

INTRODUCTION

Maxillomandibular advancement (MMA) is currently regarded as the most effective surgical option for adults with obstructive sleep apnea (OSA). Younger age has been documented as a predictor of surgical success. The case report presents an older adult with reduction and instability of pharyngeal airway expansion following MMA for the treatment of severe OSA.

CASE REPORT

A non-obese 58-years-old male presented with a diagnosis of severe OSA after an overnight polysomnography. The apnea-hypopnea index (AHI) was 43.5 events per hour. The nadir oxygen saturation was 84%. The Mallampati score was class III. He was referred for surgical correction because of poor adherence to CPAP therapy. On clinical examination, he showed a convex facial type with mandibular retrognathism and steep mandibular plane. Intraorally, he had an end-on Class II molar relationship with 8 mm of overjet and 6 mm of overbite. The upper right and bilateral lower second molars were missing. Proclined upper and lower incisors were noted (Figure 1). The patient was also diagnosed with chronic periodontitis. Therefore, he was referred to periodontal treatment until the condition improved. MMA surgery with genioglossus advancement were performed to advance the skeletal framework, enlarge the pharyngeal space, and reduce pharyngeal collapsibility. He also had orthodontic treatment after the surgery.



Figure 1. Pre-treatment clinical evaluation, photos and radiographs.

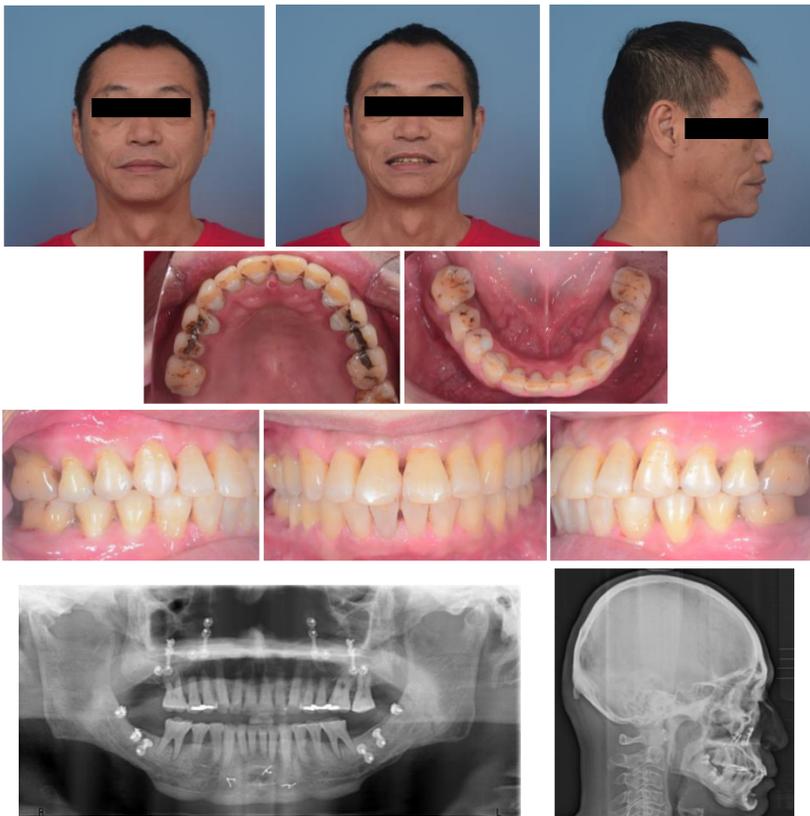


Figure 2. Post-treatment clinical evaluation, photos and radiographs at the debonding visit. The total treatment duration was 12 months.

TREATMENT RESULTS

After MMA surgery, the surgical outcomes showed that the maxilla and the mandible were advanced 3 mm and 18 mm respectively. The masticatory function was re-established by vertical elastics in posterior teeth. All teeth were in good alignment and inclination after orthodontic treatment. The total treatment duration was 12 months. Patient's occlusion finished in canine and molar class I relationship with normal overjet and overbite. Upper and lower incisor inclination was improved. Patient's facial profile was straight and chin-throat length was increased (Figure 2). For the pharyngeal airway space, the anteroposterior dimension rather than the lateral dimension was significantly enlarged (Figure 4). According to Invivo™ software, the total upper airway volume was increased from 18.6 cc to 26 cc after MMA surgery and gradually decreased to 18.9 cc within 12 months after MMA surgery. The minimum cross-sectional area (mCSA) of the velopharynx was also increased from 168.7 to 265 mm² after MMA surgery and reduced to 218.2 mm² at 12 months after MMA surgery (Figure 5,6). In follow-up PSG, the AHI was decreased to 24.8 events per hour. And the nadir oxygen saturation was reduced to 83%.

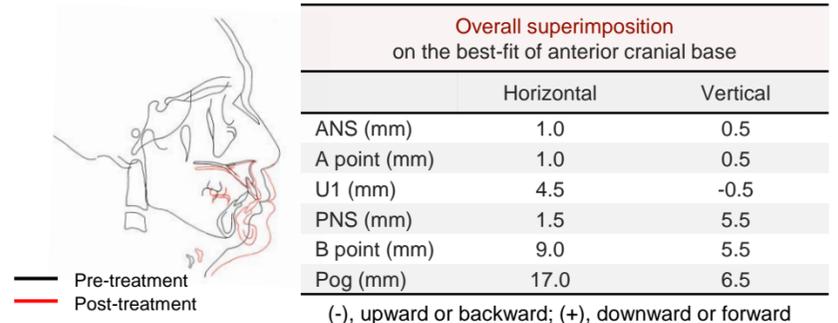


Figure 3. The overall superimposition by cephalometric tracing at debonding.

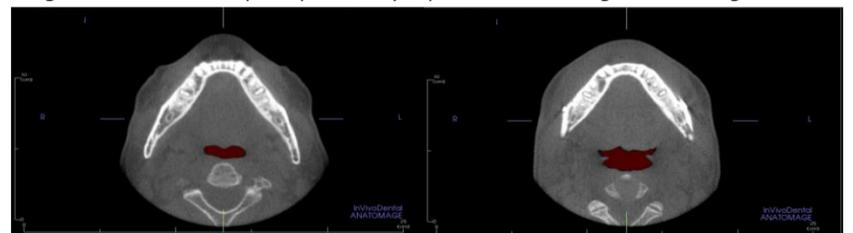


Figure 4. The cross-sectional area (CSA) of the velopharynx at post-surgery (1 month after MMA surgery) by Invivo™.

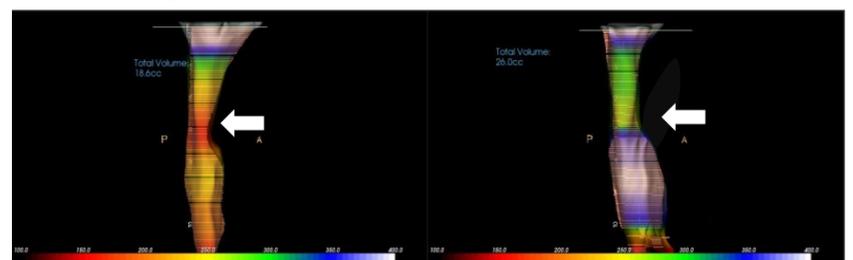


Figure 5. The minimum cross-sectional area (mCSA) of the velopharynx (white arrow) at pre-treatment (left) and post-surgery (right) by Invivo™.

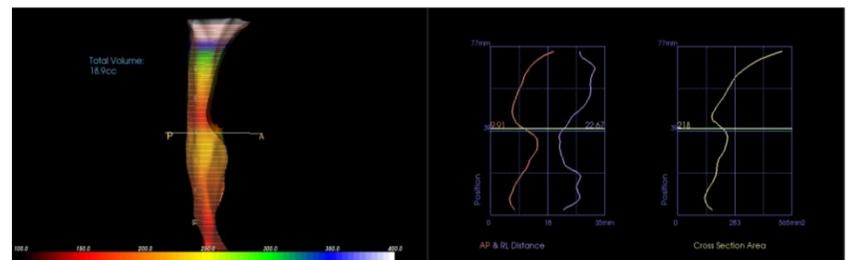


Figure 6. The minimum cross-sectional area (CSA) of the velopharynx at 12 months after MMA surgery by Invivo™.

DISCUSSION

For severe OSA in older adults, MMA surgery might not be the definite treatment for patients. When MMA is performed with incomplete remission, the patients are still eligible for further treatments of residual OSA. Positive airway pressure remains a safe option for the treatment of residual OSA in older patients following MMA.

CONCLUSION

MMA surgery is one of treatment modalities in order to reduce the severity of OSA and improve the pharyngeal airway of the patient by enlarging the skeletal framework and increasing muscle tone. However, hypotonic soft tissue in pharyngeal wall and less lateral pharyngeal expansion could be observed in patients with advanced age. Facing the possibility of incomplete remission after MMA, further treatment with other treatment modality should be considered in older adult patients.