

#### **P04 STERNAL PLATE FIXATION FOR STERNAL WOUND RECONSTRUCTION**

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**INTRODUCTION:** Sternal instability associated with deep sternal infection is a serious complication after median sternotomy. Biomechanical studies have suggested the superiority of primary rigid plating over wire cerclage for sternal fixation. This study tests evaluates the strength of plating in a human cadaver model and tests the hypothesis that sternal closure stability is stronger with sternal plating even following wiring. The Synthes Locking Sternal Plate System (West Chester, USA) was selected for study, which can be fixed to bone and cartilage.

**METHODS:** Midline sternotomy was performed in 18 human cadavers. In nine cadavers initial sternal closure was achieved using six interrupted steel wires (size No.5), or cables and tested. New wires and a single plate (4 screws/side) at the sixth rib followed. Four sternal plates, one at the manubrium and at ribs 3 through 5 was the final group. Measurements were obtained after each closure technique. Intrathoracic pressure was continuously recorded as it increased in a standardized fashion using an inflatable rubber bladder placed beneath the anterior chest wall until failure, defined by 2.0 mm of separation. Sternal separation was measured at three levels of the sternum. Differences in pressures were analyzed using regression co-efficients, one-way repeated measures ANOVA and the Holm-Sidak test.

**RESULTS:** Intrathoracic pressure required to cause sternal separation of 2.0 mm was significantly improved with plate fixation using either single or multiple plates compared to either monofilament or multifilament wiring. Wire and cable fixation groups were similar and when combined and compared to plating were significantly weaker. Discussion: Improved structural strength of the sternal closure was seen in each specimen with either plating technique over wiring alone in this sequence of wiring followed by plating, designed to mimic the clinical event. Our clinical experience in dehiscence cases utilizing with plates has suggested that this form of plate fixation restores sternal stability reliably in this situation.

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