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### Comparison of bag-valve-mask hand-sealing techniques in a simulated model.

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**STUDY OBJECTIVE:** Bag-valve-mask ventilation remains an essential component of airway management. Rescuers continue to use both traditional 1- or 2-handed mask-face sealing techniques, as well as a newer modified 2-handed technique. We compare the efficacy of 1-handed, 2-handed, and modified 2-handed bag-valve-mask technique.

**METHODS:** In this prospective, crossover study, health care providers performed 1-handed, 2-handed, and modified 2-handed bag-valve-mask ventilation on a standardized ventilation model. Subjects performed each technique for 5 minutes, with 3 minutes' rest between techniques. The primary outcome was expired tidal volume, defined as percentage of total possible expired tidal volume during a 5-minute bout. A specialized inline monitor measured expired tidal volume. We compared 2-handed versus modified 2-handed and 2-handed versus 1-handed techniques.

**RESULTS:** We enrolled 52 subjects: 28 (54%) men, 32 (62%) with greater than or equal to 5 actual emergency bag-valve-mask situations. Median expired tidal volume percentage for 1-handed technique was 31% (95% confidence interval [CI] 17% to 51%); for 2-handed technique, 85% (95% CI 78% to 91%); and for modified 2-handed technique, 85% (95% CI 82% to 90%). Both 2-handed (median difference 47%; 95% CI 34% to 62%) and modified 2-handed technique (median difference 56%; 95% CI 29% to 65%) resulted in significantly higher median expired tidal volume percentages compared with 1-handed technique. The median expired tidal volume percentages between 2-handed and modified 2-handed techniques did not significantly differ from each other (median difference 0; 95% CI -2% to 2%).

**CONCLUSION:** In a simulated model, both 2-handed mask-face sealing techniques resulted in higher ventilatory tidal volumes than 1-handed technique. Tidal volumes from 2-handed and modified 2-handed techniques did not differ. Rescuers should perform bag-valve-mask ventilation with 2-handed techniques.