

Turkish Plastic Surgeons' Preferences Related to the Inframammary Approach in Breast Augmentation Surgery: A Descriptive Study

İnframammarian Yaklaşım ile Yapılan Meme Büyütme Ameliyatında Türk Plastik Cerrahların Tercihleri: Tanımlayıcı Çalışma

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ABSTRACT Objective: Breast augmentation is one of the most frequently performed aesthetic surgery procedures. Unlike in other surgeries, the location of the incision is vital in breast augmentation, especially in the inframammary incision. A survey was conducted to define surgeons' preferences in the inframammary approach to breast augmentation. **Material and Methods:** A 16-item electronic questionnaire was administered to plastic surgeons in Türkiye. Questions on incision location, incision length, implant, surface, and other details were included. The collected data were analyzed. **Results:** There were 140 plastic surgeons who responded. The respondents preferred inframammary incisions in 97%, axillary incisions in 2%, and periareolar incisions in 1% of cases. Moreover, 66% preferred subglandular or subfascial pockets, whereas 34% preferred submuscular pockets. Eighty-five percent used round implants, and 15% used anatomical implants most commonly. Ninety-six percent preferred textured implants, and 4% preferred smooth implants. The most prominent reason for preferring the inframammary approach was "easier implant insertion," with 62% giving this response. The mean inframammary incision length was 4.02 (± 0.36) cm for implants of less than 300 cc, 4.37 (± 0.60) cm for implants of 300-399 cc, 4.68 (± 0.66) cm for implants of 400-499 cc, and 4.85 (± 0.69) cm for implants of 500 cc or above. **Conclusion:** Although practices for the length of the incision and its vertical and horizontal location differ between surgeons in the inframammary approach, it is by far the most preferred incision location among plastic surgeons in Türkiye.

ÖZET Amaç: Meme büyütme, en sık uygulanan estetik cerrahi prosedürlerinden biridir. Diğer cerrahilerin aksine insizyonun yerleşimi özellikle inframammarian insizyondan çok önemlidir. Bu sebeple cerrahların inframammarian yaklaşımla meme büyütmedeki pratiklerini ortaya koymak için bir anket uygulandı. **Gereç ve Yöntemler:** On altı soruluk elektronik bir anket Türkiye'deki plastik cerrahlara uygulandı. İnsizyon yerleşimi, insizyon uzunluğu, implant şekli, implant yüzeyi ve diğer detaylara dair sorular mevcuttur. Toplanan veriler analiz edildi. **Bulgular:** Çalışmaya 140 plastik cerrah katıldı. Tercih edilen insizyon %97 inframammarian, %2 transaksiller, %1 periareolardı. Katılımcıların %66'sının subglandüler ya da subfasial planı, %34'ünün ise submusküler planı tercih ettiği görüldü. Yüzde 85 yuvarlak, %15 anatomik implant kullanımı tespit edildi. Yüzde 96 pürüklü, %4 düz yüzeyli implant tercih edildiği görüldü. İnframammarian yaklaşımın tercih edilmesindeki en öne çıkan neden %62 ile "daha kolay implant yerleştirilmesi" idi. Ortama inframammarian insizyon uzunluğu 300 cc altındaki implantlar için 4,02 ($\pm 0,36$) cm, 300-399 cc aralığındaki implantlar için 4,37 ($\pm 0,60$) cm, 400-499 cc aralığındaki implantlar için 4,68 ($\pm 0,66$) cm ve 500 ve cc üzeri implantlar için 4,85 ($\pm 0,69$) cm olarak hesaplandı. **Sonuç:** İnsizyonu uzunluğu, vertikal ve horizontal yerleşimi cerrahlar arasında farklılık gösterse de inframammarian yaklaşım meme büyütmede Türkiye'de en çok tercih edilen insizyon şeklidir.

Keywords: Breast implants; breast implantation; mammoplasty

Anahtar Kelimeler: Meme implantları; meme implantasyonu; mammoplasti

Breast augmentation is one of the most frequently performed aesthetic surgical procedures in the world. There are many variables in breast augmentation planning, such as incision placement (inframammary, periareolar, transaxillary, or transumbilical), pocket placement (subglandular, subfascial, subpectoral, total submuscular, or dual-plane), implant shape

(round or anatomical), implant surface (smooth, textured, or polyurethane-coated), and filler material (silicone or saline). The inframammary approach is the most common type of incision. However, unlike in other incisions (periareolar, transaxillary, or transumbilical), the location of the inframammary incision is vital for implant pocket dissection.

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Various well-known formulas have been described for determining the vertical location of an inframammary incision. Tebbetts first described the “TEPID System” in 2002, and a few years later, Tebbetts and Adams reported the “High Five System” in 2006.^{1,2} Later, Mallucci and Branford described the “ICE Principle.”³ More recently, Beekman and Beekman reported the “ARC Algorithm.”⁴ All these methods are primarily based on the nipple (N) and inframammary fold [(IMF) existing or planned] distance measured during stretching. Considering the dimensions of the implant to be placed, the required N and IMF distances are calculated. There are also other studies on vertical location, horizontal location, and length of inframammary incision.⁵⁻⁷

It has been observed that according to surgeons, it is unrealistic to apply the fine mathematical calculations described above in practice. As in other procedures, surgeons have personalized practice in breast augmentation with an inframammary approach. For this reason, it was desired to describe Turkish plastic surgeons’ practices in breast augmentation, especially in designing inframammary incisions, and a survey study was conducted to accomplish this.

MATERIAL AND METHODS

A 16-item electronic questionnaire written in Turkish was sent to plastic surgeons in Türkiye via email groups. The survey study, created in Google Forms (Google, Mountain View, CA, USA), started in January 2022 and was completed in February 2022. The questionnaire addressed incision location, incision length, implant, surface, and other details in breast augmentation surgery. Respondents were anonymous and informed about the purpose of this survey study. Ethics committee approval is not required for this type of study. Informed consent was obtained from the patient whose body was partially visible in the questionnaire. Guiding principles from the Declaration of Helsinki were followed. The survey results were analyzed using standard methods. Charts were created using Microsoft Excel for Mac Version 16.57 (Microsoft Corp., Redmond, WA, USA). The 16-item questionnaire is given in [Appendix 1](#).

RESULTS

The total number of respondents was 140. The average experience of the participants as plastic surgeons was 8.01 (± 5.83) years. Thirty-two percent of participants had performed 100 or more breast augmentations. Sixty-six percent preferred subglandular or subfascial pockets, whereas 34% preferred dual-plane, subpectoral, or total submuscular pockets. Eighty-five percent uses round implants most commonly, and 15% used anatomical implants. All participants preferred silicone gel-filled breast implants. Ninety-six percent preferred textured implants, and 4% preferred smooth implants. Seventy-two percent of the participants most commonly used implants in the volume range of 300-399 cc. Ninety-seven percent used inframammary incisions, 2% used transaxillary incisions, and 1% used periareolar incisions. None of the surgeons preferred the transumbilical route ([Table 1](#)).

The most prominent reason for preferring the inframammary approach was “easier implant insertion,” at 62%. Thirty percent of the participants did not need incision lengthening, whereas 70% sometimes needed incision lengthening ([Table 2](#)). The mean preferred inframammary incision lengths were 4.02 (± 0.36) cm for implants of less than 300 cc, 4.37 (± 0.60) cm for implants of 300-399 cc, 4.68 (± 0.66) cm for implants of 400-499 cc, and 4.85 (± 0.69) cm for implants of 500 cc or above ([Figure 1](#)).

In the question about the horizontal placement of the inframammary incision, 51% of the respondents chose the option in which “approximately 1/3 of the incision is medial to the imaginary vertical line passing through the N” ([Figure 2](#)). In the question about the vertical placement of the inframammary incision, 73% of the respondents chose the option stating, “I adjust the distance between the N and the incision according to the diameter of the implant to be placed” ([Figure 3](#)).

DISCUSSION

It is natural to observe differences in common practices related to aesthetic surgical procedures between regions or countries. In breast augmentation, there is a difference between North America and Europe, especially in terms of the selection of implants.

TABLE 1: Common practices in breast augmentation.

Question	Percent of total respondents (n=140)
Approximately how many breast augmentation surgeries have you performed to date?	
1-9	11 (8%)
10-49	34 (24%)
50-99	50 (36%)
100 or more	45 (32%)
In which pocket plane do you place implants most often?	
Subglandular or subfascial	93 (66%)
Dual-plane, subpectoral or total submuscular	47 (34%)
What implant shape do you use most often?	
Round	119 (85%)
Anatomical	21 (15%)
What implant filler type do you use most often?	
Saline	0 (0%)
Silicone	140 (100%)
What implant shell surface type do you use most often?	
Smooth	5 (4%)
Textured/microtextured/nanotextured/polyurethane coated	135 (96%)
In which volume range do you use implants most often?	
Less than 300 cc	22 (16%)
300-399 cc	101 (72%)
400-499 cc	17 (12%)
500 cc and above	0 (0%)
What is your most preferred incision location?	
Inframammary	135 (97%)
Periareolar	2 (1%)
Transaxillary	3 (2%)
Transumbilical	0 (0%)

TABLE 2: Reasons for preferring the inframammary approach and the need for incision lengthening.

Question	Percent of total respondents (n=135)
Why do you prefer inframammary incision? (You can choose multiple responses)	
Ease of implant pocket dissection	62 (46%)
More precise adjustment of pocket dissection boundaries	79 (59%)
Ease of inframammary fold repositioning	75 (56%)
Easier implant insertion	83 (62%)
Does not require transect through the breast tissue	55 (41%)
Faster wound healing	26 (19%)
Less scarring	41 (30%)
Other	5 (4%)
Do you require some lengthening of the inframammary incision in case of difficulty during sizer or implant insertion?	
Yes, my incision lengthening rate is 50% or more	11 (8%)
Yes, my incision lengthening rate is between 25% and 50%	18 (13%)
Yes, my incision lengthening rate is between 10% and 25%	35 (26%)
Yes, my incision lengthening rate is 10% or less	31 (23%)
No, I do not need incision lengthening	40 (30%)

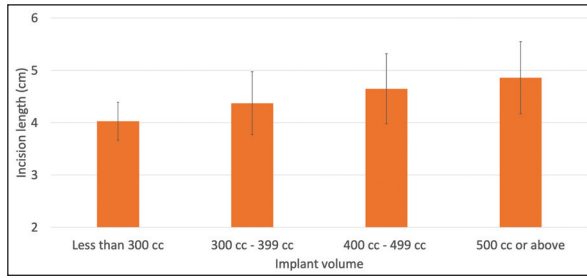


FIGURE 1: Mean inframammary incision length preferred according to implant volume ranges.

Hidalgo and Sinno presented current breast augmentation practices in the United States via a comprehensive survey.⁸ Moreover, Heidekrueger et al. reported the results of a worldwide survey designed by Hidalgo and emphasized that there were significantly different practices on an international basis.⁹ In the present study, the questionnaire was shorter than those used in previous research, and it focused on the most commonly performed inframammary approach practices.

The subglandular or subfascial pocket planes were found to be more common than the submuscular pocket planes in this study. This finding is similar only to Latin America, where use of submuscular

pocket planes is more common than it is in other regions.⁹ A possible reason for this finding may be the increasing popularity of the combined use of implants and fat grafting, which is called “composite breast augmentation” or “hybrid breast augmentation.” The tendency to prefer a submuscular approach in thin patients may have decreased with the use of fat grafts.

The rate of using round implants was approximately 5 times the rate of using anatomical implants. This finding is also similar to findings reported in Latin America.⁹ The superiority of anatomical implants over round ones in the aesthetic outcome could not be demonstrated.¹⁰⁻¹² In addition to unprovable aesthetic superiority, the cost of anatomical implants and the possibility of rotation may be the reason for the preference for round implants.

The most common implant filler type used was silicone in this study, as it is all over the world. The proportion of surgeons preferring textured implants was 96%. In other regions of the world (outside the United States), the use of textured implants is also more common. In contrast, a smooth implant preference is most common in the United States.⁸

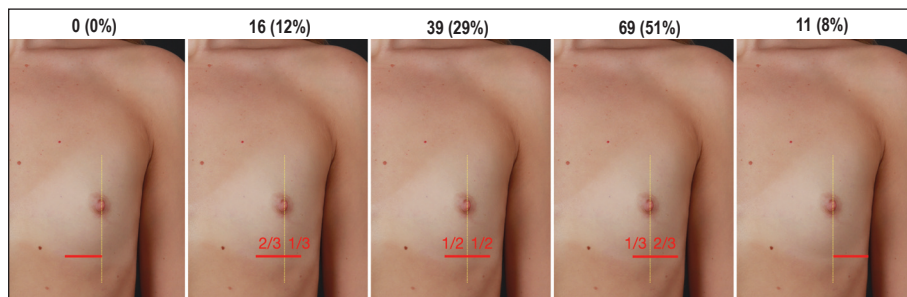


FIGURE 2: Surgeons’ responses to the illustrated question about horizontal placement of the inframammary incision. “In the figures below, alternative inframammary fold positions are given according to the imaginary vertical line passing the nipple. Choose the one that most closely resembles your preferred placement.” (Percent of Total Respondents (n=135))

“How do you determine the vertical position of the inframammary fold incision?”		Percent of total respondents (n=135)
	I make the incision on the existing inframammary fold	16 (12%)
	I make the incision superior to the existing inframammary fold	0 (0%)
	I make the incision inferior to the existing inframammary fold	13 (10%)
	I adjust the distance between the nipple and the incision according to the diameter of the implant to be placed	98 (73%)
	I use some other approach	8 (6%)

FIGURE 3: Surgeons’ responses to the illustrated question about vertical placement of the inframammary incision.

Breast implant-associated anaplastic large cell lymphoma (BIA-ALCL) has been an important topic in recent times. BIA-ALCL is strongly associated with textured implants.¹³ Considering the risk of BIA-ALCL, the preference for smooth implants is expected to increase. The reason for the lack of a significant increase in the use of smooth implants may be the habits of surgeons and the dominance of textured implants in the market.

The most commonly used implant volume range is 300-399 cc. Whereas implants with a volume above 300 cc are most frequently used in the United States, implants below 300 cc are used most frequently in Europe and Asia.⁹ This difference may be due to patient expectations, surgeon habits, or cultural differences.

The most commonly preferred approach is inframammary incision; it is the most preferred incision for breast augmentation all over the world.⁹ When the reasons for surgeons to prefer the inframammary approach are considered, the top 3 are as follows: (i) easier implant insertion, (ii) more precise adjustment of pocket dissection boundaries, and (iii) ease of IMF repositioning. These are the well-known advantages of the inframammary approach.¹⁴

A wide range of lengths of inframammary incision have been reported in the literature. Fanous et al. suggested a 1.7 cm incision.¹⁵ In their cadaveric study, Muresan et al. suggested incisions of 2.5-5 cm in length for implants of different volumes.⁷ In the present study, the inframammary incision length was between 4 and 5 cm. These higher values may be due to the more difficult placement of textured and silicone-filled implants compared with smooth and saline-filled implants. Seventy percent of the participants stated that they may need incision lengthening; therefore, a preoperative plan can be made by including some margin (such as 3-5 mm) on the average incision lengths revealed in the survey.

There is no clarity in the literature about the horizontal location of the inframammary incision. Zelken et al. suggested the “lateral inframammary approach” for better outcomes.⁶ It was observed that the horizontal location of the inframammary incision was generally determined by considering the projection of the N (an imaginary vertical line) to the IMF. In this study, the most common answer was the follow-

ing option: “approximately 1/3 of the incision is medial to the imaginary vertical line passing through the N.” The author recommends that at least more than half of the incision should remain lateral to the N for less visible scars and better aesthetic outcomes.

As mentioned in the introduction, there have been various articles published on the vertical location of the inframammary incision.¹⁴ Swanson suggested that the incision should be made 0.5-1 cm above the IMF to avoid a double bubble deformity.⁵ Although it was not questioned which well-known method was used by the participants in the survey, it was seen that most of them conducted measurements based on the implant diameter and the N-IMF distance measured during stretching.

The limitations of this study include that the survey questions neglected the following topics: preference changes over time, the surgical instruments used (e.g., insertion funnels), additional surgical maneuvers (e.g., fat grafts), cost effects, and common complications. If these variables had been considered, more valuable results could have been obtained.

CONCLUSION

Although practices related to the length of the incision and its vertical and horizontal location differ between surgeons in the inframammary approach, it is by far the most preferred incision location for breast implants among plastic surgeons in Türkiye. The preferences of Turkish surgeons for breast augmentation are mostly similar to those of Latin America.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

This study is entirely author's own work and no other author contribution.

APPENDIX 1: 16-item questionnaire.

1. How many years have you been working as a plastic surgeon?
2. Approximately how many breast augmentation surgeries have you performed to date?
 - 1-9
 - 10-49
 - 50-99
 - 100 or more
3. In which pocket plane do you place implants most often?
 - Subglandular or subfascial
 - Dual-plane, subpectoral, or total submuscular
4. What implant shape do you use most often?
 - Round
 - Anatomical
5. What implant filler type do you use most often?
 - Saline
 - Silicone
6. What implant shell surface type do you use most often?
 - Smooth
 - Textured/microtextured/nanotextured/polyurethane coated
7. In which volume range do you use implants most often?
 - Less than 300 cc
 - 300-399 cc
 - 400-499 cc
 - 500 cc or above
8. What is your most preferred incision location?
 - Inframammary
 - Periareolar
 - Transaxillary
 - Transumbilical

Please answer the following questions only if you selected “Inframammary” on the last question.

9. Why do you prefer inframammary incision? (You can choose multiple responses.)
 - Ease of implant pocket dissection
 - More precise adjustment of pocket dissection boundaries
 - Ease of inframammary fold repositioning
 - Easier implant insertion
 - Does not require transect through the breast tissue
 - Faster wound healing

Less scarring

Other

10. Approximately how long (in cm) are the incisions you employ for implants with a volume of less than 300 cc?

11. Approximately how long (in cm) are the incisions you employ for implants with a volume between 300 cc and 399 cc?

12. Approximately how long (in cm) are the incisions you employ for implants with a volume between 400 cc and 499 cc?

13. Approximately how long (in cm) are the incisions you employ for implants with a volume of 500 cc and above?

14. Do you require some lengthening of the inframammary incision in case of difficulty during sizer or implant insertion?

Yes, my incision lengthening rate is 50 percent or more.

Yes, my incision lengthening rate is between 25 percent and 50 percent.

Yes, my incision lengthening rate is between 10 percent and 25 percent.

Yes, my incision lengthening rate is 10 percent or less.

No, I do not need incision lengthening.

15. How do you determine the vertical position of the inframammary fold incision?

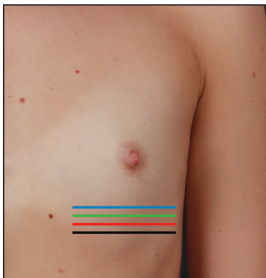
I make the incision on the existing inframammary fold.

I make an incision superior to the existing inframammary fold.

I make an incision inferior to the existing inframammary fold.

I adjust the distance between the nipple and the incision according to the diameter of the implant to be placed.

I use some other approach.



16. In the figures below, alternative inframammary fold incision positions are given according to the imaginary vertical line passing through the nipple. Choose the one that most closely resembles your preferred placement.

The entire incision remains medial to the imaginary vertical line through the nipple.

Approximately 2/3 of the incision is medial to the imaginary vertical line passing through the nipple.

Approximately 1/2 of the incision remains medial to the imaginary vertical line through the nipple.

Approximately 1/3 of the incision is medial to the imaginary vertical line passing through the nipple.

The entire incision remains lateral to the imaginary vertical line through the nipple.



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