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eComment. Complex and novel versus simple and traditional approaches for sternal closure

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I congratulate Grabert and colleagues for presenting their experience with a novel sternal closure system [1]. Mechanical sternal stabilization devices (MSSD) have significantly developed in the last decade. Although many theoretical advantages have been proposed, the clinical results may be controversial [2]. The plates usually include large holes and the screws occupy significant space in the sternum, which may become a nidus for bacterial growth and invasion. Herein, I would like to emphasize some major advantages of the traditional wiring originally described by Robicsek *et al.* [3].

The longitudinal wires positioned along the sternum in the traditional technique aims to provide a landing zone for the crossover wires that will eventually approximate the sternal edges. The surgeon might simply reposition the wires over the sternum on both sides, which differs in MSSD, since locating the rigid plates and screws are almost always more challenging. This has a unique importance when the sternal blood supply is considered. In an outstanding paper, Berdajs and colleagues studied the sternal blood supply in cadavers [4]. They demonstrated that there are superficial and deep sternal perforating branches, organized as an arcade which is found more significantly at the first three intercostal spaces. Practically, this means that vigorous plate and screw positioning at the manubrium will eventually disrupt the sternal blood supply. Moreover, the sternal branches are located laterally at the sternal edge, which divide into anterior and posterior branches in the intercostal space, therefore the sternocostal junctions are relatively avascular. Under these circumstances, a freehand positioning of longitudinal wires passed in and out at the sternocostal junctions and the cross over wires laterally fixed to this landing zone will help to spare this arterial arcade. In cases when there is partial sternal tissue loss, our group also introduced the utilization of the fibula allografts in order to create an artificial landing zone for crossover wires, which, in fact, resembles the function and the manner of the long axis parasternal wires described by Robicsek *et al.* [3,5]. In my opinion, as long as the MSSD have large plates, screws and holes, infective complications related to the interruption of the sternal blood supply will always be a challenge for the surgeon when compared to the simple traditional wiring. As a result, the major disadvantages of the implantation of synthetic materials, such as excessive rigidity with the risk of erosion of the adjacent structures, risk of infection, risk of migration, insufficient strength, and impossibility of incorporation into the host tissue will challenge the surgeon in the clinical implementation of MSSD. More creative approaches with the utilization of the traditional techniques rather than the usage of foreign space occupying materials will cost effectively decrease the incidence of this untoward complication in cardiac surgery.

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