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Cosmetic

Evaluation of Different Breast Implant Shapes in the Same Patient: Is There Really a Difference between Round and Anatomical Implants?

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Background: The choice of the right implant shape is one of the most frequent debates in cosmetic breast augmentation. In current literature, the question of whether there is a difference in the appearance of different implant shapes is still an argument of highly controversial discussion. The aim of the present work was, therefore, to analyze whether any difference exists in terms of aesthetic outcome between round and anatomical implants, and if they can be distinguished from each other in a like for like swap, making sure the evaluation was made in exactly similar conditions.

Methods: Fourteen consecutive patients who underwent aesthetic breast augmentations received primarily an implant of a given volume, projection, and shape (round or anatomical) and then decided to undergo implant replacement to a different shape but maintaining the same volume and projection. At 12-months follow-up, standardized photographs were taken, blinded and randomized. They were evaluated by 10 plastic surgeons and 10 nurses.

Results: All 20 observers could distinguish between round and anatomical shape in all 14 cases (100%), which was highly significant ($P < 0.0001$) for each observer.

Conclusions: The present data indicate that there is a clear difference between anatomical and round-shaped implants in terms of aesthetic appearance, when a comparison is properly performed. With the use of both round and anatomical implant shapes, aesthetically appealing results can be achieved in cosmetic breast augmentation. The right implant choice must be made, based on patients' anatomy and desires.
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INTRODUCTION

Cosmetic breast augmentation remains one of the most frequently performed procedures of aesthetic plastic surgery. The choice of the right implant, which should always be a made-to-measure process for each patient, is key for the outcome and for the prevention of postoperative complications. Among the huge variety of commercially available implants, which can be selected as round or anatomical, there is no certain consensus about which implant shape is preferable for use. Generally speaking, anatomical implants offer greater versatility, as they can be varied in height, width, and projection independently of each other. With round implants, the width and the height are always the same with the only independent variable being the projection. The other fundamental difference between the two shapes is with the maximum point of projection; in round implants, the projection point is relatively high, and with anatomical implants the projection point is low, and this can influence nipple position significantly.

Given the right indications, both round and anatomical implants can certainly guarantee favorable outcomes. Comparing pros and cons of both shapes, the risk of malrotation is one of the main drawbacks of anatomical implants, which is around 5%, especially after subglandular placement.[1–5] The development of BIA-ALCL

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is also a rare, but significant complication mainly associated with textured implants. These factors should be taken into account when selecting the implant shape and surface.[6,7] On the other hand, textured implants are also associated with lower rates of capsular contracture and implant rupture,[7–9] as well as lower reoperation rates and lower overall complication rates than round smooth implants.[10–12]

The aesthetic results and the indications for use of anatomical versus round implants are still subject to constant debate. Furthermore, there are studies[13–16] suggesting that there is no difference in the cosmetic outcome of the two implant types, and that as surgeons we are unable to differentiate between the two different shapes in any case. Given these statements, the question then arises as to whether or not there is a substantial difference between round and anatomical-shaped implants for cosmetic breast augmentation, both in terms of aesthetic outcome and indication for use and, subsequently, whether or not both implant shapes are still needed in the surgeon's toolbox.

We have already published several studies making the point of the precise different indications for use of anatomical versus round implants.[8–11] The main hypothesis of the present work was, therefore, to examine if round and anatomical implants can be distinguished from each other in terms of final aesthetic outcome, comparing implants of the same volume and projection but different shape, applied to the same patient at different time frames.

Most importantly, it needs to be emphasized that the primary goal of this project was to establish whether or not a difference was discernible between the two implant types in terms of shape. The authors did not aim to depict any cosmetic superiority of round or anatomical implants, simply whether they could be differentiated in a like for like swap.

MATERIALS AND METHODS

The present study included all consecutive patients who underwent implant exchange for mere aesthetic reasons between 2010 and 2020 at the same institution. Only those patients who received an implant of the same volume and projection, but different shape (from round to anatomical or from anatomical to round), were included. A total of 14 consecutive patients who had primarily received an implant of a given volume, projection and shape (round or anatomical) decided to undergo implant replacement to a different shape but maintaining the same volume and projection. Implant replacement was performed by the first author on all cases for sole aesthetic reasons on patients' request; none of the patients showed postoperative complications of any kind. Follow-up time was 12 months for all patients, and standardized photographs were taken. All patients included were operated on by the same surgeon and received their implants in the submuscular space through an inframammary incision.

The images of the included patients were then blinded, randomized and thereafter evaluated by 10 plastic surgeons and 10 nurses, experienced with cosmetic breast augmentation (see Fig. 1 for typical sets of patients' images). The observers were asked whether they could determine which implant shape (round or anatomical) had been used in the same patient in each of the images.

Takeaways

Question: The present study aimed to show differences in the appearance of anatomical and round-shaped implants.

Findings: Fourteen consecutive patients who underwent aesthetic breast augmentations and received an implant change of different shape were evaluated by 10 plastic surgeons and 10 nurses. All implants were identified correctly.

Meaning: The present data indicate that there is a clear difference between anatomical and round-shaped implants in terms of aesthetic appearance, when a comparison is properly performed.

Statistics

The data were summarized as counts and percentages. Binominal distribution was used to test for statistical significance. A P value of 0.05 was set as statistically significant.

RESULTS

During this retrospective study, 20 observers (10 plastic surgeons and 10 nurses) were able to detect whether the implant shape used was round or anatomical in 14 cases (Fig. 2). In total, 280 decisions were made. All 20 observers made the right choice, assigning the right implant shape in all 14 cases (100%), reaching highly significant P values ($P < 0.0001$) for each observer (Table 1). There was no difference between surgeon and nurse cohorts.

DISCUSSION

The presented data support the main hypothesis of this work, that round and anatomically shaped implants can clearly be distinguished in terms of their appearance. However, to properly make this comparison, similar conditions need to exist: the only way to obtain these unique conditions is to observe the same patient at two different timeframes, carrying implants of the same volume and projection but with different shapes. By this means, interindividual differences can be ruled out, making the different appearance of both implant shapes clearly visible. This was further supported by the fact that all observers could precisely identify the correct implant shape in 100% of cases.

Previous attempts have been made to determine whether we, as surgeons, are able to perceive the difference between round or anatomical implants in postoperative patient images. Some studies have indicated that differences are perceivable between the different implant shapes.

In particular, Bletsis et al compared 20 patients with round or anatomical implants, with plastic surgeons and lay participants as observers, to distinguish between both types, and also assessed their aesthetical outcome.[12] Both lay person and surgeon cohorts were able to predominantly

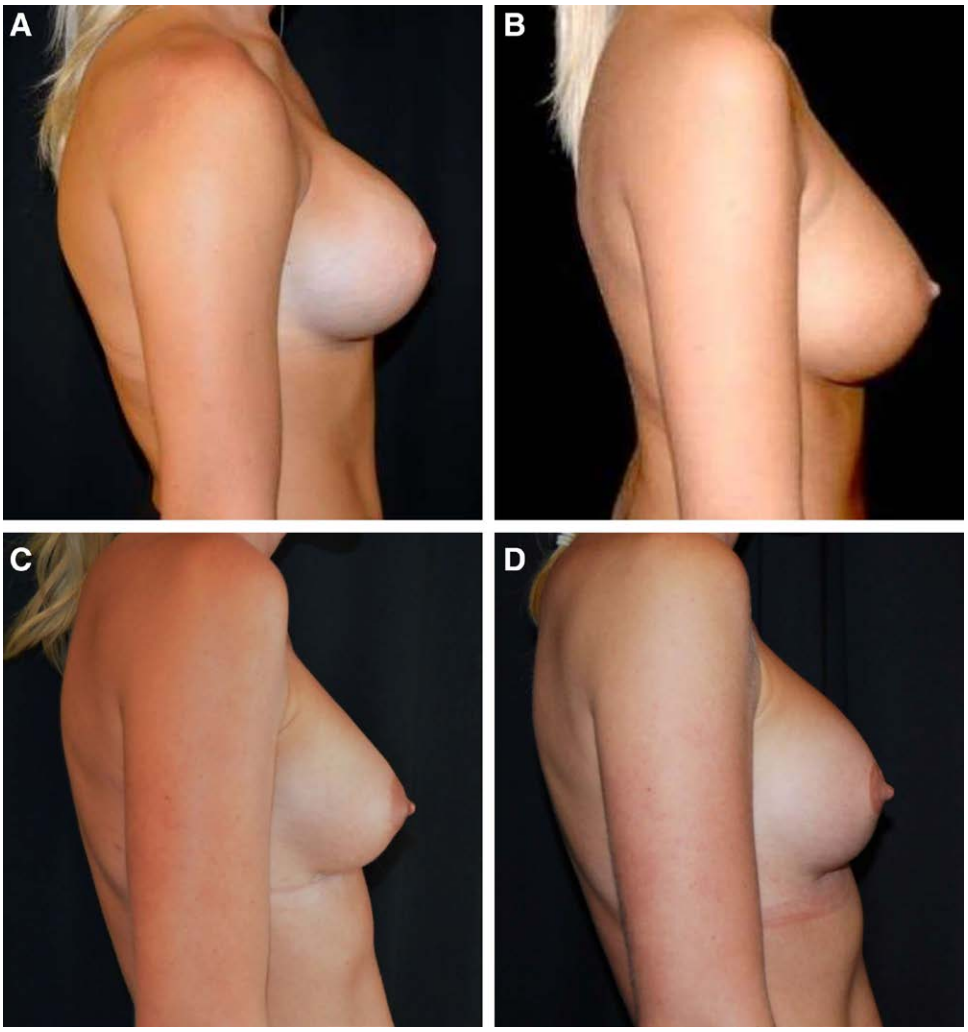

Fig. 1. Blinded and randomized picture set of patients who received two different implants for cosmetic breast augmentation with same size and projection but with different implant shape (round and anatomical shape). The upper two images (A, B) show the same patient with round implants on the left side of the image and anatomical implants on the right side. The lower image row (C, D) depicts another patient with anatomical implants on the left side and round implants on the right side. All pictures were taken during 12 months follow-up.

identify the correct implant type and, moreover, selected the anatomical implants to be more natural and attractive in appearance.

In addition, a German research group (Kovacs et al) compared pre- and postoperative results of axillary breast augmentation with round and anatomically shaped implants via 3D scan.[13] Interestingly, at the same implant size and volume, they noted an increased projection in the anatomical implant group. Arvind et al compared the accuracy of assignment of round an anatomical implant shape in different patients during the London breast meeting in 2016, showing that even experienced plastic surgeons could not tell whether a round or anatomical implant was used.[14]

Other high profile studies, including those of Rubi and Hidalgo, have claimed that we are unable to distinguish between round and anatomical implants and in turn have inferred that as a result, there is no indication for the use of anatomical implants.[15,16] Rubi et al compared single pre- and postoperative photographs of 30 patients who had had either a round or an anatomical implant placed (no comparison was made of the different shapes within the same individual). An experienced cohort of 30 surgeons and nurses were asked to evaluate the images 1 year postoperatively to see if they could determine whether a round or an anatomical implant had been used in each individual. Only 50.3% of the implants were identified correctly, with no significant difference between the surgeons' and nurses' cohort. In the study by Hidalgo and colleagues, 10 surgeons and 10 lay observers assessed intraoperative photographs of 75 patients with a round-shaped implant in one breast and an anatomical device inserted in the other. Both lay person and surgeon cohorts did not find differences in

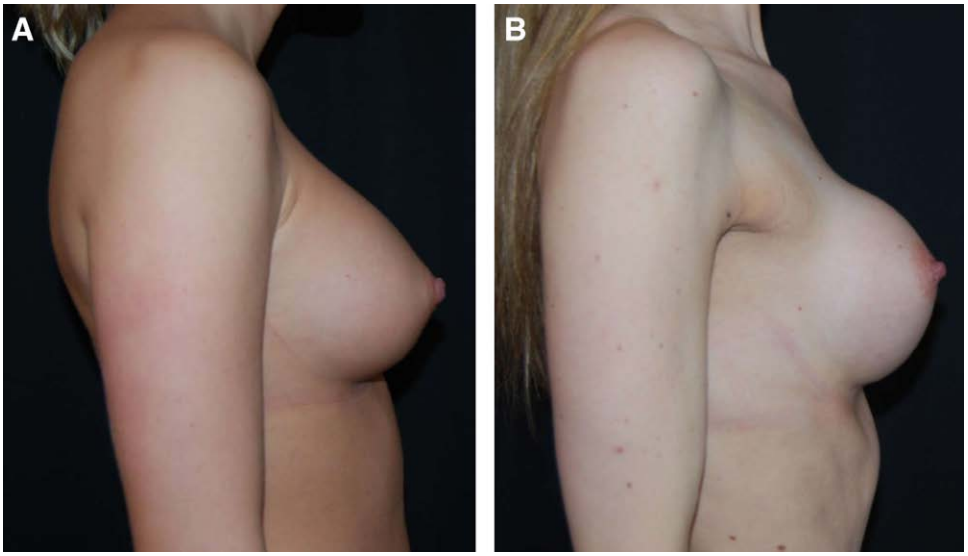

Fig. 2. This picture set shows two different patients who received different implant shapes (round and anatomical) for cosmetic breast augmentation. These patients should simply exemplify how easy it is to misidentify the implant shape if no proper comparison is made. The patient on the right (B) looks round, but she received an anatomical implant. The patient on the left (A) looks anatomical, but she received a round implant. Both pictures were taken 12 months postoperatively. The shown patients in this figure were not part of the study cohort.

Table 1. Correct and Wrong Decisions Made by Each Observer (10 Nurses and 10 Plastic Surgeons) Discerning the Use of Round or Anatomical-shaped Implants

	Correct Decisions (%)	Wrong Decisions (%)
Observer 1	14 (100)	0 (0)
Observer 2	14 (100)	0 (0)
Observer 3	14 (100)	0 (0)
Observer 4	14 (100)	0 (0)
Observer 5	14 (100)	0 (0)
Observer 6	14 (100)	0 (0)
Observer 7	14 (100)	0 (0)
Observer 8	14 (100)	0 (0)
Observer 9	14 (100)	0 (0)
Observer 10	14 (100)	0 (0)
Observer 11	14 (100)	0 (0)
Observer 12	14 (100)	0 (0)
Observer 13	14 (100)	0 (0)
Observer 14	14 (100)	0 (0)
Observer 15	14 (100)	0 (0)
Observer 16	14 (100)	0 (0)
Observer 17	14 (100)	0 (0)
Observer 18	14 (100)	0 (0)
Observer 19	14 (100)	0 (0)
Observer 20	14 (100)	0 (0)

the aesthetic appearance, nor were they able to correctly identify the implant shape. The principal shortcomings of this study are that although they compared round and anatomical implant shapes in the same patient, they did so by putting a round implant in one breast and an anatomical in the other breast—not a direct comparison. Furthermore, intraoperative photographs were made, which strongly differ from the postoperative outcome, considering the perioperative swelling, adequate wound closure, and scarring. Furthermore, sizers were used for the anatomical side, whereas round implants were used for the contralateral breast. Lastly, the study excluded patients with important indications for anatomical devices—for example, lower pole constrictions or chest wall deformities.

Finally, a comparative study by Al-Ajam et al assessed photographs of 60 patients who had undergone primary breast augmentation with round or anatomical devices.[17] In 45% of all reviewed cases, the expert panel of 22 plastic surgeons was not able to identify the implant shape correctly, and furthermore, no differences in aesthetic or natural appearance became evident.

Although these data seem quite controversial, it needs to be underlined how almost all studies compared round and anatomical implant shapes in *different* patients or *different* breasts. However, looking at a single picture of a patient who has undergone breast augmentation, in an attempt to guess whether a round or an anatomical implant was used, has no scientific validity. Figure 2 is a very good example of how the appearance of round and anatomical implants can differ highly among different patients, making it virtually impossible to distinguish which shape was used. In fact, the soft tissue envelope, the subglandular/submuscular placement, the size, the gel, and the projection of the implant are key to determine the aesthetic outcome of each breast augmentation. For this reason, it is not possible to compare the aesthetic outcome of different patients (each of them with their own unique features) who have received implants with different characteristics (gel, volume, projection, placement). As previously said, the only way to make this comparison scientifically valid is to compare shapes in the same patient carrying an implant with the same characteristics.

Possible indications for choosing round or anatomically shaped implants have been discussed quite extensively[8,11] and have previously been published; therefore, we did not feel we needed to repeat them.

Although the results of this work clearly support the main hypothesis, there are some limitations of this study, the principle one being the limited number of patients recruited. This limitation is somewhat negated by the fact that in all 14 cases, the observers were able to distinguish between anatomical and round implants with 100% accuracy, in the same individual. Furthermore, consistency of protocol was ensured by the fact that all cases were carried out by the same surgeon (the principal author), using implants with the same properties in terms of dimension and gel properties and all placed in the same subpectoral plane.

The question of whether anatomical or round implants are superior with regard to aesthetic outcome remains open to debate, and although established norms of breast beauty[18] might favor the use of anatomical implants in many cases, similar results can be achieved using well-selected round implants in patients with good anatomy.

However, the purpose of this study was not to address the issue of outcome or indications for the selection of different implants but rather to contest previous assertions that there are no differences between round and anatomical implants, and that we as surgeons are unable to tell them apart. On the contrary, we have been able to demonstrate that there is an easily discernible difference between the two when exactly similar implants are placed and compared with each other in the same breast in the same individual.

CONCLUSIONS

There is no doubt that there are fundamental differences between round and anatomical implants, as already discussed, and as has been previously published in the literature. Understanding the differences between the two is key in making appropriate choices to maximize outcome and patient satisfaction after breast augmentation surgery. It is the authors' view that there are indications for both round and anatomical implants in the practice of aesthetic breast surgery, and to limit practice to the use of only one shape could lead to a compromise in outcome with higher reoperation rates. Ultimately, implant selection needs to be tailored according to patients' anatomy and their individual desires or needs. It is incumbent upon all of us as surgeons to offer the best solution to our patients, free from personal bias or vested interests.

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DISCLOSURES

Dr. Montemurro is a consultant and speaker for Polytech (Hörsching, Austria). Dr. Mallucci is a speaker for Polytech, Laboratoires Sebbin (Boissy-l'Aillerie, France) and Becton Dickinson (Franklin Lakes, USA). Dr. Hedén has had consultancy agreements with Allergan (Dublin, Ireland), Mentor Worldwide LLC (Irvine, USA), G&G Medical (Ware, USA), Establishment Labs (Costa Rica) and GC Aesthetics (Dublin, Ireland), is a shareholder in Polytech and Establishment Labs, and has a Development Contract with Allergan. Dr. Williams is an Education advisor for Mentor Worldwide LLC and Consultant for Becton Dickinson. Drs. Nava and Wagner have no financial interests to declare in relation to the content of this article.

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