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by David Bronstein

Repair Revolution: Surgeons use fat grafts to address extensive facial deformities

Fat grafts have been used to repair the aging face for about two decades, but recently, surgeons have been using grafts to repair more extensive facial deformities caused by injury, illness or congenital abnormalities. Success, they said in interviews with ENT Today, depends on proper patient selection, matching the fat graft to defects that are most amenable to repair with fat injections and an understanding of the biology of the graft and how it reacts with surrounding facial structures.

This 23-year-old man presented 15 years after radical local excision of a rhabdomyosarcoma of his left masseter followed by irradiation (left). Seven months after one procedure, the volume correction is obvious.

Fat Grafts and War Injuries

Still, there are surgeons who push the envelope when it comes to using fat grafts without any dermis or other structures attached to repair major facial deformities. Two noted proponents of fat grafting, Sydney R. Coleman, MD, a plastic surgeon in New York City, and J. Peter Rubin, MD, chief of plastic and reconstructive surgery at the University of Pittsburgh Medical Center (UPMC), have been using the grafts in soldiers with extensive soft tissue injuries incurred during the war in Iraq. The surgeons rely on fat harvesting, processing and injecting techniques that have been developed and continually refined over the past decade by Dr. Coleman (Clin Plast Surg. 2006;33(4):567-577), who visits UPMC regularly to assist in the procedures.

“The effects we’ve achieved in some of these soldiers [are] pretty remarkable,” Dr. Coleman told ENT Today. “We’ve actually filled in some huge craniotomy defects that had left the patients with just skin over metal mesh, with no place to put anything, and yet we’ve been able to get some remarkable filling of those defects and improved facial scarring as well. So it’s not just big holes we’re filling.”

Asked to explain how fat, which does not have much structure or “lift,” could not only fill but also support facial contours in such defects, Dr. Coleman replied that it is probably due to the stem cells in the grafted fat that he maximizes using his harvesting and processing technique. “We collect the fat and then centrifuge in such a way that we are left with only the most dense, stem

cell-rich fat," he explained. "The oily fat residue is either thrown out, placed back into the patient or retained for research purposes."

As for exactly what those stem cells are doing to help achieve the impressive defect filling he's reported, "there are lots of theories that have been published by some very well-respected scientists," Dr. Coleman said. "What most studies have shown, and what I firmly believe is taking place, is that the stem cells promote blood vessel growth and blood flow via some type of angiogenic process. That is absolutely crucial not only for the survival of the fat graft but also wound healing."

Dr. Coleman stressed that the outcomes he and Dr. Rubin have achieved in the injured U.S. soldiers aren't attributable just to proper fat-graft harvesting and processing; his methods for injecting the fat are also crucial. The technique involves several steps, including the placement of miniscule amounts of fatty tissue each time the surgeon withdraws a blunt cannula that is used to inject the fat into the defect being repaired. (Dr. Coleman has published extensively on these methods, and his books, "Structural Fat Grafting" [Quality Medical Publishing, 2004], and "Fat Injection from Filling to Regeneration" [Quality Medical Publishing, 2009] are considered major references on the topic.)

He also pointed out that the results he has achieved at UPMC are mirrored in several cases from his own practice. "I've had cases in which large craniofacial defects were repaired using these fat-grafting methods," Dr. Coleman said. In some of the cases, he noted, patients were missing a quarter of their faces. "They still had a rudimentary jawline, so we didn't have to reconstruct the jaw. But they did have really remarkable defects that I was able to fill in with fat grafts, and the outcomes were very impressive and long-lasting."

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More Views on Stem Cells

A rash of papers has been published in the last few years in support of Dr. Coleman's claim that adipose-derived stem cells (ASC) have the potential to enhance angiogenesis and blood flow to the graft, promote skin rejuvenation and yield a superior cosmetic result overall.

As one paper (Handchir Mikrochir Plast Chir. 2010;42(2):124-128) coauthored by Dr. Rubin noted, "The angiogenic potential of ASCs distinguishes these cells as a highly desirable cell source for transplantation and tissue repair."

Unfortunately, many plastic surgery practices have turned that potential into breathless marketing claims about the rejuvenating effects of stem cells. The claims have drawn the attention of the American Society for Aesthetic Plastic Surgery (ASAPS) and the American Society of Plastic Surgeons (ASPS), which released a joint position statement in May 2011 that sought to put the brakes on the hype. According to the statement, "while stem cell therapies have the potential to be beneficial for a variety of medical applications, a substantial body of clinical data to assess plastic surgery applications still needs to be collected," and "The marketing and promotion of stem cell procedures in aesthetic surgery is not adequately supported by clinical evidence at this time."

Concerns

One might think that Dr. Coleman, who believes strongly in the contributions made to clinical outcomes by stem cell content in fat grafts, might have an issue with professional societies and individual surgeons advocating a go-slow attitude with the technology. But he's staunchly in their camp, at least when it comes to marketing claims that tout the benefits of "stem cell facelifts."

"I find it unbelievably difficult to understand how some of these surgeons are now making a new claim of miraculous rejuvenation from the same fat grafts we have been injecting for twenty-five years. They're not using a new technique or an innovative device. They're just using the term 'stem cell' to market themselves as having a procedure that their competitor surgeons cannot provide, and I think that's unconscionable."

The debate over ASCs promises to continue, given the preliminary nature of the relevant research. As for the more practical consideration of just how extensive a facial reconstruction should be attempted with fat grafts, Dr. Coleman added this final consideration: "I use my technique of fat grafting primarily for cosmetic repairs such as restoring facial tissue that has atrophied due to aging, acne, accidents or disease. But, in select cases, it can be a very effective filler for larger defects." In fact, he added, "it really should be considered to be the best choice for a soft tissue filler." **ENT TODAY**