Aesthetic Breast Shape Preferences Among Plastic Surgeons

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Background: There has been little discussion in the plastic surgery literature regarding breast shape preferences among plastic surgeons, despite strong evidence that such aesthetic preferences are influenced by multiple factors. Much effort has been focused on delineating the objective criteria by which an "attractive" breast might be defined. This study aimed at providing a better understanding of the presence and significance of differences in personal aesthetic perception, and how these relate to a plastic surgeon's demographic, ethnic, and cultural background, as well as practice type (academic vs private).

Methods: An interactive online survey was designed. Modifiable ranges of upper pole fullness and areola size were achieved via digital alteration, enabling participants to interactively change the shape of a model's breasts. The questionnaire was translated into multiple languages and sent to plastic surgeons worldwide. Demographic data were also collected. Analysis of variance was used to elucidate plastic surgeon's breast shape preferences in respect to sex and age, geographic and ethnic background, as well as practice type.

Results: The authors gathered 614 responses from 29 different countries. Significant differences regarding preferences for upper pole fullness, areola size in the natural breast, and areola size in the augmented breast were identified across surgeons from the different countries. Further, significant relationships regarding breast shape preferences were distilled between the age and sex of the surgeon, as well as the practice type. No differences were found in respect to the surgeons' self-reported ethnic background.

Conclusions: Country of residence, age, and practice type significantly impact breast shape preferences of plastic surgeons. These findings have implications for both patients seeking and surgeons performing cosmetic and reconstructive breast surgery. In an increasingly global environment, cultural differences and international variability must be considered when defining and publishing new techniques and aesthetic outcomes. When both the plastic surgeon and the patient are able to adequately and effectively communicate their preferences regarding the shape and relations of the breast, they will be more successful at achieving satisfying results.

Key Words: breast, aesthetics, ethnic and cultural background, practice, international, augmentation, breast shape, preferences, age

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BACKGROUND

There has been little discussion in plastic surgery literature regarding breast shape preferences among plastic surgeons or laypersons, despite strong evidence that aesthetic preferences are influenced by several factors.[1–4] Significant differences in breast shape preferences have been demonstrated between plastic surgeons and breast augmentation patients with respect to superior pole contour.[5] Another study showed significant differences in preferences for breast fullness among plastic surgeons, cosmetic breast surgery patients, and reconstructive breast surgery patients.[6] However, these studies are limited to the national level.

Although plastic surgeons approach breast shape evaluation with the aid of seemingly objective linear and angular measurements, indicated by the often extensive preoperative markings, the overall impression of ideal proportions largely depends upon the individual's own aesthetic judgment. This rule applies for both patients and surgeons. Although this judgment, or "aesthetic sense," is strongly influenced by repeated observations and how one relates to beauty and perfection, it remains unknown to what extent it is influenced by age, sex, ethnicity, and cultural background.

Such findings could have significant implications for both patients seeking and surgeons performing cosmetic and reconstructive breast surgery, because cultural differences and international variability must be acknowledged when new techniques and aesthetic outcomes are being defined and published.

Pusic et al[7] performed a systematic review and found that "valid, reliable, and responsive instruments to measure patient-reported outcomes in cosmetic and reconstructive breast surgery" were lacking. They conclude that to demonstrate the benefits of aesthetic and reconstructive breast surgery, new cosmetic and reconstructive breast surgery-specific instruments must be developed and confirmed. Although objective and validated measures are useful, aesthetics are not defined simply by metrics alone. There is a strong psychological component to patient satisfaction as it relates to body image. Cosmetic proportion, balance and harmony with the personal expectations of the individual undergoing the procedure and the surgeon performing it, are critical factors that must be considered when determining satisfaction or "benefit." As such, ideal proportions and measurements, which define an attractive breast and are suggested in the plastic surgery literature, might not apply on a cross-cultural basis. Caution should be practiced if these standards were to be applied both on the part of the surgeon and the patient.

Objectives

This survey project was aimed at identifying and increasing the awareness of the existing variations in breast shape preferences among plastic surgeons around the world. The ways individuals define or recognize the criteria required for breasts to be considered attractive are quite diverse. However, the breasts are a key feature of the female body and have substantial impact on a woman's overall self-confidence and identity as a female.[8–10] Given the variable anatomy and controversies in breast aesthetics, the authors investigated the degree to which these differences may be influenced by ethnic background and nationality, as well as demographic factors such as age, sex, and type of surgical practice (academic vs private).

The results of this study will increase surgeons' awareness in respect to potentially significantly different breast shape preferences.

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The authors hope that this information will enhance and clarify communication among plastic surgeons, aid to put often quoted "ideal proportions" in context, and help to adequately and effectively define surgical goals, which will ultimately increase patients' and surgeons' satisfaction alike.

METHODS

Survey Design

An interactive, online survey (http://plastics.yale.edu/~jong/breasts2/) displaying computerized images of a white woman's breasts was designed. The volunteer model was photographed from anterior, oblique, and lateral views. Various ranges of superior pole fullness and areola size in the natural and augmented breast were achieved via digital alteration using imaging software (Adobe Photoshop CS5).

By choosing one of several circles, each of which reduced or augmented the specific areas of interest, participants were able to change certain characteristics in the shape of the model's breasts.

Specifically, these modifications allowed the survey taker to apply augmentation or reduction to upper pole fullness on a range of either 2 scales up or 2 scales down (Fig. 1). For areola size in the natural (Fig. 2) and augmented breasts (Fig. 3), the digital modifications allowed the user to apply augmentation and/or reduction on a scale between 15 and 50 mm, whereas the size and upper pole fullness of the breasts remained the same. The specific areas of modification were chosen because they were felt to be critical for achieving the desired aesthetic outcome in both reconstruction and augmentation procedures.

Demographic information including sex, age, country of residence/practice, ethnic background, and type of practice (academic vs private) was collected as well.

Participant Recruitment

Seven hundred plastic surgeons were contacted by e-mail correspondence through contact listings in national and international specialty societies, including, but not limited to, the member rosters of the American Society of Plastic Surgeons, the German Association of Plastic Surgeons (Vereinigung der Deutschen Plastischen Chirurgen), the French Society of Aesthetic and Reconstructive Plastic Surgery (La Société Française de Chirurgie Plastique Reconstructrice et Esthétique), the Brazilian Society of Plastic Surgery (Sociedade Brasileira da Cirurgia Plastica), the Colombian Society of Aesthetic and Reconstructive Plastic Surgery (Sociedad Colombiana de Cirugia Plastica Estetica y Reconstructiva), and the Indian Association of Aesthetic Plastic Surgeons. To maximize international participation, the questionnaire was designed in English, German, French, Portuguese, and Spanish.

The societies were chosen based on the size of their listed members (>500 members) to provide for adequate statistical power. Societies without public listings of their members were contacted directly to inquire about members and their respective e-mail addresses. The recruitment e-mail contained a header in the national language of the country in which the society was located, as well as a description of the nature of the study and links to the survey Web site in all 5 language translations.

During a period of 8 weeks, a total of 614 responses were gathered from plastic surgeons practicing in 29 countries. Only countries with a total number of responses of more than 25 met the

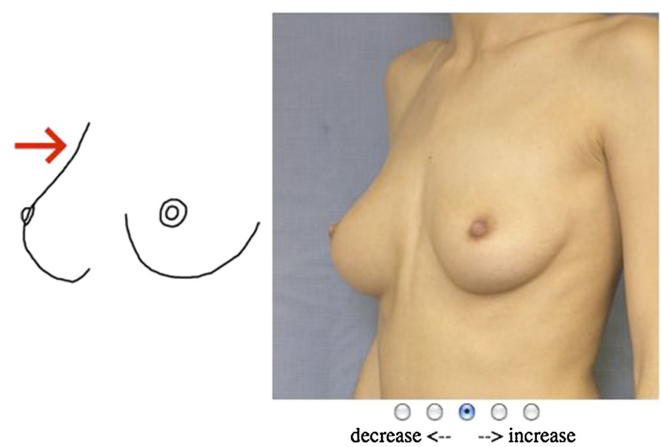

FIGURE 1. Interactive image allowing augmentation or reduction of upper pole fullness.

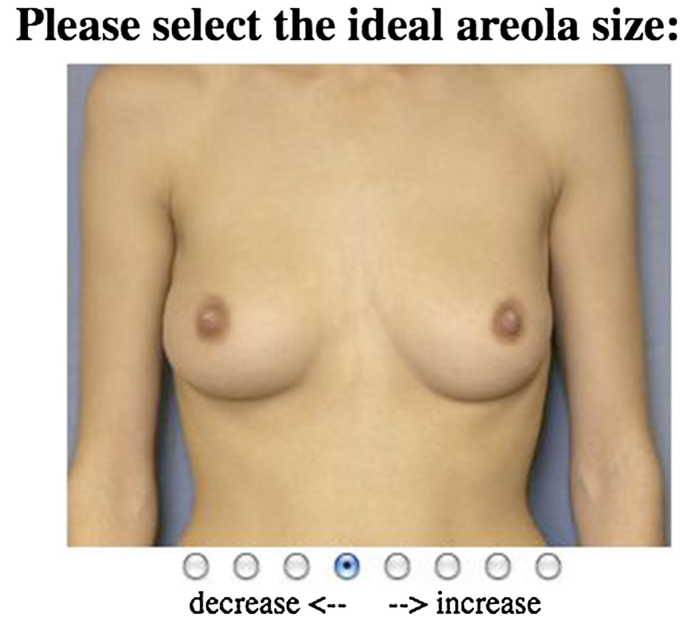

FIGURE 2. Interactive image allowing augmentation or reduction of areola size in the natural breast.

FIGURE 3. Interactive image allowing augmentation or reduction of areola size in the augmented breast.

TABLE 1. Respondents by Sex and Country of Residence/Practice

	Frequency		
	Male Surgeons	Female Surgeons	Percent
United States	236	47	46.1
Brazil	121	14	22
France	48	9	9.3
Germany	23	3	4.2
India	39	3	6.8
Others	56	15	11.6
Total	523	91	100

inclusion criteria for analysis for statistical significance (United States, Brazil, France, Germany, and India [in order of number of responses]) (Table 1).

Statistical Analysis

When processing the data, less than 1% was found to be missing. In the interest of data retention, the authors imputed the respective arithmetic means. Analysis of variance was used to elucidate differences for 3 indicators of breast shape preferences across countries, sex and age, and ethnicity and practice type. Normality assumptions of the 3 indicators of breast shape preferences were met.

RESULTS

Impact of Surgeons' Country of Residence/Practice on Breast Shape Preferences

To assess the impact of the variable "country of residence/practice" of plastic surgeons on aesthetic preferences, surgeon responses were grouped accordingly.

Upper Pole Fullness

Significant differences in opinion regarding ideal upper pole fullness were found among surgeons across countries, $F_{5,606} = 5.94$, $P < 0.0001$ (Fig. 4). Whereas surgeons in India expressed a preference for the greatest degree of upper pole fullness (M = 0.5 [0.1]), surgeons in France expressed preference for the lowest degree of upper pole fullness (M = 0.18 [0.1]).

Ideal Areola Size (in the Natural Breast)

Further, significant differences in opinion regarding ideal areola size in the *natural* breast were found across countries, $F_{5,606} = 3.42$, $P = 0.005$ (Fig. 5). Plastic surgeons in Brazil preferred the largest areola size (M = 33 [4]), whereas surgeons in Germany preferred the smallest (M = 30 [1]).

Ideal Areola Size (in the Augmented Breast)

Lastly, significant differences in opinion regarding ideal areola size in *augmented* breasts were found across countries, $F_{5,606} = 2.94$, $P = 0.012$. Again, surgeons in Brazil expressed preference for the largest areola size (M = 34 [5]), whereas surgeons in Germany expressed preference for the smallest (M = 31 [2]). However, surgeons in the United States (34.43), India (34.05), and France (33.86) all elucidate similar mean values of the selected values as the surgeons in Brazil.

Impact of Surgeons' Ethnicity on Breast Shape Preferences

To assess the impact of the variable "ethnicity" on breast shape preferences, surgeons' responses were grouped according to their self-reported identification with a specific ethnic group.

Breast shape preferences did not differ significantly across surgeons' self-reported ethnic groups regarding upper pole fullness, $F_{5,606} = 2.04$, $P = 0.07$; areola size of the natural breast, $F_{5,606} = 0.70$, $P = 0.62$; and areola size of the augmented breast, $F_{5,606} = 0.29$, $P = 0.92$.

The authors therefore conclude that differences in preferences in breast shape are independent of the surgeon's ethnicity, despite their significant variation across countries. The geographic location of the surgeon has therefore more influence on different beauty ideals than his or her ethnicity.

This finding is of major importance, highlighting the dependent relation between the surgeons' country of residence/practice and their aesthetic preferences in breast shape independently of their ethnic background. The underlying assumption therefore reveals that a surgeons' opinion is coined by their direct geographic environment and less so by their ethnic heritage.

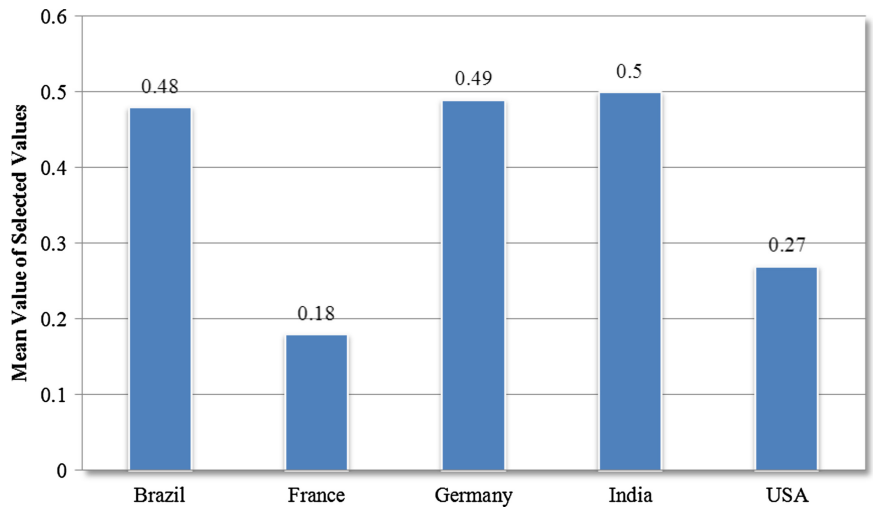

FIGURE 4. Perception of ideal upper pole fullness.

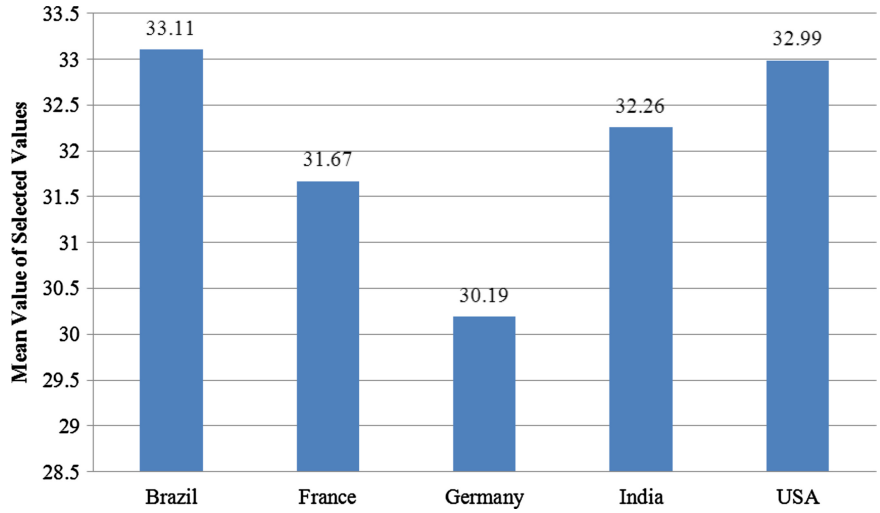

FIGURE 5. Perception of ideal areola size in the natural breast.

Impact of Surgeons' Age on Breast Shape Preferences

Significant relationships were distilled between surgeons' age and breast shape preferences. The age of the surgeons was negatively correlated with the perception of ideal upper pole fullness, $r = -0.11$, $P = 0.006$. Older surgeons prefer lower degrees of upper pole fullness.

This pattern was reversed for ideal areola size of natural as well as augmented breasts, where older surgeons preferred greater areola size in natural breasts, $r = 0.20$, $P = 0.001$ and augmented breasts, $r = 0.14$, $P = 0.001$. All of these relationships were significant ($P < 0.01$) after correcting for multiple comparisons using the Bonferroni method.

Interaction Effects

In a subsequent step, the data were analyzed for relations between multiple variables. A 3-way interaction effect of the (1) practice type (private vs academic), (2) sex, and (3) the surgeons' country of residence/practice were observed for ideal areola size preference in augmented breasts, $F_{3,588} = 3.55$, $P = 0.014$.

In the United States, preferences regarding areola size in the augmented breast differed significantly between male and female private surgeons. Whereas female private surgeons preferred larger sizes, male private surgeons selected smaller areola sizes. When comparing male surgeons among themselves, there was no difference. However, differences were found for women. Female academicians' selection of the ideal size is significantly smaller when compared to their female private colleagues (Fig. 6). Their male counterparts' preference is even lower.

In France, the assessment of ideal areola size in the augmented breast across private and academic surgeons follows a different pattern. Compared to the United States, it is the French male surgeons who prefer larger areola sizes in the augmented breast, not the women. Again, male private and academic surgeons seem to agree in their evaluation. The trend in preference among French women, however, is the same as for women in the United States. Private female surgeons in France prefer greater areola sizes in the augmented breast compared to their academic colleagues.

For Brazil, these variables interlink very differently. Here, female academic surgeons are the ones who selected the largest areola size among the interviewees of both sexes and types of practice. This evaluation is very contrary to their female private colleagues, who prefer the smallest areola size among all Brazilian survey participants. Also, unlike the pattern in the United States or France, male surgeons do not seem to agree. Private surgeons selected larger areola sizes as ideal compared to their academic colleagues. However, in

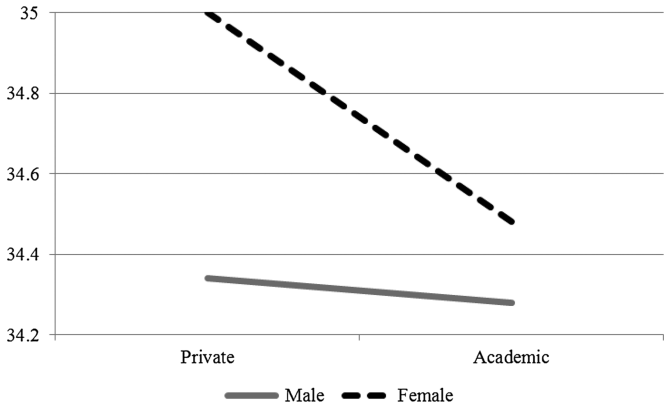

FIGURE 6. Perception of ideal areola size in augmented breast, with the following variables: sex, type of practice, and country of residence/practice—United States.

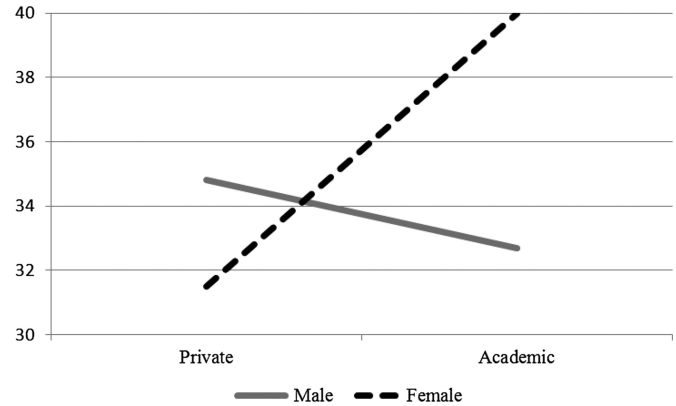

FIGURE 7. Perception of ideal areola size in augmented breast, with the following variables: sex, type of practice, and country of residence/practice—Brazil.

both types of practice, the values of as "ideal" selected areola size among male surgeons lied within the more extreme values compared to women (Fig. 7).

DISCUSSION

The female breast has been of central importance across countries and cultures since earliest times. Its absence or alteration in size and shape has a significant impact on not only a woman's perception and function in society but also on her personal well-being and self-esteem. As early as 3000 BC, women used primitive brassieres and corsets to enhance the appearance of their breasts.[11] The first reports of surgical approaches to the breast date back to the very roots of medicine.

Much research has been performed in the overlapping fields of evolutionary biology and psychology regarding attractiveness, specifically the mating advantages conferred by certain aspects of the female breasts. Adaptive psychological mechanisms play a dominant role in how attractiveness is judged. Humans have evolved to identify prospective mates who will increase reproductive success above the level expected in random mating based on a selection of well-defined and observable physical traits.[12,13] Several hypotheses exist regarding the visual cues, including size, symmetry, shape, areola diameter, and pigmentation, delivered by the breasts' morphology to a potential mate. Primary among them being signals related to changes in age and reproductive status.[14,15]

With the exception of a few brief periods in history, most notably the 15th and 20th centuries when women seem to de-emphasize the appearance of their breasts, large breast size has been considered the social ideal of beauty in many cultures.[16–19] In most studies, it has been associated with greater fertility, and hence, attractiveness ratings[20–22] compared to average female breast sizes.[23,24]

The authors' findings seem to conflict with these general conclusions. Surgeons in France and Germany, for instance, preferred less upper pole fullness and smaller areola sizes. Although rare, some reports have identified men in certain cultures that may have a preference toward female morphology signaling nulliparity.[25] In these societies, with breast size being a strong cue of a woman's age and increasing after pregnancy, men prefer breasts of smaller size.[26] However, other studies have failed to find any influence of breast size on attractiveness.[27,28]

Research has long tried to search for the "ideal" regarding surgical techniques as well as functional and aesthetic results of breast surgery.[29,30] Given multiple sociocultural factors influencing behavior and aesthetic perception, the authors investigated the question of how cross-cultural and demographic variables impact plastic surgeons' preferences regarding such "ideal" breast shape and size, as patients and surgeons should be aware of potential discrepancy between ideals and expectations.

With respect to breast aesthetics, the often-cited "golden ratio" may not hold true on an international basis, because it fails to establish uniformly applicable proportions and breast measurements, which would allow for a mathematical mean to delineate which proportions lead to a harmonious or, conversely, a deformed breast.[31,32] Consequently, plastic surgeons should not operate based on universal parameters. Different countries and their people are influenced and socialized by their ethnic and cultural environment, resulting in different aesthetic perceptions.[33]

With this study, the authors were able to show significant differences among plastic surgeons' breast shape preferences. Surgeons in India expressed a preference for the greatest degree, whereas surgeons in France prefer the lowest degree, of upper pole fullness. Similarly, significant differences regarding the ideal areola size of natural breasts were found across countries, with surgeons in Brazil expressing a preference for the largest areola size and surgeons in Germany expressing a preference for the smallest; a finding, which held true for augmented breasts as well.

Further, breast shape preferences did not differ significantly across surgeons' self-reported ethnic group, in either degree of upper pole fullness or areola size in the natural and augmented breasts. It seems that the country of residence/practice is the crucial factor when assessing a plastic surgeon's aesthetic perception, rather than the self-reported ethnic heritage.

Significant relationships were also distilled between the age of the plastic surgeon and breast shape preferences. The surgeons' age was negatively correlated with perceptions of ideal upper pole fullness and positively with areola size of both natural and augmented breasts. This finding suggests that older surgeons tend to have a preference for a lower degree of upper pole fullness and for larger areolas.

Arguably, throughout their career, each generation of plastic surgeons has been exposed to different sociocultural influences, including visual media, which might have influenced these findings.

The same assumption might explain intercultural preferences. Because media and suggested ideals in fashion and body habitus are different in every country, and therefore undoubtedly impact beauty preferences. It is important to note that the findings of this study represent current trends in aesthetics, are therefore only a snapshot in time, and may as such be subject to change, much like fashion for instance.[30]

Because this study was based on voluntary participation in an online survey, a certain degree of selection bias might prevail. Another point worth mentioning is the fact that the survey displayed 1 pair of breasts, which were artificially altered using digital software, a technique, which may be less ideal than comparing different "real" breasts with different features. On the other hand, by only using 1 pair of breasts for the evaluation, many potential confounding factors such as skin color, age of patients, and remaining body habitus do not need to be taken into consideration. Also, using different models also means that the actual proportions of breast size and shape would have to be calculated each time, as a big pair of breast in a larger person might evoke the same sense of "ideal" proportion as a smaller pair of breasts in a smaller person for instance. Using modern technology and changing only certain features of the breasts with an otherwise fixed body frame and thereby changing proportions, the point of this study, however, was to show exactly the opposite—apparently golden ratios and "ideal" proportions are not universally applicable and should be seen in context. Further, despite the artificial character of the model, the fact that all surgeons used the very same images for their assessment increased the validity of the findings.

Although foundation of any thorough patient consultation, specifically discussing and defining the desired goal of a cosmetic procedures and bearing in mind that surgeon and patient may not be "on the same page" is of utmost importance. Arguably, the patients' aesthetic desires are ultimately the gold standard and will judge upon the surgical result, even if it may be different from the surgeons' perceived ideal. Again, although most plastic surgeons will acknowledge these facts given their experience, it is very hard to prove it numerically. The aim of the study was, consequently, different in that it was trying to prove that plastic surgeons' "ideal" dimensions of a female breast are indeed very different; that depending on ethnic and geographic background, certain preferences can be elucidated across certain groups of plastic surgeons; and that, as such, in the international plastic surgery literature, often-cited "ideal" dimensions and measurements of the breast have to be interpreted with caution.

This study may change a surgeon's modi operandi because it sensitizes the aesthetic perception of plastic surgeons. It emphasizes that many factors need to be taken into consideration in respect to the aesthetic evaluation of our patients, including country of residence/

practice, sex, age, and ethnic background. It is important to keep such factors in mind, as they can aid with preoperative planning and intraoperative decision-making. They also help to establish a common denominator between patients and surgeons, which might ultimately lead to higher patient satisfaction.

The authors suggest that future research should consider investigating whether surgeons' opinions lead to surgical behavior change across different countries. For example, by having augmented many women's breasts, have plastic surgeons affected the way society thinks breasts should look like and the way they are portrayed in the media?

CONCLUSIONS

Aesthetic perception is influenced by a wide range of factors. This study illustrated that intercultural and ethnic differences as well as surgeons' age and sex play a major role in this regard.

Now more than ever, and particularly in the field of plastic and reconstructive surgery, globalization suggests more and more unified surgical goals. It has been found that, at least with respect to breast aesthetics, this does not necessarily hold true. The authors of this study urge all plastic surgeons to take all compounding factors into consideration when defining surgical goals with their patients, which will ultimately aid in achieving optimal aesthetic outcomes, satisfying both surgeon and patient alike.

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