The surgeon, as the artist, has an accurate view of human body shapes. The artist may take it for fantasy whereas the plastic surgeon will make it a new reality for the patient’s sake. –J.W. Fernandes, 2020

INTRODUCTION

Medical sciences and arts have been consistently related to each other throughout history. The perception of beauty, especially the diagnosis of its absence, cannot be achieved based only on universal, objective, logical, and concrete scientific concepts.1

Leonardo da Vinci extensively sketched and measured many faces, looking for “the divine proportions,” along with his many anatomy dissections depicted in his very accurate anatomy drawings. In the “Vitruvian Man” drawing, Leonardo developed his own discoveries about human proportions, over Marcus Vitruvius Pollio’s from the 1st century BCE. That achievement is still the basis for art drawing and modelling lessons besides having contributed to the medical semiology regarding many human body deformities.

Aesthetics is the study and creation of beauty in art and nature, as cosmetic aesthetic plastic surgery relates to beauty in the human face and body. Aesthetics is derived from the Greek word “αἰσθάνομαι” meaning “I perceive” or “I feel.” Gonzáles-Ulloa, in his manifesto (1960s), emphasized the importance of beauty in our lives and in plastic surgery.2 Macgregor refers to the body image as a basic component of our self-concept and our feeling of personal identity, encompassing the mental picture we have of our physical characteristics as much as our attitudes toward these characteristics, in a conscious and even unconscious way.2 The French plastic surgeon Pierre Fournier quoted Konrad Lorenz’s theory associating beauty to very early childhood facial features.4 The smooth skin, round-shaped facial angles, and fullness of the facial middle third are indeed children’s features, which the patients also look for as goals after rejuvenation surgery. A psychoanalytical view could reasonably infer this trend as a possible inclination toward the opposite of the signs of chronologic aging, which evokes the inexorable progression toward death.5

As early as 1969, Thompson et al promoted a simplified art course for plastic surgeons at the Indiana University Medical Center. After 16 hours of practice on drawing, clay modeling, molding and casting the residents’ development was remarkable and evident when the drawings before and after the course were compared.6 Morani, a plastic surgeon and sculptor, promoted in 1992 the importance of art lectures at the Medical College of Pennsylvania, where an art gallery was opened.7 Gümeron followed both authors and promoted successfully in 2005 a course for 13 plastic surgeons at Obdokuz Mayis University, Samsun, Turkey.8 Metka and Neuffer-Hoffmann opened in 2009 an art course for surgeons at Kunsthistorisches Museum in Vienna, Austria, which is nowadays fully integrated with anatomy lessons by M. Pretterklieber and plastic surgery lectures by S. Metka and the author.5 Sepehripour, in 2012, carried out a survey with plastic surgery training

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representatives in England \((n = 26)\), concluding that most plastic surgeons have an art background in their lives, such as formal qualification, attendance to art courses/classes, or as a hobby. Moreover, 15 surgeons agreed or strongly agreed that artistic skills are important in plastic surgery.14

The study of the mimic muscles and their portrayed emotional expression may be helpful to plastic surgery. Masterpiece paintings may teach and guide us in performing myotomies or administering botulinum toxin injections.16

Surprisingly, many patients see and value their plastic surgeons as artists,13 as argued by Goldwyn in his 2004 editorial, and replied apud Cigna: “….if they could (the patients), they would choose Michelangelo instead of Hippocrates.”17 According to Rohrich and Sullivan, trainees in plastic surgery have gone through different learning processes, akin to the artistic approaches great artists took in the Renaissance.13 These peculiarities invite for a reflection on the importance of art in plastic surgery and how plastic surgeons can make art a daily asset in their lives, in and out of the operating theatre “milieu.”

**METHOD**

A sample of plastic surgery procedures was presented, relating their technical execution to the analogous author’s sculpting experience in clay, marble, and bronze contemporary art. Exploring those relations, this article intends to illustrate the extension of the contributions art has provided to the plastic surgery practice and the benefits art education may afford the plastic surgeon.

**DISCUSSION**

Januszkiewicz described 5 theoretical stages of creativity in the relationship of the plastic surgeon with the art activities: insight, sensory input, incubation, illumination, and artist releasing.14 These stages were considered in 2 main ways: analytical (logical and verbal) at the left cerebral hemisphere, and synthetic (intuitive and non-verbal) at the right hemisphere. Although controversies exist about the aforementioned cerebral locations, the corpus callosum connects both hemispheres. Looking at an object, our brain would possibly take the quickest, and logical left hemisphere mode, recognizing its shape. Once that task has been accomplished, the attention eases and focuses on the next target. Apud Januszkiewicz: “Awaken the R-mode (right hemisphere) and you will release the artist hidden within the plastic surgeon,” which means the observer employing his right hemisphere mode would go beyond the quick object recognition, and would catch “unnecessary features” to its visual recognition, like shadows, texture, and lines, in the same way the “artist eye” does.14 This theory corroborates the different ways plastic surgery residents learn, taking advantage of their predominant trends, skills, and talents as mentioned by Rohrich and Sullivan.12 If we consider visual perception as the key to the precise diagnosis of deformities, and the corner stone to the technique of choice and its well succeeded achievement, any supplementary “artistic view” data may be an asset to the surgeon’s work. Perception is as important as technique before, during, and at the end of any plastic surgery when evaluating the immediate postoperative result and the long-term expected outcome. Despite the innovations on imaging, no software or 3-dimensional printing can substitute the surgeon’s accurate perception. Drawing practice can make one’s perception very sharp, identifying proportions, symmetry, beauty, and especially its absence. Convexities and concavities in the face and body silhouette became readily evident in the draughtsman view taken by the plastic surgeon.2

Webster considered foreseeing imaginations a very important requisite for a plastic surgeon, and quoted Aristotle in his foreword to the Gillies and Millard book, *The Principles and Art of Plastic Surgery* (1957): “Art indeed consists in the conception of the result to be produced before its realization in the material.”12 Before the first strike hits the marble, or before the pigment touches the canvas, the artist needs an intention and a clear feeling of the expected result to pursue, especially considering a realistic sculpture or painting; performing plastic surgeries has the same connotation. The surgeon, as the artist, will usually foresee the idealized shape to be achieved as the end result of the procedure performed.

Beauty is an emotional response afforded by perception. For centuries, philosophers and artists have tried in vain to frame beauty as a purely rational or mathematical concept, sometimes recalling the alchemist’s chrysopoeia. Orthodontists and maxillofacial surgeons have sought cephalometric data and the phi number as ultimates to reproduce beauty in surgery.16,17 Dealing with beauty, experienced plastic surgeons and artists usually go beyond view, realizing how a canon transgression may sometimes bring an exotic, incredibly attractive beauty to someone’s face or body. Beauty is not the end product of a mathematical equation; it is an emotional outcome of an unexpected encounter. An equation can justify it but it will not necessarily make it.18,19

The Louis Sullivan principle, *form follows function*, was promoted in the famous Bauhaus design and architecture school. The same idea is useful in plastic surgery, especially in hand and craniofacial procedures. Moreover, it may be a sound advice throughout any cosmetic surgery, protecting the patient and the surgeon from overdoing procedures.

The practice of plastic surgery is exhausting, stressful, and imposes an outrageous pressure on every surgeon, although it is different in the way it affects the surgeon in aesthetic and reconstruction procedures. To see, perceive, and feel art in this daily endeavor makes this highly burdensome activity as light and rewarding as an artistic self-expression. A few reverberations of art and its principles to our surgical procedures are as follows.

**The Body and Head Proportions**

Leonardo da Vinci’s *Le proporzioni del corpo umano secondo Vitruvio*, from c.1490, at Gallerie dell’Accademia, Venice, Italy, depicts many curious proportions of the human body, of which the most practical ones are as follows: The ideal human height would be about 8 times the head. The second head measurement from the chin
would reach the male nipple level; the third, the elbow level, considering the hands are straight and relaxed by the sides; the fourth, the pubis and the wrist level; the fifth, sixth, seventh, and eighth would correspond to the body’s lower half (Fig. 1). It is useful to think of the head construction (cranium plus face) of an oval face as 3½ vertical units in length and 2½ horizontal units in width. The open hand, from the wrist to the tip of the middle finger, has the same length as the facial mid-line dimension from the chin to the hairline, and the face can be divided into 3 equal thirds from the chin to the hairline (Fig. 2). The head, by its turn, is divided into 2 halves through a line crossing the pupils (Fig. 2). The nose, the thumb, and the ear have approximately the same length.

**Rhinoplasty**

Rhinoplasty is different from marble and bronze sculptures, which keep their shape for their lifetime, but it recalls a fresh clay work getting dehydrated, shrinking, and cracking day after day, unless successfully burnt in the kiln. Hopefully, the sculptor will never face fibrosis, cartilage memory, and bone neoformation, but on the other hand, the artist dealing with marble will never have a second chance: once the dorsum is over resected, no grafting is possible and no retouch will be acceptable.

Despite the consecrated Leonardo da Vinci crayon sketch analyzing the shape and relationship of the facial features, the classical Greek nasal length of one third of the face has been abandoned in favor of shorter noses, considering the contemporary pattern of beauty (Fig. 3). The clay modelling practice portrays the vertical length of the contemporary nose as being oftentimes about 1½ the interalar nasal width distance or less, and the lateral nose profile as roughly being half cartilages (upper, alar, and septal) and half bones (nasal bones and maxillary processes). Moreover, quite different from the old Greek noses, the

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**Fig. 1.** The human body has an 8-head length proportion. (Men drawing Public Domain—Wikimedia Commons.)

**Fig. 2.** The face has 3 equal thirds from the chin to the hairline, and the head is divided into 2 halves through a transverse line at the pupils’ level.
frontonasal angle has been considered very desirable: the contemporary noses have a noticeably deeper radix at the end of the frontal bone. The nasal dorsum also requires a clear end, causing the tip to be 1 or 2 mm higher. After lowering the dorsum, we usually need to make fractures to close the nasal “open roof.” If the bones collapse after such fractures, an unacceptable “V-shape” deformity will result, requiring a spreader graft. The clay modelling work has also demonstrated that the usual clinical reference, one third of the interalar width as the ideal dorsum width over the nasal bones, may eventually not be aesthetically pleasant, but the intranasal width between the medial crural footplates may afford another reference to the dorsum as the adequate final width after the lateral fractures (Fig. 4). Even on marble, the ideally shaped nose must express the always desirable light reflection over the nasal tip (Fig. 5). In the aesthetic rhinoplasty, the best results sometimes rely on millimeters, but beyond rigid measurements, the surgeon’s aesthetic judgment is supreme as mentioned by Farkas et al.\textsuperscript{19}

Otoplasty

The ears have an extraordinarily complex cartilage scaffold, with many variations in size and proportion, and are not easy to mimic in clay or marble (Fig. 6). The ears depicted by great masters display many anatomical variations in their shapes (Fig. 7). Many unpublished “tips” from the sculpture activity can be applied in ear reconstruction after trauma, cancer, or congenital deformities as follows: the ear lobe vertical implantation is in the head’s midcoronal line (Fig. 8A), and the helix is slightly

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**Fig. 3.** The nose throughout the centuries: Greece 200 BC (A) and north Europe 2019 (B). (Sculpture, Public Domain—Wikimedia Commons; portrait of a man, from the Web.)

**Fig. 4.** The interalar width (A), the nasal dorsum width (B), and the intranasal distance between the medial crural footplates (C). Because the nasal dorsum width as one third of the interalar width may eventually be too wide, the intranasal distance between the medial crural footplates may be another reference. (Clay and bronze sculptures by the author.)
posterior to the same line (Fig. 8B); a horizontal line at the deepest crus of helix may divide the ears into 2 halves (Fig. 8C); after an otoplasty for prominent ears, the lower half of the helix should be partially hidden by the anterior concha in the frontal view, among many other noncanonical, useful references.

Blepharoplasty and Browlift

Reference lines and proportions contribute to precisely locate the eyes and the eyebrows whenever drawing, sculpting, or even reconstructing. The lower line at upper middle third of the face locates the eyebrows, while...
one third of the dimension between the right and the left lateral canthus of the eyelids will define one’s transversal eye width. We can also think about a face’s middle third as containing 3-dimensionally, 5 eyes from one temple to another (Fig. 9). The ptotic eyebrows, together with the upper eyelids, heavily contribute to express aging in our patients and even in the stiffness of the marble sculptures (Fig. 10). The clinical understanding of the facial aging process enhanced the representation of aged eyes and brows in my sculptures. Two other reference lines employed by artists may be useful in aesthetic and reconstructive surgery: the eyelids’ medial canthus vertical lines will point the ideal position of the nasal alae in White faces, and the irises medial borders vertical lines will point the mouth corners’ locations.

Lip Procedures

A line dividing the lower third of the face into 2 halves may locate the lowest point of the lower lip in the average face. The lips’ artistic anatomy is difficult to reproduce in clay or marble (Fig. 11), and the relations between the upper and the lower lips have to be respected: the less prominent upper lip is continuous with the middle face, and goes laterally backward before the lower one (Fig. 12). Besides, the roundness and fullness of the lips are attractive features to be considered, especially in late refinements of cleft lip surgery, or even lip filling for cosmetic reasons, with hyaluronic acid or fat.21

Mammoplasty

The contemporary idealized breast shapes that many patients demand are very often a half sphere with the nipple-areola complex on its top convex surface (Fig. 13), instead of the most realistic and natural conical shape seen in the standing position, and also influenced by the patient’s age, pregnancies, and hormonal changes.
Reduction mammoplasty, mastopexy, augmentation, and reconstructive mammoplasty can be based on the artistic Greek phi number (in honor of the sculptor Phidias): if the distance from the sternal notch to the projection of the nipple over the sternum is shorter than 16.0 cm, a mastopexy will probably not be required \(^2\) (Fig. 14).

**Body Contour and Liposuction**

The application of art training in these cases is mainly in the preoperative marking, when the “artistic eye” has to follow the right expected design for any particular gender and body type, foreseeing the result after skin retraction.\(^2\) In the transoperative fat grafting for body depressions, or breast augmentation, the surgeon may also think of “negative space” terms, as used in drawing and sculpting, once part of the injected volume disappears by absorption, leaving the body contour with the idealized foreseen shape.

As a matter of fact, a plastic surgeon can get good surgical results regardless of their formal art commitment, but the surgeon’s and the artist’s looks, although different in nature, background, limits, and goals, match one another profitably.

**CONCLUSIONS**

Art education contributes to plastic surgery by the following affordances:

1. Perception enhancement: By means of drawing exercises, art can teach the surgeon how to perceive the 3-dimensional world and register it as 2-dimensional sketches together with the standard usual preoperative pictures. Associating the human anatomy background, the art-oriented surgeon can readily perceive the body not only as sizes and shapes, but also as volumes, light reflection and shadows, besides the expected proportionality.

2. Imaginative foreseen view facilitation: the art practice develops the imaginative foreseen ability every plastic surgeon has. Before surgery, a 2-dimensional foreseen imaginative view of the deformity and its surgical planning affords a great asset to the surgeon.

3. Beauty understanding: Beauty is largely beyond any rigid mathematical principle or equation and plastic surgeons may apply their artistic feelings about beauty alongside ethnic considerations and the patients’ views of themselves, before creating a new reality and shape for their patients.
4. Haptic training and 2-dimension to 3-dimension reading: The clay modelling practice enhances the surgeon’s haptic skills and stimulates the interaction between the 2-dimensional and the 3-dimensional worlds in the same way a surgeon looks at the patient’s pictures throughout a rhinoplasty or any other plastic surgery.

5. Sensorial reprogramming. By the practice of drawing and clay modelling, “the eyes start to feel, and hands learn to see,” as stated by Neuffer-Hoffmann in 2009.

6. Architectural thinking: As in architecture, “aesthetics follows function” is a sound principle to keep in mind throughout cosmetic and reconstructive surgery.

7. Art introjection: The delight of artistic contemplation is a great relief in plastic surgery, at the museum, or even on the operating table.

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REFERENCES
1. Choi J. Cosmetic surgery: is it science or art? Arch Plast Surg. 2015;42:672–674.
2. Converse JM. Introduction to plastic surgery. In: Converse JM, eds. Reconstructive Plastic Surgery. Vol. 1, 2nd ed. Philadelphia, Pa.: Saunders; 1977: 3–68.
3. Hage J. González-Ulloa’s manifesto on aesthetic surgery. Plastic and Reconstructive Surgery. 2002;4:1167–71.
4. Pierre F. What is human beauty. In: Advanced surgical face rejuvenation. Heidelberg: Springer-Verlag Berlin AN; 2012:117–122.
5. Fernandes JW, Metka S. Art and plastic surgery. Aesthetic Plast Surg. 2016;40:331–333.
6. Thompson LW, Gosling CG, Epstein LI, et al. A simplified art course for the plastic surgeon. Plast Reconstr Surg. 1972;40: 408–410.
7. Morani AD. Art in medical education: especially plastic surgery. Aesthetic Plast Surg. 1992;16:213–218.
8. Güneron E, Kivrak N, Koyuncu S, et al. Aesthetic surgery training: the role of art education. Aesthet Surg J. 2005;25:84–86.
9. Sepehripour S, Patel AJK. Art, artistry, and plastic surgery. Plast Reconstr Surg. 2012;130:638e–640e.
10. Jankau J, Grzybiak M. Mimetic muscles and emotions: Hans Memling’s fifteenth century masterpiece, “last judgement,” as a study for aesthetic surgery. Aesth Plast Surg. 2002;26:146–150.
11. Goldwyn RM. The plastic surgeon as an artist. Plast Reconstr Surg. 2004;114:175.
12. Cigna E. Medicine and plastic surgery: science or art? Plast Reconstr Surg. 2004;114:598–599.
13. Rohrich RJ, Sullivan D. So, you want to be like Leonardo Da Vinci or Michelangelo? Which one are you? Plast Reconstr Surg. 2001;128:1309–1311.
14. Januszkiewicz JS. The hidden art in plastic surgery in five stages of creativity. Plast Reconstr Surg. 2002;109:2463–2470.
15. Webster JP. Foreword. In: Gillies H, Millard R, Magill I. Principles and Art of Plastic Surgery. Vol 3, Boston, Mass.: Little, Brown:1957.
16. Marquardt SR. Dr. Stephen R. Marquardt on the golden decagon and human facial beauty. Interview by Dr. Gottlieb. J Clin Orthod. 2002;36:339–347.
17. Jefferson Y. Facial beauty—establishing a universal standard. IFO. 2004;15:9–21.
18. Holland E. Marquardt’s Phi mask: pitfalls of relying on fashion models and the golden ratio to describe a beautiful face. Aesthetic Plast Surg. 2008;32:200–208.
19. Farkas LG, Kolar JC, Munro IR. Geography of the nose: a morphometric study. Aesthetic Plast Surg. 1986;10:191–223.
20. Fernandes J. Anatomia artística e opções técnicas na rinosseptoplastia. Ver Bras Cir Plást. 2018;33:40–42.
21. Fernandes JW. ed. Cirurgia Plástica Bases e Refinamentos. Curitiba, Brazil: Primax; 2012.
22. Fernandes JW, Miró A, Rocha AADS, et al. Practical criteria for a safer liposuction: a multidisciplinary approach. Rev Bras Cir Plást. 2017;32:454–466.