

Fat Grafting in Hollow Upper Eyelids and Volumetric Upper Blepharoplasty

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Background: Periorbital volume loss creates a shadow frame, and traditional excisional blepharoplasties may aggravate the situation. Divergence in filling treatments establishes a demand for simple and reproducible techniques to achieve consistent results. Here, the author’s hollow upper eyelid evaluation and treatment approach are presented.

Methods: A retrospective photographic analysis was conducted of 32 women who underwent fat grafting for hollow upper eyelids between 2012 and 2016. Preoperative and postoperative evaluations of upper eyelid ratios at the medial and lateral corneal limbus, together with lateral contour modifications, were used to determine the efficacy of the technique to restore youthful proportions and contours.

Results: Preoperative analysis showed 20 eyelids with an inner shadow, or A-pattern; and 44 eyelids with the complete extension of the hollow, or C-pattern. Three patients presented mild blepharoptosis, and eight patients had undergone a previous upper blepharoplasty. Mean grafting volume was 0.4 cc in the deep plane and 2.8 cc in the superficial plane. Fat grafting exclusively was performed in six patients, improving all ratios and correcting the A-pattern deformity. Volumetric upper blepharoplasty combining fat grafting in two levels and orbicularis oculi muscle imbrication was performed in 26 patients, correcting every inverted ratio ($p < 0.001$). On the lateral view, all cases with a concave pattern changed to a convex one, regardless of the approach used.

Conclusion: Synergy between fat grafting and orbicularis imbrication proved adequate to restore the lateral convex contour and return youthful proportions to the hollow upper eyelids. (*Plast. Reconstr. Surg.* 140: 889, 2017.)

CLINICAL QUESTION/LEVEL OF EVIDENCE: Therapeutic, IV.

Modern trends in periocular beauty aim at full, convex upper eyelids with smooth, taut, and luminous skin.¹⁻⁹ Pretarsal skin should be barely visible because of the volume above the supratarsal sulcus.^{1,3,5,10,11} In cases where the aging process is characterized by volume loss rather than by skin sagging, traditional excisional blepharoplasties may aggravate the situation, creating a sunken or hollow appearance.^{1,5,9-12}

By upper hollow eyelid, we understand a concavity or depression in the eyelid filled by a shadow.

Periorbital volume depletion is caused by fat atrophy and focal bone reabsorption with aging, producing dark and sunken areas under the eyebrows and increasing the amount of pretarsal skin showing.¹³⁻¹⁸ The upper eyelid exposes the curvature of the eye globe, and the supratarsal crease recedes. As this occurs, the luminous area from the sulcus to the eyebrow is reduced while the darker pretarsal show from the sulcus to the ciliary margin

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increases. This upper eyelid ratio, which in full volume should be greater than 1 (infrabrow > pretarsal), is inverted by the displacement of the sulcus, the appearance of multiple creases, and the shadows that denote orbital rim exposure. Furthermore, lateral view evaluation may show a conversion from a convex juvenile contour to a depleted concave one. These hollow upper eyelids pose a challenge for the modern plastic surgeon.

As current concepts in periorbital rejuvenation focus on advancing the orbitomalar sulcus closer to the lid margin, the same occurs with the supratarsal crease on the upper eyelids.^{1-3,5,8,16,17,19} Fat grafting has been presented and popularized as the surgical alternative to restore youthful contours.²⁰ However, little has been published regarding the techniques to accomplish this in the upper eyelids, and the existing literature presents significant conceptual differences between authors.^{2,4-6,8,21,22} Within a single publication, disparate techniques are described for grafting in the retroseptal space,⁸ above the orbicularis oculi muscle,⁶ or between the muscle and the septum,²³ and by open or closed approaches.²⁴ Moreover, there are discrepancies regarding the extension of the area to graft and determining the amount of skin to resect (if so).

Here, the author's systematic approach to treating hollow upper eyelids is presented with the objective of restoring youthful proportions and contour. The term volumetric upper blepharoplasty is analogous to Trepsat's "volumetric face lift," which was the first description of the association and synergy between fat grafting and superficial musculoaponeurotic system imbrication.²⁵ Volumetric upper blepharoplasty is a simple and reproducible technique that combines fat grafting in two layers with the orbicularis oculi muscle imbrication as described by Fagien.¹

PATIENTS AND METHODS

Between 2012 and 2016, 32 women with hollow eyes requesting rejuvenation surgery were selected and treated with autologous fat grafting in the upper eyelids by the author at his private practice or at the Hospital de Clínicas in Buenos Aires. All patients were informed of and accepted a longer recovery time in comparison with traditional resective blepharoplasties.

The author performed a retrospective review and photographic analyses to confirm or reject the efficacy of fat grafting in correcting the hollowness in the upper eyelids, to improve or revert the upper eyelid ratio on the frontal view, and to restore the lateral convex contour. All

preoperative and postoperative photographs were taken with standard positioning and lighting. The digital images were opened in Gimp 2.8 (GNU Lesser General Public License). Color and contrast were adjusted, but no shape pixels were altered. Preoperative and postoperative images were superimposed using the Layer function to obtain the appropriate sizing and rotation; measurements were made using the Ruler function.

On the frontal view, the upper eyelid ratio (infrabrow/pretarsal) was generated and registered from the measures taken at the level of the medial and lateral corneal limbus meridians, using as divisor the supratarsal sulcus, the uppermost crease, or the shadow under the superior orbital rim, depending on where the higher limit to the infrabrow area existed (Fig. 1).

Patients were classified by groups and patterns according to the cause and extension of the hollow as follows: group 1 patients presented an incipient medial shadow with a triangular configuration, also known as an A-frame deformity (A-pattern), accentuated in the upward gaze. The medial limbus ratio was inverted, but the lateral limbus ratio was preserved (Fig. 1, *left*). Group 2 patients displayed a complete hollow pattern (C-pattern), where there was an extension of this shadow laterally, switching over the lateral limbus ratio accordingly (Fig. 1, *right*).

Group 3 patients had iatrogenically deflated eyelids after traditional excisional blepharoplasties.²⁶ Although these patients presented with an A or C hollow pattern, differentiation was made for treatment purposes because of the limited redundant skin. Finally, group 4 patients presented ptotic upper eyelids, with the hollowness produced as the result of levator muscle dehiscence and displacement of the sulcus upward.⁵

Lateral view analyses registered the concavity or convexity below the lateral eyebrow as lateral C- or D-pattern, respectively, according to the eyelid fold contour running parallel or tangentially toward the eyebrow's tail to head axis. The location and volume of injections were tabulated, as were patients' satisfaction or concerns as recorded in the medical records.

Statistical Analysis

Statistical analysis was performed using Fisher's exact tests to evaluate inverted ratio reversion (from ≤ 1 to > 1) and paired *t* tests for ratio improvement. Independent *t* tests compared ratio improvement between volumetric upper blepharoplasty and fat grafting without skin resection. Ratios are presented as the infrabrow fraction, considering a

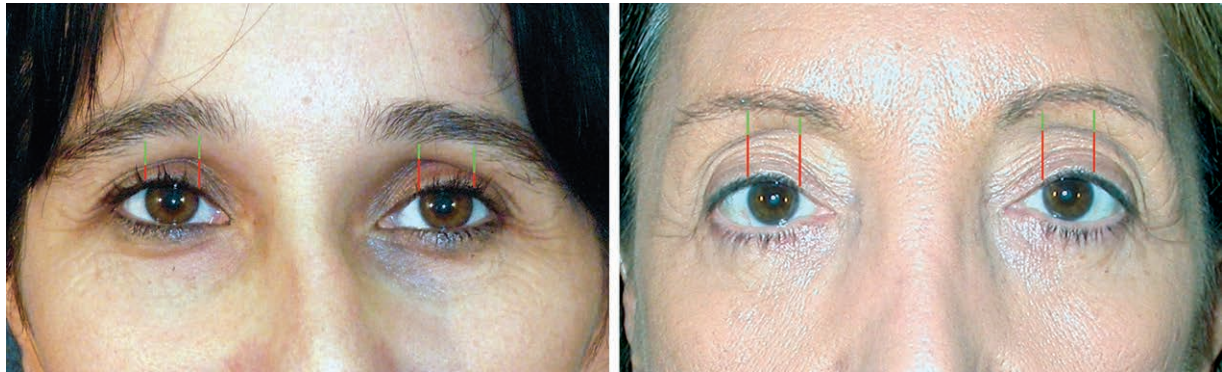


Fig. 1. Hollow patterns and upper eyelid ratios. Pretarsal measure is shown in *red* and infrabrow measure is shown in *green*. (*Left*) A-frame deformity (A-pattern) with inverted medial limbus ratio (≤ 1) and preserved lateral limbus ratio (> 1). (*Right*) Lateral extension of the shadow and complete hollow (C-pattern) with inverted medial limbus ratio and lateral limbus ratio. Volume loss exposes the curvature of the eye globe, creating multiple folds and creases. The uppermost shadow denotes the orbital rim and is taken as the ratio divisor.

ratio value less than or equal to 1 as inverted (pretarsal \geq infrabrow measurement). All analyses were conducted using Stata SE version 13.1 (StataCorp, College Station, Texas), and a value of $p < 0.05$ was considered statistically significant for all tests.

PREOPERATIVE PLANNING AND SURGICAL TECHNIQUE

Patients were examined under tangential light for better identification of shadows and hollow extension. The first grafting zone included the concave depression just below the supraorbital rim. The supraorbital notch was identified and marked for care of the bundle during this deep layer grafting.

A larger area was then marked for the second zone or superficial layer grafting, extending from 1 mm over the eyebrow to a line 10 mm above the ciliary margin, merging the layer under the orbicularis muscle with its transition to the subcutaneous

layer under the eyebrow (Fig. 2). The tail of the eyebrow was considered for lifting within this last plane. If the procedure was complemented with a temporal brow lift, care was taken to avoid excessive grafting because the hollow temple could be accentuated, producing a “Neanderthal” appearance. If a brow lifting was planned exclusively using fat, the area for grafting extended to the temple for blending.

Preoperative marking for volumetric upper blepharoplasty begins with a low skin resection design, 8 mm from the gray line, as described by Fagien.¹ The amount of skin to be resected is evaluated with a forceps pinch test, not considering a smaller resection area in relation to the extra tension created by the fat graft as other authors do.² Nevertheless, this pinch test should be repeated intraoperatively after the grafting and before incising the skin. (See **Figure, Supplemental Digital Content 1**, which shows the preoperative

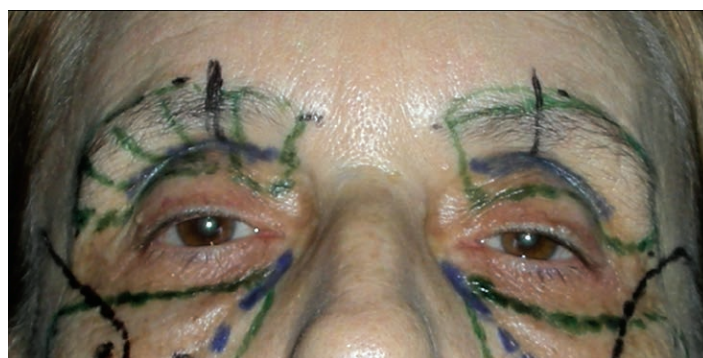


Fig. 2. Preoperative marks. A 69-year-old group 4 patient with complete hollow pattern for whom fat grafting exclusively was planned. The deep grafting layer is shown in *blue* and superficial grafting layer is shown in *green*. The supraorbital notch is indicated with *thick black lines*.

marks for volumetric upper blepharoplasty in a 37-year-old group 2 patient with C hollow pattern for whom volumetric upper blepharoplasty is planned. *Red dots* mark the medial access point and the skin resection design on *dotted black lines*, <http://links.lww.com/PRS/C391>.)

Fat processed by filtration is deposited through microcannulas in the deep layer and then superficially through a medial and lateral access point. Volumetric upper blepharoplasty relies on the even distribution of the graft below the orbicularis to heighten the thickness of the muscle. This muscle is then plicated/imbricated by the closure of the skin edges after the redundant skin is resected, following the technique popularized by Fagien.^{1,10,11} The amount of imbrication is directly relative to the area of skin resected. (See Document, Supplemental Content 2, which describes a detailed technique for fat grafting in the hollow upper eyelids and complementary steps for the volumetric upper blepharoplasty, <http://links.lww.com/PRS/C392>. See Videos, Supplemental Digital Content 3 through 9, in which the detailed technique for fat grafting and complementary steps for volumetric upper blepharoplasty are described and shown; hyperlinks to view the videos are available in the Appendix.)

In the case where a resective upper blepharoplasty has already been performed, volumetric upper blepharoplasty might be possible if there is still some redundant skin present. Where the opposite occurs, fat grafting exclusively should be performed with the notion of filling the concavities but avoiding excessive tension and fat necrosis by overgrafting. Moreover, grafting through scar tissue with microcannulas may prove to be a difficult task, and extra care should be taken.



Videos. Supplemental Digital Content 3 through 9 show the detailed technique for fat grafting and complementary steps for volumetric upper blepharoplasty; hyperlinks to view the videos are available in the Appendix.

Patients with levator muscle dehiscence might conceal more redundant skin than is apparent. Indeed, ptosis in group 4 is not corrected but camouflaged, implying the need for a two-stage operation and Müller muscle shortening by means of an internal approach.²

RESULTS

Between April of 2012 and April of 2016, 32 women with hollow eyes ($n = 64$) underwent fat grafting in the upper eyelids (Table 1). Mean age of the patients was 55 years (range, 37 to 73 years). In the same time span, 18 resective and 11 augmentation blepharoplasties were performed on nonhollow eyelids.

Preoperative photographic analysis showed that, on the frontal view, nine cases presented with a mild inner shadow (A-pattern) and 21 cases presented with a complete extension of the hollow (C-pattern), of which three patients presented a 2-mm upper eyelid ptosis (group 4). In the remaining two cases, both presented an A-frame on the left and a complete hollow pattern on the right side. Eight patients had undergone a previous upper blepharoplasty (group 3), of which six had a C-pattern and two had an A-pattern. On the lateral view, 48 eyelids presented a concave (lateral C) pattern and 16 had a convex (lateral D) contour. Mean follow-up time, when the last photographs were taken, was 11 months (range, 6 to 24 months).

Overall grafting volumes on each upper eyelid ranged from 0.2 to 0.8 cc in the deep plane (mean, 0.4 cc) and 1.5 to 4 cc in the superficial plane (mean, 2.8 cc). Per eyelid, mean volume grafted with volumetric upper blepharoplasty was 3.2 cc (range, 1.8 to 4.3 cc; $n = 52$), and 3.1 cc (range, 2.3 to 4.8 cc; $n = 12$) when only fat grafting was performed without skin resection.

Frontal view postoperative photographic analysis indicated that all A-pattern eyelids corrected the inverted ratios after volumetric upper blepharoplasty. Mean medial limbus ratio improved from 0.6 to 4.5 ($n = 18$; $p < 0.001$). The same occurred in the C-pattern eyelids ($n = 34$), also reverting the lateral limbus ratios. Mean medial limbus ratio improved from 0.62 to 4.39 ($p < 0.001$) and mean medial limbus ratio improved from 0.39 to 3.62 ($p < 0.001$) (Figs. 3 and 4).

In contrast, fat grafting performed exclusively achieved ratio reversion of the A-pattern case in group 3 ($n = 2$; $p = 0.02$), whereas on C-pattern eyelids (group 3, $n = 8$; group 4, $n = 2$), it improved the mean medial limbus ratio (from 0.47 to 0.85;

Table 1. Patient Demographics

Patient	Age (yr)	Group	HP	Follow-Up (mo)	DFG R-L	SFG R-L	VUB	AP	MLRprO		LLRprO		MLRPO		LLRPO		MLRprO		LLRprO		MLRPO		LLRPO		LCP
									R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	
1	39	1	A	10	0.3-0.3	3-2.5	+	FL	0.75	7.52	1.76	7.04	0.7	7	1.41	7.16	D								D
2	39	1	A	6	0.4-0.4	3-3	+		0.45	3.6	1.49	3.14	0.64	3.64	1.7	3.91	C								C
3	45	1	A	8	0.2-0.2	2.7-2.7	+		0.66	3.36	2.44	4.81	0.45	2.7	1.73	3.16	D								D
4	41	1	A	20	0.2-0.2	3-3	+	BL + FL	0.65	4.52	1.14	4.77	0.7	3.67	1.5	4.41	C								C
5	70	1	A	6	0.3-0.3	3-3	+		0.9	5.29	1.23	5.81	0.8	4.37	1.42	5.41	C								C
6	58	1	A	6	0.3-0.3	2.5-2.5	+		0.52	6.75	2	7.8	0.87	5.44	1.25	6.52	C								C
7	55	1	A	8	0.4-0.4	2.1-2.5	+		0.39	4.3	1.16	6.3	0.34	4.53	1.13	5	C								C
8	58	2	C	12	0.3-0.3	2.4-2.4	+	FL	0.67	6.75	0.5	5.04	0.22	3.96	0.31	6.25	D								D
9	55	2	C	12	0.3-0.4	3-3.5	+	BL + FL	0.51	3.75	0.52	3.5	0.62	5.95	0.52	5.3	C								C
10	57	2	C	24	0.7-0.5	3.5-3	+	BL + FL	0.27	2.33	0.24	6.66	0.24	2.86	0.34	3.7	C								C
11	37	2	C	24	0.5-0.5	2.6-3	+		0.39	1.83	0.59	2.83	0.3	2.25	0.68	2.97	C								C
12	47	2	C	6	0.3-0.5	3-3.5	+	BL + FL	0.28	3.55	0.59	5.5	0.37	5.13	0.6	4.29	C								C
13	62	2	C	18	0.3-0.3	2-2.8	+		0.31	3.44	0.57	4.81	0.36	2.59	0.83	3.17	C								C
14	73	2	C	10	0.4-0.4	3.5-3.5	+		0.43	4.33	0.74	5.78	0.46	5.42	0.98	8	C								C
15	69	2	C	8	0.4-0.4	3.4-3.4	+	FL	0.55	4.18	0.72	5.48	0.29	5.33	0.84	3.85	C								C
16	64	2	C	6	0.5-0.3	3.8-3.5	+		0.42	2.56	0.69	3.06	0.36	1.94	0.58	2.15	C								C
17	49	2	C	9	0.3-0.3	2.6-2.6	+		0.57	3.52	0.81	4.29	0.37	4.2	0.28	5.63	C								C
18	39	2	C	11	0.2-0.4	2.5-2.5	+	FL	0.55	5.26	0.91	5.14	0.24	8.4	0.84	8.22	C								C
19	41	2	C	9	0.4-0.3	3-2.6	+	FL	0.17	3.35	0.5	3.02	0.11	2.2	0.3	3.1	C								C
20	57	2-1	C-A	12	0.3-0.7	3-3.5	+		0.28	2.77	0.9	6.77	0.42	3.8	1.14	4.36	C								C
21	65	2-1	C-A	6	0.3-0.3	2.5-3	+		0.77	3.63	0.95	4.73	0.8	5.69	1.05	4.44	C								C
22	57	3	A	10	0.4-0.3	2-2	+		0.25	4.85	4.65	5.23	0	4.36	3.83	4.25	D								D
23	40	3	A	6	0.3-0.3	1.5-2	+	FL	0.3	2.33	1.53	2.54	0.46	2.88	1.26	3.3	D								D
24	61	3	C	8	0.5-0.5	1.5-1.5	+		0.94	1.33	0.66	0.88	0.79	1	0.19	0.9	D								D
25	58	3	C	12	0.3-0.3	2.5-2.5	+		0.16	0.53	0.71	0.51	0.58	0.53	0.84	0.34	C								C
26	67	3	C	18	0.5-0.5	2-2.5	+		0.26	0.87	0.51	0.81	0.42	0.86	0.59	0.9	D								D
27	58	3	C	7	0.3-0.3	2.5-3	+	BL + FL	0.74	0.86	0.21	1.43	0.27	0.8	0.36	1.02	C								C
28	71	3	C	6	0.3-0.3	2.5-2.5	+	FL	0.22	2.66	0.94	3.37	0.28	2.5	0.72	3.22	D								D
29	55	3	C	13	0.4-0.4	3.4-3.4	+	FL	0.22	2.57	0.42	2.12	0.38	2.2	0.47	3.08	C								C
30	69	4	C	24	0.8-0.8	4-4	+	FL	0.39	1	0.4	0.8	0.17	0.67	0.26	0.72	C								C
31	41	4	C	8	0.5-0.5	3-3	+	BL + FL	0.43	3.42	0.48	4.16	0.41	5.07	0.57	6.83	C								C
32	68	4	C	24	0.2-0.2	3-3	+		0.67	1.44	0.68	1.65	0.68	1.7	0.35	1.53	C								C

HP, hollow pattern (A or C); DFG, deep fat grafting; SFG, superficial fat grafting (in cubic centimeters); L, left side; R, right side; VUB, volumetric upper blepharoplasty; AP, adjunct procedures; FL, face lift; BL, brow lift; MLR, medial limbus ratio; LLR, lateral limbus ratio; prO, preoperative; PO, postoperative; LCP, lateral contour pattern; C, concave; D, convex.

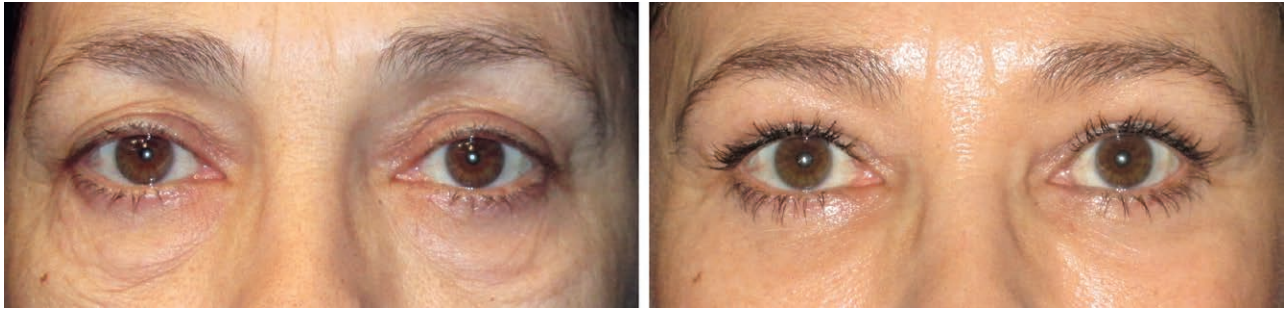


Fig. 3. A 58-year-old group 1 patient with A-frame deformity on the frontal view and concave lateral contour. Before (*left*) and 6 months after (*right*) volumetric upper blepharoplasty with 0.3-cc deep and 2.5-cc superficial fat grafting in each upper eyelid.

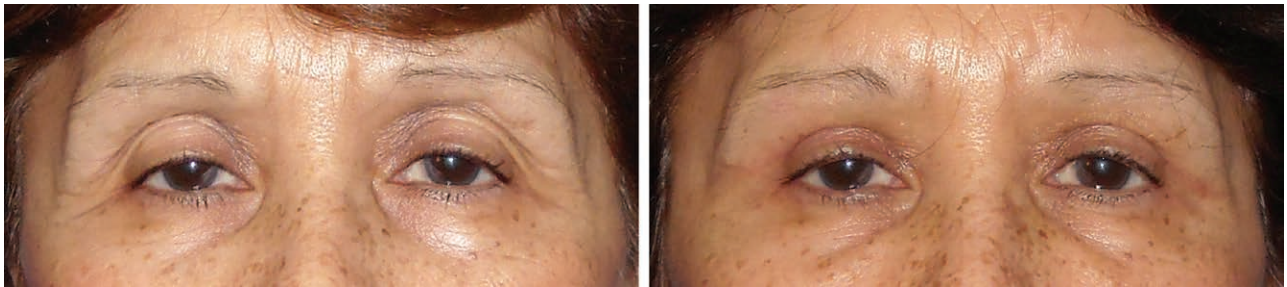


Fig. 4. A group 4, 68-year-old woman presenting a complete hollow pattern with mild eyelid ptosis on the frontal view (*left*). One year after volumetric upper blepharoplasty with 0.2-cc deep and 3-cc superficial fat grafting in each upper eyelid (*right*). The patient rejected a second-stage operation to correct the ptosis (by plication of the Müller muscle), satisfied by the results obtained. Even if the graft could act as extra weight, ptosis increment was not perceived.

$p < 0.001$) and lateral limbus ratio (from 0.47 to 0.83; $p = 0.04$), although without the desired ratio correction. [See **Figure, Supplemental Digital Content 10**, which compares the results between fat grafting alone and volumetric upper blepharoplasty. Inverted upper eyelid ratio reversion with volumetric upper blepharoplasty (*above*) and improvement with fat graft alone (*below*). Preoperative (*left*) and 6 months postoperatively (*right*), <http://links.lww.com/PRS/C400>.]

Compared with fat grafting ($n = 12$), t tests showed that mean improvement with the volumetric upper blepharoplasty technique ($n = 52$) resulted in 8.7 times higher medial limbus ratios ($p < 0.001$) and 10.5 times higher lateral limbus ratios ($p < 0.001$). In addition, Fisher's exact results indicated a significant association between the groups, patterns, and ratio reversions ($p < 0.001$).

On the lateral view, all cases with a concave pattern changed to a convex one, regardless of whether volumetric upper blepharoplasty or fat grafting was performed. [See **Figure, Supplemental Digital Content 11**, which evaluates the change on lateral contour pattern after volumetric upper blepharoplasty from concave (*left*) to a convex

pattern (*right*). The same patients as presented in Figs. 3 and 4, <http://links.lww.com/PRS/C401>.]

After 6 months, satisfaction was assessed by asking the patients whether they were pleased with the results of the operation. The great majority (97 percent) reported being satisfied or very satisfied with the procedure. One patient complained about the reduction of the pretarsal area for make-up purposes, and one patient referenced a change in the eyelid pigmentation to a yellowish tone that lasted for 4 months.

DISCUSSION

Our visual perception of brow height is dependent more on the amount of visible skin between the lid crease and the brow than on the absolute height of the brow above the eyelid.^{5,9} This is why brow-lift techniques are used misguidedly on hollow eyes in an attempt to show more of the skin over the orbital rim, even though the brow is in its normal position.²⁷ The result is often peculiar, with an exaggeration of the brow's slope, the orbital rim showing through the thin skin, and the remaining shadows. Brow-lift techniques imply dissecting close to the eyebrow and thus obstructing the near grafting. We prefer a galeal suspension

through forehead incisions with oblique vectors.²⁸ When needed, this is performed before the grafting to avoid misjudgments of the skin to be resected later. The oblique vector's effect is more significant in the eyebrow's tail, leaving to the graft the task of pushing and sustaining the whole complex.

Results with reabsorbable fillers, mainly hyaluronic acid gels, have been described as acceptable, but it is difficult to obtain a smooth and taut surface and there is the additional drawback of fluid retention and swelling appearance.^{9,26,29} The higher pressure needed for the injection adds additional risk of complications. Thin skin represents a contraindication and the temporary effect requires maintenance, but the possibility of using hyaluronidase to correct lumps and irregularities makes this a feasible choice for patients who refuse surgery. The ideal candidates for hyaluronic acid fillers are those younger patients avoiding surgery, with A-patterns, with mild or no skin redundancy, and requesting the fastest recovery time possible. The general belief by most plastic surgeons is that lipofilling on the upper eyelids is a complex and unreliable procedure, with the risk of bulging or contour irregularities. Even the use of elaborate instruments for precision has been described.³⁰

Grafting directly in the retroseptal space through an open approach has been proposed.⁸ The feeling of comfort with direct visualization and the possible advantage of senile enophthalmos prevention entail the risk of a retrobulbar hematoma. Similarly, filling the space with a lumbrical¹² or en bloc fat graft taken from the abdomen seems too complex compared with the less invasive techniques using microcannulas.

Lipofilling techniques aim at filling depressions and undervalue skin tension, whereas volumetric upper blepharoplasty concentrates on enhancing the muscle's volume by micro fat grafts. Volumetric upper blepharoplasty is not a skin resection complementary to the lipofilling as Trepsat described,^{2,7,23} but the opposite. Even though the fat grafting technique requires most of the surgical time and attention, the main event of the procedure is the muscle plication and the smooth surface obtained by the simple skin resection. That is why the amount of skin to be resected is as was marked instead of trying to gain as much volume as possible with the graft and then taking out some skin, if any. After the muscle plication, any irregularity caused by the graft is concealed and the result is a smooth and convex surface. Tension is necessary to obtain a reflecting surface and luminosity. A laser skin resurfacing could

possibly be enough in mild cases, but the skin resection helps to lower the supratarsal crease and thus inverts the proportions.

The amount of fat grafted differs between reports, depending on the area or level to treat, from superficial scarce conservative grafting in a limited concave area to a more demanding multilayer graft in a larger zone.^{2,4-7,20-25,30-33} The endpoint of grafting should not be stressful. Volumetric upper blepharoplasty focuses on improving the muscle's volume instead of filling concavities; thus, artistic notions step aside to the method and technique.

Nevertheless, patients should be aware of the full-eyelid or full-brow appearance because some might find this unwelcome. Care should be taken when performing volumetric upper blepharoplasty on nonhollow eyelids because the excessive volume obtained might produce a permanent swelling-like effect. Instead, when eyelid ratios are preserved, we prefer a reduced area fat grafting as the augmentation blepharoplasty describes.³²

Ptosis repair might have been enough to correct eyelid ratios. In the three patients presented here, ptosis was "masked" with volume as an adjunct procedure because other more concerning areas were also grafted.

Male patients merit a different consideration because the complete 2-mm arc of pretarsal skin visible may feminize the eyelid. Variation on the amount of skin to be resected, aiming to leave enough volume to eclipse the lateral aspect of this arc, can achieve the desired volume rejuvenation, maintaining the masculine features. Unfortunately, after explanation, no men accepted the longer recovery time and swelling associated with the technique.

Periorbital ecchymosis resolved by the second to third week in most cases. In two patients, edema lasted up to 5 months (2 months typical). Minor asymmetries were noticed in five patients, but no lumps or irregularities were observed in the volumetric upper blepharoplasty group. Some reabsorption of the initial volume was evident in six patients. This translated as a loss in skin tension and luminosity but not in ratio modification. No patients accepted a proposed revision procedure because all were satisfied with the final results. [See **Figure, Supplemental Digital Content 12**, which shows a 57-year-old group 2 patient with previous lower blepharoplasty, complete hollow pattern, and eyebrow tail ptosis (*left*). Five months after volumetric upper blepharoplasty plus malar lift and temporal brow lift, the tail of the brow remains low, but the graft has masked the orbit

(center). Despite some volume loss, proportions persist after 2 years (right), <http://links.lww.com/PRS/C402>.]

Given that the periorbital venous system has no valves, continuous movement of the blunt-tip cannula and application of minimal pressure to the 1-cc syringe plunger during retrograde infiltration are mandatory to avoid major complications such as intravascular and retinal embolization. Previous infiltration with lidocaine and epinephrine improves the passage of the cannula and reduces the chance of vessel damage because of the mild hydrodissection and vasoconstriction. Nevertheless, complications and additional morbidity of this technique should be assessed prospectively.

Furthermore, future studies should compare fat grafting against Fagien's volume-enhancing blepharoplasty and excisional techniques. Even though the presented approaches were successful in achieving the convex lateral contour, traditional procedures may obtain similar results. Moreover, hyaluronic acid fillers or limited fat grafting techniques seem sufficient to correct A-pattern eyelids and should be included.

CONCLUSIONS

When brightness around the eyes is the desired goal, instead of just eyelid skin tightening, volume replacement techniques should be considered. The actual paradigm leads to moving the sulcus closer to the eye and improving the ratio of infrabrow clarity over pretarsal shadows. Correct diagnosis and clear understanding of the hollow aging patterns are critical for preventing undesired results. Preoperative and postoperative evaluation should include ratio measurements and comparisons. The presented technique aims for simplicity, making the surgeon confident with small amounts of fat graft and a routine eyelid skin resection. On the hollow upper eyelids, synergy between fat grafting and orbicularis muscle imbrication has proven adequate to return the youthful proportions on the frontal view and restore the lateral convex contours.

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PATIENT CONSENT

Patients provided written consent for the use of their images.

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APPENDIX

Supplemental Digital Content 3, <http://links.lww.com/PRS/C393>. Video showing anesthetic solution infiltration. Anesthetic solution infiltration through lateral access with the same blunt cannula used later for fat grafting.

Supplemental Digital Content 4, <http://links.lww.com/PRS/C394>. Video demonstrating deep layer fat grafting. Deep layer fat grafting through lateral access intending to “build down” the orbital rim.

Supplemental Digital Content 5, <http://links.lww.com/PRS/C395>. Video demonstrating superficial layer fat grafting 1. Starting controlled superficial layer fat grafting through lateral access.

Supplemental Digital Content 6, <http://links.lww.com/PRS/C396>. Video demonstrating superficial layer fat grafting 2. Complementary

fluid superficial layer fat grafting through lateral access.

Supplemental Digital Content 7, <http://links.lww.com/PRS/C397>. Video demonstrating superficial layer fat grafting 3. Superficial layer fat grafting through medial access.

Supplemental Digital Content 8, <http://links.lww.com/PRS/C398>. Video demonstrating the pinch test. The pinch test is repeated before incising the skin, proving no eversion of the eyelashes despite the volume obtained by the graft.

Supplemental Digital Content 9, <http://links.lww.com/PRS/C399>. Video demonstrating monopolar cautery application. Monopolar cautery applied on the muscle, above the lower wound edge, to enhance the low position of the supratarsal crease and smooth the pretarsal soft-tissue surface.