A case of breast reconstruction using waistline incisional extended latissimus dorsi muscle flap

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Abstract Breast reconstruction using extended latissimus dorsi (ELD) flap often results in a large and somewhat conspicuous back scar, even though several surgical design modifications have been reported. Patients often complain of self-consciousness when wearing bikinis and a reluctance to visit pools or hot springs where the back scar would be easily seen. We performed a single-stage breast reconstruction operation in which the ELD muscle flap with cutaneous fat pad was elevated through a waistline incision. The patient underwent a nipple-sparing mastectomy by breast surgeons. The patient's breast volume was small, and the weight of excised breast tissue was 74 g. As a result of this small size, the latissimus dorsi muscle flap with subcutaneous fat pad alone had sufficient volume for the patient's breast reconstruction, and the flap was elevated through the patient's waistline incision. The patient's undergarments easily hid the waistline scar, and her back was scar-free. Patients with smaller sized breasts who undergo a nipple-sparing mastectomy procedure and choose not to use synthetic implants can achieve successful reconstruction results using the waistline incisional ELD muscle flap.

Keywords Breast reconstruction · Extended latissimus dorsi flap · Waistline · Harmonic focus

Introduction

Ever since Hokin [1] described the method of using the extended latissimus dorsi (ELD) musculocutaneous flap without synthetic implants, it has become one of the standard flaps for breast reconstruction. Although free deep inferior epigastric perforators (DIEP) flap reconstruction is the most popular reconstructive operation in the world, ELD flap remains useful in many cases [2]. Unfortunately, one of the biggest drawbacks of the ELD flap method is that patients have a long and sometimes conspicuous scar on their backs. To counter this scarring problem, we placed the incision along the waistline and elevated the ELD muscle flap for a patient with small sized breasts who declined the insertion of synthetic implants.

Patient reports

Case

A 47-year-old woman was referred to our hospital presenting with a tumor in the D area of her right breast. She had previously been diagnosed in another hospital as having an invasive ductal carcinoma using core needle biopsy. No swelling of her axillary area lymph nodes was observed.

Breast surgeons performed a nipple-sparing mastectomy while the patient was under general anesthesia. The excised breast tissue weight was 74 g. The patient's sentinel lymph node biopsy was negative, and an axillary lymph node

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Fig. 1 The decubitus position. The incision line was placed 1.5 cm below the iliac crest line

dissection was not performed. The patient's breast was small and she declined the use of synthetic implant material; thus, the waistline-ELD (WL-ELD) flap procedure was performed.

Following nipple-sparing mastectomy, the patient's position was changed to a decubitus position. An incision of approximately 15 cm was made 1.5 cm below the iliac crest line (Fig. 1). The latissimus muscle flap with cutaneous fat pad was elevated through the waistline incision and the mastectomy incision. To facilitate flap elevation, we used the Harmonic Focus Long or Harmonic ACE (Ethicon Endo-Surgery Inc., Johnson & Johnson Company, Cincinnati, Ohio, USA) with light cable attachment during the operation (Fig. 2). After completing the flap elevation, the muscle flap with fat pad was transferred to the breast and the waistline incision was closed. Then, the patient's position was changed to a sitting position, the flap was trimmed and adjusted, and the flap was inserted into the breast skin envelope (Fig. 3). The total operation time was 6 h 9 min (including mastectomy), and the blood loss was 224 g (including mastectomy).

Postoperatively, the patient recovered uneventfully and reported satisfaction with the resulting breast volume (Fig. 4). Moreover, the resulting waistline scar was well hidden by the patient's undergarments and skirt (Fig. 5).

Discussion

Single-staged breast reconstruction with the latissimus dorsi myocutaneous flap gained popularity in the late 1970s. Although there are several methods of breast reconstruction—including use of implants, tissue expanders, free transverse rectus abdominis musculocutaneous (TRAM) flap, and DIEP flap—the latissimus dorsi flap remains useful and is considered to be the workhorse flap for breast reconstruction.

Fig. 2 Harmonic Focus Long (Ethicon Endo-Surgery Inc., Johnson & Johnson Company, Cincinnati, Ohio, USA) with light cable attachment was used during the flap elevation (a). Using this system, one can elevate the flap more easily, especially in deep tissue areas (b) (different case)

Fig. 3 Elevation of latissimus dorsi muscle flap with subcutaneous fat pad

Fig. 4 After 10 months, the reconstructed breast was of sufficient volume and retained a natural shape

Fig. 5 After 10 months, the scar length was 15 cm on the patient's waistline (**a**), and her back scar was easily hidden by her undergarments and skirt (**b**)

Currently, the most popular flap for breast reconstruction is the DIEP flap. Nonetheless, the free flap still has the risk of thrombosis in microsurgical anastomosis and it requires a longer operation time, although these microsurgical techniques are continuously improving. In addition, some women complain about the longer abdominal line resulting from DIEP flap usage, and younger women who want to have babies should avoid usage of lower abdominal flaps. In such cases, the latissimus dorsi flap with or without synthetic implants remains a very useful flap for breast reconstruction. However, one of the biggest drawbacks of ELD flap without implants is the resulting long scar on patients' backs. Patients with such scarring report self-consciousness when wearing exposed-back clothing and a reluctance to visit pools or hot springs. To overcome this drawback, we modified the incision line of the ELD flap and elevated the muscle flap with subcutaneous fat pad though the waistline incision.

When patients choose breast reconstruction with implants, there is no resulting back or abdominal scarring. Implant reconstruction is advantageous unless a patient declines to use synthetic material—some patients are

averse to the insertion of foreign materials into their breast tissue. In particular, Japanese women have a tendency to oppose placement of any synthetic materials into their bodies. Although rates of adverse effects are very low and continue to decrease owing to advances in synthetic material technology, some undesired effects remain, including capsular contracture, infection, breakage, and anaplastic large cell lymphoma [3]. Use of latissimus dorsi flap combined with implants has been used for breast reconstruction; this combination method is most useful for patients with large volume breasts [4]. Recently, latissimus dorsi flap elevation alone via anterior approach and use of permanent implants with breast reconstructive surgery has been reported and exhibited acceptable results [5]. This method minimizes the back or abdominal scarring. However, the volume of latissimus dorsi flap taken via an anterior approach is very limited, which necessitates a permanent implant for almost all patients. For patients who have an aversion to the synthetic material of the implants, this method cannot be used.

With recent oncological treatment advancements, cases of nipple-sparing mastectomy also have increased. When the nipple and other skin tissue are preserved, flap volume is reduced which allows the muscle flap with subcutaneous fat pad to sufficiently fill the breast skin envelope. Asian women tend to have smaller breast volumes and also are less likely to accept implantation of synthetic materials than women of other groups. In patients who have smaller breasts, an aversion to synthetic implants, and who are recommended for nipple-sparing mastectomy, the WL-ELD flap method is indicated. In these cases, the waistline scar is easily hidden by undergarments or skirts. Patients' backs will remain scar-free, thus removing any self-consciousness associated with wearing exposed-back clothing. Several reports have indicated that the latissimus dorsi muscle flap can be elevated with the assistance of endoscopes [6, 7]. Although our surgical team did not use this method, it would appear difficult

to elevate the latissimus dorsi flap with cutaneous fat pad using only endoscopes. Other reports have indicated that the scar line resulting from ELD flap elevation may be located on the bra line, and thus be hidden more easily. But compared to the waistline scar resulting from the WL-ELD flap method, a bra line scar is noticeably more conspicuous [8].

We modified the ELD flap design and elevated the ELD muscle flap through the waistline incision. The area of latissimus dorsi muscle flap and the subcutaneous fat pad is the same as the original ELD flap, for which a stable blood supply has been demonstrated [9]. Atrophy of the breast was minimal after 10 months. With the oncological advancements in breast cancer detection, cases of nipple-sparing mastectomy have been increasing. For women with smaller breasts who are averse to synthetic implants, the WL-ELD flap method proves very useful. Additionally, patients will have a clear, scar-free back.

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Conflict of interest The authors declare that they have no conflict of interest.

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