ANALYZE MY FACE

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Plastic surgery is gaining more and more popularity, while stigma and popular myths about it are gradually decreasing. Analyze My Face conjunctly deals with the two main problems of facial plastic surgery: the excessive rate of dissatisfaction, which results in high revision requests and negative psychological side-effects and the "diagnosis by procedure" approach, which leads to erroneous measurements. This new and innovative method of Digital Facial Analysis is a direct non-expensive online service that provides professional and documented in-depth consultation to patients before they decide to undergo any type of facial intervention. The paper thoroughly explains the scientific method with which professionals provide customers with a facial assessment based on specific parameters which will be discussed (height, width, proportions, direction of facial growth, the way they assess each facial area in detail (eyes, mouth, cartilage), and the motivations for which they suggest to correct eventual defects through precise measurements, indicators and suggested interventions. Long-term evaluation of stability of surgical results and patient satisfaction achieved with digital facial analysis has not yet been established and needs further research. However, it is important to underline that the AMF approach tends to consider exclusively possible and feasible procedures that do not compromise functionality and that do not put patients in danger of serious damage. Problems or deformities that cannot be treated are always indicated. AMF aims to maximize professionality by giving practitioners an additional tool to aid their work, give unbiased opinions and look at the overall picture. It also aims to help patients by soothing their way into the complicated world of aesthetic surgery.

Plastic surgery is gaining more and more popularity, while stigma and popular myths about it are gradually decreasing (1). While it was commonly believed that surgery, especially when it concerns the face, is a mere tool for aesthetic amelioration, in recent studies it was confirmed that 88% of patients felt healthier on many levels after their treatments. Furthermore, the decrease in prices of procedures and the presence in the market of less invasive new technologies helped to boost numbers as never before. In the United States only, in 2017 cosmetic procedures increased by 4%, reaching 1.7 million; cosmetic procedures increased by 3% reaching 17.1 million and minimally invasive procedures have increased by 3% reaching 15.4 million (2). Reconstructive procedures kept a steady rate with almost 6 million patients. Over the last years, it has also been observed that an increasing number of men are turning to treatment for restoration, reconstruction or alteration of body parts. An article published on the 22nd of June on Bloomberg News, explains a new

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report by the American Academy of Facial Plastic and Reconstructive Surgery that says that 31% of male respondents admit they would seriously contemplate surgery to improve their appearance. Fifty-eight percent of these men are between 24- and 34- years-of-age. This is just the latest data in a long-brewing trend in which more and more men, especially the youngest, are realizing that surgical benefits are not merely a female issue (1).

While the market and its possibilities are as open as never before, there remains a substantial threshold before seeking any actual treatment. Deducing and discovering the correct aesthetic issue and appropriate treatment is a task that should be left to professionals and not to the patients themselves. Despite the advances and increasing interest in the market, not much progress has been made to simplify this step or increase its accessibility.

To detect the presence and source of aesthetic imbalance and how it may be alleviated, the professional is able to perform a facial analysis. It can vary greatly between different techniques, but in its essence, facial analysis evaluates the suitability of patients for aesthetic, maxillofacial and craniofacial intervention by quantifying and interpreting facial proportions, shape, and relationships and the degree of any aesthetic or functional facial deformity (2).
Some approaches and their clinical application have been well described in medical literature. The most common method, clinical facial analysis (CFA), generally involves a two-step approach: a live assessment of the patient as well as the assessment of standardized photographs that are normally produced during the consultation or shortly thereafter.

This crucial procedure for selecting the most beneficial applicable aesthetic treatment has so far been limited to being performed exclusively in the office of a practitioner and, as such, been limited to a narrow group of potential patients. Furthermore, it depends on the medical surgical expertise and knowledge of the practitioner performing the clinical facial analysis (3).

A new approach in this field is the Digital Facial Analysis, which relies entirely on photographs that are digitally sent to clinicians by the potential patients that wish to receive a comprehensive facial analysis without having to book a consultation or having any prior knowledge about their possible or assumed aesthetic deviations that would require specialist consultation. We can already detect a growing popularity of such an approach by the emergence of video conference-based consultations offered by medical practitioners in general and cosmetic plastic surgeons in particular, and web-based services like Analyze MyFace and Realself (4).

The typical, most common plastic surgery patient is female, married, upper middle class and between 30 to 50 years old. The current method of clinical facial analysis needs to be performed locally, within a medical office, thus limiting the target of aesthetic intervention to a narrow group. Using digital facial analysis eliminates the need for physical presence. Furthermore, geographical restrictions for the practitioner and patient are eliminated as well. There is a increasing number of patients willing to travel significant distances to undergo specific aesthetic treatments with specific surgeons. This method can furthermore assist reputable surgeons and experts to increase their reach and educate and diagnose patients that would otherwise not be able to travel to their offices (5).

However, since such method of facial analysis is conducted solely on the basis of digital photographs produced by the patients themselves, limitations as to which cases it can be applied to for satisfactory and reliable results occur. By using images provided by the patients themselves, the photographs and models will naturally exhibit significant deviations in camera distance, camera angle, camera mode, head position and head tilt that must be accounted for. Since the main focus is evaluation from an aesthetic point of view, these deviations force the analyst, while conducting this method, to shift the focus on relative metrics and relationships instead of absolute distances. From the aesthetic point of evaluation however, relative metrics play a far greater role in the perception of facial attractiveness and unattractiveness.

As the scientific elite becomes increasingly aware of benefits linked to aesthetic ameliorations, both in terms of health and in terms of self-confidence and psychological returns, it is important to notice that

in many cases the market share is rendered higher by revision rates (6).

The problem of recurring revision surgery is extremely common, even though surgeons record much lower numbers, it is most probable that disappointed patients look for solutions elsewhere, rendering the self-reported "coming back for repair" statistics biased (7).

One of the main reasons for revision, as stated by David Sarver and Fabio Meneghini in their work, involves the problem of obtaining "diagnosis by procedure" from specialists rather than basing their judgment on patients' needs on an average assessment of facial proportions. Too many times, absolute and standardized proportions are taken into consideration without considering relative proportions, facial equilibrium and harmonious overall results.

Analyze My Face conjunctly deals with the two main problems of facial plastic surgery: the excessive rate of dissatisfaction, which results in high revision requests and negative psychological side-effects and the "diagnosis by procedure" approach, which leads to erroneous measurements. This new and innovative method of Digital Facial Analysis is a direct non-expensive online service that provides professional and documented in-depth consultation to patients before they decide to undergo any type of facial intervention (8).

The consultation includes a professional assessment of the patient's face, based on relative ratios and proportions according to the pictures that will be requested by different perspectives; a detailed explanation of the objective defects and eventual surgical or non-surgical solutions when possible; a studied opinion on the extent to which the procedures are recommended or not and an analysis, reinforced by connected ad-hoc created pictures, of possible short term and long-term outcomes.

The service includes different packages according to the extent to which patients want their analysis performed. The elaboration of hard data through objective and precise measurements is only the first step towards a new frontier of facial surgery: the data is interpreted according to a new approach which reflects relative rather than absolute proportions according to a vision based on an in-depth overall view of the face, that considers every detail to pursue the most aesthetic possible version of customers (9).

The paper thoroughly explains the scientific method with which professionals provide customers with a facial assessment based on specific parameters which will be discussed (height, width, proportions, direction of facial growth, the way they assess each facial area in detail (eyes, mouth, cartilage), and the motivations for which they suggest to correct eventual defects through precise measurements, indicators and suggested interventions (10).

Furthermore, the paper assesses the approach professionals utilize when interpreting the ratios and hard data collected in the first phase of the service. This innovative evaluation method sets a turning point between AMF specialists' conception of aesthetic surgery and the prevalent approach. While rhinoplasty is nowadays the second most recurrent facial surgical operation, the AMF team considers it greatly overused and should, in most cases, be viewed as ultima ratio if other interventions cannot be applied. The paper will give details on why this happens and what other features of the face confer this illusion. Moreover, it will mark another difference with mainstream approach by analyzing the importance of ancillary procedures that are nowadays much less common though they should be implemented in much higher percentages as their aesthetic importance is underestimated.

Finally, the paper will focus on the reasons why AMF shifts the attention towards results that are possible and convenient to pursue under a medical point of view rather than whatever operation is deemed necessary by the patient, who may at time be discouraged.

MATERIALS AND METHODS

Technical requirements

Before the method can be applied, photographs must be requested from the patient, which exhibit sagittal view and frontal view of their face. If complex and unusual three-dimensional deformities are detected, additional images exhibiting basal and oblique view may be requested and analyzed to verify the findings.

To improve the reliability and efficiency of the

facial analysis, these images need to meet a baseline of photographic requirements in resolution, positioning and compression, in order to minimize the variance. If the deviations in head tilt or camera angle are extreme, new images must be requested and used, as it can lessen or enhance the aesthetic impact of points of interest.

These images are then altered using photo-editing software to standardize the format ratio (any standard format can be used) and leveled, using an approximation of the Frankfort horizontal plane *(tragus – infraorbitale)* as a plane of reference to allow comparability.

These initial alterations serve only to improve the workflow of the practitioner, allow for greater comparability of the images and cases, and lastly identify any deviations too extreme to proceed with the analysis.

Analysis

Before any further alterations are made and before facial landmarks and other hard data is identified and processed, the images should first be observed manually, without any influence of hard data. This forming of a "first impression" is similar to when non-experts observe faces of strangers, even though the impression is supported by medical knowledge and surgical expertise, which is important to interpret data correctly. It includes the observation of general proportions, points and zones of interests, obvious distractions and deviations (11). The next step is extrapolation of relevant data, that includes facial landmarks, angles, lines used using facial recognition or photo editing software.

There are many described facial landmarks, lines, angles in medical literature that are considered to play an important role in the perception of facial attractiveness. Many methods, masks and models have been described, each claiming to be able to quantify facial attractiveness. There is however an ongoing debate and thus far, there is no clear consensus in the field. Using even most of these facial landmarks and lines altogether would not prove to be a valid method because of the considerable increase in workload and the redundant nature of many of these indicators (12).

Instead, it may be said that less is often more. Facial analysis serves to provide initial indicators for underlying aesthetic deficiencies or deformities and the overall relationships of the face. The general method of evaluating the aesthetics of the side profile, using facial planes such as the Frankfort horizontal or others, and assessing the level of convexity or concavity of the outline, has already been tested and applied with good results. While an aesthetic profile and an aesthetic frontal face are positively correlated, creating an attractive profile projection often does not create a beautiful face. On the other hand, a face that is deemed beautiful may not have a particularly aesthetic profile.

It is the frontal face that is essential to the perception of an attractive face. Medical literature and research however, has often placed its focus on the analysis and enhancement of the profile view and there is much more data on this matter. In the process of developing this method, while we assess the profile using the conventional method, we could not apply a thorough analysis to the frontal face, which we deem more important (13).

For the analysis of the frontal face, we use a simple yet conclusive approach, using 19 base facial landmarks that play a paramount role in overall proportions, facial projection and facial symmetry to assess the attractiveness of a face. They are the basis to form many lines and calculate angles and crucial relationships. These can be supplemented by the use of additional facial landmarks and measurements in complex cases. Except trichion, that marks the beginning of the hairline, all of the base facial landmarks lie in the lower and middle facial third of the face. The landmarks are used to assess general proportion, facial feature relationship and bilateral symmetry (14).

The proportions, the placement of the facial features relative to each other, especially of the lips and the eyes play a pivotal role to facial aesthetics, and it must be assessed thoroughly. While changing the proportions directly can only be achieved with highly invasive reconstructive procedures, and therefore never recommended but in most extreme cases, its perception can be influenced with aesthetic intervention and therefore must be an important part of a facial analysis (15).

One important proportion metric that is considered is the inclination of the intercanthal axis. This angle can be measured between a horizontal line passing through the medial canthus and a line passing through medial and lateral canthus. Most people will have a slightly positive tilt, but it can anatomically be negative, neutral or positive. A negatively inclined intercanthal axis has a strong negative effect on facial aesthetics and perceived emotional or physical state ("tired-looking", "sad eyes").

The average angle differs depending on ethnicity and sex, but it is about 2°±2° in men and 4°±2° in women. This shows that it should be noticeably positive in female faces, and at least neutral in male faces. A positively inclined intercanthal axis is correlated with strong skeletal support of the upper maxilla and zygoma.

Similarly, we use a line that passes through the medial canthus and the midpoint of the upper eyelid (vertically above the center of the pupil) to calculate the angle of eye opening. Significant deviations may indicate aesthetic problems such as proptosis or upper eyelid ptosis.

Other measurements we can use to determine the proportions of the face that we can apply using facial landmarks, include: the total upper and lower anterior face height (TAFH, UAFH, LAFH); the relative length of the upper lip and philtrum (subnasale – stomion) compared to the relative length of the chin (stomion-menton); bigonial width; bizygomatic width and bimental width. All these measurements play an important role in determining aesthetic problems or sometimes functional deformities.

Only succeeding this step should the facial analysis focus on individual parts (such as the nose, with a nasal assessment) if the case requires and the general analysis indicate aesthetic problems in that area. It is often not required, and the aesthetic problems can be identified without this additional procedure in most patients.

Interpretation

Interpretation of data that is extracted from the facial analysis to form a conclusive report is obviously critical, for this we can rely on many described correlations and relationships in medical science. For example, an increased LAFH (>0.6) is strongly correlated with the presence of moderate to severe dentofacial deformities such as vertical maxillary excess (long face syndrome). This strong correlation is well described and applied in maxillofacial surgical and orthodontic practice.

Moreover, we need to interpret the relationship and facial shape and lateral contours of the face. By assessing the bimental width, bigonial width and bizygomatic width, we have clear width indicators and can assess the face shape and lateral projection. We find that not only are well defined projecting zygomatic and gonial bones highly important to the aesthetics of the frontal face, they are also easily alterable with aesthetic intervention. They serve as a frame to the frontal face and provide structural support just like a well-developed upper and lower maxilla does to the eyes, lips and nose. Especially in male faces, the lateral projection and shape of the zygomatic arch, mandibular angles and lateral temporal bone should form a distinct straight contour in a frontal view, while the jaw angles in the female face should project slightly less while a distinct contour is still desired to achieve a beautiful face. There are many treatment options to achieve this distinct contour, improvement of the facial frame is a viable option (16).

It becomes clear that the interpretation of the data must be handled with utmost care, as there is no fully automated "cookie-cutter" approach and it differs widely depending on a set of variables, such as sex, age, and height. In a medical field where most facial aesthetic procedures are targeted for and performed on women, this distinction is often not made. Aesthetic problems must also not be assessed singularly, but always on how they fit into the composite face, in order to avoid "diagnosis by procedure" as David Sarver described this phenomenon. Additionally, the negative impact of aesthetic deviations (and positive impact of aesthetically pleasant facial features) can vary widely between individual faces despite a similar level of severity, so it is important not to rely on such metrics completely, but to use them as a tool that complements the clinician's practical expertise and experience (15).

In his research, Patzer categorizes such determinants of facial attractiveness in compensatory and non-compensatory relationships - if a favorable feature can compensate other unfavorable features and vice versa. Very strong features do not necessarily compensate aesthetically poor features, and poor features do not necessarily negate aesthetic features.

Ultimately, the facial analysis incorporates, if available, solutions to the aesthetic problems, if present. This requires the clinician to individually assess the case and weigh the level of invasiveness and complication rate of possible procedures against the expected aesthetic (and in some cases, functional) improvement – for example, while orbital decompression surgery for mild proptosis (solely for aesthetic reasons) is possible and has been done, such an invasive procedure cannot be considered feasible since there are other, less invasive ways to improve the appearance of proptosis from an aesthetic point of view.

When presented with mild to moderate structural deformity, camouflage aesthetic surgery and treatments

will routinely be suggested alongside the ideal procedure, when the expected aesthetic outcome is close to the ideal, inform the patients on their treatment options. When presented with severe structural deformity that may or may not yield to functional impairments, such a distinction is not made, since in such case camouflage surgery cannot achieve an aesthetically satisfactory result.

Presentation

Following interpretation, a table of hard data which includes the most important measurements and a brief individual assessment is presented to the patient, describing the findings in a technical, but accessible way. This includes listing the most problematic aesthetic areas (if any), if and how they can be improved aesthetically and listing any present structural deformities. Lastly, it compiles possible treatment options in order to achieve such an aesthetic improvement. They are not complete, but rather a selection of most suitable procedures decided by the analyst.

The patient can be presented with a list of referrals, either in a general way to guide him to practitioners of the relevant medical field, or in a more individualized approach considering his geographical location and the specific expertise of surgeons in a particular procedure etcetera.

To conclude the digital facial analysis, we present altered images of the photographs in sagittal and frontal view, or "virtual simulations" (17). They serve as a tangible visual representation of the treatment options and their expected aesthetic amelioration, providing immediate feedback not only as to how a post-surgical result could look like from an aesthetic point of view, but also to highlight the immediate aesthetic impact of present structural deformities or aesthetic imbalances which educates the patient and assists in making an informed decision. The simulations also assists the operating surgeon or performing practitioner intra-consultation, by providing an approximation of the desired aesthetic result.

DICUSSION

The market is in dire need of an immediate, easily accessible way of providing potential patients and customers important information so they can make a more informed decision whether they want to pursue their treatment options. Digital facial analysis, in many cases, can be considered an entry-level medium that provides this and can significantly increase the reach of aesthetic analysis and practitioners. Due to its limitations, it never is and should not be viewed as a singular assessment before any aesthetic intervention: As the decision in favor of aesthetic intervention is made, a further live consultation and clinical assessment by the performer is customary before eliciting surgical treatment. AMF's digital facial analysis is however not performed by the operating surgeon. This consultation and live assessment therefore serves as a second opinion and another assessment that complement each other in a "checks and balances" fashion.

Currently, many people do not get second opinions and solely base their decision on one assessment: This is a poor state that can be significantly improved using this medium. This state is especially concerning because patients that seek to address aesthetic issues

Fig. 1. *A simplified model illustrating the 19 base facial landmarks that are used: Trichion, nasion, subnasale, stomion, menton, center of pupil left, center of pupil right, medial canthus left, medial canthus right, lateral canthus left, lateral canthus right, apex of the zygomatic arch left, apex of the zygomatic arch right, lip commissure left, lip commissure right, gonion left, gonion right, most superior point of the chin left, most superior point of the chin right.*

usually do not possess a critical unbiased perspective of all aspects of their features, so they tend to look for the "most visible" imperfections, underestimating the reasons that underlie behind such defects. The most central and three-dimensional part of the face is the nose, combined with the ubiquity of rhinoplasty in the beauty market and advertising compared almost to every other facial procedure that is constantly presented to the patient, commonly leads them to identify the nose as the main culprit of aesthetic problems. Such apparent information and power asymmetry places the aesthetic outcome in the hands of a single person, and if that person has been chosen for reasons of proximity and word of mouth, the aesthetic outcome is unpredictable.

The facial analysis, if performed digitally, can either reinforce a patient's suspicions, increasing their likelihood to achieve a good aesthetic result, or more commonly, rebut them which allows them for a more objective self-assessment as many become obsessed with their perceived flaw. In any case, incidence of revision surgery may greatly be reduced.

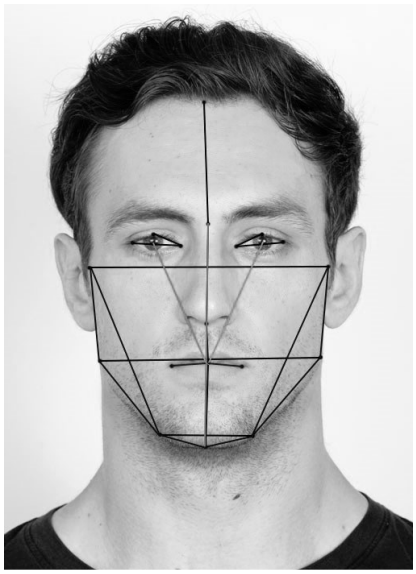

Fig. 2. *Overlay of selected measurements that can be obtained from using the base facial landmarks, including TAFH (LAFH+UAFH, indicated purple), eye-mouth-eye angle (indicated gold), relative bizygomatic width, relative bigonial width, relative bimental width, lip turn, philtrum height to chin height, intercanthal axis inclination, eye opening angle and fWHR that can be used to assess general proportion, facial feature relationship and bilateral symmetry.*

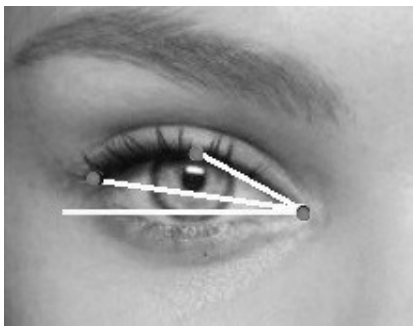

Fig. 3. *Facial landmarks medial and lateral canthus and medial canthus and midpoint of upper eyelid and angles illustrated.*

While rhinoplasty is a powerful and highly effective tool in the right cases and aesthetic deformities, it is currently highly over performed – it is the second most commonly performed facial surgical procedure, accounting for 954,423 or 25.3% of facial aesthetic surgeries in the year 2013 which yields to poor aesthetic outcomes, patient dissatisfaction and unacceptably high revision rates. The revision rate of rhinoplasty is still debated. It is commonly stated to be 5-15% by self-reporting surgeons. However, this method is flawed, as a significant part of patients choose to have a revision rhinoplasty with another practitioner and are therefore not accounted for. Other studies suggest it might be up to 40%. Not included are the poor aesthetic results that are not revised, either because it is not wished for or not identified by the patient. In any case, the revision rate is unacceptably high.

Rhinoplasty must not be performed so carelessly and as such, it must not be considered an entry-level facial plastic surgery as it is now, but rather as a last resort, if other measures cannot achieve adequate proportion without incorporating rhinoplasty.

AMF's method of facial analysis incorporates analysis of all relevant facial features and overall proportions. It may incorporate a nasal assessment if needed. As such, it aims to detect if, and the exact reasons for which a patient's nose is perceived as unaesthetic. The nasal assessment can provide important information about size, width, height

and rotation. But in many cases the defects depend on more complex structural issues that have little or nothing to do with the dimension of the nose. Many professionals however, do not consider essential ratios such as the *subnasale-stomion* and *subnasale-menton* ratio which determines important aesthetic balances: the distance between nose and lips or lips and chin and how a rhinoplasty may affect this important relationship. It is very hard to reverse negative changes to these ratios induced by rhinoplasty, so an overall evaluation is of primary importance before deciding to render the nose "better" as a single feature without considering facial harmony as a whole.

In the case of structural deficiencies, maxillofacial deformities such as maxillary retrognathia or mandibular hypoplasia, which often greatly exaggerate the perceived dimension of the nose, despite normal dimensions, many patients that initially only considered the nose the aesthetic problem and desired rhinoplasty may decide against this treatment due to invasiveness and prolonged convalescence, however it is important to inform them of all viable options, and educate them about the aesthetic limitations and risks of undergoing rhinoplasty to camouflage the problem. This is rarely done, adding to a high patient dissatisfaction and exaggerated patient expectations.

Informing patients about their overall facial aesthetics and presence of aesthetic deformities on the one hand, may yield or enforce negative psychological effects, but on the other hand, it can prevent unnecessary, aesthetically unfavorable surgery and subsequent revision surgery.

Another factor that AMF's digital facial analysis aims to improve with its holistic approach to improving facial attractiveness is the widespread mistake of "diagnosis by procedure", singling an aesthetic problem out, analyzing and treating it by itself. This mistake is evident in the prevalence of rhinoplasty and high revision rate, but it doesn't stop there. According to these considerations the next step is assessing the relevance of many ancillary procedures that have up to now been underestimated in terms of priority when searching for the best possible, feasible aesthetic result.

Previously, orthognathic surgery was mostly reserved for treatment of severe maxillofacial deformities to improve both form and function. This has changed in recent years and nowadays, many patients undergoing orthognathic surgery are mainly motivated by aesthetic reasons and exhibit moderate or even only mild maxillofacial deformities. The commonly used techniques, Le Fort I osteotomy and BSSO only affect a limited area. Despite this limitation, in many cases ancillary surgery to eliminate aesthetic imbalances is not performed, causing dissatisfaction in these patients. This is unjustified, as such intervention does not greatly increase invasiveness or risk, would be relatively easy to perform and would yield immediate aesthetic improvements and an overall greatly improved result. Furthermore, such patients would be responsive to those additional measures.

The assessment of the jaw angles and "ZYGOMO" relationship, i.e. zygoma and gonial projection and shape in relationship to the mouth, should be associated to orthognathic surgery in all cases, which is needed, especially since the surgery itself may alter facial proportions (it causes issues on a skeletal level: movements of the left create malaria fat pages, upper midface volume deficiency, tissue descent, nasolabial folds).

We already established that with the measurements we use during the analysis, such as UAFH and LAFH, we can reliably identify dentofacial deformities such as long face syndrome. This deformity is characterized by excessive vertical growth, a steep occlusal plane and a hyper divergent profile. In most of these cases, linear advancement may increase the aesthetic imbalances. Instead, a more effective approach would be to perform a counterclockwise rotation. However, this rotation by itself cannot contrast the skeletal limits: contouring is necessary (for example enhancing the lateral projection of the jaw angles with medpor implants or segmented osteotomies on the border of the mandible; fillers may also be considered after post-surgical swelling decreased) and it should be considered much more frequently. It is in fact very rare that patients who present such deformities that require orthognathic surgery, present no other skeletal defects. In most

cases ancillary surgery is mandatory to achieve a good aesthetic outcome.

Since the target of AMF's digital facial analysis is to open up the market and make it more accessible whilst reducing common problems, it serves as an entry for many potential patients and interested clients. To provide a satisfying first contact experience, it is important to provide comprehensible feedback, and mustn't overload it with unnecessary information. In light of this selection we focus exclusively on suggesting aesthetic intervention that are deemed as possible, feasible and beneficial for the patient's overall aesthetic and medical condition. This requires the clinician to individually assess the singular cases and weigh the level of invasiveness and complication rate against the expected improvement – for example, while orbital decompression surgery for mild proptosis is possible, such an invasive procedure cannot be considered feasible for mild proptosis since there are other, less invasive aesthetic treatment options. However, in moderate cases where there are no functional issues, such a step may be considered and presented to the patient. When presented with mild to moderate structural deformity, camouflage aesthetic surgery and treatments will routinely be suggested alongside the ideal procedure, when the expected aesthetic outcome is close to the ideal, the patient has to be educated about their treatment options. When presented with severe structural deformity, such a distinction is not made since in such case camouflage surgery cannot achieve an aesthetically satisfactory result.

In all cases, the report is not meant to satisfy patients regardless of possible harms or unfavorable consequences. If such information is available, mental health disorders such as body dysmorphic disorder, obsessive compulsive disorder or delusions that may cause customers to have wrongful or greatly exaggerated impressions on their necessities, will be considered and no customer will be assessed on biased criteria.

Conclusively, by analyzing a patient's face, we can identify and quantify most relevant facial proportions, imbalances and a considerable amount of deformities in order to directly provide tangible feedback to the patient (patient education). Due to the limitations of facial analysis performed on non-standardized photographs, it cannot be considered a method that fully replaces established ones, but it should assist and improve existing techniques. The AMF approach is born to contrast the conflict of interest which may bring specialists to direct patients' attention mostly on specific problems that they can take care of, rather than overall problems which determine aesthetic imbalances.

Long-term evaluation of stability of surgical results and patient satisfaction achieved with digital facial analysis has not yet been established and needs further research. However, it is important to underline that the AMF approach tends to consider exclusively possible and feasible procedures that do not compromise functionality and that do not put patients in danger of serious damage. Problems or deformities that cannot be treated are always indicated. AMF aims to maximize professionality by giving practitioners an additional tool to aid their work, give unbiased opinions and look at the overall picture. It also aims to help patients by soothing their way into the complicated world of aesthetic surgery. Patients are given a chance to have a professional overview of their situation, a scientific method based analysis and a photographic projection of possible results, other than important advice on what procedures they can have access to.

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