

# The Trapezoid Flap

## A New Technique for Nipple Reconstruction

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### **Abstract**

The author reports his experience with a new flap for tailoring a neo-nipple in breast reconstructions. A series of 50 cases with a four year post-operative follow-up is presented. The technique is based on the fact that the design of the flap is predominantly horizontal with a 3:1 ratio over the vertical size. The central 1/3 of the greater axis corresponds to the dermal vascular pedicle, which ensures its greater viability. At closure, the trapezoid flap determines a conical or cylindrical structure for the neo-nipple, depending on the design and how it is sutured. The main advantages of this flap are that the donor site can be closed primarily by advancement and after fashioning, the flap can be implanted on a dermal bed where the future areola will also be grafted. A vascular reinforcement is achieved through this procedure. This dermal platform serves to contain the neo-nipple, preventing its collapse. When the flap is closed margin to margin, a loss is observed in height

of about 30% in six months. However, if the suture is made in a twisted manner, it is substantially reduced with a more significant and definitive result. Because of these observations, a hypercorrection compared to the opposite side is recommended. Up to the present, only two cases of complete and one of partial necrosis have occurred, which corresponds to a complication rate of about 0.5%. It is indicated for all reconstructions, including for irradiated skins. The esthetic disadvantage of a lighter colored skin can be eliminated by immediate grafting of skin like the neo-areola or by pigmentation.

### **Introduction**

For some decades, numerous authors have been publishing various reconstruction techniques for the areola-papillary complex, ranging from the first report by Berson<sup>1</sup>, followed by Adams<sup>2</sup> and Dufourmentel<sup>3</sup>. The possibilities of using the contralateral complex were well reported by Millard<sup>8</sup>, after observations of the case demonstrated by Kiskadden<sup>4</sup>, in 1950. This involved the successful transplant of the complex in a case of an arm burn. Tattoos were introduced by Epstein in 1956<sup>5</sup>. The idea of the horizontal division of the nipple by Millard was used in the sagittal form by Pitanguy<sup>11</sup>. The study of the skin tonalities introduced by Broadbent in 1977<sup>14</sup> practically defined the choice of technique for the areola by grafting the root of the thigh in most patients. However, this did not occur with the nipple, where a vast variety of flaps

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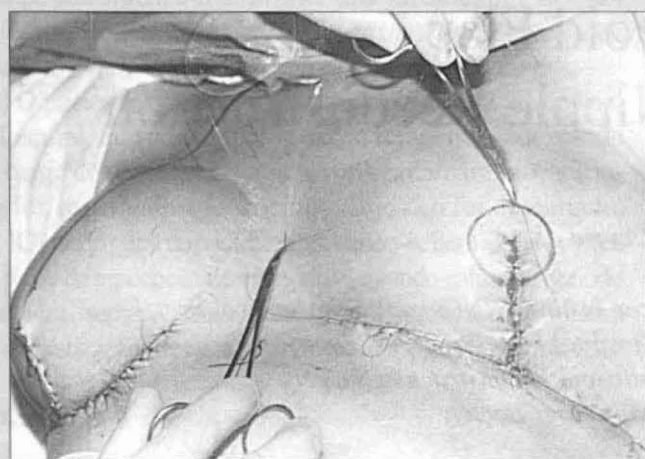
ADDRESS FOR CORRESPONDENCE

**Mauricio Chveid**

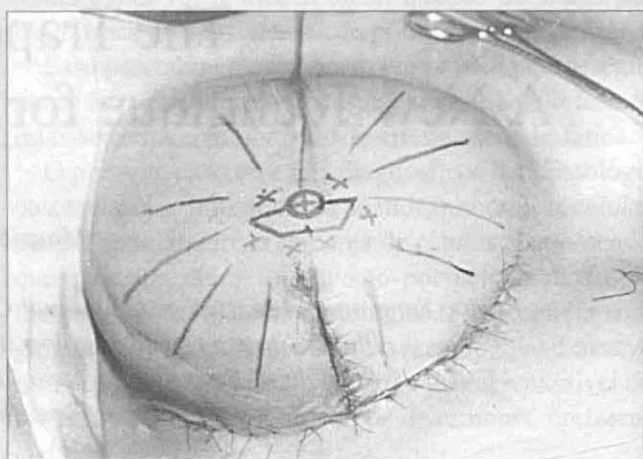
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**Fig. 1** - Design of the exact site for the neo-nipple compared to the contralateral one. **Fig. 1** - Demarcação do exato local da futura papila em relação à contralateral.



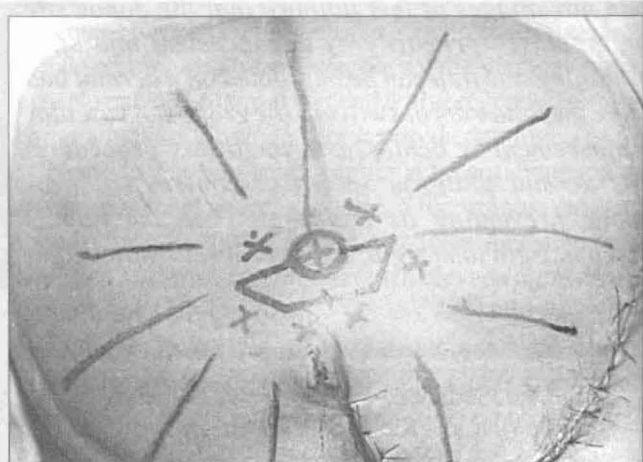
**Fig. 2** - Central nipple circumference and trapezoid outlined around it. Design of the various axes possible, evading possible scars. **Fig. 2** - Circunferência central papilar e trapezóide desenhado ao redor. Desenho dos inúmeros eixos possíveis na mama, fugindo-se das prováveis cicatrizes.

is described. Many flap shapes are described in the literature, such as semilunar, cartilaginous, rhomboid, quadrangular, in omega, finger grafts, vertical with upper or inferior pedicle, of the latissimus dorsi, in "T", in "S" and many others<sup>3,7,12-20</sup>. These descriptions are interesting because the flaps are basically vertical or grafted or folded over themselves with dermal or subcutaneous pedicle. These principles usually determine that the blood supply in the flaps is a greater risk and, therefore, resulting in marked reduction of volume as time goes by. Consequently, an attempt was made to modify this vascular principle, by designing a shape which would bring a greater volume of well nourished skin; the trapezoid shape provided the use of this principle with safety.

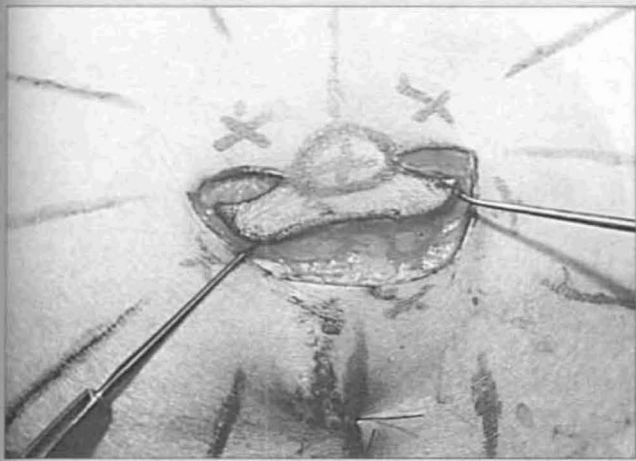
### Material and Methods

All the patients in whom this technique was utilized were postmastectomy with breast reconstructions by myocutaneous flaps of the rectus abdominus, or expanders or by lateral thoracoepigastric flaps. This means that the trapezoid flap was also utilized in cases of prosthesis directly under the skin. The minimum time in which the trapezoid flap was used was three months after the first stage breast reconstruction. The new nipple is marked as symmetrically as possible to the opposite side, preferably before the surgery, with the patient seated or

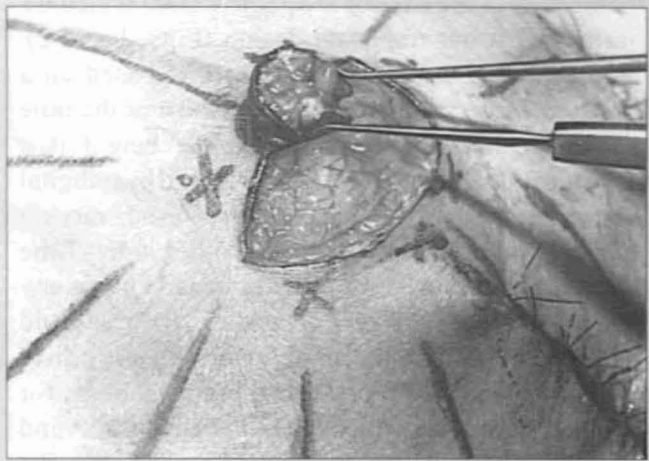
semi-seated. We should not be bound by rigid markings such as the external furcula or the clavicular midline or the midcorporal line. The reason is that there is no uniformity in the performance of the mastectomies and consequently, in the results of reconstructions. These measurements often result in errors. From an esthetic and summetrical point of view, the best parameter is purely visual. After determining the point of the neo-nipple we need not be concerned with designing the areola at this time. This point



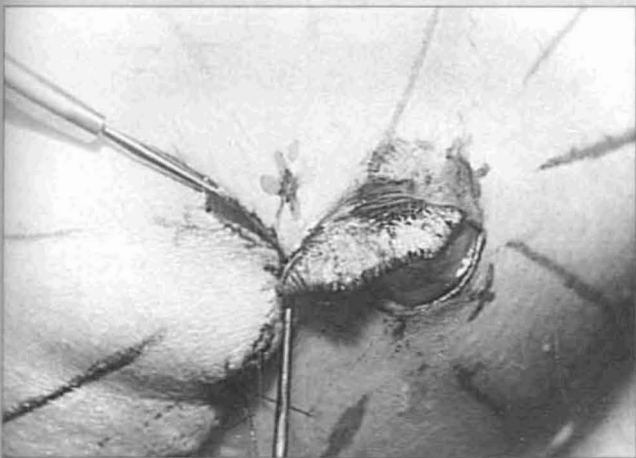
**Fig. 3** - Design of the trapezoid; three portions in the base and two on the opposite side, all of the same size. **Fig. 3** - Detalhe do desenho do trapezóide: três porções na sua base e duas no lado oposto, todas com o mesmo tamanho.



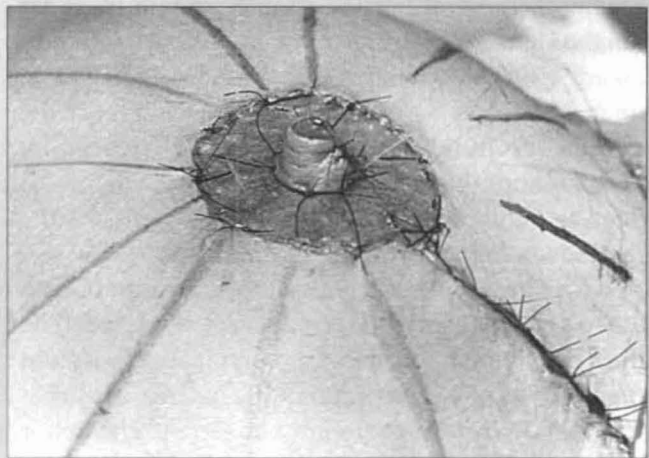
**Fig. 4 - Dermal-fat incision sparing the central zone of the pedicle. Fig. 4 - Incisão dermogordurosa poupando a zona central do pedículo.**



**Fig. 5 - Intubation of the liberated flap as described in the text. Fig. 5 - Intubação do retalho já solto, da maneira descrita no texto.**



**Fig. 6 - Advancement of the margins of the donor site, forming a platform which will support the flap, after decortication to receive the neo-areola. Fig. 6 - Avanço das bordas da área doadora formando uma plataforma onde o retalho será apoiado após docorticação para receber a neo-aréola.**



**Fig. 7 - Already formed nipple and grafted areola taken from the root of the thigh. Fig. 7 - Papila já formada e aréola enxertada vindo da raiz da coxa.**



**Fig. 8 - Result 15 days p.o. Fig. 8 - Resultado pós-operatório imediato de 15 dias.**



**Fig. 9 - Preoperative aspect. Fig. 9 - Aspecto pré-operatório.**

corresponds to the base of the pedicle from which we will construct our trapezoid design (Figs. 1 and 2). The entire structure of the trapezoid is based on a measurement termed "x" and which most of the time is close to 1cm. The base is 3x, the height is a minimum of 1x and it is always determined by bidigital grasp of the amount of skin that can be used, varying from one subject to another. The other side of the trapezoid is 2x. This designs can be made using any directional axis of the new breast, i.e., the trapezoid can be vertical, horizontal, or oblique, with the pedicle in any position. This represents a big advantage, for often there are scars which cross the new breast and therefore, the design can be adapted according to the situation, without impairing the flap's viability (Fig. 3). It is a dermal-adipose flap, but in relation to the pedicle, the central portion should contain more fat than the sides for better shaping and simplification of closure (Fig. 4). Closure may be accomplished in either or two ways: by direct approximation of the margins resulting in a final conical shape, or by approximation by twisting. In the latter, one of the edges is sutured to the base of the other and the remainder adapted naturally margin to margin (Figs. 5 and 6). The latter result is a cylindrical form. In both cases a good amount of fat remains in the interior. The upper portion of the neo-nipple (the roof) should remain open without sutures, resulting in slight invagination by secondary epithelization. The donor site is easily closed by direct subdermal approximation. It is only at this point that the neo-areola is marked and it is decorticated around the neo-nipple. The former will be supported on this dermal platform, taking care not to strangle the pedicle. All sutures are accomplished with 5-0 nylon (Fig. 7). Both the dermal bed and the trapezoid are grafted with skin from the root of the thigh. This graft should be completely independent, with separate sutures so that retraction will occur in different directions. When the trapezoid is grafted, in order to obtain a darker tone, it should be decorticated while still attached to its original bed. Contrarily, it can be pigmented later (Figs. 8 and 9).

## Discussion

Several techniques are available for fashioning the neo-nipple. The main ones are those that use the opposite side, the dermal-fat grafts with vertical pedicle and superior or inferior base, and the triangular



Fig. 10 - Thirty days p.o. Fig. 10 - Pós-operatório de 30 dias.



Fig. 11 - Thirty days p.o. Fig. 11 - Pós-operatório de 30 dias visto de lado.

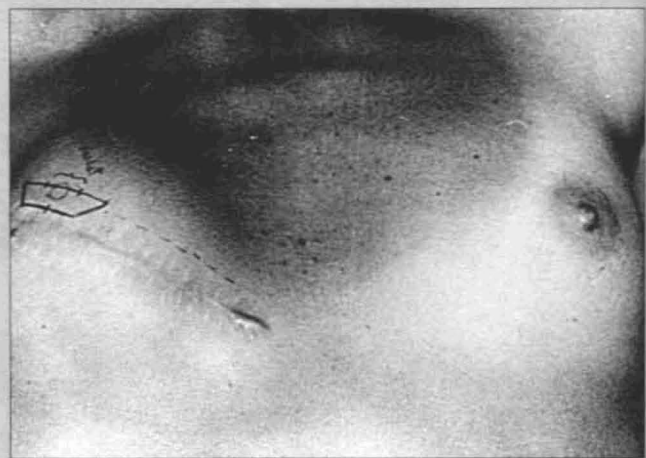
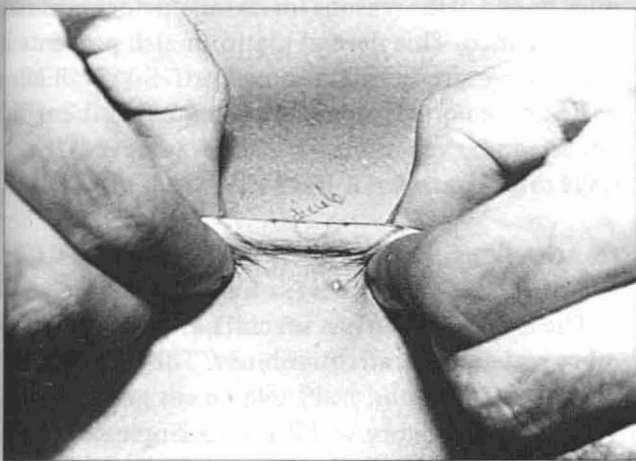
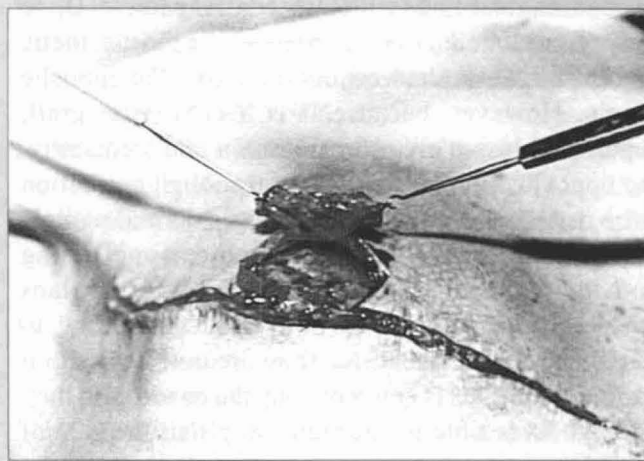


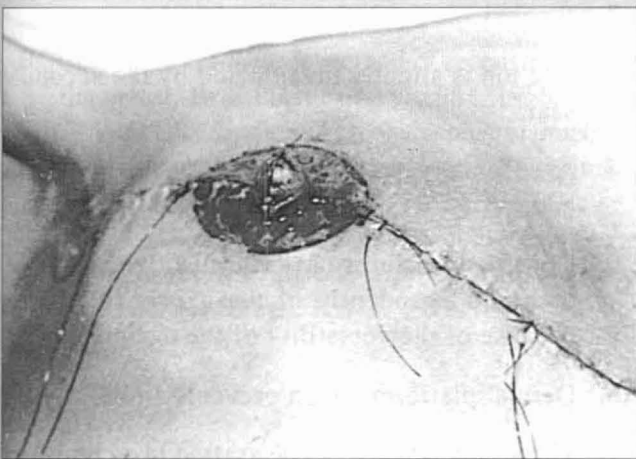
Fig. 12 - Application of trapezoid flap in the event of prosthesis implantation. Fig. 12 - Aplicação do trapezóide em caso de próteses.



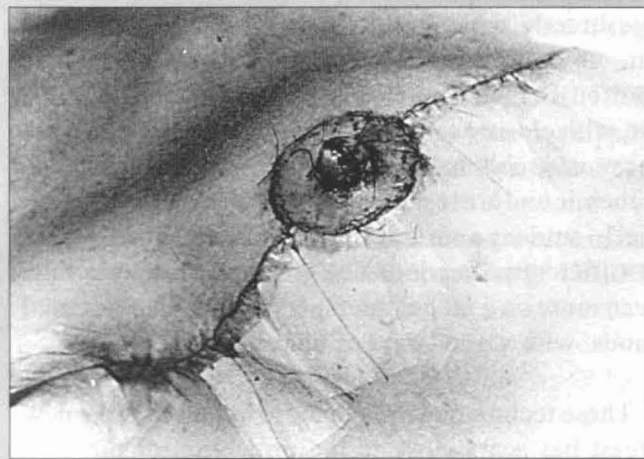
**Fig. 13 - Bidigital pinch to evaluate skin elasticity.**  
**Fig. 13 - Tática do pinçamento para se avaliar a elasticidade existente.**



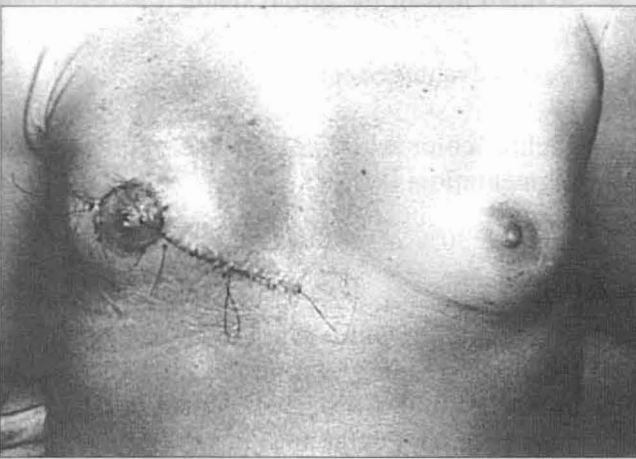
**Fig. 14 - Raising of the flap, escaping the mastectomy scar.**  
**Fig. 14 - Levantamento do retalho fugindo-se da cicatriz da mastectomia.**



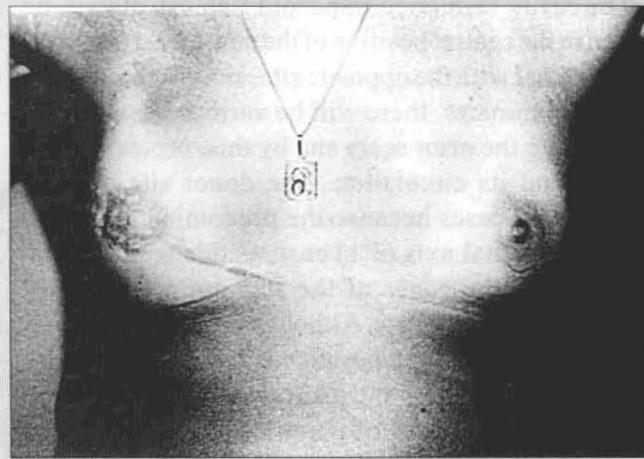
**Fig. 15 - Flap shaped into a nipple and on the dermal platform.**  
**Fig. 15 - Retalho modelado em papila e sobre a plataforma dérmica.**



**Fig. 16 - Graft already placed in the bed for the new areola and nipple.**  
**Fig. 16 - Enxerto já colocado no leito para a nova aréola e a papila.**



**Fig. 17 - Immediate p.o. result.** **Fig. 17 - Resultado pós-operatório imediato.**



**Fig. 18 - Results at three year follow-up.** **Fig. 18 - Resultados ilustrativos dos casos com três anos de observação.**

or quadrangular flaps with fatty central pedicle. Up to the present time, in our experience, the most esthetic and definitive results were obtained with the opposite nipple. However, because it is a composite graft, superficial losses are more common and frequently, the opposite nipple does not have enough projection to be used as a donor site. The single dermal pedicle flaps grafted, demonstrate some problems concerning both their structure and the donor site. They are flaps whose vertical dimension predominates leading to circulatory impairment, for they are outlined within another flap. This is confirmed by the absorption they undergo over time in the same way that the rate of graft loss is more common. It was also noted that these flaps shorten and undergo caudal or cephalic deviations because of retraction, depending on the pedicle used. It is often impossible to close the donor site directly, which results in the areolar graft over the fat, obviously making integration difficult. The Morton-Berson type flaps with central pedicle in the fat, with closure for elevation of the central cone, are the most problematic. These flaps frequently become ischemic and are lost. And those that initially progress well, undergo much reabsorption, leading to insufficient projection. The graft for the areola falls even more on a fat bed interspersed with small dermal bands, with a good deal of unevenness.

These technique are even more impaired if the new breast has scars close to the projection of the neo-nipple. In order to avoid these scars, the neo-nipple becomes decentralized.

The easily fashioned trapezoid flap can always be placed in the central position of the new breast perfectly symmetrical with the opposite site, since its horizontal axis predominates, there will be various possibilities of avoiding the prior scars and by this, protecting the pedicle and its circulation. The donor site may be closed in all cases because the predominance of the flap's horizontal axis (3:1) ensures this feature, plus the fact that the edges of the flap are acute angles permitting easier closure. Although the flap circulation was impaired in three cases (we believe caused by technical error), up to the present, we have observed in almost all the cases obvious bleeding throughout the margin. We believe that because it is supported on a well-vascularized platform, this confers a second source of vascularization over the long term, which

must be one of the reasons for its satisfactory anatomic maintenance. This dermal platform also prevents its sinking by preserving its support. Since in most patients the normal nipple is not more than 1 cm, this height and even more is easily achieved by the trapezoid flap.

### Conclusion

The trapezoid flap has several advantages over the other techniques currently in use. They include:

1. Great circulatory viability in a single pedicle, in which the horizontal axis is three times the vertical one, establishing a more favorable proportion in the midst of fibrosis. It is of lower risk;
2. Final shape conical or cylindrical;
3. The top is slightly invaginated by the secondary scar;
4. A secondary pedicle originating in the dermal bed;
5. Constant possibility of centralization in the new breast independently of the existence of scars, because of the versatility of the design;
6. Dermal platform which prevents sinking;
7. The areola can always be grafted in a completely dermal bed without fat, due to the closure of the donor area;
8. A small loss of the initial shape is acceptable.

The disadvantages are:

1. Lighter color when not grafted, requiring later pigmentation;
2. Loss of 30% of its volume when closed in the cone-shape;
3. The possibility of the scar left in the donor site of the flap extending beyond the limits of the neo-areola graft, but even so, it has not been the subject of complaint until now;
4. Small axis deviations of the neo-nipple due to inadequate fixation and scar retraction.

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