

# Facial dynamics and emotional expressions in facial aging treatments

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## Summary

Facial expressions convey emotions that form the foundation of interpersonal relationships, and many of these emotions promote and regulate our social linkages. Hence, the facial aging symptomatological analysis and the treatment plan must of necessity include knowledge of the facial dynamics and the emotional expressions of the face. This approach aims to more closely meet patients' expectations of natural-looking results, by correcting age-related negative expressions while observing the emotional language of the face. This article will successively describe patients' expectations, the role of facial expressions in relational dynamics, the relationship between facial structures and facial expressions, and the way facial aging mimics negative expressions. Eventually, therapeutic implications for facial aging treatment will be addressed.

*Keywords:* emotions, facial expressions, cosmetic techniques, botulinum toxin type A, hyaluronic acid

## Introduction

Facial aging treatments are based on the concept of a comprehensive, natural, three-dimensional rejuvenation of the face.<sup>1,2</sup> Apart from an evaluation of static and dynamic wrinkles, volumetric analysis employs a three-dimensional approach which produces appreciable improvements in the quality of the results obtained. This process has been facilitated by a more complete understanding of the pathophysiology of facial aging in light of the four facial anatomical components (bone, fat, muscles, and skin). The symptomatology of facial aging is analyzed by segmenting the face into upper, middle, and lower thirds; this forms the basis for an individualized treatment plan aimed at achieving three main objectives: restoring mass in the middle third of

the face, rejuvenating the look, and rejuvenating the buccal and peribuccal areas.

Apart from the concept of three-dimensional facial rejuvenation, a fourth treatment-based dimension, that of facial dynamics, must be included.

This option is supported by two lines of reasoning:

The vast majority of patients desire natural, individualized results, and reject any stereotype or, by extension, any procedures that could result in excessive morphological changes to their face, mouth, or cheeks, for example. It is to be presumed that in this quest for natural results, facial expressions and the emotional language of the face are to be respected, as opposed to the set or even artificial appearance most feared by patients. It is therefore essential that facial dynamics be taken into account in any correctional procedure.

The second reason has to do with the development of unpleasant facial expressions with the onset of age, such as sadness, sternness, fatigue, and resentment. Not only does aging change the face's anatomical

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structures, but it additionally imposes inappropriate expressions to the point where the subject is no longer recognizable. "Aging makes persons lose their facial reference image" (David Le Breton).

These expressions are identified and deemed as emotionally inappropriate by the patients themselves and by the people around them. This creates quite a discrepancy between the patient's image and his personality, resulting in a loss of self-esteem and reduced quality of life.

Hence, the facial aging symptomatological analysis and the treatment plan must of necessity include knowledge of the facial dynamics and the emotional expressions of the face. This approach will more closely meet patients' expectations of natural-looking results, by correcting age-related negative expressions while observing the emotional language of the face.

#### What patients expect and the meaning of "natural"

Around eighty patients attending our surgeries were asked to complete a questionnaire of open-ended queries. This purely qualitative survey did not intend to provide figures or statistics, but only to extract verbatim reflecting patient expectations, which are summarized in the table below:

**Table: Summary of patient responses to the questions "What are your expectations of this treatment?" and "What fears do you have in relation to this treatment?"**

Failure from a loss of facial expressiveness	A fixed stare
	A hardened expression
	Loss of expression; inexpressive, lifeless, or bland face
	Frozen look
	Loss of facial mobility
Failure due to a loss of naturalness	Misrepresenting, distorting my opinion of my face
	A deformed face
	Facial distortion
	Changes that are not reflection of personality
	Variances with my personality
	Having my personality taken away
	Not recognizing myself
	Having a different face
Rejection of stereotypes	No standardization of the face
	Looking like an inflated doll
	Having an inflated, wrinkle-less face
Other	Identifying the type of treatment
	Indelible marks (linked to complications)
	Appearing ridiculous from wanting to appear too young

In terms of expectations, the responses are remarkably similar: looking "attractive," "rested," "less tired,"

"fit," or "relaxed" are the most commonly occurring statements in more than three-quarters of the questionnaires.

#### Effects of negative expressions

The patients emphasized the effects of negative expressions: only few respondents complained about "looking old," with the majority primarily voicing regret about a negative or odd expression, without specifically complaining about aging.

Appearing "sad and old" and "less lively" were the most frequently mentioned complaints, followed by "loss of expressiveness" and have a "less pleasant" appearance. Interestingly enough, several patients were bothered by the discrepancy between the change in their appearance and their "full life," their "state of mind," and their "lively, exciting disposition". Also worth mentioning is a patient's comment that "my face ages more quickly than my personality."

In terms of expectations, the requests made pertained mostly to obtaining positive, pleasant expressions: "a sparkling expression," "a benign expression" and "more cheerful."

#### Expectations: in search of naturalness and balance

More than three-thirds of the patients spontaneously asked for "natural" results. In response to the question "what are natural results?," the answer was almost unanimously a "touch-up" without any noticeable modifications; "I want to look like myself" wrote one patient, "to give the impression that I've come back from a holiday" and "that I'm using a good cream." The next sentence sums it up nicely: "How do you do it? You never change."

Lastly, several patients were entirely cognitive in their expectations: "To treat myself well physically and morally without giving a reason," "to be cheerful and raring to go in the morning," "to be in top form and feel good about myself," "to feel more radiant," "to be full of energy" and "to feel comfortable in my skin." These comments that exclude any reference to appearance fall in line with a concept discussed below: the relationship between emotions expressed and emotions felt.

#### Rejection of stereotypes

In response to the question "What are your fears concerning the treatment?," the vast majority of patients said they feared the treatment would bring about variances between their face and their personality,

make them lose their expressiveness or turn them into stereotypes.

Several patients wanted “the same face without big wrinkles,” “the same but better, or younger,” “to appear younger without it being too noticeable,” expressing the desire to make changes that are not radical and to be able to recognize themselves after the treatment.

Thus, our patients desire above all else to remain as they are and are requesting inconspicuous treatments which respect their original facial appearance and their expressiveness. Some of them explicitly wrote that they wanted to look “the same way with a few years taken off”. They dreaded having rigid masks, stereotypes, and no longer being “themselves.”

### Facial expressions and emotions: the foundation of relational dynamics

As early as 1872, Darwin claimed that facial expressions performed the communicative function of informing persons in a social environment of the emotional state of the person wearing the expression.<sup>3</sup> The traditional theory postulates that there are innate, biologically determined connections between some emotional states and prototypical facial expressions, the purpose of which is to communicate what people feel. These would include, *inter alia*, the emotions of joy, fear, sadness, surprise, dislike, shame, and contempt.<sup>4</sup> Paul Eckman actually believes that the basic emotions are limited to anger, fear, surprise, dislike, joy, and sadness (Fig. 1).<sup>5</sup>

These basic emotions would therefore be universal, notwithstanding variations acquired on the basis of cultural usage and social rules. Alternative theories advanced around the close of the 20th century and supported by sound research suggest instead that facial expressions could result from a subtle chemistry

involving emotion, communication, and individual personal characteristics associated with gender and social status, among other things.

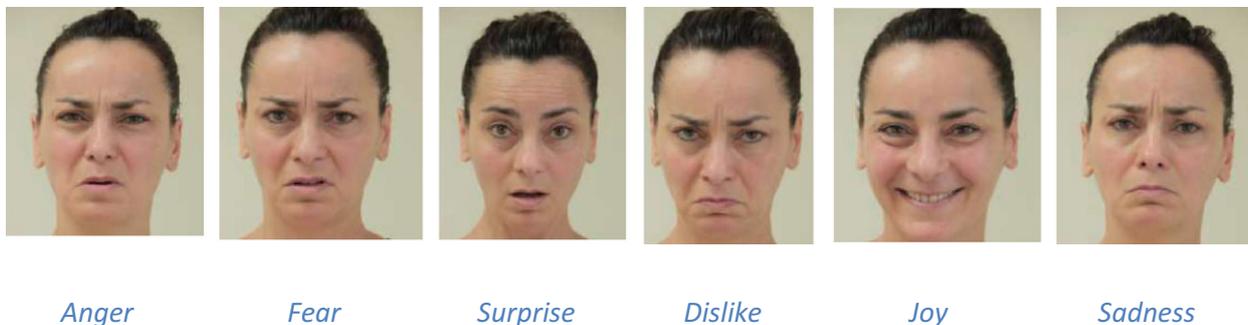
Irrespective of the theoretical basis, emotions – which are conveyed by facial expressions – form the foundation of interpersonal relationships, and many of these emotions promote and regulate our social linkages. In addition to the basic facial expressions, there is an infinite variety which finds their explanation in culturally determined display rules (Fig. 2).

For instance, “emotional affinity” (similar reactions by persons to the same occurrence) plays a role in the attraction two persons feel toward one another. The “emotional contagion” phenomenon is an involuntary response to the emotional reactions of others; “empathy” is understanding another person’s emotions from that person’s psychological viewpoint, and this encourages supportive behaviour.

Emotional facial expressions and communication are very closely linked. To communicate, a person must be capable of externalizing his emotions – keeping them genuine to a degree or varying them according to the situation – so that the person to whom he is speaking is able to share and feel them. Emotional displays therefore, apart from simply being spontaneous manifestations of our feelings, are intricately integrated into relational dynamics.<sup>6</sup>

### Mirror facial expression recognition

When a given facial expression is witnessed, a neural circuit, identical to the one triggered when this same emotion is felt, is activated. This phenomenon is referred to as “mirror” facial expression recognition. It would appear to be used for understanding and anticipating the behaviour and intentions of the other person, as well as for suitably controlling one’s own



Coll. Dr Michaud

**Figure 1** Basic prototypical expressions according to Eckman (Coll. Dr Michaud).



**Figure 2** Complex expressions : the sophisticated nature of facial expressions constitutes a separate language form and an actual method of communicating emotions: “to talk with one’s eyes, to eye hungrily”.

behaviour. In a broader sense, this mechanism serves to give an understanding of what occurs whenever others experience a sensation (i.e., pain, a touch) or an emotion (i.e., joy, sadness). The fact that the emotional mechanism is activated during execution as well as during observation of an emotional facial expression, suggests that these two cognitive functions are functionally interdependent.<sup>7</sup>

In addition, the other person’s facial gestures tend to be automatically and subconsciously imitated, from as far back as early childhood. It has been demonstrated that observing angry or happy faces produces a corresponding electromyographic response. For example, activity in the large zygomatic muscle is more pronounced when happy faces are observed than when angry faces are observed, while corrugator activity is reduced. By the way of stimulating facial expression, imitation enables the emotions expressed by another individual to be better understood and categorized. In this way, it has been demonstrated that the intensity of the emotional facial expressions imitated influences the intensity of the nervous system’s response. The interplay of sensory and motor systems in enabling recognition of emotions expressed by others is therefore vitally important<sup>7</sup>.

#### Facial feedback

The “facial feedback” phenomenon shows that our own expressions also influence our cognition. For example, a positive facial expression assumed as part of an experience leads to funnier interpretations in the form of cartoons. This also obtains for negative expressions: generally speaking, voluntarily adopting a facial expression increases the extent to which the corresponding emotion is felt. Conversely, the inability to put on an expression reduces the ability to feel the corresponding emotion. Hence, it has been demonstrated that patients injected with botulinum toxin (Botox) in the glabella (and therefore unable to frown) were less prone to depression and anxiety than patients given other aesthetic treatments.<sup>8</sup> Other experiences have shown that frowning leads to a more depressing mood, raising the brow increases the ability to experience surprise, and producing an expression of disgust leads to greater detection of unpleasant odours.<sup>9</sup>

#### Factoring facial dynamics into treatment

A face is not static but dynamic: it reflects an expression.

This expressiveness engages the play of the muscles involved in the facial expression as well as the

movement of basic segments of the face, including fatty segments.

### Facial expressions and their muscular system

The cutaneous muscles of the face are very closely interconnected from an anatomical viewpoint, as they are all agonist and antagonist muscles on a variety of levels. This interplay of functions is most useful in the role of conveying the complex and subtle looks, communication, and facial expressions which are very often meant to replace speech.<sup>1</sup>

As far back as 1862, Duchenne de Boulogne, through his research in electrophysiology, attributed the language of expression, passion, and emotion to the various cutaneous muscles of the face.<sup>10</sup> The “facial action coding system” (FACS), more recently, developed by psychologists Ekman and Friesen (1987), is a method of describing facial movements. The FACS system is based on a description of 45 action units each corresponding to the movement of one part of the face and capable of engaging several muscles.<sup>11</sup>

### Basic facial expressions: joy, fear, sadness, anger, surprise and dislike

Expressions resembling joy are characterized by a general uplifting of the face, accompanied by the opening and dilation of the transverse orifices. The *risorius* muscle, which is peculiar to humans, is the muscle most engaged in the act of smiling, as it laterally widens the commissure, combining this action with the *orbicularis oris* muscle which relaxes and allows the buccal orifice

to open. As the *orbicularis oris* muscle relaxes, the *modiolus* is released and mobilized:

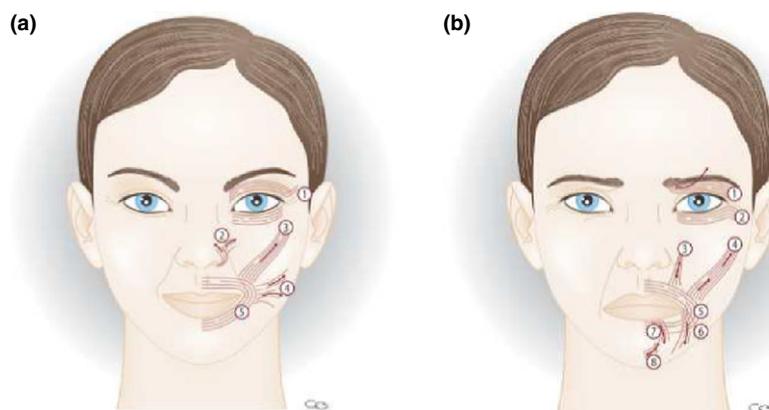
- Laterally to express satisfaction, like the Mona Lisa.
- Upwards and outwards by the *zygomaticus major* muscle to express joy and to laugh.

Simultaneously, synchronous contraction of the *orbicularis oculi* muscles, as during hearty laughter, causes the outer corners of the eyelids to crease by slightly lifting the lower eyelids (Fig. 3).<sup>9</sup>

Expressions of total exuberance are likewise produced in conjunction with the levator muscle of the upper lip. If the smile is suppressed, the *orbicularis oris* muscle contracts, preventing mobilization of the *modiolus*. A forced smile or a grimace is identified through isolated contraction of the *zygomaticus major* muscle in an otherwise motionless face.

Conversely, in sad facial expressions, depressor muscle action predominates by drawing transverse orifices downwards. The *corrugator* muscle creases the eyelid and draws it downwards, the *depressor anguli oris* pulls the labial commissure downwards, accentuating the bitterness folds and expressing sadness and contempt. It can be voluntarily contracted to suppress tears. The *corrugators* play a role in expressing sadness, concentration, and attentiveness; however, when its action is exaggerated, anger and impatience as well as mental torture could be expressed. The *procerus*, by horizontally creasing the space between the eyebrows, produces expressions of aggressiveness or intense pain. Fright and anger are produced by the action of the *platysma*.

Attentiveness, concentration and deep thought are communicated by the combined action of the two



**Figure 3** (a) Happy expression in which the levator and dilator muscles predominate. (1) Orbicularis oculi muscle, (2) Dilator naris muscle, (3) Zygomaticus major muscle, (4) Risorius muscle, (5) Orbicularis oris muscle. (b) Sad expression in which the depressor muscles predominate. (1/2) Orbicularis oculi muscle, (3) Levator muscle of the upper lip, (4) Zygomaticus major muscle, (5) Orbicularis oris muscle, (6) Depressor anguli oris muscle, (7) Depressor labii inferioris muscle, (8) Mentalis muscle (Diagrams by L. Belhaouari and V. Gassia).

*orbicularis* muscles (*oculi* and *oris*), the *frontalis* muscle, and the *corrugator* muscle. This is reflected on the face by tension in the facial mask which restricts the opening of orifices. The *frontalis* muscle, while it lifts the brow, increases the action of its antagonist, the *orbicularis oculi* muscle. Transverse frontal wrinkles and glabellar wrinkles express the action of the *frontalis* and *corrugator* muscles.

Sensuality is expressed in the mobilization of the *zygomaticus major*, the *nasal* and *orbicularis oris* muscles, with the nostrils dilated, the commissure slightly open, and the lips eager.<sup>9</sup>

The expression of surprise engages the dropping of the lower jaw (masseter, temporal, and pterygoid muscles), the lifting of the eyebrows by *frontalis* muscle action, and the opening of the eyes by the corresponding *orbicularis* muscle.<sup>11</sup>

#### The fat compartments in facial expressions

The mid-face, that is, the cheeks and the malar regions, located between the lower eyelid and the nasolabial fold, comprises a bony foundation which supports two malar fat compartments separated by the *orbicularis oculi* muscle.

It has fixed, static suborbicularis oculi fat and movable superficial orbicularis oculi fat, which play a dynamic role in looks and facial expression and in slackening linked to aging. These two fat compartments are separated by the *orbicularis oculi* muscle. They feature prominently in our work and contribute enormously to the contours of the cheeks and the fullness of the cheek area.<sup>12-16</sup>

*Suborbicularis Oculi Fat* (SOOF) forms a dense padding which adheres to the bony protrusion it covers. Such deep adherence fixes this suborbicularis oculi fat in place and renders it static. It is not mobilized by facial expressions and does not droop with age-

related slackening. It does, however, become partially atrophic due to the effects of aging (Fig. 4).

*Superficial orbicularis oculi fat* covers the orbicularis muscle and the suborbicularis oculi fat. Being of less dense structure than the suborbicularis oculi fat, superficial orbicularis oculi fat adheres to the skin (Fig. 4).

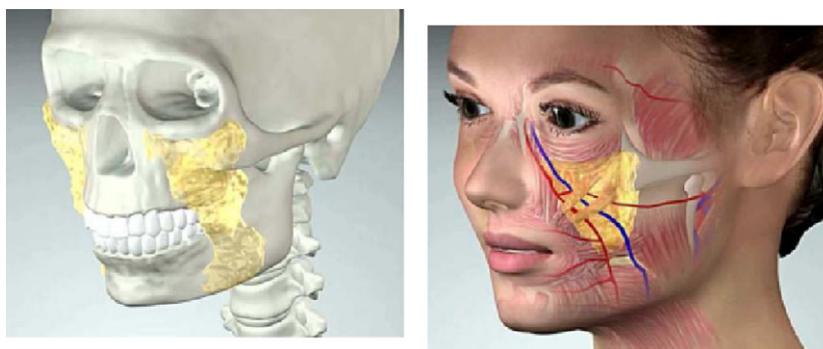
It conforms to the movements which produce expressions and facial dynamics, of which the orbicularis muscle is one of the prime instigators in this respect. Apart from being partially atrophied by aging, it becomes loosened and posed in a downward/inward rotation vector.

Overall, the movable, dynamic elements are as follows: the skin, the superficial orbicularis oculi fat, and the orbicularis oculi muscle. Everything functions as if there is drift space between the suborbicularis oculi fat and the orbicularis muscle, as well as between the orbicularis muscle and the superficial orbicularis oculi fat. As far as volumizing treatments are concerned, it would be absolutely necessary to analyze how the soft parts of the face move when facial expressions are assumed, in order to determine whether the suborbicularis oculi fat compartment should be filled, or to learn about the movable superficial orbicularis oculi fat.

### Aging and facial expressions

#### Full facial aging

*Chronodermis* is genetically programmed natural cellular aging. With the passage of time, the mechanisms maintaining the body's cells change, and the cell renewal rate decelerates. Chronodermis effects changes on all levels: in the bones, muscles, and subcutaneous and cutaneous layers, resulting in signs of aging. Loose skin, aponeuroses, fat, and muscle become evident, as well as fixed expression lines and deep wrinkles from



**Figure 4** Sub-orbicularis and superficial orbicularis fat compartments.

muscular hypertonia in response to age-related slackening of the muscles, along with atrophy of these various components accompanied by volume reduction: retrusion of the lips, subcutaneous depressions, reduced fullness, and contours.

While the age at which this process begins is genetically determined, there are certain internal and external factors which contribute to its premature onset and the speed at which it advances, such as sun exposure, smoking, alcohol use, diet and lifestyle imbalances and nutrition, hormonal changes, illness, and pathological disorders.

#### Aging of the mid-face

One of the key factors of facial aging is the aging of the mid-face.<sup>1</sup>

The primary mechanism of aging in the cheek area is slackening, as the skin and fat of the upper part droops downwards and fills the lower part of the face. The triangle of youth becomes inverted (Fig. 5).

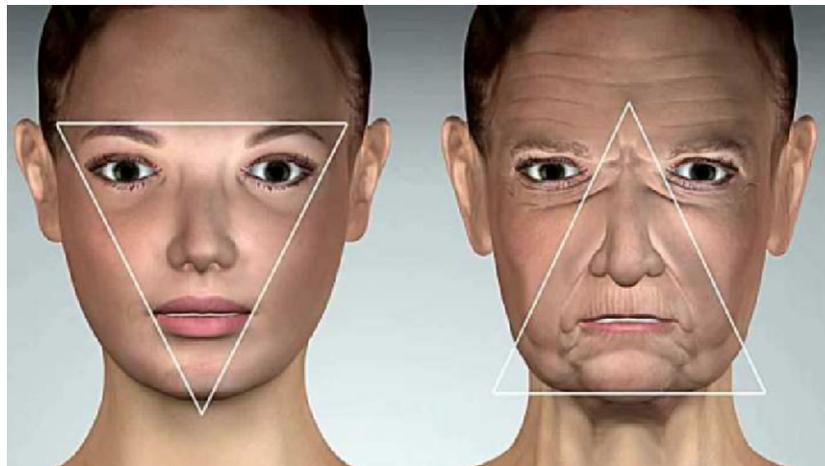
This morphological transformation outlines the 3 main folds linked to facial aging: the palpebromalar fold, the mediojugal fold, and the nasolabial fold (Fig. 6).

The palpebromalar fold marks the upper boundary of the superficial orbicularis oculi fat pad.

The mediojugal fold is oblique toward the bottom and outside of the downward and inward drift vector linked to the slackening of tissue.

The internal portions of these two folds meet to form a "Y," creating the tear trough.

The nasolabial fold marks the lower boundary where the skin-fat complex is intercepted. This is a fold made up of accumulated tissue. The nasolabial fold is pro-



**Figure 5** Aging of the mid-face: inversion of the triangle of youth.



**Figure 6** (1) Palpebromalar fold, (2) Medio-jugal fold, (3) Nasolabial fold, (4) Internal part of the palpebromalar fold and internal upper part of the malojugal fold = tear trough.

gressively transformed into a nasal line, consequently creating the bitterness fold under the oral commissure. When it extends lower, it extends past the jaw line and forms the anterior part of the jowl.

Located between the palpebromalar and mediojugal folds is the partially unoccupied area of superficial orbicularis oculi fat.

Two essential factors must be taken into consideration when dealing with the mid-face area:

- Volume: insufficient, normal, or excessive.
- Age-induced slackening: presence or absence of drooping.

The indications will depend on these stages: enhancement when only the volume is insufficient; enhancement and rejuvenation if there is age-induced slackening of tissue.

We have observed that the introduction of a relatively minimal quantity of 0.55 cc of volumizing hyaluronic acid into the mid-face results, among other things, in a definite facelift effect, with lifting of the palpebromalar fold, foreshortening of the lower eyelid, reduction of the nasolabial fold, and improvement of the oral commissure.

We believe by assumption that this input of volume stimulates and lengthens the orbital portion of the orbicularis muscle in this area, and as a result of medullary or cerebral reactions, the orbicularis muscle contracts, thereby causing a definite facelift effect.

#### Aging of the upper third of the face

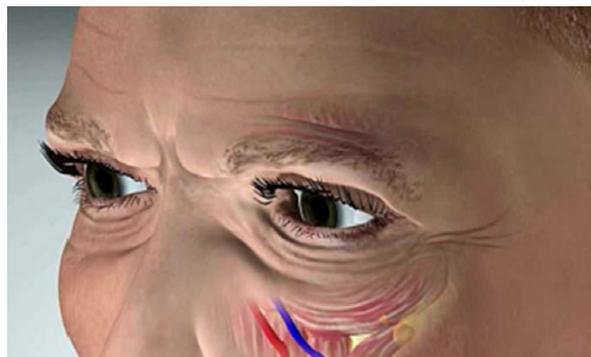
Slackening is the loss of elasticity added to the weight of the brow and of the retro-orbicularis oculi fat (ROOF), leading to drooping of the forehead and brow. Reactionary contraction of the forehead muscle leads to the appearance of horizontal expression lines on the forehead. This reactionary contraction can offset or even improve the drooping effect by raising the brow, except in the case of the lateral part of the brow.

In addition, the upper eyelid becomes heavier when the palpebral sacs are accentuated due to reduced support from the orbital septum which becomes less toned with age. Hypertonia of the palpebral orbicularis muscle causes the palpebral fissure to recede.

Drooping of the brow and upper eyelids progressively limits the field of vision, and this accentuates reactionary contraction of the forehead.

In some cases, aging can also bring about atrophy of soft parts accompanied by skeletization of the periorbital region.

Vertical frown lines signal breaks caused by repeated contractions of the *corrugators* muscle and horizontal



**Figure 7** Aging of the upper third of the face.

wrinkles at the root of the nose signal the action of the *procerus* muscle (Fig. 7).

#### Aging of the lower third of the face

The nasolabial fold is progressively transformed into a nasal line, consequently creating the bitterness fold under the oral commissure. When it extends lower, it extends past the jaw line and forms the anterior part of the jowl. Double chin, jowls, dewlaps and shrivelled skin gradually replace the oval contour of the face and the well-defined neck and chin.

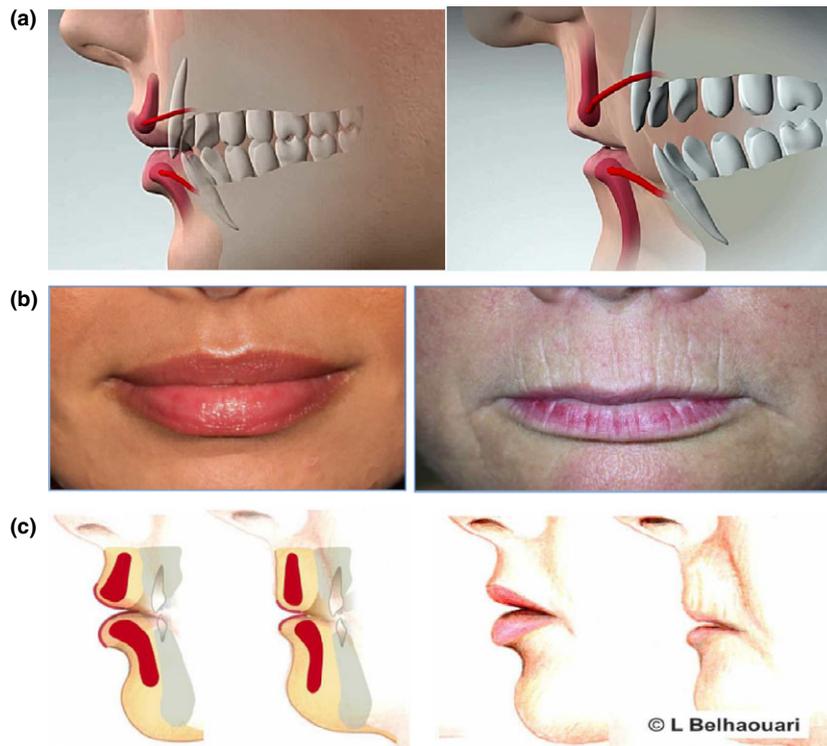
The skin-fat tissue in the neck, as elsewhere, loses its elasticity. It becomes loose and progresses downwards as with cheek slackness. The platysma muscle is where shortening occurs, and where the muscle fibres cluster together to form platysma cords. The horizontal wrinkles of the neck are creases and puckers, and not expression lines created by the muscle action.

Lip volume is reduced and bone loss decreases back tooth counter-support. The lips lose their convexity and obliquity, and become vertical and retruded with greater evidence of a lengthened white lip. Radial surface expression lines appear due to skin-muscle interaction and atrophy of the muscle bed which gave the lips their contours (Fig. 8a,b,c).

At the level of facial expressiveness, aging is the cause of two phenomena:

Creasing of the skin linked to repetitive expressions become permanent over time and sets people's natural expressions (dynamic wrinkles: crow's feet, forehead wrinkles).

Slackening and drooping, associated with drift and fat volume atrophy and loss of bone support, characterize artificial expressions and simulate



**Figure 8** (a) Aging of the lower third of the face. (b) Loss of volume; lengthening of the white lip; retrusion; atrophy of the skin; wrinkles. (c) Aging of the lips.

the effects of depressor muscles: nasolabial folds, bitterness folds, and tear troughs which express sadness, fatigue, bitterness, and sternness.

### Aging and negative expressions

The semiological sequence of facial aging analysis follows a systematic approach, albeit the aging perception is obviously global. It is hence possible to establish an accurate correlation between facial aging anatomic signs and related negative expressions. The semiological analysis, both static and dynamic, leads to identify the “key points” of negative expressions induced by aging; this identification allows to establish a treatment plan aiming to correct those “key points,” while respecting emotional facial expressions.

#### Mid-face analysis, cornerstone of the treatment

Bone support, fat compartments, and their mobilization during facial movements, ptosis, and volume changes, creases (palpebomalar, mediojugal, and nasolabial folds), and jugal wrinkles must be systematically analyzed.

“Key points” of negative expressions related to mid-face aging are summarized in Fig. 9.

#### Look area analysis

It includes the following orbital bone frame examination (widening, retrusion), expression wrinkles analysis (glabellar lines, crow’s feet), eyebrow examination (position, shape, volume), eyelids examination (blepharochalasis or upper lid hollow, undereye bags, dark rings, lower lid – malar area junction), periorbital volumes analysis (supraorbital and temporal), skin status (sagging and atrophy, superficial lines).

“Key points” of negative expressions related to orbital area aging are summarized in Fig. 10.

#### Smile area analysis

It has to check:

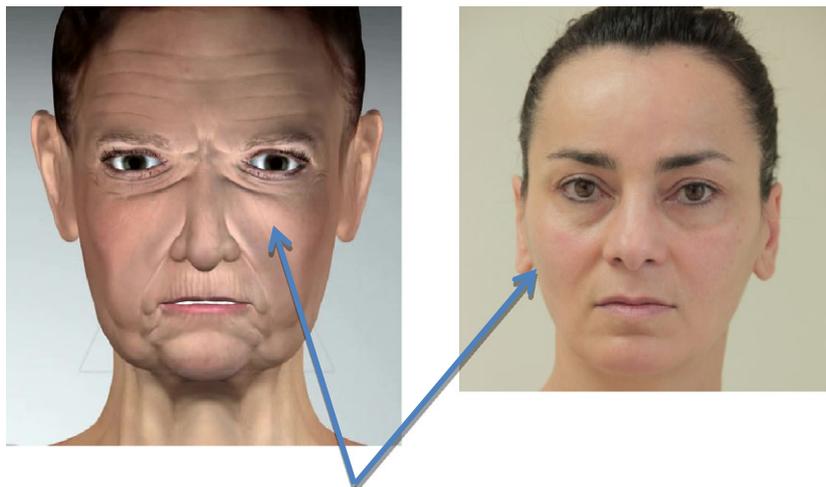
Lips architecture (border, philtrum, commissures, osteo-dental posterior support), red, and white lips lines.

Peri-oral area: bitterness folds, creases, and chin wrinkles.

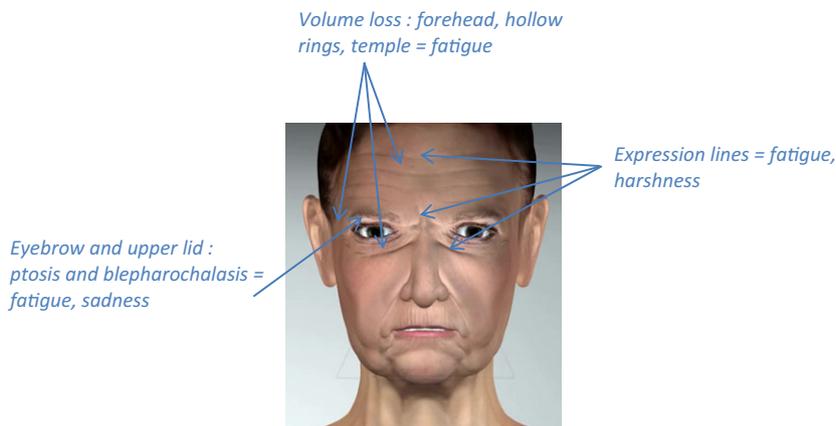
Oval of the face.

“Key points” of negative expressions related to smile area aging are summarized in Fig. 11.

A facial analysis of the sad, tired patient (Fig. 12a) shows as follows:



**Figure 9** Negative expressions mid face key points : loss of volume and convexities, gaunt face simulate expressions of sadness and fatigue.



**Figure 10** Negative expressions look area key points. Eyebrow and upper lid : ptosis and blepharochalasis = fatigue, sadness Volume loss: forehead, hollow rings, temple = fatigue, Expression lines = fatigue, harshness.

In the mid-face: loss of volume with pronounced mediojugal and nasolabial folds, dark hollow rings; slackening of soft parts (shadowed areas and hollows).

In the upper third of the face: eyebrows rendered more horizontal; lowering of the brow; drooping of the lower palpebral muscle; glabellar wrinkles.

In the lower third of the face: bitter folds; loss of volume in the lips accompanied by atrophy; perioral wrinkles; loss of oval contours; chin folds.

A facial analysis of the patient with an expression of disgust (Fig. 12b) shows as follows:

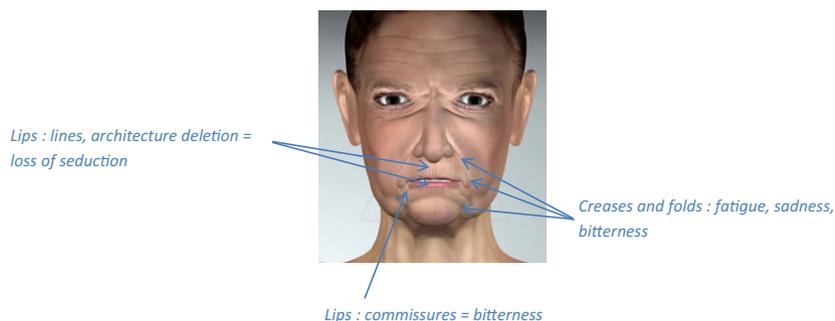
In the lower third of the face: pronounced bitterness folds; creased and slackened nasolabial folds; downturned oral commissures; loss of oval contours.

In the mid-face: loss of cheek volume; pronounced mediojugal and palpebromalar folds.

### Therapeutic implications

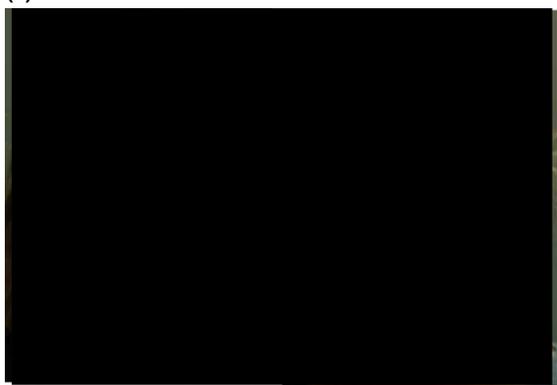
Facial aging treatments should aim to restore the reference face, so as to rebuild the close link between image and personality. This consists in recreating a state of mind rather than set or stereotypical beauty. To do this, consideration of the facial dynamics is crucial; inappropriate facial expressions must be corrected while retaining the natural expressiveness of the face.

Overall, identification of the negative expression “key points” allows their accurate correction; thanks to few basic principles that must be complied with:



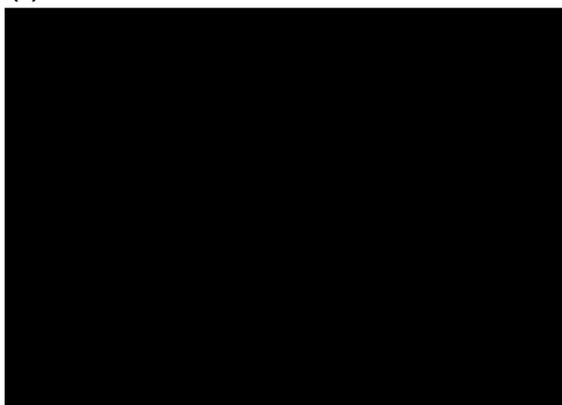
**Figure 11** Negative expressions smile area key points. Lips: lines, architecture deletion = loss of seduction. Lips: commissures = bitterness. Creases and folds : fatigue, sadness, bitterness.

(a)



Before treatment    After treatment

(b)



Before treatment    After treatment

**Figure 12** (a) Sadness and fatigue (Coll.Dr Michaud). (b) Disgust (Coll. Dr Michaud).

Botulinum toxin:

Never freeze and adapt doses to preserve emotional facial expressions.

Take into account the diffusing area of the used toxin.

Play on muscular balance to favor positive expressions rather than aim to wrinkles softening at any price.

Fillers:

Fillers rheological properties must be suitable for facial dynamics (a filler shall never be detectable).

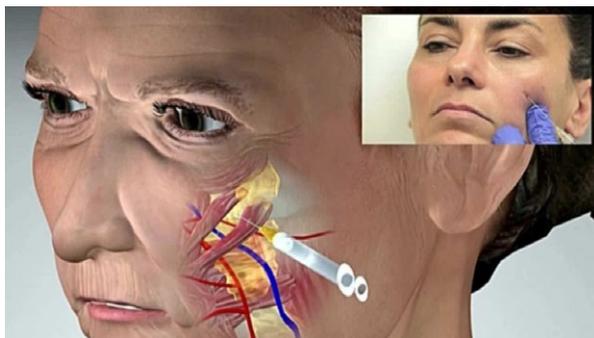
Choose the filler according to the anatomic area to inject for “key points” correction.

#### Mid-face

The harmonization of volumes is more important than the volume itself. It has to do with restoring tissue volumes in the fat compartments. The quantity of the product, the site, and the depth of the injection must be carefully assessed on the basis of a sound knowledge of anatomy. Prior to any treatment, it is essential to analyze the movement of soft tissue when a facial expression is produced, in order to determine whether to fill the unmoving part, that is, the suborbicularis oculi fat compartment, or the movable dynamic part, that is, the superficial orbicularis oculi fat.

While the site and depth of the injection are very important, the rheological qualities of hyaluronic acid also assume a great deal of importance, principally in preserving expressiveness. The products injected must adapt to facial movements in a manner similar to native tissue.

Current advances enable us to achieve sophisticated, natural results using innovative technologies. State-of-the-art products give better performance in terms of mobility and naturalness. With reduced water absorption, more uniform distribution and greater malleability, the end results are easier to control and a high degree of durability maintained.



**Figure 13** Deep tissue supra-periosteal injection volumizing (hyaluronic acid filler 20 mg/mL (VYC-20 L) : 1 mL per side).

As hyaluronic acid volumizers have good malar projection, they are ideal for injecting the suborbicularis oculi fat pads<sup>17</sup> (Fig. 13).

It may be prudent to add an injection to the upper part of the superficial orbicularis oculi fat pad using less concentrated hyaluronic acid, making it easier to inject superficially. The advantage will be volume creation as well as improved skin surface texture, radiance, and hydration. This superficial injecting stimulates dermal fibroblasts which will increase the synthesis of elastin and collagen.<sup>18</sup>

### Upper third

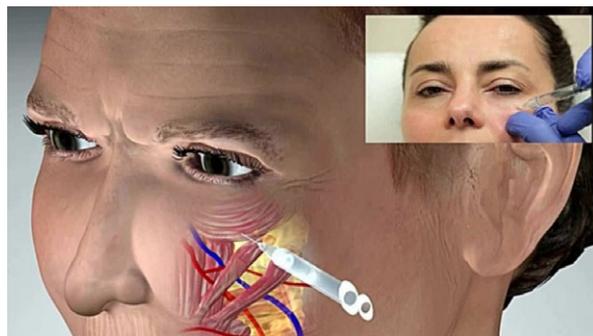
Treatment of the upper third of the face uses botulinum toxin and hyaluronic acid (dark rings, Charpy's fat pads).

Botulinum toxin should not be used with the intention of completely eliminating certain expressions, at the risk of achieving a fixed expression and confusing other people's perception of one's emotions; it should also be used with the aim of softening the emotions felt by the patient himself. For the injection of dark rings, mildly hydrophilic state-of-the-art hyaluronic acid is required, so that oedemata and the Tyndall effect (bluish rings) are avoided<sup>19</sup> (Fig. 14).

A knowledge of the anatomy and physiology of muscle balance, accuracy in administering the injections (volume, dilution, diffusion), the appropriate doses and pace of injections are the practical aspects which need to be mastered to achieve optimal results and meet patient expectations.

### Lower third

The lips are the central component of the lower third of the face: enhancing them means enhancing the



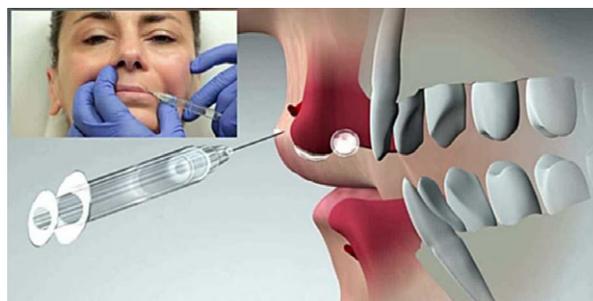
**Figure 14** Injection of dark rings, under the orbicularis oculi muscle (hyaluronic acid 15 mg/mL (Vyc-15 L) l : 0.3 mL per side)

smile. The lips have their own unique characteristics: the labial and peri-oral region (Fig. 14).

Oral area: the objective is to harmonize lip volumes, redefine the edges, restore hydration, and the convex shape of the vermillion margin (Fig. 15).<sup>20</sup>

Peri-oral zone: the treatment consists in filling the folds (nasal-labial-chin), correcting the shadowed areas, restoring harmony to the static and dynamic oval and convex contours, which are responsible for negative expressions.

For the treatment of these extremely mobile superficial areas (buccal and peri-oral areas), state-of-the-art products are easier to extrude with the use of very fine needles and make for a less traumatic procedure. With the face at rest, the elastic properties of hyaluronic acid are most in evidence, producing a volumizing effect. In dynamic mode (smiling), viscosity becomes the predominant property by preventing resistance to movement, thereby enabling the product to adapt to the movement of the lips (preventing the "duck's bill" effect). Conformity to the anatomy of the lips is a



**Figure 15** Lip treatment: Volume, vermilion margin, edges, philtral ridges, commissures (Juvederm Volbella with lidocaine 15 mg/mL : 1 mL), treatment of bitterness folds (Juvederm Volift with lidocaine 17.5 mg/mL:1 mL).



**Figure 16** Full facial treatment with botulinum toxin and hyaluronic acid before and 15 days afterwards (Onabotulinumtoxin-A + Hyaluronic acid 15 mg/mL with lidocaine + Hyaluronic acid 17.5 mg/mL with lidocaine + Volumizing Hyaluronic acid 20 mg/mL with lidocaine): correction of the negative expressions with the face at rest can be observed.

prerequisite for any treatment. The rheological qualities of hyaluronic acid must respect the natural order.<sup>17</sup>

## Conclusion

Facial dynamics constitute the fourth dimension of full facial treatment. This is an essential consideration nowadays in conforming to emotional facial expressions and in correcting age-related negative expressions. In this way, one of the major concerns of patients is also addressed: the quest for natural, balanced results (Fig. 16).

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