

Regenerative Aesthetics

**NATURAL BEAUTY,
MADE BETTER**

*By Todd K. Malan, M.D.
Contributing Editor & Advisor*

The cosmetic surgery industry has evolved dramatically over the past few years. While the era of minimally invasive cosmetic procedures has brought about incredible advances in liposuction, breast augmentation, facial rejuvenation and body contouring, perhaps the most promising advance is in the field of Regenerative Aesthetics.

“Regenerative Aesthetics” is the term used to describe a cosmetic procedure that utilizes a patient’s own adipose-derived stem and regenerative cells to create a more youthful and desirable appearance. Patients desiring larger or fuller breasts now have options beyond traditional implants. Areas of the body that have lost their elasticity, firmness, or shape due to age, pregnancy, significant weight gain/loss, or trauma can be restored without the use of foreign materials. And because the technology utilizes the patient’s own tissue and stem cells, the downtime and risks that are often associated with traditional cosmetic procedures are greatly diminished.

THE BIRTH OF REGENERATIVE AESTHETICS

The idea behind Regenerative Aesthetics as we know it today was born in 1999 when a professor of surgery at UCLA questioned whether stem cells might exist in the fat he routinely

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removed from liposuction patients. After a few years of studying fat cells in the lab, his team published its discovery in 2001: stem cells do exist, in abundant numbers, within fat tissue. This

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opened the door for a host of potential uses, including cell-enriched fat transfer.

Fast forward to 2007: a cosmetic surgeon in Japan reports the results of the first study on fat transfer breast augmentation using stem cells derived from adipose fat tissue. Using Cytori Therapeutics' Celution System to isolate and activate the stem cells, the study found that an injection of 160 cc of stem cell-enriched fat increases breast circumference by an average of four centimeters. Most significantly, the study reported that the new volume was retained long-term, and the breast itself maintained a soft and natural feel – all due to the stem cells' ability to create a blood supply for grafted fat, enabling its survival.

learned how to best harvest fat tissue or transfer the harvested fat, and as a result survival of the fat cells was very poor – around 50 percent. Industry professionals speculated that the dead fat tissue would leave patients with scarring and calcification that could potentially interfere with breast cancer detection. The procedure was denounced as dangerous and essentially abandoned in favor of traditional silicone implants in the U.S. in 1987.

Thanks to the results of the 2007 study from Japan and great improvements in mammography technology, the door to natural breast augmentation and Regenerative Aesthetics as a whole new field in cosmetic surgery was re-opened.

minimal damage, and injecting it back into the body in micro droplets rather than large volumes. The current survival rate of cell-enriched fat transfer, when performed correctly, is 80 to 90 percent.

Although FDA approval of stem cell-enhanced procedures in the U.S. is still pending, physicians are permitted to remove and transfer stem cells enriched from one area of a patient's body to another as long as the process takes place in a single procedure.

It is important to point out that this form of breast augmentation will never completely replace silicone implants. There will always be a subset of patients looking to obtain a very dramatic change in breast size, and they will likely turn to implants. But the majority of patients seeking fuller breasts are looking for a more subtle enhancement: a one or two cup size increase, with a natural look and feel.

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INDUSTRY IMPACT OF REGENERATIVE AESTHETICS

The results of this study have had an enormous impact on the cosmetic surgery industry. Up to this point, autologous fat transfer for breast augmentation and reconstruction (introduced in the mid-1980s) had a controversial history. The procedure itself was hampered by several factors. First, the liposuction equipment used in those early days severely damaged the fat tissue as it was harvested. Clearly doctors had not yet

Therefore, a small group of doctors in the U.S. took a closer look at what physicians in Japan, Germany, and Brazil were doing with stem cell fat grafting and developed a technique that incorporated the best of these practices.

In October 2009 at my surgery center in Scottsdale, AZ, I performed the first U.S. fat transfer breast augmentation procedure using stem cells. After thorough research and clinical testing, my colleagues and I had determined that the survivability of the fat tissue depended on two factors: removing the fat with

THE EXPANSION OF REGENERATIVE AESTHETICS

While Regenerative Aesthetics essentially began with natural breast augmentation, there is a wide range of procedures ideal for stem cell technology.

Stem cell fat transfer to the hands has been very successful. Patients often come to us concerned that their hands are giving away their age, and before Regenerative Aesthetics it was challenging to correct this problem. Now we can use patients' own fat to replace lost volume and create the youthful appearance they desire.

Also, stem cell facelifts have become popular with physicians in Italy and throughout Europe and are slowly gaining traction in the U.S. Doctors here are beginning to realize that volume replacement is of greater importance than merely cutting out excess skin, which can create an abnormal appearance. Cell-enriched fat, used as a filler, helps avoid the too-taut appearance, significant downtime, and risks associated with traditional facelifts.

PURSUIT OF PERFECTION

While we are very close to perfecting stem cell-enriched fat transfer, there are still a few challenges that we need to overcome as an industry.

First, the procedure itself continues to evolve. Results today are far better than they were even two years ago, but more fine-tuning is required. We continually work to develop the best methods for harvesting the fat without causing damage. We need to determine the ideal location to inject the fat, whether it is in the superficial fat layer, beneath the gland, or directly into the muscle. And we have not yet arrived at the correct proportion of stem-to-fat cells to ensure not just survivability but a *dynamic graft*, where the fat continues to grow and behave as it did in its original location in the body.

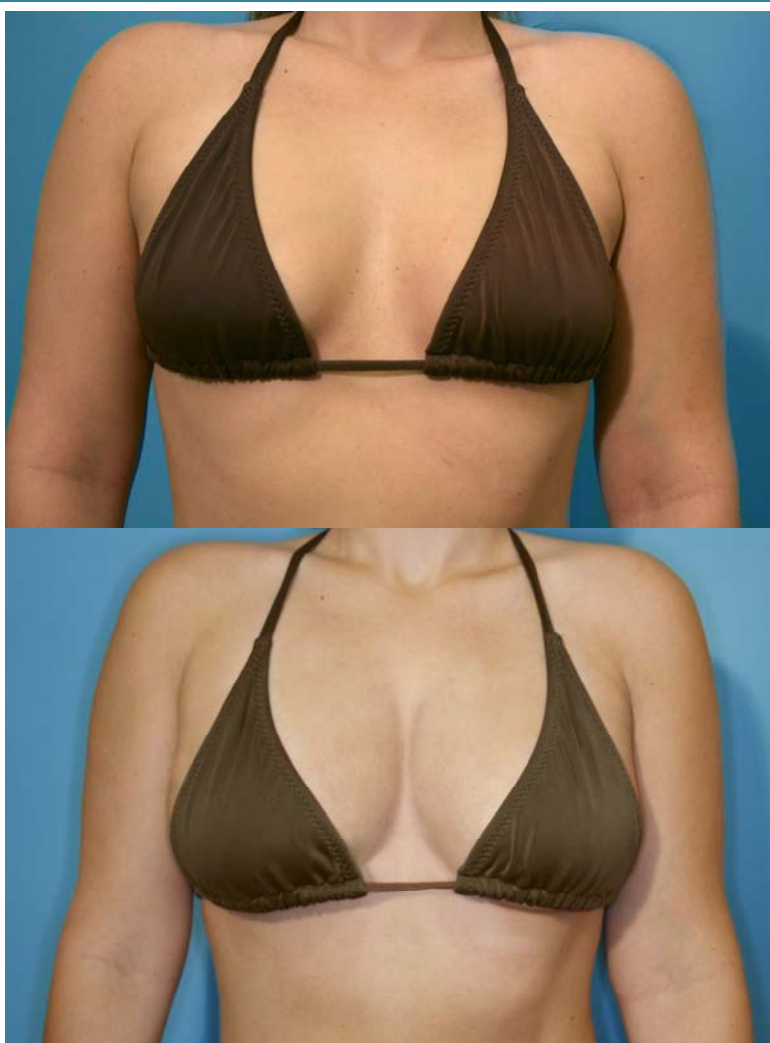
Second, we have begun to see doctors offer stem cell procedures without truly understanding the technological expertise associated with achieving great results. There are physicians performing these procedures using the very same equipment and

techniques that were banned in the 1980s. In this case, much of the fat does not survive the harvest, and the fat that does is not being injected in micro droplets, lowering survival rate even further.

There is a great deal of confusion among physicians regarding what actually constitutes

a stem cell procedure. Simply moving fat tissue, with its naturally occurring stem cells, is not enough. To be successful, the stem cells have to be isolated, activated, re-concentrated into the fat cells, and then injected in micro droplets. No other technique to date has been proven to achieve great results.

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Breast augmentation before (top left) and after (bottom left) treated with a regenerative aesthetics procedure.

Photos courtesy of Dr. Malan.

Additionally, some manufacturers of cosmetic surgery devices have misled physicians into believing their devices can isolate and activate stem cells. Currently, only Cytori Therapeutics' Celution System has been tested and proven in a published study to produce actual good long-term results. Doctors performing stem cell fat transfers with any other device are utilizing unproven equipment.

It is imperative that doctors educate themselves on best practices, techniques, and equipment before they perform any stem cell procedure. Patients who receive less than optimal results will likely place blame on the procedure, and then the industry as a whole potentially faces negative backlash.

LOOKING TO THE FUTURE

Soon we will see stem cells alone used in cosmetic procedures, where the focus will be on correcting pigment changes or fine lines, rather than volume replacement. This will be ideal for patients in their thirties or forties who have not lost much volume but would like to improve the overall quality of their skin. Stem cells will be able to take the skin back ten or twenty years, essentially reversing the aging process.

In my estimation, one of the next major breakthroughs in aesthetic stem cell technology will be the treatment of burns and skin grafts that are not purely cosmetic, but reconstructive. The technology is currently being tested in San Antonio's world

famous burn unit at Brooke Army Medical Center for treatment of soldiers injured and burned in combat.

It is important to note that, as we age, stem cells become less potent and useable. Serious conditions such as diabetes also greatly diminish the viability of fat-derived stem cells. The earlier the fat is harvested and stored, the more effective it will be for future use, both medical and cosmetic.

The potentially lifesaving benefits of fat-derived stem cells are enormous. As technology advances and we are able to use stem cell technology to treat serious medical conditions, cosmetic surgeons will be faced with the need to counsel patients about storing their fat after a liposuction procedure. **777**



Hands before (top left) and after (bottom left) treated with a regenerative aesthetics procedure.

Photos courtesy of Dr. Malan.



About the Author

Todd K. Malan, M.D. is the founder of the Innovative Cosmetic Surgery Center in Scottsdale, AZ, and creator of the BeautiFill X™ fat transfer breast augmentation procedure. He was the first physician in the United States to offer stem cell natural breast augmentation and has performed over 100 stem cell fat transfers to date. He trains physicians globally in advanced cosmetic procedures including the most progressive methods in water-assisted liposuction, fat transfer, and stem cell technology. Visit his website:

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