Journal of Cosmetic and Laser Therapy, 2011; 13: 77–86

informa
healthcare

REVIEW ARTICLE

How to achieve synergy between volume replacement and filling products for global facial rejuvenation

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Abstract

The objective of this paper is to provide an expert consensus regarding facial rejuvenation using a combination of volume replacement (Juvéderm® VOLUMA®), filling products (Juvéderm® Ultra product line) and botulinum toxin. The Juvéderm product line exploits innovative 3-D technology, producing a range of cohesive, homogenous gels that produce predictable, long-lasting and natural results. The products are easy to use by practitioners and are well-tolerated by patients, and used in combination can provide additional benefits not achieved with one product alone. An assessment of facial anatomy and consideration of the aging process, as well as available treatment options, are also addressed in determining the best combination of products to use. Outcomes from a questionnaire and workshop sessions focusing on specific aspects of use of the Juvéderm product line and botulinum toxin in daily clinical practice are discussed, and recommendations for product use following debate amongst the experts are provided.

Key Words: *botulinum toxin type-A (BoNTA), global facial rejuvenation, hyaluronic acid (HA), Juvéderm® Ultra, Juvéderm® VOLUMA®*

Introduction

A panel of experts from the field of aesthetic enhancement in France met to discuss the use of volumizing and filling products, and botulinum toxin type-A (BoNTA). Their objective was to provide a consensus regarding global facial rejuvenation using a combination of volume replacement (Juvéderm® VOLUMA®), filling products (Juvéderm® Ultra product line) (Allergan Inc.) and BoNTA. As part of their discussion, the results of a questionnaire on the use of the combined treatments were evaluated. The rationale for conducting this evaluation in France was because French aesthetic physicians have the widest and most extensive experience in the use of Juvéderm VOLUMA as the product has been available in this country since 2005. Furthermore, Vistabel® (BOTOX Cosmetic, France) was first approved for aesthetic use in France in February 2003, and is now available in all European countries.

The key desirable characteristics for facial fillers and volumetric products are that they are effective and provide predictable and natural results that are long-lasting but not permanent. Practitioners must find them easy to use, and treatment must be well-tolerated and as painless as possible for patients. The Juvéderm product line (Ultra and VOLUMA) has been designed to meet all these requirements. Juvéderm VOLUMA is a robust dermal filler that has a high volumizing effect that makes it ideal for correction of deeper wrinkles and folds, as well as for facial volumizing and contouring applications. The Juvéderm Ultra range comprises Juvéderm Ultra 2, 3 and 4, which are designed

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(Received 19 December 2010; accepted 15 February 2011)

ISSN 1476-4172 print/ISSN 1476-4180 online © 2011 Informa UK, Ltd.
DOI: 10.3109/14764172.2011.564629

for the treatment of more superficial lines and folds. The Juvéderm Ultra range of products all contain lidocaine to reduce pain on injection (1).

3-D matrix technology

Hyaluronic acid (HA)-based products predominantly depend on cross-linking technology, which allows the development of a volumizing product that is fluid and easy to inject. In the case of the Juvéderm product line, cross-linking consists of linking butanediol diglycidyl ether (BDDE) HA chains with molecules characterized by cross-linking properties. The cross-linking molecule has links at both ends; however, sometimes the molecule only links at one end, or does not link at all. When a BDDE molecule is only able to link at one end, this has the effect of reducing the strength of the network as well as reducing resistance to degradation.

However, the 3-D matrix technology developed by Allergan Inc. is a process which improves the efficacy of cross-linking such that it has made it possible to reduce the number of molecules that only link at one end and increasing the number of molecules that link at both ends. This results in enhanced product durability and volumizing effect (2,3). Indeed, in the case of Juvéderm VOLUMA, almost all BDDE molecules link at both ends, whereas with the Juvéderm Ultra 2, 3 and 4, a limited quantity of short chains are maintained to preserve the desired properties of fluidity, injectability and volumizing effect. The 3-D cross-linking technology makes it possible to achieve cohesive and homogeneous gels, which limits the risk of product migration and gives a natural result, particularly since the product cannot be detected under the skin. This effect is especially beneficial when the injections are administered in areas where the skin is very thin.

Juvéderm Ultra and Juvéderm VOLUMA can be evenly injected and this results in ease of use for practitioners. This contrasts with other available products that show different injection profiles. Indeed, the fluid consistency of these products means they can be injected into different layers, as required, during the same treatment session. Furthermore, the gel is very well-tolerated by patients owing to its biosynthetic source of HA. The gel is subject to a very effective purification process, with Juvéderm Ultra undergoing the longest purification of the range in order to achieve low residual BDDE quantities (less than 2 ppm, comprising the minimum detectable measurement). This BDDE value corresponds to the Food and Drug Administration (FDA) guidelines to ensure patient safety. The gel also has a very low protein concentration of approximately 2.5 ppm.

A product longevity test, involving heating the product at a high temperature and then measuring the degree of degradation, confirmed the longevity of both Juvéderm Ultra 3 and Juvéderm VOLUMA. It is important to note that, despite the fact that the number of BDDE molecules added to Juvéderm VOLUMA is lower than that found in Juvéderm Ultra 3, the products both have a long period of longevity. This has been confirmed in clinical practice, most notably by Pinsky et al. (4), who showed that the effects of the Juvéderm family lasted at least a year, offering significant improvements at 1 year in >75% of patients. Similarly, the range of HA dermal fillers that include pre-incorporated lidocaine has been found to offer patient comfort, prolonged duration of clinical improvement (longevity of effect) and an excellent safety profile (5). Longevity of the product has also been demonstrated by Raspaldo et al. since patients returned to the clinic reporting extremely high levels of patient satisfaction after more than 12 months post-treatment (6), and a retrospective study in 102 cases found that the benefits of Juvéderm VOLUMA treatment lasted 12–18 months, with some patients still happy with treatment at 22 months (7).

Consultation for volume replacement

Initial consultation

As for any aesthetic procedure, the first consultation for volume replacement is vital for establishing a precise diagnosis and corrective treatment plan. This visit must be scheduled before the procedure to allow the patient a period of reconsideration. From a regulatory perspective, a 2-week reconsideration period applies to surgical rather than medical procedures.

The initial consultation should include medical history, physical examination and systematic patient photography, the latter being important in providing medical and legal documentation if a problem should subsequently arise. In addition, written documentation must be provided to the patient at this initial visit, including key data and a cost estimate. Throughout this first consultation, the physician must adopt an appropriate and empathetic means of communication with the patient, providing a clear explanation of the procedures so that patient expectations are clearly understood and any concerns raised, such as fear of treatment complications or financial impact, are adequately addressed.

Regulatory aspects

The delivery of complete and appropriate information is essential, either in writing (e.g. using a validated information leaflet providing details of the diagnosis of the defect for treatment, the type of procedure that is offered, expected benefits and duration of benefits, choice of anaesthesia, follow-up schedule, potential complications, number of days of social

downtime, and information on other therapeutic alternatives, if appropriate) or verbally, is both a medical and legal obligation. However, if written information is provided to the patient, this cannot replace informative conversation in which specific patient issues are addressed. The physician must adapt the information delivered according to the level of understanding of each patient and, above all, must ensure that a relationship of trust is built between patient and practitioner.

Request for volume replacement

Patient requests for volume replacement treatment are increasingly fuelled by the media; in particular, by magazines. Patient recruitment usually occurs through 'word of mouth' and via information leaflets available in practices; indeed, patients are more likely to request treatment when they know that their physician can offer these procedures. Patients may make clear, precise requests and the physician must assess whether such expectations are feasible. Alternatively, patients may be generalized and vague, with statements such as "I look tired" or "I would like to look younger". In these cases, the physician must establish a precise diagnosis of the problem and indicate the benefits of volume replacement. However, the physician must also refuse to perform any procedures if the request has no real foundation or is simply unrealistic. Occasionally, physicians are required to correct morphology in young patients with facial asymmetry or in patients suffering from a specific problem, such as restoring facial symmetry.

Analysis and correction of facial aging

The analysis of facial aging comprises studying all the components of aging, including assessment of skin, muscles, fat and bones. Assessment of each of these components will determine the physician's decision regarding appropriate treatment. The physician must also conduct an analysis while the patient is in a sitting position at rest, as well as in a dynamic position. However, this is more of a qualitative than a quantitative analysis since there is no precise grading available for volume replacement, especially with respect to palpebral malar grooves (8) (also known as 'tear troughs'). It is possible to use a 4-point facial volume scale at baseline, comprising 1 = normal, 2 = evidence of early malar fat pad descent or atrophy slightly visible, 3 = visible palpebral malar groove or malar fat descent that augments the nasolabial folds, and 4 = severe facial depression or atrophy (7). Upon completion of the analysis, the physician is then able to prepare an individualized aesthetic treatment regimen (Figures 1 and 2).

In order to correct the signs of facial aging, a generalized approach must be taken in which skin quality is assessed, and muscular balance and volume is restored before any potential future surgery procedures are considered. Accurate quantification is difficult to achieve in the absence of a validated scale, with the exception of nasolabial folds where a more formal grading system exists. Quantification of the defect requiring correction directly determines the choice of product, and the quantity to inject. Often it is appropriate to use combined treatments incorporating a variety of volumizing products in order to achieve the desired effects (7).

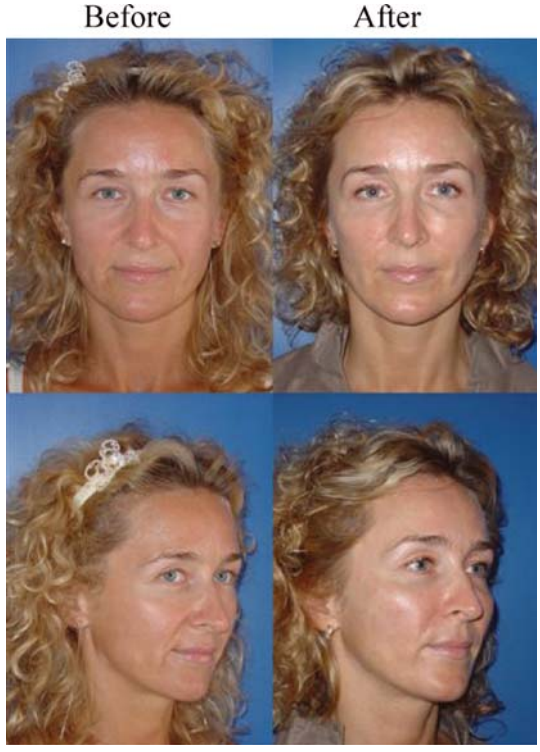

Figure 1. Photographs of a 45-year-old patient before and after treatment: Juvéderm VOLUMA (2 cc/side) in the mid-face, Juvéderm ULTRA 2 (0.3 cc/side) in the tear trough, Juvéderm SMILE (0.6 cc) in the lips, and Juvéderm ULTRA 4 (0.4 cc/side) in the nasolabial folds. Photographs supplied courtesy of Hervé Raspaldo. © www.raspaldo.fr.

Anatomical approach

Mid-face rejuvenation

The volume of the mid-face and the malar region is based on bone structure, as well as soft tissues with subcutaneous fat deposits (Figure 3). These regions are composed of several layers, comprising skin, superficial and deep malar fat, and orbicular, zygomaticus and levator labii muscles. The thickness of the fat layer varies according to the individual and it is of note that the orbicular muscle extends very deeply such that, over time, this muscle sags and becomes grooved, revealing the sub-orbicularis oculi fat that is strongly attached to the deep bone layer. In young patients, superficial malar fat levels are high, creating high cheekbones, but with aging this superficial malar fat sags and creates various folds (9).

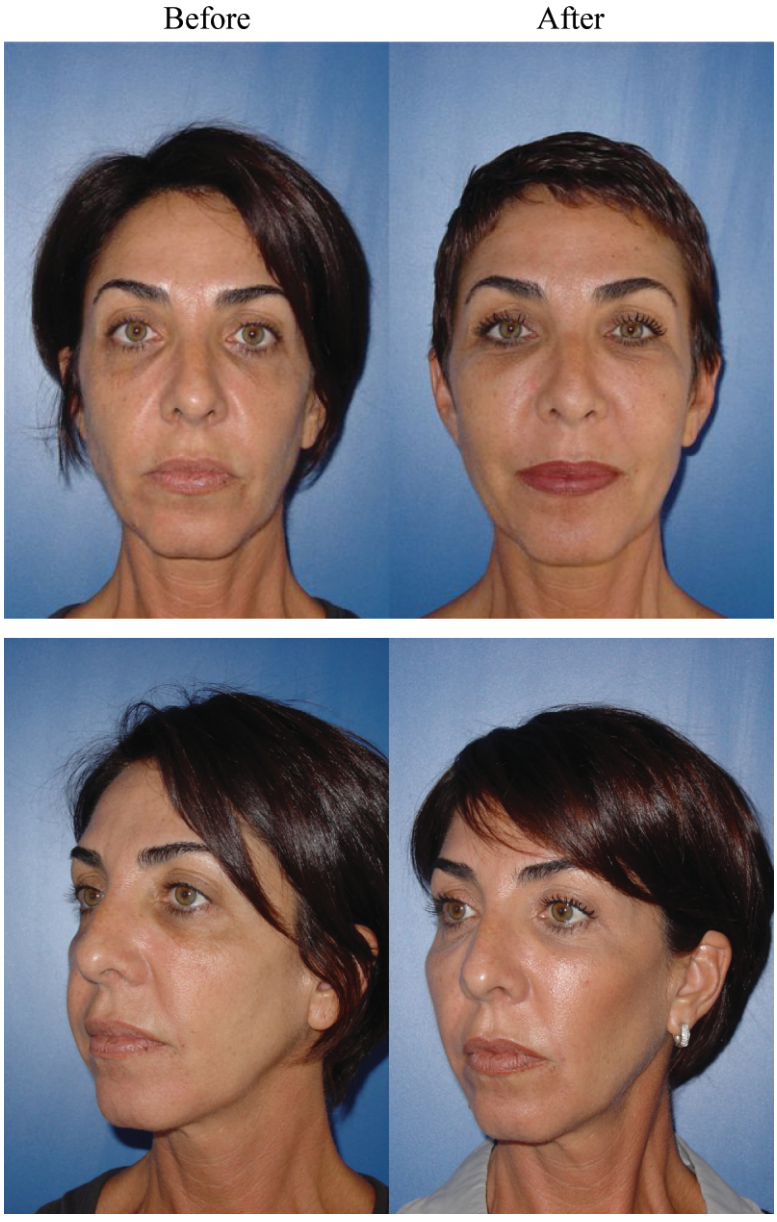

Figure 2. Photographs of patient before and after treatment: Juvéderm VOLUMA (2 cc/side in the mid-face). Photographs supplied courtesy of Hervé Raspaldo. © www.raspaldo.fr.

There are two important considerations with respect to mid-face rejuvenation. First, there must be sufficient tissue, and there are wide anatomical differences in this respect, with some patients having a large malar mass, while others less so. Second, an assessment of the aging process must be made. The aging process is characterized by sagging skin, development of wrinkles, fat sliding or sagging, and, occasionally, atrophy of the soft tissues. Sagging occurs with a downward and inward rotation, creating folds such as the palpebral malar fold, the mediojugal fold and the nasolabial fold. Sagging is due to the depletion of superficial malar fat which stops at the nasolabial fold level due to a barrier between skin and muscle, and the delineation by fibrous structures. When the superficial malar fat comes against the nasolabial fold, it creates a swell on this fold and leaves a trough above it, the depth of which varies according to the quantity of fat present. In addition, reduction of the deep buccal space also induces the development of the nasolabial fold and the orbicular muscle also plays a role. One view is that this muscle droops and flattens resulting in sagging, while another theory is that the orbicular muscle pulls the others inwards towards the inner canthus (10,11).

It is possible to treat sagging with a deep plane lift as specified by Hamra (12) or a biplane lift without the addition of fat, whereas malar fixation may

be done with the help of a series of small lifts. In cases where sagging and volumizing are required, the lift is then combined with fat re-injection into the deep or superficial malar fat to increase the volume of fat deposits.

Schaverien et al. identified that the subcutaneous tissue of the human body is highly organized, being partitioned by fibrous membranes that carry the perforator blood supply to the skin, and each anatomical compartment has an identifiable vessel running along its boundary. With regard to the face, this interlocking connective tissue network provides stability and protection for the vascular supply during facial animation (13). However, between the ages of 20 and 80 years, the face shows little variation in total fat volume, although fat distribution does show changes. It may therefore be appropriate to target specific areas rather than attempting to volumize the whole face in order to recreate a heart-shaped face as described by the 'HeArt of Face®' method (14).

Use of HA-based products enables an increase in volume, and the particular cohesiveness of Juvéderm VOLUMA produces excellent results. Juvéderm VOLUMA can also be combined with Juvéderm Ultra 4 and Juvéderm Ultra 3, since both of these products increase volume and can be injected more superficially. This can then improve the superficial aspect of the skin, increase radiance of the face and potentially treat superficial wrinkles. A surface treatment is then applied after the volumizing treatment. The combination of both products not only induces volumetric augmentation, but also improves skin surface hydration.

Materials and methods

A questionnaire was sent to all participants prior to the meeting. Then four discussion groups were organized in Paris, March 2009 to discuss the outcomes from the questionnaire.

A. Results from questionnaire on combined treatments

Eighteen experts who had experience in injecting all three products completed a questionnaire on the use of combined treatments in order to assess how Juvéderm VOLUMA, Juvéderm Ultra and BoNTA (BOTOX®; Allergan Inc.) are used in daily clinical practice. Previously, aesthetic practitioners focused on wrinkle filling, which sometimes makes the bottom of the face heavier. Now, by reworking volume and muscle balance, it is possible to make the face look more attractive by restoring such features as smooth, round contours, high cheekbones, oblique, hollow jowls and a thin, well-defined jaw line, recreating the 'triangle of beauty' or 'HeArt of Face®', with its base at the top and summit

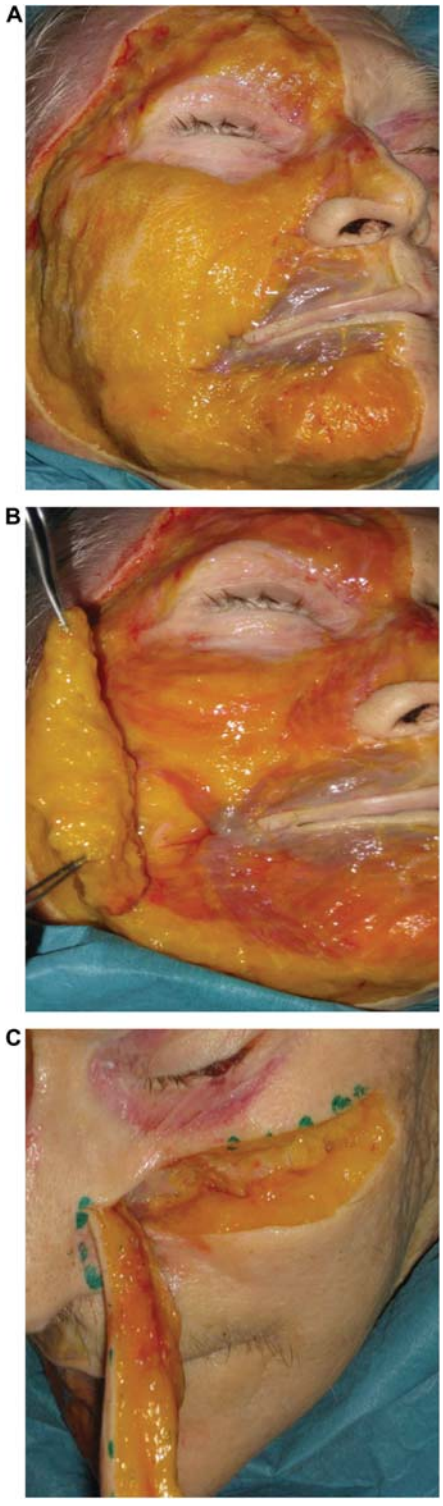

Figure 3. Dissection photographs of the malar fat and mid-face. (A) Fresh cadaver dissection; after removing the skin, the superficial malar fat is visible. (B) After undermining and elevating the superficial malar fat, the different muscles and the deep malar fat can be seen. (C) The elevation of a block of soft tissues in the upper part of the mid-face shows the different compartments: skin, superficial malar fat pad, deep malar fat, orbicularis oculi muscle, levator labii superioris, zygomaticus major, and bone (malar and maxillary superior). (Photographs supplied courtesy of Lakhdar Belhaouari. © Lakhdar Belhaouari.)

below (14,15). However, it should be noted that this is only effective if there is no excess skin present.

Juvéderm VOLUMA: questionnaire and results. Results of the questionnaire showed that most practitioners use Juvéderm VOLUMA for the cheekbones in the middle third of the face, followed by the palpebral jugal groove (i.e. between the eyelid and cheek), the nasolabial folds, cheeks, temples and, less frequently, the chin, the eyebrow tail, the mandibular line and the nose.

Little consensus was found regarding choice of anaesthesia for Juvéderm VOLUMA injection. A topical anaesthesia was most commonly used (53% of cases), with local anaesthesia used in one-third of cases. However, some practitioners used no anaesthesia at all. Adrenaline was found to be administered in only one-third of cases.

Juvéderm VOLUMA injection quantity was found to be an average of 1cc per side, although some practitioners favoured 2cc per side. Sites of Juvéderm VOLUMA injection comprised under malar fat (93.5%), under the orbicular muscle (37.5%), into malar fat (31.1%), subcutaneously (12.5%), and other (including one case of periosteal injection) (12.5%). With respect to the depth of Juvéderm VOLUMA injection, the authors of this paper recommend a pre-periosteal injection, thus avoiding painful injection into the periosteum.

In the early days, injection technique usually required insertion of the needle distant from the target area. Today, physicians tend to insert the needle increasingly closer to the target area, which avoids the use of long cannulae, making it possible to cross horizontal and vertical injections to achieve a 3-D grid and effectively restore volume (7). In 30% of cases, the physician used a needle alone and 20% used a cannula alone: the remainder used a combination of both. In 80% of cases, the 18 G cannula supplied in the product box was used. In 53% of cases, only one injection of Juvéderm VOLUMA was administered. However, the view was that the 23 G needles included in the package are too short, thereby resulting in the need for multiple injections. Preference was for 21 G needles (73% of cases), which enabled only one injection to be used and prevented large puncture sites. The most commonly employed injection techniques were fan technique (73.3%), criss-cross pattern (63%), retrotracing technique (66.7%) and an antero-retrotracing technique (20%). A new approach is to use a shorter 23 G or 21 G cannula (length 50 cm) with a 1cc Luer Lock syringe.

Following Juvéderm VOLUMA injection, the recommendations for aftercare comprised ice in 90% of cases, deep massage (56%) and homeotherapy (50%). Therefore, post-injection recommendations for Juvéderm VOLUMA are similar to any other filling products. With respect to other products used, SubQ® was noted as also being used in 53% of cases, even though this product can migrate and be visible under the skin if it is incorrectly injected. Other products that were used included fat, Sculptra®, Radiesse®, and Teosyal® Ultra Deep.

Juvéderm Ultra range: questionnaire and results. With respect to use of the Juvéderm Ultra range versus the Surgiderm® range (without lidocaine), 78.7% of practitioners used Juvéderm Ultra and 21.3% used Surgiderm (note: the result was not weighted for the number of syringes). Juvéderm Ultra needs to be injected more slowly so that the pre-incorporated lidocaine starts taking effect, and it appears that a combination of lidocaine and HA induces a slight pH variation, resulting in a less painful burning sensation upon injection (6). Juvéderm Ultra 2 was found to be commonly injected in the peri-oral zones, eye circles and for treatment of moderate wrinkles because it has less cross-linking and is recommended for more superficial injections. Juvéderm Ultra 3 was preferred for increasing lip volume, as well as for nasolabial folds, deep wrinkles and sometimes eye circles, although in this case careful administration of low doses is recommended. However, the use of Juvéderm Ultra 2 for eye circles was recommended over Juvéderm Ultra 3 in order to avoid the development of bumps, which in some cases can last up to 2 years. Juvéderm Ultra 4 corresponds to the former Surgiderm 30 and is more volumizing than Juvéderm Ultra 2 and 3, but less volumizing than Juvéderm VOLUMA. It was injected in the nasolabial folds in 88% of cases, in the eyebrow tail in 47% of cases, as well as in the malar area. The product is excellent when combined with Juvéderm VOLUMA to recreate volume, and results in better superficial skin quality.

Juvéderm Ultra was injected using the fan technique in 43.8% of cases, the retrotracing technique in 81% of cases, and nappage technique in 31% of cases. However, since the syringe contains a pre-incorporated anaesthetic agent, the recommendation is to use an anterograde technique and to start injecting the product so that lidocaine begins to take effect, then followed by a retrograde technique, rather than using a retrotracing technique.

With respect to anaesthesia, 60% of practitioners used a topical anaesthesia for administration of Juvéderm Ultra. It was perhaps surprising to find that 30% of practitioners were still likely to use a troncular anaesthesia with Surgiderm 30.

Combined treatments: questionnaire and results. Patients who had received combination treatments were

primarily between the ages of 45 and 65 years. Less than 25% of practitioners were found to have combined Juvéderm VOLUMA and Juvéderm Ultra, with 12% never having combined the two products. Seventeen percent of practitioners used this combined treatment in three-quarters of their cases, and it may be that, in the longer term, combined treatment may be offered in all cases. Combined treatment was recommended in 27% of all cases. It was used in the middle third of the face in 53% of cases, and in the chin, marionette lines, and the peri-oral area in 13% of cases.

In terms of order of product administration, volumizing treatment tended to be used before the filler, with Juvéderm VOLUMA being the volumizing product of choice in 80% of cases. In 46% of cases, volumizing treatment and Juvéderm Ultra were used at the same time. In 60% of cases, practitioners started treatment using BoNTA, which tended to be used first, followed by the volumizing product and lastly HA was administered. With respect to the interval between treatment visits, 40% of practitioners waited 2 weeks between visits and 26% waited 30 days.

B. Expert recommendations

Patient selection criteria. Patient selection criteria for combined treatments is linked to age. Before 30 years old, muscle hypertonia is most successfully treated using BoNTA, although Juvéderm VOLUMA can be useful in thin faces. Between 30 and 40 years, some folds do develop but there is a transfer of volume at this age. In these patients, a combination of BoNTA and Juvéderm Ultra is recommended. However, a volumizing treatment can also be used as first-line treatment in emaciated faces or to correct a morphological problem. Between 40 and 50 years, it is appropriate to use a volumizing treatment before the development of skin folds and Juvéderm VOLUMA is the treatment of choice for restoring volume. It is also of note that some women are becoming increasingly thinner and lose weight in their faces; in these cases volumizing treatments are appropriate. However, caution should be used not to inject too much volume as faces tend to put on weight as part of the aging process.

Sequence and scheduling of injections. Two scheduled visits are recommended, with a 1-month interval between visits. However, it is possible to administer multiple injections during the same visit, especially for patients who live far away from the practice or for those who would rather have only one follow-up consultation. There was no consensus regarding the sequence of the injections. Three of the experts started with a volumizing treatment of the malar and mid-jowl area, while one expert recommended starting with the circles around the eyes.

Recommended treatment areas for Juvéderm VOLUMA. Juvéderm VOLUMA is appropriate for use in the mid-facial region, the chin (mandibular line and possibly the deep marionette lines), the cheeks (for very hollow faces with prominent cheekbones), and the temples (with deep injections under the aponeurosis of the temporal muscle, while avoiding the facial nerve path). The eye area and lips are contraindicated areas for Juvéderm VOLUMA injections.

Recommended treatment areas for Juvéderm Ultra 4. Juvéderm Ultra 4 is indicated in marked nasolabial folds and in the mid-facial area in young women requiring a small quantity of volumizing product, or as a supplement to Juvéderm VOLUMA. There was no consensus reached for the eyebrow area. Lastly, it was considered more appropriate to treat the hands with Juvéderm Ultra 4 than Juvéderm VOLUMA.

Anatomical criteria for Juvéderm Ultra and Juvéderm VOLUMA injection technique. Two areas were identified as being appropriate for injection with Juvéderm VOLUMA: deep malar fat and superficial malar fat (Figure 1). Recommendations for use of Juvéderm Ultra 2 were for treatment of deep eye circles with bone contact, superficial wrinkles and lip contouring. Juvéderm Ultra 3 was recommended for injection in folds and to enhance lip volume. Lastly, Juvéderm Ultra 4 is useful for folds and for treating the cheeks and eyebrows.

Use of cannula versus needle. The choice of whether to use a cannula or needle for injection of Juvéderm VOLUMA largely depends upon the preferences of individual practitioners. However, the consensus was for Juvéderm VOLUMA to be injected using a 21 G or 23 G needle. Only one expert used a cannula since his view was that the product extrudes more easily than from a needle, a cannula does not blunt as easily as a needle, and a cannula seems to prevent haematoma formation, particularly in the malar area. Furthermore, injection into the glabellar area can result in necrosis when the product enters a vessel and this is more likely to occur with a needle than a cannula. Therefore, injections must be performed carefully to avoid supratrochlear vessels and the total volume injected must be limited to avoid necrosis due to compression, which can occur when too much product is injected.

With respect to Juvéderm Ultra, the consensus was for this product to be injected with 27–30 G needles.

Injection technique. Both the fan and retrotracing injection techniques were used, the latter being favoured owing to the risk of injecting the product into a vessel with the first technique.

Supportive care and management of complications

Pain. The following recommendations were made with respect to pain management:

- Use of troncular block 32G ½ cc (for Juvéderm VOLUMA in some cases)
- Patient half-seated or almost seated for volume replacement
- Use of adrenaline
- Stress-free environment
- No pre-medication (e.g. sedatives to be avoided owing to the risk to the patient if they are driving from the clinic post-treatment)
- No use of topical lidocaine (Emla®) needed with Juvéderm VOLUMA
- Topical anaesthesia should be available on request for Juvéderm Ultra.

To limit pain, the recommendation was to always use as thin a needle as possible. Use of local anaesthesia is not required for Juvéderm Ultra injections, but occasionally topical lidocaine is needed since it takes several seconds for the pre-incorporated lidocaine in the product to take effect. Some practitioners use a very mild local anaesthestic in the lip or mucous membrane during mesotherapy.

Supportive care. The following recommendations were made with respect to supportive care:

- Use of ice or cold therapy
- Self-massage by patients to encourage involvement in treatment and to produce a positive psychological effect
- No sports or sauna for 7 days to prevent risk of swelling, ecchymosis, oedema or haematoma development
- No aesthetic care for 24 hours
- No aspirin or anti-inflammatory agent due to increased risk of bleeding.

Management of complications. Possible complications following volumetric treatment are haematomas, ecchymoses, infections, persistent oedemas and unevenness. Infections only occur very rarely.

Haematoma. The following recommendations were made to minimize the risk of haematoma development:

- Use needles or cannulae as thin as possible to avoid bruises
- Use of the 'nappage' injection technique to prevent bleeding with Juvéderm VOLUMA
- Paying close attention to the injection technique: using needles vertically and using cannulae with the fan technique since this produces less trauma
- Press the target area when needed to prevent bleeding (vein pattern)
- Use immediate compression and cold therapy
- Apply vitamin K cream and arnica, although the effects of these tend to be limited.

Oedema. Immediate oedema development is linked both to injection technique and the patient. Patients who suffer from drainage problems in the lower eyelid (i.e. swollen malar bags in the morning) are at risk of developing persistent oedemas after injection with Juvéderm VOLUMA. Therefore, surgery seems more appropriate in these patients. In the event of oedema development, massage in minor cases, and lymph-drainage or hyaluronidase treatment is recommended in severe cases to reduce the injected volume (note: hyaluronidase currently has no market authorization in France).

Infection. The following recommendations were made with respect to management of infection:

- Antisepsis using a local chlorhexidine-based antiseptic solution
- An anti-infective treatment when required
- When a patient presents with an infection or fever, the injection must be postponed to another visit.

Herpes. Herpes flares do sometimes occur following injections, mainly in the lips. In the event of frequent herpetic outbreaks, the recommendation was to prescribe a preventive treatment with valacyclovir at a dosage of one tablet per day for 5 days, starting on the evening before the injection.

Necrosis. There is a high risk of necrosis following injection into the glabellar area due to artery contact. Therefore, superficial injection is recommended. Nasal and nasolabial injections can also, in rare cases, create a vascular obstruction, source of necrosis of the upper nasolabial fold or of a nasal segment. In such cases, urgent treatment with hyaluronidase injection is recommended (16).

Granuloma. There is a risk of granulomatous complications in patients who have had previous injections of non-resorbable products, who then go on to receive HA injections. Although the expert panel was unaware of any case of granuloma as a consequence of Juvéderm VOLUMA or Juvéderm Ultra treatment, the recommendation was to refer to the work of Annick Pons-Guiraud in order to establish the appropriate course of action (17).

Eye circles. Dark or hollow eye circles are evidence of specific complications and occur as bluish tones. Sometimes patients present for treatment of eye circles but treatment can result in bags under the eyes due to use of excess product and oedema. In such cases, treatment with hyaluronidase injection is recommended.

Unevenness. Unevenness may be due to a poor injection technique and can be corrected later with use of massage (up to 3 weeks post-injection) or with use of less volumizing products. This complication highlights the importance of following up patients for between 3 weeks to 1 month post-procedure, especially following major injections.

Combination with other treatments. Combination treatments often yield the best results. Volumizing treatments can successfully be combined with other surface treatments such as:

- Vistabel is commonly combined with HA as a first-choice treatment and is most frequently administered before HA
- Peels, laser or pulsed light treatments 1 month prior to the volumizing injection
- Mini-invasive surgery (e.g. blepharoplasty or advanced face lift). Most patients who have undergone surgery will benefit from combined and supplement filling treatments.

Discussion

The main issue for the consensus group was to assess how best to combine a range of well-tolerated, well-studied aesthetic products, specifically HA (Juvéderm Ultra) with a volumizer (Juvéderm VOLUMA) and BoNTA. Assessment of the questionnaire results and outcomes from the workshop sessions show the French expert panel currently endorses the following points for facial rejuvenation:

Treatment is best started by relaxing the muscle and enhancing the muscular balance with BoNTA, specifically in the upper face.

It is then essential to explain the procedure to the patient and to recommend volumetric treatment with Juvéderm VOLUMA before using a dermal filler (Juvéderm Ultra), especially in the mid-face.

The focus of treatment should not be on targeting wrinkles and nasolabial folds. Instead, it is important to educate patients to understand that creating a smooth contoured, convex mid-face is the current accepted approach and sets the benchmark for the future of facial rejuvenation and beautification.

The Juvéderm Ultra range and Juvéderm VOLUMA can be used together in the same session and in different layers (the Juvéderm Ultra range is used more superficially) to obtain the maximum effect and to optimize their effects, particularly in the mid-face and lower face. However, the panel recommends that the volumizing treatment is given first.

BoNTA relaxes the muscle and may prolong the effects of HA treatment, specifically in the glabella, chin and the peri-oral areas when used in conjunction with Juvéderm Ultra. However, this concept needs to undergo further detailed studies, specifically in the peri-ocular and peri-oral zones using an objective grading system.

Conclusion

A panel of experts from the field of aesthetic enhancement produced this review paper in order to achieve a consensus regarding facial rejuvenation using a combination of volume replacement (Juvéderm VOLUMA), filling products (Juvéderm Ultra product line), and BoNTA.

The key desirable characteristics for facial fillers and volumetric products are that they are effective, providing predictable and natural results that are long-lasting, although not permanent. Practitioners must find them easy to use, and treatment must be well-tolerated and as painless as possible for patients. Through the exploitation of the innovative 3-D technology developed by Allergan Inc., the Juvéderm product line (Ultra and VOLUMA) is a range of cohesive, homogenous gels that meet all these requirements. The combination of these different products during the same injection session in different zones and different layers in the same areas is a new concept validated by the consensus group.

The importance of individualized patient consultation in which legal and medical requirements are addressed, together with clarification of patient expectations and treatment objectives in an atmosphere of mutual trust between patient and practitioner, were discussed.

An assessment of facial anatomy and consideration of the aging process, as well as available treatment options, were also addressed. This paper also reports on practical aspects of facial rejuvenation through a discussion of the results obtained from questionnaires asking practitioners how products are used in daily clinical practice, as well as reviewing the outcomes and establishing recommendations from a meeting of the experts designed to investigate different treatment combinations, injection techniques, supportive care and management of complications.

Significantly, this is the first study which confirms there is great interest in combining BoNTA with a volumizer and dermal fillers.

Acknowledgements

The authors would like to acknowledge Allergan Inc. for supporting the consensus meeting and for providing medical writing support for the production of this manuscript.

Conflict of interest: Allergan Inc. provided support for the organization of the expert meeting, including travel costs and expenses. Medical writing support for this paper was also provided by Allergan Inc.

Dr Raspaldo is a consultant for Allergan Inc.

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