Transaxillary Totally Subfascial Breast Augmentation with Anatomical Breast Implants: Review of 27 Cases

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Background: The transaxillary route is a popular method of breast augmentation because it is associated with inconspicuous scars. The subfascial plane carries the advantages and decreases the disadvantages of subglandular and submuscular planes. In the technique described, the authors placed the implant totally subfascially to strengthen the advantages of the traditional subfascial plane.
Methods: Twenty-seven patients (50 breasts) were included in the study from 2009 to 2012. The mean patient age was 27.3 years (range, 19 to 32 years). An axillary incision was performed and the pectoralis major fascia was opened initially. With endoscopic assistance, the dissection continued craniocaudally underneath the fasciae of the pectoralis, serratus, and rectus abdominis muscles. Patients were followed up in terms of rippling, implant visibility, capsular contracture, and asymmetry.
Results: Patients were followed up for an average of 21 months (range, 7 to 28 months). Anatomical, textured, and cohesive gel implants were used, with a mean implant size of 235 cc (range, 180 to 300 cc). In terms of the Baker classification, only 16 percent of the patients had grade II capsular contractures. There were no cases of malpositions, wrinkling, or rippling. Overall satisfaction was quite high (96 percent), and none of the patients required an implant removal or change.
Conclusions: A modification of the subfascial plane was demonstrated where the implants have been placed totally subfascially, in contrast to the traditional subfacial techniques. Satisfactory results have been obtained in terms of breast shape, nipple sensitivity, capsular contracture, and implant visibility. However, more long-term results are needed to evaluate the exact effect of total fascial coverage. (*Plast. Reconstr. Surg.* 131: 1149, 2013.)
CLINICAL QUESTION/LEVEL OF EVIDENCE: Therapeutic, IV.

The transaxillary route of breast augmentation has become popular because of the placement of the final scar in a relatively invisible body site and better nipple sensitivity.[1] However, the major disadvantage has been the difficulty of inserting the implant through a narrow channel and achieving symmetrical inframammary folds.[2,3] In the literature, transaxillary, subglandular, subpectoral, and subfascial breast augmentations have been reported with various results.[4–6]

In this article, we aimed to modify the subfascial dissection through the transaxillary route. The pectoralis, rectus abdominis, and serratus anterior fasciae were elevated as an en bloc envelope. Thereafter, an anatomical cohesive gel implant was placed through the axilla in a totally subfascial plane.

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PATIENTS AND METHODS

The study was approved by the hospital ethics committee, and all of the patients gave informed written consent. A total of 27 consecutive patients (50 breasts) with a mean age of 27.3 years (range, 19 to 32 years) were included in the study between the years 2009 and 2012. Four patients had unilateral augmentations because of unilateral hypoplastic breasts. The patient inclusion criterion was mammary hypoplasia without ptosis. Patients requiring large augmentations were excluded. Markings were performed with the patient standing up. Relevant markings such as dissection borders and existing and new inframammary folds were made.

Surgical Technique

All of the procedures were performed by the senior surgeon (A.C.A.). The patient was positioned with the arms abducted at 90 degrees. A 4- to 5-cm S-shaped incision was made on the axillary sulcus. The incision was deepened until the pectoralis muscle was identified. Another incision was made (approximately 5 to 6 cm to enable passage of the endoscope and the lighted retractor) on the pectoralis fascia parallel to the muscle fibers. The fascia was raised very meticulously with cauterization of the perforators. With the aid of an endoscope, sharp dissection was continued on the pectoralis muscle beneath the fascia moving toward the inframammary fold (Fig. 1, *above*, *right*). Laterally, dissection was limited to the anterior axillary line to prevent lateral displacement of the implant. Medially, dissection then proceeded approximately 1 to 2 cm lateral to the sternal border. Close to the inframammary fold, extra attention was paid to not perforate the fascia (Fig. 1, *below*, *left*), which was quite thin and fragile. Dissection was continued sharply caudally below the fold, corresponding to the fasciae of the serratus anterior, external oblique, and rectus muscles (Fig. 1, *below*). The inferior limit of dissection was decided according to the new position of the inframammary sulcus, which was approximately 1.5 to 2.5 cm below the fold. Following fine hemostasis, irrigation was performed with an antibiotic solution. Anatomical, textured Cohesive III implants

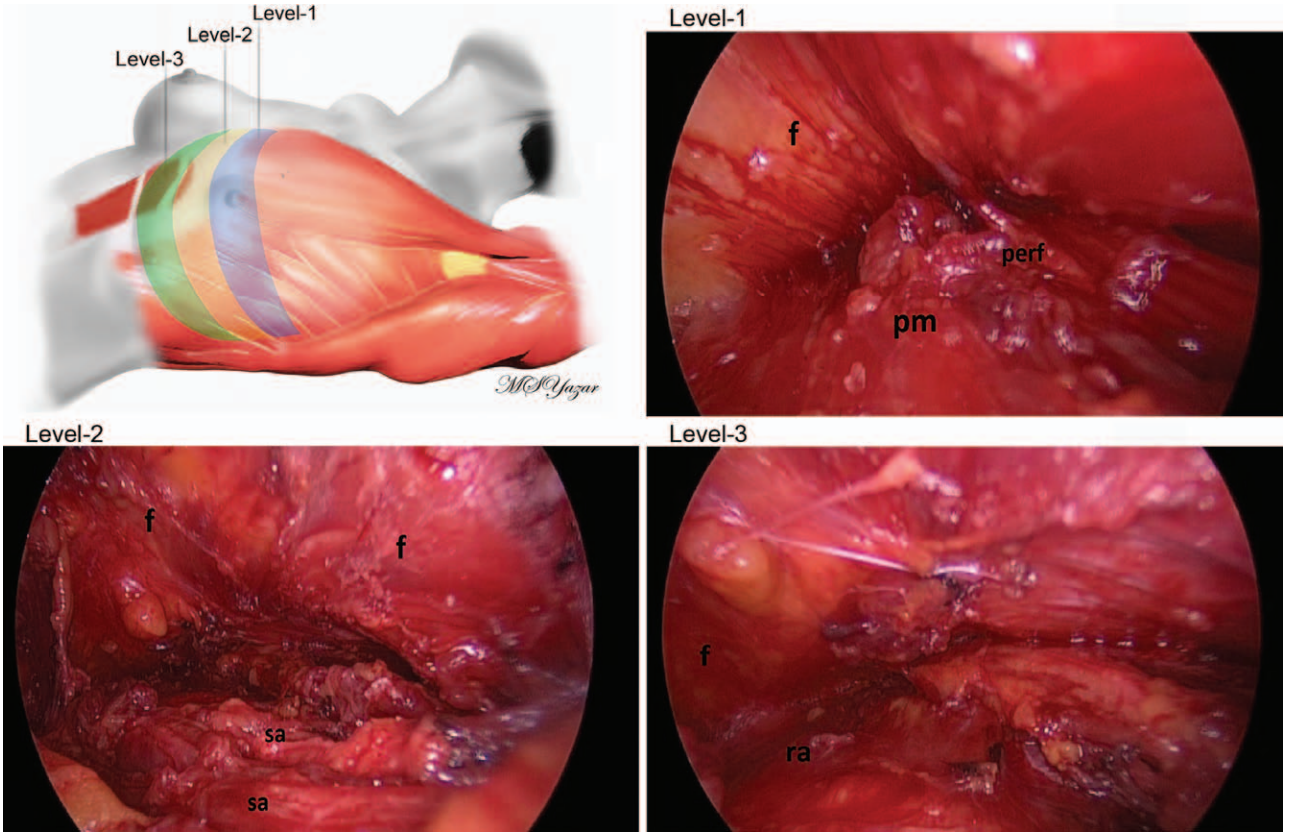

Fig. 1. (*Above*, *left*) Demonstration of the various levels of subfascial dissection. (*Above*, *right*) Level 1 is formed mainly by the pectoralis major (*pm*) muscle fascia. (*Below*, *left*) At level 2, external oblique and serratus anterior (*sa*) muscle fasciae predominate. (*Below*, *right*) At level 3, rectus abdominis (*ra*) and external oblique muscle fasciae are dominant (*perf*, perforator; *f*, fascia).

Video 1. Supplemental Digital Content 1 demonstrates the transaxillary totally subfascial breast augmentation with anatomical breast implants, ***http://links.lww.com/PRS/A717***.

(Mentor, Santa Barbara, Calif.) were inserted. Layered closure was performed. Drains were placed in only one patient. An adjustable strap was used over the superior breast poles and maintained for 4 weeks. A short video can be seen that demonstrates the major surgical steps. (**See Video, Supplemental Digital Content 1**, which demonstrates the transaxillary totally subfascial breast augmentation with anatomical breast implants, ***http://links.lww.com/PRS/A717***.)

RESULTS

Patients were followed up for an average of 21 months (range, 7 to 28 months). Contour profile anatomical textured Cohesive III implants (Mentor) with a mean size of 235 cc (range, 180 to 300 cc) were used. The average operation time was 137 minutes (range, 127 to 151 minutes). All of the patients were discharged on the day after surgery except for one patient who had a hematoma that required drainage. Only 16 percent of the patients had Baker grade II capsular contracture. None of the patients complained of nipple hypoesthesia. No implant malpositions were noted. One patient complained of mild asymmetry but did not request a secondary operation. Three patients had very minor asymmetries detected on photographic analysis. One patient had a subjective feeling of an implant palpation where she had an upper pole pinch test of 1.3 cm before the operation. Two patients had hypertrophic scars that were treated conservatively. In terms of satisfaction, 96 percent of the patients were very satisfied with the outcome (assessed by using a 0- to 10-point scoring system). None of the patients requested an implant change or removal. Patient examples are shown in Figures. 2 through 4.

DISCUSSION

Major parameters of breast augmentation are optimal skin and soft-tissue coverage, pocket location, implant volume and dimensions, position of the inframammary fold, and incision site.[7,8] In the literature, the muscles and the fascia have been considered to enable enough soft-tissue coverage. In terms of the submuscular pocket, moderate to severe postoperative pain and discomfort have been reported. Because of separation of the muscle fiber attachments at the medial sternal border, the visibility of the implant has become problematic in some cases.[9,10] In addition, reattachment of the muscle fibers to the capsule or skin could cause traction, rippling, or asymmetry. To prevent the aforementioned drawbacks of subpectoral augmentations, the dual-plane technique has emerged.[11] In this technique, medial pectoral muscle attachments at the sternal border were left intact. Dual-plane augmentation aimed to improve the implant/soft-tissue relationship by adjusting the pectoralis muscle and glandular tissue positions. However, it nevertheless necessitated a muscle incision. One other variation, the muscle-splitting technique, was based on principles similar to those of the dual-plane technique, with minor differences.[12,13] However, this technique was also prone to animation problems or distortions because of disruption of the muscle. In both techniques, the implant was more or less in contact with the gland directly. To eliminate this, Troilius proposed total coverage of the implants by pectoralis, serratus anterior, and extensor oblique muscles.[14] Although this method enabled coverage of the implant totally by the surrounding muscles, it was considered to be traumatic because of large areas of muscle dissection.

Regarding the subfascial plane, augmentations with inframammary and periareolar access sites have been reported in the literature.[15–17] For example, Barbato et al. reported their series concerning the retrofascial approach in which the implant was placed under fasciae of the pectoralis, rectus abdominis, and serratus anterior muscles.[18] However, the incision was periareolar and a round implant was used. Although total subfascial coverage was achieved, the anatomical glandular and fascial integrity was broken because of

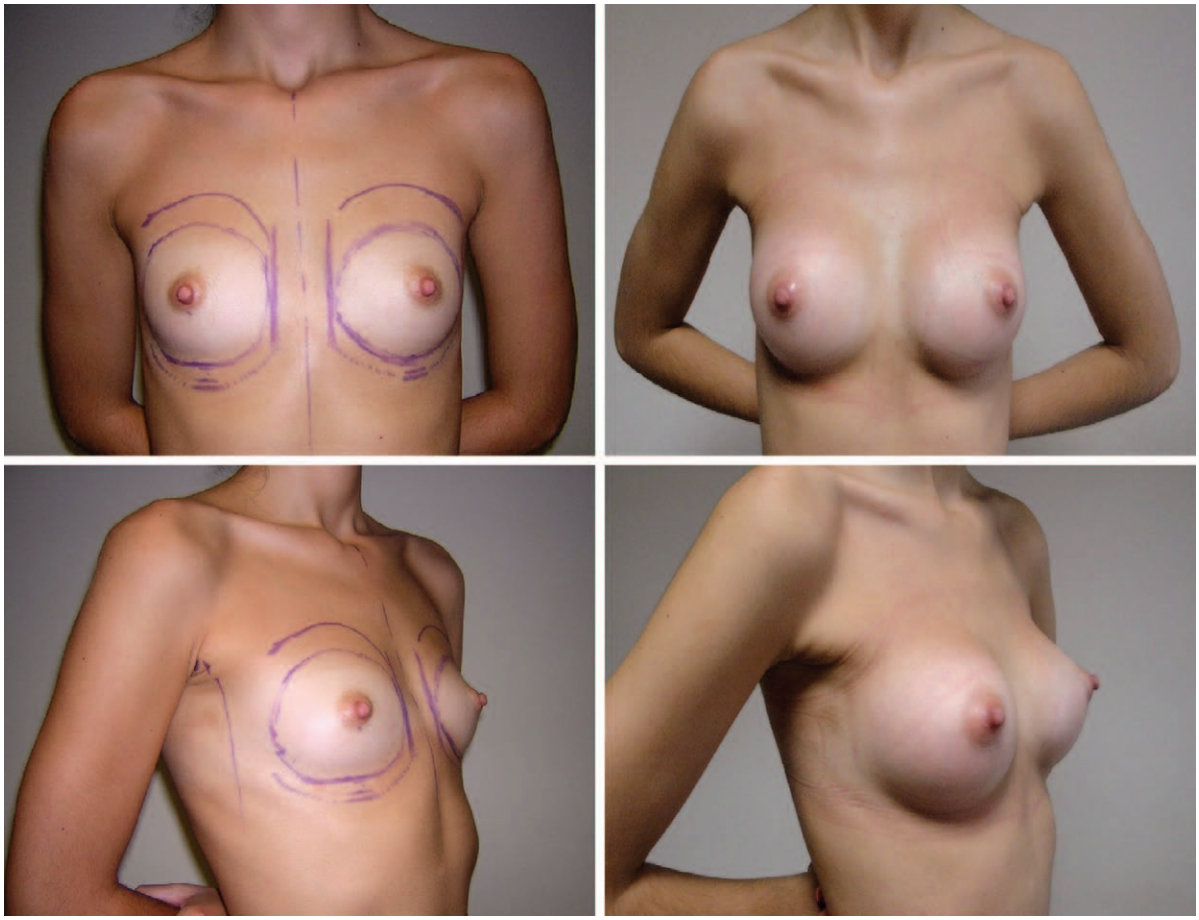

Fig. 2. (*Left*) Preoperative views with markings. (*Right*) Postoperative views obtained 14 months after augmentation with medium height, high-projection, 225-cc anatomical implants.

the access site, which has also been pointed out by Graf et al.[19]

Transaxillary subfascial breast augmentation was first defined by Wright and Bevin.[5] Various articles have been published in terms of advantages of the subfascial plane.[19–22] In an article published by Graf et al., the authors started the dissection from the lateral border, and continued undermining down to the sixth intercostal space. Here, at the junction of the pectoral, rectus abdominis, and external oblique muscle fasciae, undermining shifted from the subfascial layer to the subglandular layer. Undermining at this plane continued for up to 2 cm below the inframammary fold.[20] Serra-Renom et al. also changed the plane at the level of the sixth rib to the subcutaneous-subglandular level.[21] However, in our study, we kept the plane subfascially constantly. As demonstrated in Figure 1, three different levels of subfascial plane have been encountered. In zone I, dissection was carried out beneath the pectoral fascia. Especially during the dissection close to the inframammary fold (levels 2 and 3), extra care was taken to avoid perforating the fascia. Even some muscle fibers were left attached to the fascia to maintain integrity (Fig. 1, *below, right* and *left*). However, an en bloc subfascial plane could be achieved eventually.

Actually, the concept of raising en bloc pectoralis, serratus, and rectus abdominis muscle fasciae is not new. In 1976, Wright and Bevin emphasized the importance of the junction of the pectoralis facia with the rectus abdominis and the external oblique fasciae. They proposed that the fascial envelope was important for supporting the prosthesis.[5] In that study, a round silicone implant was used. In addition, Ventura and Marcello demonstrated a subfascial breast augmentation technique with total coverage of the implant with the aforementioned muscle fasciae.[16] However, the incision was periareolar and a round implant was used. In our study, we placed anatomical implants through the axilla, different from the previous authors.

Experimentally, it was demonstrated that pectoralis fascia was continuous with the rectus,

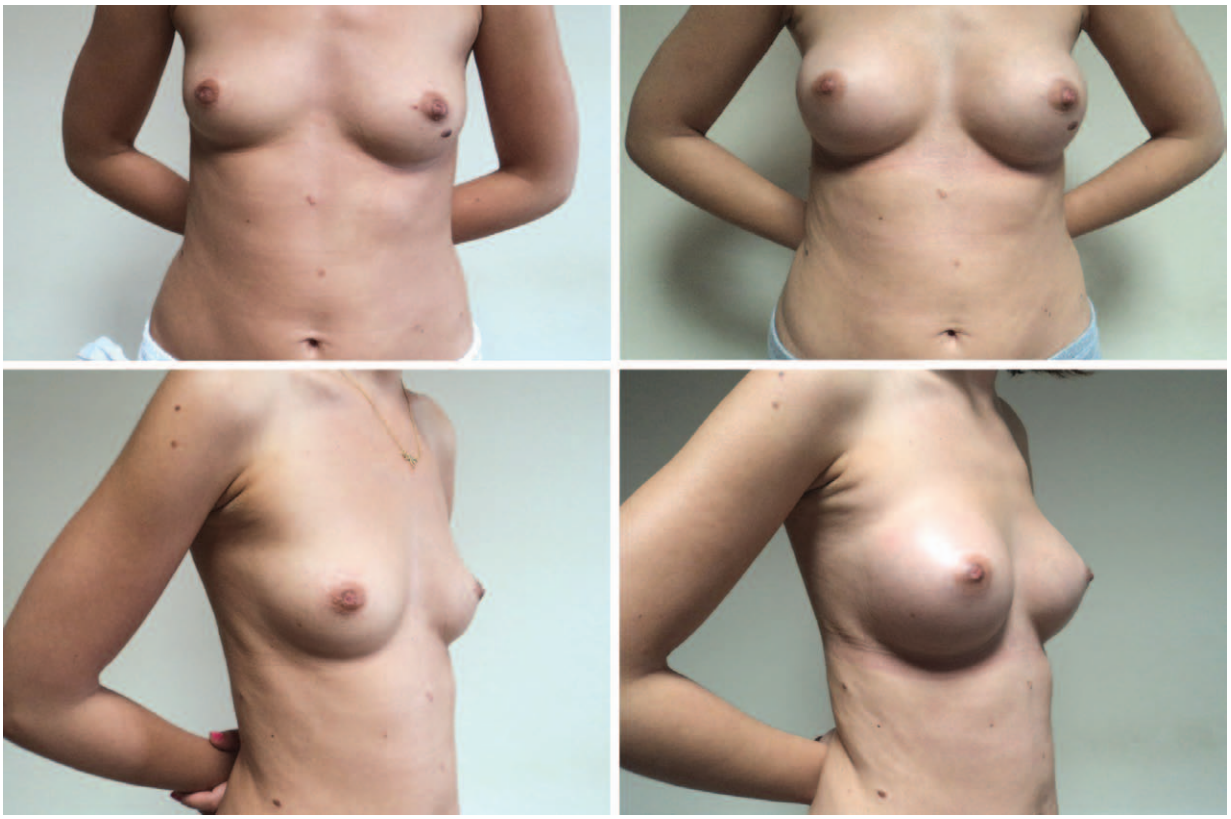

Fig. 3. (*Left*) Preoperative views. (*Right*) Postoperative views obtained 18 months after augmentation with medium height, high-projection, 225-cc anatomical implants.

serratus, and external oblique fasciae, although dissection was difficult at the sixth intercostal space.[17] To verify this, we also examined the fascia in a fresh cadaver. The pectoral fascia could be raised in continuity with the serratus and rectus abdominis fasciae (Fig. 5, *left*). An anatomical implant placed underneath an en bloc fascia is demonstrated in Figure 5, *below*.

(**See Video, Supplemental Digital Content 1**, which demonstrates the transaxillary totally subfascial breast augmentation with anatomical breast implants, ***http://links.lww.com/PRS/A717***.)

In our opinion, total placement of the implant underneath a fascia has certain advantages. In submuscular augmentations, complications such as double fold or high-riding implants have been reported. Some authors proposed disruption of the fascial attachments to prevent these complications, which we think might cause ptosis in the long term.[2] According to them, during digital examination, a fascial continuation of the pectoralis fascia to the serratus anterior and rectus abdominis fascia could be felt. This fascia should be broken to accommodate a large implant to achieve symmetry. Otherwise, a double fold or high-riding implant could be seen. However, we think that this zone of transition could actually be retained. We do not think that fascial disruption with a dissector or by a finger bluntly is suitable at this zone. In cadaveric dissection, we have demonstrated that this fascial integrity could be preserved, as shown in the study by Jinde et al.[23] To achieve an accommodation for the implant (especially for larger implants), the fascial flap can be raised more inferiorly over the rectus muscle. In this way, the fold can be lowered behind the fascia without disrupting the fascial integrity. Actually, the main concept of our study has been based on this concept. Similar findings have also been stated by Ventura and Marcello,[16] who also suggested a totally subfascial plane of dissection. Rippling, implant displacement, and prevention of ptosis resulting from preservation of the Cooper ligament system were all claimed to be decreased because of the preservation of the fascial integrity.[16]

Another advantage of the totally subfascial method has been the extra coverage of the implant at the lower pole. As mentioned before, previous transaxillary methods left the inferior pole prone

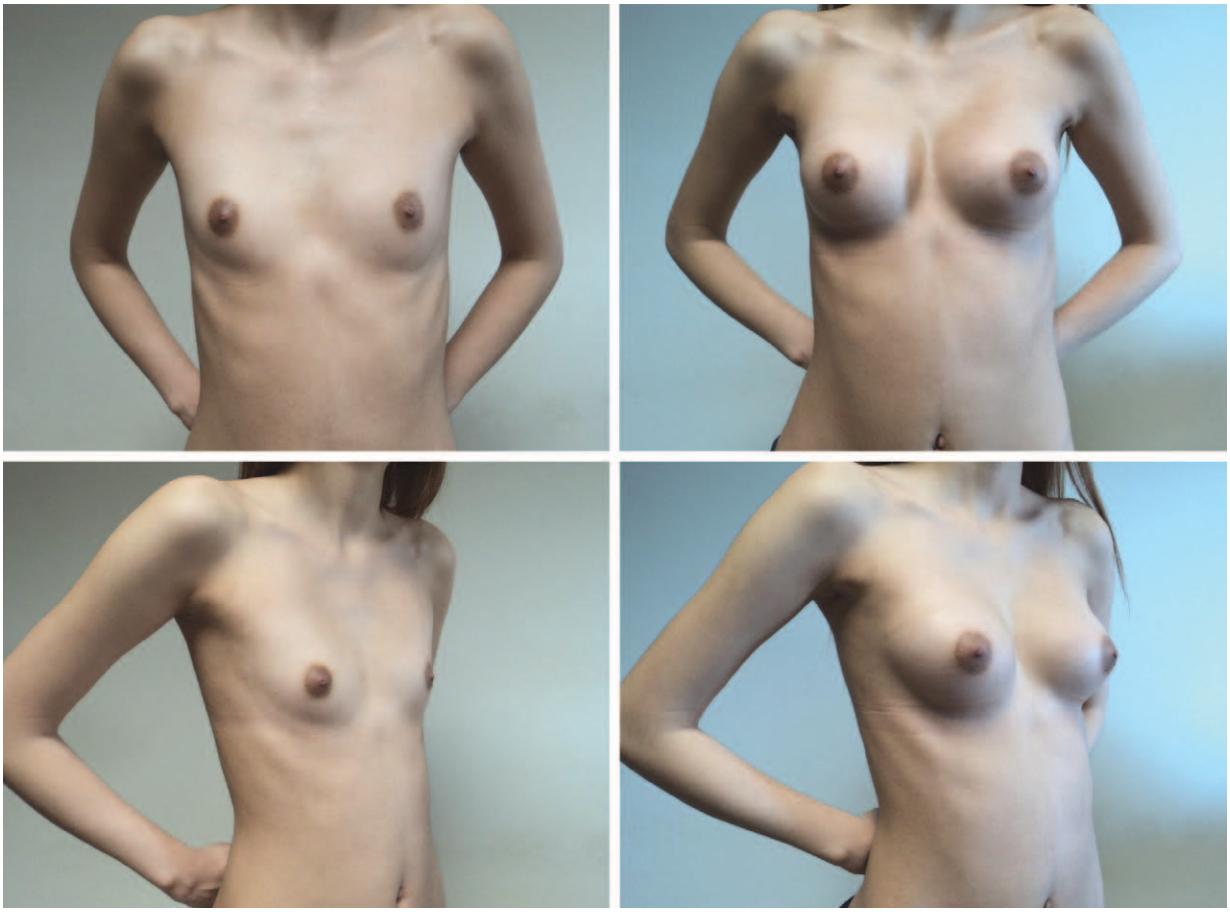

Fig. 4. (*Left*) Preoperative views. (*Right*) Postoperative views obtained 16 months after augmentation with tall height, high-projection, 180-cc anatomical implants.

to direct contact of the implant with the skin or breast tissue.[20,21] In our study, extra padding could be achieved because of the preservation of the fascia, which may decrease implant visibility. Although better camouflaging of the implant has been suggested by many authors other than us, this is of course a theoretical explanation.[16,20,21]

One other advantage of choosing the subfascial plane was the prevention of muscle dissection, which has been an important determinant of postoperative pain. In addition, initial dissection at the incision site was kept in a superficial plane to avoid the risk of intercostobrachial nerve injury and to prevent postoperative discomfort.[24] All of these factors enabled the patients undergoing surgery to have a relatively better postoperative period.

In terms of capsular contracture, previous experimental and clinical studies have documented the lower risk of capsular contracture with the subfascial technique.[15,25] Theoretically, the rate should be decreased more, because of the extra coverage of the inferior pole. A very low rate of capsular contracture at the time of this writing has supported this finding (only 16 percent of Baker grade II). However, longer follow-up periods may be required to document the capsular contracture rates.

Each parameter of the technique (i.e., transaxillary totally subfascial anatomical breast augmentation) enabled us to enjoy certain advantages. A more natural shape because of the type of implant, a better feeling of the breast with a decreased risk of ptosis and capsular contracture because of a total subfascial plane, and an inconspicuous scar hidden in the axilla were advantages.

Although the advantages stated above have been present in this technique, certain points should be discussed. The major difficulty was elevation of the fascia in one sheet inferiorly. This might be bothersome for those lacking sufficient experience initially. As suggested by Lee et al., meticulous sharp dissection with an electroscalpel should be performed at this region.[26] In cases of larger implant placements, the fascia disruption risk increases.

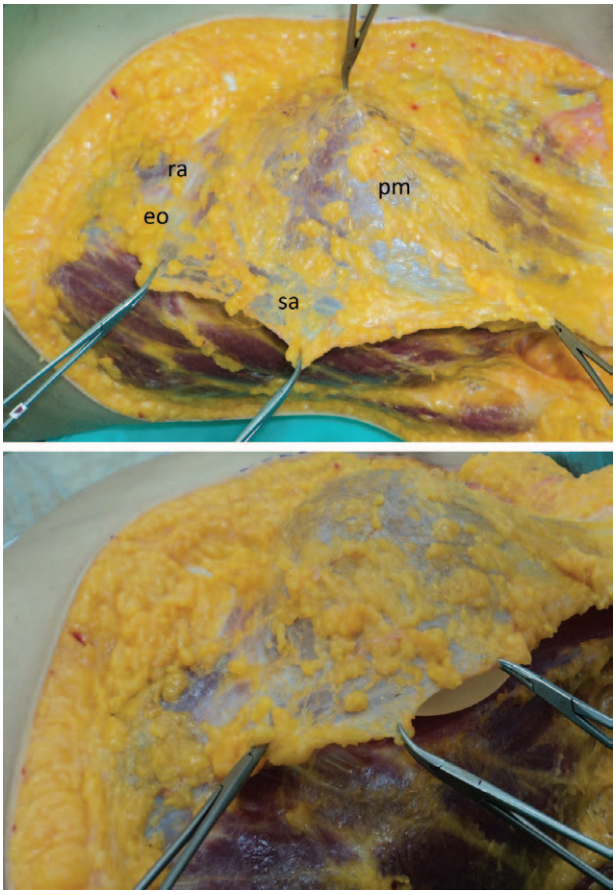

Fig. 5. (*Above*) Cadaveric dissection demonstrating the fascia covering the pectoralis major (*pm*), serratus anterior (*sa*), external oblique (*eo*), and rectus abdominis (*ra*) muscles. (*Below*) Placement of an implant with total fascial coverage.

Another point to be discussed is the possible asymmetries that may emerge in longer follow-up periods. Our series had a mean follow-up period of 21 months (range, 7 to 28 months). However, this period might not be long enough to capture the asymmetries, malrotations, and capsular contractures. Therefore, it should be kept in mind that patients may present with extra complications later. Longer operation time and the requirement for instruments might be other disadvantages of the transaxillary approach.

CONCLUSIONS

In conclusion, transaxillary totally subfascial breast augmentation might introduce many advantages, especially with regard to total fascial coverage. However, more long-term and comparative studies are required to determine the overall effect of an en bloc fascial coverage. This is particularly important for documenting the "theoretical" advantages of total coverage on capsular contractures, asymmetries, and malrotations.

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