

## A COMPARISON OF OUTCOMES BETWEEN WISE PATTERN REDUCTION MAMMAPLASTY AND NO VERTICAL SCAR REDUCTION MAMMAPLASTY: EIGHT YEARS OF EXPERIENCE.

### MEME KÜÇÜLTME OPERASYONUNDA WISE PATTERN VE VERTİKAL SKARSIZ TEKNİĞİN SONUÇLARININ KARŞILAŞTIRILMASI: SEKİZ YILLIK DENEYİM

Nihal İŞLEYEN<sup>1✉</sup>

1. Nest Esthetical Clinic Erzurum, TÜRKİYE

ORCID: 0000-0002-7790-1056

E-mail: drnihalisleyen@gmail.com

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#### Abstract

**Objectives:** Macromastia or breast hypertrophy is a significant health problem for women that requires surgical correction. Many procedures have been described for reduction mammoplasty (RM) with specific skin incisions (such as inverted T scar, vertical scar, no vertical scar, circumareolar scar, snowball shape incision), or blood supply to the nipple-areolar complex (NAC) (such as inferior, superior, medial, lateral, superomedial, superolateral pedicle or horizontal bipedicle, vertical bipedicle). Since each method has its advantages and disadvantages there is no standard guideline to be applied. Patient expectations, the shape, and size of the breast, as well as the surgeon's knowledge, and experience, are important in decision-making. **Material and Methods:** In the study, 65 patients underwent RM operations from 2012 to 2020. All the surgeries were performed by a single surgeon. While 20 cases were operated by the no vertical scar (NVS) technique, the operations of 45 cases were performed by the inverted T scar, wise pattern (WP) technique. The inferior pedicle technique was chosen as a pedicle in all NVS cases. Although all pedicles can be used easily with a WP, only cases using the inferior pedicle are included in this study. The patients were followed up as outpatients at 1, 6, 12 months, and yearly afterward. In the follow-up controls, the subjective criteria such as relief of symptoms and patient satisfaction were checked along with the objective criteria such as early and late complications. **Results:** The average age of the patients was 42.7 years (42 years for WP; 44.2 years for NVS). The average total reduction for patients was 2594 g for WP and 2248 g for NVS. Preoperatively, the average distance from the sternal notch to the nipple was 33.1 cm for WP and 32.5 cm for NVS. While the early complication rate in patients operated with WP was 17.7%, and the late complication rate was 18.8%. On the other hand, the early complication rate of NVS patients was 2.5%, and the late complication rate was 15%. It was found that the total early complication rate was 13%, and the total late complication rate was 17.6% considering all cases. In total, complications occurred in 30% of all patients. Among the patients who underwent WP operations, 75.5% were very satisfied, 22.3% were satisfied, and 2.2% were not satisfied. The complaint of the dissatisfied patient was permanent pain. 80% of the patients who underwent NVS were very satisfied, and 20% were satisfied. **Conclusion:** Patient and surgeon satisfaction was very high in both techniques.

**Keywords:** reduction mammoplasty, wise pattern, no vertical scar, inferior pedicle

#### Özet

**Amaç:** Makromasti veya meme hipertrofisi kadınlar için cerrahi müdahale gerektiren önemli bir sağlık sorunudur. Spesifik cilt insizyonları (ters T skar, dikey skar, dikey skar yok, çevresel skar, kartopu şeklinde insizyon gibi) veya meme başı-areolar kompleksine (NAC) kan temini ile meme küçültme ameliyatı (RM) için birçok prosedür tanımlanmıştır. alt, üst, medial, lateral, süperomedial, süperolateral pedikül veya yatay ikipedikül, dikey ikipedikül gibi). Her yöntemin avantaj ve dezavantajları olduğundan uygulanacak standart bir kılavuz yoktur. Karar vermede hastanın beklentileri, memenin şekli ve büyüklüğü kadar cerrahın bilgi ve deneyimi de önemlidir. **Gereç ve Yöntem:** Araştırmada 2012-2020 yılları arasında 65 hastaya RM ameliyatı uygulandı. Ameliyatların tamamı tek cerrah tarafından gerçekleştirildi. Olguların 20'si dikey skarsız (NVS) teknikle, 45'i ise ters T skarlı, bilge desen (WP) tekniğiyle ameliyat edildi. Tüm NVS vakalarında pedikül olarak alt pedikül tekniği seçildi. WP ile tüm pediküller rahatlıkla kullanılabilse de bu çalışmaya sadece alt pedikülü kullanan vakalar dahil edilmiştir. Hastalar 1, 6, 12. ay ve sonrasında yıllık olarak ayaktan takip edildi. Takip kontrollerinde semptomların azalması, hasta memnuniyeti gibi subjektif kriterlerin yanı sıra erken ve geç komplikasyonlar gibi objektif kriterlere de bakıldı. **Bulgular:** Hastaların ortalama yaşı 42,7 (WP için 42, NVS için 44,2) idi. Hastalar için ortalama toplam azalma WP için 2594 g ve NVS için 2248 g idi. Ameliyat öncesinde sternal çentikten meme başına ortalama mesafe WP için 33,1 cm, NVS için 32,5 cm idi. WP ile ameliyat edilen hastalarda erken komplikasyon oranı %17,7, geç komplikasyon oranı ise %18,8 olarak belirlendi. NVS hastalarında ise erken komplikasyon oranı %2,5, geç komplikasyon oranı ise %15 olarak belirlendi. Tüm olgular dikkate alındığında toplam erken komplikasyon oranının %13, toplam geç komplikasyon oranının ise %17,6 olduğu belirlendi. Toplamda, tüm

hastaların %30'unda komplikasyon meydana geldi. WP operasyonu geçiren hastaların %75,5'i çok memnun, %22,3'ü memnun, %2,2'si memnun değildi. Memnun olmayan hastanın şikayeti kalıcı ağrıydı. NVS yapılan hastaların %80'i çok memnun, %20'si memnun kaldı. **Sonuç:** Her iki teknikte de hasta ve cerrah memnuniyeti oldukça yüksekti.

**Anahtar Kelimeler:** küçültme mammaplastisi, wise pattern, vertikal skar, alt pedikül

## 1. INTRODUCTION

Macromastia or breast hypertrophy is an important health problem for women. Complaints of macromastia patients include severe back and neck pain, inframammary skin eruptions, persistent shoulder groove from the bra, chest discomfort, and unpleasant appearance of the body. Patients also experience psychological and social discomfort because of body image problems. It causes a decrease in the quality of life.

Reduction mammoplasty (RM) aims to alleviate these issues by reducing excessive breast volume while preserving arterial circulation and nipple sensation, ultimately providing an aesthetically pleasing outcome.

Macromastia is a complaint that surgeons have been trying to resolve for a long time. Nowadays, the task has become a bit easier with the demonstration of the nipple blood supply and definition of pedicles. However, a perfect method that answers all problems once is still not available.

There are roughly three decisions to be made before operation (1).

First of all, a technique to be used for skin excision is decided. For this purpose, inverted T (wise pattern) is the most commonly used technique which is easy to learn and apply. All pedicle applications are easily performed with this method. The only drawback is that it leaves a large scar. The other technique that has been applied commonly in recent years is the vertical scar technique. The vertical scar technique gives an aesthetically pleasing shape to the breast and increases projection (2,3). On the other hand, the temporary breast misshape in addition to the vertical scar appearance are disadvantages of the vertical scar RM technique (4,5). In addition, with the vertical scar RM technique, better results are more easily achieved for small to moderate reduction volumes (<800 g per breast). At the same time it can be difficult to achieve a satisfactory cosmetic result when a larger reduction is required (5). Another method known as the no vertical scar (horizontal) technique has been on the rise in recent years (6). The biggest advantage of this method is that it does not leave a visible scar. This can result in an "unoperated" appearance after the surgery. While the periareolar scar is concealed by the junction of the areolar skin and breast skin the inframammary scar is concealed beneath the breast (6,4). On the other hand, the horizontal RM technique has been criticized for several reasons. It can give a boxy appearance to the breast (7). The scar on the chest wall can extend more laterally than it does with the

WP (6) and, it is not ideal for all breast types. It is best suited for breasts that are exceedingly ptotic (normal skin of 5 cm or more between the areola and new areola) (6). Additionally, some critics argue that there is a postoperative loss of projection (6). Many modifications have been proposed to address all those criticisms (4,6,7,8).

The second decision to be made is determining the appropriate pedicle. Surgeons are generally aware of the blood supply to the breast, which comes from branches of the internal mammary (thoracic), the lateral thoracic, and the thoracoacromial arteries (3,9). A pedicle is selected for the protection of the NAC blood supply. Unfortunately, there is no consensus among surgeons as to which pedicle to choose. NAC necrosis is a very serious complication and to avoid it, the surgeons select an appropriate pedicle they trust.

The last decision to be made is the amount and location of the tissue to be removed. Excision is performed to provide the desirable breast shape and projection. Careful consideration of the selected pedicle is of utmost importance in this regard.

## 2. MATERIAL AND METHOD

Erzurum Health Sciences University ethics committee approval (37732058-514.10) was obtained before surgery.

Many factors including the size of the breast, the amount of tissue excised, skin quality, and the patient's request were taken into consideration when deciding on skin incisions in patients. When the techniques were explained to the patients, it was observed that younger patients tended to choose the horizontal scar technique. The pedicle selection is made according to the nipple position in patients who applied the WP technique. As it is suggested in the literature, all pedicles can be freely selected when the WP is used. If the nipple length is longer than 34 cm an inferior pedicle is selected for pedicle safety. If the nipple length is less than 28 cm, an inferior pedicle is selected for projection. Other pedicles are selected in cases with a nipple length of 28-34 cm. In that case, if the nipple is lateral to the breast meridian, a superomedial pedicle is selected, while a superolateral pedicle is selected, if the nipple is medial to the breast meridian. Only inferior pedicle cases were included in the scope of this study. The inferior pedicle technique was applied to all patients undergoing a horizontal scar pattern.

## **2.1 OPERATIVE TECHNIQUE:**

### **2.1.1 Preoperative Preparation:**

The operation was discussed with the patients in detail before the surgery. Requests and expectations of the patient were asked. What happens during and after the operation was clearly explained to the patient. The active participation of the patient in the operation method was ensured. Thus, the expectations of the patients were realistically leveled, and their postoperative satisfaction increased. Prior to surgery, all patients underwent breast ultrasonography, and for patients aged 40 and above, mammography was also performed. Benign radiological findings were carefully considered during the operation. Sometimes these benign findings required a change in the pedicle selection. Standard pre-anesthetic blood tests were performed for all patients while blood sugar level was carefully monitored and regulated in diabetic patients.

### **2.1.2 Wise Pattern:**

First of all, the patient was marked in the standing position before the surgery. Marking started with finding the suprasternal notch and breast meridian. The most important step in marking is the determination of the new nipple position. The distance to the suprasternal notch is important for deciding the new nipple position. The new nipple position must also be compatible with the inframammary fold of the patient. The new nipple should be positioned on the breast meridian, slightly above the projection of the inframammary line and 19-23 cm from the suprasternal notch. The WP was placed after the new nipple position was set (Picture 1a, Picture 1b). When the base was 8 cm wide and centered on the breast meridian.

### **2.1.3 No Vertical Scar (Horizontal) Technique:**

Before the operation, marking was performed in a standing position. The design used in the NVS technique was accomplished as described by Lalonde (6). Similar to the WP technique, nipple position was decided first. Then areola was shaped to be 3 cm in diameter. The new inframammary sulcus was shaped 6 cm below the new areola. While the incision line was extended to the medial and lateral. The anterior axillary line was not crossed. The diameter of the areola was adjusted to be transposed as 3.5 cm. Lalonde recommends 4-5 cm for relaxing closure and minimized scar (Picture 2a, Picture 2b). The pedicle width was kept at 8 cm.

All operations were performed under general anesthesia with the patients lying supine with abducted arms at 90 degrees. The surgical field was then sterilized and tumescent infiltration was applied to each patient for bleeding control and desepithelization. After the primarily planned pedicle was shaped, the breast tissue and skin were removed en bloc. The Pectoralis fascia was not exposed. Pedicle-shaping sutures were placed in both methods. If the pedicle was too long, it was

shortened with sutures, and the pedicle was fixed from the medial and lateral to the pectoral fascia. Pedicle shaping sutures were avoided from being too tight for nipple viability. Areola was placed in its new position with 4-0 and 5-0 monocryl sutures. Skin and subcutaneous tissue were sutured with 3-0 and 4-0 monocryl sutures. The drain was applied to each patient and removed on the 3rd day. A compression dressing was applied after surgery. Antibiotic therapy was administered in the immediate preoperative phase and continued until the postoperative fifth day (first-generation cephalosporin). The physical activity of the patients was instructed to be limited for 3 weeks after the surgery. Patients were advised to wear a special bra (lateral supported) for 6 weeks.

## **3. RESULTS**

Between January 2012 and June 2020, 65 macromastia patients (130 breasts) were operated. Patient characteristics including age, amount of tissue removed, preoperative distance from the sternal notch (SN) to the nipple, breast ptosis, preoperative and postoperative macromastia-related symptoms, and postoperative complications were analyzed. Patients underwent postoperative evaluations at 1 month, 6 months, and 1 year after surgery, followed by annual check-ups thereafter. Patients were interviewed at 1 month and 1 year. Annual breast cancer evaluation of patients over 35 years old was also performed in the same hospital. A satisfaction survey was administered during the first year follow-up, and patients were asked to rate their satisfaction with the surgery on a scale of 1 to 3.

1: not satisfied, there was no improvement in symptoms

2: satisfied, improvements in symptoms

3: very satisfied, complete improvement in symptoms

34 out of 45 patients who were operated the WP technique were very satisfied, 10 were satisfied and 1 was not satisfied. On the other hand, there were 16 very satisfied and 4 satisfied patients out of 20 patients with the NVS technique. Satisfaction results are shown in figure 1 and figure 2.

The average age of the patients was 42 (range, 19-65) for WP and 44.2 years (range, 24-66) for the NVS pattern. The average total reduction in the patients was 2594 g (range, 860-5850 g) for WP and 2248 g (range 1290-3740 g) for the NVS pattern. The average specimen weight was 1316 g (range, 480-3202g) for right breast WP; 1116 g (range, 640-1840g) for right breast NVS pattern, and 1278 g (range, 380-3050g) for left breast WP; 1132g (range, 650-1900g) for left breast NVS pattern. Preoperatively, the average distance from the sternal notch to the nipple was 33,1 cm (range, 24-51 cm) for WP and 32,5 cm (range, 26-41 cm) for the NVS pattern. Seven patients who underwent the NVS technique were found to have 2nd-degree ptosis and

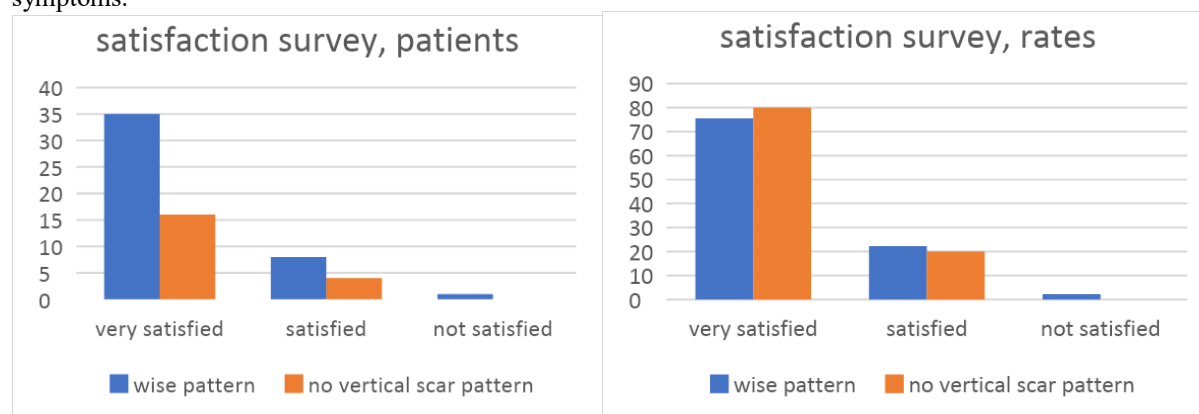
13 patients had 3rd-degree ptosis. Among the patients who underwent the WP technique, 15 had 2nd-degree ptosis, and 30 had 3rd-degree ptosis. The early complications of RM include hematoma, seroma, infection, wound dehiscence, and nipple areola necrosis. Among the cases operated with the WP technique, two breasts developed hematoma, six had wound dehiscence and partial nipple-areola necrosis, one had an infection, and one breast had total nipple areola necrosis. Patients with wound dehiscence and partial nipple areola necrosis were followed up by repeated dressing with topical ointments. Afterward, secondary healing was observed in wound dehiscence and nipple areola necrosis. There was no need for a secondary operation. Although hematoma is an early complication, in one case, hematoma developed after the 2nd week at the patient's one breast. This case was reoperated, but total nipple necrosis occurred (Picture 3). The second hematoma case was not reoperated since it was limited. Late complications of RM are abnormal scarring, dog ear deformities, over-reduction, under-reduction, and nipple sensory loss. Six patients who were operated with WP had nipple sensory loss in the early period, but it was not

permanent. Among six patients (12 breasts) with hypertrophic scar, and two with dog ear deformity (4 breasts), only one patient requested correction. In addition, one patient can be classified to be under reduction but this was due to the patient's request. This patient was very satisfied with the operation even six years after surgery (Picture 4a, Picture 4b). Partial nipple areola necrosis developed in one of the breasts operated with the NVS technique. Other early complications have not been observed with the use of this technique. Abnormal scarring from late complications was observed in three patients (6 breasts). None requested correction. Other late complications have not been observed. It was determined that for those undergoing an RM with the WP technique, the early and late complication rates were 17.7% and 18.8%, respectively. On the other hand, the early complication rate in patients who were operated with the NVS technique was 2.5% and the late complication rate was 15%. The total early complication rate was 13% and the total late complication rate was 17.6%. The overall complication rate was found to be 30%.

**Table 1:** Mammary ptosis was classified according to Regnault's (10) classification

	1st degree mild	2nd degree moderate	3rd degree severe
Breast ptosis			
Wise	0	15	30
NVS	0	7	13
	0	22	43

**Figure 1:** Satisfaction survey, patients, Both methods provide significant improvement for macromastia-related symptoms.

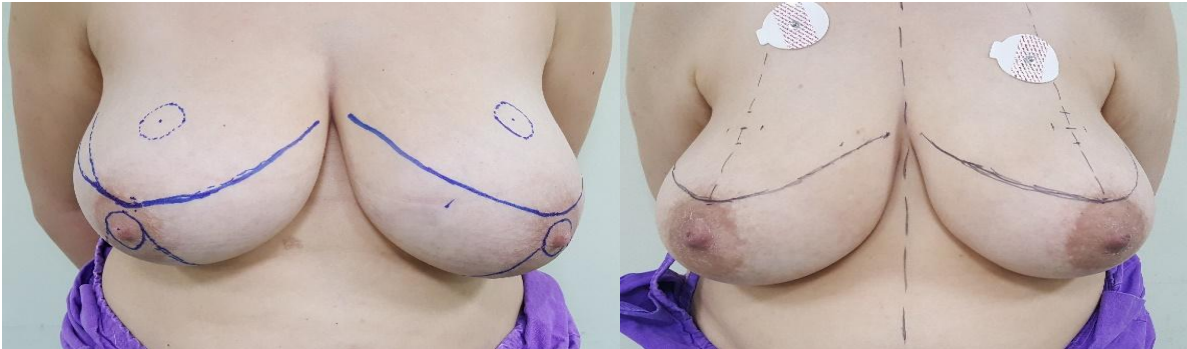




**Picture 1:** new nipple position and wise pattern.



**Picture 2:** Marking for no vertical pattern



**Picture 3:** Patient 10 after 2 weeks hematoma developed and total NAC necrosis occurred.



**Picture 4:** Patient 52 wise pattern, inferior pedicle technique. Preoperative, postoperative 7. years. It can be classified under resection but the patient is still very satisfied.



**Table 2:** Early and late complications

	Wise Skin Resection Pattern		No Vertical Scar Pattern	
	Breast (90)	%	Breast (40)	%
<b>Early Complications</b>				
Hematoma	2	%4,4	0	%0
Infection	1	%1,1	0	%0
Seroma	0	%0	0	%0
Dehiscence at T junction	6	%6,6	0	%0
<b>Nipple areola necrosis</b>				
Partial	6	%6,6	1	%2,5
Total	1	%1,1	0	%0
<b>Late Complications</b>				
Abnormal scarring	12	%13,3	6	%15
Dog ears	4	%4,4	0	%0
Nipple-areola sensory loss	0	%0	0	%0
Under- reduction	0	%0	0	%0
Over- reduction	1	%1,1	0	%0

#### 4. DISCUSSION

Macromastia has been a problem that surgeons have been working on for a long time. The earliest studies started in the late 19th century, but these studies aimed only to reduce the tissue mass. Billroth (11) and Pousson (12) who were among the pioneers in the treatment of macromastia, did not concern themselves with the aesthetic results. In the early 20th century aesthetic results gained importance with the work of Morestin (13), Hollander (14), Lexer (15), and Kraske (16).

In 1922, Thorek defined the method of removing the lower pole of the breast and carrying the nipple as a graft (17).

The skin excision pattern was defined in 1956 by Wise, who made a significant contribution to its prevalence (18,19). The wise pattern is still widely used in the world. Robbins described the inferior pedicle technique in 1977 (20). This technique still has a wide range of applications due to its pedicle safety, ease of learning, and application, and successful aesthetic outcomes. The only disadvantage of the inferior pedicle technique is that it can lead to bottoming out deformity with tissue accumulation in the lower pole (21). Many modifications have been described to prevent this complication (22).

Pitanguy (23) described the horizontal dermal pedicle and superior dermal pedicle. Skoog (24), described lateral dermal pedicle. McKissock (25), described vertical dermal bipedicle. Hester (26), described the central pedicle. And the combinations and modifications of pedicle selection were defined. Thus comprehensive freedom in pedicle selection was gained.

Recently, the vertical pedicle technique has been introduced and popularized by Arie (27), Lassus (28), Lejour (2), and Hall-Findlay (3) for use in RM. There is no inframammary incision in this technique. The no-vertical scar technique, which was proposed by Passot (29) in 1925 has long escaped attention. The method, which was re-described by Yousif et al (30) in 1992 and used by Savaci (31) in 1996, gained a wide application area with Lalonde in 2003. Lalonde (6) published no vertical scar operation technique as a modification of the wise pattern. In this method, only inframammary and periareolar incisions are made. In this way, it is attempted to avoid a visible scar. The vertical scar technique is one of the best techniques that provide aesthetic breast shape (2) but leaves a permanent visible scar. In contrast, the no vertical scar technique does not leave a visible vertical scar. However, a disadvantage of this technique is the challenge in achieving breast projection. Various modifications have been suggested to overcome this difficulty.

When the RM is applied, the remaining tissue and pedicle are usually placed in the new skin pocket. Especially if the inferior pedicle is left unshaped, there is a possibility of developing bottoming-out deformity. This deformity can be prevented by shaping the pedicle and suspending it from the pectoral fascia. In our case series, pedicle shaping was performed for all cases, and as a result, no bottoming-out deformity was observed.

The most common complications associated with RM are wound dehiscence, delayed wound healing,

infection, seroma, hematoma, and skin and NAC necrosis. Current literature has demonstrated complication rates in RM to ranging from 7.1% to 53% (32,33). In the adolescent population, overall

complication rates are similar, ranging from 10% to 55% (34,35). In the present study, the overall complication rate was 30%. The most common complication to be seen was an abnormal scar.

**Picture 5:** Patient 28. Four years after operation (wise pattern). The vertical scar was perfectly healed, but there was a slight irregularity in the inferior of areola. The patient did not experience any wound-healing problems, and there were no irregularities in the areola during the early period.



**Picture 6:** Patient 63 wise pattern, inferior pedicle technique. Preoperative, postoperative 1. year, postoperative 3. year



**Picture 7:** Patient 65 wise pattern, inferior pedicle technique. Preoperative, postoperative 1. Year



In a study by Dancey et al. patients were subdivided based on the weight of breast tissue resection into

two groups: macromastia (<1500 g resection per breast) and gigantomastia (>1500 g resection per



breast)(36). Degeorge et al. reported that there was no significant difference in terms of major complications between the two groups. However minor complications were observed more frequently in the gigantomastia group (37). In our study, 30 breasts (13 patients with bilateral gigantomastia, and

4 patients with unilateral gigantomastia) can be classified to be gigantomastia. A wound-healing problem occurred in a patient with unilateral gigantomastia, and partial nipple areola necrosis was observed in a patient with bilateral gigantomastia.

**Picture 8:** Patient 54 wise pattern, inferior pedicle technique. Preoperative, postoperative 1. month. Bilateral partial nipple-areola necrosis.



**Picture 9:** Patient 59 wise pattern, inferior pedicle technique. Preoperative, postoperative 1. Month. The patient has diabetes mellitus and excellent healing was observed.



**Picture 10:** Patient 58 wise pattern, inferior pedicle technique. Preoperative, postoperative 7. years.





**Picture 11:** Patient 28 wise pattern, inferior pedicle technique. Preoperative, postoperative 4. years. The patient has breastfed.



**Picture 12:** Patient 2 no vertical scar technique. Preoperative, postoperative 1 year.



**Picture 13:** Patient 4 no vertical scar technique. Preoperative, postoperative 1. Year.



If wound healing problems occurred in the patients who underwent WP, irregular scars were observed in the inferior of the areola. Lalonde suggested that a vertical incision caused unaesthetic appearance of the areola (6). Our experience indicated that in cases without wound healing problems, the wise pattern also yielded satisfactory/desired aesthetic results.

It was observed in the study that even if the vertical scar healed well in the wise pattern RM, there was a possibility that irregularity can develop in the

inferior of the areola (Picture 5). Our personal opinion is that the wise pattern inferior pedicle technique is applied due to excessive tissue tension in the upper and lower areas of the T junction.

A significant advantage of the inferior pedicle technique is that it does not interfere with breastfeeding. Four patients who became pregnant after the operation were able to breastfeed. Since all those patients were operated on using the wise pattern, a comparison was not possible.

**Picture 14:** Patient 6 no vertical scar technique. Preoperative, postoperative 1. Year.



In the study, there were 11 patients with type 2 diabetes mellitus, and all of them operated using the WP technique. Among the RM patients with diabetes, only one experienced a wound-healing problem. Smoking is considered to be a risk factor for wound complications after RM operations. There were a total of 7 patients who smoked, and no complications were observed in those patients.

Although many studies have shown that the use of prophylactic antibiotics is inefficacious (38), many surgeons still use them. The reason could be related to the forejudgement of the surgeon or the fears due to the observation of the developing infection. In the study, prophylactic antibiotherapy was applied to all cases to avoid any complications related to the development of any infection.

The most important criticism of the NVS technique is its inability to provide adequate breast projection. Horndeski and Gonzales (39) proposed that the perfect projection can be achieved in the no-vertical scar technique by shaping the pedicle. They also pointed out that successful shaping could give the appearance of a prosthetic implanted breast and the patient's expectation of not having a vertical scar. It was also found in present cases that shaping the pedicle rather than releasing it in the pocket had a greater contribution to projection.

One limitation of the vertical scar technique is that it can be applied to ptotic breasts. There must be at least 6 cm between the new NAC location and the NAC that the patient has. Shin et al. (40) overcame this restriction with the semicircular skin island prepared from the lower breast.

Whatever method is chosen, RM eliminates pain, restores physical activities, improves the quality of life, and has the highest patient satisfaction rates (41,42). In our study, very high satisfaction rates of the patients were observed for both techniques.

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