

Breast reconstruction using latissimus dorsi muscle flap: a novel surgical technique with reduced scarring

Reconstrução de mama usando o músculo grande dorsal: descrição de uma nova técnica com cicatriz reduzida

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ABSTRACT

Background: The latissimus dorsi muscle flap is one of the most commonly used surgical options for breast reconstruction. The donor area scar on the back, although sometimes hidden beneath the bra strap, is often extensive and enlarged or hypertrophic. The aim of this study is to describe the dissection and rotation of the latissimus dorsi muscle using 2 reduced vertical incisions. **Methods:** Twelve female patients underwent unilateral breast reconstruction with latissimus dorsi muscle flap. Ten patients had Poland's syndrome, and their breast reconstruction was performed with a tissue expander at the first instance, with subsequent latissimus dorsi muscle flap rotation to cover the silicone prosthesis. Two patients experienced volume decrease, irregularities, and breast retractions after adenomastectomy; their prosthesis were also covered by a latissimus dorsi muscle flap. The surgical procedure consisted of a 5-cm longitudinal incision on the lateral border of the latissimus dorsi muscle and another on the inframammary fold. Dissection, section, and rotation of the muscle were performed through skin retraction. **Results:** The final extension of the scar at follow-up averaged 6.2 cm. The mean surgical time for flap rotation and synthesis of the donor area was 80 minutes. No postoperative complications were observed in any of the cases. **Conclusions:** The reduced incision for dissection of the latissimus dorsi flap for breast reconstruction proved to be feasible and safe; this method provides aesthetic advantages without increasing cost or surgical time.

Keywords: Breast/surgery. Poland syndrome. Mammoplasty. Plastic surgery/methods.

RESUMO

Introdução: O retalho de músculo grande dorsal (MGD) é uma das opções cirúrgicas mais usadas nas reconstruções mamárias. A cicatriz da área doadora no dorso, embora por vezes situada sob a alça do sutiã, frequentemente é extensa e pode ser de qualidade ruim (alargada ou hipertrófica). O objetivo deste trabalho é descrever a dissecação e rotação do MGD através de duas incisões reduzidas. **Método:** No total, 12 pacientes do sexo feminino foram submetidas a reconstrução mamária unilateral com retalho de MGD isolado (sem pele). Dessas pacientes, 10 eram portadoras de síndrome de Poland e tiveram suas mamas reconstruídas com expansor tecidual num primeiro tempo, com posterior rotação do retalho de MGD para cobrir a prótese de silicone definitiva; e outras 2 pacientes tinham evoluído com diminuição do volume, irregularidades e retrações da mama após adenomastectomia, e tiveram sua prótese coberta pelo MGD. O procedimento cirúrgico consistiu de incisão longitudinal de 5 cm sobre a borda lateral do MGD e no sulco inframamário. Realizou-se dissecação, secção e rotação do músculo somente com a retração da pele. **Resultados:** Em seguimento ambulatorial, a extensão da cicatriz apresentou média de 6,2 cm. O tempo cirúrgico médio para rotação do retalho e síntese da área doadora foi de 80 minutos. Não foram observadas complicações pós-operatórias nesta série. **Conclusões:** A incisão reduzida para dissecação do MGD nas reconstruções mamárias mostrou-se bastante factível e segura, com vantagem estética e sem aumento dos custos e do tempo cirúrgico.

Descritores: Mama/cirurgia. Síndrome de Poland. Mamoplastia. Cirurgia plástica/métodos.

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INTRODUCTION

The latissimus dorsi muscle flap is one of the most commonly used surgical options for breast reconstruction. The donor area scar on the back, although sometimes hidden beneath the bra strap, is often extensive (15 cm to 25 cm) and enlarged or hypertrophic. Therefore, minimally invasive techniques have been developed and are being used more frequently.

For breast reconstruction, exclusive muscular coverage of the silicone prosthesis may be required. Adenomastectomies, previously handled by direct placement of prosthesis below the pectoralis major muscle and serratus anterior, may have very thin cutaneous coverage, leaving the prosthesis palpable and requiring muscular overlap of the latissimus dorsi. For patients with Poland's syndrome and agenesis of the pectoralis major and pectoralis minor, it is essential to reconstruct the armpit's anterior pillar; this reconstruction can be more suitably achieved through transposition of the latissimus dorsi muscle¹. The endoscopic approach, in spite of the device's cost, typically uses 3 incisions: a 1- to 2-cm port incision or an axillary incision (5 cm to 6 cm) and 2 other port incisions.

Therefore, the aim of this study is to describe the dissection and rotation of the latissimus dorsi muscle through 2 reduced incisions and provide measurements of the resulting thoracic scars.

METHODS

Twelve female patients underwent unilateral breast reconstruction with latissimus dorsi muscle flap. Ten of these patients had Poland's syndrome, and their breasts were first reconstructed with tissue expansion and posterior replacement by silicon prosthesis followed by latissimus dorsi muscle flap for coverage. The 2 other patients developed volume decrease, irregularities, and breast retraction after adenomastectomy; surgical reconstruction was required to correct these deformities. These patients received a silicone implant with latissimus dorsi flap surgery.

Surgical Procedure

The surgical procedure began with the patient in the lateral decubitus position. A 5-cm longitudinal incision was performed over the lateral edge of the latissimus dorsi muscle (Figure 1). We dissected, sectioned, and rotated the muscle by retracting the skin with surface retractors and pulling the muscle toward the incision, without endoscopic assistance (Figure 2). In the first 2 cases, another incision with the same extension at the axillary region was used to assist pedicle dissection and flap rotation. The dissection started on a plane between the subcutaneous tissue and the latissimus dorsi, between the rib cage and the latissimus dorsi muscle. After

dissection was completed, an inferior and medial incision was performed between the latissimus dorsi and trapezius muscles. Langenbeck retractors were used for assistance during the procedure.

For breast molding and flap transposition of the latissimus dorsi, a new incision in the receiving area was required. All patients had a previous incision as a result of a previous adenomastectomy or the placement of a skin expander. The flap was rotated towards the thorax, and absorbable sutures were used at the donor site, with the intention of reducing dead space and decreasing the risk of hematomas and seromas. Vacuum closed drainage was used in all cases. After suturing the donor area and placing the patient in a supine position, synthesis was performed in the receiving area.

RESULTS

Twelve surgical procedures were performed using the latissimus dorsi transposition for breast reconstruction.



Figure 1 – A 5-cm longitudinal incision over the lateral edge of the latissimus dorsi muscle.

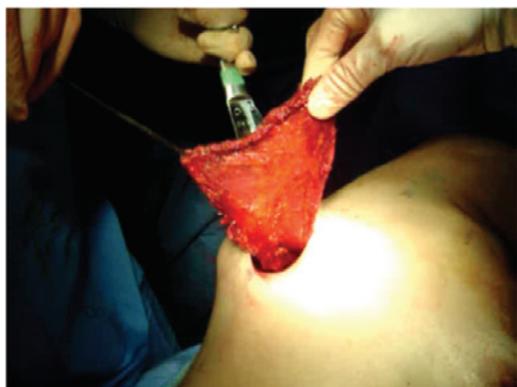


Figure 2 – Dissection, section, and rotation of the muscle by only retracting the skin with surface retractors and pulling the muscle towards the surgical incision.

During the follow-up period, no complications such as hematomas, seromas, wound dehiscence, impairment of flap viability, or aesthetic loss of the reconstructed breast were observed.

The average extension of the scar was 6.2 cm during the outpatient follow-up, ranging from 4.4 cm to 7 cm (Figure 3).

The average time required to perform the entire surgical procedure, including flap rotation and synthesis of the donor and receiving areas, was 80 minutes.

Figures 4 and 5 show 2 patients who underwent breast reconstruction using the latissimus dorsi flap.

DISCUSSION

The latissimus dorsi flap is a versatile flap that can be employed in a wide range of reconstructions for correcting thoracic deformities. The muscular anatomy is generally predictable, and the muscle has good vascularization and flexibility for transposition to several areas, based on its rotation arch. The flap can be transferred with a skin island,

enabling long-lasting thoracic coverage, associated with or without expanders and breast implants for reconstruction^{2,3}. Although the latissimus flap has all of the aforementioned technical advantages, the chance of minor complications is approximately 25%, including hypertrophic scar, contractures, seromas, hematomas, and infections⁴.

The major indication for the use of a latissimus dorsi flap is breast reconstruction after cancer and congenital defects of the thoracic wall, such as in Poland's syndrome. The latissimus dorsi is also used for reconstructions in the head and neck (after trauma or tumor exeresis), lower limbs, and thorax (other acquired thoracic defects).

With the recent advances in diagnostic modalities, diagnosis of breast cancer occurs earlier; this has led to the development of more conservative and less mutilating therapeutic alternatives⁵. The latissimus flap was used for the first time in 1906 by Tanzini for coverage of the mastectomy area in a patient with breast cancer. Later, in the 1990s, this use was popularized both after quadrantectomies and in broad resections⁶. Poland's syndrome has a spectrum of clinical presentations that range from hypomastia to amastia, with absence of the sternal and clavicular portion of the latissimus dorsi in almost all cases⁷. In minor cases, breast reconstruction may simply require implants; however, in serious cases, it is necessary to associate the prosthesis with a latissimus dorsi flap for suitable coverage of the implant.

Minimally invasive techniques are desirable in all surgery fields. Breast surgery, because of a tumor or malformation, would most benefit from this concept due to its special characteristics of reduced surgical aggression and scarring. There are several techniques for obtaining the latissimus dorsi flap through small incisions, with the intention of using it as a flap for breast reconstruction. Although the latissimus dorsi flap scar is easily hidden by clothes, patients complain about sensitivity and wound retraction.

The latissimus dorsi flap generated through the endoscopic route enables the most accurate visualization and

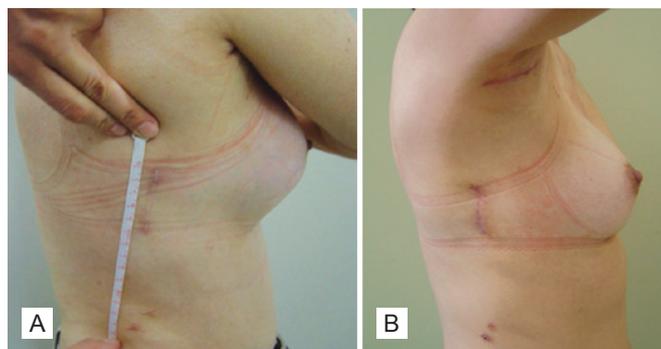


Figure 3 – A patient with Poland's syndrome who underwent breast reconstruction with latissimus dorsi muscle flap with reduced incisions. In **A**, outpatient measurement of the scar extension.

In **B**, the presence of the axillary scar is observed in the first two cases in this study.

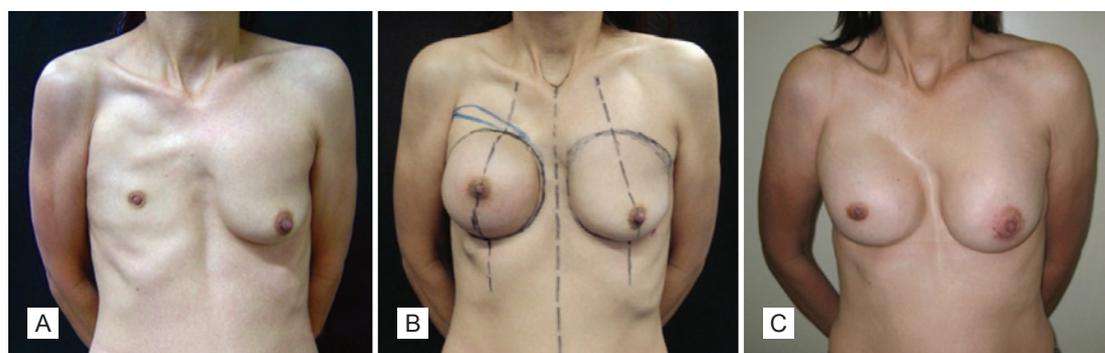


Figure 4 – Patient with Poland's syndrome. In **A**, preoperative aspect. In **B**, appearance after placing the expander. In **C**, appearance after breast reconstruction.

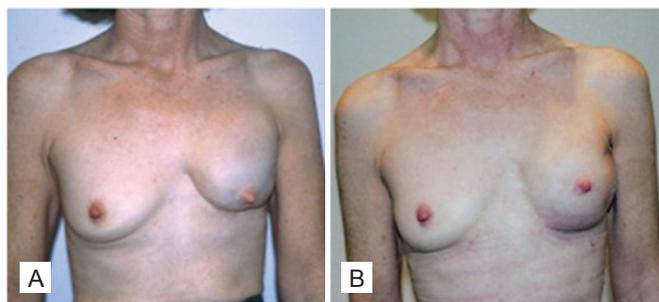


Figure 5 – Patient who underwent breast reconstruction after adenomastectomy, with placement of subpectoral breast prosthesis. In **A**, pre-transposition aspect of the latissimus dorsi muscle. In **B**, post-transposition aspect of the latissimus dorsi muscle.

mobilization of the vascular pedicle, as well as faster postoperative recovery^{1,5,8,9}. The surgery is performed with a lateral incision or with multiple, typically 3, orifices for instruments usage. An optical cavity is required for suitable visualization, and space is required for surgical dissection. Manual retraction and dissection with instruments were initially used for this surgery. However, more recently, a transparent cannula (optical dissector) is used to create multiple tunnels, which can be interconnected with endoscopic dissection to create the optical cavity. Other authors have developed a method in which a dissection balloon is placed in the epimuscular and submuscular fascial planes, thus creating an optical cavity; this cavity, in association with carbon dioxide insufflation, further simplifies latissimus dorsi collection¹⁰. As the axillary route has evolved for use in the introduction of breast prosthesis, the endoscopic technique for removing the latissimus dorsi has also evolved in a similar manner. This technique is more expensive, more technically difficult, and requires the use of special materials for suitable performance of the surgery; however, its results tend to last longer¹¹.

Other minimally invasive techniques use 3 incisions (“S”-shaped dorsal, axillary, and anterior) for breast reconstruction in Poland’s syndrome¹². The authors believe that these incisions are well positioned, with a positive aesthetic result. However, other authors have used 2 incisions: a dorsal “S”-shaped incision and an axillary incision, thus eliminating the anterior incision¹². In more conservative studies, an axillary incision was used for tumor removal in the breast and flap rotation of latissimus dorsi, the advantage being the absence of a visible scar in the breast. However, from an oncological viewpoint, this procedure would be restricted to cases where breast skin is preserved¹³.

Therefore, there are several therapeutic options for correcting thoracic deformities using a latissimus dorsi flap. Currently, many of these techniques are less aggressive and have lower complication rates. The technique of using a vertical incision is a conservative option that should be considered at the time of planning treatment because of its low morbidity, technical ease, and good aesthetic result.

CONCLUSIONS

Reducing the number of incisions for dissecting the latissimus dorsi during breast reconstruction is a very feasible and safe technique. In addition to the aesthetic advantages in the donor area, this technique does not increase cost or surgical time.

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