

## Peer Review File

Article information: <http://dx.doi.org/10.21037/abs-20-71>)

### **Reviewer #1**

The authors present a well-written thorough review of the impact of radiation on breast reconstruction touching upon the available data both for autologous and prosthetic based reconstruction. They also provide some of their own experience, insight and recommendations regarding reconstruction in the setting of prior radiation.

Overall, this is a well written manuscript and addresses many concerns regarding reconstruction. It also highlights many controversial issues and the need for further research to guide the reconstructive surgeon in breast reconstruction.

Can the authors address a few points for the readership of the journal?

**Comment 1:** Perhaps the authors can distinguish briefly between a pedicle flap and free flap and whether they have a preference for one or the other based on their experience? Is a free flap recommended unless there are no donor sites available? Would the authors consider a hybrid approach where an implant is placed under a free flap?

**Reply 1:** We added a paragraph discussing the difference between pedicled and free flaps. In general, our first choice is a free flap. We do not prefer the hybrid approach and believe it to be counterproductive in the setting of PMRT

**Comment 2:** The authors' algorithm always uses a pedicle flap with an implant. This is a pedicle latissimus dorsi flap correct? Would the authors always recommend a skin paddle with the latissimus dorsi flap or would the authors consider a muscle only latissimus flap? Can the authors comment briefly on the use of the robotic harvest for a muscle only latissimus flap?

**Reply 2:** Yes, a pedicled latissimus flap is always added to the reconstruction if the patient opts for an implant-based reconstruction. If a tissue expander was placed before and we do not need a skin paddle then we attempt a robotic muscle only latissimus flap. If the skin is insufficient, then a pedicled latissimus with a skin paddle is required.

**Comment 3:** Would the authors recommend radiating a free flap? studies have demonstrated that there is no difference in a DIEP or TRAM flap in terms of protective benefits from radiation. However, the generally consensus is that this should be avoided. Does the type of radiation have an impact on fat necrosis rates? In some institutions, the internal mammary chain is targeted with radiation which can injure the pedicle to the free flap.

**Reply 3:** We prefer not to irradiate free flaps. Radiating flaps has been proven to have a higher rate of fat necrosis and shrinkage in flap size, decreasing patient satisfaction

and compromising the cosmetic outcome.

**Comment 4:** How long do the authors wait before proceeding with reconstruction following radiation? For implant and for autologous? Peled et al. recommended 6 months for prosthesis based, but while the Bauman study demonstrate lowest risks at 12 months, the risks at 6 months were also significantly lower than at 3 months for autologous free flap reconstruction.

**Reply 4:** This was mentioned in the submission. In general, for implants we prefer to wait 6 months after radiation therapy. With autologous reconstruction we prefer to wait 9 months.

**Comment 5:** For autologous fat grafting, is there a limit to the volume that can be injected in a single setting? Studies have demonstrated increased complications with higher volumes which is likely the case or potentially even worse in the setting of prior radiation.

**Reply 5:** We added a study that addresses this issue. Yes indeed the higher the volume of fat injected the more complications happen. A balance is needed because the less volume injected per session, the higher number of procedures is required to achieve the final reconstruction.

**Comment 6:** There are some minor grammatical errors that should be corrected.

### **Reviewer #2**

The authors submit a review article on the subject of radiation therapy and breast reconstruction, including both prosthetic and autologous techniques. This is certainly a vast topic, and the authors have done a nice job summarizing the considerations and literature on this topic.

**Comment 1:** My primary suggestion would be to elaborate on the advantages and disadvantages of performing implant exchange before radiation therapy versus after radiation therapy, in relation to relative capsular contracture and reconstructive failure rates. Also, it would be helpful to also include the timing considerations for these two different approaches (i.e., exchange before radiation therapy is most feasible in patients undergoing adjuvant chemotherapy where you can expand during chemotherapy, and is typically done approximately 4 weeks after chemotherapy ends and 4 weeks before radiation therapy starts).

**Reply 1:** This was discussed in the prosthetic reconstruction section. Specifically comparing radiating the tissue expander versus radiating the implant. We further discussed this and added the part about expansion during chemotherapy