

Bipolar Latissimus Dorsi Transfer through a Single Incision: First Key–Step in Poland Syndrome Chest Deformity

William Watfa, MD
Pietro G. di Summa, MD, PhD
Wassim Raffoul, MD

Summary: Poland syndrome is a rare congenital anomaly characterized by a unilateral congenital absence of the sternocostal head of the pectoralis major muscle. The absence of the pectoralis major does not only result in chest asymmetry but also in a missing anterior axillary fold, which is essential for natural anatomical appearance in both male and female patients. In Poland syndrome patients, we perform bipolar latissimus dorsi flap transfer, which can be associated with a sublatissimus implant in women. All procedures are performed through a single short midaxillary incision, and tendon translocation in this technique allows the creation of the anterior axillary fold and thus a natural chest appearance. Moreover, this technique can be performed by any plastic surgeon operating under a basic operating room setting. (*Plast Reconstr Surg Glob Open* 2016;4:e847; doi: 10.1097/GOX.0000000000000851; Published online 15 August 2016.)

Described by Sir Alfred Poland 150 years ago, Poland syndrome (PS) consists of a spectrum of congenital anomalies, including pectoralis major hypoplasia or its absence. The lack of this muscle results in chest deformation, breast asymmetry, and nipple distortion, and incidence ranges from 7,000 to 100,000. Most cases of breast hypoplasia are associated with a deformity of the costal cartilage ribs, alopecia of the axillary fold, and ipsilateral upper limb deformity (bradysyndactyly). Thus, chest and breast asymmetry are enhanced by the missing sternocostal portion of the pectoralis muscle because of subclavian artery hypoplasia during embryologic development.¹

The absence of the pectoralis major does not only result in asymmetrical breast but also in a missing anterior axillary fold, which are essential elements for natural anatomical chest appearance. Although restoring similar breast volume is necessary in PS treatment, our experience

would show that the creation of the anterior axillary fold is a key step in the reconstruction process.

The literature reveals a wide variety of surgical options for chest and hypoplastic breast repair in PS ranging from lipofilling and breast implants to a variety of flap options.^{2–5} Recently, other authors have described latissimus dorsi (LD) harvest using robotics and endoscopic techniques with minimal incisions.^{6–8} The bipolar LD transfer is the relocation of the LD humeral insertion into the intertubercular groove, which is similar to active elbow flexion repair.⁹ Compared with a classical LD flap, the bipolar LD would allow for the creation of an axillary fold in addition to implant coverage.

Extensive literature review illustrates that all breast reconstructions using the bipolar latissimus transfer were performed through at least 2 incisions, which unfortunately leaves maximum scarring in young patients consulting for cosmetic purposes.

We present an innovative technique for PS by recreating the missing fold through a single, short midaxillary incision, which can be well hidden during bipolar LD transfer for breast reconstruction for which we have long-term outcomes.

SURGICAL TECHNIQUE

Preoperation begins by drawing the missing landmarks (borders of the pectoralis major). These markings are

Disclosure: The authors have no financial interest to declare in relation to the content of this article. The Article Processing Charge was paid for by the authors.

Supplemental digital content is available for this article. Clickable URL citations appear in the text.

From the Department of Plastic, Reconstructive and Hand Surgery, University Hospital of Lausanne (CHUV), Lausanne, Switzerland. Received for publication March 28, 2016; accepted June 17, 2016. Presented, in part, at the IIIrd World Congress of Plastic Surgeons of Lebanese Descent, in Beirut, Lebanon, October 23 through 26, 2014.

Presented, in part, at the 51th Swiss Congress of Plastic Surgery, Thun, Switzerland, September 11 through 12, 2015.

Copyright © 2016 The Authors. Published by Wolters Kluwer Health, Inc. on behalf of The American Society of Plastic Surgeons. All rights reserved. This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially.

DOI: 10.1097/GOX.0000000000000851



Fig. 1. Illustration explaining the bipolar transposition. Posterior view shows the flap harvest (A). Anterior view shows the transposed flap and new orientation (A–D) (B).

then transposed and replicated on the back within the LD drawing (mid axillary line, scapular head, and back mid-line). Patients are positioned in lateral decubitus with ipsilateral forearm attached to an armrest. A 9-cm incision is performed on the mid-axillary line from the axillary apex extending to the sixth rib. Raising the LD, while sparing its fascia, is performed along the preestablished markings. After ligation of the thoracolumbar secondary pedicles, the thoracodorsal pedicle is dissected proximally, ensuring enough length for flap transposition onto the chest wall. To complete the bipolar transfer, the flap is disinserted from the humeral intertubercular groove. Thereafter, the flap is transferred above the serratus anterior directly within the subcutaneous plane until it reaches the midline. The donor site is closed with resorbable quilting sutures.

The previous LD humeral insertion is then fixed with permanent sutures Ethibond, 2.0 (Ethibond, Ethicon, J&J) on the anterior aspect of the humeral neck, where a fi-

brous band of remnant pectoralis is usually present. Afterward, the muscle flap is positioned over the thoracic wall, and its distal borders are suspended transcutaneously with several nonabsorbable sutures (Prolene, Ethicon, J&J). To keep the muscle in the desired position, running sutures are placed along the medial and inferior border of the flap attaching it to the subcutaneous tissue of the breast. This procedure results in a new submuscular pocket, which is ready to receive an implant (Fig. 1). In women who have reached maturity, the implant is placed while in a sitting position; and care is taken to suture the lateral side of the LD with the border of the serratus anterior to avoid future lateral displacement of the prosthesis. In the postoperative phase, patients are instructed to keep an arm sling for 1 month to avoid any internal rotation and abduction of the arm. (See video, Supplemental Digital Content 1, which summarizes the surgical steps performed in bipolar LD transfer. This video is available in the “related videos” section of the full-text article on PRSGlobalOpen.com or available at <http://links.lww.com/PRSGO/A241>.) Physical therapy can begin 6 weeks post operation.

DISCUSSION

Bipolar LD transfer has been previously described in PS for breast reconstruction.¹⁰ However, no bipolar LD reconstruction was performed through a single incision. Because PS patients consult for aesthetic purposes, it would be beneficial that recreating an anterior axillary fold and a normal chest appearance should not necessarily result in 2 scars. Recreating the anterior axillary fold can only be done by a muscle flap transfer to mimic the missing pectoralis major landmarks despite the possibility of achieving breast volume and shape with an implant or lipofilling. In PS, social impairment and embarrassment are major problems for these patients. Although breast volume cannot be addressed before maturity, creating the anterior axillary fold at a young age can alleviate the patient’s distress signifi-



Video 1. See video, Supplemental Digital Content 1, which summarizes the surgical steps performed in bipolar latissimus dorsi transfer. This video is available in the “related videos” section of the full-text article on PRSGlobalOpen.com or available at <http://links.lww.com/PRSGO/A241>.



Fig. 2. Preoperative (A). Postoperative after right bipolar transfer with sublatissimus prosthesis (B).



Fig. 3. Mid-axillary scar after bipolar latissimus dorsi transfer after 1 mo.

cantly by restoring a normal appearance. Moreover, this first key step is essential in women to prepare for future breast implant or fat-filling procedures. The technique described herein offers a mid-axillary hidden incision compared with visible scars on the back and sternum, which have been traditionally described in bipolar transfer (Figs. 2 and 3).

If the aforementioned surgical steps and principles are respected, this technique can be replicated by any qualified plastic surgeon within any basic operating setting and without the need for sophisticated equipment. Moreover, the needless change in patient positioning during the procedure minimizes operating time.

CONCLUSIONS

The bipolar LD transfer through a single incision is a safe, reliable, and satisfactory surgical technique. The advantage of this innovative technique resides in the single well-hidden scar instead of multiple back or sternum scars

seen in traditional bipolar LD transfers. An anatomical appearance of the chest is possible by recreating the missing anterior axillary fold. The muscle transfer allows future breast implant to be placed in a retromuscular plane. Considering these advantages, this technique is now a routine practice in our unit and it could be considered a useful surgical tool in PS where reconstructive and cosmetic surgery unify. Finally, this procedure is applicable by any plastic surgeon operating under basic operating room setting.

William Watfa, MD

Department of Plastic, Reconstructive and Hand Surgery
Centre Hospitalier Universitaire Vaudois (CHUV)
Rue du Bugnon 46, 1011
Lausanne, Switzerland
E-mail: williamwatfa@gmail.com

REFERENCES

1. Fokin AA, Robicsek F. Poland's syndrome revisited. *Ann Thorac Surg.* 2002;74:2218–2225.
2. Baratte A, Bodin F, Del Pin D, et al. [Poland's syndrome in women: therapeutic indications according to the grade. Apropos of 11 cases and review of the literature]. *Ann Chir Plast Esthet.* 2011;56:33–42.
3. Huemer GM, Puelzl P, Schoeller T. Breast and chest wall reconstruction with the transverse musculocutaneous gracilis flap in Poland syndrome. *Plast Reconstr Surg.* 2012;130:779–783.
4. Pinsolle V, Chichery A, Grolleau JL, et al. Autologous fat injection in Poland's syndrome. *J Plast Reconstr Aesthet Surg.* 2008;61:784–791.
5. Arslan E, Unal S, Demirkan F, et al. Poland's syndrome with rare deformities: reconstruction with latissimus dorsi muscle through a single short incision. *Scand J Plast Reconstr Surg Hand Surg.* 2003;37:304–306.
6. Chung JH, You HJ, Kim HS, et al. A novel technique for robot assisted latissimus dorsi flap harvest. *J Plast Reconstr Aesthet Surg.* 2015;68:966–972.
7. Clemens MW, Kronowitz S, Selber JC. Robotic-assisted latissimus dorsi harvest in delayed-immediate breast reconstruction. *Semin Plast Surg.* 2014;28:20–25.
8. Missana MC, Pomel C. Endoscopic latissimus dorsi flap harvesting. *Am J Surg.* 2007;194:164–169.
9. Chaudhry S, Hopyan S. Bipolar latissimus transfer for restoration of elbow flexion. *J Orthop.* 2013;10:133–138.
10. Buchanan P, Leyngold M, Mast BA. Bipolar latissimus dorsi transfer for restoration of pectoralis major function in Poland syndrome. *Ann Plast Surg.* 2016;77:85–89.