

Peer Review File

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Reviewer A

Comment 1: This is a very good manuscript in terms of the originality. The technique is appropriately described and novel. The authors describe a new technique of BOTH surgical delay and supercharging. HOWEVER, the authors use a 4 day delay period, which is completely insufficient to achieve a permanent delay phenomenon in the flap, and thus the benefit is not able to be used as a measure of flap success as it will be completely reversed in the postop period, and any benefit in flap survival will be purely due to intrinsic vascular stabilisation as in any flap, or the supercharging. As such the results cannot be said to be due to the actual technique itself! This is disappointing!

Response: Thank you for your comment. A previous study showed that after flap elevation, flap vascularity can be particularly enhanced from postoperative three days to five days as the abundant neo-vascularization and dilation of choke vessels are promoted (17). Furthermore, a recent report showed that flap vascularity was poor just after elevation; however, it had improved circulation over time and was much more strengthened compared to its strength just after elevation, even on postoperative day 1 (18). Additionally, in clinical experiences, flap congestion at postoperatively one day can improve at postoperative four days. Therefore, flap delaying for four days is possible to contribute to enhance flap vascularity, and this was applied in our study. Subsequent DIEAV dissection during flap transfer may be difficult due to scarring if the delaying period in our technique is more than 7 days, which is similar to what we experienced in another similar delayed DIEP flap case with a seven-day delay. Accordingly, we revised the manuscript to add the aforementioned information for clarity in page 11, lines 4-9.

Actually, flaps in zones I–III and in half of zone IV for Case 2 and in zones I–III for Cases 1 and 3 with cesarean scars, all survived without fat-hardening and fatlysis; these results may not be achieved with conventional pedicled TRAM flap transfer with ipsilateral DIEAV supercharging; flaps in zones I–III for Case 2 and zones I–II and cranial zone III for Cases 1 and 3 may be operated on to make them survive as much as possible, yet operation on half of zone IV for Case 2 and caudal zone II for

Cases 1 and 3 may cause fat necrosis, fat-hardening, and fatlysis. (Please refer to page 8, lines 16-21)

Furthermore, in all three cases, the DIEV diameter during flap transfer using our technique was smaller than that during conventional supercharged pedicled TRAM flap transfer. Consequently, this suggests that the delay method may increase superior epigastric vein drainage. (Please refer to page 10, lines 4-8)

We applied our technique to only three cases; therefore, our results cannot be generally applied. According to your comment, we added a statement in the limitation section on the necessity of performing a study on the effectiveness of the short delaying period including a larger number of patients. (Please refer to page 12, lines 3-6)

Reviewer B

Comment 1: The authors clearly have the ability to perform microsurgery. It is unclear why they are not just doing a delay of a DIEP flap or free msTRAM or free TRAM flap.

Response: Thank you for the comment. We developed the technique in this study with the consideration that all patients would not like to undergo an operation that includes the possibility of total or heavily partial flap necrosis due to anastomosed vessel obstruction. We have accordingly revised the manuscript for clarity in page 11, lines 19-21.

Comment 2: This is a small series with little data showing the usefulness of the delay. There is limited discussion on the risks of pTRAM flaps, mainly abdominal weakness, bulge or hernia.

Response: Actually, flaps in zones I–III and in half of zone IV for Case 2 and in zones I–III for Cases 1 and 3 with cesarean scars, all survived without fat-hardening and fatlysis; these results may not be achieved with conventional pedicled TRAM flap transfer with ipsilateral DIEAV supercharging; flaps in zones I–III for Case 2 and zones I–II and cranial zone III for Cases 1 and 3 may be operated on to make them survive as much as possible, yet operation on half of zone IV for Case 2 and caudal zone II for Cases 1 and 3 may cause fat necrosis, fat-hardening, and fatlysis. (Please refer to page 8, lines 16-21)

Furthermore, in all three cases, the DIEV diameter during flap transfer using our technique was smaller than that during conventional supercharged pedicled TRAM flap transfer. Consequently, this suggests that the delay method may increase superior epigastric vein drainage. (Please refer to page 10, lines 4-8)

We applied our technique to only three cases; therefore, our results cannot be generally applied. According to your comment, we added a statement in the limitation section on the necessity of performing a study on the effectiveness of the short delaying period including a larger number of patients using objective method of examination effectiveness; additionally, we added statement on the risks of pedicled TRAM flaps, mainly abdominal weakness, bulge, or hernia. (Please refer to page 11, line 22-page 12, line 2 and page 12, lines 3-6)

Reviewer C

To perform the delay procedure or supercharge to augment the tissue perfusion of pedicled TRAM flap for breast reconstruction have been well established. Only one method added is good enough for a successful breast reconstruction with pedicled TRAM flap. The author performed partial flap elevation for a delay procedure at first than performed supercharge operation 2 weeks later and transplanted the flap to reconstruct breast defect.

Comment 1: It seemed too complicated and is not necessary. It also required a longer time and costly for this reconstruction.

Response: Thank you for the comment. In our cases, flaps in zones I–III and in half of zone IV for Case 2, and zones I–III for Cases 1 and 3 with cesarean scars were required and all flaps survived without fat-hardening and fatlysis. Surgical delay enhances the pedicled TRAM flap’s vascularity to dilate the choked vessels of zones I–II and zones I–III; however, achieving complete flap survival in zones I–III remains difficult (1-8). Supercharging of the ipsilateral DIEAV can provide a large vascular territory of this flap involving zones I–III in many cases; however, even with this technique, partial flap necrosis of zone II in cases with cesarean scars and flap necrosis of zone IV may occur (11,12). (Please refer to page 8, lines 16-21).

Therefore, we supposed that pedicled TRAM flap with only one additional method may not be enough; subsequently, we developed the technique in this study with the consideration that all patients would not like to undergo an operation that includes the

possibility of total or heavily partial flap necrosis due to anastomosed vessel obstruction. (Please refer to page 11, lines 19-21)

The operative time was approximately two hours for the first operation and approximately five hours for the second operation, on average. In our institution, breast reconstruction by a conventional pedicled TRAM flap with supercharging required about seven hours on average; therefore, we believe that each operation is not time-consuming. Costs should be considered; however, two-stage surgery may be performed if some benefits to patients and surgeons are expected. Accordingly, we revised the manuscript to add a statement on costs. (Please refer to page 11, line 15)

Comment 2: If the author consider that this couple operations is super to others, they should present objective data such as Duplex sonography or ICG scanning that tissue perfusion or blood flow are better enhanced than other operations. There was no such data and only three cases were reported.

Response: In all cases, all marginal flap bleeding was good (please refer to page 6, line 2, page 7, line 9, page 8, line 5) , and we have accordingly confirmed that ICG angiography is not required. Actually, there was no flap necrosis, infection, fat-hardening, and fatlysis after elevation and transfer. (please refer to page 6, lines 2-4, page 7, lines 9-11, page 8, lines 5-7) Duplex sonography was usually used for perforator detection and the planning of flap design and elevation. Predicting the flap survival area was usually evaluated by ICG angiography or, in some institutions, intraoperative ex vivo angiography.

We applied our technique to only three cases; therefore, our results cannot be generally applied and should be reinforced by many cases and objective data. According to your comment, we revised the limitation section of the manuscript. (Please refer to page 12, lines 3-6)

Comment 3: The value of BMI were low (25, 26, 18) and these patients were not obese. The zone number of TRAM flap are Zone I, II, III and IV not 1, 2, 3 and 4.

Response: I also think that the patients in this study were not obese. Their unaffected breasts had comparatively high projection and were ptotic, even though they were not obese. We set flaps vertically; therefore, abdominal flaps that were longer horizontally were required. According to your comment, we numbered the zones using roman numbers throughout the manuscript.

Comment 4: More objective data and clinic experience of cases are required to convince the readers that this couple operation is an acceptable operation for breast reconstruction with pedicled TRAM flap.

Response: We applied our technique to only three cases; therefore, our results cannot be generally applied and should be reinforced by many cases and objective data. According to your comment, we revised the limitation section of the manuscript. (Please refer to page 12, lines 3-6)

Reviewer D

Comment 1: What is the anesthesia method for the first surgery?

Response: Thank you for the comment. All surgeries were performed under general anesthesia. We have accordingly revised the manuscript in page 5, lines 2-3, page 6, lines 9-10, page 7, lines 16-17.

Comment 2: Is supercharging with DIEAV an option? Or is it always mandatory? If it is always performed, wouldn't it be sufficient to do uni-pedicle free TRAM flap after the delay procedure?

Response: In breast reconstruction using a pedicled TRAM flap, we usually also performed supercharging as much as possible because partial flap necrosis often occurs when only the pedicled TRAM flap is used. (Please refer to page 8, lines 13-16, 18-19)

We developed the technique in this study with the consideration that all patients would not like to undergo an operation that includes the possibility of total or heavily partial flap necrosis due to anastomosed vessel obstruction. (Please refer to page 11, lines 19-21)

Actually, flaps in zones I–III and in half of zone IV for Case 2 and in zones I–III for Cases 1 and 3 with cesarean scars, all survived without fat-hardening and fatlysis; these results may not be achieved with conventional pedicled TRAM flap transfer with ipsilateral DIEAV supercharging ; flaps in zones I–III for Case 2 and zones I–II and cranial zone III for Cases 1 and 3 may be operated on to make them survive as much as possible, yet operation on half of zone IV for Case 2 and caudal zone II for Cases 1 and 3 may cause fat necrosis, fat-hardening, and fatlysis. (Please refer to page 8, lines 16-21)

We applied our technique to only three cases; therefore, our results cannot be generally applied and should be reinforced by many cases and objective data. According to your comment, we revised the limitation section of the manuscript. (Please refer to page 12, lines 3-6)

Reviewer E

The authors are to be credited for their technique of vascular augmentation of the pedicled TRAM. They delay the skin paddle with perimeter incisions, but unlike the usual practice, they leave the DIEA&V intact. During transfer, they anastomize the DIEA&V to the contralateral internal thoracic A&V to augment blood supply.

My comments are as follows:

Comment 1: The procedure creates a dual pedicle for zone I. If we consider the DIEA&V as the dominant pedicle, then the ultimate vascular pattern approximates of a free TRAM flap. So why not do a free TRAM flap?

Response: Thank you for the comment. In patients in this study, flaps in zones I–III and in half of zone IV for Case 2, and zones I–III for Cases 1 and 3 with cesarean scars, were required and all flaps survived without fat-hardening and fatlysis, and these results may not be achieved with a free TRAM flap as you described and conventional pedicled TRAM flap transfer method with ipsilateral DIEAV supercharging; flaps in zones I–III for Case 2 and zones I–II and cranial zone III for Cases 1 and 3 may be operated on to make them survive as much as possible, yet operation on half of zone IV for Case 2 and caudal zone II for Cases 1 and 3 may cause fat necrosis, fat-hardening, and fatlysis.

(Please refer to page 8, lines 16-21)

We developed the technique in this study with the consideration that all patients would not like to undergo an operation that includes the possibility of total or heavily partial flap necrosis due to anastomosed vessel obstruction.

(Please refer to page 11, lines 19-21)

We applied our technique to only three cases; therefore, our results cannot be generally applied and should be reinforced by many cases and objective data. According to your comment, we revised the limitation section of the manuscript. (Please refer to page 12, lines 3-6)

Comment 2: The description of the technique is unclear and may be clarified by the illustration. Use of second illustration to show the transposed flap and the vascular hook-ups would be useful.

Response: According to the comment, we modified Figure 1E and its legends.