin incision and the proximal edge of the transected galea ("p")
The lifted skin attaches down to the periosteum in the gap between the two galeal edges (proximal edge at "p" and distal edge at "d"), and will stabilize of the eyebrow in its lifted position.

When combined with a facelift, it is also possible to perform the subcutaneous portion of the dissection from caudally through the face lift incision. After hemostasis the suspension is obtained by placing two to three 2-0 Vicryl® sutures between the cranial edge of the transected galea and the galea at the cranial side of the skin incision. This is a solid suspension, as the anterior mobility of the galea is known to be very limited, as authors who describe hairline lowering techniques need to dissect the galea back almost to the occiput to advance the anterior hairline. This creates a "tucking in" motion of the galea and a skin fold caudal to the skin incision. It is important to realize that the galea is merely used as a vehicle for the vertical repositioning of skin flap that contains the tail of the eyebrow. The lifted skin attaches down to the periosteum in the gap between the two galeal edges (**fig 2, point "p" and "d"**), and will stabilize the eyebrow in its lifted position. A minor trimming of the skin is performed to reduce the bulging of the skin fold, and the skin is closed with a running 3-0 nylon suture. After 6-8 weeks the Vicryl sutures dissolve and the skin fold disappears.

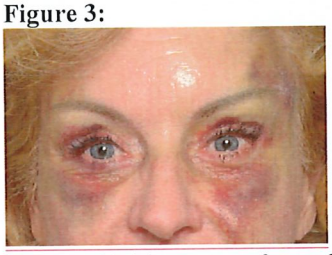
In the initial series (from 2005 to 2007) the skin incision was carried out high in the temporal hair, extending laterally from the temporal crest. As some results were disappointing both in efficacy and longevity the skin incision was brought down caudally, in closer proximity to the deformity, as described above. This dramatically increased the power of the procedure as well as the longevity.

III. Results

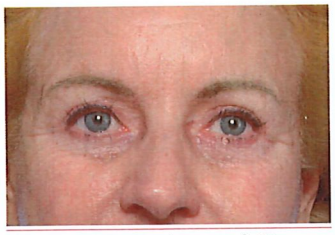
The short-scar temporal lifting has been performed by both senior authors in 923 cases over 8 years (from 2005-2013). Of these 91% were females, 9% were male, with an overall mean age of 58 years (42-83y). 738 of these were performed in conjunction with a MACS-lift procedure, 185 were performed as an isolated procedure or as an addition to a blepharoplasty.

Complications were noted in less than 5%, and consisted of hematoma (**fig 3**)(1,3%), sensory changes (3,2%), asymmetry (1,9%) and atrophic scars due to too superficial suture placement (**fig 4**)(0,6%).

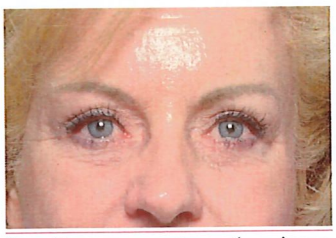
Figure 3:



3a Left-sided haematoma after modified Fogli's procedure, not reported by the patient until the one-week postoperative visit. The haematoma resorbed uneventfully as shown in the one year postoperative picture. Please note the overcorrection in the eyebrow position, which is customary.

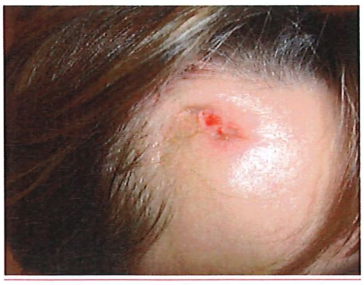


3b Preoperative image of 57 year-old patient with ptosis of the lateral brow and temporal hooding

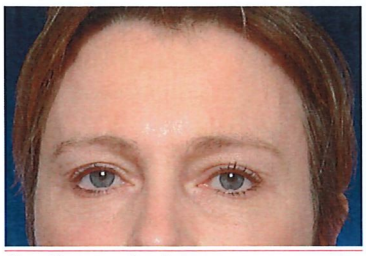


3c One-year postoperative image after combined MACS-lift and modified Fogli's procedure

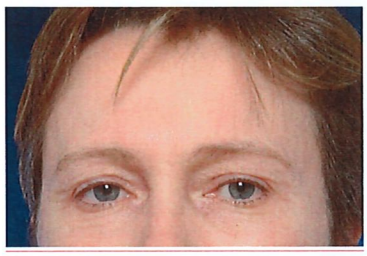
Figure 4:



4a Skin atrophy at the site of galeal suspension after a modified Fogli's procedure



4b Preoperative image.



4c 1-year postoperative image showing satisfactory result with no residual scar

A follow up time of more than 5 years was registered in 151 patients, of which 34 accepted to participate to the study for clinical evaluation.

Although patient satisfaction is generally high, early in the series some disappointing results could be noted. In 12 patients revisions needed to be done for early relapse. After redesigning the position of the skin incision in 2007 the incidence of revision surgery for disappointing results decreased to less than 1%.

The panel assessment results were:

For the lateral hooding **(Table 1)** a 1 year score of 4 (markedly better) in 51,25%, 3 (somewhat better) in 43,75% and 2 (no difference) in 6,25%. At 5 years the number of score 4 dropped to 28,75% to the advantage of score 3 which reached 55%, and 2 which raised to 16,25%.

Table 1 Lateral Hooding

Professional panel scoring of the results concerning correction of lateral hooding in 34 patients, respectively one year and 5 years after a modified Fogli's temporal lift procedure

LATERAL HOODING	1 YEARS (%)	5 YEARS (%)
1 : WORSE	0	0
2: DIFFERENCE	6,25	16,25
3 : SOMEWHAT BETTER	43,75	55,0
4 : MARKEDLY BETTER	51,25	28,75

For the brow position **(Table 2)** after 1 year the score was 4 in 48,75% and 3 in 42,5% , and 2 in 8,75%. At 5 years the scores were 4 in 27,5%, 3 in 50% and 2 in 22,5%.

Table 2 Eyebrow position

Professional panel scoring of the results concerning correction of eyebrow ptosis in 34 patients, respectively one year and 5 years after a modified Fogli's temporal lift procedure

BROW POSITION	1 YEAR(%)	5 YEARS(%)
1 : WORSE	0	0
2: NO DIFFERENCE	8,75	22,5
3 : SOMEWHAT BETTER	42,5	50,0
4 : MARKEDLY BETTER	48,75	27,5

IV. Discussion

Ageing of the brow is often underestimated and even more frequently misunderstood. Traditional brow lifting techniques tend to overelevate the eyebrow (3).

When analyzing a youthful attractive face, especially in females, one can observe in most cases that the apex of the brow arch is located in the transition from the middle to the lateral $1/3^{rd}$ to $1/4^{th}$. The lateral segment of the brow is usually higher or at least at the same level as the medial segment (**fig 5**).

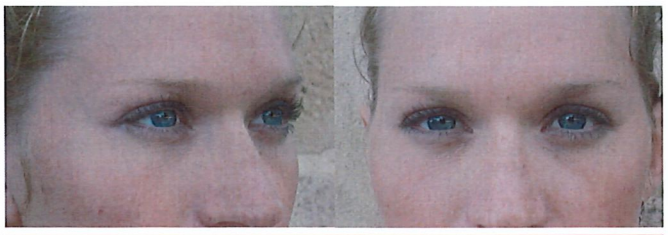


FIGURE 5:

features of a youthful and attractive brow in a young female : the apex of the eyebrow is located between the middle and the lateral 1/3 of the brow, and the lateral 1/3rd of the eyebrow is at the same level or slightly above the level of its medial end. No rhytids or hooding are present in the paracanthal region.

The central part of the forehead is subject to frontalis muscle hyperactivity, often induced by a latent blepharochalasis. This often causes the medial eyebrow to *rise* with age instead of dropping, as linear aesthetic analyses eloquently demonstrate (4). Therefore the central forehead only exceptionally needs a surgical lifting, and in our practice botulinum toxin has completely taken over the treatment of the central forehead.

Surgical brow lifting can be carried out in a subcutaneous, a subperiosteal or a subgaleal level. The subcutaneous approach necessitates a pre-hairline incision. The latter two are traditionally performed through an open bicoronal approach, or the last decades via endoscopic techniques. The advantages of these traditional techniques are a predictable and consistent outcome, and a low complication rate. The disadvantages of the open bicoronal technique include unfavorable scars, possible alopecia and sensory changes (5). The main disadvantage of the endoscopic techniques is the inconsistency of the results as a consequence to the multitude of fixation methods. Additionally, the traditional sectioning or weakening of the corrugator muscles and brow depressors often included in these techniques involves a high risk of overcorrection in the medial brow often resulting in an unnatural "surprised" appearance. This elevation may even increase with time (6) as the un-antagonized action of the frontalis keeps lifting the eyebrows actively.

The most evident sign of brow aging is a descent of the lateral third of the eyebrow often combined with temporal hooding, which consists of horizontal wrinkles and folds in the paracanthal region. Most surgical facial rejuvenation plans will need to incorporate correction of this area in order to preserve or restore facial harmony.

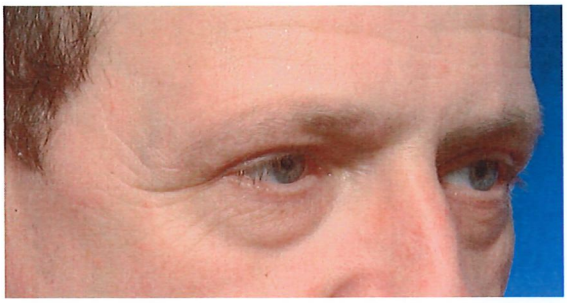
It is our conviction that only the lateral brow needs a surgical correction, as the middle third of the forehead can very easily be corrected with botulinum toxin injections. In our practice we have seen needle surgery by botulinum toxin replacing knife surgery by endoscopic or open forehead lifts. Since the introduction of botulinum toxin as a very elegant treatment modality for glabellar and frontal grooves, we saw a clear shift in the indications from brow lifting towards a pure temporal lifting.

There are three issues in temporal lifting: to avoid damaging the frontal branch of the facial nerve, to avoid altering the position of the hairline, and to obtain a good and stable result. There is a myriad of techniques, with either a subperiosteal, a subgaleal or a subcutaneous dissection plane, or a combination of these (5,7-10). The technique of Alain Fogli (1) allowed us to reach the goal of brow rejuvenation in a simple way, without worrying about the frontal branch, and with remarkably stable long term results.

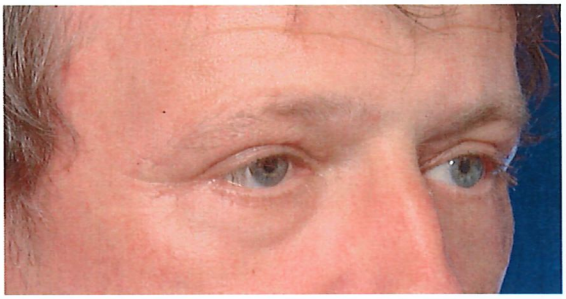
As experience grew, we further simplified Fogli's technique, limiting the dissection to the subgaleal and the subcutaneous planes and omitting the subperiosteal part of the surgery. Fogli argues that the galea, the superficial temporal fascia and the periosteum of the frontal bone are confluent just medial to the temporal crest and therefore should be released (1). As the short scar temporal lifting essentially is a subcutaneous lift, we have experienced that the subperiosteal dissection plane does not contribute to the result, and potentially increases the morbidity and the length of recovery. We also modified the orientation of the incision to a more horizontal direction, in order to better deal with the paracanthal and temporal skin excess created by the vertical lifting in the MACS-lift. It has indeed been shown in our results that the correction of the temporal hooding is the most powerful and most stable feature of the temporal lifting, closely followed by the brow correction (**fig 6-9**). Indeed lateral hooding is visibly diminished in 95% after 1 year, and this remains stable in 83,75% of the cases. The brow position is improved in 90,25% of the cases after 1 year, and stays stable up to 5 years in 77,5% of the cases. This results in an effective rejuvenation of the upper third of the face, effacing rhytids and skin folding in the paracanthal area, and restoring a youthful elevated position of the lateral 1/3rd of the eyebrow.

Case examples

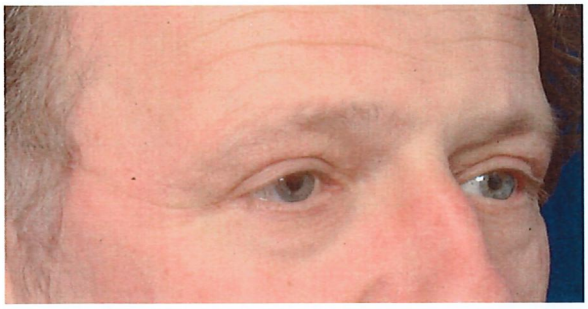
FIGURE 6:



49 year old male, 5 years post upper blepharoplasty done elsewhere. Consulted for correction of facial laxity, brow ptosis and temporal hooding

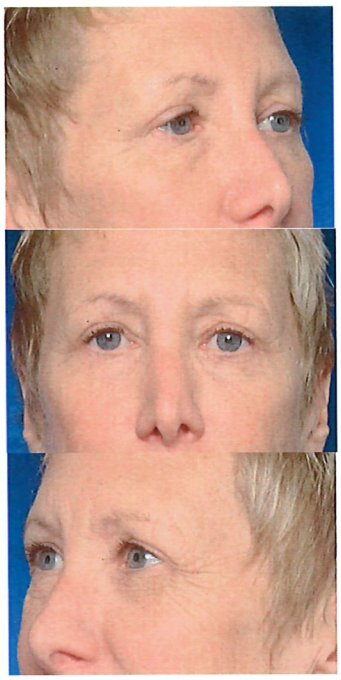


result one year post modified Fogli's procedure combined with MACS-lift. Note the improved position of the eyebrow and eradication of temporal hooding and skinfolds

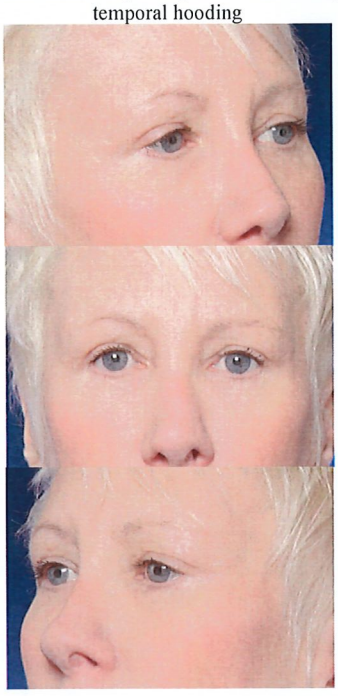


five years postoperative result : both eyebrow position and temporal area have maintained their correction. This patient was scored 4 for both eyebrow position and temporal hooding.

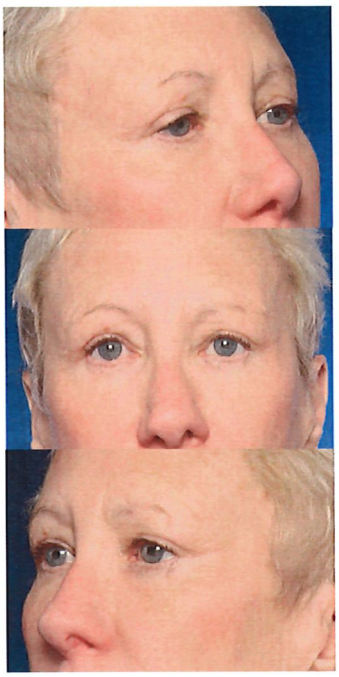
FIGURE 7



7a 62 year old female requesting correction of blepharochalasis and temporal hooding

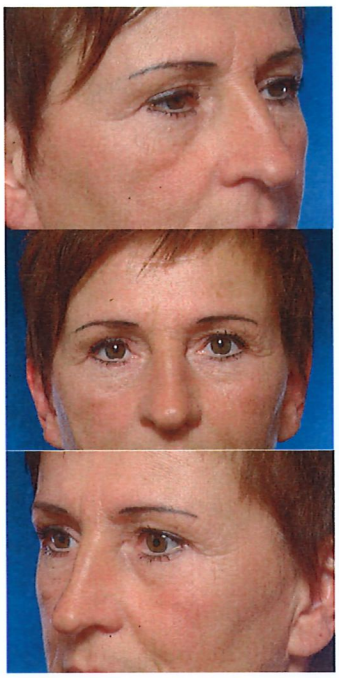


7b one year postoperative result after modified Fogli's procedure and upper blepharoplasty

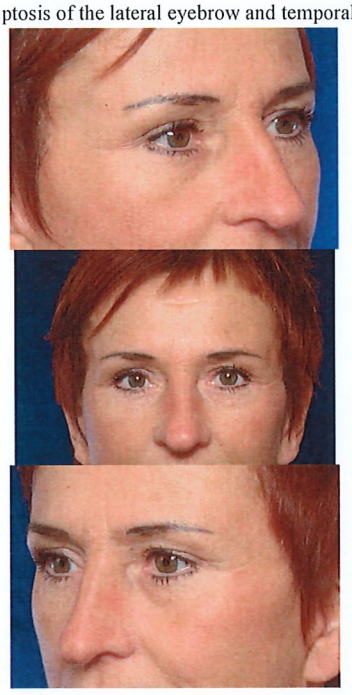


7c six years postoperative result, demonstrating good stability of correction of both temporal hooding and eyebrow elevation

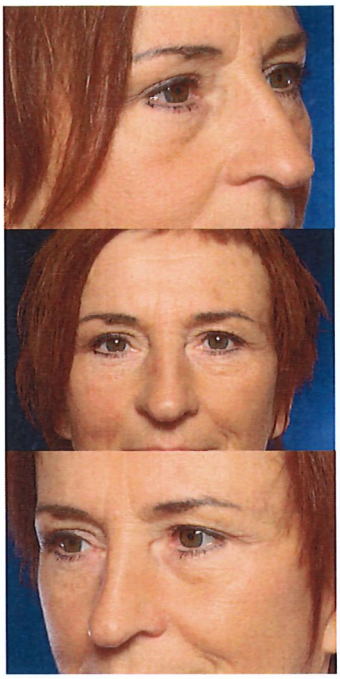
FIGURE 8:



8a 50 year-old female requesting correction of facial laxity, including ptosis of the lateral eyebrow and temporal hooding

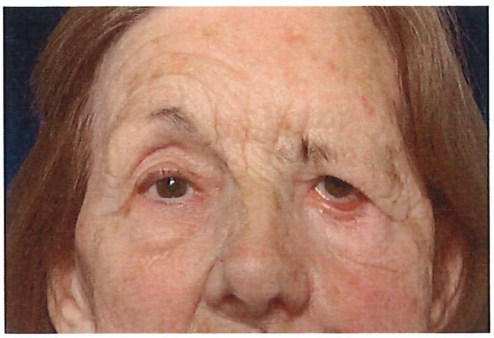


8b one-year postoperative result, demonstrating good correction of the temporal hooding and an elevation of the lateral third of the eyebrow by a modified Fogli's procedure

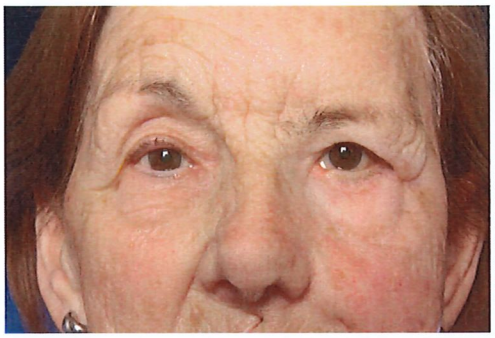


8c eight years postoperative result. One can observe a partial relapse in both eyebrow ptosis as in temporal hooding.

FIGURE 9



82 year old female with a long standing left peripheral facial palsy, with severe brow ptosis and ectropion



one year postoperative result after combined modified Fogli procedure and canthopexy with bony anchoring demonstrating a powerful and stable correction of the brow

Conclusion

The Fogli's technique for temporal lifting, described 10 years ago, is simple and safe in concept and produces predictable and satisfying results. Applied by us with some modifications it has proven to be effective, safe, predictable and stable over time. It has shown its usefulness both as an isolated procedure as in combination with vertical vector facial rhytidectomy techniques such as the MACS-lift.

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