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Acute Nasal Reconstruction With Forehead Flap After Dog Bite: Reply

To the Editor:

We appreciate the comments made by Dr Shipkov and colleagues with regard to our recent article “Acute nasal reconstruction with forehead flap after dog bite.”¹ We also thank them for bringing to our attention other citations of mammalian bite injuries to the head and neck,² and we congratulate them on their recent, large review of their experience in pediatric bite injuries.³

As our colleagues note, most of bite injuries to the head and neck can be immediately and safely closed primarily. Because of the robust vascularity of the face, infection is not frequently encountered.³ The indications for flap closure in these particular injuries—and specifically of forehead flap closure of nasal defects—reflect more general algorithms for nasal reconstruction. These are defined by the size and type of tissue loss, as they have explained in their letter. We agree with them that immediate flap reconstruction, when indicated, offers the advantages of decreased fibrosis and decreased psychological impact of the injury.

Because bite injuries to the nose requiring forehead flap reconstruction are relatively and fortunately rare, our understanding and treatment methods are slow to change and mature. As we noted in our conclusion, immediate cartilage grafting for structural support would likely have decreased the resultant nasal stenosis noted in our cases.¹ Such cartilage grafting would have required a more intensive operation, as the nasal lining would require its own blood supply, possibly with mucoperichondrial flaps or extended forehead flaps that wrap a cartilage graft between a thinned flap folded on itself. However, we are hesitant to explicitly dissuade other colleagues from attempting immediate cartilage grafting, as it would theoretically provide a more anatomical, trilaminar reconstruction, and it may lead to better, long-term results. We hope to encounter reports of these reconstructions in the future.

Again, we thank our colleagues for their interest in our article and for their contributions to understanding the management of these challenging cases.

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Fat Graft Survival Physics Matters: Invited Commentary to “The Impact of Liposuction Cannula Size on Adipocyte Viability”

Clinical interest in autologous fat grafting is widespread and growing, but consensus regarding best practices remains absent. As with many emerging techniques, prospective randomized trials have yet to be reported. Furthermore, preclinical studies of autologous fat grafting have been of variable quality, with inconsistent outcomes assessments and a wide range of results. A recent review of the literature failed to identify any clearly beneficial techniques for any aspect of fat grafting procedures.¹ As a field, we need to do better.

Fortunately, new data reported in the past year have begun to clarify the impact of liposuction cannula size and associated shear stress on adipocyte viability. Our group has identified a negative impact on cell viability with a smaller liposuction cannula² as well as with increased shear stress.³ Tambasco, Arena, et al⁴ add to these findings with their study of cannula size and adipocyte histology. Their protocol was straightforward, involving syringe aspiration of human adipose tissue with a 3-mm or 5-mm liposuction cannula. Other equipment, donor site, and aspiration technique were standardized. Aspirated tissue was fixed and examined by light microscopy, revealing a 25% higher rate of adipocyte rupture in the tissue collected with the smaller cannula.

Tambasco’s study⁴ is limited in its scope. It was performed in vitro, with a single indirect measure of cell viability (appearance on histology) as its outcome measure. Clearly, in vivo outcome measures would be more useful. Analysis of adipocytes by histology can be confounded by cell fracture during routine processing, by cross-sectional sampling error due to the relatively large size of the cells, and by imperfect sensitivity and specificity for terminal cell damage. In any case, the significance of ruptured adipocytes

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immediately after aspiration is unclear. Many commonly used clinical techniques would remove damaged cells such as these before tissue transfer. Analysis after fat injection, instead of just after aspiration, would be illuminating.

That said, Tambasco et al add to our understanding of adipose handling with their clear and eloquent discussion of the physics that underlie fat transfer. To summarize, their group notes that as cannula size decreases, liposuction flow speed and shear stress must increase, and that turbulent flow becomes more likely. This combination of factors can be expected to have a deleterious effect on adipose tissue in transit. Tambasco’s experimental findings do align well with this expected outcome. Their observations complement the data from our own group, as well as that from Erdim et al⁵ and Ozsoy et al,⁶ all of which suggest that minimization of shear stress on liposuction, in part by use of larger aspiration cannulae, can improve fat graft viability.

As we move toward a better understanding of liposuction techniques, physical forces, and cell survival, additional variables will need to be considered. From a holistic viewpoint, adipocytes must remain viable not only at the point of aspiration but through subsequent injection and engraftment as well. In the future, this may be modulated not only by optimization of equipment and technique but also by treatment with protective agents, methods for enhancing revascularization, and manipulation of the interaction between adipocytes and stromal cells. Although many questions remain, the Tambasco group has added to the discussion with their data as well as their thoughtful articulation of core principles. We look forward to additional discussion as interest and research in fat grafting continue to expand.

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