Authors have nothing to disclose with regard to commercial support.

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MITRAL VALVE REPAIR WITH RESECTION VERSUS NEOCHORDAE: A CALL FOR HIGH- QUALITY EVIDENCE Reply to the Editor:

We thank Tomšič and colleagues for their comments on our article¹ and agree with their assessment of our study. Specifically, we acknowledge the paucity of comparative data in the literature between leaflet resection and chordal replacement mitral repair techniques, and we emphasize that our study should be regarded as hypothesis generating.

A systematic review and meta-analysis can be a useful tool in evidence-based medicine, and a crude search on PubMed for the terms “meta-analysis” and “cardiac surgery” by year illustrates the exponential increase in use of this tool to offer insights in our field (Figure 1). The systematic review itself is helpful to compile the known literature of articles that aim to address a specific question. Meta-analysis of data from multiple studies allows the calculation of point estimates from a pooled analysis, which can be more precise than the individual studies. Meta-analysis can also be a blunt tool, however, with the potential to introduce bias, and the results must be interpreted with caution.² For a meta-analysis to be meaningful, the studies should be sufficiently homogeneous with respect to subjects, interventions, and outcome measures.

With respect to subjects, we chose to include studies of patients undergoing isolated posterior leaflet prolapse, the most common mechanism of mitral insufficiency. As Dr. Tomšič and colleagues point out, we could not distinguish between possible etiologies of mitral regurgitation—

FIGURE 1. Publications by year in PubMed with search terms of “meta-analysis” and “cardiac surgery.” Asterisk indicates that 2017 includes publications from January through August only.

fibroelastic deficiency versus myxomatous disease—which are often addressed with different repair techniques. Although there were some differences in baseline characteristics between the neochordae and resection groups in the observational studies, however, the groups were comparable with respect to age. This is important, because patients with myxomatous disease typically present at a younger age than those with fibroelastic deficiency. The single propensity-matched study included in this meta-analysis did not match according to leaflet pathology, but it did show similar patient baseline characteristics. Finally, in the only prospective randomized trial included in this meta-analysis, all subjects were deemed amenable to repair with either technique before randomization.

With respect to interventions, we agree that there is much art to the mitral repair with both techniques, including the amount of leaflet to resect, the length and number of neochordae, and choice and size of ring. As Tomšič and colleagues highlight in their central illustration, a successful mitral valve repair depends on the surgeon’s ability to recognize the etiology of mitral disease, the lesions that result from the disease, and the leaflet dysfunction produced by these lesions. The mitral surgeon must then apply the appropriate repair techniques, tailored to the individual valve’s morphology and function. Such a tailored approach requires skill and experience. It is worth noting that most of the studies included in this meta-analysis were performed in high-volume, expert centers.

The initial inspiration for this study were reports by the Ottawa Heart Institute group demonstrating that patients with leaflet resection may be at risk for functional mitral stenosis.^{3,4} This refers to an elevated gradient across a repaired mitral valve with exercise or physiologic stress, resulting in functional limitation and possibly heart failure. This clinical entity is particularly relevant for young, active adults who can generate large transmitral

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valve gradients. In a pilot study, Chan and colleagues³ found that patients with mean intraoperative mitral trans-valvular gradients greater than 3 mm Hg were predominantly treated with a resection strategy, whereas patients with mean gradients of 3 mm Hg or less were predominantly treated with a leaflet preservation strategy. They then showed that patients who predominantly underwent leaflet resection had higher peak and mean mitral valve gradients at peak exercise than did patients who predominantly had a leaflet preservation strategy.⁴ Consistent with these findings, our meta-analysis showed that patients undergoing leaflet resection may have a smaller annuloplasty ring and lower ejection fraction than patients undergoing chordal replacement. Again, these data are not conclusive but suggest a possible association.

Because early mitral valve repair is now recommended for selected symptom-free patients with severe mitral regurgitation,⁵ the findings of functional mitral stenosis by Chan and colleagues^{3,4} are of increasing importance. Patients with severe asymptomatic mitral regurgitation are typically young adults who may want to pursue an active lifestyle after their operation.

One of the major findings of our systematic review is the lack of high-quality data in the surgical literature regarding mitral repair strategies. This is true of many aspects of valvular surgery, in which guidelines are primarily based on a lower level of evidence.⁵ Of the 43 recommendations pertaining to mitral valve disease in the 2014 American Heart Association and American College of Cardiology guideline for the management of patients with valvular heart disease, only 3 (7%) were deemed to have a level of evidence of A. In an effort to overcome this lack of high-quality data to inform cardiac surgical practice, the Cardiothoracic Surgical Trials Network (www.ctsurgery.net.org) was developed and has already made several seminal contributions with high-quality evidence for surgical decision making.^{6,7} Another such initiative is CardioLink, a platform for cardiac surgical clinical trials that is based at the Applied Health Research Center at St Michael's Hospital (<http://stmichaelshospitalresearch.ca/research-programs/cardiovascular-disease-diabetes-research-program/our-research/cardiolink/>). One of the CardioLink arms, the Canadian Mitral Research Alliance (CAMRA) randomized controlled trial (ClinicalTrials.gov number: [NCT02552771](https://clinicaltrials.gov/ct2/show/study/NCT02552771)), is directly addressing the question at hand: whether mitral valve leaflet preservation with chordal replacement leads to lower rates of functional mitral stenosis than does leaflet resection.⁸ This trial is

currently enrolling patients, and it is our hope that it will serve to add some science to the art of mitral valve repair.

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REVISITING POSTERIOR MITRAL LEAFLET PROLAPSE: RESECT, RESPECT, OR RESECT WITH RESPECT?

Reply to the Editor:

In this issue of the *Journal*, Tomšič and colleagues¹ from Leiden have published a letter under the title of “Respect Versus Resect—Two Different Repair Techniques or Two Different Tools in the Toolbox?” in response to the article, by Mazine and colleagues,² also published in the *Journal*, “Systematic Review and Meta-Analysis of Chordal Replacement Versus Leaflet Resection for Posterior Mitral Leaflet Prolapse.” In their letter, Tomšič and colleagues¹ state that both techniques in cause,