

# Reconstructive options following partial or total mastectomy

## Introduction

The decision making process for women diagnosed with breast cancer or for women who are at high risk due to family history or genetic predisposition are confronted with a multitude of decisions. For women with breast cancer, eradication of the tumor is first and foremost to ensure a cancer free survival. For women at risk for developing breast cancer, the issues are focused on prevention. The topic of breast reconstruction following total or partial mastectomy is relevant for all women and is usually reviewed following the initial diagnosis. For some women, the decision to proceed with breast reconstruction is straightforward and without question; however, for others it is complicated and requires significant thought and research. There are several factors that can influence ones decision to proceed with reconstruction that include breast cancer stage, need for adjuvant therapy, as well as ones physical and mental status.<sup>1</sup> Plastic surgeons and breast surgeons should provide information regarding the types of mastectomies performed (skin sparing versus nipple sparing), therapeutic versus prophylactic, reconstructive options (prosthetic devices versus autologous tissue versus oncoplastics), possibility of radiation therapy (RT), postoperative recovery, and adverse events.<sup>2</sup>

## Breast reconstruction options

Current statistics in the USA demonstrate that nearly 50% of women that have a mastectomy will choose to proceed with reconstruction.<sup>3</sup> Breast reconstruction can be performed immediately following the mastectomy or on a delayed basis. Some women choose never to have reconstruction for a variety of reasons that include reluctance for additional surgery, fear of tumor recurrence, cultural factors, lack of plastic surgical availability, and the feeling that reconstruction is not necessary. Reconstructive options can be divided into two types, prosthetic and autologous. Prosthetic reconstruction is a simpler operative procedure and associated with a shorter postoperative recovery. The downside side is that prosthetic devices do not last forever and will eventually need to be removed or replaced. Autologous reconstruction on the other hand is a more complicated procedure with a longer recovery period. However, the advantage is that when successful, it will last forever. The decision as to which to choose will be based on patient factors, surgeon factors, and oncologic factors.

## Prosthetic reconstruction

Breast reconstruction using prosthetic devices is the most commonly utilized option in the USA and performed in nearly 80% of women.<sup>4</sup> There are two accepted methods by which this is performed that include direct-to-implant (DTI) and 2-stage. With DTI, a permanent implant is inserted immediately following the mastectomy and with the 2-stage, a tissue expander is first inserted to stretch or preserve the post mastectomy skin followed by a permanent implant several months later. It should be remembered that DTI does not imply one operation because revisions are sometimes necessary. Women who are good candidates for DTI typically have a body mass index (BMI)<30, small to moderate breast volume, and good quality

Volume 3 Issue 3 - 2016

**Maurice Y Nahabedian**

Department of Plastic Surgery, Georgetown University Hospital, USA

**Correspondence:** Maurice Y Nahabedian, Department of Plastic Surgery, Georgetown University Hospital, 3800 Reservoir Rd NW, Washington DC 20007, USA, Tel 202-444-6576, Email DrNahabedian@aol.com

**Received:** October 14, 2016 | **Published:** December 21, 2016

mastectomy skin flaps. Women that are good candidates for the 2-stage procedure typically include those that have skin deficiency and will require expansion prior to permanent implant as well as patients with post mastectomy skin quality that is insufficient for a direct to implant reconstruction. The two stage technique is preformed most often because most plastic surgeons prefer it because it will provide another opportunity to optimize breast contour and position. It is the goal of all surgical procedures to provide results that are predictable and reproducible and ultimately high patient satisfaction. Figures 1 & Figure 2 illustrate a woman following 2-stage prosthetic breast reconstruction.

## Autologous reconstruction

The other principle method of breast reconstruction following mastectomy is to use a woman's own tissues commonly referred to as flap or autologous reconstruction.<sup>5</sup> Through ingenuity and innovation, plastic surgeons have designed a variety of flaps that are currently in use in order to minimize donor site morbidities and to maintain high aesthetic quality. The composition of flaps can include skin, fat and muscle. Flaps that include skin and fat only are usually referred to as perforator flaps, e.g. DIEP, SGAP; whereas flaps that include skin, fat, and muscle are referred to as musculocutaneous flaps (e.g. TRAM, latissimus dorsi). Musculocutaneous and perforator flaps are derived from virtually all territories of the body that include the abdomen, posterior and lateral thorax, gluteal region, as well as the medial and posterior thigh. Some of these flaps are robust and can provide large volumes for total breast reconstruction and others are less voluminous and ideally suited for partial breast defects. Given the diversity in flap characteristics and the various donor sites, the ability to properly evaluate and select patients for autologous reconstruction is important. This entails evaluation of a woman's general body habitus, breast volume and donor site considerations. The indications for autologous reconstruction are variable and include women that do not want prosthetic reconstruction, have a sufficient quantity of donor site tissue, have had a prior failed prosthetic reconstruction, or have had prior radiation to the breast or chest wall. The lower abdominal region has become the preferred donor site for the majority

of autologous breast reconstruction procedures and is the source for the pedicle TRAM (transverse rectus abdominis musculocutaneous), free TRAM, DIEP (deep inferior epigastric perforator), and SIEA (superficial inferior epigastric artery) flaps. Figures 3 & Figure 4 illustrate a patient following bilateral breast reconstruction with DIEP flaps. The Latissimus dorsi (LD) musculocutaneous flap is derived from the back and is considered to be one of the most reliable and predictable. Partial or total removal of the LD muscle does not interfere with arm movement but will result in some limitation of forceful arm movements (pull downs, rowing motions). Because the LD flap alone has less volume, it is usually combined with an implant. Gluteal based flaps (SGAP/IGAP) are usually considered when there is insufficient skin and fat in the abdomen. The medial and posterior thigh flaps have also demonstrated success for breast reconstruction. These flaps are alternatives to the abdomen in the event that the abdomen is not suitable.



**Figure 1** Preoperative image of a patient with ductal carcinoma in situ of the right breast.



**Figure 2** Postoperative image following bilateral nipple sparing mastectomy and 2-stage prosthetic breast reconstruction.



**Figure 3** Preoperative image of a patient with right breast cancer.



**Figure 4** Postoperative image following bilateral skin sparing mastectomy and immediate breast reconstruction with DIEP flaps.

### Oncoplastic surgery

Oncoplastic surgery represents the most recent option in the reconstructive armamentarium of plastic and breast surgeons.<sup>6</sup> This option is frequently considered in women who require a large resection of breast tissue in order to complete their breast cancer resection rather than total mastectomy. Breast conservation therapy (BCT) is the most common form of cancer ablation and accounts for approximately 2/3 of women. The primary limitation of BCT is that 20-40% of women will have a contour abnormality especially following radiation therapy. The principle behind oncoplastic surgery is that following the partial mastectomy, the adjacent tissues are rearranged to prevent or minimize any contour abnormality. This may be in the form of a mastopexy, breast reduction, or by using a flap such as the TDAP or latissimus dorsi. This can occur either immediately following the partial mastectomy or on a staged basis. The staged approach is to ensure that the pathologic margins of the specimen are free of tumor and is usually performed 1-2 weeks later and before the radiation. The best candidates for oncoplastic surgery are usually women with larger breasts in whom the lumpectomy defect can be easily corrected using reduction mammoplasty techniques. Figures 5 & Figure 6 illustrate a patient following right partial mastectomy and bilateral oncoplastic reduction mammoplasty. In women with smaller breasts, adjacent breast tissue rearrangement may not be possible and therefore distant tissues such as the latissimus dorsi flap are considered.



**Figure 5** Preoperative image of a patient with right breast cancer.



**Figure 6** Postoperative image following right partial mastectomy and immediate bilateral oncoplastic reduction mammoplasty.

### Acknowledgements

None.

### Conflict of interest

The author declares no conflict of interest.

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