



## Use of Facial Sutures with Cones (Silhouette Lift\*) in the Treatment of Facial Ptosis: Technique, Indications and Outcome in the Palliative Treatment of Facial Paralysis and for Rejuvenation Surgery

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### Abstract

Since January 2008, the author has been interested in the use of suspension wires for treating facial ptosis. Initially this concerned the palliative treatment of certain facial paralyses where no other technique was possible or appropriate, and simultaneously, for the treatment of ptosis of the mid-face during ageing in healthy subjects. In all cases, the patients wanted non- or minimally invasive techniques, performed under local anesthetic and as outpatient treatments. In a significant number of cases, additional procedures (fat grafting, canthopexy) were combined with the suspension using silhouette\* sutures. The particular characteristic of these sutures is that they contain polylactic acid cones absorbable over the course of a few months and nodes between each cone in a non-absorbable polypropylene wire; this is not merely a passive suspension of tissue in the malar and cheek region, but the inducing of a healing response with fibrosis and neocollagenesis, prolonging the action of the wire beyond the absorption of the cones.

The sutures can be readjusted or retightened 1 to 2 years later by accessing them in the temporal region of their insertion. It is possible to combine other surgical procedures with this technique, especially lipofilling, canthopexy, plasty of the nasolabial fold, etc.

**Keywords:** Treatment of facial ptosis; Serrated sutures; Face-lift; Facial paralysis; Mid-face rejuvenation; Palliative surgery of facial paralysis; Tightening wires; Canthopexy

### Introduction

Surgeons have long sought minimally invasive techniques for the treatment of centropacial ptosis, whether this is due to classic ageing (Figure 1) or through facial paralysis. Among these techniques, the use of wires as stays underneath the skin has never been proven to have lasting effect. No matter what wire is used, whether serrated or not, and sometimes with a certain associated iatrogeny, no referenced publication has shown results in the short or long term.

Following endoscopic face-lift techniques developed by ISSE [1], the surgical implementation of a new generation of polypropylene tissue suspension has the characteristic of having a series of polylactic acid absorbable cones along the length of the wire, held by the nodes. Besides the mechanical action of the cone which slides on the node and forms a tissue trap to ensure an immediate suspension of tissue, the more sustainable action once the polylactic acid is absorbed in a few months is achieved by the creation of microscars and a fibrosis which maintains the outcome. We are reporting on a retrospective study of two groups of patients:

- 1) A series of patients exhibiting the consequences of facial paralysis.
- 2) A series of patients seeking rejuvenation surgery. The author reports on the technique; the indications, complications and outcome.

### Materials and Methods

This is a retrospective study of a series of patients operated beginning on January 2008.

#### The patients

- 27 Patients (17 women and 10 men) between 29 and 82 years of age with chronic facial

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Received Date: 16 Nov 2019

Accepted Date: 20 May 2020

Published Date: 26 May 2020

#### Citation:

Poignonec S. Use of Facial Sutures with Cones (Silhouette Lift\*) in the Treatment of Facial Ptosis: Technique, Indications and Outcome in the Palliative Treatment of Facial Paralysis and for Rejuvenation Surgery. *Ann Plast Reconstr Surg.* 2020; 4(2): 1057.

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Figure 1: Centro facial ageing process from 20 to 60 years old.



Figure 2: Silhouette suture.

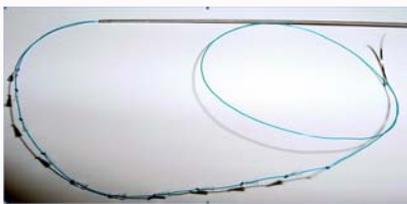


Figure 3: Silhouette suture.

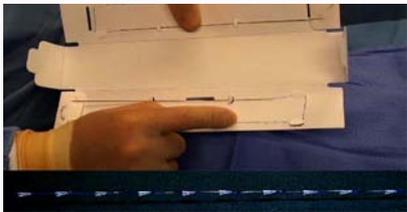


Figure 4: Silhouette suture.

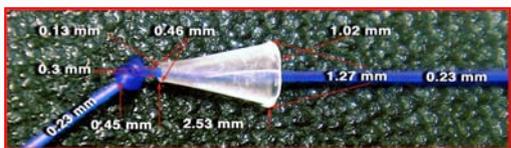


Figure 5: Cones.

paralysis of various etiologies.

- 15 patients for aesthetic purposes.

**The pre-operative work-up**

This included a pre-anesthesia consultation for all patients with an assessment of coagulation factors.

For paralyzed patients, care was multidisciplinary (medico-surgical consultation) and included an electromyographic assessment, a scan and/or an MRI.

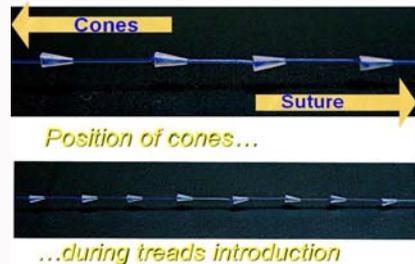


Figure 6: Aspect of the cones during the surgery.

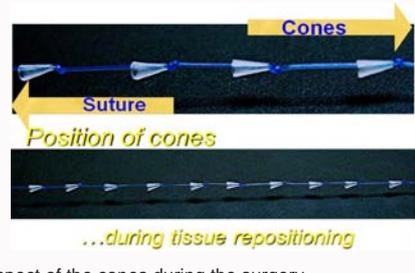


Figure 7: Aspect of the cones during the surgery.

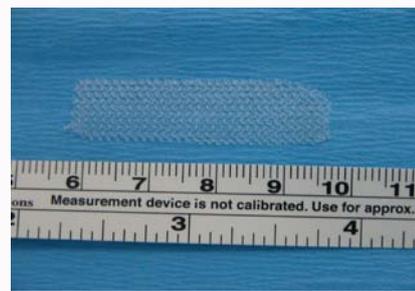


Figure 8: Silastic plate.

**The material**

A suspension system comprising Silhouette lift\* brand non-absorbable polypropylene 3/0 wires with CE marking and FDA approval since 2007 (Figure 2). The sutures are mounted on a straight needle of a length of 20 cm and a 20 gauge diameter (Figures 3 and 4). Each wire is equipped with 6 to 10 cones inserted into the wire (Figure 5) and secured with a knot in the wire at the end of each cone. The cones are 1.12 mm in diameter and 2.50 mm in length.

During the rise of the soft tissue, the cone will slide over the node and secure itself at the end (Figure 6 and 7).

At the other end of the wire a round curved needle allows the wire to be fastened to the Silastic\* plate on the deep temporal aponeurosis (Figure 8).

**The indications**

- Symmetry of facial paralysis sequela: 27 cases.
- Aesthetic indications: 15 cases.

**Etiologies of facial paralyses**

This concerned mainly tumour-induced facial paralysis:

- Tumors of the cerebellopontine angle: neuroma of the 8<sup>th</sup> nerve, neuroma of the 7<sup>th</sup> nerve, mixed nerve neuromas, schwannomas of the 7<sup>th</sup> nerve, glomus tumors, craniopharyngioma: 15

### Diagramm of etiology of facial palsy

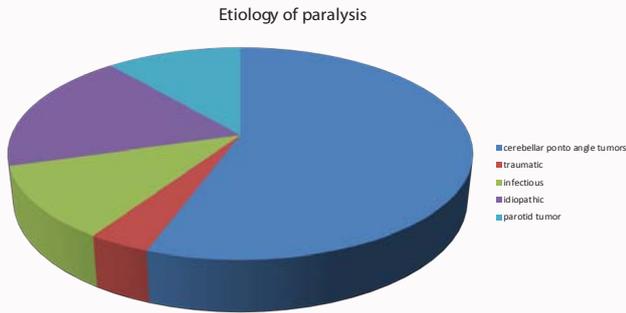


Diagram 1: Most were unilateral except for a case of facial diplegia.

### Previously operated patients

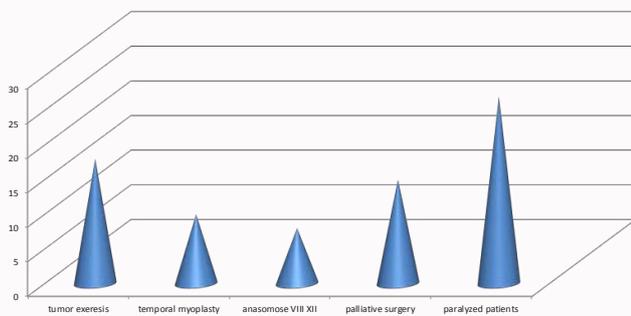


Diagram 2: Types of interventions.

- Benign or malignant parotid tumors: 3
- Traumatic: 1
- Infectious: 3 poliomyelitis, tuberculosis.
- Idiopathic: 5

This involved flaccid peripheral facial paralysis classed as at least grade 4 of the House-Brackman scale [2] (Diagram 1).

22 paralyzed patients had been operated on previously: This involved surgery for tumour excision, temporal myoplasty, transfacial grafts, hypoglossal-facial anastomosis or palliative surgery for facial paralysis. Some had received multiple interventions:

Types of interventions: Diagram 2.

#### Surgical technique

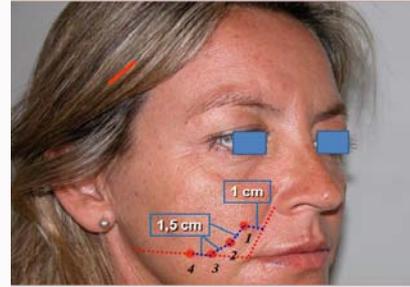
Before surgery, the patient was examined in the sitting position, the lip position was recorded at rest and when smiling.

The anatomical landmarks and areas of emergence of wires were recorded.

#### Anatomical landmarks

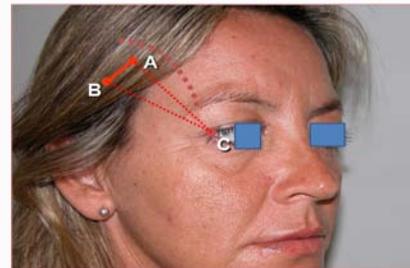
The frontal branch of the facial nerve which occurs at the Union of 2/3 EXT 1/3 inside the zygomatic arch starting from the tragus and the adhesion zones of the ligaments of the face (cutaneous malar or McGregor's patch) are identified [3].

Two lines and the points of emergence of the wires are drawn:



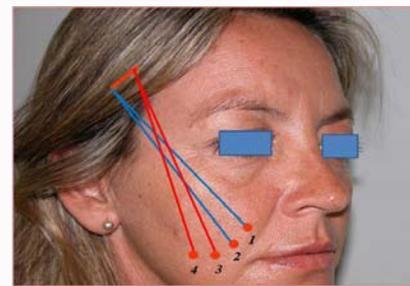
**Exit points**

Figure 9: Diagram of the etiologies of facial palsy.



**Incision Line C to A = 7 cm. C to B = 8 cm.**

Figure 10: Diagram of the previously operated patients.



**Sutures deployment Mental Labial Fold**

Figure 11: Areas for local anesthesia.

1. Nasolabial line: at 5 mm from the nasolabial fold
2. Cheek line: we raise the cheek slightly and draw a horizontal line between the oral commissure and the gonion of the mandible. This line may be lower if there is significant ptosis of the cheek.

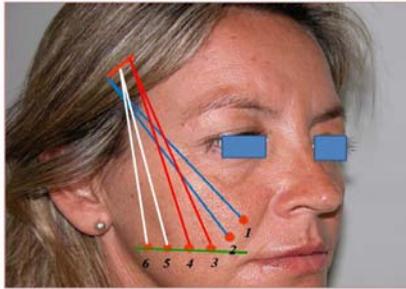
The points of emergence: 4 to 6 sutures are positioned per side:

Point of emergence 1: located midway between the nostril implantation and the oral commissure 5 mm outside the nasolabial fold.

Point of emergence 2: 1 cm below the first at the same distance from the nasolabial fold.

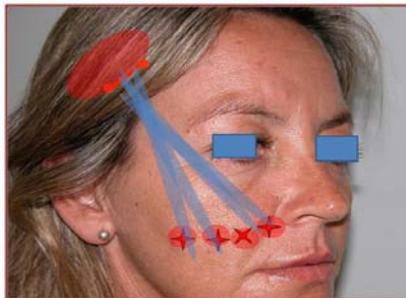
Point of emergence 3: at the intersection of the nasolabial fold and horizontal cheek line described above or 1 cm to 1.5 cm below if the cheek is heavy.

Point of emergence 4: 1.0 cm away from point number 3 on the cheek line.



More Sutures

Figure 12: Emergence of the wires.



local anesthesia

Figure 13: Sutures deployment.



Figure 14: Sutures deployment.



Figure 15: Sutures deployment.

Point of emergence 5: 1 cm away from point number 4 on the cheek line.

Point of emergence 6: 1 cm away from point of emergence number 5 on the cheek line (Figures 9-12).

**Anesthesia**

Patients received a local anesthetic of xylocaine 1% with adrenaline in the path of the sutures or a trigeminal block with



Figure 16: Surgical procedure.



Figure 17: Surgical procedure.



Figure 18: Surgical procedure.



Figure 19: Surgical procedure.

sedation and/or a general anesthetic. The duration of hospitalization was 24 h maximum (Figure 13).

**Preparation and positioning**

The patient is positioned as for a face-lift with a drape. Surgical technique Figures 14-19.

## Incision

This is located in the temporal region 1 cm below the temporal ridge, 1 cm to 3 cm behind the implantation line, at approximately 7 cm from the outer canthus.

## Orientation

The upper part of the incision is 1 cm behind the hairline and the lower part 3 cm behind the hairline.

## Passing of wires

In the temporal region, the dissection is performed between the deep temporal aponeurosis and the superficial temporal aponeurosis up to the hairline to avoid any risk of alopecia, and then it superficialises to become deep subcutaneous.

On the deep temporal aponeurosis, a small Silastic plate of 1 cm 2 is sutured using vicryl 3/0. The wire is mounted on a long straight needle and ends with a small curved needle used to fix the temporal aponeurosis, the needle must slide easily under the skin during insertion. At first, the use of introducer foam may be helpful. The needle exits from predefined points of emergence and the wire is cut after the node so as not to leave a cone loose under the skin.

In the facial region the sutures are positioned in the deep subcutaneous layer. If they are too superficial they may be palpable; if they are too deep they may not be effective because of the convexity of the cheekbone. The straight needle tends to emerge at the skin so it is necessary to lift the cheek and the malar region to avoid misposition of the suture.

## Trajectory of sutures

The two nasolabial sutures are directed from the lowest portion of the temporal incision to points of emergence 1 and 2.

Suture number 3 enters the highest region of the temporal incision and the oral commissure.

Sutures 4, 5, 6, pass under the suture 3 in the same order.

Sutures 3, 4, 5, and 6 cross sutures 1 and 2 at the zygoma.

## Traction and fixation

All sutures are traced and fixed at the end of the procedure two by two in order to distribute the tension on the Silastic plate. The temporal incision is closed in two planes to cover the vicryl 3/0 Silastic plate (Figure 20) and stapled in the scalp.

## The post-operative care

At the end of the procedure, steri-strips are placed in the malar and sub-malar region to relieve the tension on the wires (Figure 21). It is advisable to avoid chewing very hard foods, to avoid opening the



Figure 20: Section of the nodes.

mouth very wide in the two weeks following the surgery, and to avoid chewing gum.

The scalp wires or staples are removed on day 7.

Characteristics of the techniques and association in facial paralysis: The positioning of wires is defined in the pre-operative phase according to the lesions observed; in both cases we have positioned the emergence of sutures in the labial commissures to raise a very low commissure. It is also possible to anchor it in the nasolabial fold and not outside to accentuate the reformation of the fold, and it is possible to tie up two wires at their point of emergence to limit slipping.

## In most cases we have combined one or more of the techniques described herein

A facial fat grafting of the malar region on the paralyzed side, often the place of fat atrophy. An external canthopexy in the event of a sagging lower eyelid or paralytic ectropion.

Plasty of the nasolabial fold in the event of excess skin.

In 4 cases we positioned 4 wires contralaterally to treat an associated senile ptosis. In 5 cases we performed a retensioning after 12 months: Under local anesthetic, we return to the temporal incision and the dissection of the plate is quite easy; it is grasped with forceps and everything is lifted from 0.5 cm to 1 cm and repositioned higher up on the aponeurosis. If the nodes are easily dissected we can also try to tighten them directly taking care not to break the suture.

## Outcome

Assessed using before and after photos and videos and responses to a quality of life questionnaire drawn up by the speech pathologist.

The average time between the intervention and the assessment of the outcome was: 24 months; with extreme cases between 9 months and 48 months; 20 out of 27 patients operated on to balance facial paralysis responded to the quality of life questionnaire.

Questions were:

1. What is the degree of improvement of symmetry?
2. What is the degree of improvement of the corner of the mouth?
3. Did you notice an improvement in your breathing?
4. Did you notice less salivary leakage?
5. How long does the result last?
6. Do your relatives have noticed an improvement?
7. Did you have any pain following the procedure?
8. Did you have any mark hematoma following surgery?
9. Would you be ok to repeat the procedure if necessary?
10. Would you recommend the procedure to your relative?

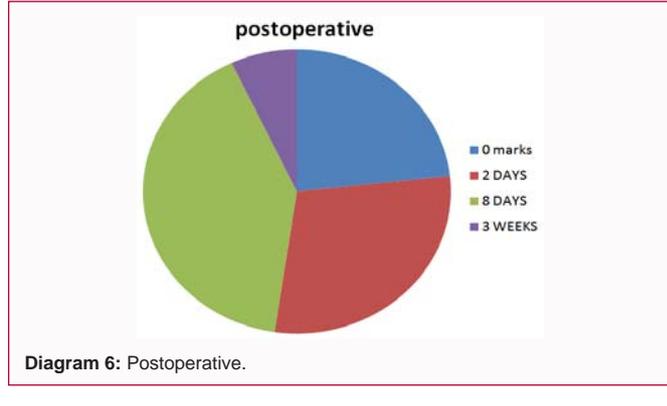
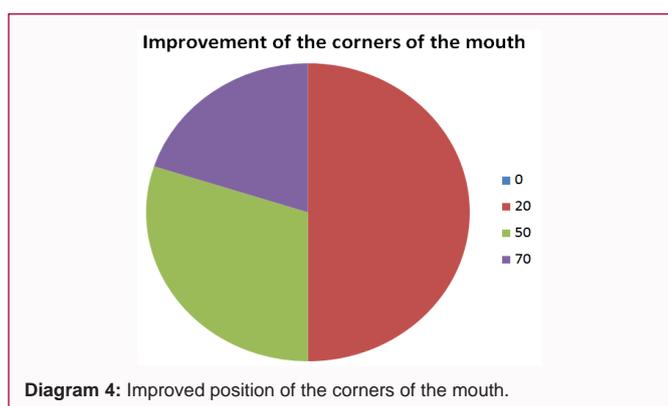
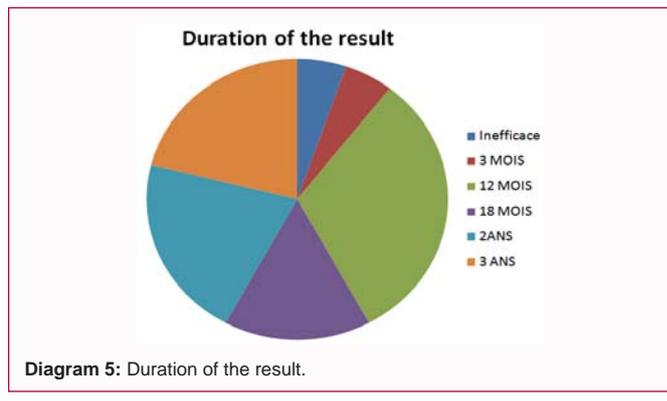
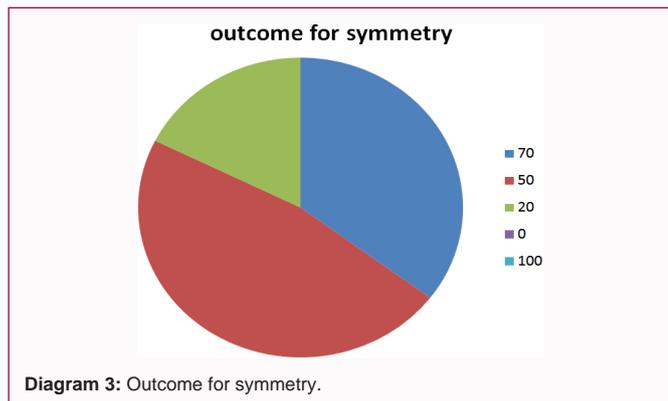
Outcome for paralyzed patients:

Improved facial symmetry in the opinion of the patient (Diagram 3).

No improvement: 0 patients

20% improvement: 6 patients

50% improvement: 8 patients



70% improvement: 6 patients  
 100 % improvement: 0 patients  
 Improved position of the corners of the mouth: Diagram 4  
 0%: 0  
 20%: 10  
 50%: 6  
 70%: 4  
 100%: 0  
 Better nasal breathing: 2 patients out of 20  
 Less salivary leakage: 8 cases out of 20  
 Duration of effectiveness: Diagram 5  
 Ineffective 1  
 3 months: 1  
 6 months  
 9 months  
 12 months: 6 patients  
 18 months: 3  
 2 years: 4 cases  
 3 years and above: 5 cases  
 Have those close to you noticed a difference?  
 Yes: 16 cases  
 No: 4 cases

Did you suffer following the procedure?  
 Yes: 5 cases  
 NO: 15 cases  
 Do you have any marks? Bruises, folds, etc.. Diagram 6  
 No marks: 4 cases  
 2 Days: 5 cases  
 8 Days: 7  
 3 Weeks: 4 cases  
 Would you be willing to repeat the procedure once the effectiveness of the wires has gone?  
 Yes: 19 cases  
 No: 1 case  
 Would you be willing to recommend it to those close to you?  
 YES: 19 cases  
 No: 1 case  
 Re-operation in 5 cases: 4 men including one case of facial diplegia, in the latter case patient re-operated on 3 months later to reposition 4 new wires on each side.  
 For aesthetic surgery patients:  
 Wires alone: on 15 patients. 6 had the procedure alone: immediate improvement for 3 to 6 months. Maximum duration of effectiveness 18 months.  
 Nine had combined techniques: Fat grafting, canthopexy to improve the result for up to 3 years maximum.



Figure 21: On live patient.

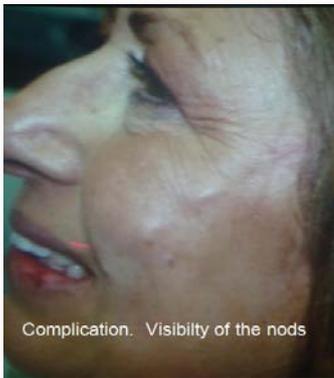


Figure 22: Sutures of the threads on the silastic plate.

**Post-operative**

Irregularities, sub-cutaneous ripples are recorded in practically all of our patients in the days which follow the procedure (Figure 22).

In two they continued for 3 weeks;

In all cases they completely regressed spontaneously or after massages.

**Complications**

12 Patients complain about pain in the temporal region for a few days to two weeks.

In 4 cases we noticed an extrusion of the plate several months after the procedure.

3 times we have to remove extrusion of a photo cone on the cheek under local anesthesia without sequelae.

In one case, overly superficial implantation of the wire had to be removed.

In one case neuralgic pain in the path of wires occurring several months after implantation.

Results on Figure: Figure 23 and 24, 35 years old female suffering of facial palsy after acoustic neurinoma surgery: result after 9 months; 9 silhouettes sutures implantation one side. Figure 24 and 25, 65 years old patient one year after implantation of 6 silhouette sutures. Figure 27, 70 years old patient 18 months after implantation of 6 Silhouette sutures. Figures 28-30, 31 aesthetic cases after one year: Bilateral implantation of 6 silhouette sutures each side.



Figure 23: Adjusting the traction of the threads.



Figure 24: Histologic results.



Figure 25: Histologic results.



Figure 26: End of surgery steristrip.

**Discussion**

**Concerning patients exhibiting facial paralysis**

Facial Paralysis (FP) is a common condition, the severity of which is related to its etiology, its clinical stage and the percentage of axonal loss determined by the EMG. While 80% of FP is idiopathic [4], the cause of the other 20% must be sought to enable a tailored treatment



Figure 27: Operating suites.



Figure 31: Complication weakness area of the thread.



Figure 28: Diagram of the results on facial symmetry.

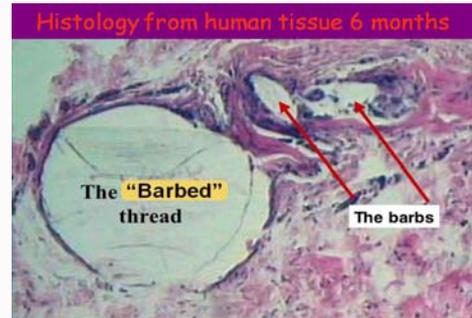


Figure 32: Histology from human tissue 6 months.



Figure 29: Diagram of the duration of the result.

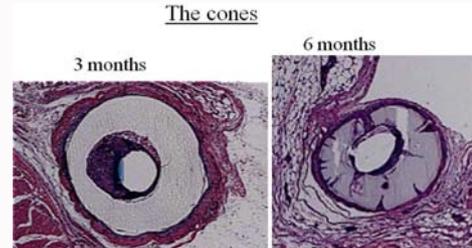


Figure 33: Facial palsy result after 9 months.



Figure 30: Complication visibility of the cones.

which may, in some cases, be surgical. When the patient has been successfully assessed and the cause treated, and the paralysis develops in a chronic flaccid mode, the alteration of self-image often leads to a long-term deterioration of socio-professional relationships, and often a depressive syndrome. The ideal method of reanimation of the paralyzed face is yet to be found. Currently the best aesthetic and

functional outcomes are obtained by dynamic processes, nerve graft, hypoglossal-facial anastomosis, temporal muscle or masseter muscle transfer, cross face nerve grafting free muscle transfer associated or not with static procedures: canthopexy, face-lift, etc [5-7]. However, in some cases patients undergo prolonged anesthesia due to an overly weak general condition, or do not want heavy procedures (multi-operated patients); in other cases, the methods of reanimation are impossible through temporal denervation, section of the distal facial branches of the facial reached, and harm to the 5<sup>th</sup> nerve. It is for these patients that we have proposed the use of SL sutures; the indications could be extended for example when a patient has received a nerve graft or a free muscle transfer and the result takes a long time to reach, it is possible to propose the implementation of SL type passive suspension.

Other types of passive suspension have been described: Goretex with a significant amount of suppuration requiring the removal of the material, fascia lata strips thin and fragile autologous material that causes a scar on the thigh [8].

For the Sulamanidze et al. [9] type serrated wires no serious study has shown the effectiveness or outcomes for this type of wire whose potentially iatrogenic notches are often broken and can project

onto the cheek. Cho et al. [10] demonstrated the use of thread lifting technique for long standing facial paralysis.

The superiority of SL sutures comes from their original composition: The polypropylene is well tolerated having been used in vascular surgery for many years; adding polylactic acid cones allows the sub-cutaneous coupling and the ascent of the cone on the node creates a tissue trap conducive to the creation of neocollagen (Figure 32 and 33). Polylactic acid has been used for more than ten years to fill deep facial depressions (HIV lipoatrophy patients) [11]. The implantation of the suspensions is a simple and reproducible technique which can be carried out under local anesthesia and or neuroleptanalgesia as an outpatient service. No serious complication was noted. 4 times the poor tolerance of the plate necessitated its removal under local anesthetic without consequence and 3 cones rejected by the cheek due to a technical fault were removed under local anesthesia.

Concerning durability, no passive process is sustainable due to the weight and heaviness of the tissue which is even more pronounced in the case of facial paralysis.

Other passive procedures such as SMAS face-lift [12] or malar subperiosteal facelift provide excellent results at the price of a relatively insignificant scar [13], the results are more durable but the procedure is heavier and the postoperative period is longer.

#### For aesthetic indications

In recent decades, the demand for cervicofacial lifts has significantly decreased in favor of minimally invasive surgical techniques and the development of aesthetic medicine (fillers, lasers, etc).

Therefore currently, the vast majority of patients seeking rejuvenation surgery call for the lightest possible procedure, performed under local anesthetic, without hospitalization, with a rapid return to social life, and invisible scars.

It is in response to this demand that surgeons have worked on the use of the suspension wires with relatively convincing results in terms of product tolerance and durability of the expected effect. The use of SL sutures seems an interesting compromise in patients refusing a face-lift; it is particularly interesting to combine a fat graft for faces ageing in atrophic form [14]. Moreover, it is also very possible to combine blepharoplasty and a canthopexy at the same operating time in order to optimize the aesthetic outcome.

The sustainability which averages 18 months and the cost seem to be limiting factors of the technique; this aspect can be improved by the option of secondary retensioning of the wire.

#### Summary of indications:

- Chronic flaccid facial paralysis.
- Non-indication or failure of dynamic rehabilitation processes (nerve grafts, myoplasties, etc.).
- General contraindication to general anesthetic.
- Patient's refusal to undergo major surgery.
- Patient waiting for the result of a nerve graft, a nerve anastomosis.
- Use of the silhouette sutures on the involved side and possible association. With botulinum toxin on the contralateral side

to reduce hypertrophy and ipsilateral synkinesis.

#### Indications for healthy subjects:

- Moderate facial ptosis, moderately deep nasolabial folds.
- Relatively young patients before the age of 55.
- Little or no excess skin.
- Patients seeking a light scar-free procedure.
- Patients opposed to injections.
- Patient not wanting a face-lift.

#### Negative indications:

Patients with significant skin laxity, too many wrinkles with a very thick skin heavy tissue or otherwise in another way too delicate skin risk visibility of sutures and the absence of subcutaneous fat needed for gripping cones.

#### Conclusion

Silhouette lift sutures can be a good alternative to treat the unilateral drooping face of patient with chronical facial palsy. Procedure is easy to realize under local anesthesia with short duration time for aged or fragiles patients. It can be associated with botulinum toxin on the other side or other type of palliative surgery.

Procedure is safe with a short recovery period; the duration result is not more than 2 years but the threads could be readjusted or retightened 1 to 2 years later by accessing them in the temporal region of their insertion under local anesthesia.

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