Clinical, Cosmetic and Investigational Dermatology

Dovepress

open access to scientific and medical research

Open Access Full Text Article

METHODOLOGY

Turn Your AART into a HIT Using a Complete Range of Aesthetic Injectables: Methodology for Combining Products to Maximise Patient Outcomes

Andreas Nikolis[1,2], Luiz Eduardo Toledo Avelar[3], Alessandra Haddad[4], Stephanie Chuk Kwan Lam[5], Andrei Metelitsa[6], Heidi B Prather[7], Frank Rosengaus[8], Kaitlyn M Enright[1], Desislava Ognyanova Lazarova[9], Inna Prygoya[10], Fabio Iachetti[10]

[1]Clinical Research Unit, Erevna Innovations Inc, Westmount, Quebec, Canada; [2]Department of Plastic Surgery, McGill University, Montreal, Quebec, Canada; [3]Clinica Domani Luiz Avelar, Belo Horizonte, Minas Gerais, Brazil; [4]Federal University of São Paulo and Hospital Israelita Albert Einstein, São Paulo, São Paulo, Brazil; [5]Central Health Medical Practice, Hong Kong, People's Republic of China; [6]Department of Dermatology, University of Calgary, Alberta, Canada; [7]Westlake Dermatology, Austin, TX, USA; [8]Dr. Rosengaus Clinic, Mexico City, Mexico; [9]Galderma SA, Lausanne, Vaud, Switzerland; [10]Galderma, Uppsala, Sweden

Correspondence: Andreas Nikolis, Email research@vicpark.com

Purpose: Optimizing outcomes of aesthetic treatments with injectable products usually requires a consideration of the entire face to ensure balance, along with combination treatments that align with the patient's goals. To help injectors, a method of assessing the patient and developing an individualized, holistic treatment plan was developed. This methodology is termed Assessment, Anatomy, Range, and Treatment (AART™) and Holistic Individualized Treatments (HITs™). This article aims to describe and evaluate the novel and systematic AART-HIT™ methodology.

Methods: The AART-HIT™ methodology, including its associated diagnostic tool the Facial Assessment Scale (FAS™), were developed to aid injectors in completing a patient assessment in which the entire face is evaluated, the relevant anatomy is considered, the science behind the available range of products is understood, and the treatment plan is individualised for the patient. Specifically, the HITs™ are methodologic tools for practitioners to perform a standardized, full facial assessment and to create an individualized treatment approach to holistically address a patient's aesthetic concerns. The use of this methodology in clinical practice was assessed via a survey, deployed to twenty-eight clinicians.

Results: Over 85% of participants agreed that the AART-HIT™ methodology was adequate for their needs. Additionally, 100% of participants agreed that the temporal sequencing of HITs™ and the FAS™ diagnostic tool was useful in clinical practice. Furthermore, over 70% of participants agreed that the anatomical locations identified in each HIT™ were sufficient, while over 80% responded that the HITs™ adequately represented the range of products. Finally, over 85% of participants agreed that the HITs™ covered different ethnic skin types and various patient ages and, over 80% of participants responded that they would not add additional elements to any of the 5 HITs™.

Conclusion: The AART-HIT™ methodology, including the FAS™ were comprehensive enough for clinical use in providing a personalised treatment plan for individual patients.

Keywords: fillers, biostimulators, neuromodulators, hyaluronic acid, education, treatment techniques

Introduction

Patients seek aesthetic treatments to address dissatisfaction with specific areas of their face.[1–3] A comprehensive understanding of the patients' reasons for seeking treatment is necessary to fully address their concerns.[4] Although patients may request treatment of specific areas or treatment with certain product types [hyaluronic acid (HA), calcium hydroxylapatite, poly-L-lactic acid (PLLA), or neuromodulators], performing the requested treatment may not be

Received: 17 April 2024
Accepted: 28 August 2024
Published: 13 September 2024

sufficient to provide optimal results.[4,5] Instead, it may be necessary to treat additional areas to correct the underlying cause of their concern (eg, volume deficit, skin quality), or adjacent regions requiring treatment to achieve natural appearing, balanced results.[4] Clinicians must understand how to determine and then deliver on the patient's goals to ensure their satisfaction following aesthetic procedures. This includes establishing realistic expectations, creating an individualized treatment plan, and understanding product properties, differences and ideal uses.[4,6]

The "art" of aesthetics has been restrained by the necessity to train new injectors based on reproducible product indications and specific labeling to protect patient safety.[7–11] This approach can erroneously be misinterpreted and applied as a "one-size-fits-all" plan. This educational gap creates the need for a systematic approach that allows injectors to think beyond the constraints of basic injection techniques and to incorporate guidelines that best meet patient expectations for natural aging. Standardized assessment tools and treatment approaches may help clinicians perform full facial evaluations to understand the patient's treatment goals, prioritize the appropriate facial areas that should be addressed, and establish a corresponding treatment plan for individual patients to provide balanced and natural results.[5,12,13]

Assessment, Anatomy, Range, and Treatment (AART™) and Holistic Individualized Treatments (HITs™) are methodologic tools for practitioners to perform a standardized, full facial assessment and to create an individualized treatment approach to holistically address a patient's aesthetic concerns. The AART™ approach is built on proper facial assessment, understanding patients' underlying anatomy, product selection, and developing a comprehensive treatment plan. AART™ allows clinicians to systematically identify the severity of the primary area of focus to fully address patients' needs, select appropriate treatments, and evaluate patient progress over time. HITs™ provide guidance for treating specific areas of the face with the optimal use of the products to achieve desirable results. A comprehensive approach to patient assessment and treatment is needed to create a consistent and reproducible patient experience that allows injectors to be trained in a standardized manner that promotes patient safety, increases injector awareness of anatomy, minimizes potential complications, and prioritizes natural outcomes to ensure satisfactory aesthetic results. This paper describes the development and validation of the novel and systematic AART-HIT™ methodology. A list of acronyms used in this manuscript is displayed below.

- AART: Assessment, Anatomy, Range and Treatment
- FAS: Facial Assessment Scale
- HA: Hyaluronic acid
- HA_{DEF}: Restylane Defyne
- HA_{KYS}: Restylane Kysse
- HA_{LYF}: Restylane Lyft
- HA_{REF}: Restylane Refyne
- HA_{REST}: Restylane
- HA_{SBs}: Restylane Skinboosters (includes Vital Lido and Vital Light Lido)
- HA_{SBV}: Restylane Skinboosters Vital/Lido
- HA_{VOL}: Restylane Volyme
- HITs: Holistic Individualized Treatments
- NASHA: Non-animal stabilised hyaluronic acid
- OBT: Optimal balance technology
- PLLA-SCA: Sculptra (poly-L-lactic acid)
- SCALP: [S]kin, subcutaneous [C]onnective tissue, [A]poneurosis/superficial musculoaponeurotic system (SMAS), [L]oose connective tissue, and [P]eriosteum/deep fascia
- SMAS: Superficial musculoaponeurotic system

AART-HIT™

Once you have [A]ssessed the patient, identified the relevant [A]natomy, and considered the [R]ange of products in the Galderma Aesthetics Portfolio (herein referred to as "the Portfolio") that are needed based on the assessment and

anatomy of the patient, the final step of AART™ is to execute the [T]reatment. Detailed information on each step of the AART™ process is described below.

Assessment

A systematic method of assessing patients is needed to ensure a holistic (complete) approach that does more than just consider an isolated correction, but rather focuses on treatment regimens.[14] For this reason, the FAS™ was developed as a means of systematically evaluating the entire face, thus standardizing facial assessment, and identifying outliers and priorities (Figure 1).[13] The use of the FAS™ assessment tool will identify patient's individual needs and define the areas requiring improvement at a specific moment in time. This will provide each patient with a unique and tailored experience, as each assessment and treatment plan rely on an injector's personal acumen and ability to create "art" through AART™.

Assessing the face in its entirety helps to identify short and long-term treatment priorities and propose a holistic treatment plan. Standardising the assessment process allows injectors to address unmet needs commonly observed in most aesthetic clinics, including patients isolated focus on specific problem areas and patients being unaware of the benefits of treating with more than one product for a balanced outcome. A standardised system for facial assessment allows providers to create a holistic, individualised and reproducible long-term treatment plan. Five facets of facial assessment must be considered to create a standardised approach to facial assessment. These facets guide a structured and complete assessment, which ensures that all aspects of the patient's face, and therefore aesthetic goals, are included in the consultation.[14]

FACIAL ASSESSMENT SCALE

		SEVERITY EVALUATION			
		0 - None	1 - Mild	2 - Moderate	3 - Severe
Skin quality	Loss of Radiance/Glow	☐	☐	☐	☐
	Loss of firmness	☐	☐	☐	☐
Facial shape	Sagging	☐	☐	☐	☐
	Volume loss	☐	☐	☐	☐
Proportions	Imbalance	☐	☐	☐	☐
Symmetry	Asymmetry	☐	☐	☐	☐
Expression	Static lines	☐	☐	☐	☐
	Dynamic lines	☐	☐	☐	☐

ADDITIONAL SKIN ASSESSMENT SCALE

		SEVERITY EVALUATION			
		0 - None	1 - Mild	2 - Moderate	3 - Severe
Skin quality	Skin color unevenness	☐	☐	☐	☐
	Scars	☐	☐	☐	☐

Figure 1 The Components of the Facial Assessment Scale.

The Five Facets of Facial Assessment

1. Skin quality: Prescriptive, consumer, and/or aesthetic topical products can be used to enhance and improve skin quality. An example would include addressing the loss of radiance due to photoaging and/or acne, where a recommendation to cleanse, treat, moisturize, and protect the skin from UV damage would be proposed (ie, Cetaphil^{TM})
2. Facial shape: Facial distance, from bizygomatic (cheek) width, bigonial (jaw) width and chin protrusion, define aesthetic elements of youthfulness and traditional feminine and masculine anatomic characteristics. These variations in facial distance lend to facial shapes, such as heart shaped, round, square, and oval. Oval is frequently considered the ideal face shape for women or to achieve a traditional feminine aesthetic, however with age, cultural ideals, gender identification and genetic characteristics the ideal form, and therefore patient goals, may vary. Furthermore, each face shape has a different aging process.
3. Facial proportion and contour: Injectors should assess facial proportions by evaluating the balance between the facial thirds (upper, middle, and lower) and maintenance of the Ogee Curve. Such rules of proportions can also be applied to specific structures, such as the lips. Lip contour should be assessed in terms of maintaining the ideal ratios based on ethnic considerations and aesthetic goals, as well as surrounding facial support for balance. More specifically, this step evaluates facial proportions [ie, the upper, middle, and lower thirds, and whether the thirds (ie, their spacing) are equally balanced].
4. Facial symmetry: Although some degree of facial asymmetry is to be expected and within natural limits, these nuances between facial hemispheres must be noted and communicated with the patient prior to treatment. Furthermore, since no one is perfect, the level of facial asymmetry should be evaluated and corrected depending on severity, and in context with other facial attributes. This step involves an evaluation of facial symmetry (ie, whether the right and left sides of the face appear similar).
5. Animation and emotion expression: Animation and increased contraction or overuse of facial muscles may shift the position of soft tissues. Moreover, normal facial aging may lead to a worried or sad appearance from increased muscular movements leading to rhytids and movement of soft tissue landmarks to volume loss. These unique functional facial deficits influence the magnitude of facial animations and expressions, some of which patients may want to preserve or in other cases improve.

When you assess patients through these five facets, the potential outcomes can be anticipated and visualized graphically using the FAS™.

The Facial Assessment Scale

The FAS™ helps injectors to develop a Holistic Individualised Treatment (HIT™) plan with their patients by 1) determining their individualised treatment priorities and 2) providing a reference point for comparison over time (ie, FAS™ grade at baseline vs outcome). The FAS™ creates a standardized way in which injectors assess patients. For example, each FAS™ category is graded on a 4-point scale (0 = none, 1 = mild, 2 = moderate, 3 = severe; Figure 1) and documented linearly in a pie chart. As each parameter is graded, a circular figure begins to appear. Once the figure is completed, outliers will inform injectors as to what areas need to be prioritized based on severity at that point in time. **Note**: To change the "Expression" category, multiple areas will likely need to be treated. With each subsequent treatment, the lines of the FAS™ will move closer to point 0, or the center, indicating milder deficits.

Anatomy

A tailored treatment plan requires a thorough knowledge of patients' anatomy for both injection safety and understanding the science of aging. Each patient's aging profile and aesthetic goals are unique, and each practitioner will interpret these through their own lens and apply their individual unique expertise, understanding that some points are universal (eg, bone resorption in the midface). Because the patient may have multiple concerns and each concern may have different causes, utilizing the FAS^{TM} algorithm is critical in creating reproducible, standardized solutions that encompass multiple factors. Understanding how the

fundamentals of aging occur and which structures are impacted in each patient, leads to a targeted approach to enhance youthfulness with safe injection techniques and minimizing product overuse or misuse.

Facial Layers

One such fundamental concept to understand is layered anatomy. With few exceptions, facial areas consist of five anatomical layers: [S]kin, subcutaneous [C]onnective tissue, [A]poneurosis/superficial musculoaponeurotic system (SMAS), [L]oose connective tissue, and [P]eriosteum/deep fascia (known by the acronym "SCALP", Figure 2). The "SCALP" classification system is most applicable, as it utilizes layers that apply across the whole face. The SMAS, a fibrous layer of connective tissue and platysma muscle, when manipulated can affect the positioning of other soft tissues. Using this foundation of anatomy, injectors can frame and define facial features, understand the anatomic boundaries of the treatment area(s), and apply volumetric displacement techniques to optimally reposition the soft tissues.

Layers Through Aging

With increasing age, bones remodel and resorb (eg, the aperture of the orbits widen, the pyriform widens, the maxillar bones deepen, the mandibular width and angle change, the malar bone rotates), fat pads descend and deflate, muscles increase and decrease in tonus, and skin loses elasticity (Figure 3). However, there is limited evidence as to how much of these visual changes are attributed to ligaments, as they do not stretch or lengthen (although some speculate ligaments may become stiffer).[15] Therefore, the mechanisms through which the upper skin layers move with age is also due to movement of deeper layers. Notably, there are very little changes to the zygoma with age; it stays in place and is very robust, while the central midface retracts substantially with age. These facts are relevant when considering injection techniques. As most structures are impacted by their bony foundation, reinforcing, or replacing lost volume attributed to bone is a fundamental principal in injection strategies for rejuvenation. Bones such as the zygoma, which change minimally, can be used as constant landmarks in our treatment strategy. Osteocutaneous ligaments are anchored to bone and thus shift in position with age-related bony changes. Due to these connections, injections just lateral to the line of ligaments serve as an anchoring technique to pull back and "lift" or project tissues restoring baseline anatomy.[16] In contrast, when treating facial planes void of ligamentous attachments, the primary role of the injector tends to be restoration of facial contour and volume.

The midface: There exists a line of ligamentous attachments, beginning with the superior temporal ligament, orbicular retaining ligament, zygomatic cutaneous ligament of major and minor zygomaticus muscle (define border of masseter), premasseteric ligaments (n = 4), and mandibular ligament which all align vertically dividing the face into an anterior and lateral

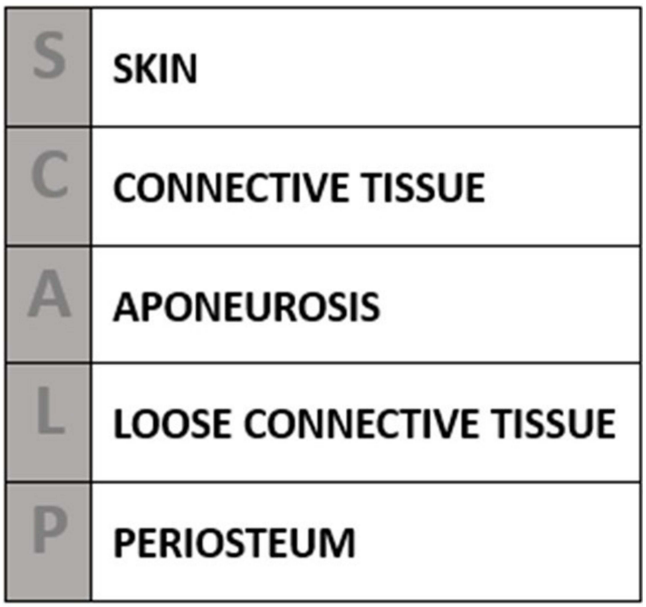

Figure 2 The Layers of Facial Anatomy.

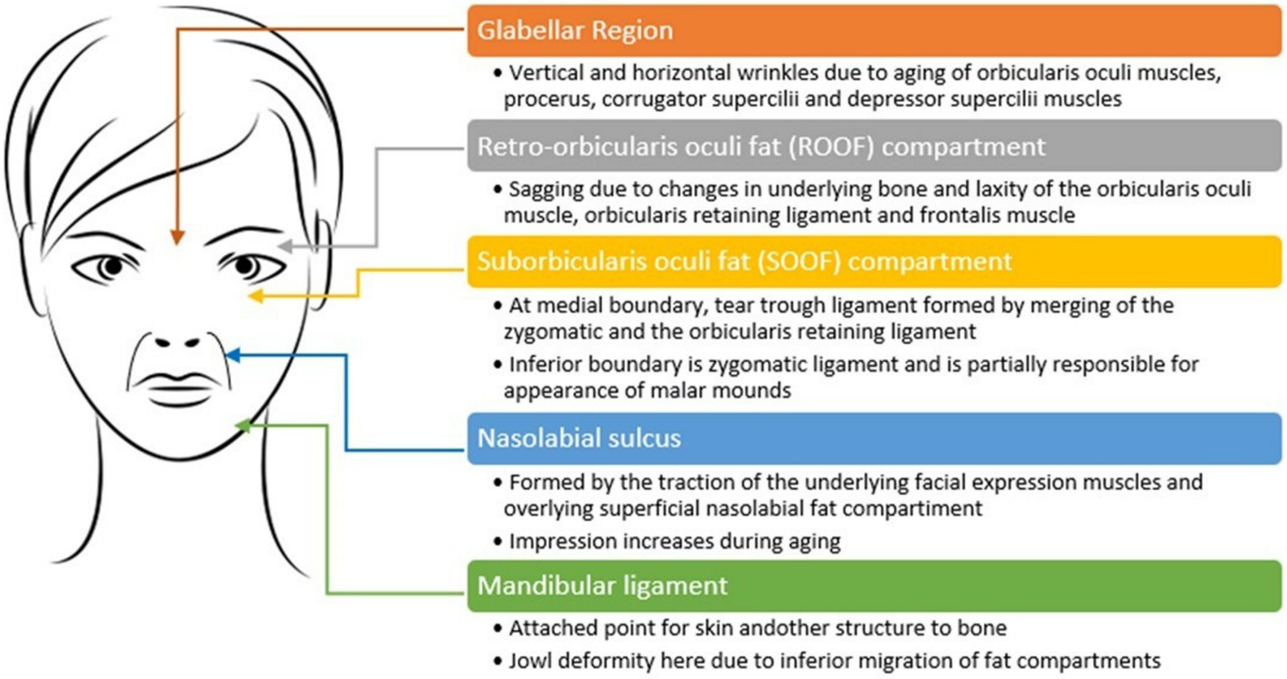

Figure 3 Common Trouble Spots of the Aged Face.

aspect. This alignment is called the "line of ligaments" or the ligament plane and anchors the face allowing decent of the cutaneous structures anteriorly with aging. This anterior region is void of multiple ligamentous attachments and is ideal for volumization and cutaneous support, while the lateral region is ideal for treatments focused on manipulating these attachments with injection techniques that create lift or projection.[16]

The perioral area: Lip shape changes over time due to volume loss, reduced bony support with age-related mandibular changes, and is influenced by lip shape and jaw position as determined by the class of occlusion (I, II, or III). Notably, orthodontic correction alone can significantly improve the appearance of perioral volume loss and lip position. When utilizing injectables to offset age-related or genetic factors, there are key anatomical landmarks of the lips that injectors must be familiar with, such as the Cupid's bow, philtral columns, vermillion border, white roll, wet-dry border, oral commissure, and tubercles. The lips should be considered when evaluating the side profile and facial proportions. The main perioral structure is the orbicularis oris muscle. This is a complex muscle, with the superficial and deep fibers behaving differently. The superficial fibers acts as a retractor and is related to facial expression (eg, pout and projection) and the precise movements of lips needed in speech, while the deep fibers act as constrictors and are responsible for the sphincteric action of the mouth. Thus, there is duality within the same muscle, which has no tendinous or bony attachments. There is a thin layer of fat in the perioral area (ie, central, medial, and lateral fat pads of the chin, which are separated by septa and can be manipulated), but none in the lip themselves, where the skin or mucosa is directly on muscle. There is a distinct gender-based difference in the thickness of the cutaneous support and muscle of the upper lip, where women have thinner support resulting in increased vertical rhyids. The vascular system of the perioral area is supplied by the facial artery, where it branches off into the superior and inferior labial arteries. The labial arteries typically lie within the deep layer of the orbicularis oris muscle however can be found more superficially in the muscle, mucosa or subcutaneous.[17] The problem with these vessels is the unpredictability of their distribution. So aside from an understanding of anatomy, mindful injection technique is necessary to ensure safety. Small aliquots of product, careful product selection, and a slow injection technique are critical to ensure safer injections; there is no risk-free injection. While the relationship of the facial artery with certain structures does not change between patients, the 3-dimensional distribution does. The placement of the facial artery may depend heavily on age-related changes to subcutaneous tissue and bony support. Therefore, injectors should be cognisant of the branching of the superior labial artery, which has columellar and septa branches. The superior labial artery also has interconnections with the angular artery and lateral nasal branch in the nose. The facial vascular supply is an intertwined plexus of arteries.

The lower face: The lower face includes the perioral region, chin, and jawline. With aging, the lower face loses definition, shape, and fullness. As the mandible thins, fat pads descend and reposition creating a loss of structural support resulting in the appearance of jowls. As the overall muscular, subcutaneous, and bony supports dwindle with age, there is an "empty bag appearance" of the skin contributing to the formation of rhytids and laxity.[18] Furthermore, with the loss of perioral support, the lips tend to flatten, thin and invert with age.

Range

To ensure optimal treatment outcomes, it is essential that injectors understand the properties, uses, and science behind each product in The Galderma Portfolio. There are two unique and complementary technologies used to manufacture the products: 1) the NASHA™ technology and 2) optimal balance technology (OBT™)/XpresHAn Technology™. NASHA is designed for lifting and precision by utilizing less cross-linking to create products with a higher G' and firmer HA-gel. OBT/XpresHAn is designed for contouring and natural movement with expression. It utilizes more HA-crosslinking to create a lower G' and softer, more flexible HA-gel. Choosing between NASHA or OBT/XPresHAn HA-gels should be based on consideration of the skin thickness, amount of tissue coverage and location of treatment.[19] Each patient's needs differ based on the amount of volume loss and desired treatment outcome. Soft tissue depth across areas of the face can also vary for each patient based on genetics or photoaging. Facial areas with thin, lax skin or with more pronounced signs of aging generally have minimal (thin) tissue coverage and require an HA filler with a low G' and softer texture to naturally integrate into tissue. Facial areas with good (thick) tissue support require an HA filler with a high G' and firmer texture, to ensure greater lifting capacity for optimal results. The Galderma Portfolio provides the tools for an individualised treatment: to relax (neuromodulators), refine (HA fillers), refresh (HA_{SBs}) and/or renew (collagen biostimulation).

1. Relax: Relax the facial muscles of expression involved in the formation of dynamic wrinkles
2. Refine: Refine the shape and contour of the face through lifting, volumizing, or filling lines and wrinkles to create a healthy, more youthful appearance
3. Refresh: Refresh tissues for more radiant and hydrated skin.
4. Renew: Restore the skin's natural collagen production to maintain a youthful foundation.

Treatment

This section will focus on a discussion of properly selecting products for holistic individualised treatments (HITs™). Through the use of the HITs™, injectors can transform patient concerns into individualised treatments to deliver the results patient's desire. While specific treatment techniques are outside the scope of this paper, examples may be discussed such as volumizing the anterior cheek, defining the zygoma, or lifting lateral cheek.

Holistic Individualised Treatments

Several studies support a holistic approach to treatment, which often involves combining the use of multiple products.[20–23] Ensuring a holistic approach to aesthetic treatments requires the injector to consider the entire patient journey, including immediate assessment, discussion, treatment, aftercare [including at home skincare to treat, moisturize, and protect], and future long-term goals. Performing an initial full-face evaluation is important not only for documentation purposes and progress mapping but also to create a mutual understanding of the overall treatment plan with the patient. Patients tend to focus only on one or two areas of immediate concern but improving the overall aesthetic appearance may require several treatments over different visits in multiple regions. Discussing this global treatment plan with patients will include them in the decision-making process and may help manage expectations.[24] The relationship between the AART methodology and each HIT is depicted in Figure 4. The suggested product range for each HIT™ are described in the .

Bright Eyes HIT™: The Bright Eyes HIT™ includes using botulinum neurotoxin type A for treating glabellar lines and lateral canthal lines, treating the periorbital and temporal fossa regions with fillers, as well as volumization of the superior-anterior midface. The superior-anterior midface is included in this HIT™ as it is known that when the anterior malar region is injected, there is a compensatory improvement of the tear trough region. This improvement is related to

	FACIAL ASSESSMENT SCALE					
Skin Quality	Skin Quality	Loss of Radiance/Glow	0	1	2	3
		Loss of firmness	0	1	2	3
Midface	Facial Shape	Sagging	0	1	2	3
		Volume loss	0	1	2	3
Lips and Perioral	Proportions	Imbalance	0	1	2	3
Profile	Symmetry	Asymmetry	0	1	2	3
Periorbital	Expression	Static lines	0	1	2	3
		Dynamic lines	0	1	2	3

Figure 4 Relationship Between the FAS and Each HIT™.

the superior movement of the fat pads, and subsequent improvement of the cutaneous appearance of the tear trough deformity. Moreover, one of the major causes of the tear trough deformity is the descent of the fat pads.

Glow on HIT™: Skin radiance, or glow, is affected by skin texture (pores, lines, wrinkles, folds), collagen and elasticity, and skin hydration. The culmination of these factors can create a light reflection from the dermis that causes a halo effect characterised by glowing skin.[23] Achieving glowing skin is therefore all about radiance (ie, how incoming light is reflected) and can impact the impression of youthfulness, healthiness, likeability, and attractiveness. The Glow on HIT™ encompasses the prevention of further lines and aging through the use of botulinum neurotoxin type A, PLLA-SCA or $HA_{SBs.}$ Dynamic changes or hyper functional musculature are usually best addressed with botulinum neurotoxin type A. However, static changes can be handled by a variety of means and to some degree can be treated with botulinum neurotoxin type A, as well. In the authors' experiences, smoothing of the skin that often occurs following treatment with botulinum neurotoxin type A can also result in the appearance of improved skin quality.[25,26] Botulinum neurotoxin type A can be used in an off-label fashion to improve the appearance of facial aging.[23] While measuring skin quality can be clinically challenging, direct observation and simple techniques such as the pinch test can help verify treatment results.[15] The pinch test is a useful measure of skin quality because 1) it has been validated against ultrasound,[19] 2) it is a low-cost alternative to mechanical probes, and 3) every clinician can perform the pinch test without the level of expertise and costs associated with operating an ultrasound.

The Glow on HIT™ is an appropriate treatment for middle aged patients who have never received treatment before and want subtle results with a focus on longevity, rather than immediate, drastic results.[22–24] It is the treatment of choice for patients who desire a "natural, rested, relaxed look" with some residual degree of animation or expression without appearing angry when they are not.

The Glow on HIT™ also takes into consideration daily skincare, depending on the patient's needs. Skin treatment, hydration, protection, and when needed, the addition of prescription drugs and/or aesthetic procedures may be considered. Aesthetic procedures (Table 1) may include:

Table 1 Comparison of Products Used in Aesthetic Treatments

	HA	Sculptra	Skinboosters	Neurotoxin A
Volumisation	++++	++	None	None
Laxity treatment	+	++++	+	None
Indications	Localised	Overall	Overall	Localised
Results	Instant	Gradual	Instant	Gradual
Lasting	+++	++++	++	++

Notes: HA = hyaluronic acid. ++++ = Extremely, +++ = Very, ++ = Moderately, + = Slightly.

- PLLA-SCA: Indicated for correction of fine lines and wrinkles, and shallow to deep contour deficiencies, it is suitable for addressing signs of skin ageing such as sagging and loss of firmness. PLLA-SCA is also suitable for restoration and/or correction of the signs of facial fat loss (lipoatrophy).[27] Through PLLA-SCA's mechanism of action, it activates fibroblasts to increase the collagen content of the skin and improve structure and firmness with results lasting up to 25 months.[28]
- Neurotoxins: Indicated for glabellar lines (vertical lines between the eyebrows) seen at maximum frown and/or lateral canthal lines (crow's feet lines) seen at maximum smile in adult patients under 65 years, when the severity of these lines has an important psychological impact on the patient.
- HA_{SBs}: Indicated to restore skin hydro balance, improve skin structure and the elasticity of the skin. This is accomplished by the water associated with the stabilized HA in the gel. HA_{SBs} can also improve elasticity with overall results lasting up to 15 months.[29]

Shape up HIT™: The Shape up HIT™ concerns primarily the midface and is divided into two types of patients; one requiring shaping and lifting and the other requiring firming of the skin envelope and lifting. A patient requiring shaping and lifting has sufficient skin firmness but has lost some volume. This defines patients with a lack of definition in the midface, midface volume loss, heavy nasolabial folds, who has potentially a slimmer face, and still has good skin elasticity. Sagging is not a concern for this patient. Therefore, the goal of treatment should be to address the observed changes in structure. On the contrary, in a patient requiring firming and lifting, it is the skin that has undergone the most changes throughout the aging process. This is defined by a patient with hollowing of the midface, sagging skin/skin laxity, loss of jawline definition, appearance of jowls, and may have potentially a rounder/fuller face. This patient's concerns should be addressed primarily with PLLA-SCA. Of note, skin firmness and volume are independent of each other. Skin firmness relates to collagen deposition and quantity, and skin characteristics. Volume changes can occur independently of the skin changes, as the descent of the superficial fat pads takes place primarily due to gravity. Also, given changes in the bony resorption of the skeleton, the deep fat pads classically rotate and create involution of the midface. These drastic changes in the bony and soft cutaneous tissue are independent from what is observed at the skin surface.

With the Shape up HIT™, injectors can volumize the midface, define structures (eg, zygoma, cheek bones, mandibular bone), and lift or project tissues. For treating the patient requiring shape and lift, the deep layers (ie, layers 3, 4 and 5) can be injected with HA_{LYF}, HA_{DEF}, or HA_{VOL}. For example, the medial midface/malar can be treated with HA_{VOL}, the zygoma can be treated with HA_{LYF} (thick skin) or HA_{DEF} (thin skin) depending on skin thickness, and the pyriform aperture can be treated with HA_{LYF}. For the patient requiring firming and lifting, superficial layers (ie, layers 1 and 2) can be treated with HA_{DEF}, HA_{LYF} and/or PLLA-SCA. When using PLLA-SCA, the patient consultation is especially important in managing expectations, as results can take up to six months. The main objective of using PLLA-SCA is for improving skin quality, correcting depression in the skin surface, and large volume correction with respect to facial fat reduction. The main target of PLLA-SCA is skin laxity and sagginess. The pinch and slide tests can help establish how severe the skin laxity issue is. Patients can even be taught how do this themselves to track treatment progress and gain confidence that the treatment is working. Ask the patient to look downwards (incline) can also evidence the degree of skin laxity and sagginess before and after treatments.[19] PLLA-SCA is cell specific for fibroblasts, so the injection technique usually requires targeting the dermis. The more fibroblasts activated by the PLLA-SCA, the greater collagen production will be stimulated. How injectors distribute the product (eg, fanning) and determine the depth of injection (eg, dermal) is based on this mechanism of action. Furthermore, asking the patient to distribute PLLA-SCA particles through massage will help maximize outcomes.

Other sources of fibroblasts include the aponeurosis of the facial muscles, SMAS, area of ligaments, and SMAS attachments, so product can also be placed in these regions. The amount of product placed in each region can be biased, to direct the direction of skin tightening.

Kiss and smile HIT™: The Kiss and smile HIT™ is a HIT™ for the lips and perioral area. This HIT™ is divided into three treatment priorities, which can be determined using the Lip Assessment Tool, a version of the FAS™ modified to be site-specific (Figure 5):

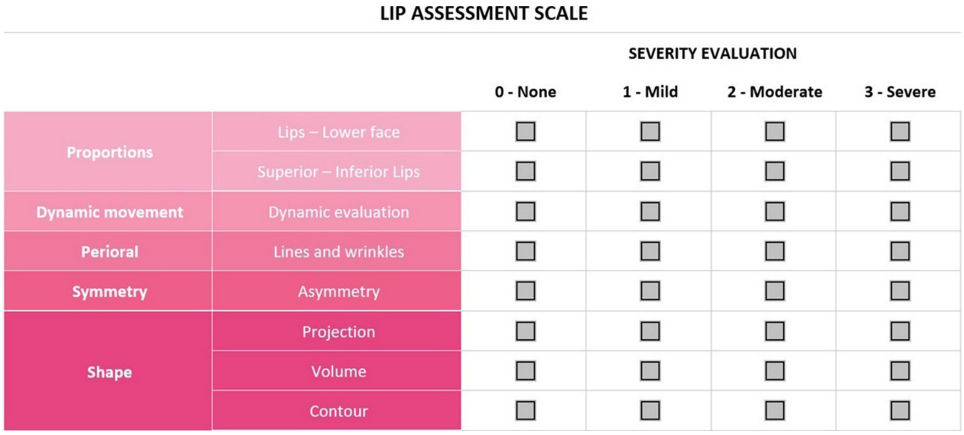

Figure 5 Components of the Lip Assessment Scale.

i. The ideal lips: Products used include HA_{KYS} or HA_{RES}.
ii. Framing lips: Products used include HA_{KYS} or HA_{RES} for the lips, and HA_{LYF}, HA_{REF}, HA_{DEF}, or HA_{SBV} for surrounding areas (eg, pyriform aperture, nasolabial folds, marionette lines, labiomental fold, perioral hydration).
iii. Confident smile: Products used may include HA_{KYS} or HA_{RES} (lips); HA_{LYF}, HA_{REF}, or HA_{DEF} (perioral); and Dysport for lateral canthal lines. For the gummy smile, treatment should also focus on camouflaging underlying muscle overactivity by volumizing subcutaneous or submucosal tissues (eg, depressor anguli oris, orbicularis oris, mentalis). The gummy smile requires treatment of the perioral area and perhaps a bit of lip volumization. Correcting the gummy smile is more about improving confidence and animation, rather than beautification.

Treatment needs change as patients age, so injectors may need to focus on beautification (era: 20s+), volumization (era: 30s+), creating eversion (era: 40s+), and/or defining contours (era: 50s+), depending on the patient. Product selection for lips depends on whether a higher G' (NASHA) or higher xStrain (OBT) is required. Most of the time, OBT (HA_{KYS}) can be used but HA_{RES} (NASHA) is also an option. OBT will add more volume, whereas NASHA will provide better definition and projection. A stronger product may also be required to turn a downward facing lip corner.

Profile HIT™: The Profile HIT™ ensures balance between the tip of the nose, lips, and chin. However, before assessing any of these three structures, the projection of the midface and particularly of the pyriform aperture needs to be considered. For example, if the pyriform aperture is recessed, the nose may appear too prominent, or the lips may appear protruded. Following the correction of any midface deficit, injectors can use the Ricketts' line or aesthetics line to evaluate the relationship between the nose, lips, and chin. The Ricketts' line is a line between the most anterior point of the soft tissue nose to soft tissue chin. A straight line between these structures can be used to determine whether over projected lips or an under projected chin are contributing to problems with the profile, as the area touching the true vertical line is not the problem area. Injectors can also verify the gonial angle, as an online survey in 2016 revealed that an angle of 130° is ideal; ensure the mentocervical angle differentiates the chin and neck; correct the nasofrontal angle; and/or correct the dorsal aesthetic lines, as they need to reflect light and provides a perception of how straight, wide, and defined the nose is.

Methods

Survey

To validate the usefulness of the AART-HIT™ methodology in clinical practice, a combination of virtual and in-person one-on-one meetings were conducted during the 24th International Master Course and Aging Science World Congress (IMCAS) in Paris, France on January 26 to January 28, 2023. Thirty-two clinicians who had previously attended seminars on the topic were invited to participate in the survey. Prior to data collection, the invited clinicians were emailed informational brochures summarizing the AART-HIT™ methodology, including the FAS™ and each HIT™.

This material was also available to them during the one-on-one meetings. All participants were required to have implemented the AART-HIT™ methodology into their clinical for a minimum of 6 months, at the time of the survey. Participants were asked seven questions aimed at assessing their perceived utility of the AART-HIT™ approach within clinical practice. Questions 1 and 2 were general in nature whereas questions 3 to 7 were uniquely repeated for each of the five HITs™ (Table 1). Participants were also given the opportunity to provide additional comments related to each question in a free text box. Responses were collected using the online survey platform, Survey Monkey (Momentive, San Mateo, CA).

Data Analysis

Data were summarized using descriptive statistics.

Results

Of the thirty-two clinicians invited to participate in the survey, twenty-eight (87.50%) accepted. Responses are summarized in the following sections. All respondents were medical doctors that underwent training at Galderma Aesthetic Injector Network (GAIN) events, which are didactic events where the AART-HIT™ concept, including the FAS™, was explained, and patients were treated live to demonstrate outcomes. All injectors used AART-HIT™ in their clinical practices for at least 6 months before completing the survey.

Bright Eyes HIT™

Most survey participants (71.4%, n = 20) indicated that they would not add any additional anatomical regions to the Bright Eyes HIT™ (Table 2). However, suggested additions included the A-frame, brow area, forehead, lower forehead, skin, supraorbital area, upper eyelid, and upper orbit. Most participants (82.1%, n = 23) would not consider using any additional products in the HIT™. Participants responding "yes" mentioned biostimulators, threads, lasers, peeling, and HA_{SBs}. Similarly, most participants (89.3%, n = 25) agreed that the HIT™ covers all their needs in all patient age groups of patients. Additional considerations related to needs across patient age groups included the potential need for other devices beyond HA fillers, neuromodulators, and biostimulators for a holistic treatment, additional changes in the skin of the periorbital area, and the need to address A-frame deformity. A similarly high percentage of participants (89.3%, n = 25) agreed that the HIT™ covers all their needs in different ethnic skin types. Among those who disagreed, concerns

Table 2 Participant Responses to Survey Questions

Question	Answer (N = 28)				
Q1. Is the temporal sequencing suggested by the "FAS scale" adequate for your needs? (Y/N)	100% (n=28) Responded "Yes"				
Q2. Is the diagnostic tool "FAS scale" adequate for your needs? (Y/N)	100% (n=28) Responded "Yes"				
Q3. What other anatomical regions would you like to add to this HIT (if any)?	**Bright eyes**	**Kiss and smile**	**Glow on**	**Shape up**	**Profile**
	71.4% (n=20) Responded "None"	85.7% (n=24) Responded "None"	82.1% (n=23) Responded "None"	78.6% (n=22) Responded "None"	82.1% (n=23) Responded "None"
Q4. Would you consider using any other products in this HIT?	82.1% (n=23) Responded "No"	89.3% (n=25) Responded "No"	92.9% (n=26) Responded "No"	92.9% (n=26) Responded "No"	89.3% (n=25) Responded "No"
Q5. Does this HIT cover all your needs in the young, middle, and old-aged patient?	89.3% (n=25) Responded "Yes"	100% (n=28) Responded "Yes"	96.4% (n=27) Responded "Yes"	96.4% (n=27) Responded "Yes"	100% (n=28) Responded "Yes"
Q6. Does this HIT cover all your needs in different ethnic skin-types such as Caucasian, Asian, Latino or and African American?	89.3% (n=25) Responded "Yes"	100% (n=28) Responded "Yes"	96.4% (n=27) Responded "Yes"	96.4% (n=27) Responded "Yes"	96.4% (n=27) Responded "Yes"
Q7. Are there any relevant considerations that are still missing that you would like to see considered in this HIT?	89.3% (n=25) Responded "No"	96.4% (n=27) Responded "No"	82.1% (n=23) Responded "No"	96.4% (n=27) Responded "No"	92.9% (n=26) Responded "No"

Notes: All participants were required to have implemented the AART-HIT™ methodology into their clinical for a minimum of 6 months, at the time of the survey.
Abbreviations: FAS, Facial Assessment Scale; HIT, Holistic Individualised Treatment; Y/N, "yes or "No"; Q, Question; N, sample size.

regarding regional differences in treatment preferences and anatomical differences were raised. Most participants (89.3%, n = 25) did not have any additional suggestions for the HIT™. The inclusion of off-label treatment areas was suggested.

Kiss and Smile HIT™

While many participants (85.7%, N = 24) responded that they would not add any further anatomical structures to this HIT™ (Table 2), some suggestions included chin cellulite and radial smile lines into the cheek. Most participants (89.3%, n = 25) would not consider using any additional products in the HIT™. Participants responding "yes" suggested HA_{SBs} (N = 2) or using HA_{LYF} for marionette lines. All participants (100%, n = 28) agreed that the HIT™ covers all their needs in all age groups of patients and in different ethnic skin-types. Most participants (96.4%, n = 27) did not have any additional suggestions for this HIT™. As an explanation for suggesting the inclusion of HA_{SBs}, one participant highlighted that some patients do not want volume or projection and only want to improve skin quality.

Glow on HIT™

Although most participants (82.1%, n = 23) would not add any anatomical regions to the HIT™ (Table 2), some suggested additions included lower eyelids, forehead, perioral, periocular, neck, preauricular, superficial musculoaponeurotic system, jawline, and lower face areas specifically. Most participants (92.9%, n = 26) would not consider using any additional products in the HIT™. Similarly, most participants (96.4%, n = 27) agreed that the HIT™ covers all their needs, in all age groups of patients. One participant highlighted the need to consider laser and topical products because injectables cannot address issues such as melasma and rosacea. The same percentage of participants (96.4%, n = 27) agreed that the HIT™ covers all their needs in different ethnic skin types. While most participants (82.1%, n = 23) did not have any additional suggestions for this HIT™, additional suggestions included integration of skincare for patients with skin conditions, inclusion of devices, use of HA_{SBs} on the neck, inclusion of lower face, jawline, and chin, development of a contour HIT™, and consideration of topical products for skin texture.

Shape Up HIT™

Most participants (78.6%, n = 22) would not add any anatomical regions to this HIT™ (Table 2). Suggested additions included the posterior temple, jawline, chin, cheek, neck, and NLFs. Most participants (92.9%, n = 26) would not consider using any additional products in the HIT™. Participants responding "yes" mentioned off-label use of neuromodulators for treating masseter muscle hypertrophy. Similarly, most participants (96.4%, n = 27) agreed that the HIT™ covers all their needs in all age groups and different ethnic skin-types of patients. The remaining participants felt that young patients only needed treatment to shape the face, such as in the case of a hypoplastic maxilla, especially common in individuals of Asian descent, and a flatter maxilla, especially common in individuals of Hispanic descent. Most participants (96.4%, n = 27) did not have any additional suggestions for the HIT™, although one participant suggested including treatment of the posterior temple for lifting effect.

Profile HIT™

Although most participants (82.1%, n = 23) would not add any anatomical regions to this HIT™, beyond the midface (Table 2), some additional suggestions for anatomic regions included the gonial angle, jawline, forehead, bridge, and radix. Most participants (89.3%, n = 25) would not consider using any additional products in this HIT™. Participants responding "yes" suggested off label use of neuromodulators to the neck for Nefertiti lift, HA_{REF}, and HA_{SBs} in the lips. All participants (100%, n = 28) agreed that the HIT™ covers all their needs in all age groups of patients. Most (96.4%, n = 27) agreed that the HIT™ covers all their needs in different ethnic skin-types of patients. One participant highlighted the need to respect certain ethnic features when augmenting the profile, and to not make every face look Caucasian. Most participants (92.9%, n = 26) did not have any additional suggestions for the HIT™. One participant suggested including neuromodulator use for dynamic changes in profile. The participant also mentioned possible conflict between the Profile and Kiss and smile HITs™, owing to overlapping anatomical regions; and advocated for the development of a "contour" HIT™, to include areas such as the nose and jawline.

Case Studies

A panel of seven international aesthetic experts applied the AART-HIT™ Methodology to patient case studies to deliver HITs™. Figures 6–9 display the results of applying each of the five HITS.

Discussion

An interesting development in the arena of facial aesthetics is not the advent of any single product or technology but rather the possibilities when combining treatments and complimenting products based on their differing rheological properties. For example, the ability to combine the use soft products in areas of thin skin (eg, the lips and perioral areas) or for superficial injections in dry skin, firm products for sculpting, volumizers for volume restoration, and neurotoxins in dynamic areas, has been deemed one of the most significant developments in recent history. As the number of products

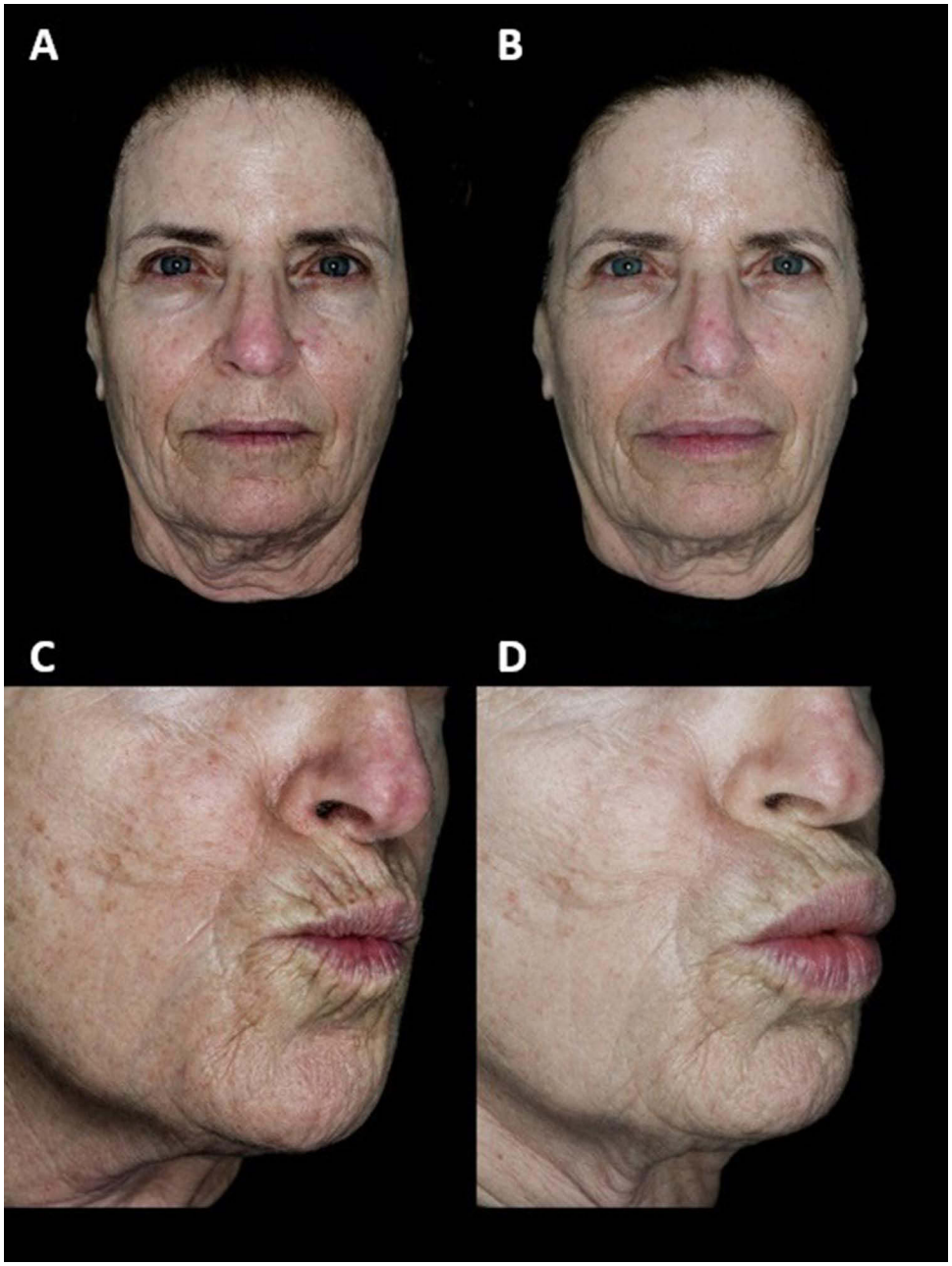

Figure 6 Female patient treated with the Kiss and smile HIT™ for the lips and perioral area (**A** and **C**) before; (**B** and **D**) after treatment with 0.5mL of Restylane Refyne.

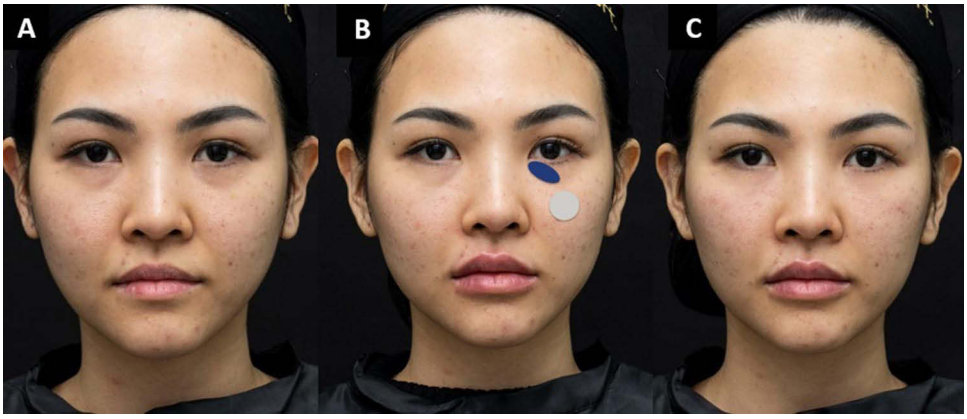

Figure 7 Female patient treated with the Bright Eyes HIT™ for treating the periorbital area (**A**) before; (**B**) treatment areas; (**C**) after treatment of the medial cheek fat pad with Restylane Volyme (0.5 mL per side) and the tear troughs with Restylane (0.2 mL per side). Note: Subject was also treated with the Kiss and Smile HIT™ for the lips and perioral area.

available in the injector's armamentarium has increased in recent years, it has been made possible to combine products in a way that can achieve results that were not attainable with the limited selection available in the past. Thus, it has become increasingly useful to provide a rational framework to consider which product combinations make sense for restoring a more youthful appearance and provide optimal outcomes for patients. An easily applied method of combining different products can include varying their use geographically (ie, in different facial regions), or temporally (ie, at different visits), and use of the AART-HIT^{TM} methodology can help injectors develop the required treatment plan with their patients.

Recent studies have established the safety and enhanced efficacy of combination treatments, in comparison to singular treatments,[30] for all areas of the face (including treatments in the lower, mid, and upper third).[31–34] Moreover, many consensus groups have affirmed the value of the combined approach, including North American and French consensuses,[33–35] a panel of experts from Canada, Europe, and South America, and a multidisciplinary group of key opinion leaders in core aesthetic specialties from Asia, Australia, Europe, and North and South America. Authors have previously determined that the multifactorial cause of facial aging provides the rationale for combined treatments.[30,36] Lastly, science-based selection of filler products and injection techniques allows a more evidence-based approach toward safety and efficacy.[37]

Tips and tricks for implementing the use of combination products in your clinical practice include:

- Introduce PLLA-SCA into your practice: Some injectors find PLLA-SCA hard to propose as a treatment option because the results are not immediate. This is when the discussion of the patient journey and establishing long-term outcomes is important. Injectors can combine fillers for immediate results in combination with PLLA-SCA for long-term outcomes, thus firming and lifting during the same session. This strategy will provide patients with an immediate "wow" effect from the fillers and then PLLA-SCA will be introduced as a "maintenance" product. At subsequent visits, less filler may also need to be used in comparison to if PLLA-SCA was not introduced. Photos and documenting the results of the FAS™ are critical for tracking progress because the leap of faith the patients have to take is substantial. Of note, there are special situations where an injector might complete the PLLA-SCA regimen before treating with HA fillers, for example, after significant weight loss, which would require too much filler to volumize; in male patients that do not want to appear "filled"; or in patients that do not want a sudden change in their appearance but would rather a more natural result that appears over time, so friends and family do not know they had received treatment.
- Master the products: Understanding the science behind each product in The Portfolio is essential to optimizing treatment outcomes, including ensuring patient safety and maximizing efficacy.
- Master the techniques: Harness the principle of treating one area and improving another (eg, treating the upper face can improve aspects of the midface, treating the midface can improve lower face structures); and know your tools

Figure 8 Female patient treated with the Shape up HIT™ for shaping, lifting, and firming of the skin envelope (**A, C** and **E**) before; (**B, D** and **F**) after 3 months. The patient received treatment with two vials of Sculptra and products from the Restylane portfolio.

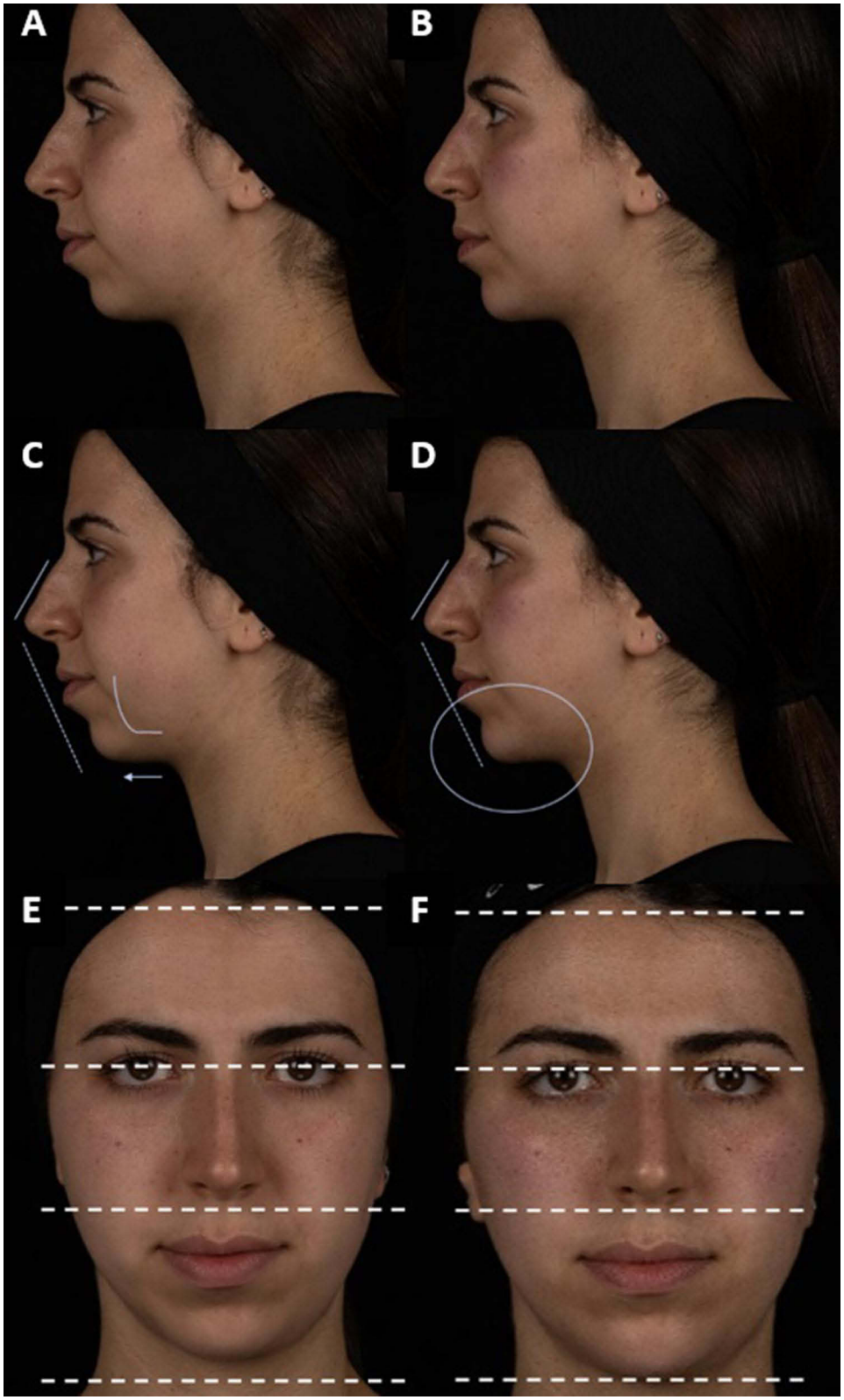

Figure 9 Female patient treated with the Profile HIT™ to balance the proportions between the nose, lips, and chin (**A, C** and **E**) before; (**B, D** and **F**) after. The patient received treatment in four regions (Chin: Restylane Lyft, 3 mL; Pre-jowl sulcus: Restylane Defyne, 0.5 mL/side; Zygoma: Restylane Lyft, 0.5 mL/side; Nose: Restylane Lyft, 0.3 mL).

(ie, when, and where to deliver products with a needle or cannula). Training is also available via face-to-face meetings and online through the iGAIN platform, where users can access webinars/videos, e-learning modules, consultation tools (eg, FAS™); consult resources such as product information; and view results of scientific studies.

Limitations

Although the number of participants in the survey is relatively small, it includes the entirety of the population meeting the inclusion criteria (eg, attended AART-HIT™ training, implemented AART-HIT™ methodology into their clinical practice for at least 6 months, were present at the IMCAS conference, agreed to participate). However, there remains a chance of selection bias, as participant details [eg, number of years in practice, the average number of filler-related treatments performed per month, and clientele (males versus females, age ranges, ethnicities] were not collected. Lastly, as there is a sparsity of evidence on the safety and efficacy of combined injectable treatments, more research is required.

Conclusions

The results of the real-world clinical experience survey highlight the utility of the AART-HIT™ methodology among practicing clinicians. There was a high level of agreement among survey participants that the FAS™ and corresponding HITs are adequate for assessing patient needs and developing treatment plans.

Ethics Statement

Under section 46.104 of the Common Rule for the Protection of Human Subjects (2018), this research was exempt from this policy as it consisted only of research on the effectiveness of or the comparison among instructional techniques. This research only included interactions involving educational material and survey procedures, and the information obtained was recorded anonymously, so that the identity of the participants cannot readily be ascertained, directly or through identifiers. Patients displayed in Figures 6–9 provided informed consent for their images to be published.

Funding

This study was funded by Galderma SA, Lausanne, Switzerland. Galderma was involved in the review of the manuscript and the decision to submit it for publication.

Disclosure

Andreas Nikolis, Luiz Avelar, Andrei Metelitsa and Frank Rosengaus are/have been speakers, trainers, and researchers for Galderma. Alessandra Haddad is a speaker, medical consultant, and researcher for Galderma. Stephanie Lam is a speaker and trainer for Galderma. Heidi B. Prather is/has been a consultant and researcher for Galderma. Kaitlyn Enright is/has been a consultant for Galderma. Desislava Lazarova, Inna Prygova and Fabio Iachetti are all employees of Galderma (Uppsala, Sweden). Dr Andreas Nikolis reports grants from Allergan, grants from Prollenium, grants from Merz, outside the submitted work. Dr Heidi Prather reports personal fees from Revision, grants from Allergan, personal fees from Alastin, personal fees from Lutronic, personal fees from Cynosure, personal fees from Revelle, grants from Merz, outside the submitted work; The authors report no other conflicts of interest in this work.

References

1. Jagdeo J, Keaney T, Narurkar V, Kolodziejczyk J, Gallagher CJ. Facial treatment preferences among aesthetically oriented men. *Dermatol Surg off Publ Am Soc Dermatol Surg Al*. 2016;42(10):1155–1163. doi:10.1097/DSS.0000000000000876
2. Narurkar V, Shamban A, Sissins P, Stonehouse A, Gallagher C. Facial treatment preferences in aesthetically aware women. *Dermatol Surg*. 2015;41 (Supplement 1):S153–S160. doi:10.1097/DSS.0000000000000293
3. Sobanko JF, Taglienti AJ, Wilson AJ, et al. Motivations for seeking minimally invasive cosmetic procedures in an academic outpatient setting. *Aesthet Surg J*. 2015;35(8):1014–1020. doi:10.1093/asj/sjv094
4. Werschler WP, Calkin JM, Laub DA, Mauricio T, Narurkar VA, Rich P. Aesthetic Dermatologic Treatments: consensus from the Experts. *J Clin Aesthetic Dermatol*. 2015;8(10 Suppl):S2.
5. de Maio M. MD Codes™: a methodological approach to facial aesthetic treatment with injectable hyaluronic acid fillers. *Aesthetic Plast Surg*. 2021;45(2):690–709. doi:10.1007/s00266-020-01762-7
6. Fagien S. Maximizing patient satisfaction with facial soft tissue fillers: a question of balance. *Cosmet Dermatol*. 2010;23:204–212.

7. BOTOX® Cosmetic (onabotulinumtoxinA). Allergan aesthetics. https://www.allerganaesthetics.com/brands/botox. Accessed August 28, 2023.
8. JUVÉDERM® Collection of Fillers | Dermal Filler. Allergan Aesthetics. Available from: https://www.allerganaesthetics.com/brands/juvederm. Accessed August 28, 2023.
9. DYSPORT IFU. Available from: https://www.accessdata.fda.gov/drugsatfda_docs/label/2016/125274s107lbl.pdf. Accessed September 3, 2024.
10. Restylane IFU. Available from: https://www.galderma.com/us/sites/default/files/2018-11/Restylane_IFU.pdf. Accessed August 31, 2023.
11. Physician Extender. American society of plastic surgeons. Avialbale from: https://www.plasticsurgery.org/for-medical-professionals/advocacy/key-issues/physician-extender. Accessed August 29, 2023.
12. Corduff N. An alternative periorbital treatment option using calcium hydroxyapatite for hyperpigmentation associated with the tear trough deformity. *Plast Reconstr Surg Glob Open*. 2020;8(2):e2633. doi:10.1097/GOX.0000000000002633
13. Jain R, Huang P, Ferraz RM. A new tool to improve delivery of patient-engaged care and satisfaction in facial treatments: the aesthetic global ranking scale. *J Cosmet Dermatol*. 2017;16(1):132–143. doi:10.1111/jocd.12297
14. Haddad A, Meski A, Cazerta C, et al. Managing the Aesthetic Patient. *J Drugs Dermatol JDD*. 2019;18:92–102.
15. Svensson RB, Heinemeier KM, Couppé C, Kjaer M, Magnusson SP. Effect of aging and exercise on the tendon. *J Appl Physiol*. 2016;121 (6):1353–1362. doi:10.1152/japplphysiol.00328.2016
16. Casabona G, Frank K, Koban KC, et al. Lifting vs volumizing—The difference in facial minimally invasive procedures when respecting the line of ligaments. *J Cosmet Dermatol*. 2019; 18: 1237–1243. doi:10.1111/jocd.13089
17. Cotofana S, Pretterklieber B, Lucius R, et al. Distribution pattern of the superior and inferior labial arteries: impact for safe upper and lower lip augmentation procedures. *Plast Reconstr Surg*. 2017;139(5):1075–1082. doi:10.1097/PRS.0000000000003244
18. Swift A, Liew S, Weinkle S, Garcia JK, Silberberg MB. The facial aging process from the "inside out. *Aesthet Surg J*. 2021;41(10):1107–1119. doi:10.1093/asj/sjaa339
19. Nikolis A, Enright KM, Lazarova D, Sampalis J. The role of clinical examination in midface volume correction using hyaluronic acid fillers: should patients be stratified by skin thickness? *Aesthetic Surg J Open Forum*. 2020;2(1):ojaa005. doi:10.1093/asjof/ojaa005
20. Carruthers J, Carruthers A. A prospective, randomized, parallel group study analyzing the effect of BTX-A (Botox) and nonanimal sourced hyaluronic acid (NASHA, Restylane) in combination compared with NASHA (Restylane) alone in severe glabellar rhytides in adult female subjects: treatment of severe glabellar rhytides with a hyaluronic acid derivative compared with the derivative and BTX-A. *Dermatol Surg off Publ Am Soc Dermatol Surg Al*. 2003;29(8):802–809. doi:10.1046/j.1524-4725.2003.29212.x
21. Carruthers J, Carruthers A. The effect of full-face broadband light treatments alone and in combination with bilateral crow's feet Botulinum toxin type A chemodenervation. *Dermatol Surg off Publ Am Soc Dermatol Surg Al*. 2004;30(3):355–366. doi:10.1111/j.1524-4725.2004.30101.x
22. Patel MP, Talmor M, Nolan WB. Botox and collagen for glabellar furrows: advantages of combination therapy. *Ann Plast Surg*. 2004;52 (5):442–447. doi:10.1097/01.sap.0000123806.03865.4d
23. Yamauchi PS, Lask G, Lowe NJ. Botulinum toxin type A gives adjunctive benefit to periorbital laser resurfacing. *J Cosmet Laser Ther Off Publ Eur Soc Laser Dermatol*. 2004;6(3):145–148. doi:10.1080/14764170410023767
24. Carruthers A, Cohen JL, Cox SE, et al. Facial aesthetics: achieving the natural, relaxed look. *J Cosmet Laser Ther*. 2007;9(sup1):6–10. doi:10.1080/17429590701523927
25. Sun Y, Li Y, Zhang Y, et al. Unparallel improvement patterns of dynamic wrinkles and skin quality after botulinum toxin type A treatment on the upper face. *Skin Res Technol*. 2023;29(3):e13309. doi:10.1111/srt.13309
26. Humphrey S, Jacky B, Gallagher CJ. Preventive, cumulative effects of botulinum toxin type a in facial aesthetics. *Dermatol Surg off Publ Am Soc Dermatol Surg Al*. 2017;43 Suppl 3:S244–S251. doi:10.1097/DSS.0000000000001404
27. Galderma Laboratories, L.P. SCULPTRA. Available from: https://www.galderma.com/us/sites/default/files/2023-04/Sculptra_USA_eIFU.pdf. Accessed 04 September 2024.
28. Narins RS. Minimizing adverse events associated with poly-l-lactic acid injection. *Dermatol Surg*. 2008;34(s1):S100–S104. doi:10.1111/j.1524-4725.2008.34250.x
29. Ayatollahi A, Firooz A, Samadi A. Evaluation of safety and efficacy of booster injections of hyaluronic acid in improving the facial skin quality. *J Cosmet Dermatol*. 2020;19(9):2267–2272. doi:10.1111/jocd.13493
30. Sundaram H, Liew S, Signorini M, et al. Global aesthetics consensus: hyaluronic acid fillers and botulinum toxin type a—recommendations for combined treatment and optimizing outcomes in diverse patient populations. *Plast Reconstr Surg*. 2016;137(5):1410–1423. doi:10.1097/PRS.0000000000002119
31. Custis T, Beynet D, Carranza D, Greco J, Lask GP, Kim J. Comparison of treatment of melomental fold rhytides with cross-linked hyaluronic acid combined with onabotulinumtoxina and cross-linked hyaluronic acid alone. *Dermatol Surg off Publ Am Soc Dermatol Surg Al*. 2010;36 Suppl 3:1852–1858. doi:10.1111/j.1524-4725.2010.01741.x
32. Carruthers A, Carruthers J, Monheit GD, Davis PG, Tardie G. Multicenter, randomized, parallel-group study of the safety and effectiveness of onabotulinumtoxinA and hyaluronic acid dermal fillers (24-mg/mL smooth, cohesive gel) alone and in combination for lower facial rejuvenation. *Dermatol Surg off Publ Am Soc Dermatol Surg Al*. 2010;36(4):2121–2134. doi:10.1111/j.1524-4725.2010.01705.x
33. Raspaldo H, Baspeyras M, Bellity P, et al. Upper- and mid-face anti-aging treatment and prevention using onabotulinumtoxin A: the 2010 multidisciplinary French consensus--part 1. *J Cosmet Dermatol*. 2011;10(1):36–50. doi:10.1111/j.1473-2165.2010.00544.x
34. Raspaldo H, Niforos FR, Gassia V, et al. Lower-face and neck antiaging treatment and prevention using onabotulinumtoxin A: the 2010 multidisciplinary French consensus--part 2. *J Cosmet Dermatol*. 2011;10(2):131–149. doi:10.1111/j.1473-2165.2011.00560.x
35. Carruthers JDA, Glogau RG, Blitzer A; Facial Aesthetics Consensus Group Faculty. Advances in facial rejuvenation: botulinum toxin type a, hyaluronic acid dermal fillers, and combination therapies--consensus recommendations. *Plast Reconstr Surg*. 2008;121(5 Suppl):5S–30S. doi:10.1097/PRS.0b013e31816de8d0
36. Carruthers J, Fournier N, Kerscher M, Ruiz-Avila J, Trindade de de Almeida AR, Kaeuper G. The convergence of medicine and neurotoxins: a focus on botulinum toxin type A and its application in aesthetic medicine--A global, evidence-based botulinum toxin consensus education initiative: part II: incorporating botulinum toxin into aesthetic clinical practice. *Dermatol Surg off Publ Am Soc Dermatol Surg Al*. 2013;39 (3):510–525. doi:10.1111/dsu.12148
37. Sundaram H. Igniting discovery, dialogue, and global innovation through international collaboration. *J Drugs Dermatol JDD*. 2014;13(4):386–388.