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Facial Rejuvenation With Fine-Barbed Threads: The Simple Miz Lift

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Abstract

Background Since the invention of the first barbed (short) suture by Sulamanidze in the late 1990s, different techniques have been described including Woffles (long) thread lifting, Waptos suture lifting, Isse unidirectional barbed-threads lifting, and silhouette lifting. The authors have implemented a newly developed type of thread integrating more small cogs and a soft and fragile feeling of the material (medical grade polypropylene: 16.5 cm long, 15 cm of length covered with cogs, and 0.40 mm in diameter). This study aimed to describe the authors' thread and the surgical techniques they have adopted to counteract the descent and laxity of facial soft tissues.

Methods A retrospective chart review was performed during a period of 2 years, from March 2010 to February 2012. The procedure was performed with the patient under local anesthesia and intravenous sedation. The face was marked preoperatively to determine the appropriate vector of the thread and its five end fixation points. The superior border of the incision was approximately at the level of the lateral brow, and the lower border was about 2 cm above the superior margin of the helical root. After the temporal incision was made, the dissection was carried all the way down to the deep temporal fascia to create a plane between the superficial and deep temporal fascias. Using blunt cannulas, the dissection was continued in an inferomedial direction from the temporal incision to the lower face through the sub-submucosal aponeurotic system (sub-SMAS) plane, which was marked preoperatively. This sub-SMAS dissection could easily proceed to the premasseteric space (PMS). The face-lift sutures (Gusan Inc., Seoul, Republic of Korea) then were inserted through the cannula from the lower face to the temporal incision line. The sutures were trimmed, and the proximal ends were secured on the deep temporal fascia reinforced with Vicryl interrupted sutures. The results were assessed objectively using serial photography and subjectively according to patient assessment. Complications also were recorded.

Results All but two patients (100/102, 98.1 %) were satisfied with the outcomes after surgery. Consensus ratings by two independent plastic surgeons found that objective outcomes were divided among "excellent," "good," and "fair." The postoperative course was uneventful except for one patient (1/102, 1 %) who presented with minor skin dimpling and another patient (1/102, 1 %) who had a temporary facial weakness. These two complicated cases were resolved spontaneously without any surgical interventions.

Conclusions The reported technique has several advantages over current approaches. First, the use of nonabsorbable

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sutures with sufficient maintenance potential can produce long-lasting, satisfying results. Second, use of the authors' fine thread can avoid complications such as extruded or visible thread, which often have been complaints with thread lifting. Third, use of a loose areolar plane, including sub-SMAS and PMS free of vital structures, which is deeper than the traditional lift procedure, can avoid any traction line during rest or animation without any significant complications.

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Keywords Rejuvenation · Rhytidoplasty · Thread

Plastic surgery patients often wish to disguise the effects of age [1]. For several decades, simple and minimally invasive thread lifts became popular and replaced, to some extent, the conventional face-lift methods [2]. Consequently, various techniques evolved and were introduced into clinical practice. Representative examples include the limited-incision face-lift including S-lift, the minimal access cranial suspension lift, and the face-lift with suture suspension using percutaneous cable-suture [3].

Recently, face-lifts with barbed sutures such as Sulamanidze's antiptosis subdermal suspension threads, Isse's endo progressive face lift suture, and contour thread techniques have gained prominence among plastic surgeons and patients who seek a minimally invasive face-lift [4–7]. The theoretical benefit of using such thread for facial rejuvenation is a short recovery time, a scarless operation, a low incidence of complications, effectiveness for the early aging face (third to fifth decades), and correspondence with contemporary medical trends. Above all, these techniques entail the passage of sutures under the skin of the face without any long incisions, wide undermining, or significantly compromised postoperative course [8].

Since the first presentation of Sulamanidze's antiptosis (Aptos) subdermal suspension threads in 2002, a number of similar techniques including Waptos suture lifting, Isse's endo progressive face-lifting, and silhouette lifting have been described [8, 9]. This report aims to describe our thread and the surgical techniques we have adopted to counteract the descent and laxity of the facial soft tissues.

Patients and Methods

A retrospective chart review was performed over a period of 2 years, from March 2010 to February 2012. We compiled and analyzed the data for consecutive patients who underwent thread lifting with medical grade polypropylene thread at our clinic. We reviewed the patients' gender, age, and pre- and postoperative clinical photographs. The results were assessed objectively using serial photography and subjectively according to patient assessment.

For the objective assessment, two physicians not involved in the operations assessed the surgical outcomes based on serial photography. The patients were followed up after lifting, and their outcomes were evaluated by asking them to rate their overall satisfaction on the following scale: 5 (very satisfied), 4 (satisfied), 3 (neutral), 2 (dissatisfied), or 1 (completely dissatisfied). All statistical analyses were conducted using PASW version 18.0 (IBM, Armonk, New York, USA). The descriptive statistics are presented as both numbers and percentages of patients or as means and standard deviations.

Surgical Technique

The procedure was performed with the patient under local anesthesia and intravenous sedation. We marked the skin preoperatively to determine the appropriate vector of the thread (dotted line) and its five end fixation points (x) (Fig. 1). The access incision was located in the temporal area ~1 cm inferior to the superior temporal crest and 2 cm behind the hairline. The superior border of the incision was approximately at the level of the lateral brow, and the lower border was about 2 cm above the superior margin of the helical root.

After the temporal incision was made, the dissection was carried all the way down to the deep temporal fascia to create a plane between the superficial and deep temporal fascias. The number of sutures was five in a half side of the face. The sutures were crescent in shape from 1 cm lateral

Fig. 1 Preoperative design of the Miz lift

to the ala of the nose to 1 cm inferior to the mandible angle.

Using blunt cannulas, dissection was continued in an inferomedial direction from the temporal incision to the lower face through the sub-submucosal aponeurotic system (sub-SMAS) plane, which was marked preoperatively. This sub-SMAS dissection could easily proceed to the pre-masseter space (PMS). The face-lift sutures (Gusan Inc., Seoul, Republic of Korea) then were inserted through the cannula from the lower face to the temporal incision line. The sutures were trimmed, and the proximal ends were secured on the deep temporal fascia reinforced with Vicryl interrupted sutures. The overall surgical time was <30 min (Video 1).

Table 1 Baseline patient characteristics

	Patients ($n = 102$) n (%)
Age (years)	39 ± 14
Gender	
Female	102 (100)
Male	0 (0)
Ancillary procedure	
Free fat graft	81 (79.4)
Aesthetic eyelid surgery	30 (29.4)
Rhniplasty	12 (11.8)
Complications	
No	100 (98.1)
Yes	2 (1.9)
Transient dimple	2 (1.9)

Values are median ± standard deviation for continuous variables and no. (%) for categorical variables

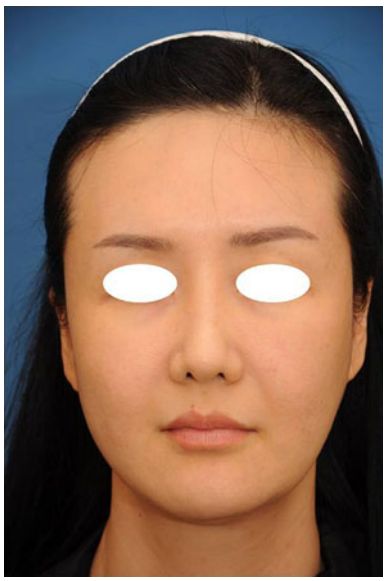

Fig. 2 Preoperative frontal view of a 43-year-old woman

Results

The patients' baseline characteristics are summarized in Table 1. Over the 2-year period, the patients underwent thread-lift using medical grade polypropylene. All the patients were women, and their average age was 39 years. Most of the patients in this series underwent additional procedures at the time of the thread lift, with free fat grafting accounting for a majority of the procedures (79.4 %).

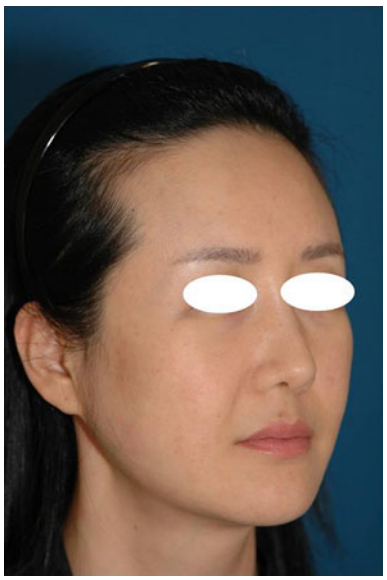

Fig. 3 Preoperative oblique view

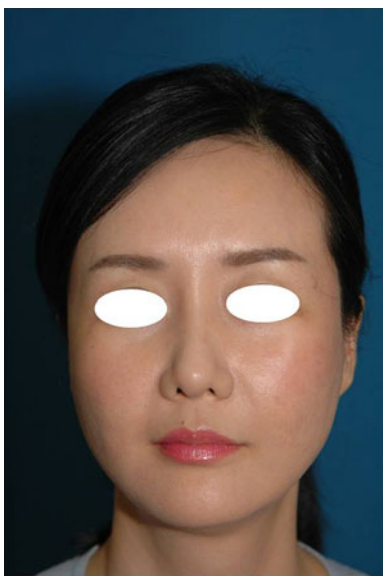

Fig. 4 Frontal view of both lateral cheek areas 1 year after a thread lift and free fat grafting (4 ml, respectively)

Representative pre- and postoperative photographs are presented in Figs. 2, 3, 4 and 5. During the postoperative follow-up periods, the patients were regularly seen for evaluation of recurrent laxity, undercorrection, and poor longevity of results. The follow-up period ranged from 5 to 18 months.

The treatment outcomes were evaluated both subjectively and objectively. The results of the satisfaction ratings are summarized in Tables 2 and 3. All but two patients (100/102, 98.1 %) were satisfied with the outcomes after the surgical procedure. The consensus ratings by the two independent plastic surgeons found that objective outcomes were divided among "excellent," "good," and "fair." None of the outcomes were rated as "no change" or "worse."

The postoperative courses were uneventful except for that of one patient (1/102, 1 %) who presented with minor skin dimpling and another patient (1/102, 1 %) who had a temporary facial weakness. The two complicated cases were spontaneously resolved without any surgical interventions.

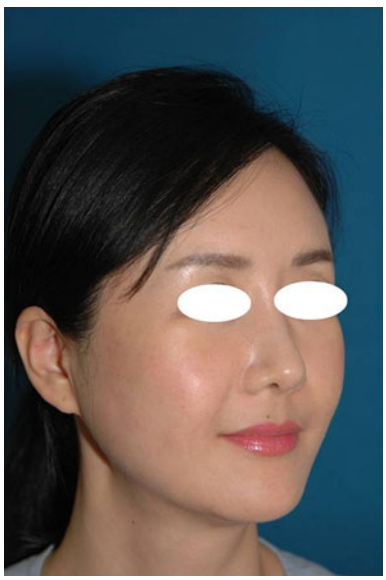

Fig. 5 Oblique view 1 year postoperatively

Table 2 Posttreatment outcomes in terms of patient satisfaction

	n (%)
Dissatisfied	1 (0.9)
Neutral	1 (0.9)
Somewhat satisfied	13 (12.8)
Very satisfied	34 (33.4)
Very much satisfied	53 (52.0)
Total	102 (100)

Table 3 Posttreatment outcomes in terms of surgeon satisfaction

	n (%)
Worse	0 (0)
No change	0 (0)
Fair	3 (2.9)
Good	28 (27.5)
Excellent	71 (69.6)
Total	102 (100)

Discussion

Sulamanidze invented the first barbed (short) suture in the late 1990s [4]. The next barbed suture to be developed was the Woffles (long) thread in 2002, also known as Waptos. Wu [10] used this thread as a suture suspension sling to lift facial soft tissues to the deep temporal fascia. Currently, this procedure is more correctly known as the Woffles (long) thread lift [11]. Isse's unidirectional barbed threads were developed in 2004. Only the Woffles thread (Waptos) uses a barbed thread folded on itself, secured to the temple without any additional suture fixation, and therefore deployed differently than Aptos [12].

Several iterations of barbed threads have occurred over the years, but each has essentially the same principle of design, and the barbs on each thread also are similar [13]. The following continue to be principles of successful thread lift in most cases:

1. Use of reliable, long-lasting thread
2. Strong anchorage
3. Reasonable target tissue.

Controversy, however, remains concerning the specific type of suture material needed to provide sufficient traction/holding power and consequently long-lasting maintenance, the anchoring technique, the optimal structure to be used as an anchor, and the proper dissection plane to be used for lifting.

For the past several years, we have favored the use of nonabsorbable, polypropylene thread for thread lifting. We think absorbable suture materials can be a good option for thread lifting with regard to improvement of skin texture and tightness as well as effacement of fine wrinkles. However, we are suspicious about the actual lifting effect of absorbable materials (e.g., in the correction of soft tissue sagging). For these reasons, we have implemented a newly developed thread with more small cogs and a soft and fragile feeling of the material [medical grade polypropylene: 16.5 cm long (①), 15 cm of length covered with cogs, and 0.40 mm in diameter (③)] (Fig. 6).

Our technique has several advantages over current approaches. First, using nonabsorbable sutures with

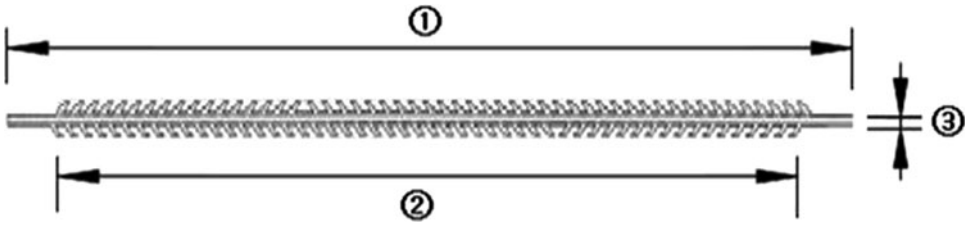

Fig. 6 Schematic diagram of face-lift suture material consisting of medical grade polypropylene [16.5 cm long (①), 15 cm in length covered with cogs, and 0.40 mm in diameter (③)]

sufficient maintenance potential can have long-lasting and satisfying results. Second, use of our fine thread can avoid complications such as extruded or visible thread, which often have been complaints of thread lifting. Third, use of a loose areolar plane including the sub-SMAS and PMS free of vital structures, which is deeper than traditional lift procedures, can avoid any traction line during rest or animation without any significant complications. It also can reduce suture extrusion, which tends to be caused by the superficial placement of threads.

The relationship between the SMAS layer and the deep fascia remains controversial and requires further investigation [14]. It is generally accepted that the SMAS layer and the underlying fascia are separated by a loose areolar plane in some anatomic regions, whereas in other areas, the two structures are adherent to each other via a fibrous tissue [14].

Mendelson et al. [15] have suggested that a potential space exists between the superficial fascia and deep fascia, which are defined by retaining ligaments, and that this space appears tight in youth and gradually becomes looser and easier to dissect in the elderly. As suggested in many studies, we also believe this potential space could be easily dissected with our blunt cannula, and we actually were able to proceed to the premasseteric space via this potential space without difficulty. That is, this areolar PMS between the SMAS of the cheek and the fascia surrounding the masseter muscle accounts for the ease of dissection. We think this space can be considered an optimal dissection plane for various thread-based face-lift procedures.

With regard to concerns about a facial nerve weakness in our lifting, we were able to confirm that the introduction of the PMS provides significant benefits without any facial nerve problems. Moreover, because this space is a naturally occurring cleavage plane, dissection is bloodless, safe, and extremely easy.

Except for finer thread and a new surgical concept of the plane, the current Miz thread can be considered a combination of widely used techniques in addition to a modification of them. We inserted the thread in a direct linear fashion from the temple to the lower face similar to Wu's Woffles lifting despite different detailed reference points and techniques with Wu's Woffles lifting. In addition, the proximal end was secured to the temporal fascia with Vicryl sutures (similar to Isse's threads).

In 2011, Zhang et al. [16] reported that tension itself can induce the mechanotransduction pathway promoting epithelial morphogenesis. These authors believe that physical forces can be transformed into chemical signals producing wound-healing effects. Our fine thread provides sufficient traction/holding power, and we have anchored our thread to fixed, not mobile, structures, leading to long-lasting maintenance. We also have used the sub-SMAS and PMS for the dissection plane to be used for lifting.

The young age of our patients (average, 39.1 years) can be partially explained by the relatively younger age distribution of the Korean aesthetic market. Nevertheless, our experiences have shown that Miz-lifting also provides excellent longevity of results without recurrent laxity among older patients.

In conclusion, our technique is effective in addressing midface ptosis and minimal to moderate jowls in selected patients at the midterm. Constant follow-up evaluations during longer periods are critical to determine whether the Miz-lift provides long-lasting satisfying results.

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