

Gender-affirming Mastectomy

Gender-affirming mastectomy is a type of surgery that removes breast tissue, tightens the skin, and can adjust nipple placement to provide the desired results of a more masculine-looking chest. Mastectomies started as a way for surgeons to remove tumors from the breast tissue. However, as of 2022, surgeons also use the procedure as a means of gender-affirming surgery for transgender and non-binary, hereafter TNB, individuals. If a person identifies as transgender, their gender identity differs from the sex they were assigned at birth and the gender they were most likely raised as, which can produce gender dysphoria, a condition that can last a lifetime. Non-binary individuals may have a similar experience, but they identify outside of or between the identifiers of man and woman. Gender-affirming mastectomy, sometimes called top surgery, improves the quality of life for people who seek the appearance of a masculine chest to both better integrate themselves into society and lessen the mental and emotional burden of gender dysphoria.

Diagnostic manuals and researchers describe gender dysphoria as a clinically significant distress related to a strong desire to be perceived as the gender that a person identifies with, which differs from the gender they were assigned at birth. At birth, people are typically assigned a gender based on their body, and though gender differs from biological sex, a person's body can influence their perception of their gender. A mismatch between a person's internal sense of gender and how they physically present can cause the distress present in gender dysphoria. Such sources mention that people can begin to experience gender dysphoria during childhood, and those feelings usually strengthen or worsen when an individual develops secondary sex characteristics like breasts or body hair. People can grow up with such feelings and go on to experience them for years, decades, or their entire life. Studies have shown that gender-affirming mastectomies positively impact patients' confidence, relationships, social interactions, and mental health because the results allow them to live more easily and safely as their affirmed gender.

Gender-affirming mastectomies involve operating on the muscles and tissue of the chest wall and surrounding areas to create a chest that looks more masculine. On the outside of the body, the breasts and the chest wall include the skin, nipples, areolae, and inframammary fold. The skin has three layers, the epidermis, dermis, and hypodermis, going from outermost to innermost. Most of the skin covering the breast is the same color as the rest of the body, however, there is a darker circle of skin, usually somewhat centralized on the breast, called the areola. In the center of the areolae are the nipples, which typically protrude to some degree out from the breasts. The medical community calls the area of the breast containing the nipple and areola the nipple-areola complex, hereafter NAC. The line where the underside of the breast connects to the chest wall is called the inframammary fold, hereafter IMF. One of the ways that a medical team determines the best surgical approach for a gender-affirming mastectomy is by looking at the breasts' degree of ptosis, or sagging. Ptosis is graded by the measurement of the angle made at the IMF between the breast and the chest wall. A more acute angle corresponds to a higher degree of ptosis.

Under the skin, the breasts are mainly comprised of tissue, blood vessels, and lymph nodes. There are two types of tissue in breasts, connective and glandular. Glandular tissue is the part of the breast that makes milk, called lobes, and connective tissue is the surrounding part that contains fat and holds the rest of the tissue together. The size of a person's breasts is determined by how much fat the body has distributed to the area. As the breasts are adjacent to the armpits, they are also very close to the axillary lymph node, which is in the armpit. Lymph nodes are small clusters of tissue that help fight infection by trapping and neutralizing harmful substances and safely draining them from the body. While breasts have no muscle in them, an individual's pectoralis muscle lies beneath, as a barrier between a person's ribs and breasts. The pectoralis is a muscle group that

aids in bringing one's arms down to their sides or out in front of them, and is separated into the pectoralis major and pectoralis minor. The pectoralis major is the muscle closest to an individual's skin. How surgeons treat the skin, tissue, and muscle of the chest wall during mastectomies has changed over time due to an evolving understanding of breast and chest anatomy.

Gender-affirming surgical practices for mastectomy have evolved alongside mastectomy techniques for removing breast cancer with innovations from multiple surgeons. Surgical interventions to remove breast cancer or abnormal breast tissue date back to Galen, a Greek physician who lived during the second and third centuries. However, the modern era of mastectomy began in the 1890s. In 1894, William Halsted, a surgeon working in Baltimore, Maryland, published his paper "The Results of Operations for the Cure of Cancer of the Breast Performed at the Johns Hopkins Hospital from June 1889, to January 1894," where he described a deep incision to remove all breast and underlying tissues. The incision was deep enough to also cut through both pectoralis muscles. Called the Halsted Radical Mastectomy in medical circles, the technique persisted as the standard procedure for roughly seventy years. The radical mastectomy removed the breast, axillary lymph nodes and all lymphatic tissue, as well as the pectoral muscles from the chest wall. With such an extensive removal of tissue, the radical mastectomy came with side effects such as paresthesia, or a tingling feeling in the affected area, as well as a buildup of fluid in the arm because of the damaged lymph system and rib damage. Other physicians attempted to extend Halsted's procedure but they found no significant added benefit.

In 1948, David H. Patey, a surgeon who practiced in London, England, and one of his colleagues, published a review of their own modified radical mastectomy that spared the pectoralis major muscle and compared their results with the Halsted Radical Mastectomy. The authors did not find a difference in survival rate, and Patey wrote that there needed to be a deeper understanding of how breast cancer spread for physicians to make more advances in its treatment. Then, in 1972, John Madden, a surgeon working at St. Clare's Hospital and Health Center in New York City, New York, published the procedure and outcomes for his version of a modified radical mastectomy in the journal *Annals of Surgery*. The modifications made in Madden's procedure spared both the pectoralis major and minor, a technique made possible by physicians mapping the body's lymphatic system more extensively than before. Without the need to cut into the axillary lymph nodes at the time of the mastectomy, the surgeons could spare the muscles. From there, physicians directed their advances towards breast conservation, as well as procedures that preserved the skin and nipples. Gender-affirming mastectomies utilize some advances like the understanding of the NAC to graft it back on to patients. However, surgeons vary the amount of tissue they cut out of certain areas, as the goal of the procedure is not removing all tissue for cancer treatment, but to provide the most natural looking, masculine chest. Even though physicians had been performing some form of breast tissue removal for centuries, physicians did not utilize the surgical techniques for gender-affirming purposes until the 1930s.

Some scholars believe that one of the first gender-affirming mastectomies may have been performed in the early 1930s by Magnus Hirschfeld, a physician who worked primarily in Germany and opened one of the world's first gender identity clinics in Berlin, Germany. However, any documentation of the operation would have likely been lost in 1933 when the Nazi government burned down the clinic that housed all of their research. The next known mastectomy for gender-affirming purposes was performed by a plastic surgeon at the Bristol Royal Infirmary, in Bristol, England, in 1942. While the surgeon's name is unknown, the patient who received the mastectomy was Laurence Michael Dillon, a transgender man who had been taking testosterone pills for years, allowing him to pass as male in social settings. The Halsted Radical Mastectomy was still the standard at the time of Dillon's procedure, meaning Dillon's mastectomy likely followed that procedure. Dillon was an exception to the time's social norms, and TNB people did not begin receiving gender-affirming mastectomies frequently until later.

In 1962, Bromley S. Freeman, a surgeon working in Houston, Texas, described a technique for mastectomy that preserved more skin. The new approach consisted of removal of all breast tissue as well as the NAC and continued to undergo modification during the late twentieth century. In the early 2000s, plastic surgeons in Perugia, Italy, carried out trials of their updated version, the nipple-sparing mastectomy and publishing their findings in 2006. The surgeons combined techniques from

the skin-sparing mastectomy but preserved the NAC, which the surgeons reattached to a typical position on the chest. The technique was modified to what is called, as of 2022, free nipple grafting, or FNG, which happens in many mastectomies for gender affirmation.

Surgeons consider multiple factors when deciding what the best approach would be for their patient, such as age, breast size, breast ptosis, skin quality, and overall physique. Researchers are still, as of 2022, not in agreement as to whether, prior to the procedure, a patient needs to stop their masculinizing hormone therapy, which induces the development of typically masculine secondary sex characteristics such as facial and body hair growth, growth of the clitoris, and a deeper voice. As of 2022, most clinics stop hormone therapy for several weeks prior to the procedure. However, the medical staff make those decisions based on their clinical experience. The physician will determine which approach they take based primarily on the breast size, grade of breast ptosis, amount of excess skin to be removed, and position of the NAC in relation to the IMF.

The most common combination of procedures is a double-incision mastectomy with free nipple grafting, often called DI-FNG or DIM if the patient does not want nipple grafting. Double-incision mastectomy is better suited to a higher percentage of patients because it accounts for patients with more breast tissue to remove. It also provides the best aesthetic outcomes per patient reports, as well as allowing for the best nipple placement. Before the procedure starts, the medical staff will mark the route of incision to remove the NAC, which the surgeon will graft back onto the chest after removing the breast tissue. The medical staff also marks the route of the two incisions the surgeon will make on the breast, the first horizontally across the middle of the breast and the second along the IMF and the pectoral muscles. The placement of the second, lower incision helps to ensure that the incision area and subsequent scar will cover the IMF and follow the curvature of the pectoral muscles. The medical staff marks the patient in both a sitting and standing position. Such markings also prevent excess skin from accumulating in the area by the patient's armpit after surgery, as they ensure the surgeon extends the incisions far enough to the patient's sides that they can suture the skin together at the end of the procedure.

Once set up in the operating room, the surgeon first cuts into and removes the NAC for grafting later and continues to tissue removal. The depth of all surface incisions in the procedure depends on the thickness of the patient's skin and chest wall tissue, as well as the patient's desired appearance. The surgeon makes the first incision for tissue removal horizontally across the previously drawn line. At that point, the surgeon can lift the breast up and separate its tissue from the underlying muscle using a scalpel and carefully cutting above the connective tissue that lies over the muscle, making sure to keep that connective tissue intact. Once the surgeon has separated the breast tissue from the rest of the chest, they can remove that tissue, leaving a flap of skin on top and the pectoral muscle underneath. Next, the surgeon can make any adjustments to where they were planning to make the second incision under the breast along the IMF. To check the placement of the second incision before they cut into the patient, the surgeon pulls the upper flap of skin created by the first incision down to the line of the pectoralis curve. The flap of skin from the first incision should be able to line up with the planned second incision. Once the surgeon has ensured that they can sew the two incision sites together at the end of the procedure, they make the second incision along the potentially adjusted line, below the IMF.

After the surgeon creates both incisions and has removed the breast tissue, they gently pull the skin from the second, lower incision up to where the end of the muscle attaches to the bone, and they suture the skin's underlying connective tissue in place. The surgeon then temporarily fastens the skin from the upper incision together with a few stitches or staples to ensure the correct amount of skin remains and to mark where they will attach the NAC grafts later. If the surgeon needs to remove any additional skin, they will do so and temporarily fasten the skin flaps together again to further check their work. After the surgeon has confirmed that the skin is appropriately tight and that they have planned the correct placement for the NAC graft, they clean the area and place plastic tubes near the outer side of each wound. The tubes will drain any excess liquid during the healing process. Only then does the surgeon suture the open tissue flaps closed at the multiple layers of skin and connective tissue. The surgeon removes the drains and any required sutures at a follow-up appointment, which takes place typically one week after the procedure.

Nipple grafting after a double-incision mastectomy requires the surgeon to separate the removed

nipple and areola from the skin and tissue and reattach them in the typical place on the chest. To place the NAC graft, the surgeon thins out the attachment side of the graft and removes the epithelium, or the thin tissue that forms the outer layer of the body's surface, from the attachment site on the patient's chest. They then suture the graft in place. With a double-incision mastectomy, the nipple typically loses all sensation because the procedure requires full removal of the NAC and reattachment in a completely new area on the patient. Because a double-incision mastectomy often involves removing more skin than other methods, the scars from the procedure are typically larger and longer than those from other methods.

The second main approach surgeons use for gender-affirming mastectomy is the periareolar approach where the incisions are two concentric circles surrounding the areola that do not remove the NAC. Periareolar mastectomy typically works better for patients with less breast tissue to remove. Prior to operating, the medical staff marks the IMF, the new ideal position of the nipple, as well as the incision locations. The first incision the surgeon makes is the inner circle that the staff marks to be a more masculine size, if the surgeon needs to make the NAC smaller. They mark the second incision around the initial incision, the amount of space between the two circles indicating how much skin the surgeon needs to remove. Once the surgeon has made both incisions, they remove the epidermis, the top layer of skin, and a very small, superficial portion of the dermis, the layer of skin that lies immediately under the epidermis, that was between the two incisions.

Through the newly exposed tissue, the surgeon makes another incision that allows them to lift the NAC and remove the breast tissue through the newly created opening. Once the surgeon removes the breast tissue, they then suture the outer circle to the inner circle with a purse-string suture. A purse-string suture is a continuous running stitch that can be pulled tight as if pulling closed a drawstring bag. Sometimes the closing of the two circles together creates a pleated or rippled effect around the area as there is more skin making the circumference of the outer circle than the inner circle. Most of the time, those diminish or disappear while healing in the weeks and months after surgery. In a periareolar approach, the surgeon does not disconnect the NAC from the chest and graft it back on, so most patients do recover most or all sensation, though some patients may experience reduced sensation in the NAC after surgery.

While the periareolar approach leaves less scarring, it has a higher rate of secondary corrective surgery as it is more challenging to achieve uniform thickness across the chest compared to the double incision approach. The periareolar approach is also limited in that patients must require minimal excess skin removal to be considered a candidate. If a patient has more excess skin than recommended, the procedure could result in loose folds of skin on the lower chest, or the pleating from the sutures could remain prominent after healing.

The healing time after a gender-affirming mastectomy can vary patient to patient, but medical professionals typically follow the same post-operative procedures for four to six weeks after the procedure. The final results can take three to six months, not including time for scars to fully mature and skin remodeling to complete. Patients are not usually required to stay overnight at the hospital following surgery, but may in an instance where physicians need to monitor a possible complication. Otherwise, patients are sent home with medication, surgeon-inserted drains, and a compression vest. The post-operative care instructions instruct patients to take medication on time and consistently. They also need to empty any fluid from their drains every twelve hours until their physician has approved the removal, usually two or three days after the surgery. Patients wear the compression vest or bandage for four to six weeks. The tightness of a compression vest reduces the risk of a hematoma, or a pool of mostly clotted blood that can form by the tissue. Patients are to avoid physically demanding tasks or activities for the same four to six weeks. Once their physician no longer requires the compression bandages, patients should still wait an additional two weeks, for a total of eight weeks after surgery, to start any kind of scar treatments. Aside from hematoma, the other common complication patients may experience is partial or complete rejection of the NAC graft. Studies have found that, depending on the group of patients followed, anywhere between eight and forty percent of patients request revision surgery. Such revisions could be to further reduce the NAC or to revise scars once the patient has properly healed and can see the final results. Regardless of revision rate, studies consistently find improvement of quality of life and confidence in social settings for TNB persons who undergo a gender-affirming mastectomy.

In 1979, the World Professional Association for Transgender Health, or WPATH, published their Standards of Care, with the seventh version published in 2012 and the updated eighth version published in 2022. WPATH is an organization that educates medical professionals and others about transgender health and advocates for research and a better understanding of what proper health-care looks like for TNB individuals. The standards of care provide clinical guidance for health professionals so that they can assist TNB patients with safe and effective treatments that bring their patients not only psychological well-being, but comfort with themselves. WPATH standards for patients undergoing gender-affirming mastectomy include a letter of support from a qualified mental health professional that describes a persistent and well-documented diagnosis of gender dysphoria. Other requirements include that the patient is a minimum of eighteen years old, has the capacity to make a fully informed decision to consent for their treatment, and, if significant medical or mental health concerns are present, they must be reasonably under control. If a patient is younger than eighteen years old, they could still be a candidate for gender-affirming mastectomy if their medical team and legal guardians agree that it would cause the patient harm to delay the surgery until they were eighteen. Per the WPATH Standards of Care, hormone therapy is not a prerequisite, however, individual clinics or surgeons may have other or additional requirements.

Gender-affirming surgeries like mastectomies are a method of addressing serious threats to the mental and physical health of TNB people. In 2019, a group of professors and other scholars from Augusta University in Augusta, Georgia, published a study they conducted in the journal *Psychology and Sexuality*. Their study explored how TNB people experience mistreatment, stating that their experiences of violence, homelessness, and a perceived lack of safety because of those factors contribute to mental and physical health disparities in the community. TNB individuals who want a gender-affirming mastectomy or breast reduction can sometimes bind their breasts every day to make them less visible. Binding is when an individual either wears a binder, a thick and sparingly elastic tank top or sports bra-like garment, or uses another means to compress the breast tissue into their chest wall to have the appearance of a flat or flatter chest. A study published in 2021 states how young adults would rather continue binding their chests regardless of possible negative health effects so they can benefit from the social protection that it provides. Social protection can come in the form of an individual's ability to safely use the restroom that aligns with their gender identity or having other people in social situations assume the correct gender identity without misgendering them. The experience of being misgendered includes not only the action of a person calling a TNB person by the incorrect pronouns, name, or familial marker like brother or sister, but it invalidates and questions the individual's reality. Such invalidation undermines the TNB person's experiences and sense of self, leading to lower quality of life, a decrease in mental health, isolation, and distrust in people who misgender them consistently with no intent to adjust their actions and words.

Having access to gender-affirming procedures like a mastectomy can provide a sense of safety and comfort for individuals who are not properly recognized as their affirmed gender. In 2018, a group of plastic surgeons from the Division of Plastic Surgery at the University of Utah in Salt Lake City, Utah, published a study analyzing pre- and post-operative emotions and perceptions of patients undergoing gender-affirming mastectomy procedures. In their introduction, they mention how, even after hormone treatments, patients still experience distress over their breasts and how it contributes to social, physical, and psychological concerns. In 2019, a group of physicians and researchers published a study in the journal *Plastic and Reconstructive Surgery* titled "Assessing Quality of Life and Patient-Reported Satisfaction with Masculinizing Top Surgery: A Mixed-Methods Descriptive Survey Study," where they sent surveys to patients who had undergone a type of mastectomy or top surgery. The survey results indicated that the average age people started considering top surgery was twenty-five years old, however, approximately nine percent of respondents selected thirteen years of age or younger for that answer. The authors found that most of the individuals who responded reported their quality of life and sexual confidence had significantly improved, and eighty-six percent of respondents also reported improvement of their mental health. Such studies provide evidence that gender-affirming mastectomies improve the lives and functioning of TNB individuals.

Gender-affirming mastectomies lessen the mental and emotional burden of gender dysphoria and being misgendered. A person's access to a procedure that removes the breast tissue and reconstructs the appearance of their chest so that it aligns with their affirmed gender improves their

quality of life, safety, and mental health. The success of gender-affirming mastectomies and the extremely high patient-reported satisfaction rates show how gender affirmation in the medical world is paramount to TNB patient health and safety from childhood through adult and even senior years.

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