Four Dimensional Lipofilling of the Face

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Abstract

Debate over what constitutes beauty, particularly beauty of the human face, has raged since philosophy began. Interested scholars have debated the meaning of beauty for centuries. However, it seems that numbers and the resulting numeric relationships play a fundamental role in the classification of the human body, and that a harmonic profile or shape is produced only at certain definite numeric relationships.

New research suggests that fat may be a more important key to a younger looking face. Further, that this finding may provide new ways to make faces look younger. The recent research describes how the face has underlying fat compartments. These compartments are distinct and are separated from each other by fibrous connective tissue. They are independent compartments that are found in all areas of the face, around the mouth, cheeks, eyes and forehead. These independent compartments age at different rates. As we age different compartments will change in shape, and decrease or increase in size. In the young face, the boundaries between the facial compartments are not obvious and so the face has a generally smooth outline. As we age the transitions become more obvious. The different rates of changes of the different parts of the face explain why the face does not age evenly.

This study provides a review of the locations and characteristics of the facial fat compartments that can be filled with harvested fat and provides examples of how this knowledge can be used clinically on 42 female patients treated by fat injection in various compartments of the face.

Key Words: Fat injection — Facial compartments — Facial dimensions.

Introduction

BECAUSE of the tremendous increase in demand for all types of facial aesthetic procedures, an understanding of beauty is becoming of utmost importance in various settings of medical practice [1]. A satisfactory cosmetic result and optimal healing is the aim of aesthetic surgery. It is essential therefore to be able to assess the possible satisfaction that can be expected after an aesthetic surgery procedure and to determine the beauty of the final result as precisely as possible [2].

Interested scholars have debated the meaning of beauty for centuries [3]. In contemporary society, the media are largely responsible for providing universal yardsticks against which individual faces and body shapes are measured [3]. It appears that youth and symmetry are the most highly prized attributes of beauty [3]. Although experiments with holistic or individual feature representations of the human body have demonstrated the importance of features in discriminative tasks, studies suggest that humans perceive faces and body shapes holistically and not as individual features [4,5]. The beauty of individual features depends on “ideal” proportions [4].

Historical background:

Although beautiful individuals make up a small percentage of the population [6], beautiful and harmonious human figures have been present in artistic representations since antiquity. Body measurements were used by the old Egyptians to execute their famous sculptures and paintings. Facial measurements were first performed by the Greeks as part of total body measurements for the same purpose [7]. Rules defining the relationships between various face and body features were more clearly formulated by scholars and artists of the Renaissance based on classical Greek canons [8]. More recently, the reasons for these measurements have not always been the same. Some investigators have applied such measurements to create the art of ultimate beauty, whereas others have used measurements of human beings to imply that certain groups of people are superior [7]. In modern medicine, the use of neoclassical formulas of human harmonious proportions was propagated by the artist-anatomists of the 17th to the 19th centuries [8].
Fourth dimensions of the face:

The most important surface full of secrets which we face is the face. It is curved and has its anatomical depth of muscles, nerves, vessels, fat tissues, and ligaments. But it also has a fourth dimension—its spiritual deepness reflecting our mind and soul. It is the tool expressing our emotions, thoughts and messages of surprisingly deep contents in endless floating nuances [9]. We breathe, eat, drink, speak, and hear with the face. Four senses are concentrated here even the fifth-tactile sense—is represented here. With one look at the face we recognize somebody’s age, gender, race, health, even affection and individuality. It possesses unique anatomy, expressiveness, beauty, and singularity. There are six billion faces on earth and not two of them are the same. Even mono-ovular twins have symmetry of their faces, composed like in a mirror. We have learned more about the face in the last 20 years than in the 20,000 years before. Every human being has a unique and unmistakable iris, pattern of the ears, and thermal emission of the face and, in addition, the voice, fingerprints, and handwriting are unique. If we imagine that facial muscles are musicians in an orchestra, than the game of our facial expressions would be the melody played by this orchestra. Words are just cascades of feelings, whereas our faces are able to show subtle emotions in smooth flow without rough transitions. Simply, the face is the mirror of our soul. It also indicates our character [9].

A smile is a very powerful social instrument. Different muscles produce a frank and a false “social smile”. The first one is produced by zygomatic and the second one by risorius muscle. An acted smile is limited to the mouth: The eyes do not take part in a “social smile”. That is why the Japanese have the word mokushoh, which means “smile of eyes”. A false smile is asymmetric: in-right handed people the left mouth angle is higher than the opposite lip commissure. Similarly, in “acted anger” the left eyebrow is deeper. The face shows the truth, the whole truth, and nothing but the truth. At the same time it might show the lie, the whole lie, and nothing but the lie. That is why Cicero said: “All is situated in the face”. This fits into the sentence of Oscar Wild: “The real mystery of the world is the visible, not the invisible” [9].

The human weakness for the beautiful was scientifically confirmed by the Hamburg brain researcher Knut Kampe. He measured the effects within the limbic system (which is responsible for human emotions) when looking at an attractive human being. If the limbic system, which is considered one of the oldest in the evolution of human beings, sets off endorphins, we receive a feeling of pleasure. Stereotypes with regard to attractiveness work in favor of the beautiful. In other words, we are doping ourselves [9].

Artistic anatomy of the face:

Definition of facial beauty: Steven Hoefflin said as a scientist, I am quite surprised by the mathematics of facial beauty. As a plastic surgeon, I am delighted. My research has shown that the fundamental difference between an unattractive, average, attractive, and remarkably beautiful face lies within a few millimeters and a few angular degrees. With this in mind, I have developed the formula of “AH,” a simple mathematical formula that allows for the first time a mathematical definition of facial beauty based on seven facial angles (A) and seven facial highlights (H) Fig. (1) [10].

![Diagram of facial measurements](image-url)
Language of beauty: For centuries, poets and artists have been unsuccessful in creating a uniform definition of “beauty”. Defining beauty, like defining love, today, more than any other era in history, there is an intense interest in beauty. There must be a common denominator, a consistency of qualities or features that our aesthetic sensitivities automatically perceive as beautiful a beautiful face, like a beautiful oil painting, combines impressive and unified expressions of ideal features, rhythm, balance, and symmetry of proportion, harmony, style, and artistic value. There are pleasant, graceful lines, angles, and arches. There are uplifted and balanced forms and contours. There may be complementary coloring and shading with stunning harmony, and a symphony of anatomical rhythm. The result is a beautiful portrait beauty itself as “a highlighted and extraordinarily high-quality elevated image which catches and hold’s one’s emotional attention” pleases and enhances one’s perception, prolongs the eager evaluation, and creates lasting and positive appreciation.

Anatomically and physiologically, the eye, like a camera, is stimulated by the quantity and quality of light that is reflected off the face. In viewing an image, the eye focuses on areas that are highlighted with pleasing shapes. As light stimulates the eye, these highlights are perceived as gentle, rhythmic, and flowing curves. This pleasing visual stimulus may be genetically wired into our brain. In viewing a beautiful face, the eye will be drawn to the smooth “egg”-shaped volumetric soft tissue areas (fat pads) with uniformly bright highlights and pleasing, rhythmic flowing curves.

In evaluating a beautiful face, the features which command the most attention, in order of appearance are the eyes, brow, cheeks, lips, nose, chin and jaw line, and neck. Features which rarely attract scrutiny (unless an abnormality is noted) are the forehead and ears.

As stated, in artistic opinion, a beautiful face combines facial features that are harmonious, shapely, balanced, elevated, symmetrical, highlighted, in volumetric proportion and relationship.

Ideally, the width of the “Fabergé egg” highlights should be 50-60% of their length. The sum total of the seven egg volumes and their respective height and angles off the horizontal can be compared with the total egg volume of the face. The proportions are determined and analyzed. Although a very difficult and sophisticated mathematical analysis can be performed with digital imaging and computerized calculations, a more simplified approach has been developed to help the average person. Although the three-dimensional shape of the facial soft tissue features should be accurately calculated as such, two-dimensional calculations are easier.

It appears that measuring the actual volume of the “Fabergé egg” highlight may be difficult. A good correlation exists when comparing the width of the egg to its length. Although these features are truly three dimensional values, using length and width measurements and proportion alone should suffice. The higher the value of the width compared with the length (up until 50-60%) reached, the more beautiful and youthful the features. These proportions can certainly be too great, leading to an abnormal or possibly deformed facial feature.

In its simplest form, the beauty of a face can be visualized merely by placing and judging the position, volume, and angle of the seven eggs on one side of the face:

- Subbrow egg and its position, volume, and angle.
- Eye egg and its position, volume, and angle.
- Cheekbone egg and its position, volume, and angle.
- Upper-lip egg and its position, volume, and angle.
- Lower-lip egg and its position, volume, and angle.
- Mandibular angle egg and its position, volume, and angle.
- Chin eggs and their position, volume, and angle.

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Secret of beauty:

Debate over what constitutes beauty, particularly beauty of the human body, has raged since philosophy began. What is beauty and why are some humans considered more beautiful than others? Has the construct of beauty changed over time? Is our sense of beauty learned or innate? What is beauty, and can we quantify it?

Beauty is a universal phenomenon, present across many species and all ages, that heightens and clarifies our relationship to the world. It is a universal part of human experience provoking pleasure, riveting attention, and compelling actions that help ensure survival of our genes.

As the formal aspect of idealization, it can embody the finest and most transcendent values in the human aesthetic experience. According
to a modern definition, beauty is “excelling in grace or form, charm or colouring, qualities which delight the eye and call forth that admiration of the human face in figure or other objects” [15]. Nevertheless, beauty is a mystery that has been with us for ages, and its presence is ubiquitous [12, 16]. It is something we can recognize in an instant, yet it still is difficult to formulate [4].

Beauty is essentially a visual phenomenon and therefore is exposed to the influences of optical illusions [1]. To be perceived as beautiful, structures need to be visually appealing and capable of evoking an emotional level of pleasure [17]. The visual processing of human faces, the most complex and captivating structure in nature, whose attractiveness influences much of our behavior and social interaction, has attracted the imagination and received the attention of philosophers and scientists such as Aristotle and Darwin for centuries. The face has received most of the attention and generated most of the studies related to beauty and attractiveness [1, 4, 18]. Concepts and rules derived from these studies, however, may be applicable to all parts of the human body.

The notion that beauty is in the eye of the beholder and that individual attraction is not predictable beyond our knowledge of a person’s particular culture, historical era, or personal history has been widely held for centuries.

However, more recent work suggests that beauty is not an inexplicable quality that lies only in the eye of the beholder and that the constituents of beauty are neither arbitrary nor strictly culture bound [4]. Beauty is a perception of the physical form appreciated by the observer. Such a concept suggests that it comprises two distinct but competing elements—the one who is beautiful and the other who considers the one beautiful—the “subject versus beholder hypothesis” [1]. Despite an apparent impression that every human society has its own standards [8] and despite the fact that when culturally isolated populations are taken into account, some supposedly invariant standards may prove malleable, [11] cultural invariance combined with an adaptive potential has been used to support an adaptationist explanation of human beauty and to set culturally invariant standards of beauty [11]. It seems that there is a universal standard for beauty regardless of race, age, sex, and other variables [19, 20]. There is, however, evidence that certain perceptions of beauty change with time [12] and that the recent globalization of modern society has wrought changes in our perceptions of beauty [12].

The face has received most of the attention, and mankind’s interest in facial attractiveness and its study date back to the beginnings of recorded history. Determining the essence of this quality and its nature has occupied us individually and collectively at least from the time of the Egyptians 4,000 years ago [7, 21, 22].

Attractiveness is an essential attribute of beauty and biologically, beauty is something that the visual processing segment of the nervous system finds attractive [1, 23]. These biologic phenomena are operative during early adulthood [24]. But what makes a female or male figure attractive? The observation of true beauty arouses an emotional level of pleasure perceived not in the neocortex,
but deep within the subconscious limbic system [1,25]. Such an arrangement has developed in response to the pressures that have shaped the brain throughout its evolution [1,26].

An interesting finding, however, is a biologic trend away from perfect symmetry in primates consequent to adaptive evolutionary alteration favoring functional asymmetry [27]. Studies have demonstrated that the right hemisphere is dominant for visual recognition and identification, whereas the left hemisphere is associated with the perception and production of language. However, the degree of labor divisions differs between the sexes. Men are more functionally lateralized for visuospatial skills and women for language [1,28]. Moreover, beauty is shown to be more pronounced on the right side of women faces (men show no difference), with lateralizing of facial expressions on the left. This lateralization is perceived by the left hemisphere of the observer, allowing beauty to be emphasized on the right side of the face and perceived by a male’s right (preferred) hemisphere [1,28]. The finding that no such mechanism for characterizing beauty is present in females confirms that beauty is a male-driven emotion based in evolutionary neuropsychology rather than a purely social concept [28]. This by no means implies that females cannot experience beauty [1].

A beautiful face has the following features based on scientific-artistic interpretation: A Beautiful face is basically a normal face with augmented and elevated angles and highlights.

**The beautiful cheek:**

Artistically, the beautiful cheek is one of the most important and attractive facial features. For centuries, this beautiful eminence has been highlighted with makeup and festive painting. The beautiful cheek should be well defined, full, and ovoid like a definite highlighted “egg”. The peak of the highlighted cheekbone or malar eminence should be high and full. The full egg volume should be sitting at an angled position, marked from the upper lip to the upper ear with its pointed end toward the ear. The egg apex should lie on the vertical line splitting the lateral canthus and brow, and the horizontal line, from the division of the middle and lower thirds of the nose to the superior auricular tragus or cartilage bump in front of the ear.

The fullest portion of the cheek should be centered high over the cheekbone and not down toward the nasolabial fold, as occurs with aging. The appearance of the nasolabial fold should be minimal, and the jowl area should be flat or slightly concave. A prominent nasolabial fold occurs owing to genetics or aging, loss of fat and bone volume, and the slipping of the fat pad and skin down against the contracted nasolabial fold and mandibular or “jowl” ligaments. This creates the aged and unattractive cheek folds and jowls [10]. Scientifically, the measured peak height of the cheek eminence should be 25-27mm from the lateral canthus. The optimum angle is 40°. This area comprises bone, muscle, soft tissue, and cheek fat pad. The width of the cheek egg should be at least as wide as the distance from the lower lid to the brow peak horizontal. This width is at least 15% less than the width between the zygomatic arches. The hollow of the beautiful cheek or “thumbprint of beauty” is located on the occlusal plane or above a line drawn between the ear lobule and the ala Fig. (3) [10].

![Fig. (3): In youth, the midcheek has a uniform rounded fullness. The youthful lid-cheek junction is a three-dimensional surface contour with concave shape. The skin of the youthful lid-cheek segment is indistinguishable from the skin of the youthful upper cheek.](image)

**The beautiful lips:**

Artistically, in the beautiful lips, the upper lip should protrude out further than the lower lip, but the lower lip should be fuller in volume than the upper lip. There should be a slight, but distinctive upper lip “white roll”. The lateral commissure should be at a vertical line drawn down from the medial iris-pupil. If a line is drawn from one commissure of the lip to the other, this horizontal line would sit on the lower third point at the center of the upper lip. The upper and lower lips should have a central fullness shaped like two pairs of twin eggs lying against one another [10].
The lower-lip twin “Fabergé eggs” should be larger and slightly more protuberant than those of the upper lip. Within limits, society has readily correlated fullness or labial plumpness with beauty. A slight pouting of the upper lip has been identified with youthfulness or sensuality [10].

Scientifically, the beautiful lips are approximately 57-62mm in width. The upper lip should have a distinctive Cupid’s bow with a slight pout or upward tilt from the comissure to the Cupid’s peak of 10-20°. The upper lip precedes or protrudes more than the lower lip. The upper-lip vertical height is 8.5-9mm, and the lower-lip height is 9.5-10mm. The width of the philtrum, at the junction with the vermillion, is 10-11mm and distinctive. From a central open point, located between the upper and lower lips, the horizontal angle to the commissures should be at least 5-10°. The upper-lip and lower-lip angles of the Cupid’s bow, off the horizontal, should be 10-20° positive and negative, respectively. The distance from the base of the columella to the Cupid’s bow horizontal or “labial ledge” should be equal to or shorter than the distance from the lower-lid lash line to the supratarsal crease.

The gingiva exposed in a smile should be 0-2mm maximum. The horizontal lip position should fall behind the nasomental angle line at a distance of 4mm for the upper lip and 2mm for the lower lip [10].

The beautiful chin and mandible:

Artistically, the beautiful chin and mandible should be soft, slightly curved, and well defined. A delicate menton is associated with more feminine beauty. The chin should have adequate projection. The tip of the chin should just touch a vertical line, dropped from the nasion through the nasal spine. On frontal view, two attractive mental “Fabergé eggs”, lying against one another should be seen centrally. The “Fabergé eggs” at the angle of the jaw are subtle, but distinct highlighted sites. These represent fat and muscle soft tissue over the masseter muscle. This Fabergé area, by calculation, is more attractive in the masculine face. This pair of eggs should have an angle parallel to the mandible. Scientifically, the jaw line should be clean, smooth, and relatively free of ptotic fat. The soft tissue of the chin ranges in thickness from 10 to 14mm. The chin should be positioned on the vertical line drawn from the nasion to the subnasal to the labrale inferior. The mentolabial sulcus should lie approximately 4mm behind this line, or slightly anterior to a line drawn down from the upper to the lower lips. The mandibular angle should be tilted from the chin up along the jaw or mandibular border at least 10-25° from the horizontal. The jaw angle should have a definite soft tissue egg, lying over the masseter muscle. A distinctive hollow should fall below the entire mandibular border [10].

Anatomy: Figs. (4-8)

Superficial cheek:

In their 2007 study, Rohrich et al. [27] injected dye into cadaveric heads and determined that there are four superficial fat compartments in the cheek area: Nasolabial, medial, middle, and lateral-temporal. The nasolabial fat compartment is bounded medially by the nasolabial crease and is reported to be bounded superiorly by the ORL. The ZM muscle also adheres to this compartment. Notably, the volume of this compartment was reported to be consistent across cadavers. The medial fat compartment is located just lateral to the nasolabial fat (described earlier) and is bounded superiorly by the ORL and laterally by the subcutaneous periorbital compartment and inferiorly by the jowl fat. The middle is located just lateral to the medial compartment, anterior and superficial to the parotid gland, and extends laterally to what can be referred to as the “lateral cheek septum”. The lateral-temporal is the most lateral cheek compartment, is located immediately superficial to parotid, connects the lateral forehead fat to the subcutaneous cervical fat [29].

Deep cheek:

In 2008, Rohrich et al. [30] discovered the deep medial cheek fat compartment that is located just medial to the buccal fat pad and ZM muscle. The compartment is bounded medially by the pyriform ligament of the nasal base, superiorly by the ORL, and lies just deep to the orbicularis oculi muscle. The compartment is distinct from the suborbicular’s oculi fat SOOF and abuts the superior suborbicularis oris fat inferiorly. A portion of the compartment surrounds the levator anguli oris muscle. The compartment is located just deep to both the medial and middle superficial cheek compartments. The compartment extends posteriorly to the maxillary periorbital bone leaves a potential space that is referred to as Ristow’s space.

Further dissections found that the deep medial cheek fat compartment can also be seen as two distinct compartments: One that abuts the pyriform membrane (medially), and the other that surrounds the levator anguli and is adjacent to the buccal fat (laterally) [30].
**Perioral area:**

In two individual case series of cadaver dissections Rohrich et al., identified a deep fat compartment of both the upper and lower lips that is located deep to the orbicularis oris muscle. The orbicularis oris muscle inserts into the dermis at the wet-dry border, and the deep perioral fat compartments are located immediately posterior to this insertion [31].

**Jawline:**

In 2008, Reece et al. [32], found that the jowl is formed by the deflation or descent of two fat compartments that line the jaw. These fat compartments were labeled the superior and inferior jowl fat compartments. These are distinctly highlighted by methylene blue dye injection, and they are noted to be bounded medially by the labiomandibular crease, where the lip depressors such as the depressor anguli oris insert. Interestingly, these fat compartments share an inferior border at the mandible where membranous fusion of the platysma occurs.

**Chin:**

In 2009, Rohrich et al. [31], found a deep chin fat compartment located deep to the mentalis muscle and spanning the border of the lower lip. Notably, this compartment is located on either side of the midline, over which it was not confluent. This compartment is distinct from the suborbicularis oris fat compartment that lies superiorly.

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**Fig. (4):** An artist’s rendition of the subcutaneous compartments of the face [29].

**Fig. (5):** The basic five layers of the face, which are simple on the scalp and complex on the midcheek. Note that the facial nerve branches course beneath the deep fascia (level 5) in the lateral face and then cross layer 4 outside the facial spaces where they are under the “protection” of the retaining ligaments into layer 3, where they travel until innervating their targeted muscle [33].

**Fig. (6):** (Left) Methylene blue dye injected into the forehead flows down the cheek in a specific and reproducible manner. The nasolabial fat also stains as a specific region. (Right) An artist’s rendition of how dye flows from the forehead to the neck with a distinct medial boundary (arrow). Dye partitioning would not occur if the face were a confluent mass [29].

**Fig. (7):** The nasolabial fat compartment is the most medial of the major cheek compartments. Bluedyehas stained this region. The orbicularis retaining ligaments is the superior boundary (ORL), and the suborbicularis fat is a lateral and deep boundary (SOOF). Medial cheek fat hasbeenreflected off the nasolabial compartment. The zygomaticus major is tethered at its inferior border (ZM) [30].
Patients and Methods

From January (2008) to April (2010) forty-two female patients were treated with lipofilling procedure in the Department of Surgery at the University of Beni Sewif. Patients Underwent Lipofilling for aesthetic reasons only either refilling or augmentation. Patients with history of previous facial pathologic conditions such as cancer, trauma or facial dysmorphism are excluded from this study.

All patients received fat grafts in cheek area, 9 in lips, 12 in nasolabial area, and 5 in chin area. 10 patients were operated for aesthetic operations 5 of them for rhynoplasty, two for blepharoplasty and three facelift operations either in the same setting or in another setting.

All patients were photographed preoperatively during rest and smiling and marking of the face was done during smiling, as a fourth dimension of the face, during smiling cheek area appeared more bulky and properly delineated, and face appeared more beautiful which is the target giving the face the smilable appearance by lipofilling is the concept of this study.

Marking:

The idea of this study depending on the fact that smiley face is beautiful face and during smiling the compartments of the face changes mainly with protrusion of cheek, chin and malar area so I ask the patient to smile repeatedly to detect volume changes in various compartment the face and do marking in smiley position and also take photos. This is the guide for final filling and volume detector.

Application and injection methods:

Using 17 gauge coleman blunt ended cannula connected to 1mL syringe containing fat. The local anesthesia is infiltrated through the same site that will be used for placement of fat. Vasoconstriction from epinephrine lessens bruising, hematomas, and intravascular embolization of the transplanted fat. The blunt infiltration cannula is attached to the 1mL syringe filled with the refined tissue.

The cannula is inserted through the incision and advanced through the tissue to the appropriate plane as the cannula withdrawn, fatty tissue is injected into the pathway of the retreating cannula to avoid placement of the fat in clumps and to
encourage nutrition and integration of the grafted tissue by placement in small aliquots.

Placing the fat in small aliquots maximize the surface area of contact between the surrounding tissues and the grafted fat this allows each parcel of fat access to a blood supply and a greater possibility to anchor in a more stable fashion in the new site. Such placement enhances the potential for survival, encourages stability, and minimizes the possibility of visible or palpable irregularities.

Volumes and placement:

They key to accurate volume placement is familiarity with the technique, knowledge of attractive facial topography, and understanding the goals of the patient. Light massage of infiltrated areas should be approached to properly distribute infiltrated fat with gentle manipulation but strong direct pressure should be avoided in the 1st week.

Postoperative care:

The most expected sequela of fat grafting is swelling. The many passes of a blunt cannula used for placement of the refined tissue results in remarkable tissue edema. Immediately after the procedure, plastic adhesive tape is placed over the infiltrated area. This remains in place for 72 hours post operatively, ice bags should be applied frequently and the head should be elevated. Postoperative analgesic used for 3-4 days.

Results

A total of 42 women have undergone facial augmentation for refilling or enhancement with Coleman technique of fat transfer over a period of 18 months.

The facial regions augmented in this study include the malar area (42 patients) nasolabial fold (12 patients), lips (9 patients) and mental area (5 patients).

Ten patients out of forty two had been operated upon for another facial surgery to improve facial beauty five of them had rhinoplasty, two blepharoplasty and three face lifting there have been no procedure-related complications at the fat harvest sites.

The follow-up period reached up to 18 months and the main task of evaluation is the changes of the degree of beauty depending on patients and here relatives questionnaire responses which where:

- Overall beauty of the face.
- Harmony of the face.
- Contour improvement.
- Healthy look.
- Smile attraction which is our fourth dimension in the facial beauty and also complications of the recipient and donor site were evaluated.

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These factors were rated on scale of 0 to 10 (Bruising 10 = Significant bruising) depending on score of improvement 10 patients have good satisfactory results as score is less than (40/50) 80% while 40 patient have more than (40/50) = 80% degree of satisfaction was higher in civilized and educated patients and also in patients in the third decade of life.

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<th>Table (1): Criteria of improvement.</th>
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<td>Over all facial beauty.</td>
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<td>Harmony of face.</td>
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<td>Contour improvement.</td>
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<td>Healthy look.</td>
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<td>Smile attraction.</td>
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<th>Table (2): Criteria of complications.</th>
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<td>Recipient site:</td>
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<td>Visible swelling and bruising</td>
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<td>Local discomfort</td>
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<td>Infection</td>
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<td>Subcutaneous nodules</td>
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<td>Dysesthesia</td>
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<td>Donor site:</td>
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<td>Local discomfort</td>
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<td>Bruising</td>
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<td>Skin contour depression</td>
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Diagram (1): Total results.

Diagram (2): Results according to age.
Overall beauty increased with various degrees depending mainly on, degree of fat resorption which is variable from patient to patient so repeated injection can enhance the degree of satisfaction and the 2nd important factor is the degree of patient civilization and education so educated patients were more satisfied as the changes of facial beauty is accepted even with minimal changes.

While in non educated patients the degree of acceptance is commonly low as the patient expectations is commonly higher than possible even with preoperative discussion of possible changes.
Case no (4): A 26 year old female patient with lipofilling of cheek, lip and chin with excellent result.

Case no (32): 27 year old female patient with cheek augmentation.
Case no (1): 38 year old female patient with cheek and lip augmentation (excellent result).

Case no (27): 19 year old female patient with cheek and nasolabial refilling (excellent result).
Case no (5): 33 year old female patient with cheek augmentation (good result).

Case no (29): 27 year old female patient with cheek and nasolabial compartment refilling (excellent result).
Case no (14): 23 year old female patient operated upon for rhinoplasty followed by lipofilling of cheek and nasolabial compartment (excellent result).

Fat injection and make up make a great difference in feminity, beauty and attractiveness.
Discussion

As people age, many are left with the feeling that their physical appearance is no longer an accurate representation of their mental state, leaving them with the desire for facial rejuvenation, or “matching their outsides with their insides”. The face like other parts of the body, ages in a unique but relatively consistent manner, creating a distinct and easily recognizable “aged” appearance [33].

Many verbs have been used to describe the underlying mechanical changes with aging, including deflation, attenuation, “doubling over”, radial expansion, and rotation [34].

The correction of facial contour problems remains a challenge for reconstructive surgeons because the “ideal filler” has not been elucidated. Many new soft-tissue fillers are marketed and greeted with tremendous anticipation and enthusiasm. Unfortunately, with the passage of time, these synthetic materials fail to meet expectations and result in unforeseen complications. The excessive use of injectable liquid and prosthetic block silicon for treatment of facial contour deformities demonstrates this point. Initially, the symmetry obtained from silicone injection to the face is dramatic and an aesthetic improvement [35,36] [39].

However, over time, the patient can develop complications such as malposition, dyschromia, dysesthesia, contractures, infection, fistula, and chromic inflammatory reactions [37].

Coleman [38] presented a reliable technique of autologous fat grafting for long-lasting rejuvenation of the dorsum of the hand. Small intact parcels of fatty tissue are harvested with a syringe and a blunt 3-mm cannula most of the viable components are removed from the harvested subcutaneous material by centrifugation, decanting, and wicking. Separation of the ting parcels of fat maximizes contact between the surfaces of the transplanted fat and surrounding recipient tissues to encourage integration, anchoring, and long term survival.

Butterwick and Lack [39] presented their experience with 100 patients who underwent a new technique known as fat autograft muscle injection in which fat was injected within the muscles of facial expression. The fat was harvested in a atraumatic and sterile manner centrifuged fat was then injected with specific blunt tipped cannulas for different muscle groups. The majority of patients underwent a partial versus full-face procedure.

Facial volume restoration with the fat autograft muscle technique is a systematic approach for facial volume restoration. It offers the potential for symmetric, long term results.

Other methods have been reported in the literature and used clinically to obtain fat grafts [40,41]. Har-Shai et al., advocated an integrated approach for increasing the survival of autologous fat grafts. In their study, fat grafts were harvested with conventional liposuction and processed by slow centrifugation. The fat grafts after centrifugation were suspended with cell cultural medium. In 15 patients who were enrolled in the study, the amount of graft taken in the recipient sites ranged between 50 and 90 percent clinically at 6 to 24 months’ follow-up [42].

Ramon et al., reported their preferred technique for obtaining fat grafts. In their study, fat grafts were harvested with conventional liposuction. The fat grafts were then placed on a sterile cotton towel, called the “towel” technique. Significantly less fibrosis was noted with this technique compared with the centrifugation technique [43].

In this study on 42 patient treated for facial refilling or augmentation I depend on smile as fourth dimention of face to detect the proper compartment of the face to be filled with harvested fat as during smiling the cheek appeared more bulky and prominent the nasolabial line change in it's appearance and the chin fallsly protrude as lips stretched laterally to open mouth and teeth appeared during this smilly phase I did markings of areas of injection and take photos both in rest and smilly appearance patients found definite beautiful changes and their self contidence increased obviously and no single patient showed major complications it was very important to analysis the patient need, his expectations and to discuss with them the possible changes.

Sometimes I use old photos of the patient as guide for filling as many of the patient like certain facial view during his life and used old photos as a fact of their previous beauty.

I believe that refilling or enhancement of the face with the guide of smile will easily detect the proper compartment to be filled with fat and to reach, with simple maneuver, to the ideal view and degree of fullness of face.

References

2. GREULICH M.: Scoring beauty: Green means go, yellow


