

The Omega Flap: A New Method for Immediate and Delayed Nipple Reconstruction

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ABSTRACT

The challenge of nipple reconstruction is to create a stable projecting three-dimensional structure from a two-dimensional surface. The use of different local flaps has and still being described by many authors and this variety of methods proves that no single technique is perfect. 2 years follow-up showed progressive flattening of the reconstructed nipple and this led to patients' dissatisfaction. Some of those techniques need a graft for donor site defect, while others give a bizarre long pointing nipple that gradually becomes cylindrical as it loses projection.

The author suggests an omega-shaped local flap suitable for both immediate or delayed nipple reconstruction. The projection and shape of the reconstructed nipple is natural from the start and the loss of projection over a 2 years period is less than 30%.

INTRODUCTION

The nipple is the most essential structure of the breast mound and the first thing that catches the eye of the beholder. Its vertical and horizontal position on the breast mound is critical for determining whether the breast mound has an aesthetically pleasing form or not. Hence, no breast reconstruction is complete unless nipple and areola complex (NAC) is also reconstructed.

There are two basic methods by which nipple can be reconstructed: The use of local flaps with or without skin grafts and as a composite free nipple graft from the contralateral breast. Numerous techniques have been and are still being described for local flap reconstruction including C, CV, Tab, Skate, Arrow, Star and Bell to name a few [1-7]. The multiplicity of techniques explains that no single method yields perfect results. Shestak et al., have demonstrated that Star, Skate and Bell flaps lose from 50 to 70% of their projection over 2 years [8]. Jabor et al., revealed that only 13% of all patients were satisfied with their reconstructed nipple areola complex [9].

In this study, the author presents an omega shaped flap of nipple reconstruction that is suitable for both immediate or delayed nipple reconstruction. The base of the flap can be oriented in any direction so that the distal end of the flap along a scar if necessary in case of secondary reconstruction. The technique is simple, straightforward and reliable with normally looking nipple from the start and adequate long-term projection of the reconstructed nipple.

PATIENTS AND METHODS

From May 2006 till January 2010, eight patients have undergone reconstruction of the nipple by the omega flap technique. Three patients have undergone immediate nipple reconstruction while the other five have undergone delayed reconstruction. The follow-up period ranged from 7 to 36 months with an average follow-up period of 22 months. The immediate cases were reconstructed by latissimus musculocutaneous flap with 2 under-going skin-sparing mastectomies for Paget's disease of the breast.

The size and shape of the flap for either primary or secondary reconstruction is the same however wound closure in the primary cases is closed by advancing an opposing flap while in secondary cases a full thickness skin graft from the groin is used to close the defect and at the same time reconstruct the areola.

Flap design and preoperative markings:

An omega shape is designed on the existing breast mound in delayed reconstruction or skin paddle destined for transfer in case of immediate reconstruction (Fig. 1). The flap has two arms with equal sides each of 10 to 15mm and a central half circle with a diameter of also 10 to 15mm. By joining the two arms of the omega flap and the half circle coming on top like a hat, a cylindrical

structure of 10 to 15mm in projection and diameter is created mimicking the native nipple. The flap is sutured in 2 layers: 4-0 polyglactin for subcutaneous closure and 5-0 polypropylene on the skin. The location of the reconstructed nipple is deter-

mined by that of the contralateral breast in case of delayed reconstruction. The centre of the half circle will be the centre of the new nipple and hence the surgeon should take this point in consideration for proper flap positioning.

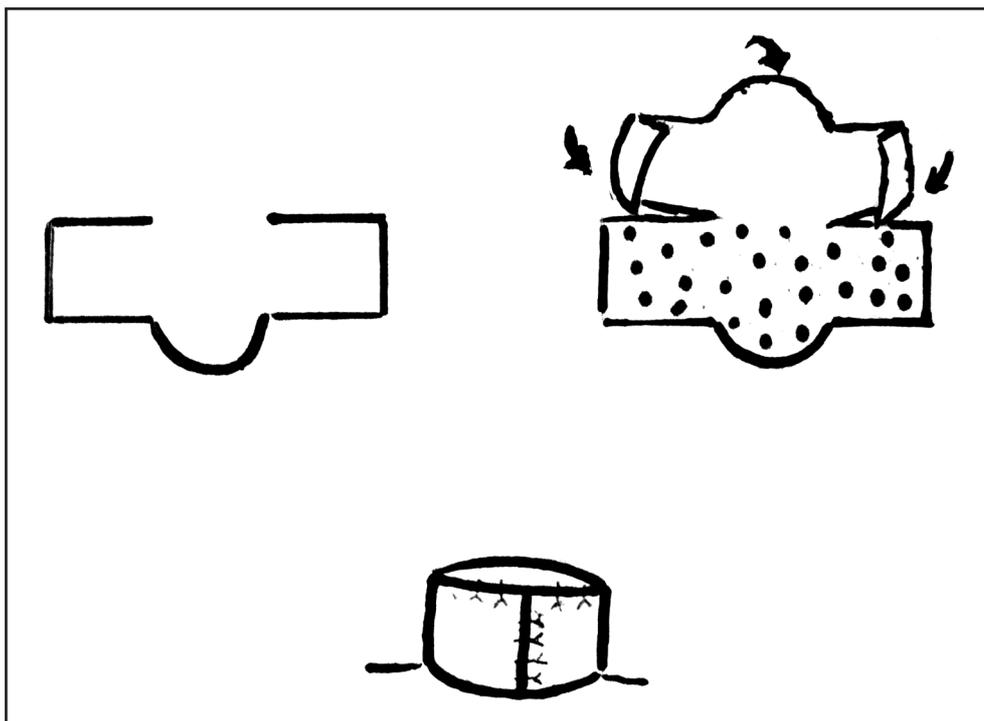


Fig. (1): (Above Left) A superiorly based omega flap is designed with two arms having equal sides of 10-15mm and a central half circle with a diameter similar to the sides of the arms. (Above Right) after incision along the marked lines and subcutaneous dissection, it is held at a perpendicular plane on its uncut side. The two arms are joined together while the half circle comes on top like a hat. (Below) A cylindrical nipple is thus formed having an equal diameter and height ranging from 10-15mm.

Operative technique for primary nipple reconstruction:

The omega flap is centred along a circle of 8-9cm skin paddle destined for nipple and areola (NAC) reconstruction. The skin of the outer circle and that of the omega flap is incised till the subcutaneous fat and the flap is raised with only 2-3mm of subdermal fat. The viability and survival of the flaps depends on the subdermal plexus of the uncut portion. The flap is sutured to form the cylindrical nipple, leaving behind two opposing hemi-circle flaps. Those 2 flaps are advanced towards each other to get sutured along each side of the new nipple and at the same time forming a new areola (Fig. 2). This areola can be tattooed later on to give a more realistic appearance. A protective nipple shield is applied for 2 months. Sutures are

removed at 2 weeks and the patient is allowed to shower at the same day.

Operative technique for secondary nipple reconstruction:

The flap is designed so that the base of the flap (uncut portion) is away from any scar along the reconstructed breast mound. A circle of 8-9cm in diameter is marked around the flap. The omega flap is elevated and sutured as before, and the rest of the circle is de-epithelialized. A full thickness skin graft from the inner groin skin is taken and is placed over the donor site defect as well as de-epithelialized area so as to create a new areola. A tie-over is placed for ten days and the graft take is almost always complete in all 5 cases. The postoperative care is similar to that of immediate reconstruction (Fig. 3).



Fig. (2): (Right) A 50 year-old female patient with Paget's disease of the right nipple. (Left) 9 months postoperative result after she has undergone skin sparing mastectomy and immediate reconstruction with latissimus dorsi myocutaneous flap. Skin paddle was used for primary nipple reconstruction with Omega flap and areola reconstruction with the 2 opposing hemi-flaps. Note the adequate projection of the reconstructed nipple.



Fig. (3): (Above, left) A 44 year-old female patient seeking postmastectomy right breast reconstruction. (Above, right) the reconstructed breast mound with pedicled TRAM flap without NAC reconstruction. (Below) 14 months result after delayed NAC reconstruction with Omega flap and full thickness graft from the groin.

RESULTS

All patients had an uneventful postoperative period. The nipple looked of adequate size and shape, however some mild nipples' level discrepancies were present in all cases. The projection of the reconstructed nipple remained unchanged for the first 6 months. Subtle de-projection appeared later with loss of 2mm in 4 cases and up to 4mm in 3 cases who were followed for more than 18 months. However, in 2 of those five cases who were available for more than 2 years follow-up period, the projection remained unchanged after the initial loss. The patients with skin paddle derived from latissimus dorsi flaps showed a better long-term projection than those having the nipple reconstructed from abdominal skin. All patients were satisfied with the results, despite the slight discrepancy in color and position of the reconstructed nipple.

DISCUSSION

Creation of a new nipple areolar complex provides the final touches of the tedious and artistic work of breast reconstruction. Local flaps for nipple reconstruction have been used for more than 2 decades with myriads of ideas to create a stable cylindrical structure from a two-dimensional surface.

The double opposing tab flaps is one of the first methods introduced by Kroll and Hamilton. The method necessitates a substantial amount of skin and subcutaneous fat that makes it unsuitable in some cases of prosthetic breast reconstruction where skin is thin. Early breast mound distortion is seen and marked flattening occurs within the first year. The Star flap was first introduced by Anton and Hartrampf and later modified by Esker-nazi [6]. The flap projection and width also depends on subcutaneous fat bulk within the flap, which almost always disappear in the first year leaving a flat structure. Also flap modification necessitates a full thickness graft for defect closure. Little introduced skate flap with or without graft for nipple reconstruction again with a bulk of subcutaneous fat [4]. He insisted that the nipple should be at least twice in height of the opposing one to compensate for the inherent loss of projection. This resulted in a long tapering bizarre-shaped nipple in the early postoperative period, which still ends with inadequate projection at 2 years period. Some authors suggested the insertion of auricular cartilage graft for long lasting support however this proved to be inefficient [10]. The use of acellular

dermal matrix was even advocated by some surgeons to maintain the projection [11]. The elongated C and CV flaps were described in the last decade and differs from the other previous techniques in that they depend in their projection on dermal support and not subcutaneous fat bulk [1,2]. The decrease in projection with time was noted to be less dramatic than that reported with other methods. However, the flap dimensions (maximum 40X 15mm) and its configuration restrict the possible projection that can be provided [1].

In this study, the omega flap suggested by the author is also a method of nipple reconstruction depending on the dermal support. It can be designed over the ample skin paddle in the time of reconstruction or on the existing breast mound despite any scar location. Moreover, there is no need for skin redundancy. In case of delayed reconstruction, a full thickness skin graft closes the defect while reconstructing the areola. Another advantage of the omega flap is that it results in a nipple of normal shape from day one. This is contrary to other flaps as C flap, which initially yield a nipple conical in shape and assumes its cylindrical form as it flattens.

The flap dimension should take in consideration that the projection will shrink by 2-4mm. For a nipple with a projection of 8mm, a flap of 10 to 12mm in dimensions is appropriate to accommodate for such changes. On the other hand, due to the increased thickness of back skin, nipples reconstructed by latissimus dorsi musculocutaneous flap are more likely to have a better maintained projection than nipples derived from abdominal or chest wall skin. Moreover the author believes that skin paddle of latissimus muscle flap is more reliable to undergo primary reconstruction rather than try the same procedure in a pedicled TRAM flap. This explains why the three immediate NAC reconstruction were done in cases of latissimus flap reconstruction.

In this study, the author introduces a reliable simple and reproducible method of nipple reconstruction. The Omega flap is suitable for any breast mound whether prosthetic or autologous. Moreover, the flap has a natural shape and long lasting projection making it an ideal solution for nipple reconstruction.

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