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DISCUSSION

Discussion: A Novel Framework for Optimizing Efficiency and Education in Microsurgical Breast Reconstruction

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We had the pleasure of reading this study on a framework for training of the deep inferior epigastric perforator (DIEP) flap procedure, where the authors show optimized efficiency and education at each stage of the procedure.[1] Because not all plastic and reconstructive surgery (PRS) trainees have the chance to be trained at a center with a high volume of autologous free tissue transfer for breast reconstruction or with established microsurgery fellowship programs, many residents may go through their training without sufficient exposure to the fundamentals of microsurgical reconstruction.[2] The intricate steps of the DIEP flap surgery involve a great deal of technical finesse, especially regarding the delicate harvesting of perforators and performing the microsurgical anastomosis of the free flap's vasculature. Thus, there is a significant learning curve that primarily improves with experience.[3]

There has been increasing consensus among members within PRS for the need to develop standardized microsurgery fellowship training.[2] Although microsurgery has been practiced since the 1980s, and the DIEP flap first described in 1989, there remains no established microsurgery curriculum or agreed upon method for training of this procedure.[4,5] For surgical fellowships that may include microsurgery training, there may be variation in caseload, diversity, and resources.[5] Surveys of plastic surgery residents and fellowship directors have shown that there is a perceived low number of attending microsurgeons and too many residents, which, when combined, result in decrease in access to resident training for microsurgery, with the DIEP flap being the primary microsurgical procedure in PRS.[5]

In their study, Lester et al[1] describe their educational model for performing DIEP flap reconstruction in an academic plastic surgery program that lacks a formal microsurgical fellowship. The model consisted of two parts: (1) a session on fundamentals of microsurgery (FMS) skills and (2) an operative setup composed of either one or two attendings and one or two residents (senior, defined as PGY4/5 and chief, defined as PGY6/7) receiving training. The resident must complete the FMS session before being able to participate in the surgical case. The operative setup varies depending on laterality of the microsurgical breast case. The roles and steps to be performed by each individual are described. The authors explain that their framework of working in parallel and with clear assignment of roles and operative steps beforehand improves efficiency without undermining teaching quality. The concept is intuitively understandable and clearly explained.

Although the authors outlined their technique for the DIEP procedure in fair detail, there may be opportunity for the reader to understand that specific setups may be developed in different centers. For example, understanding whether their model was based on past experience, adopted from a similar surgical setup in PRS, or adopted from another surgical specialty would be relevant context for the audience. If the protocol was created based on the attending surgeons' experience, other methodologies that were tried but found to be less efficient would be important to understand. Other points of data for this study would have been an analysis of DIEP operative time, complication rates, and resident confidence for trainees pre- and postexposure to the proposed educational model. Lastly, this article does not seem to include involvement from junior PRS residents, so it is unclear whether their framework is as efficient and educational when involving those with less microsurgical training. However, despite these findings, there are several important takeaways.

With how successful free flap transfers have become, the emphasis in microvascular breast reconstruction is moving away from flap success to reducing complications and optimizing aesthetic outcome and intraoperative efficiency. Surgical times also differ vastly across surgical teams. For example, total perforator harvesting and microvascular anastomosis times in the literature were highest for the supervised chief and lowest for faculty surgeons, with the resident and faculty combination in between.[6] General disparities in operative times underscore the critical need for streamlined workflows and comprehensive training methodologies, as exemplified by the educational model proposed by Lester et al. Their framework also fosters operational efficiency and patient safety. Indeed, in the context of contemporary microvascular breast reconstruction, where the focus extends beyond mere technical proficiency to encompass holistic patient care and procedural optimization, such educational interventions play a pivotal role in shaping the future of a center's surgical practice.

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We congratulate Lester et al on their timely study. The efficiency and educational benefits of the framework described by Lester et al go alongside the growing number of simulation and training models being developed for microsurgery training across various disciplines. In 2019, there were nearly 50 published studies on training models for microsurgery.[7] Models have included bench models (eg, rubber glove, practice cardboard), cadaveric and live animals, virtual reality, and training programs. With growing numbers of simulation options, more skills sessions from other disciplines could be incorporated into plastic surgery residents' microsurgery training, especially for programs without a formal microsurgery fellowship. It is suggested that bench models be used as initial training, followed by cadaveric models, followed by case experience. More evidence may be needed in the future to study the effect of microsurgical simulation training and educational frameworks on decreasing complication rates in DIEP procedures and increasing efficiency in operative time.

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