

A Novel Mandibular Advancement Bite Block Prevents Hypoxemia During Sedative Endoscopy

Presenting Author: Wei-Nung Teng, MD^{1,3}

Co-Authors: Chien-Kun Ting, MD, PhD¹; Ming-Chih Hou, MD²; Chun-Li Lin, PhD³, Huihua Chiang, PhD³, Mei-Yung Tsou, MD, PhD¹

¹Department of Anesthesiology, Taipei Veterans General Hospital, ²Department of Medicine, Taipei Veterans General Hospital, ³Department of Biomedical Engineering, National Yang-Ming University, Taipei, Taiwan

Introduction: During sedated endoscopic examinations, upper airway obstruction often occurred due to respiratory depression and airway collapse resulting in hypoxemia. Airway management with oxygenation, Larson maneuver, jaw thrust, or insertion of nasal airways by trained anesthetic personnel is required during upper airway obstruction emergencies. Mandibular advancement devices have been widely used to treat mild to moderate obstructive sleep apnea syndrome. A modified mandibular advancement bite block (Figure 1) that provides protrusion of mandible and inlet for upper gastrointestinal endoscopy could prevent airway obstruction during sedated upper gastrointestinal endoscopic examinations. Purpose of this study is to evaluate the efficacy of this novel mandibular advancement bite block for prevention of hypoxemia, decrease airway obstruction and decrease airway intervention events.

Methods: Patients eligible for enrollment were randomly assigned to standard bite block (0mm mandible advancement) or 6 mm mandibular advancement bite block groups. After anesthetic induction, upper gastrointestinal endoscopy was performed. Primary endpoint was area under curve of oxygen desaturation at 95% (AUCdesat) (Figure 2). Secondary endpoints were degree of upper airway obstruction and number of rescue events.

Results: 60 Patients were enrolled. AUCdesat was significantly lower for 6 mm advancement bite blocks vs standard bite block (18 ± 11.19 vs 176 ± 61.49 sec%, $p= 0.044$). The 6mm bite block also showed significant reduction in adverse events such as subclinical airway obstruction, severe airway obstruction requiring chin lift or jaw thrust, or hypoxemia ($p= 0.007$) (Figure 3). The incidence of adverse events was 70% in standard bite block group and 33% in the mandible advancement group.

Conclusion: The mandibular advancement bite block can decrease hypoxemia, provide smoother entry of endoscope, prevent airway obstruction during upper gastrointestinal examination under sedation and prevent adverse events.



Figure 1. A modified mandibular advancement bite block that provides protrusion of mandible and inlet for upper gastrointestinal endoscopy.

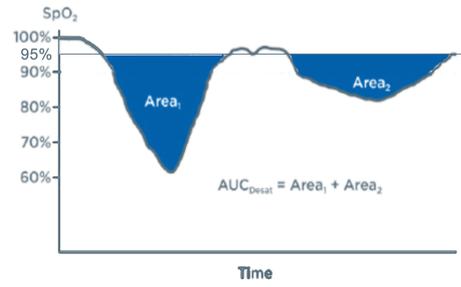


Figure 2. Area under curve of oxygen desaturation at 95%



Figure 3. Adverse events. Number of events during endoscopic examination.
 Nil: no apnea, obstruction or hypoxemia;
 Subclinical: apnea, obstruction or events requiring chin lift/ jaw thrust that did not result in hypoxemia;
 Severe: apnea, obstruction or events requiring chin lift/ jaw thrust that resulted in hypoxemia.