



# Revolutionary Breast Reconstruction

## A MINIMALLY-INVASIVE ALTERNATIVE USING THE BRAVA EXTERNAL TISSUE EXPANDER

By Roger K. Khouri, M.D., F.A.C.S.

**B**reast cancer patients who have lost all or part of their breast(s) to cancer now have a revolutionary, minimally-invasive reconstructive alternative available to them. No longer are the choices limited to the traditional implant or flap surgery which inflict additional trauma and scars. Our new breakthrough technique regenerates an entire, sensate, natural-feeling breast mound, in-situ, restoring what cancer and surgery have taken away.

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### CREATING ENTIRE BREASTS WITH BRAVA, LIPO, AND MICRO-FAT TRANSFER

In the nineties, I was professor of plastic surgery and a recognized world expert in microsurgery flap breast reconstructions. However, I was always concerned that this was far too much surgery to just recreate a patch-like breast mound. I have,

therefore, spent the past 15 years refining a more patient friendly, less invasive, superior alternative. This new micro-fat grafting procedure begins with the patient wearing an external expander device called Brava, to prepare the recipient breast for the grafts.

The BRAVA device, a bra-like external tissue expander shown to enlarge breast volume and increase blood flow, is worn 10 hours/day (while sleeping) for four weeks post-mastectomy or lumpectomy. Not only does it expand the skin, it also causes swelling of the mastectomy or lumpectomy defect to regenerate a breast-like mound through the expansion of the remaining tissues and nerves. This creates an adequate matrix into which fat is later injected.

Fat is then removed from one area of the patient's body and meticulously injected back as hundreds of tiny individual droplets at the breast defect site that has been enlarged by the Brava expansion. These micro-fat grafts (autologous grafts) are harvested by gentle liposuction from the patient's thighs, buttocks, and stomach - wherever there is fat to spare. The transferred fat then

survives within this matrix of tissue, and the breast mounds are restored "naturally" over the ensuing three months while the patient receives the benefit of liposuction. This new breast mound feels and looks like the patient's very own but contains no breast tissue - only the transferred fat. Best of all, the mound has sensation, and the nipples we reconstruct look and feel normal.

applies a gentle three-dimensional pull, which places the breast under tension. This very gentle, sustained tension causes the tissues to stretch as a natural response to sustained tension. The outcome of proper BRAVA usage is larger, fuller breasts.

The tissue expansion technique is not new, but our application of it is. For the last 30 years, the medical profession has

tissue of the breast. In fact, the BRAVA System is the only medical device that uses in vivo tissue engineering for cosmetic enhancement and reconstruction. Clinical research indicates that women who complied with the procedure experienced an increase in breast volume, which ranged from 35cc to 250cc of lasting tissue growth.

### ADVANCEMENT WITH FAT GRAFTING THE BREAST

Fat grafting the breast for cosmetic purposes has been a controversial issue ever since the American Society of Plastic Surgeons banned the procedure in 1987. The procedure had the reputation of being ineffective, unreliable, and potentially dangerous, presumably because the failed fat grafts would lead to calcifications and nodules difficult to differentiate from breast cancer.

Our major technical advance, compared to previous attempts at fat grafting, is the result of our pre- and post-grafting preparation and care of the

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The procedure is done as outpatient, often under local anesthesia and sedation, and has minimal recovery time. Unlike traditional methods, it involves no incisions, no new scars and no foreign objects, yet it recreates an entire beautiful, natural-feeling breast with the benefit of liposuction.

Although liposuction and fat transfers have for years been used to tweak or fine-tune implant or TRAM flap surgery, this innovative procedure is the very first that facilitates the total reconstruction of an entire breast using only liposuctioned autologous fat grafts.

used this same scientific principle to grow tissue for several medical procedures, including the inserted tissue expanders for breast reconstruction and the lengthening of limbs with a device called the Ilizarov. BRAVA, which holds numerous patents, is new because it uses this principle to non-surgically grow the soft

### MORE ABOUT BRAVA

The BRAVA System (BRAVA, LLC - Miami, FL <http://www.mybrava.com/medical-professionals.asp>) is an external tissue expander. The System



*Before (top) and After (bottom) Breast Reconstruction.*

*Photos courtesy of Dr. Khouri.*

recipient breast. Fat grafting can be compared to sowing seeds in a field. Assuming you start with good seeds and you are planting them well, the size of the field and the quality of the soil will determine the crop size. Over-seeding will not help. Stuffing large volumes of fat inside a small "A" cup breast will lead to graft failure and necrosis.

The pre- and post-grafting preparation gave us the ability to get extremely large volumes of fat to survive in one setting. We showed that with only one single grafting session we were able to augment a normal, small breast by an average of 230 ml, the size of a regular breast implant. We started the study conservatively, and with time and experience progressively moved to larger augmentation volumes. Average augmentation of the last 10 women was over 300 ml and the limit to augmentation was the pre-grafting Brava expansion of the breast.

## BREAST RECONSTRUCTION STUDY

Tissue-engineered organs consist of sophisticated implanted biocompatible scaffolds seeded with the appropriate cells. To tissue engineer a breast mound, we generated in-situ the necessary scaffold by externally expanding the mastectomy defect and seeded it with lipoaspirate.

In our recent 5-year clinical trial, we reconstructed 33 women who were 0d- 30y post-mastectomy (47 breasts, 14 radiated). They wore the Brava external expander 10 hrs/d for 10-30 days prior to the first grafting. Expansion was considered

adequate when the mastectomy scars stretched to create a 200-300 ml recipient matrix. We grafted 150-600 ml of fat suspension per breast per grafting session.

One week post-transfer, they resumed use of the expander for 10 hrs/d until the next lipografting session. Two to five outpatient procedures spaced 6-16 weeks apart were required until the surgeon and the patient

were satisfied with the breast volume and shape. Follow up MRI and mammograms were obtained.

Despite the very large graft volumes, there was a paucity of fat necrosis. We had nearly 90% survival of the grafted fat, and the droplets of fat that failed to engraft did not cause significant problems. The radiologists reading the Breast MRI saw no

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*Before (top) and After (bottom) Breast Reconstruction. Photos courtesy of Dr. Khouri.*

confusing lesion. They actually found that it was easier for them to interpret the MRI or the mammogram of a breast augmented with fat than that of a breast augmented with implants.

Six months after the last graft, final stable breast volume ranged from 300-600 ml. The breasts were soft, sensate, and had aesthetically pleasing shapes. Mammographies were read as normal fatty breasts, and MRI revealed well-vascularized fat with a few scattered benign oil cysts. Complications included a swiftly treated pneumothorax and a few transient cysts. All patients were highly satisfied with their reconstructed breasts and thankful for the body sculpturing byproduct. No new scars were added, and the original mastectomy scars were markedly improved.

## PATIENT EXPERIENCES

“I feel that any woman considering reconstruction after cancer surgery should consider fat grafts. The procedure offers a wonderful alternative to implants or complicated surgeries, as well as the opportunity to use your own tissue. For me, it was clearly the best choice.” - *Marjorie S., Breast Cancer Survivor*

Breast reconstruction with micro-fat grafting is an excellent alternative when combined with the Brava System. It might even be the preferred method of reconstruction. Now that we’ve


“Dr. Khouri gives women the ability to reclaim naturally what cancer has taken away. When you’ve had cancer growing in you, the last thing you want is a foreign object in your body. I have finally reclaimed my life, regained my own self, mentally and physically as a survivor, and without having muscles torn or a foreign object in my body. It’s me going forward. It’s a new opportunity.” - *Astrid, Breast Cancer Survivor*

proven you can have the real thing, why get stuffed with “falsies?”

Patients in our study were extremely satisfied with their reconstructed breasts. Fat grafting paired with the Brava System allows us to build, in its entirety, a beautifully sculpted breast that looks and feels natural. There are no scars, foreign bodies, risk of deformity, rupture or capsular contracture.

By approaching the process with a creative orientation, we facilitate a paradigm shift in breast reconstruction. Combining serial lipografting with external expansion, we achieve the equivalent of an autologous flap breast reconstruction with very few, minimally invasive grafting procedures. External expansion created a skin envelope, stretched the scar, and generated a fertile recipient matrix for large lipograft volumes.

We are giving women their breasts back without any incision and with only small outpatient quick recovery

procedures. The new breasts are their very own. No implants or patch of tissue from somewhere else. They look and feel natural and have sensation! This is a breakthrough advance, never done before. 



About  
Dr. Khouri

**Roger K. Khouri M.D., F.A.C.S.**  
Dr. Khouri is a Board Certified Plastic Surgeon trained in General Surgery at UNC, in Plastic Surgery at Brown University, in Reconstructive Microsurgery at NYU and in Hand Surgery at Harvard. Dr. Khouri lives in Miami with his wife Dr. Susana Leal-Khouri, a renowned Pathologist & Dermatologist, and their five children. Doctor Khouri is the founder of the Miami Breast Center. He is a Plastic Surgeon with more than 20 years of experience with breast reconstruction. Dr. Khouri is a leader and innovator in natural, no implant, breast augmentation and post-mastectomy breast reconstruction. Twelve years ago Dr. Khouri published what was then the largest experience in the world with breast reconstruction using microsurgery & TRAM flaps. While practicing in Miami over the past 5 years, he has perfected a much more patient-friendly alternative method of breast reconstruction. He has contributed to innovations in liposuction, lipografting, and was the inventor of the [BRAVA](#) external breast tissue expander. For further information about this procedure, contact Dr. Khouri: 305.642.4263 or visit [www.MiamiBreastCenter.com](http://www.MiamiBreastCenter.com).