

# C-V flap nipple reconstruction combined with areola grafting

**Fuat Yüksel, Bahattin Çeliköz**

Gülhane Military Medical Academy and Medical School, Haydarpasa Hospital, Department of Plastic and Reconstructive Surgery, İstanbul, Türkiye.

**Address for correspondence:** Dr. Fuat Yüksel, Gata Haydarpasa Eğitim Hastanesi, Plastik Cerrahi Srv., Üsküdar-İstanbul, Türkiye.  
E-mail: fuatyuk@hotmail.com

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## ABSTRACT

Creation of a nipple-areola complex often represents the final step in a long and troubling reconstructive process for women with breast cancer. After this hard time, the procedure of choice needs to be convenient, painless and reliable. C-V flap technique for nipple reconstruction, designed especially for later areola tattooing, is a quick and effective form of nipple reconstruction using local tissue and reported that it could serve this aim.

Nipples of 12 patients whose mastectomy sites were reconstructed with TRAM flaps were reconstructed with C-V flaps, but their areolas were skin grafted from distant areas instead of tattooing. At the follow-up evaluations, patients' satisfaction was high in projection, pigmentation, sensation and overall parameters. We concluded and agreed that C-V flap technique was a very reliable method of nipple reconstruction, even when combined with areola grafting.

## KEY WORDS

Nipple reconstruction, Areola reconstruction, Breast.

## INTRODUCTION

**N**ipple reconstruction is an important component of breast reconstruction; it completes the procedure, and it is more appealing now that no specialized tissues and tattooing can be used. The nipple and areola transforms the reconstructed mound into a breast. When breast reconstruction is done correctly and the nipple-areola reconstruction is attractive, the overall result is pleasing and natural.<sup>1-5</sup>

Numerous procedures are available for nipple reconstruction with no true universal favorite. Recently, tattoo for areola reconstruction has become more

popular because it is comfortable and avoids surgery.<sup>1,3</sup> So, surgeons have had a tendency to innovate nipple reconstruction techniques in which donor sites can be closed primarily. Among them, C-V flap technique, described by Bostwick et al,<sup>1,2</sup> has been promising in that area. Although it is rather designed for tattooing, we have also performed it with areola grafting and observed that it is as satisfactory as the former application. This study presents the early results of our cases whose nipple-areola complexes have been reconstructed by this approach.

## MATERIAL AND METHODS

Over a period of 14 months, nipple-areola complexes

were reconstructed in 12 patients whose mastectomy sites were reconstructed with TRAM flaps before. The procedures were realized at the 3<sup>rd</sup> month following TRAM flap application. The exact place for nipple was determined by measurements and according to the patient's perspective. C-V flaps were performed for nipples and areolas were reconstructed with skin grafts from upper inner thighs in 3 patients and from the corner of TRAM flap donor sites in the rest.

## TECHNIQUE

The nipple design is composed of two V flaps and a C flap. The width of the two V flaps determines the projection of the nipple, whereas the diameter of the C flap determines the diameter and the top of the new nipple reconstruction (Figure 1). The flaps are designed as a V to permit primary closure, and the C flap is incised to cap the nipple reconstruction. Harvesting of the C portion of the flap permits a circular site for inseting the V flaps (Figure 2). The flap is planned to the proper diameter; however, an additional 50% projection is planned to provide the best long-term result and to allow for shrinkage of the tissues after flap reconstruction. The V's on each end are designed to permit primary closure of these sites, and the tips of the V's are sometimes trimmed. Care should be taken not to divide the base of the C flap. The blood supply to this flap comes from the underlying subcutaneous tissues. The two V flaps are elevated from the underlying subcutaneous tissue. The subdermal plexus

is left on these as well as some fatty tissue, depending on the requirements for the fullness of the nipple. The flaps are thinned more toward their periphery than centrally to avoid devascularizing the tip of the flaps. After the donor sites are closed subdermally, the two V flaps and C flap are trapped outside. The V flaps appear as wings and the C flap appears as a cap (Figure 3).

After completing the nipple structure, a paper template of contralateral areola is prepared. Then, this template is placed and centered to the new nipple and its circumference is marked. The inner part is de-epithelialized (Figure 4). The defect is grafted with a full thickness skin graft harvested from upper inner thigh or TRAM flap donor site (Figure 5). The graft is

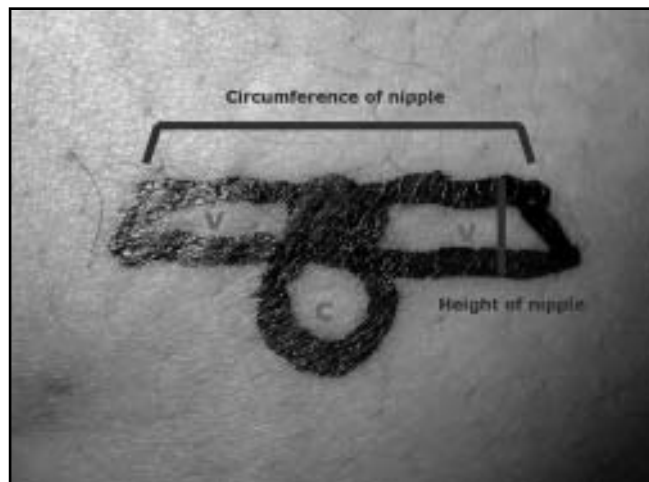


Figure 1: Design of C-V flap



Figure 2: Elevation of C-V flap



Figure 3: Primary donor site closure

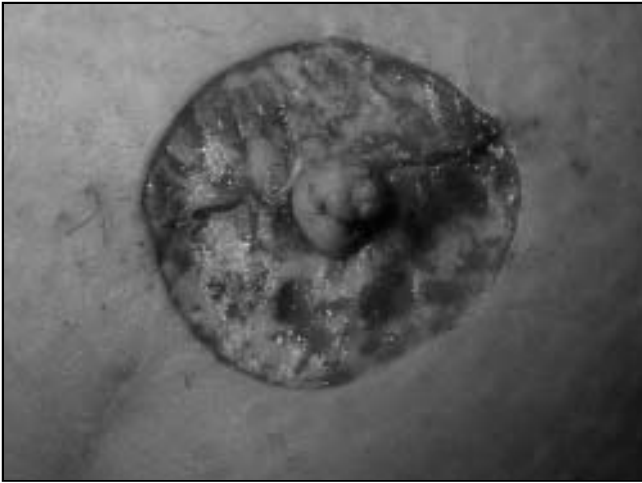


Figure 4: De-epithelialization of marked new areola

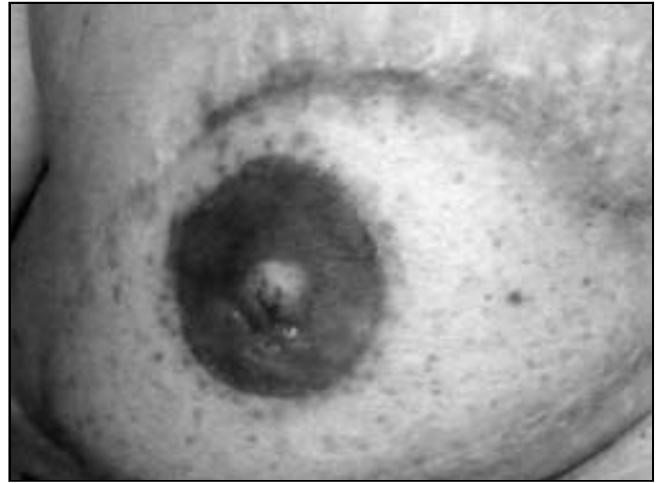


Figure 6: Anterior 6<sup>th</sup> month view of a nipple-areola complex on a reconstructed breast



Figure 5: Full thickness skin graft sutured to the new areolar recipient area.



Figure 7a: Anterior views of a nipple-areola complex on a left reconstructed breast

stabilized with Mepitel®, a non-adherent silicone dressing, which is a good choice for this procedure if available. It is removed on the 6th day.

## RESULTS

Patients are followed up at least 6 for months (Figures 6, 7a & b). Measurements of nipple diameter, projection and width of areolar areas were not followed, because these were not as important as the patients' perceptions of their own results. At the 6th month visits, patients' satisfaction with projection, pigmentation, sensation and overall satisfaction of the patients were evaluated and scored on a visual analog



Figure 7b: Lateral views of a nipple-areola complex on a left reconstructed breast

scale (VAS), containing 10 cm line, the extremes were at the ends. After getting the VAS scores, VAS percentage for each parameter was estimated (Table 1).

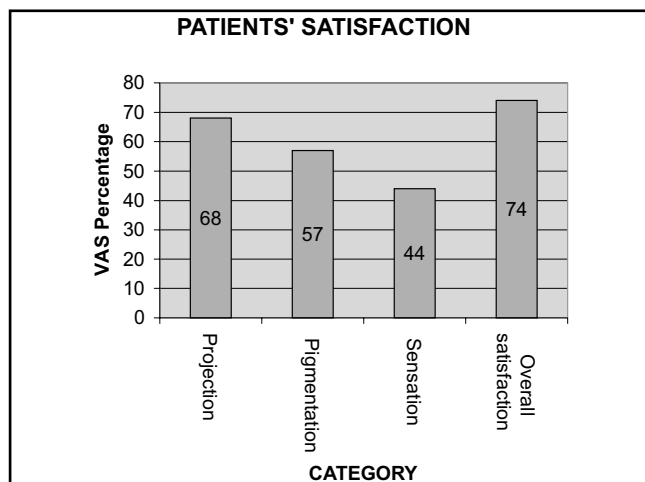
The VAS percentages were 68 for projection, 57 for pigmentation, 44 for sensation and 74 for overall satisfaction (Figure 8).

## DISCUSSION

The number of varied procedures available for nipple reconstruction is a reflection of the continued dissatisfaction with current techniques. The best time for nipple reconstruction is when the breast mound is at its best and the patient can help the reconstructive surgeon select the proper position for it. Most surgical alternatives are some variant of composite grafting or a local tissue flap followed by tattooing to recreate the areola.<sup>1-6</sup>

**Table 1: Satisfaction VAS score N=12**

Patient No.	Projection	Pigmentation	Sensation	Overall
1	6	6	4	8
2	4	4	2	6
3	8	6	4	8
4	6	2	2	6
5	8	8	6	9
6	8	8	4	8
7	6	4	5	7
8	5	3	4	5
9	7	6	7	8
10	8	7	5	7
11	8	8	6	9
12	8	6	4	8
<b>mean</b>	<b>6.</b>	<b>5.7</b>	<b>4.4</b>	<b>7.4</b>



**Figure 8:** Patient satisfaction as measured by the visual analog scale (VAS) percentage

Nipple sharing is an attractive option given the ideal color and texture match, but often the native nipple is not large enough, and most patients and surgeons are hesitant to disturb the normal breast.<sup>1</sup>

The skate flap nipple reconstruction was one of the first techniques for non-specialized nipple reconstruction; it gave excellent projection and produced an attractive nipple. Because the donor site for the skate flap was so large, a skin graft was necessary for areola reconstruction to give proper closure.<sup>1</sup> But, the shape of the new nipple was conical rather than cylindrical.

Methods for recreating the areola range from simple tattooing to the more complex grafting techniques. The decision as to which technique is appropriate depends on a patient's lifestyle and preferences. These must take precedence over surgeon's choice. Some patients prefer the least painful, least deforming and quickest method. That is why tattooing alone has now become the most frequently chosen method for areola reconstruction. It is a relatively simple procedure that avoids large donor site and areola graft morbidity. Although tattooing the areola is at the expense of its texture and projection, it is quick and effective and eliminates the creation of additional donor and recipient incisions from skin grafting. As tattooing for areola reconstruction was getting popular and replaced the grafting methods, some innovative techniques ensuring primary closure at the donor sites have been reported.<sup>2,7,8</sup>

The C-V flap, described by Bostwick III<sup>1</sup> and Losken et al,<sup>2</sup> is a quick and effective form of nipple reconstruction using local tissue. It is similar in design to the previously described star flap and modified Anton-Hartrampf star flap in that it consists of two central wings, a cap, and a base.<sup>8</sup>

The conclusions for the C-V flap technique are threefold. First, partial loss of nipple projection is inevitable with this technique, as it is with any of the local flap procedure, and needs to be considered when planning the reconstruction. Second, over-reconstructing the nipple can establish a satisfactory amount of control when pursuing symmetry with the

opposite breast. Third, although loss of nipple projection was experienced subjectively in all cases, the patients were generally satisfied with the procedure and would undergo the entire process again.<sup>2</sup>

Although tattooing has the advantage of avoiding the major surgery, some patients decline to have tattoos. Among some conservative cultures, most people have the perception of tattoos as expression of anti-social personality. That was why almost all our patients preferred grafting for their areolas despite need of surgery.

Although C-V flap technique ensuring primary donor closure was originally designed for cases in which tattoo was selected for areola reconstruction, it can also be combined successfully with grafting techniques. We observed that C-V flap technique also worked well when combined with skin grafting for areolas. For areola reconstruction, using the dog-ear at the end of the mastectomy scar or the TRAM flap donor site provides an elegant solution for a patient who is not happy with the dog-ear after the mastectomy. Anyway, the results of our cases were similar to the results

reported in the original study about C-V flap application<sup>2</sup> and patients' satisfaction was also considerably high. In our opinion, C-V flap technique is a very reliable technique for nipple reconstruction, not only when areola tattooing is being contemplated, but also for combination with areola grafting.

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