New Techniques of Breast Reconstruction after Mastectomy Operations

A SYSTEMATIC REVIEW FOR PARTIAL FULFILMENT OF MASTER DEGREE IN GENERAL SURGERY.

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2018

الطرق الجديدة لإعادة تشكيل وبناء الثدي ما بعد عمليات استئصال الأورام السرطانية.

مراجعة منهجية توطئة للحصول على درجة الماجستير في الجراحة العامة.

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كلية الطب، جامعة عين شمس.

كلية الطب

جامعة عين شمس

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بِسْمِ ٱللَّهِ ٱلرَّحْمَٰنِ ٱلرَّحِيمِ
قُلْ إِنَّ صَلَاتِي وَنُسُكِي وَمَحْيَايَ وَمَمَاتِي
لِلَّهِ رَبِّ ٱلْعَٰلَمِينَ ﴿١٦٢﴾
لَا شَرِيكَ لَهُۥ ۖ وَبِذَٰلِكَ أُمِرْتُ
وَأَنَا۠ أَوَّلُ ٱلْمُسْلِمِينَ ﴿١٦٣﴾
سُورَةُ الأَنْعَام

Acknowledge:

First and foremost, I feel always indebted to **ALLAH,** *the Most Kind and Most Merciful.*

I'd like to express my respectful thanks and profound gratitude to ***Prof. Dr. Magdy Bassiony****, Professor of General Surgery, Faculty of Medicine, Ain Shams University for his keen guidance, kind supervision, valuable advice and continuous encouragement, which made possible the completion of this work.*

I am also delighted to express my deepest gratitude and thanks to ***Prof. Dr. Saad Elfayoumy,*** *Professor of Plastic and Reconstructive Surgery, Faculty of Medicine, Ain Shams University****,*** *for his kind care, continuous supervision, valuable instructions, constant help and great assistance throughout this work.*

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List of Abbreviations

Abb.	Full term
DIN	Ductal Intraepithelium Neoplasia.
LIN	Lobular Intraepithelium Neoplasia.
DCI	Ductal Carcinoma In situ.
NST	Carcinoma of No Special Type.
ILC	Invasive Lobular Carcinoma.
ITC	Invasive Tubular Carcinoma
ICC	Invasive Cribriform Carcinoma.
NAC	Nipple Areola Compiex.
BCT	Breast Conserving Therapy.
IMF	InfaMammary Fold.
LD	Latissimus Dorsi muscle.
TRAM	Transverse Rectus Abdominus Myocutaneous flap
DIEP	Deep Inferior Epigastric Perforator flap.
SIEA	Superior Inferior Epigastric Artery.
SGAP	Superior Gluteal Artery Perforator flap.
TUG	Transverse Upper Gracilis flap.
RSS	Retrospective study
PMRT	Post-Mastectomy Radiation Therapy.
CT	ChemoTherapy.
IBR	Immediate Breast Reconstruction.
DBR	Delayed Breast Reconstruction.
ITER	Immediate Tissue Expander Reconstruction.
DTER	Delayed Tissue Expander Reconstruction.

INTRODUCTION

Since the start of the recorded time, breast is considered as a symbol of femininity, motherhood, and sexuality. It has been portrayed throughout history in works of art symbolizing each of these aspects of a woman's life and even in religious works of art, the breast has been memorialized as a central focus of a woman's anatomy. Similarly, evidences were established of the destroying effect and challenges of breast cancer dating back to the seventeenth century B.C.

One of the most comprehensive examinations of the breast throughout history was written by Marilyn Yalom. Her work illustrates how and why the breast has become such an important symbol of femininity throughout history, and why the breast continues to be so important to women in today's modern societies. Her description of the breast as both ''life-giving'' and ''life-destroying'' gives us the essence of why breast surgeons must be trained with a keen sense of blending science and art. (1)

In parallel to the changes taking place in diagnosis of the breast disease and the improvements in the breast cancer treatment, the focus on the female breast became much more socially accepted.

With the introduction of television, magazines, pornography, and more sexually directed marketing, the world's view of a woman's breast began to change, since breasts were literally much more visible each and every day.

Historically, being ‘‘well endowed’’ has long been “virtue” that artists and writers have documented throughout the ages. (1)

The beautiful woman's breast should be wide and full of meat so that no sign of underlying bone can be detected and skin color should be ‘snow-white’. The beautiful neck is like snow but the breast is like milk, the best breasts are small ones, round, firm, like the round and beautiful apple, they should neither be too attached nor too small, two raw apples looking like ivory. (1)

ABSTRACT:

Breast cancer is the most common malignancy and the second leading cause of cancer deaths amongst women. Mastectomy with different techniques is still the main approach for cure especially in advanced cases, leaving women without breasts has disastrous psychological impact on them, so the need for breast reconstruction appeared either with implant-based and autologous tissue reconstruction, but the need for neoadjuvant or adjuvant radiation therapy is still a drawback for conducting breast reconstruction.

Methodology: The data was extracted from PubMed and Cochrane collaboration data base and analyzed for assessment of the outcomes measured in this study.

Results: The review included 9 studies reviewed for extracting the data on development of early and late, minor and major, and reconstruction failure rate in radiated breast reconstructed cases.

Conclusion: Conducting IBR either with autologous or Implant-based reconstruction still carries higher rates of complication when compared to delayed one in radiated breast reconstructed patients.

OBJECTIVE:

The objective of this systematic review is to seek, through the available literature, the convenience of conducting immediate or delayed breast reconstruction in radiotherapy administrated patients either pre or postoperatively.

ANATOMY AND EMBRYOLOGY

Breast development starts in the fifths and sixth weeks of fetal development and continues through puberty. Errors during development lead to abnormal development or even complete failure of breast development. The breast composed of several structures that have a functional and supportive role. Some of these structures don't reach their full develop until pregnancy and lactation and regress or even involute after lactation and at menopause.

During the 5^{th} and/or 6^{th} week of the fetal development, the two bands of thickened ectoderm known as the ectodermal primitive milk streak are formed between the axilla and the groin. They remain in the thorax to form the mammary ridge, whereas the remainder portion regresses in the human development. The breast develops from the ingrowth of the ectoderm into the mesoderm to develop the breast bud. Glandular portion of the breast is formed from the ectodermal part. During development, at the twelfth week, 16–24 secondary buds will develop from the primary bud. [(2)]

Sequence of Development:

The breast development follows a stepwise developmental manner beginning around the 5^{th} week post-conception and

continuing till birth. In weeks five and six, the primitive milk streak is formed from a thickened band of ectoderm. Following formation of the primitive milk streak in the seventh or the eighth weeks and, the mammary anlage will thicken, and the mesoderm will invaginate. Simultaneously, the breast buds start to develop. This process continues until reaching the week twelfth till the week sixteen, when mesenchymal cells start to differentiate into the smooth muscle of the nipple and areola. Secondary breast buds will further reform and branch but still as solid components during this period. At the sixteenth week, the tips of the buds become the secretory alveoli. The secondary mammary anlage distinguishes into sebaceous and sweat gland elements and hair follicles. Apocrine glands form the glands of Montgomery. Beginning at week 20 of development and continuing until week 32, the buds of the breast will canalise to form mammary/lactiferous ducts. These ducts end with an open into a shallow mammary pit, which will from the NAC. In the final weeks before birth, weeks 32 through 40, parenchymal differentiation occurs. The lobules and alveoli complete development.

Finally, the NAC is developed via proliferation of the mesenchyme and becomes pigmented. [2]

The next table shows the breast developmental sequence during weeks of gestation;

Table (1). sequence of embryological breast development during foetal life.

Gestational week	Breast development
5–6	Primitive milk streak develops from the ectoderm
7–8	Thickening of the mammary anlage
	Invagination into the mesoderm
	Growth of breast buds
12–16	Mesenchymal cells differentiate into the smooth muscle of the nipple-areola
	Secondary breast buds develop and branch
16–20	Tips of breast buds become the secretory alveoli
	Secondary mammary anlage differentiates into hair follicles and sebaceous and sweat gland elements
	Apocrine glands develop into Montgomery glands
20–32	Breast buds canalize and become lactiferous/mammary ducts
32–40	Parenchymal differentiation; lobules/ alveoli develop
	Proliferation of mesenchyme forms the nipple-areola complex
	Pigmentation of the nipple-areola complex

Anatomy:

The breast of the adult female located between the 2nd and 6th/7th ribs. The base of the breast spans from the sternal border medially to the mid-axillary line on its lateral end, and is enveloped by the superficial and deep fascia of the chest wall. Two-thirds of the breast lies anterior to the pectoralis major and the remainder one-third lies to the anterior of the serratus anterior muscle. A prolongation of the upper outer quadrant of the breast, extends into the axilla which is known as the *tail of Spence***.**

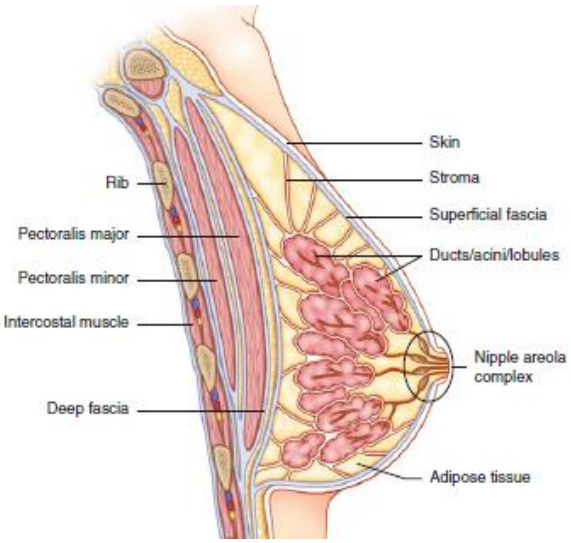

fig. 1: anatomical component of breast

Components of the breast:

Skin: It is the outermost layer of the breast where the dermis merges with the superficial fascia.

Superficial fascia – It lies just beneath the skin, which is continuation with the superficial abdominal and cervical fascia. It envelopes the breast parenchyma along with the deep fascia.

Breast parenchyma – It is composed of three principal tissue types: glandular epithelium, fibrous stroma, and supporting structures and fat. The first represents