

## Correction of a Chest Wall Deformity Utilizing Latissimus Dorsi with a Turnover Procedure

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**Abstract.** Infraclavicular hollowing and the abnormal anterior axillary fold are often seen in patients with Poland's syndrome and related conditions. The operative procedure described in this article corrects these deformities. The procedure uses the latissimus dorsi island flap. The inserted muscle is moved anteriorly and sutured between the deltoid and the biceps. Then the muscle flap is twisted between its origin and where it is inserted. The muscle fibers act like a pivot and the thickness of the flap is increased, which enables us to achieve a round anterior axillary fold. The muscle flap fills the infraclavicular region and softens the deep hollow area.

**Key words:** Poland's syndrome — Anterior axillary fold reconstruction — Latissimus dorsi muscle flap

The pectoralis major muscle deficit (Poland's syndrome) is the most common of all skeletal muscle deformities. Its clinical characteristics are an asymmetry of the breast, abnormal direction and location of the anterior axillary fold, and abnormal hollowing of the infraclavicular region. There are many operative methods that correct this breast asymmetry, and, lately, the favored procedure seems to be the latissimus dorsi musculocutaneous flap with a silicone bag prosthesis insertion [2]. However, few reports have been made of methods that reconstruct

the anterior axillary fold or infraclavicular hollowing. An operative procedure to correct these deformities and an anatomical aspect for this procedure are presented in this article.

### Operative Procedure

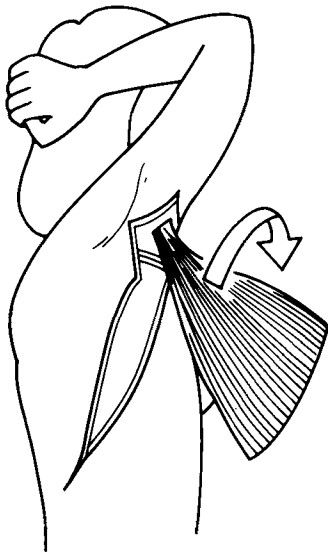
This operation is performed with the patient in the lateral position and under general anesthesia. Figure 1 shows the incision line. A "step" is made to avoid linear scar contracture. The latissimus dorsi island muscle flap is raised, preserving both the thoracodorsal vessels and the nerves (Fig. 2). The tendon of the latissimus dorsi muscle is detached from the humerus, and a subcutaneous pocket is created in the anterior chest wall. If the residual pectoralis major muscle is membranous, it should be excised. A blunt dissection between the deltoid and the biceps muscles is made, and the inserted latissimus dorsi muscle is sutured at this point. The muscle flap is twisted (this is our innovation), and the superior border of the muscle flap is inserted into the pocket and sutured to the periosteum of the clavicle, the internal border to the sternum, and the inferior border to the sixth rib (Fig. 3). This manipulation of the transposed muscle flap twists it between its new origin and the insertion point. The muscle fibers act like a pivot and the thickness of the flap is increased, which enables us to achieve a round anterior axillary fold (Fig. 4). A silicone bag prosthesis is then inserted under this turned-over muscle flap. A suction drain is inserted, brought out via a stab wound, and the wound is closed layer by layer.

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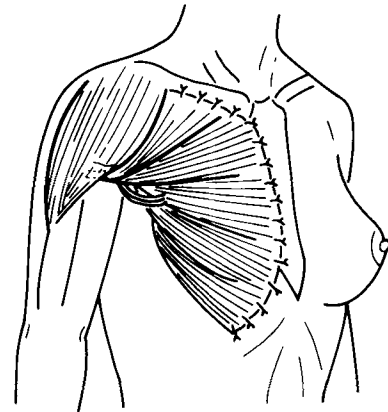


**Fig. 1.** The incision line

**Fig. 2.** The latissimus dorsi muscle flap is raised



**Fig. 3.** The muscle flap is twisted between its new origin and the insertion point



**Fig. 4.** Twisted and transposed latissimus dorsi muscle flap

### Case Reports

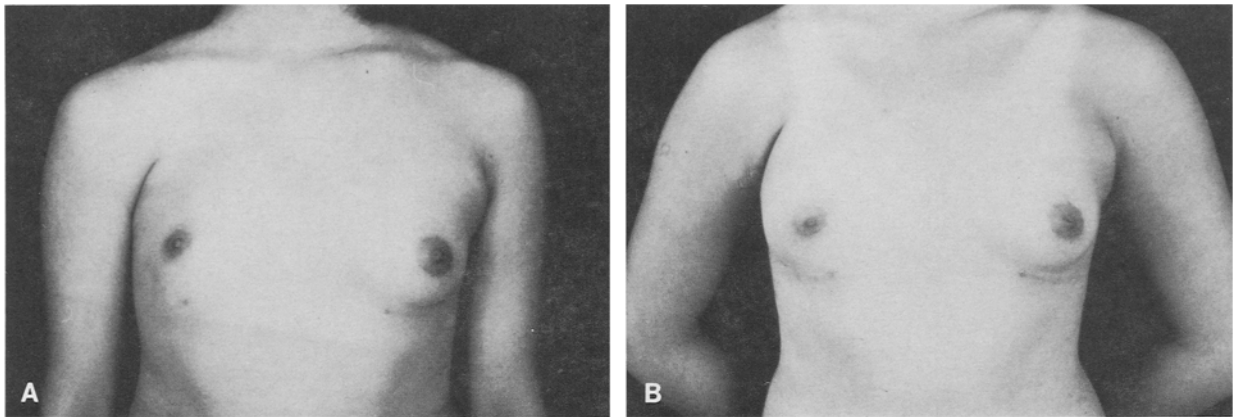
Case 1 is an 18-year-old female with right pectoralis major muscle deficit (Fig. 5A). In this case, a turned-over latissimus dorsi muscle flap was made and a 110-mL silicone bag prosthesis was inserted. (Fig. 5B).

Case 2 concerned a 19-year-old female with a left pectoralis major muscle and a nipple-areola deficit (Fig. 6A). A pedicled and twisted flap was made of the latissimus dorsi, and a 190-mL silicone bag

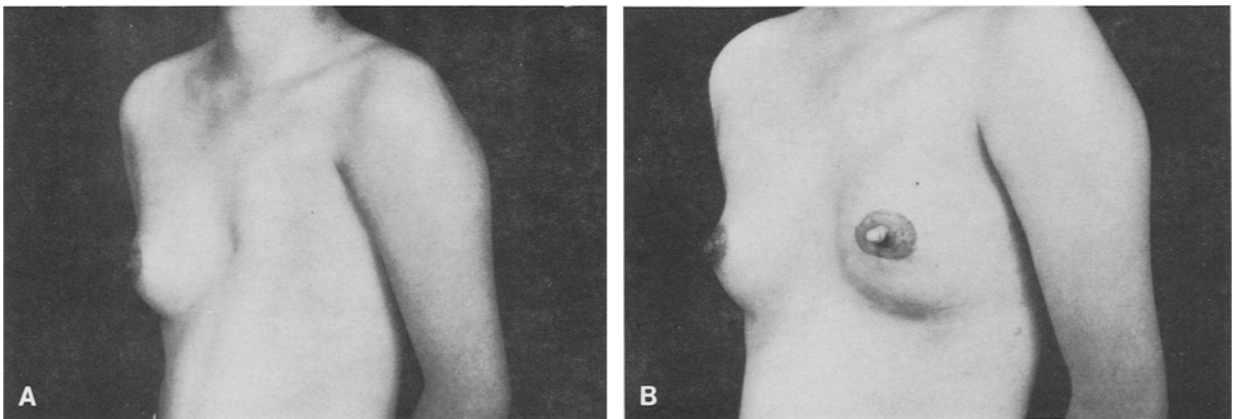
prosthesis was inserted. One year later, a nipple-areola plasty was performed (Fig. 6B).

### Discussion

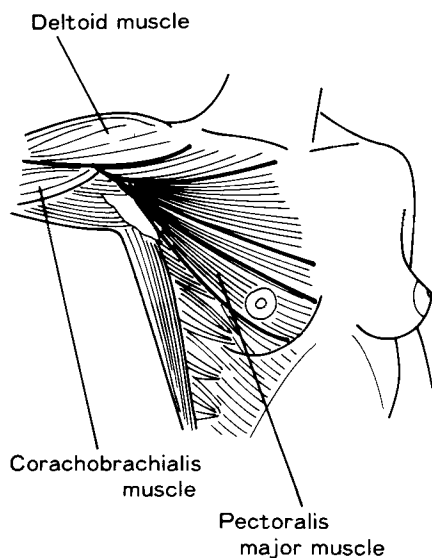
Many patients with a pectoralis major muscle deficit consult an aesthetic plastic surgeon. To reconstruct the breast, a latissimus dorsi musculocutaneous flap with a silicone bag prosthesis insertion is the standard procedure. Although this method is very good



**Fig. 5(A)** Preoperative view of case 1. **(B)** Postoperative view



**Fig. 6(A)** Case 2: Absence of the pectoralis major muscle and the nipple-areola complex. **(B)** Postoperative view



**Fig. 7.** The insertion of the normal pectoralis major muscle

and achieves an acceptable breast, the anomaly is confined not only to breast asymmetry, but also involves the deformity of the anterior axillary fold and an infraclavicular hollowing. If a patient undergoes only a breast reconstruction, there is no improvement in these other deformities. Normally, the infraclavicular region forms a slightly hollow area and gently shapes the breast line. In pectoralis major muscle deficit patients, the infraclavicular hollow is quite obvious, especially in the outer half of the region. Female patients worry about this change, as well as the breast deformity.

In the pectoralis major muscle deformity, quite often the clavicular portion is less affected and forms a membranous structure. In cases we have treated, this residual membranous portion has formed a horizontally flattened anterior axillary fold. This should be excised and a latissimus dorsi muscle flap should be used to fill in the space to soften this deep hollow.

The normal anterior axillary fold thickens and rounds out the lateral margin of the breast by the

bilaminar insertion tendon of the pectoralis major muscle. The laminae are fused in a U-shaped insert by which the lower fibers sweep below and deep to the upper fibers. The lowest fibers are the longest and the deep lamina extends upward to cover the intertubercular groove (Fig. 7) [1]. Thus, a simple transposition of the latissimus dorsi musculocutaneous flap cannot be used to reconstruct either the thickness or the roundness. Only a twisted muscle flap can resolve this problem. The preservation of the nerve can keep the postoperative muscle atrophy to a minimum. Postoperative physiotherapy to increase the muscle tone and volume, to a certain

degree, is also available. The other benefit of our procedure is that there is no operative scar on the anterior chest wall, since no cutaneous flap has been transposed.

### References

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