

Aesthetic Considerations in Breast Reconstruction

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유방재건의 목표는 건축과 비교하여 자연스럽고 대칭적인 모양을 만드는 것이다. 자가조직을 이용한 재건은 유방절제술 후 유방재건 방법으로 우선적으로 선호되어 왔고, 저자들은 이러한 유방재건에 있어서 미적 섬세함을 고려한 방법들을 발전시키고자 노력하였다. 유방재건은 피관을 거상하는 수술적 과정뿐만 아니라 수술자의 미적인 창조성을 요구하고 있다. 유방은 해부학적 외형상 사람마다 서로 다르기 때문에, 대칭적이고 만족스러운 유방을 만드는 것이 가장 핵심적인 수술적 수기라 하겠다. 이에 저자들은 자가조직을 이용한 유방재건에서 아름다운 유방 형태를 만들 수 있는 수술적 방법들과 고려할 점들에 대해 논의하고자 한다.

Key Words: Breast reconstruction, Breast / Creation of ptosis, Breast contours

I. INTRODUCTION

The goal of breast reconstruction is to recreate a new breast mound that is as natural and symmetrical as the contralateral breast. Autologous reconstruction has become the preferred method of breast reconstruction after mastectomy. Since the landmark introduction of the transverse rectus abdominis myocutaneous (TRAM) flap by Hartrampf in 1982, tremendous advancement has been made in the field of autologous breast reconstruction. The TRAM flap was widely accepted as the gold standard for autologous breast reconstruction. In 1989, Koshima¹ described the same lower abdominal (deep inferior epigastric perforator, DIEP) flap, without sacrificing the rectus muscle. This was later popularized by Allen² and Blondeel³ for breast reconstruction. Since then, we have advanced to aesthetic refinements in

유방재건 시 고려해야 할 미적 관점

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breast reconstruction. Breast reconstruction not only involves the technical procedure of raising a flap for reconstruction, it entails artistic and creative input from the reconstruction surgeon. Because of the myriad of differing anatomical configurations between individuals, surgical manipulation is crucial in the making of a breast which is symmetrical and pleasing. Most reconstruction surgeons know that it may be difficult to achieve shape and ptosis similar to the contralateral breast. This problem is more readily managed in immediate reconstruction where skin-sparing mastectomy can be performed, leaving the skin envelope as a pocket. This allows the flap to fill the pocket, hence achieving a breast mound that is similar to the contralateral breast. In delayed reconstruction, this is not possible.

Many techniques have been described to improve the shape of the breast mound during initial autologous breast reconstruction. Having a full view of the mastectomy specimen for final breast shaping has been described to help envision an exact replica of the breast.⁴ Accurate preoperative measurements of the

breast and tailoring the flap to a template created, allow greater accuracy in shaping of the flap, shorten operative time, and avoid manipulation after transfer.⁵ Vertical plication of the flap has been described to achieve the cone shape of a breast.⁶ However, over-zealous folding of the flap may result in compromise in vascularity and venous drainage.

Often, multiple procedures are required before the ideal result is finally achieved.⁷ The patient may be required to undergo a revision surgery at 6 months after the initial operation for adjustments to the breast shape. In our Asian society, further surgery or secondary revision is not well accepted. Hence it is important to create a breast mound as aesthetic as possible in the initial reconstructive procedure.

We discuss our surgical techniques and considerations in creating an aesthetic breast mound in autologous breast reconstruction.

II. Ideas and Innovations

A. Ptosis and Lower Pole Fullness

Projection and ptosis are two key elements in achieving an aesthetically pleasing and natural appearing breast. Lower pole fullness is especially difficult to achieve in reconstruction with a pedicled TRAM flap, as the medial part of the inframammary crease is lost during the creation of the tunnel through which the pedicle passes. The distinct curve of the breast contour is lost at the position of the subcutaneous tunnel. The fullness of the rectus muscle in the tunnel also

obliterates the natural shape. Another instance in which this fullness is difficult to create is in delayed reconstruction. The breast envelope from skin sparing mastectomy is not available; shaping to achieve a rounded contour is a greater challenge.

We use a concertina suturing technique to achieve the effect of cupping the lower pole of the donor flap. The word concertina, v., (Oxford English Dictionary) means "to compress; to collapse; to wrinkle". The part of the flap which is to form the lower pole of the breast is first determined and marked. A continuous absorbable suture (Vicryl[®] 3.0) is passed round the edge of the flap at the level of the dermis (Fig. 1). When tightened, this suture created a concertina effect on the dermis, hence giving rise to a rounded contour, simulating the natural shape of the breast (Fig. 1). This technique is similar to Benelli's technique of mastopexy using the circumareolar approach.⁸

This attains the effect of the natural curved contour of the lower pole of the breast while at the same time achieving conical projection (Fig. 2). This avoids the undesirable effect of the flap being placed flat onto the chest wall, giving rise to a step-off appearance at the medial and lateral borders. The rounded contour provides a cupped appearance of the flap and lower pole fullness. Ptosis of the breast is also achieved as a result of the now more prominent lower pole projection. A tear-drop shape of the breast is thus attained. We have not observed any compromise in circulation or venous drainage in all our flaps in which this technique was used. This is because only the peripheral part of the

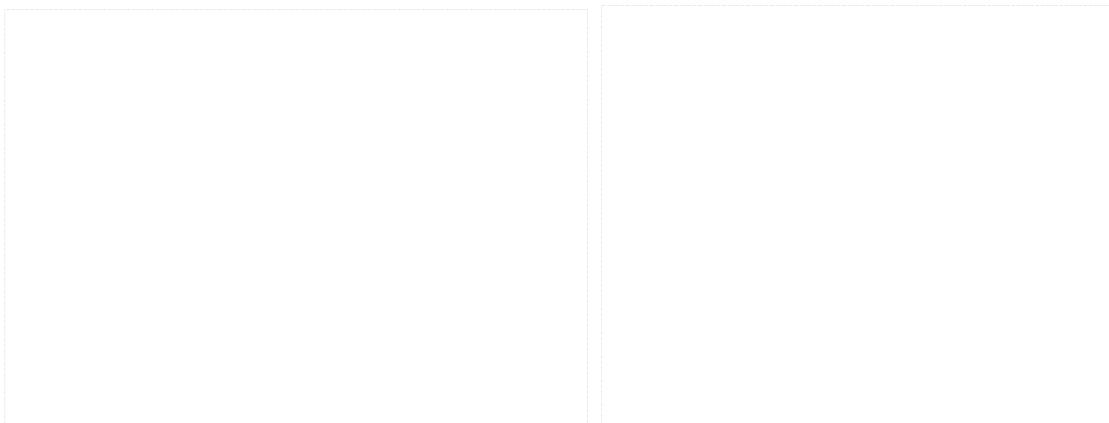


Fig. 1. (Left) A continuous absorbable suture (Vicryl[®] 3.0) is passed round the edge of the flap (deepithelialized with central skin paddle shown here) at the level of the dermis (Right) When tightened, this suture created a concertina effect on the dermis giving rise to a rounded contour and fullness to simulate the natural lower breast contour.

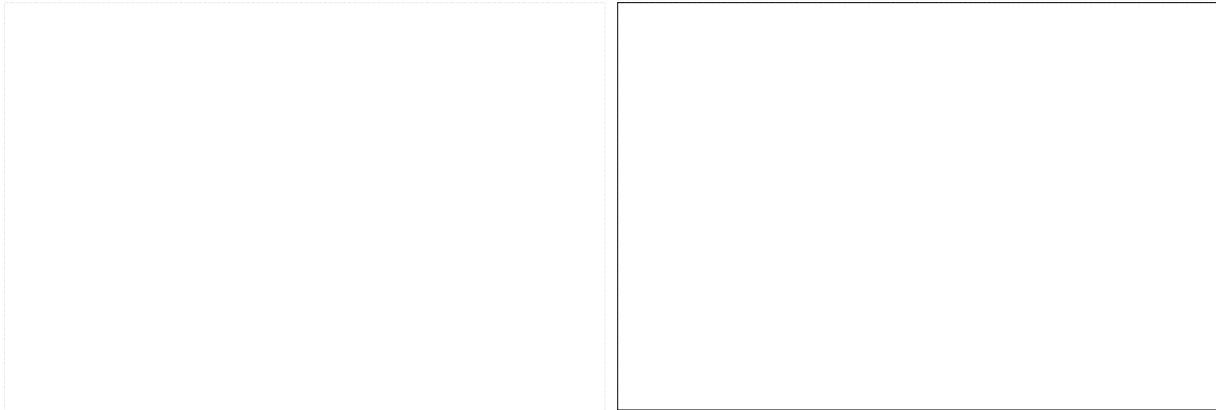


Fig. 2. Patient example of breast reconstruction with pedicled TRAM after non-skin sparing mastectomy. Results after 3 months.

dermis is utilized. The large part of the flap and its circulation are not affected. We were also able to create a larger rounded contour by increasing the length of the border of the flap sutured. This allows us to further shape the medial and lateral contours of the reconstructed breast mound. As a result of the bunching effect, the donor flap provided fill to both the medial and lateral parts of the mastectomy defect. By changing the length and area of flap sutured, this technique also allows variation and individualization, to tailor to the different requirements of each patient.

Another surgical technique which we employ to create projection is by excising a wedge of tissue at the part of the flap determined to be the inferior pole. When the edges of the excised areas are sutured together, it creates conical projection.

B. Creation of natural axillary fold and superior pole

One other common problem in breast reconstruction is the creation of a natural fold at the axillary tail, with a gradual slope down the breast mound. Often, there is an abrupt change from where skin of the chest wall joins the flap. This is caused by step-off from the thicker layer of the fat in the abdominal flap to the anterior chest wall. This problem can be corrected by using a dermal extension in the flap to help form a gradual sloping contour from the flap to the chest wall. This dermal tissue is actually the vascularised continuation of the flap used in reconstruction. When the TRAM or DIEP flap is used in reconstruction, tissue from zones I to III often suffice. There is the possibility of

fat necrosis if the bulk of zone IV is used. Converting the entire zone IV to a contiguous dermal flap allows its usage without the risk of fat necrosis. Deploying it in the axilla gives the advantage of better contour and volume. It also makes use of tissue that would otherwise have been discarded. We trim the excess fat and de-deepithelialized the skin of this dermal extension. It is then anchored in the axilla, to simulate the desired contour of the axillary tail.

Dermal grafts can also be useful in filling the superior pole. The fullness in the superior pole may sometimes be lacking due to insufficient tissue or due to the position of the flap during inset. A thin dermal graft may be fashioned and placed over the superior anterior chest wall to allow a smooth contour from the infraclavicular region to the breast mound.

III. Discussion

We offer our patients the choice of a free DIEP flap, pedicled TRAM flap, or a pedicled latissimus dorsi (LD) flap for autologous breast reconstruction. We do not find a significant difference in the aesthetic outcome using either of these flaps in reconstruction. The flap is chosen after considering the individual's requirements and availability of tissue, and the concomitant medical conditions. The individual's preference is also taken into account.

We have found that the LD flap used on its own is often insufficient to match the volume in the contralateral breast. The LD musculocutaneous flap on its own may not provide enough bulk. Very often, a small

implant is required to be placed in the subpectoral pocket. Undermining the skin to recruit more subcutaneous fat around the skin paddle in a patient who has adequate subcutaneous fat in the lower back may sometimes avoid the use of an implant.

In most instances, the DIEP or TRAM flap provides sufficient tissue for reconstruction. However, the Asian woman may have a very slim body habitus with insufficient available autologous tissue. If the volume of the breast cannot be matched with the use of a DIEP or TRAM flap, an implant can be placed under the flap to augment the autologous reconstruction(Fig. 3). This is especially useful if the patient wishes to augment the contralateral breast at the same time. Using implants allows the surgeon match both breasts by choosing the appropriate size on each side, while providing a natural breast form with overlying autologous tissue.

Proper preoperative measurements and planning contribute significantly to the outcome of a breast reconstruction. Measurements and markings of the contralateral breast are made with the patient in the upright position. Important points to note include the position of the inframammary fold, the degree of ptosis, medial and lateral contours, as well as contours of the superior pole and axillary fold. The measurements of the breast in the vertical and horizontal meridians should be noted so that an approximate size of flap can be designed before inset. The projection of the breast

mound in the upright profile is the key to creating a natural looking breast and has to be taken into consideration during the shaping of the flap.

In immediate reconstruction, skin sparing mastectomy should be performed whenever possible in the absence of oncological contraindications. This is because the preserved skin envelop provides the best contour match for the original shape. In delayed reconstructions, special considerations must be made. The mastectomy skin flaps are usually tight and will not form a smooth contour even when stretched or scored. The mastectomy skin flaps may have to be split vertically along the breast meridian to allow a rounded smooth contour in the horizontal plane and to obtain fullness of the lower pole. With this in mind, the appropriate skin incisions can be planned and special technical adjustments made.

Incorrect placement of the inframammary fold will give rise to obvious asymmetry. Special attention should be made to establish the correct position of the inframammary fold to avoid requiring a second surgery to reposition the flap or redefine the fold. The most common problem is that the fold is placed too low. Even when the inframammary fold had been marked preoperatively with the patient upright, and not breached during mastectomy, it is important to remember that closure of the abdominal wall will cause downward traction of the abdominal wall and shift the inframammary fold to a lower position. We use an absorbable

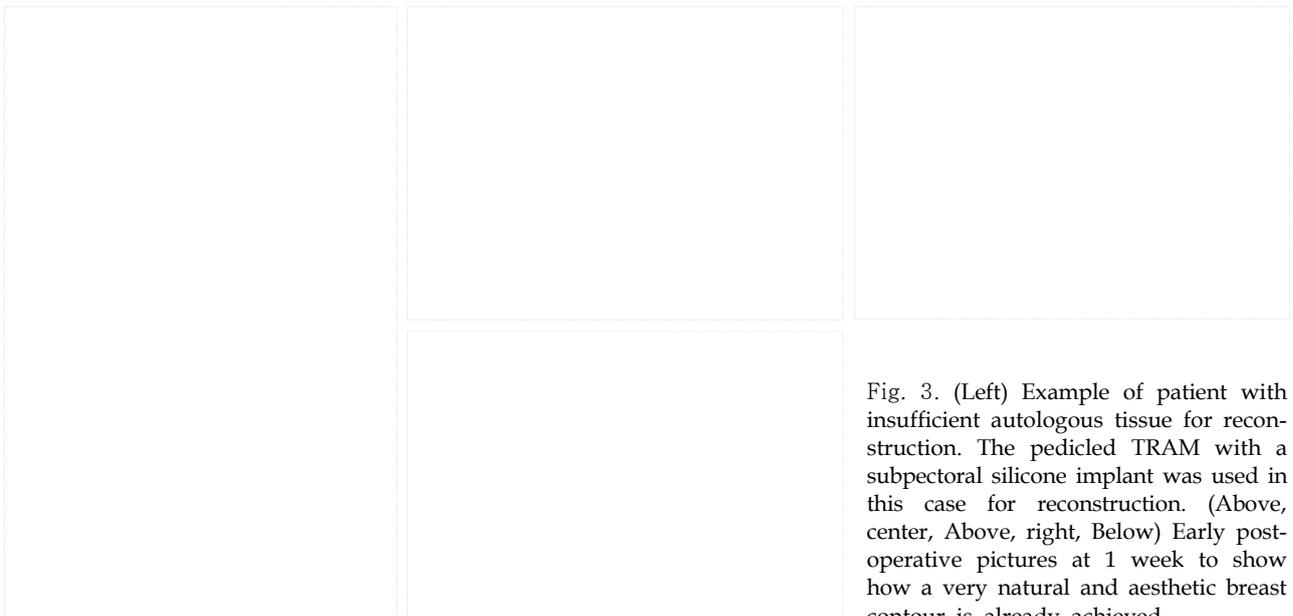


Fig. 3. (Left) Example of patient with insufficient autologous tissue for reconstruction. The pedicled TRAM with a subpectoral silicone implant was used in this case for reconstruction. (Above, center, Above, right, Below) Early post-operative pictures at 1 week to show how a very natural and aesthetic breast contour is already achieved.

suture to anchor the breast skin to the chest wall at the level marked out preoperatively. We do this before closure of the abdominal wall hence re-establishing the fold before it is moved downwards from traction of closure. These sutures are continued onto the lateral breast border. This gives definition to the lateral breast contour and a very aesthetic result. This also prevents the problem of fullness in the lateral border of the reconstructed breast, which often requires liposuction at a later procedure.

In conclusion, an aesthetic result can be achieved in autologous breast reconstruction from just a single procedure. Proper preoperative assessment and planning, special considerations and techniques can be employed to achieve a desirable result. Our described techniques of creation of ptosis, lower breast pole fullness, and a natural axillary fold are two simple methods in improving the aesthetic outcome of a breast mound in a one-stage reconstruction. This is especially important in Asian women who may not be keen for a second stage procedure.

REFERENCES

1. Koshima I, Soeda S. Inferior epigastric artery skin flaps without rectus abdominis muscle. *Br J Plast Surg* 42: 645, 1989
2. Allen RJ, Treece P. Deep inferior epigastric perforator flap for breast reconstruction. *Ann Plast Surg* 32: 32, 1994
3. Blondeel PN. One hundred free DIEP flap breast reconstruction: a personal experience. *Br J Plast Surg* 52: 104, 1999
4. Maximovich SP. Do as the artists and sculptors do: the mastectomy specimen a model to finalize TRAM flap shape in immediate breast reconstruction. *Plast Reconstr Surg* 97: 483, 1996
5. Kanchwala SK, Bucky LP. Precision transverse rectus abdominis muscle flap breast reconstruction: a reliable technique for efficient preoperative planning. *Ann Plast Surg* 60: 521, 2008
6. Charanek AM, Carramaschi FR, Curando, JH. Refinements in transverse rectus abdominis myocutaneous flap breast reconstruction: projection and contour improvements. *Plast Reconstr Surg* 106: 1262, 2000
7. Maylon AD, Husein M, Weiler-Mithoff EM. How many procedures to make a breast? *Br J Plast Surg* 54: 227, 2001
8. Benelli, L. A new periareolar mammoplasty: the "round block" technique. *Aesthetic Plast Surg* 14: 93, 1990