



# IMPLANTS USED IN BREAST CANCER THERAPY: AN REVIEW

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**Abstract:** The whole study is about implants used in the breast cancer therapy. Breast cancer is widely spread in all over the world. Which is to be more dangerous in upcoming years. Various types of implants are widely used in the therapy some of them are safe but risky while they are using. In this study etiology of breast cancer is studied. Based on this various types of therapies are studied. According to FDA these implants are useful or not is also studies. One of the most common and popular cosmetic surgery procedures performed in UK is breast augmentation surgery with more than 11,135 treatments conducted only in 2013. According to one of the estimates, above 30,000 breast implant procedures are performed every year in UK (NHS, UK). Permanent breast augmentation surgery is a surgical prosthesis that is used for modifying the shape, size, form and texture of the woman's breast. There can be three major purposes for the use of breast implants 1. Reconstruction of breast 2. For correcting the genetic deformities or defects of the chest wall. 3. Aesthetic. Required information was collected through literature review

**Keywords:** Breast cancer, various factors , chemotherapy, radiation therapy, history of breast implants, risks of breast implants, Implant vs. flap reconstruction, Comparing saline and silicone implants. Difference between silicone and saline implants.

## Introduction:-

Breast cancer is common female cancer, the 2nd most common cause of cancer death in women, and death in women ages such as 40 to 59.

It has been reported that mortality rate from breast cancer has been considerably high in women whose cancer was first diagnosed during pregnancy compared with those who had never been pregnant.

At the present time, many women all over the world faced the challenge of living with breast cancer. The lifetime chance of developing breast cancer is 1 in 6 overall.<sup>1</sup>

High prevalence of breast cancer and high mortality rate of women who stricken by, appoint it among the most challenging subjects in the area of experiments. The two major class of breast cancer risks are objective and subjective factors. Objective breast cancer risk is defined as an estimated chance for bearing breast cancer based on precisely recognized risk factors for the disease and is projecting the resultant health outcomes.

Subjective breast cancer risk is known as an individual's understanding of her chance for getting breast cancer based on her own cognitive appraisal and is affected by depressive conditions. Objective BC risk had a not enough but major relationship with immune response and natural killer cell activity (NKCA), whereas Subjective risk was highly associated with psychological distress but was not associated with NKCA also the results are still controversial.

Many parameters including prenatal conditions, diet, physical activity, estrogen exposure, body mass index, depression and class of life have been mentioned as breast cancer risk factors. A constructive family history is the main risk factor.

Diet with high consumption of alcohol, fat, caffeine and red meat is a positive risk factor for bearing breast cancer, whereas phytoestrogens and high level of calcium/vitamin D can be effective to reduce it.

Hormonal conditions stand among the most important factors. Prolonged exposure to and higher concentrations of endogenous estrogen; which is controlled and modulated by menarche, pregnancy, and menopause; increase the risk of breast cancer.

Testosterone level has also showed some parallelism with higher rate of breast cancer in some studies, although not in all of them. Younger age of menarche and older age of first full-term pregnancy are associated with a higher risk of breast cancer.

The information about the effects of oral contraceptives on breast cancer risk are controversial. Some studies show an high risk of breast cancer in oral contraceptive users, whereas in some other researches, not any significant difference was seen.

The two newer researches didn't give any data which show that oral contraceptives cause any increase in breast cancer risk. Long term use of postmenopausal hormone therapy is associated with higher risk of breast cancer.

In difference short-term HT appears not to rise the risk considerably, although it may make mammographic detection more difficult. Environmental toxic substances like Organochlorines include polychlorinated biphenyls

(PCB's), dioxins, and organochlorine pesticides such as DDT are weak estrogens with high lipophilic properties and as a result, can store in adipose tissues.

Some studies suggest that exposure to these chemicals will increase the risk of bearing breast cancer, however the data are controversial and more researches should be done. Age and gender are the strongest risk parameters for breast cancer.

Breast cancer occurs hundred times more normally in women than in men. Occurrence rates increase with age until about the age of 45 to 50.<sup>3</sup>

Cultural difference is another factor affecting breast cancer occurrence. For exemplar, in United States, breast cancer is more common between whites. Much of these differences occur from lifestyle factors and social conditions. Also, there are marked variations in breast cancer incidence and mortality among countries. Women with higher educational, occupational and economic level are at greater risk because of their reproductive pattern as well as age of parity and age of first birth. Cultural differences in estrogen and progesterone receptor subtypes have been also determined as important factors that affect the probability of breast cancer.

## **Epidemiology of Breast Cancer**

Breast cancer is the most common cancer of women worldwide and represents approximately 16% of all female cancers.

According to WHO, 519,000 women died in 2004 and 69% of cancer deaths are from breast. This is a complex disease influenced by many risky factors. We differentiate the genetic, environmental and demographic parameters on the one hand.

And on the other hand, the hormonal factors and those related to re- production, lifestyle and eating habits. Clinically, it manifests itself as a breast lump at times related with mastodymia, nipple discharge and retraction with auxiliary nodes affected in higher forms.

In developed countries, screening by imaging and needle biopsy allow the diagnosis of cancerous lesions to be earlier and as a result terrible prognos.

In developing countries, incidence rates are low but rising steadily with a tendency to become a public health problem. The prognosis is bleak because of the lack of appropriate strategies in most of these countries.

In Ivory Coast, the advent of infectious diseases (HIV/ AIDS, malaria and endemic and epidemic diseases) and their corollaries on the variant population, has put in the background women's breast cancer<sup>3</sup>. For decades, the laboratory of pathological anatomy of Hospitals and examinations of pathological anatomy until the 1990s.

A study conducted in those laboratories among 1974 and 1983 by Diomande et al. shows that cervical cancer was the first cancer of women and breast cancer was the second with a frequency of 10.52% of cases <sup>3</sup>.

According to an comprehensive study of the first results from the cancer registry of Abidjan carried out by Echimane et al., breast cancer of women has an incidence of 24.5 cases per 100,000 women <sup>4</sup>.

The aim of our study was to clarify the epi-demiological and pathological features of breast cancers of women in order to adopt an adequate strategy of care in our Ivorian context.

## **Pathophysiology of Breast cancer**

Breast cancer is a disease in which malignant (cancer) cells form in the tissues of the breast. It occurs in both male and female but very exceptional in men. Breast cancer is the most general cause of cancer death amongst women in 140 of 184 countries worldwide and the most frequently diagnosed cancer among women which now represents one in four of all cancers in women <sup>8</sup>.

Breast cancer Epidemiology and Burden Breast cancer is the most common female cancer, the second most general cause of cancer death in women, and the central cause of death in women ages 40 to 59 <sup>15</sup>.

Breast cancer is a common form of cancer surrounded by women worldwide. Now, it is the most most important cause of cancer death with 198,000 deaths per annum which represents 15.4% of all deaths in developed regions after that of the lung cancer <sup>16</sup>.

In developing countries, it is the first leading cause of death among women with 324,000 deaths which represented 14.3% of all deaths <sup>16-18</sup>.

It is second only to lung cancer as a cause of cancer mortality, and it is the leading cause of death for American women between the ages of 40 and 55 <sup>19</sup>.

The lifetime threat of a woman development enveloping breast cancer is 12.6 %. Two one out of eight females in the United States will develop breast cancer at some point in her life <sup>20</sup>. The Cancer Statistics Worldwide <sup>21</sup>, documented that worldwide; more than one million new cases of female breast cancer are diagnosed each year, making it the most commonly occurring disease in women, accounting for over 1/3 of the estimated annual 4.7million cancer diagnosis in females and the second most common tumor after lung cancer in both sexes.

It is also the most common female cancer in both developed and developing countries with 55% of it occurring in the developing countries <sup>22</sup>. Garcia <sup>23</sup>, reported that over one million women are diagnosed with breast cancer every year, and it is the leading cause of cancer death in women. Every year more than 500,000 women die from the disease <sup>24</sup>.

## Etiology of Breast Cancer

The etiology of breast cancer is not fully understood<sup>8</sup>. A variety of interrelated factors, such as genetics, hormones, the environment, sociobiology and physiology among others can influence breast cancer development.

Risk Factors for Breast Cancer:-

Cancer Studies has shown that a number of conditions known as risk factors encourage or predisposes one to cancer. Some identified risk factors for breast cancer include:

**a. Environmental factors:** Exposure to ionizing radiation due to nuclear war, use of gadgets, medical diagnostic or therapeutic procedures increased risk of developing breast cancer<sup>26</sup>.

**b. Sociobiological factors:** Gender and age are important risk factors for breast cancer development. Globally, 75% of new cases and 84% of breast cancer deaths occurs in women aged 50 and older, with the number of breast cancers diagnosed in women in their fourth decade of life rating at 1 in 232 compared to those in their seventh decade of life, which are rated at 1 in 29. This increase may be directly related to hormonal changes in women in this age group<sup>27,28</sup>.

**c. Nutritional factors:** High intake of fats increases the risk of developing breast cancer. Diet with high amounts of fat, caffeine and red meat is a positive risk factor for breast cancer. While the consumption of fruits and vegetables may reduce the risk of breast cancer development<sup>28</sup>. Phytoestrogens and high amounts of calcium/vitamin D can also be effective to reduce breast cancer risks.

**d. Physiological factors:** Moderate physical activities or exercise lowers the risks of breast cancer. Studies have shown a 30% reduction in risk level associated with a few hours per week of vigorous activity compared to no exercise at all<sup>28</sup>.

**e. Genetic factor:** Although only 5% to 6% of breast cancers are considered hereditary<sup>29</sup>, genetics plays a limited but important role as a risk factor for breast cancer. BRCA-1 and BRCA-2 account for an estimated 80% of hereditary breast cancer. BRCA-1 and/or BRCA-2 positive women have a 50% to 85% lifetime risk of developing breast cancer and a 15% to 65% risk of developing ovarian<sup>30</sup>.

**f. Family risk factors:** Breast cancer is considered a risk if you have a family member who developed cancer<sup>31</sup>.

**g. Alcohol:** The evidence that all types of alcoholic drinks are a cause of a number of cancers is now stronger than ever before. Alcohol can raise the risk of breast cancer, as well as mouth, throat, pharyngeal cancer, laryngeal, cancer of the foodpipe, liver, and bowel cancer (in men).

**h. A woman's hormonal history:** The more menstrual cycles a woman has over her lifetime, the greater is her risk of breast cancer<sup>33</sup>. The hormonal history of appears to be a risk factor, as the relative risk of breast cancer seems to

be related to the breast's cumulative exposure to estrogen and progesterone. Early menarche (onset of menstruation, age 13), having no children or having them after age 30, and menopause after age 50 and especially age 55—all these mean more menstrual cycles and thus greater hormone exposure<sup>34</sup>.

**i. History of breast cancer:** Women who were treated of breast cancer have the risk of developing a new second cancer in either the treated breast or the other breast<sup>35</sup>.

**j. Obesity:** Women who are obese have higher blood levels of the hormone oestrogen. This is because fat cells make oestrogen, which fuels the growth of most breast cancer tumours<sup>35</sup>.

**k. Hormone replacement therapy and oral contraceptives:** Hormone replacement therapy and oral contraceptives are sources of oestrogen, which is a risk factor for breast cancer<sup>33</sup>.

**l. The immune system:** People who have weakened immune systems are more at risk of developing some types of cancer. This includes people who have had organ transplants and take drugs to restrain their immune systems to stop organ rejection, plus people who have HIV or AIDS, or other medical situation which reduce their immunity to disease<sup>26</sup>.

**m. Tobacco:** Over 80 different cancer-causing substances (carcinogenic agents) are present in tobacco smoke. When smoke is inhaled the chemicals enter the lungs, pass into the blood stream and are transported throughout the body<sup>32</sup>. Smoking is thus a main risk factor for breast, lungs and other kinds of cancer.

**n. Exposure to Cancer-causing substances (carcinogens):** Exposure to cancer causing substances may cause mutation of normal cells to cancerous cells.

**o. Infections:** Breast cancer may develop as a result of viral infections. Examples include cervical cancer, linked to the Human Papilloma Virus is linked to cervical cancer, while primary liver cancer is linked to the Hepatitis B and C virus. Lymphoma is linked to the Epstein-Barr virus<sup>26,32</sup>.

**p. Pathology of the breast disease:** Clinically, breast disorders can be described as follows:

**q. Inflammatory lesions:** These are rare breast lesions that can be acute or chronic and include acute mastitis, duct ectasia, post-traumatic lesions and granulomatous mastitis.

**r. Benign fibrocystic lesions:** Fibrocystic changes represent the single most common disorder of the breast and account for more than 40% of all surgical operations on the female breast<sup>24</sup>. It is diagnosed frequently between the ages of 20 and 40 years, and rarely develops after menopause. It is frequently influenced by hormonal imbalance.

**s. Benign breast diseases:** These are rare tumours, which include fibro adenomas, phyllodes tumours and large duct papilloma.

**t. Proliferative breast disorder:** Epidemiological studies have identified changes in the breast resulting in an increased risk of developing carcinoma. This risk is due to hyperplasia with or without atypia. These lesions are often accompanied by fibrocystic changes as well. They can be associated with mammographic abnormalities <sup>28</sup>.

**u. Carcinoma of the breast:** Breast cancer can be divided into two main groups: non-invasive or carcinoma in situ, and invasive carcinoma<sup>4</sup>.

## **IMPLANTS USED IN CANCER THERAPY**

One of the most common and popular cosmetic surgery procedures performed in UK is breast augmentation surgery with more than 11,135 treatments conducted only in 2013. According to one of the estimates, above 30,000 breast implant procedures are performed every year in UK (NHS, UK). Permanent breast augmentation surgery is a surgical prosthesis that is used for modifying the shape, size, form and texture of the woman's breast.

### **History of Breast Implant**

Breast implants completed with silicone envelopes and packed with silicone gel or saline (salt water) were first sell in the United States in the 1960s, but sales were relatively slow until the 1980s. By 1990, however, approximately one million women had undergone breast implant surgery, even though no safety studies had been in print. Most of those women had silicone gel breast implants, which the plastic surgeons chosen.

Although most medical products must be proven safe and effective before they can be sold in the U.S., that was not true for implanted medical devices sold before 1976. The Food and Drug Administration (FDA) did not need that companies advertising silicone breast implants prove that their implants were safe until 1991 – after they had been in use for almost three decades. For the first time, the media in progress to report about women with implant problems, and quoted doctors who were concerned about implant safety. When the studies were provided to the FDA, the safety data were found to be inadequate to warrant FDA approval.

For example, among reconstruction patients:

- 46% of women with silicone gel implants and 21% with saline implants undergo at least one re-operation within 3 years.
- 25% of silicone patients and 8% of saline patients had implants detached; and
- 6% of silicone patients and 16% of saline patients practiced breast pain.<sup>4</sup>

**There can be three major purposes for the use of breast implants:**

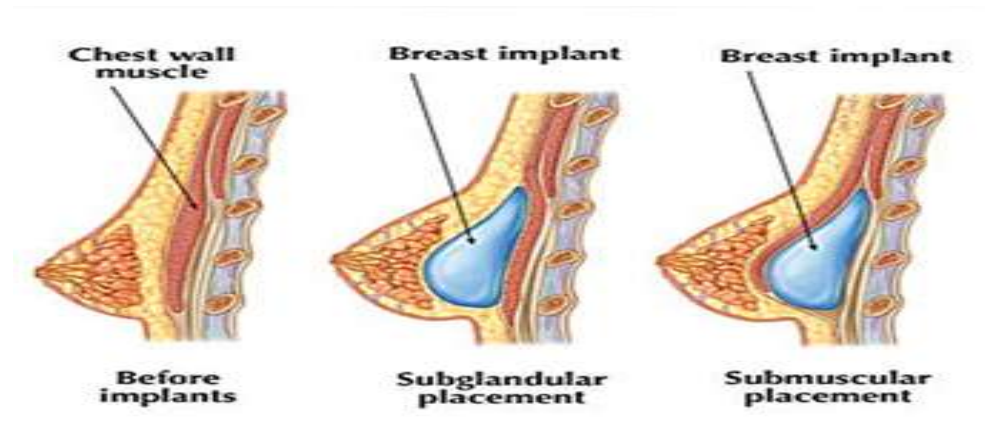
- Reconstruction of breast usually after mastectomy ( the surgical breast remover as a result of breast cancer)
- For correcting the genetic deformities or defects of the chest wall.

- Aesthetic ( for enhancing the shape, size and form of the breast to enhance the body features)

Adult women belonging to any age group can take advantage of breast augmentation surgery, as it helps in increasing the size of breasts and restore its plumpness while improving the balance of your entire body figure. Moreover, the women's ability to breast feed usually remains unaffected by the breast surgery.

The breast surgery procedure may include the following;

Figure: F1The breast surgery procedure



- Reduction of asymmetry
- Enlargement of breast
- Revision of breast implant
- Breast uplift
- Correction of inverted nipples

### Types of Breast implants used for surgery

The implants used for breast augmentation surgery are artificial implants. In the UK, usually two common types of breast implants are used:

- **Saline Breast Implants:** These implants are filled with sterilized salt water. In case a saline implant ruptures or leaks, the saline water is naturally absorbed in the body and discharged by natural body processes.
- **Silicone Gel Implants:** Silicone gel is filled up in these implants. The silicone gel gives a more natural feeling of breast tissues. If the silicone breast implant leaks, the gel may not leave the implant shell or may escape into the pocket of breast implant. It is unlikely that the silicone gel filled implant collapses after it leaks.



## Types of Breast Surgery<sup>11</sup>

Breast surgery is also called mammoplasty which makes use of surgical procedures. In these procedures, the breasts are reshaped to give them the required appearance. It is further divided into two types;

- **Mammoplasty** for breast enhancement: it is done for increasing the size of breasts by using the surgical implants.
- **Mammoplasty** for breast reduction: it is done for reducing the size of the breasts and involves removal of breast tissues.

## Chemotherapy:

Chemotherapy can affect reconstruction in several ways. Some forms of chemotherapy may delay wound healing, increase the risk of surgical infection, or cause you not to feel well, thus altering the timing of a reconstruction. Some forms of chemotherapy like Herceptin can temporarily affect heart function, and you may need to wait to recover from this therapy before reconstruction can be completed.

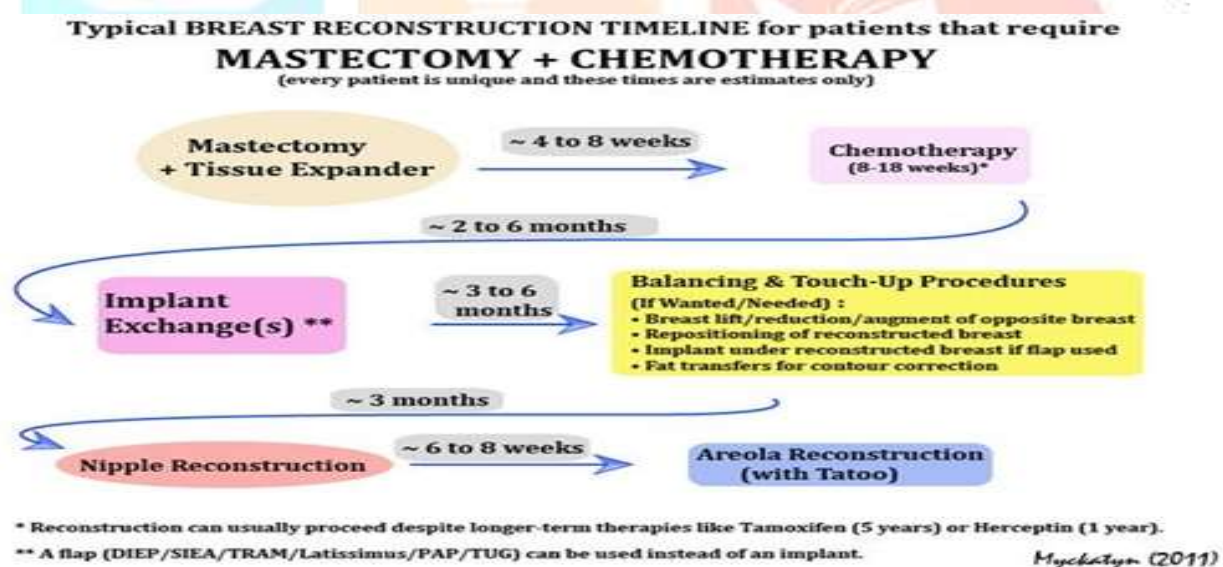


Figure: F2 Typical Breast Reconstruction Timeline for Chemotherapy

## Radiation therapy:

Radiation therapy may be recommended to treat your breast cancer after lumpectomy or mastectomy. Radiation can cause both temporary and long-term changes to the area of the breast it treats. Temporary changes include red

discoloration, injury to the superficial skin layer, and delayed wound healing. Long-term changes include scar tissue, hyperpigmentation of the skin, reduced ability of the skin to heal following subsequent procedures, capsular contractures around breast implants and other radiation-induced skin changes. Often, if radiation is required we will recommend that your final reconstruction use your own tissues (TRAM, DIEP, latissimus, or TUG flap) because there is a higher incidence of complications when breast implants are used alone after radiation.

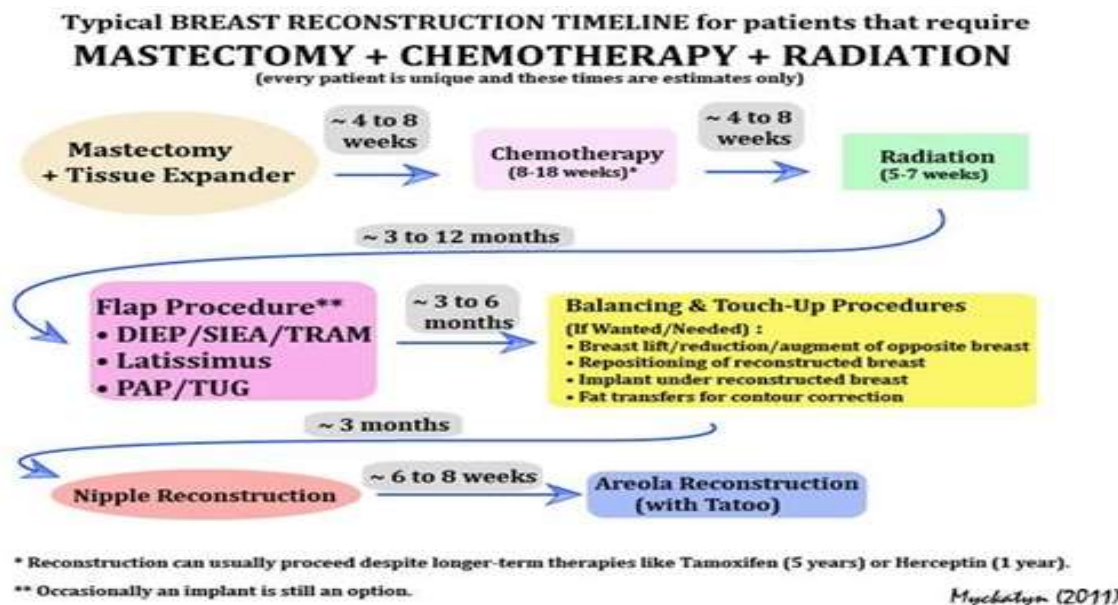


Figure: F3 Typical Breast Reconstruction Timeline for Radiation Therapy

### Type of breast reconstruction chosen.

The type of reconstruction chosen will also affect how your breasts look after surgery. Reconstruction with a flap will result in a lens-shaped scar that surrounds the new skin that was transferred with the flap. Generally, reconstructions with flaps have more ptosis or the natural shape that accompanies an aging breast. Implants, when used alone, are associated with a linear scar. In addition, reconstructions with implants generally have more fullness in the upper poles of the breasts.

### Willingness to undergo “touch-up” or “revision” surgery.

Breast reconstructions frequently require some form of touch-up surgery to optimize results. This can include repositioning the breasts, fat grafting, liposuction, improving previous scars and contours, adding an implant to add volume or projection and modifying the shape, position and size of the [other breast](#) to help match it. Every patient’s priorities are different. Some patients are more willing than others to undergo these additional “touch-up” or “revision” procedures to improve the appearance or balance of the reconstructed breast. Generally, patients who pursue these additional procedures can achieve more aesthetically pleasing results.

Presence of complications that may affect your result.

Breast reconstruction is complex and can be affected by infections

## **Difference between silicone and saline implants**

### **Silicone gel**

Silicone gel is an inert polymer which has no known any human allergies, sensitivities or reactions. Like a gummy bear candy, the molecules are stuck to one another in a cohesive matrix. Silicone is more viscous than saline. In difference to saline, it flows in a different way within its shell and can often create a more natural look and feel to the breast, like breast tissue. Women must be 22 years of age or older to be obtainable silicone gel implants for breast growth, as per the FDA's regulations.

### **Saline (sterile salt water)**

Saline-filled implants are accessible to all women for breast growth over the age of 18. A silicone shell is inserted into the body and then filled to its desired volume by a board-certified plastic surgeon with saline fluid. Saline has the consistency of water. Underneath very thin skin, folds of a saline implant might be seen or felt more often – this is known as implant "rippling" or "wrinkling."

Some saline implants have the benefit of being postoperatively adjustable via a remote injection port – this is commonly used in some types of breast reconstruction procedures to fine-tune the final implant quantity over months before the implant haven is removed.

### **How these breast implants enhanced or changed over the years?**

Silicone gel implants were first created in the late 1960s and have undergone several different generations with ongoing technological improvements. Saline filled implants were produced as an option to silicone fill and became popular in the 1990s and early 2000s. Over the last 20 years, major advances have been made to silicone gel implants. In fact, we are now implanting the 7th and 8th generation of silicone breast implants. The newest silicone implants have a slightly higher fill (96% fill versus the previous generation's 85% fill) and more cross-linking of the silicone molecules, increasing the stiffness or "cohesiveness" of breast implants.

### **What are the various types of saline and silicone implants are available?**

#### **"Baffled" saline implants**

"Baffling" refers to an interior channel structure surrounded by the implant, like layers on a shelf. Tentatively, these channels allow the saline inside to flow in diverse directions within the outer implant to simulate the feel of a silicone implant, with purported decreased incidence of rippling and slushy liquid movement.

### **Variable cohesiveness of silicone implants**

Various degrees of stiffness or "cohesiveness" (cross-linking of the silicone molecules) are now available in silicone gel breast implants. The most "liquid" ones are softest and flow most easily, and are most commonly used for routine breast augmentation. The most highly cohesive silicone implants are stiffest and tend to hold their shape most firmly, with potential advantages for post-mastectomy breast reconstruction. An transitional stiffness implant is also available, which is to be beneficial for breast growth patients who wishes to have silicone but have experienced rippling with the less cohesive devices.

### **How do we know breast implants are safe?**

Did You Know: Silicone gel breast implants are the most broadly studied medical device in the history of medical devices? In history, silicone gel implants established negative media attention and were sensationalized in the 1980s and 1990s, with apparent claims of adverse associated health problems, prompting removal and replacement of older silicone implants with saline filled devices. Since that time, general FDA-directed prospective clinical research with long-term follow-up has inveterate no connection between silicone gel implants and any chronic autoimmune disease. Read information from the ASPS about the safety of breast implants and the potential association of textured implants with an extremely rare and treatable condition called BIA-ALCL. For more information about breast rise, breast implant science and safety, visit a board-certified plastic surgeon who is an ASPS member. Be sure to Do Your Homework before having any cosmetic plastic surgery procedure.<sup>31,32</sup>

### **What are the risks of breast implants?**

Saline and silicone breast implants pose similar risks, including:

- Scar tissue that distorts the shape of the breast implant (capsular contracture)
- Breast pain
- Infection
- Changes in nipple and breast sensation, usually temporary
- Implant leakage or rupture

Correcting any of these complications might require additional surgery, either to remove or replace the implants.<sup>22</sup>

## What happens if an implant ruptures?

If an implant ruptures, the approach might vary depending on whether the implant is saline or silicone.

### Ruptured saline implant

If a saline breast implant ruptures, the implant will deflate causing the affected breast to change in size and shape.

The leaking saline solution will be absorbed by your body without posing any health risks, but you'll probably need surgery to remove the silicone shell. If you wish, a new implant can likely be inserted at the same time.

### Ruptured silicone implant

If a silicone breast implant ruptures, you might not notice right away — or ever — because any free silicone tends to remain trapped in the fibrous tissue (capsule) that forms around the implant. This is known as a silent rupture.

Leaking silicone gel isn't thought to cause systemic or long-term health problems — such as breast cancer, reproductive problems or connective tissue disease, such as rheumatoid arthritis. Still, a ruptured silicone breast implant might eventually cause breast pain or changes in the contour or shape of the breast.

If this happens, your doctor will likely recommend surgical removal of the implant. If you wish, a new implant can usually be inserted at the same time.

If an MRI scan detects an implant rupture but you don't have any signs or symptoms, it might be up to you and your doctor to weigh the risks and benefits of keeping the implant in place or having it removed.

Using an implant to rebuild the breast requires less surgery than flap reconstruction, since it only involves the chest area (and not a tissue donor site). Still, it may require more than one procedure. It also may require additional surgery in the future, as implants can wear out and develop other issues, such as tightness of scar tissue around the implant.

The implant can be filled with:

- saline (salt water)
- silicone gel
- a combination of the two -- silicone or vegetable oil in the outside chamber and saline on the inside

The implant is placed under the pectoral chest muscle. For implant reconstruction, the length of the surgery and your time of recovery are usually shorter than for flap reconstruction.

Implants usually don't last a lifetime, so you'll probably need more surgery to replace an implant at some point. The American Society for Aesthetic Plastic Surgery and the American Society of Plastic Surgeons say that both saline and silicone implants last between 10 and 20 years.

Implants may be a good option for thin women with small breasts because these women often don't have enough extra tissue on their bellies, backs, thighs, or buttocks to form a good breast shape as required by flap reconstruction. However, some of the very newest advancements in flap reconstruction have begun to address this problem by using “stacked” or multiple-layered flaps.

### **Implant reconstruction is also a good option if:**

- You'd like to avoid incisions in other parts of the body (donor sites) or sacrificing the muscle structure in donor sites. Also keep in mind that the newest flap procedures preserve muscle and may be worth exploring if you're concerned about this.
- You do not need radiation therapy. There is a high chance of developing problems in an implant reconstruction after radiation.
- You can't or don't want to endure a lengthier flap reconstruction operation.
- You are willing to surgically alter your healthy breast to achieve symmetry or balance. It is not always easy to match an implant, which has a fixed shape, to the remaining natural breast. For more information, see our section on [Altering the Opposite Breast](#).

Implants come in teardrop or round shapes. One of these shapes may be a better match for the contour of your breast area. The surface of the implant may be smooth or have a slightly rough texture -- but you won't feel this through your skin. However, you'll likely be able to feel wrinkles and the texture of the implant when you rub your hand over the breast, particularly the lower part. Your plastic surgeon may prefer one type of implant over another for technical reasons. In some cases, implants with a slightly rough texture may help lower the risk of scar tissue forming around the implant.

You may have implant reconstruction at the same time as [mastectomy](#)(immediate reconstruction), after mastectomy and other treatments (delayed reconstruction), or you might have the staged approach that involves some reconstructive surgery being done at the same time as mastectomy and some being done after (delayed-immediate reconstruction).

Implant reconstruction after mastectomy may be more difficult since the skin of the breast will have been removed. In this case, tissue expansion, or stretching of the remaining skin, would be attempted by your plastic surgeon. A surgery to insert a balloon-like expander would be performed, and the expander would be gradually filled with

saline over the course of weeks to stretch the skin. Expanding skin this way can be difficult and sometimes doesn't work, particularly after radiation because the skin is tough and resistant to stretch. Once expansion is complete, you have another operation to swap out the expander for the final implant. You and your surgeon can discuss what's best for your situation.

### **Implant vs. flap reconstruction: Potential advantages and disadvantages**

#### Advantages over flap

- shorter, less complex surgery
- uses the mastectomy incision for procedure (doesn't create new scars)
- sometimes can be completed in one step
- easy to find qualified surgeons

#### Disadvantages vs. flap

- in general renewal process can take longer (multiple steps, multiple office visits to receive tissue expander injections)
- less likely to feel, look, or move like a natural breast
- subject to future problems such as rupture, deflation, capsular contracture
- reverse healthy breast often needs surgery to match the implant
- generally not a good option if skin has undergone radiation
- implant won't last a lifetime

All implants have a slight risk of rupturing. If a saline implant is ruptures, the saline leaks out rapidly and the breast appears rather deflated, so you know immediately that it's ruptured. The salt water is absorbed by the body. If a silicone implant is ruptures, the gel leaks out more gradually because it is thicker. It may take you longer to realize that the implant has ruptured, or you may not realize it at all since the leaked material can remain around the implant. Silicone gel is not absorbed into the body; the gel can sometimes leak into the pocket surrounding the implant and stay there, or it may spread further. In whichever case, surgery would be necessary to replace the implant.

If you're concerned about the safety of silicone in your particular situation, saline-filled implants can be a more reassuring alternative.

Gossip to your surgeon about which type of implant is best for you. Ask if you can knob a sample implant of each material so you can make a decision if you prefer one texture over the other.

Researchers are studying alternative breast implants that are filled with different materials, but these types of implants are available only if you're a participant in a clinical trial. Talk to your surgeon if you're interested in being a participant in an alternative implant trial.<sup>48,49</sup>

### Comparing saline and silicone implants<sup>51</sup>

Characteristic	Saline Implant	Silicone Implant
Components	Silicone shell filled with salt water	Silicone shell with silicone gel interior
Texture	Not spongy like silicone	Soft, like normal breast tissue
Incision necessary	Shorter: implant is dispirited when inserted	Longer: implant is full when inserted
Interior part	Filled by surgeon during operation	Pre-filled by manufacturer
Rupture	Obvious	May be undetected
Follow-up recommended	None	Periodic MRI screening

### Conclusion:

Outcome data must be periodically re-evaluated, as both oncologic treatment and breast reconstruction materials and techniques continue to evolve.



Data from our series demonstrate a lower rate of complications and better aesthetic results in patients who had not received radiation therapy before implant breast reconstruction compared with those who did receive radiation therapy before completing implant reconstruction.

Although the literature and our own experience suggest that breast reconstruction with autologous tissue is preferred when possible in patients who have previously been radiated, for technical, medical, or personal reasons, not every patient is an appropriate candidate for reconstruction with autologous tissue.

In addition, the need for postoperative radiation treatment cannot always be evaluated accurately before mastectomy.

Furthermore, comparison of the current series to previous studies suggests that staged reconstruction with initial tissue expansion, complete coverage of the implant with muscle, and modern radiation therapy protocols do contribute to a reduction in complications when implant reconstruction is undertaken in radiated patients.

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