Invited Discussion on: “Reverse Expansion Following Nipple Sparing Mastectomy: A Natural, Safe and Effective Autologous Technique for Breast Reconstruction”

Dana Mihaela Jianu¹ • Andrei Marin²

Received: 3 July 2022 / Accepted: 3 July 2022 / Published online: 4 August 2022
© Springer Science+Business Media, LLC, part of Springer Nature and International Society of Aesthetic Plastic Surgery 2022

Level of Evidence V This journal requires that authors assign a level of evidence to each article. For a full description of these Evidence-Based Medicine ratings, please refer to the Table of Contents or the online Instructions to Authors https://www.springer.com/00266.

Regenerative plastic surgery is one of the most fascinating and seductive modern chapter in plastic reconstructive surgery. It opens a vast realm of possibilities to reconstruct parts or even whole anatomical regions of our body with our own tissues. One of the great, revolutionary achievements in medicine was the discovery of the regenerative power of the adipose tissue containing the mesenchymal adipose derived stem cells-ADSC (progenitor cells), the stem cell’s niche and other regenerative factors [1, 2].

Plastic surgeons started to use and to observe the benefits of fat graft in their daily practice many decades ago—used mainly for face improvements and scars—but the scientific explanations and evidences were to be revealed more recently [3, 4]. The adipose tissue is one of the richest and good quality source of regenerative cells [3]; we owe recognition for the tremendous solid scientific research—the base of understanding and further development of our plastic surgical art—to Futrell, Zuk, Yoshimura, Rigotti, Coleman, Mazzola, Rubin, Pallua, Alt, Magalon, Khouri, Biggs—just to name a few. Among these researchers we recognize also renowned plastic surgeons as a perfect demonstration of the value and validity of the translational medicine “from patient’s bed to bench side and from bench side to patient’s bed”. As a consequence of this scientific and practical fertile environment, new indications, new techniques, new concepts, new instruments and equipment were born. The Italian school of regenerative plastic surgery based on fat transplant—including the breast—is internationally renowned by the contributions of Rigotti, Mazzola, Berrino, Calabrese, Bassetto, Botti, Pelle Ceravolo and of course Giorgio Fischer—one of the fathers of liposuction and fat graft. This concept was embraced and put into practice brilliantly by our Italian colleagues Elena Lucattelli, F. Catin, F. Cipriani, Laura Dellachiesa, T. Fogacci, G. Frisoni, D. Samorani, G. Semprini, L. Fabiocchi.

The authors of this relevant article demonstrated—based on their surgical experience of eleven years and more than one hundred surgeries—that the breast reconstruction with fat transfer is one of the most appreciated both by patients and surgeons [6]. Applications of regenerative surgery has multiple advantages: the method of reconstruction is gentle, painless, even desired for reasons such as weight reduction and reshaping, recreating a natural, sensitive and warm breast, looking similar with the contralateral breast, improving the vascularization and the vitality of the irradiated breast, with rapid hospital discharge, with minimal to no complications due to avoiding undermining and large scalp wounds, without the immediate and delayed risks of the musculo-cutaneous flaps [7–10].

In a similar manner, Manconi, Berrino and colab. Describe a fat grafting technique after internal expansion and expander removal. Their method differs by using body jet system in which the lipoaspirate is separated in reservoir with internal filters (without the need of centrifugation). Similarly, a median of three fat grafting sessions were needed [11].
The breast reconstruction with sequential fat grafting filling the space created with reverse expansion also has an economical merit: it is a medical resource sparing method. The benefits of using this particular method in oncological centers could be multiple: no need for intensive care or long hospitalization, no need for blood transfusion or other expensive postoperative care (a frequent need in the reconstruction with musculo-cutaneous flaps), sparing also human resource due to rapid discharge—all very important facts in decongesting the medical system, so burdened nowadays globally with the patients with Covid-19 or other pathologies.

I have been working as a practitioner and researcher with other colleagues in this specific breast regenerative surgery field since 2003; my experience in breast reconstruction by means of regenerative agents was reflected in some publications [12]. From personal experience we are able to confirm author’s conclusions that the advantages easily counteract the disadvantages in this type of breast reconstruction post mastectomy.

As an original contribution, together with scientists specialized in microbiology, we demonstrated (in vitro) that the CO₂ fractionated laser application (set on 9 Watts, 4 milliseconds, large pattern) on the skin with transferred fat stimulates the ADSC, contributing to a better intake of the grafted fat [13].

Although not many and not so important, the disadvantages need to be known from the beginning, in order to prevent the complications as much as possible and in case they appear to have a plan of their management. The disadvantages of this method—which I and my team observed through the years—consist mainly in: the length of the treatment of the serried surgeries (2–3), the risk of lumps—cysts of necrotic or devitalized/non-vascularized fat, the lack of projection of the new breast and the lack of predictability of fat intake [14]. The macro/micro dystrophic calcifications can appear after fat grafting (from our experience this happens quite often); they are easy to differentiate from malignant micro calcifications but the patients should be warned about the possibility of developing lumps, in order not to panic. This aspect was hardly discussed in the article; we appreciate that it is important for the patients’ understanding and eventually for the informed consent before proceeding to this extremely valuable therapeutic option.

Another aspect that looks important to us and apparently was not taken into consideration is the case when the contralateral breast is ptotic and/or hypertrophic. In these cases, a correction of the breast of reference (the contralateral breast) could be beneficial for the patients and should be offered in the surgical strategy, in the same logic of creating two beautiful, non-ptotic and healthy breasts. From our experience, patients agree to improve the status of the healthy contralateral breast by reduction or pexy. Reproducing with fat graft a smaller breast will be easier to achieve, in this way also sparing the resources to reconstruct an unnecessary big, possible less healthy and surely less aesthetic breast.

All the disadvantages of the method must be clearly explained to the patients in order that they understand and assume the less favorable outcomes. Regarding the oncogenic concerns related to the method—especially in oncologic patients—this article offers an excellent opportunity to update and re-iterate the safety of fat transfer. The safety of grafted fat that cannot and doesn’t generate breast cancer is once more demonstrated through direct follow-up of the cohort of the patients enrolled in this study for a median five years and also through a “fresh” review of the literature.

The success of this type of reconstruction is related to the grade of mastering the technique of fat microtransplantation, the vascularity of the recipient area and the quality of fat. The method may look simple at first site but for obtaining optimal results, it requires a learning curve, continuous training in the field of regenerative plastic surgery, surgical skills and proper equipment.

In conclusion, the possibility of breast reconstruction using fat grafting offers the benefits of a safe, efficient, mild, “resources sparing” method, while at the same time using regenerative cells that contribute both in healing and reducing the risks associated to radiotherapy and also offering a natural result without the need for further surgical revisions.

Declarations

Conflict of interest The authors declare no conflicts of interest to disclose.

Ethical Approval This article does not contain any studies with human participants or animals performed.

Informed consent For this type of study informed consent is not required.

References:

1. Shukla L, Yuan Y, Shayan R, Greening DW, Karnezis T (2020) Fat Therapeutics: the clinical capacity of adipose-derived stem cells and exosomes for human disease and tissue regeneration. Front Pharmacol 11:158. https://doi.org/10.3389/fphar.2020.00158.PMID:32194404;PMCID:PMC7062679
2. Weiliang Z, Lili G (2021) Research advances in the application of adipose-derived stem cells derived exosomes in cutaneous wound healing. Ann Dermatol 33(4):309–317. https://doi.org/10.5021/ad.2021.33.4.309 (Epub 2021 Jul 1. PMID: 34341631; PMCID: PMC8273313)
3. Klinger M, Klinger F, Caviggioli F, Maione L, Catania B, Veronesi A, Giannasi S, Bandi V, Giaccone M, Siliprandi M, Barbera...
F. Battistini A, Lisa A, Vinci V (2020) Fat grafting for treatment of facial scars. Clin Plast Surg 47(1):131–138. https://doi.org/10.1016/j.cps.2019.09.002 (Epub 2019 Oct 21 PMID: 31739889)

4. Coleman SR, Katzeli EB (2015) Fat grafting for facial filling and regeneration. Clin Plast Surg 42(3):289–300. https://doi.org/10.1016/j.cps.2015.04.001 (PMID: 26116934)

5. Dehdashtian A, Bratley JV, Sventek SR, Kung TA, Awan TM, Cederna PS, Kemp SW (2020) Autologous fat grafting for nerve regeneration and neuropathic pain: current state from bench-to-bedside. Regen Med 15(10):2209–2228. https://doi.org/10.2217/rme-2020-0103 (Epub 2020 Dec 2 PMID: 33264053)

6. Lucattelli E (2022) Reverse expansion following nipple sparing mastectomy: a natural, safe and effective autologous technique for breast reconstruction. Aesthetic Plast Surg (in press)

7. Yun JH, Diaz R, Orman AG (2018) Breast reconstruction and radiation therapy. Cancer Control 25(1):1073274818795489. https://doi.org/10.1177/1073274818795489 (PMID: 30123338; PMCID: PMC6108018)

8. Lesniak DM, Sarfati I, Meredith I, Millochau J, Wang KC, Nos C, Clough KB (2022) Fat grafting before delayed prophylactic mastectomy and immediate implant reconstruction for patients at high risk of complications. Plast Reconstr Surg 149(1):52–56. https://doi.org/10.1097/PRS.0000000000009872 (PMID: 3493602)

9. Ribuffo D, Atzeni M, Guerra M, Bucher S, Politi C, Deidda M, Atzori F, Dessi M, Madeddu C, Lay G (2013) Treatment of irradiated expanders: protective lipofilling allows immediate prosthetic breast reconstruction in the setting of postoperative radiotherapy. Aesthetic Plast Surg 37(6):1146–1152. https://doi.org/10.1007/s00266-013-0221-2 (Epub 2013 Oct 10 PMID: 24114295)

10. Groen JW, Negenborn VL, Twisk DJWR, Rizopoulos D, Ket JCF, Smit JM, Mullender MG (2016) Autologous fat grafting in onco-plastic breast reconstruction: a systematic review on oncological and radiological safety, complications, volume retention and patient/surgeon satisfaction. J Plast Reconstr Aesthet Surg 69(6):742–764. https://doi.org/10.1016/j.bjps.2016.03.019 (Epub 2016 Mar 29 PMID: 27085611)

11. Manconi A, De Lorenzi F, Chahuan B, Berrino V, Berrino P, Zucca-Matthes G, Petit YJ, Rietjens M (2017) Total breast reconstruction with fat grafting after internal expansion and expander removal. Ann Plast Surg 78(4):392–396. https://doi.org/10.1097/SAP.0000000000000833 (PMID: 27387466)

12. Phuc Van Pham. Pancreas, kidney and skin regeneration. Springer Edition, Chapter 12, p 285

13. Constantin A, Dumitrescu M, Mihai Corotchi MC, Jianu D, Simionescu M (2017) CO₂ laser increases the regenerative capacity of human adipose-derived stem cells by a mechanism involving the redox state and enhanced secretion of pro-angiogenic molecules. Lasers Med Sci 32(1):117–127. https://doi.org/10.1007/s10103-016-2093-6 (Epub 2016 Oct 20 PMID: 27761667)

14. Hivernaud V, Lefourn B, Guicheux J, Weiss P, Festy F, Girard AC, Roche R (2015) Autologous fat grafting in the breast: critical points and technique improvements. Aesthetic Plast Surg 39(4):547–561. https://doi.org/10.1007/s00266-015-0503-y (Epub 2015 Jun 18 PMID: 26085223)

Publisher’s Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.