Peer Review File

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Reviewer A

I congratulate the authors for the manuscript. Although general, it gives a clear, well-written overview to all breast surgeons of the excellent possibilities of microsurgical breast reconstruction. Just for instructional purposes, I would revise/remove/replace figs 3 and 4 because the case might mislead the unexperienced reader about the proper use of ADM in breast reconstruction.

Reply: Thank you for your thoughtful review of our manuscript. Figures 3 and 4 demonstrate our unique practice of ADM use. Figure 4 demonstrates a novel technique that we believe can expand the use of ADM – using it for minor augmentation. We have described and referenced this HyPAD technique later in the manuscript.

Reviewer B

Congratulations to the authors on this review. Reading was certainly enjoyed. However, minimal corrections and additions should be made to this valuable manuscript as proposed below.

1. Line 87: Especially pectus excavatum deformity might lead to difficulties as it creates breast asymmetry and mamilla strabism, to be found in Wachter et al. Arch Plast Surg. 2020 for example. Correction at the time point of breast reconstruction might not be the usual approach but can be considered if the reconstruction is secondary. However, such deformities must never be denied when seeking the goal of adequate cosmetic results!
Reply: We have addressed these chest wall deformities in line 87-88 and cited the article by Wachter et al as a reference to the severe breast asymmetry that they may cause.
2. Line 105 - this phenomenon might partially be explained by the numbness experienced in the flap tissue of course, and is sometimes seen in breast reduction patients as well after damage to the cuteneus brachii medialis nerve.
Reply: Thank you for this interesting comment.
3. Line 128 - in the TUG/TMG flap, folding the tissue like a fortune cookie will lead to success. See Pülzl et al. or Wechselberger et al. for reference. We use this technique also in smaller DIEP flaps (you mention this shortly in line 225)
Reply: Thank you – we have added a line regarding designing specific flaps to allow for folding upon itself (ie TUG flap) in this section.
4. Line 162 - autologous fat grafting is missing completely, as addition to flaps for secondary boost in volume (see Russe et al. about fat grafting after TMG flap) or hybrid with implant.
Reply: We have addressed autologous fat grafting in the secondary revision section.
5. line 182 - see Tasch et al. 2022 PRS GO for further data and reference on irradiated tissue

Reply: Thank you for this reference – this study by Tasch et al specifically discusses the effect radiation has on partial vs total free flap failure and not necessarily on the effects it has on the skin envelope.

6. Line 250-255 oncologic feasibility seems a concern here. This should be noted/discussed shortly. Think "life before limb" slightly altered for "treat cancer before aesthetics".

We have addressed this point with the following:

Reply: "For the appropriately selected patient, nipple sparing mastectomy (NSM) is oncologically safe and can provide an exceptional aesthetic result. The indications for NSM have expanded over the years, with inflammatory breast cancer and malignancy involving the nipple being the only absolute contraindications, making it safe for both breast cancer patients and those with genetic mutations seeking prophylactic mastectomy."

Reviewer C

This paper summarizes the authors' experience on DIEP-flap and aesthetic improvement of the donor area and the breast

1. introduction: please clarify the numbers of breast reconstruction. US? Europe globally....

Reply: We have clarified this point by mentioning this statistic is from the US

2. I prefer the immediate adjustment of the skin envelope. the free nipple graft should be discussed too

Reply: Free NAC grafting with immediate reconstruction has now been discussed in section titled "**Skin Envelope and Nipple-Areolar Complex (NAC) Position".** While this is not the preferred method of NAC repositioning in our practice we recognize the value of the NAC graft in certain cases.

3. to my understanding Holmström was the first to perform a free TRAM flap: Holmström H. The free abdominoplasty flap and its use in breast reconstruction. An experimental study and clinical case report. Scand J Plast Reconstr Surg. 1979;13(3):423-27. doi: 10.3109/02844317909013092. please cite

Reply: Thank you for this comment – Dr. Hartrampf popularized the pedicled or rotational TRAM flap for breast reconstruction which is what we mentioned here. Dr. Grotting then went on to routinely practice the use of the free TRAM flap. We have now included the citation for the Hartrampf article.

4. please give us mor information on the long-time results of the ADM augmentation, also with regard to volume stability and cancer follow up/imaging.

Reply: We have added additional commentary on the HyPAD method.

5. please discuss AFG vs. ADM vs implant augmentation

Reviewer D

The authors provide an excellent and educational review of aesthetic principles in microsurgical breast reconstruction as well as important techniques to optimize aesthetics in these procedures. Minor revisions as suggested by reviewers such as the addition of a discussion on free NAC grafting with immediate reconstruction will help make the paper even more comprehensive.

Reply: Free NAC grafting with immediate reconstruction has now been discussed in section titled "**Skin Envelope and Nipple-Areolar Complex (NAC) Position"**