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IDEAS AND INNOVATIONS

Breast

# Temporary Areolar Demarcation for Nipple-areola Complex Reconstruction

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**Summary:** We have described a surgical method that enhances the visual aesthetic outcome of the areola periphery in nipple-areola complex reconstruction. This technique is performed immediately following closure of the nipple flap. The created areolar outline can aid the tattoo artist and may result in a more natural-appearing areola periphery than tattooing methods alone. *(Plast Reconstr Surg Glob Open 2015;3:e490; doi: 10.1097/GOX.0000000000000461; Published online 25 August 2015.)*

Achieving a natural-appearing nipple-areola complex (NAC) is an important component of breast reconstruction.[1] The NAC is one of the most prominent landmarks of the breast and failure to accurately mirror any of the NAC characteristics will result in decreased patient satisfaction.[1,2]

Re-creation of the 3 main NAC components—the nipple, the areola surface, and the areola periphery—has historically been accomplished through the use of either surgical or tattooing methods or both.[3–6] Although surgical and tattooing methods have been published for the reconstruction of the nipple and the areola surface, only tattoo methods have been developed for the areola periphery. To our knowledge, there are no published methods that take specific aim to surgically reconstruct the appearance of an areola periphery. Reports have shown that when used in tandem, surgical methods can enhance the future aesthetic outcome of tattooing and yield a superior result.[1] To address this need, we present a simple surgical technique, performed at the time of nipple reconstruction, which enhances the visual realism of the newly reconstructed nipple and improves the appearance of the peripheral areola.

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*Received for publication January 22, 2015; accepted June 25, 2015.*



DOI: 10.1097/GOX.0000000000000461

## TECHNIQUE

The temporary areolar demarcation (TAD) technique is performed immediately following closure of local flaps creating the nipple. The first step is to determine the location and size of the desired areola and mark its periphery with a 40-mm Grossman areola marker (Padgett, catalog number: PM-454, Integra, Plainsboro, N.J.). In Figure 1, a breast is shown where the C-V nipple flap has been marked.[3] After the flap is elevated and nipple reconstruction is completed, a circular line is drawn with the nipple located in its center. This is where the areola periphery will appear once the breast and NAC have healed. With subsequent healing, decrease of tissue turgor, and potential expansion, skin of the breast tends to stretch, enlarging the predetermined circular shape. Therefore, to account for the prospective areola widening, one may choose to decrease the diameter of the areola, especially if reconstruction is unilateral and the contralateral smaller areola is to be matched. Once drawn, the marked areola serves as a guide to make a partial-thickness incision into the dermis, which is subsequently closed with a running 5-0 chromic suture (Fig. 2), Dermabond (Ethicon; Somerville, N.J.), and Tegaderm transparent dressing (3M; St Paul, Minn.). The nipple is protected for 2 weeks. A minimum period of 6 months is

**Disclosure:** *The authors have no financial interest to declare in relation to the content of this article. The Article Processing Charge was paid for by Grand Rapids Medical Education Partners/Michigan State University School of Medicine, Grand Rapids, Mich.*

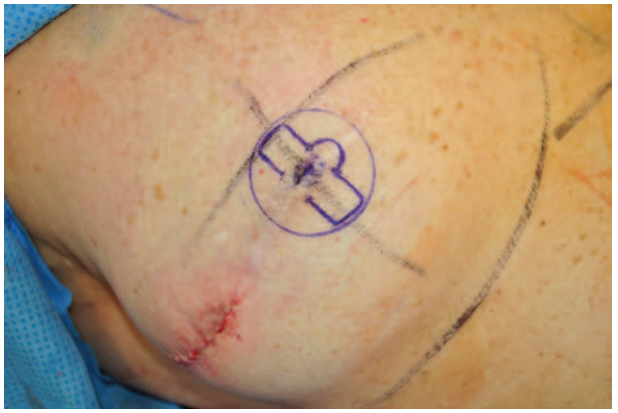

**Fig. 1.** Markings of a cylindrical C-V nipple flap.

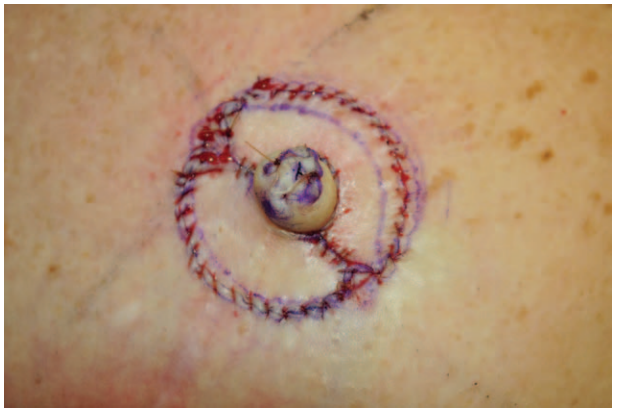

**Fig. 2.** A circular areola was incised around the newly created nipple and resutured with a 5-0 chromic gut suture to give the areola's periphery temporary definition.

allowed for the nipple and the areola to mature and contract before tattooing. Figure 3 shows a patient at 5 months postoperatively following NAC reconstruction with TAD. Figure 4 illustrates the completed NAC reconstruction 9 months after tattooing.

## DISCUSSION

Reconstruction of the NAC is often the final step for patients who have undergone breast reconstruction, and the aesthetic outcome of the NAC is a major determining factor of a patient's overall satisfaction with her surgical journey.[2] Given this precedence, creation of the NAC represents an area of breast reconstruction where even the most subtle aesthetic improvements should be continually sought. We have recognized the areola periphery as a component of the NAC with room for surgical innovation. Other NAC components, such as the nipple and the areola surface, have undergone similar reconstructive modification efforts in the past, and their results have been reported in the literature.[1,3,4]

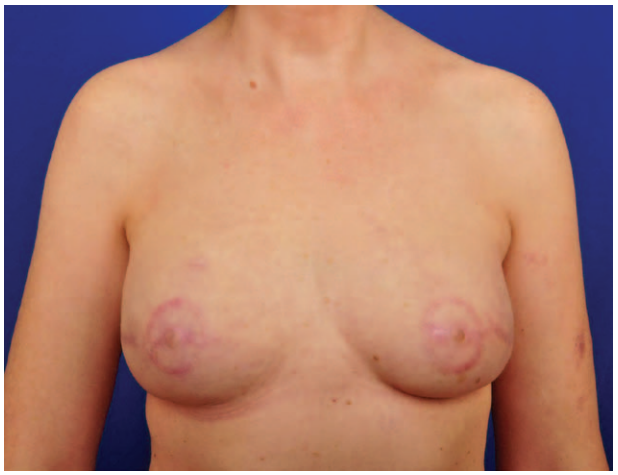

**Fig. 3.** A patient at 5 months following NAC reconstruction with TAD before tattooing.

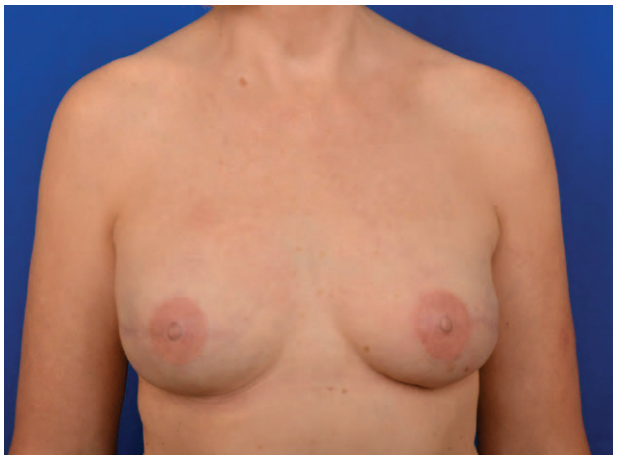

**Fig. 4.** Finished reconstruction 9 months after tattoo.

*For the nipple:* A large portion of the NAC reconstruction literature focuses on surgical flap design to create nipple projection.[3] Although tattooing methods alone can provide a blank breast mound with the optical illusion of nipple projection via a "trompe l'oeil" effect, a nipple with true 3-dimensional projection is strongly desired by most patients.[2,4,5] After surgically creating projection with a flap, tattoo methods can then be used to further accentuate the presence of the nipple.[4,5]

*For the areola surface:* Costa and Ferreira[1] demonstrated a surgical method to simulate Montgomery's tubercles by making superficial "C-" and "V-" shaped incisions in close proximity to the nipple. As a result, small, bump-like scars formed, which could subsequently be tattooed.[1] As with creating nipple projection, Montgomery's tubercles could be imitated visually by tattooing methods alone, but the combination of surgical tissue manipulation before tattooing yields an overall superior aesthetic outcome.[1,4,5]

*For the areola periphery:* Tattooing methods have been devised to mimic natural areola characteristics. These include the fading of pigmentation at the areola periphery, the contour of this edge, and its texture.[4,5] A fading effect can be produced by incrementally reducing the amount of ink tattooed into the dermis along the periphery. This is important because too sharp of contrast and/or too uniform of edge at the periphery can produce an unnatural appearance. Also, a seminatural contour can be created by tattooing the edge of the areola in an ambiguous or "wrinkled" pattern.[1,4] However, despite these tattooing methods, we hope that an even more natural-appearing periphery can be achieved when tattooing is preceded by the TAD procedure.

We speculate that at least 2 changes may occur to the skin as a result of the TAD procedure, possibly creating the more natural blending effect at the areolar periphery. The first is postinflammatory hypopigmentation—a reduced concentration of melanocytes and melanin in the former path of the chromic running suture likely contributes to a localized loss of baseline skin pigmentation.[7] Second, fibroblasts located in the dermis are responsible for the long-term retention of tattoo ink.[3] In states of wound healing and inflammation, fibroblasts transition to myofibroblasts, which have different characteristics and a shorter lifespan.[8] We speculate that the inflammation created by the application of the chromic suture used with TAD and tension forces across the incision likely promote such a cell transition. If so, this may result in decreased ability for the dermis to retain tattoo ink along the former path of the running suture, further contributing to the more natural areola blending and better aesthetic outcome.

## CONCLUSION

We have described a surgical method that enhances the visual aesthetic outcome of the areola periphery in nipple-areola complex reconstruction. The temporary areolar demarcation (TAD) technique is performed immediately following closure of local flaps creating the nipple. We speculate that the inflammation created by the application of the chromic suture used with TAD may result in decreased ability for the dermis to retain tattoo ink along the former path of the running suture, enhancing the visual realism of the newly reconstructed nipple-areola complex.

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## REFERENCES

1. Costa MP, Ferreira MC. Aesthetic quality of the nipple-areola complex in breast reconstruction with a new local graft technique. *Aesthetic Plast Surg.* 2009;33:774–779.
2. Jabor MA, Shayani P, Collins DR Jr, et al. Nipple-areola reconstruction: satisfaction and clinical determinants. *Plast Reconstr Surg.* 2002;110:457–463; discussion 464–465.
3. Farhadi J, Maksvytyte GK, Schaefer DJ, et al. Reconstruction of the nipple-areola complex: an update. *J Plast Reconstr Aesthet Surg.* 2006;59:40–53.
4. Fourie le R, Bruce-Chwatt A. Professional tattooing; alternative method to nipple reconstruction. *Br J Plast Surg.* 2004;57:693–694.
5. Loh CY, Lim P, Lam D. Re: Surgical tips: areolar tattoo prior to nipple reconstruction. *J Plast Reconstr Aesthet Surg.* 2012;65:1123–1124.
6. Spear SL, Convit R, Little JW III. Intradermal tattoo as an adjunct to nipple-areola reconstruction. *Plast Reconstr Surg.* 1989;83:907–911.
7. Vachiramon V, Thadanipon K. Postinflammatory hypopigmentation. *Clin Exp Dermatol.* 2011;36:708–714.
8. Hinz B. Formation and function of the myofibroblast during tissue repair. *J Invest Dermatol.* 2007;127:526–537.