

## Approach Towards Breast Reconstruction Using Latissimus Dorsi Flap

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**IMPORTANCE** Latissimus dorsi flap is well recognized reconstructive option for postmastectomy breast reconstruction. It is a broad muscle that can cover a large area, can give volume, and can be used for coverage of inferior pole of breast implant. It can also be used as a salvage procedure especially in case of failed previous attempt. Moreover, it provides well vascularized cover on previously irradiated tissue. This article will review uses and advantages of pedicled latissimus dorsi flap.

**KEYWORDS:** Breast reconstruction, Latissimus dorsi flap

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### Commentary

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Complete management of breast cancer patients also includes breast reconstruction, which proves to be a key component. Restoration of natural appearance of the breast is the major goal of breast reconstruction that improves the quality of life after post cancer mastectomy. Breast reconstruction may be by autologous tissue, implant, or combination of both. Overall, trends towards implant-based reconstruction are increasing with a ratio of 9:1 as compared to autologous tissue reconstruction.<sup>1</sup> The choice of procedure to be opted is multifactorial. This trend may be attributed to patient factors like nonavailability of donor tissue, co-morbidities, which may preclude the use of autologous tissue, donor site morbidity, and above all, patient preferences. Other factors considered include more operative time, exceptional surgical skills and training, availability of specific instruments, and more resources.<sup>2,3</sup> Undoubtedly, use of autologous tissue obviates the risk related to implant-based surgery including implant infection, rupture or contracture of implant and its dislodgement and migration. Implants are avoided in cases where postoperative radiotherapy is to be given or has already been given as a part of breast conservation therapy.<sup>4,5</sup> It has been observed that long term quality of life is better in patients who underwent autologous reconstruction.<sup>6</sup>

Immediate breast reconstruction is always a preferred method by most patients, but its decision depends on many factors. Combination of autologous tissue and implant can be done as single stage or two stage with the use of tissue expander and later replaced with a permanent implant. Skin sparing surgeries, being proven oncologically safe,<sup>7</sup> provides ample tissue for implant coverage, but additional tissue may be needed to provide adequate tissue and also to create a good mound. Provision of additional tissue may decrease implant-based complications like capsular contracture, rippling, and implant migration. Pedicled as well as free

tissue transfer has been described in the literature for breast reconstruction that includes latissimus dorsi flap (LD), rectus abdominus flap (TRAM), free deep inferior epigastric artery perforator flap (DIEP), superior and inferior gluteal artery perforator flaps (SGAP, IGAP) etc.

Introduced in 1906 by Iginio Tansini,<sup>8</sup> latissimus dorsi (LD) flap was used for anterior chest wound coverage and was later used in 1912 by Stefano d'Este for the reconstruction of defect created after mastectomy.<sup>9</sup> Schneider et al., in 1977, described in detail the anatomy of this flap and used it in implant-based breast reconstruction in a young lady who had a mastectomy four years ago. He found this flap useful in providing supple skin coverage while creating a natural breast mound. Since then, latissimus dorsi flap has been considered a viable breast reconstructive choice for partial or total mastectomy.<sup>10,11</sup> Ease of harvest and consistent vascular pedicle of this flap has favored its existence and success and popularity among reconstructive surgeons.<sup>12-14</sup> Literature testifies its utility in both immediate and late reconstruction.<sup>12-15</sup> Many plastic surgeons, after the advent of perforator flaps and identification of perforators of the thoracodorsal artery, have started to spare the muscle in order to preserve its function and to avoid the morbidity associated with muscle sacrifice.<sup>16,17</sup> However, the use of latissimus dorsi muscle has been advocated in many circumstances like in case of previous reconstructive failure<sup>18</sup>, prior radiotherapy<sup>19</sup>, implant failure<sup>20</sup>, and recurrent cancer after breast conservative therapy.<sup>21</sup> Other benefits of using this flap in delayed reconstruction include fewer complications, no need for microvascular skills, and it can provide vascularized coverage of previously irradiated chest.<sup>22,23</sup>

LD flap can be used for immediate breast reconstruction or in delayed cases in a single stage or two stage fashion on surgeons' and patients' choice and preferences. After

mastectomy, if no reconstruction is to be done, LD flap can be used for wound coverage in cases where ablative surgeon is not able to close the mastectomy defect primarily. If breast reconstruction is opted, latissimus flap is inspected, and other donor sites like TRAM, DIEP, SGAP, IGAP should be explored. LD flap is chosen in case of nonavailability of other optimal options, large skin defect with an open wound, prior reconstruction failure, and prior infection. Then the choice is made, if LD flap is to be done alone or with an implant that can be single stage with a permanent implant or two stages with expander-implant procedure depending on patient condition like presence of open wound or infection and whether the patient is to under radiotherapy after the surgery.<sup>24</sup>

The inherent problem in breast reconstruction is to get good aesthetic results, especially in single stage procedure. The problem lies in obtaining muscle coverage over inferior pole of implant and to create adequate ptosis while making a proper definition of inframammary fold.<sup>25,26</sup> Even in subpectoral implant placement, there is scanty tissue for coverage of the lower pole of the implant, and the implant is only partially covered, which may increase the risk of complications, poor projection, and implant loss.<sup>27-29</sup> It is not easy to achieve good symmetry in one procedure. Therefore, some surgeons prefer two stage breast reconstruction with expander.<sup>27</sup> Fascia of rectus abdominus muscle or use of serratus anterior muscle for coverage of inferior pole has been described to achieve good definition of inframammary fold and lower pole fullness.<sup>26,30</sup> Use of latissimus muscle flap was reassessed but was found to be insufficient to provide adequate volume alone.<sup>10</sup> If the muscle is used along with the implant, sufficient volume can be achieved while providing good soft tissue coverage over the inferior pole of the implant and thus gaining good results.<sup>31</sup> Studies showed that if latissimus muscle is used along with implant, either one stage or two stage, good volume, better definition of inframammary fold, and adequate ptosis can be achieved.<sup>32</sup> Harvesting of LD flap allows the surgeon to create a pocket large enough to accommodate permanent implant, thus obviating the need for tissue expander placement.<sup>33,34</sup> Other than cosmetic benefits, transfer of well vascularized tissue is preferred in already irradiated chest wall.<sup>35-37</sup> It is established that reconstruction quality is improved if nonradiated tissue is transferred to the irradiated area.<sup>36,37</sup> One concern is functional impairment after use of latissimus dorsi, but it is

well documented that it is an expandable muscle, and its use does not create considerable functional loss at the shoulder. Long follow up studies had not reported any significant functional or strength impairment after sacrifice of latissimus dorsi muscle other than mild functional limitation in case of extreme physical activity.<sup>38,39</sup> Another challenge is harvesting of big skin peddle with muscle leaving a significantly large wound that is to be closed primarily having increased risk of wound dehiscence or cosmetically unacceptable hypertrophic scar.<sup>31,35,36</sup> This can be overcome by good preoperative planning. Some studies have proposed to take minimum skin island that should be used for nipple creation later on as large skin paddle may not have good cosmetic results at recipient area.<sup>33,40</sup> Another consideration is patient repositioning during the procedure that increases the operative time. Muscle is not usually denervated in fear of muscle volume loss.

Use of latissimus dorsi flap for breast reconstruction, either in single stage, two stage or three stage procedure, is best indicated where abdominal flap (free or pedicle) is not available or possible, where previously failed free flap has been attempted, and there is nonavailability of donor vessels, where other free flaps options are not available, in case of chronic chest wall wound and the patient is not willing to have formal breast reconstruction, in patients with wound infection, in patients with implant infection and explantation and in case of severe radiation injury to the chest wall. LD flap may be used as a salvage procedure. Above all, surgeon and patient preferences should be taken into account. However, this procedure does not preclude the necessity of secondary procedures like fat grafting and symmetrizing procedure on the contralateral breast.<sup>24</sup> Patient counseling is an integral part of any procedure. In the case of breast reconstruction with LD flap, the patient is explained about the donor site, donor and recipient site scars, surgical wound related complications. The postoperative course is explained, including dressings and drains. Expander or implant related issues should be discussed in detail. On average, patient remains in the hospital for 2 to 3 days. Upper limb range of motion exercises are started after two weeks, and regular activity is expected to be regained in 3 to 6 weeks. In the case of expander placement, expansion is started at two weeks postoperatively.<sup>41</sup>

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