# ADVANCED TECHNIQUES IN BREAST RECONSTRUCTION AFTER MASTECTOMY

*Essay*

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# List of Abbreviations

| Abb. | Full term |
|---|---|
| *BCT* | *Breast Conserving Therapy.* |
| *BIRADS* | *Breast Imaging Reporting And Data System.* |
| *CC* | *Craniocaudal.* |
| *CTA* | *Computed Tomography Angiography.* |
| *DCIS* | *Ductal Carcinoma In Situ.* |
| *DIEA & DIEV* | *Deep Inferior Epigastric Artery & Vein.* |
| *DIEP* | *Deep Inferior Epigastric Perforator flap.* |
| *DVT* | *Deep Venous Thrombosis.* |
| *FNA* | *Fine Needle Aspiration.* |
| *GAP* | *Gluteal Artery Perforator flap.* |
| *IGAP* | *Inferior Gluteal Artery Perforator.* |
| *IMF* | *The Inframammary Fold.* |
| *ITA & ITV* | *Internal Thoracic Artery & Vein.* |
| *LDM* | *Latismus Dorsi Muscle.* |
| *MLO* | *Mediolateral Oblique.* |
| *MRA* | *Magnetic Resonance Angiography.* |
| *MRI* | *Magnetic Resonance Imaging.* |
| *MRM* | *Modified Radical Mastectomy.* |
| *NAC* | *Nipple-Areola Complex.* |
| *PMRT* | *Post Mastectomy RadioTherapy.* |
| *SGAP* | *Superior Gluteal Artery Perforator.* |
| *SLN* | *Sentinel Lymph Node.* |
| *SLNB* | *Sentinel Lymph Node Biopsy.* |
| *T* | *Thoracic* |
| *TNM* | *Tumour lymph Node Metastasis.* |
| *TRAM flap* | *Trasverse Rectus Abdominis Musculocutaneous flap* |

# INTRODUCTION

Breast cancer is the most frequently diagnosed cancer in women worldwide, with about 1.4 million new cases in 2008. Statistically, breast cancer is the most common female malignancy among Egyptian women as recorded by National Cancer Institute (NCI), Egypt. Breast cancer represents about 38% of all reported cancer cases in Egyptian females, with an average age of 49.6 per 100,000 populations, with higher incidence in urban areas compared to rural areas.(1)

For most women, mastectomy is a mutilating and deforming operation that has the capacity to severely damage a woman's self-image and lead her to question her desirability as a sexual partner. Breasts are a potent symbol of femininity, and the loss of a breast can have important psychological consequences.(2)

After mastectomy most women are experiencing psychological distress due to breast loss, which often impairs the patients' self-esteem and distorts their body image. To decrease the distress and improve the quality of life, breast reconstruction is suggested to these women.(3)

Breast reconstruction does not solve all the problems caused by mastectomy, but it solves many of them. A woman who has had a successful reconstruction can usually wear almost all types of normal clothing (including many bathing

suits), many women who undergo reconstruction report improvements in body image and sexuality, as well as enhanced quality of life and satisfaction with their appearance.(4)

Breast reconstruction after mastectomy (simple, total or modified, radical) can be immediate, or primary reconstruction which has been perform while the patient is still under anaesthesia or delayed, or secondary reconstruction until weeks, months, or even years after mastectomy.(5)

There are Multiple treatment options are available for breast reconstruction, including implant-based, autologous or a combination.(6)

Implant-based breast reconstruction, usually by tissue expansion followed by placement of an implant filled with silicone gel or saline, is currently the most widely used method of breast reconstruction. The main advantage of implant-based reconstruction is simplicity. The placement of an implant or tissue expander is technically easy, requires no special equipment. The procedure itself is short, and hospitalization and recovery time is minimal.(7)

Unfortunately, implants also have significant disadvantages. Formation of a fibrous tissue capsule around an implant is a normal physiological response to a foreign body. However, when a capsule forms around the implant it may

contract and lead to serious problems such as tenderness, pain and distortion of the breast.[8]

Some women do not like the idea of having implants, while others, for any number of reasons, may not be candidates for that type of reconstruction. The most common reason that a patient may not be eligible for implant reconstruction is because of a history of radiation. Using the patient's own tissues to reconstruct the entire breast is an attractive option for these patients. Natural tissue has the potential to provide durable reconstruction of the full breast volume, often without the vulnerability of implants, which can fail or require replacement eventually.[9]

Autologous tissue reconstruction is more complex, demands a longer initial hospitalization, and requires a longer recovery period than does reconstruction based on implants. The surgical procedures themselves are more difficult, and not every plastic surgeon is familiar with them. Because autologous tissue can be obtained only from the patient herself, there are always some potentially deleterious changes in the donor site even when the operation is completely successful. If the donor site is not repaired properly or if too much tissue is harvested, significant morbidity can occur. Should flap loss occur, salvage is more difficult than is the case after loss of an implant, which, at least in theory, can be replaced by a new one.[10]

# Aim of the Work

The aim of this essay is to discuss surgical management of breast cancer and the different techniques of breast reconstruction after mastectomy; to improve the quality of life in breast cancer patient.

# ANATOMY AND PHYSIOLOGY OF THE FEMALE BREAST

## Development of the Breast:

Development of the Breast The breast undergoes multiple changes throughout life, from intrauterine life to senescence. The development of the breast has several implications that impact the breast surgeon. These include not only developmental anomalies that the breast surgeon may face, but also the routine surgical approach to both benign and malignant disease. Although the majority of growth occurs with puberty, the development and differentiation of the breast are truly completed by the end of the first term of pregnancy. This is relevant to the development of cancer, because breast cancer risk is clearly and inversely related to the age at which pregnancy first occurs. It is possible that this is secondary to an increased risk of carcinogenesis when the pre parity, undifferentiated, and proliferating mammary epithelium is exposed to carcinogens, as compared to the effect of these same carcinogens on the differentiated breast.(11)

## Embryology:

The breast is a modified sweat gland originating from the ectodermal layer of the embryo during the $4^{th}$-$6^{th}$ week of intra-uterine life. It arises from two ridges of ectodermal thickening called the milk lines, which runs from the future axilla to the

future inguinal region and medial thigh. Although most of the milk line eventually disappears, a prominent ridge remains in the pectoral area to form the primary breast bud during the 5th week of intra-uterine life. This bud grows downwards into the underlying dermis. In the 10th week, the primary bud begins to branch, and by the 12th week several secondary buds have been formed.

These buds lengthen and branch throughout the remainder of gestation, and the resulting ducts canalize by the coalescence of small lumens. At birth, the mammary glands consist of 15-25 lactiferous ducts, which open onto a small superficial depression called the mammary pit. Proliferation of the underlying mesoderm usually converts this pit to an everted nipple within few weeks after birth, although occasionally the nipple remains depressed (inverted nipple). The skin surrounding the nipple also proliferates to form the areola.(12)

Up until the onset of puberty, the tissue of the breast responds to the release of estrogen and progesterone. Estrogen stimulates the formation of additional ducts, the elongation of existing ducts and formation of a system of milk secreting glands. These are associated with an increase in volume and elasticity of connective tissue, deposition of adipose tissue and increased vascularity. Progesterone stimulates lobule formation. By the time the breast is fully formed, typically by the age of 15. Until the menopause, the woman's breast tissue will continue to respond to the changing hormonal environment that

follows the menstrual cycle. The breast spends the majority of its life in a resting state, fulfilling its physiological function, lactation, under the control of hormonal changes that accompany pregnancy and childbirth.(13)

## Functional Anatomy:

The breast is composed of 15 to 20 lobes, which are each composed of several lobules.15 Fibrous bands of connective tissue travel through the breast (Cooper's suspensory ligaments), insert perpendicularly into the dermis, and provide structural support.(14)

The mature female breast extends from the level of the second or third rib to the inframammary fold at the sixth or seventh rib. It extends transversely from the lateral border of the sternum to the anterior axillary line. The deep or posterior surface of the breast rests on the fascia of the pectoralis major, serratus anterior, and external oblique abdominal muscles, and the upper extent of the rectus sheath. A small part of the mammary gland may extend along the inferolateral edge of the pectoralis major toward the axillary fossa forming an axillary tail of Spence.(14)

Natural lines of skin tension known as Langer lines which extend outwards circumferentially from the nipple–areola complex. The lines of Langer assume particular clinical

significance for the surgeon, when determining where to place the incision for breast biopsies.[15]

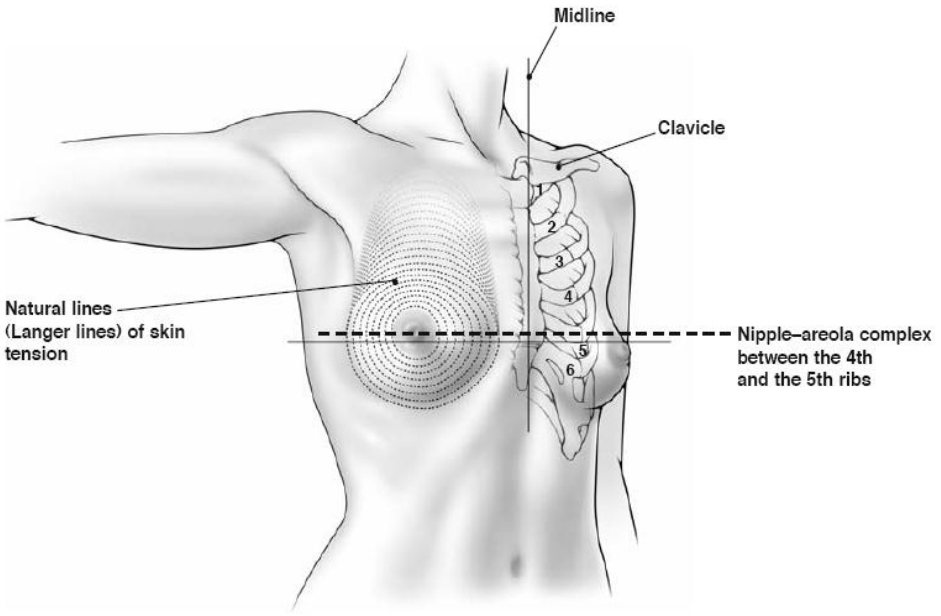


**Figure (1):** Surface anatomy of the breast.

The surface of the breast is divided into four quadrants. The main bulk of the breast tissue is usually localized to its upper outer quadrant. This quadrant is more often implicated in breast cancer and in most benign lesions of breast tissue.[16]

The breast is composed of glandular (secretory) and adipose (fatty) tissue, and is supported by a loose framework of fibrous connective tissue called Cooper's ligaments. The glandular tissue consists of 15 to 20 lobes that are composed of lobules containing between 10 and 100 alveoli. 15 to 25 ducts drain the alveoli and merge into larger ducts that eventually converge into one main milk duct which dilates slightly to form