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Breast Reconstruction with Latissimus Dorsi Flap

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ABSTRACT

The latissimus dorsi flap (LDF) is a surgical procedure employed by surgeons to reconstruct several types of breast cancer surgical defects, including modified radical mastectomy, quadrantectomy, and lumpectomy. The LDF can be used as a standalone autogenous flap, in combination with immediate implant-based reconstruction, in combination with tissue expanders for a phased reconstruction, or in either scenario, either immediately or at a later time. The LDF (Latissimus Dorsi Flap) is a reliable choice for soft tissue coverage during breast reconstruction, providing both form and function while minimizing potential complications in the short and long term. In cases of limited tissue availability, the LDF can assist by supplying additional tissue volume for autologous reconstruction. Additionally, it can function as a reliable vascular pedicle for implant-based healing in cases when the tissue has been exposed to radiation.

KEYWORDS: Latissimus dorsi flap, reconstruction, breast

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INTRODUCTION

The posterior trunk of the body is surrounded by the latissimus dorsi muscle, which is a triangle-shaped muscle that is flat. The component of the latissimus dorsi muscle that is positioned directly beneath the subcutaneous tissue is the remaining portion of the muscle, while the piece that is located behind the trapezius muscle is the superior medial portion. Specifically, the muscle originates from the iliac crest, the inferior angle of the scapula, the spinous processes of the lower sixth or seventh thoracic, lumbar, and superior sacral vertebrae, and the outer surface of the third or fourth most inferior ribs. These are the particular areas where the muscle is found. As the muscle fibers continue to lengthen in the direction of the axilla, the broad tendon is able to enter the intertubercular groove of the humerus. This occurs after the muscle fibers have been stretched out. The posterior axillary fold is formed when the fibers of the latissimus dorsi muscle and the fibers of the teres major muscle come together at the apex of the muscle. Additionally, these fibers create a strong connection with the bottom border of the serratus anterior muscle by way of an aponeurotic link. The latissimus dorsi muscle is responsible for anchoring the scapula to the back of the chest wall, which is one of its responsibilities to do. Furthermore, this muscle is accountable for the movement of the arm inward, rearward, and inwardly turning the arm. The muscle is disposable; the muscles that comprise the shoulder girdle continue to carry out their duties even in the absence of the muscle.

Mathes and Nahai state that the latissimus dorsi muscle is classified as a category V12 muscle on their classification system. This particular muscle receives the most of its blood flow from the thoracodorsal artery than any other. In addition, the lumbar artery and the posterior intercostal arteries are the smaller blood vessels that are responsible for providing

circulation to specific regions of the muscle. The thoracodorsal artery is a source of blood flow that is defined by its high degree of dependability. This is due to the fact that it has a large diameter and boasts a range of structural characteristics with regard to its structure. The blood artery, which originates from the lower side of the latissimus muscle, which is situated at the back of the armpit, is the one that makes its way into the serratus muscle. Throughout its travel inside the muscle, it splits into two branches: a small transverse branch and a large lateral descending branch. Both of these branches are distinct from one another. To add insult to injury, the presence of several musculocutaneous perforators makes it feasible to include a skin island design into the anatomy of the muscle.

Indications

The LDF is outfitted with a variety of different indicators available to the user. Patients are candidates for the Latissimus Dorsi Flap (LDF), which is the ideal method for autogenous breast cancer reconstruction. Patients who are ineligible for the TRAM flap due to a previous abdominoplasty, a previous TRAM, inadequate abdominal skin or fat, or high-risk comorbidities such as diabetes, obesity, or tobacco use are candidates for the LDF in order to reconstruct breast tissue from autogenous breast cancer. The Lateral Deep Inferior Epigastric Artery Perforator Flap, more often referred to as the LDF, is a surgical surgery that may be performed to deliver well-vascularized tissue to the ischemic chest wall in patients who have had radiation treatment on their breasts. This procedure is commonly referred to as the LDF. In addition, the LDF has the capacity to deliver tissue that may enhance the cosmetic result of a prophylactic mastectomy, solve complications that are brought about by a partial mastectomy or lumpectomy, and improve the look of skin flaps that are thin or uneven around an implant. All of these benefits can be achieved with the use of the LDF. It is not recommended to employ the latissimus muscle in combination with this therapy since a posterior lateral thoracotomy is a surgical procedure that involves the removal of the muscle from its blood supply. In addition to this, the division of the thoracodorsal nerve that occurs after the dissection of the axillary nodes is another component that leads to the development of muscle breakdown.

Advantages of Latissimus Dorsi Flap

Advantage	Description
Reliable Blood Supply	The flap has a consistent and reliable blood supply.
Versatility	Can be used with or without an implant, providing flexibility.
Good Coverage	Provides good soft tissue coverage, ideal for patients with compromised skin.
Minimal Donor Site Morbidity	The donor site morbidity is relatively low compared to other flaps.
Simultaneous Reconstruction	Can often be performed at the same time as mastectomy.

Surgical Technique

The goal of an optimal surgical method is to maximize the amount of soft tissue covering that is created by the flap while simultaneously reducing the size of the defect at the donor site and taking efforts to prevent any difficulties that may be connected with the treatment. This is the ideal surgical strategy. As part of the process of getting the patient ready for surgery, they are placed in an upright posture, and certain areas are marked. These locations include the outer edge of the latissimus muscle along the back of the armpit, the top edge at the point of the shoulder blade, the bottom edge at the hip bone, and the outer edge of the breast tissue. In addition to the center line, the lower fold of the breast, and the outside edge of the breast tissue, these locations are also included. When it comes to the removal of tissue, the dissection of tissue, and the scar that is generated as a consequence of these procedures, the skin paddle may be positioned in a vertical, diagonal, or horizontal orientation. Every one of these orientations comes with its own individual set of advantages and disadvantages.

Within the operating room, the patient is positioned in either the lateral decubitus position for unilateral flap elevation or the prone position for bilateral flap elevation. Both of these positions are used to elevate the flaps. Elevating the flaps may be accomplished in any of these two locations. Within the course of the dissection procedure, it is discovered that the subcutaneous adipose tissue is connected to the flaps of the posterior skin. On the posterior aspect of the thoracolumbar fascia, this takes place. In addition to the superior and medial fibers of the trapezius muscle, the fibers of the teres major muscle in the armpit, the fascia of the paraspinous muscles, the fascia of the lumbosacral area, and the spinal column at its outer border, the latissimus dorsi muscle is also separated from these other muscles. Following the satisfactory identification of the thoracodorsal arteries, a detachment of the latissimus muscle is carried out in the vicinity of the spot where it is joined to the humerus. Following this, a tube is inserted under the skin in the armpit area in order to transfer the muscle and skin flap to the surgical hole that was created during the mastectomy operational process. This action is performed in order to complete the mastectomy.

This is followed by the provision of anesthetic to the patient, following which the surgeon will continue to place the flap in line with the specific kind of reconstruction required. In a two-stage reconstructive therapy, a tissue expander may be positioned either below both muscles or between the latissimus and pectoralis major muscles. Both of these positions are possible. More information on each of these choices may be found below. The latter function has the potential to provide individuals with a greater degree of

creative variety. As an instance, the latissimus dorsi muscle, which is located below, has the capability of causing a natural drooping, whilst the pectoralis major muscle has the capability of concealing the upper region of the chest. The latissimus muscle is next stitched to the fascia and the muscle below it in a way that is both downward and inward. This is done after the previous step has been completed. Additionally, extra sutures are put along the front side of the armpit in order to prevent the pedicle from being subjected to an excessive amount of pressure. In addition to this, these sutures have the capability of preventing the flap or implant from moving completely freely. When doing a completely autogenous latissimus dorsi flap (LDF), the cutaneous paddle is formed into an asymmetrical U shape, and the distal fat and muscle are folded down. This gives the flap its distinctive appearance. It is because of this that the surgeon is able to achieve the desired breast volume and projection.

Figure 1. Breast reconstruction using latissimus dorsi flap, preoperative image.

Figure 2. Breast reconstruction using latissimus dorsi flap, postperative image.

Complications

The creation of seroma in the donor area, which is the location where the tissue is gathered, is the most common problem that occurs during breast reconstruction with LDF. This is because the donor region is where the tissue is normally collected. In the case that the surgical drain has already been removed, the therapy for seromas may consist of either aspiration carried out outside of the hospital or ongoing suction drainage. Both of these options are possible. This adverse outcome may be avoided by the surgeon by using quilting sutures or a fibrin sealant at the donor site defect during the process of wound closure. This is done in order to prevent the occurrence of the defect. When the patient is in the postoperative phase, it will be urged to them that they avoid from utilizing their upper extremities excessively. This is done in order to reduce the likelihood of shearing forces occurring.

On account of the fact that the thoracodorsal artery is able to provide the left ventricular function (LDF) with a consistent flow of blood, the occurrence of ischemia issues in this location is quite rare. Flap necrosis is a condition that takes place in a very small percentage of individuals, especially those who smoke or have diabetes in comparison to other patients. Hokin and Silfverskiold found that the incidence of partial flap necrosis was 7%. This information was obtained from their research. When the flap is twisted on its pedicle, a rare condition known as extreme flap necrosis may develop. This condition is generally caused by the twisting of the flap. It is possible that the twisting may cause blood clots to form or that the blood vessels will be damaged when the surgical dissection is being performed.

Dorsal hernia, limited shoulder mobility, shoulder weakness, concavity at the harvest site, and winged scapula are some of the additional morbidities that may arise at the donor site. Additional morbidities may also occur at the extraction site. Smith arrived to the opinion that reconstructing the lateral deltoid fascia (LDF) resulted in a reduction in the range of motion, strength, and functioning of the shoulder. This conclusion was reached after Smith conducted an intensive assessment of eleven research. On the other hand, these adverse effects often disappear between one and one year after the treatment has been performed. In addition, the results of Smith's study were validated by further research investigations that shown similar improvements in shoulder function. In the event that a tissue expander or implant is employed in the intervention, there is a possibility that the patient may have medical complications such as device migration, device extrusion, or periprosthetic infection. At the outset, there were a number of concerns about capsular contracture, which resulted in debates among the members of the LDF. Tissue expanders have the ability to lessen the unforeseen effect on the patient's look that is brought about by reduced rates of contracture, as indicated by recent case series. This is something that may be experienced by the patient. The case in which permanent implants are implanted prior to the use of expanders is one that is particularly correct.

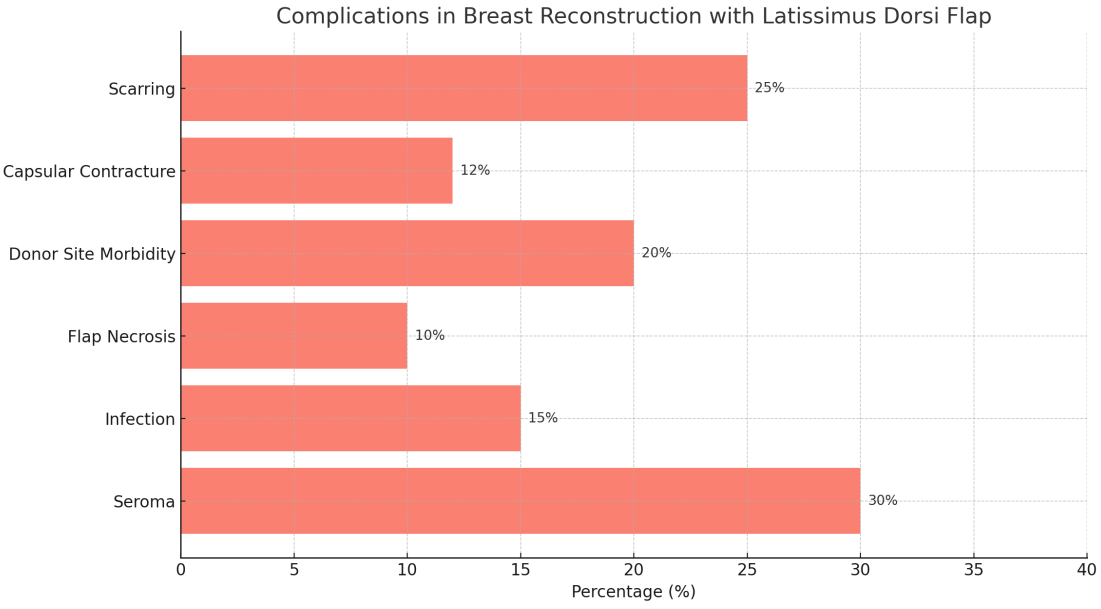

Figure 3. Complications

CONCLUSION

The Latissimus Dorsi Flap, often known as the LDF, is a breast reconstruction procedure that provides a dependable and adaptable approach to the treatment of a variety of breast abnormalities. Therefore, it is a suitable alternative for covering soft tissue since it has acceptable rates of problems both before and after surgery. Despite the fact that the LDF is still used in autogenous and implant-based breast reconstruction, both immediate and delayed, it has been surpassed in terms of primary autogenous breast reconstruction by the TRAM and DIEP flaps throughout the 1980s and 1990s.

In addition to its adaptability, the LDF is capable of producing outcomes that are dependable. Despite the fact that it is

documented, donor site morbidity is uncommon (donor site hernia), may be controlled (donor site seroma), or disappears with time (shoulder function). It is deemed acceptable to have a higher frequency of extra postoperative problems when compared to other breast reconstruction surgeries such as the DIEP flap and the TRAM flap. A cohort of 277 patients who displayed tolerable problems at the flap and donor site while utilizing the LDF in individuals who were obese or overweight also increased the flexibility of this durable flap. This cohort of patients was used to enhance the versatility of this flap.

There are several modifications that may be made to the classic latissimus dorsi flap (LDF), such as the scarless method, the muscle-sparing LDF or TDAP flap, and the extended latissimus dorsi flap (LDF). These modifications make it possible to apply this technique to a far wider variety of patient circumstances. Because of these advancements, the surgeon is now able to accurately delineate the inframammary fold, induce ptosis, and reduce the amount of scarring that occurs at the donor site. Because of this, the cosmetic result may be achieved with a greater degree of adaptability.

REFERENCES

I. Palve, J., Luukkaala, T., & Kääriäinen, M. (2022). Comparison of different techniques in latissimus dorsi breast reconstruction: plain, immediately lipofilled, and implant enhanced. Annals of Plastic Surgery, 88(1), 20-24.

II. Kokosis, G., Khavanin, N., & Nahabedian, M. Y. (2019). Latissimus dorsi musculocutaneous flap for complex breast reconstruction: indications, outcomes and a proposed algorithm. Plastic and Reconstructive Surgery Global Open, 7(8).

III. Banys-Paluchowski, M., Brus, L., Krawczyk, N., Kopperschmidt, S. V., Gasparri, M. L., Bündgen, N., ... & Paluchowski, P. (2024). Latissimus dorsi flap for breast reconstruction: a large single-institution evaluation of surgical outcome and complications. Archives of Gynecology and Obstetrics, 309(1), 269-280.

IV. Merkkola-von Schantz, P. A., & Kauhanen, M. S. C. (2022). The versatile latissimus dorsi flap: old and reliable or outmoded—with or without an add on?. Annals of Breast Surgery, 6.

V. Lee, H. C., Lee, J., Park, S. H., & Yoon, E. S. (2021). The hybrid latissimus dorsi flap in immediate breast reconstruction: a comparative study with the abdominal-based flap. Annals of Plastic Surgery, 86(4), 394-399.

VI. Myers, P. L., Tang, S. Y., Saad, N. H., & Momoh, A. O. (2023). Management after flap failure: a narrative review.

VII. Cho, M. J., Slater, C. A., Skoracki, R. J., & Chao, A. H. (2023). Building Complex Autologous Breast Reconstruction Program: A Preliminary Experience. Journal of Clinical Medicine, 12(21), 6810.