

LIPOFILLING FOR BREAST AUGMENTATION (LIPO-AUGMENTATION)

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INTRODUCTION

Fat transfer to the breast has been one of my main research interests since 1998. At that time, the technique was highly controversial and had not yet been accepted as reliable by the scientific community.

Following the success of fat transfer to the face (notably studies published by Coleman) and to other parts of the body, we first proposed to use the same procedure, which we named "lipomodeling" from the Greek root "*lipo*" (fat) and the Latin word "*modellus*" (to give shape), for breast cancer patients undergoing autologous latissimus dorsi flap reconstruction without prosthetic implant. After demonstrating the efficacy of lipomodeling and the absence of deleterious effect on chest X-ray images of the reconstructed breasts, we progressively extended the technique to other indications: patients with sequelae of conservative surgery and TRAM flap breast reconstruction, combination with insertion of implants, correction of tuberous breasts or breast deformities associated with Poland's syndrome. More recently, we extended the technique to breast cosmetic surgery.

The purpose of this presentation is to describe the background of the technique in cosmetic surgery, to take stock of the situation, especially the precautions that should be taken to limit the risk of co-occurrence of fat transfer and breast cancer, and to determine the possible indications of the technique for women considering breast augmentation.

MATERIAL AND METHODS

Based on my personal experience of 900 breast lipomodeling procedures (2000 procedures in total in my department), I will describe the surgical technique used: atraumatic collection of fat cells, centrifugation, injection of cells in multiple layers from deep to superficial tissues, graft tunnels following a three-dimensional grid pattern.

RESULTS

Evaluation of efficacy and tolerance has confirmed that fat transfer is safe and effective for patients requiring breast reconstruction. Between 60 and 70% of the fat cells purified by centrifugation and grafted to the patients are likely to remain viable over the long term.

It is absolutely necessary that the patient maintains her weight after the procedure, otherwise the benefit of lipomodeling might be lost.

The central issue with fat transfer to the breast area is the possible formation of calcifications which might interfere with the detection of breast neoplasms. Three different studies have tested the radiological evaluation of breasts

- after latissimus dorsi flap reconstruction and lipomodeling (mammography, CT-scan evaluation and MRI),
- after conservative treatment and lipomodeling,
- after correction of deformities (tuberous breast, breast asymmetry or Poland's syndrome) by lipomodeling.

Results have shown that when lipomodeling is performed following up-to-date recommendations, the risk of incorrect interpretation of breast radiological images is low, **all the more so when procedures are performed by trained surgeons and evaluations are**

made by breast imaging specialists with knowledge and experience of breast images after fat transfer. These results are essential to the design of fat transfer applications in plastic surgery.

Evaluations conducted in reconstructed breasts have shown that a majority of patients have normal breast images, with simply some signs of oily cysts and fat necrosis. All images are indicative of benign lesions easily distinguishable from malignant tissues.

Complications of lipomodeling are rare or extremely rare. Haematoma, which is a frequent complication of surgery, is practically unheard of in breast lipomodeling. All in all, none of my 900 patients undergoing lipomodeling has ever reported a hematoma.

The risk of pneumothorax is also extremely low. It was reported in only one of my patients undergoing lipomodeling after post-mastectomy latissimus dorsi flap reconstruction. This patient had very little recipient tissue and fat cells had to be injected perpendicularly to the thoracic wall. She underwent two episodes of perioperative oxygen desaturation (one during the procedure and the other in the recovery room) and lung X-ray revealed a pneumothorax. Insertion of a pleural drain restored normal saturation and the patient returned to previous clinical condition, with no long-term consequences. To avoid this complication, we recommend that fat grafting to the peri-areolar area should systematically be performed upward from two incisions made in the inframammary crease.

Opponents of the technique report a theoretical risk of fat embolism when fat cells are pumped into a vessel. None of our 900 patients suffered this complication. We recommend to use side-port cannulas and to inject fat cells while pulling the cannula off.

Finally, lipomodeling is associated with a short-term risk of local infection. Careful attention to strict asepsis is essential and the patient must be given a dose of antibiotics during the procedure. The first sign of an infection to the breast is local redness. The graft suture must be removed and some murky fat may drip off the wound. Local infection is successfully controlled with antibiotics and local application of ice, with no long-term consequences for the patient. In my series, only 6 patients developed an infection and were successfully treated with this method. Local infection may also occur at the donor site, in the umbilical region. Again, the local redness easily resolves with antibiotics and application of ice.

Long-term complications include fat necrosis and irregular body shape at the donor site.

Fat necrosis may occur when excess fat cells are forced into already saturated breast tissues, resulting in firm nodes which appear as clear spots on mammogram and oily cysts on CT-scan. These nodes are possibly amenable to puncture. When a firm, round, mobile swelling is diagnosed at the postoperative visit, puncture is recommended to confirm the diagnosis and eliminate the cyst. The puncture generally yields a thick, yellowish, acellular fluid. Fat necrosis is more frequent when the procedure is performed by inexperienced surgeons. Rates generally decrease with the number of procedures, provided that the surgeons comply with two elementary principles: use of a **three-dimensional grid pattern** and discontinuation of the procedure **when the tissues are saturated**.

Defects at the donor site may be due to irregular suction of fatty tissue. We recommend performing mini-lipoaspirations to smoothe the area and increase patient satisfaction with the results. The experience acquired with liposuction is a valuable asset for minimizing the risk of complications and achieve the best aesthetic results possible. This is why the procedure should be performed by **experienced surgeons skilled in plastic surgery**.

Indications for breast augmentation (Lipo-Augmentation)

In practice, the lipomodeling technique has been a major advance for breast plastic surgery. The current studies demonstrate that fat transfer induces no impairment of the breast radiological image possibly interfering with the diagnosis of breast cancer.

However, this requires that radiological evaluation of the breast be performed by skilled radiologists with extensive experience in breast imaging. As a rule, any suspicious finding should be biopsied. Biopsy is the cornerstone of successful breast evaluation. With this accurate tool it has become possible to consider the use of fat transfer for modeling reconstructed breasts in cancer patients.

In patients requiring purely cosmetic surgery, lipomodeling should be used with caution and the patients should have strict pre- and postoperative evaluation by a skilled radiologist with experience and interest in this procedure. Careful use of lipomodeling is all the more important as the procedure remains controversial in this setting and the risk of breast cancer, and therefore of co-occurrence of a tumor in a patient undergoing lipomodeling, increases with patient age.

Indications for breast augmentation by autologous fat transfer or by implant placement are not identical. Contrary to prosthetic implantation, lipomodeling is used for patients who require **only moderate, or very moderate, breast augmentation**, for those who wish to recover their former breast size after a weight loss or a pregnancy, for instance, or who desire breast rejuvenation without visible scar. The procedure is particularly well suited for relatively slender women with both small breasts and wide hips with sufficient fat tissue available for one or two lipomodeling sessions. The crucial point to ensure maximum benefit to the patient is that **a visible slimming effect is obtained at the donor site**.

Finally, breast lipomodeling can also be used for ptosis surgery, in women requiring correction of the upper breast quadrant and reshaping of the contours of the cleavage area. These patients do not need so much breast augmentation but greater fullness and rejuvenation.

Whatever the indication, patients must receive **precise specific information** on the procedure. Before undergoing fat grafting, it is essential that every patient be given a written information sheet describing the successive steps of the procedure, the importance of maintaining stable weight and of undergoing specific pre- and postoperative radiological evaluation by a breast specialist. The information sheet will also consider the fact that only long-term follow-up studies can ensure that injection of fat cells into the breast does not cause cancer or other breast diseases.