

Supplementary Table 1 Clinical Effect Sizes for Upper Airway Obstruction Improvement Between Conventional OA and Advanced MAD Simulator

Site/Position	Complete or partial obstruction with OA (N₁)	Improvement with MAD (N₂, %)	Paired Odds Ratio (95% CI)
Velum			
Supine)	39	18 (46.2%)	37.00 (2.23–613.99)
Head rotation	32	17 (53.1%)	35.00 (2.10–582.03)
Epiglottis			
Supine	20	13 (65.0%)	5.40 (1.40–20.82)
Head rotation	18	17 (94.4%)	35.00 (2.10–582.03)
Oropharynx			
Supine	11	7 (63.6%)	15.00 (0.86–262.65)
Head rotation	13	8 (61.5%)	5.67 (1.00–32.14)

Tongue base			
Supine	12	12 (100%)	25.00 (1.48–422.26)
Head rotation	13	12 (92.3%)	8.33 (1.53–45.31)

Notes:

N₁ represents the total number of patients who exhibited partial or complete obstruction at the specified anatomical site while using the conventional OA. N₂ (%) indicates the number and percentage of these obstructed patients who demonstrated clinical improvement (defined as a shift from complete to partial or no obstruction, or from partial to no obstruction) after switching to the advanced MAD simulator. The paired Odds Ratios and 95% Confidence Intervals were calculated based on the discordant pairs of intervention responses. To account for zero cell frequencies in specific anatomical subgroups, the Haldane-Anscombe correction was applied by adding 0.5 to all cells in the contingency tables.

Abbreviations: CI, Confidence Interval; MAD, mandibular advancement device; OA, oral appliance.

Supplementary Table 2 Comparison of AHI and lowest oxygen saturation (SpO₂) across different positions and OA Interventions

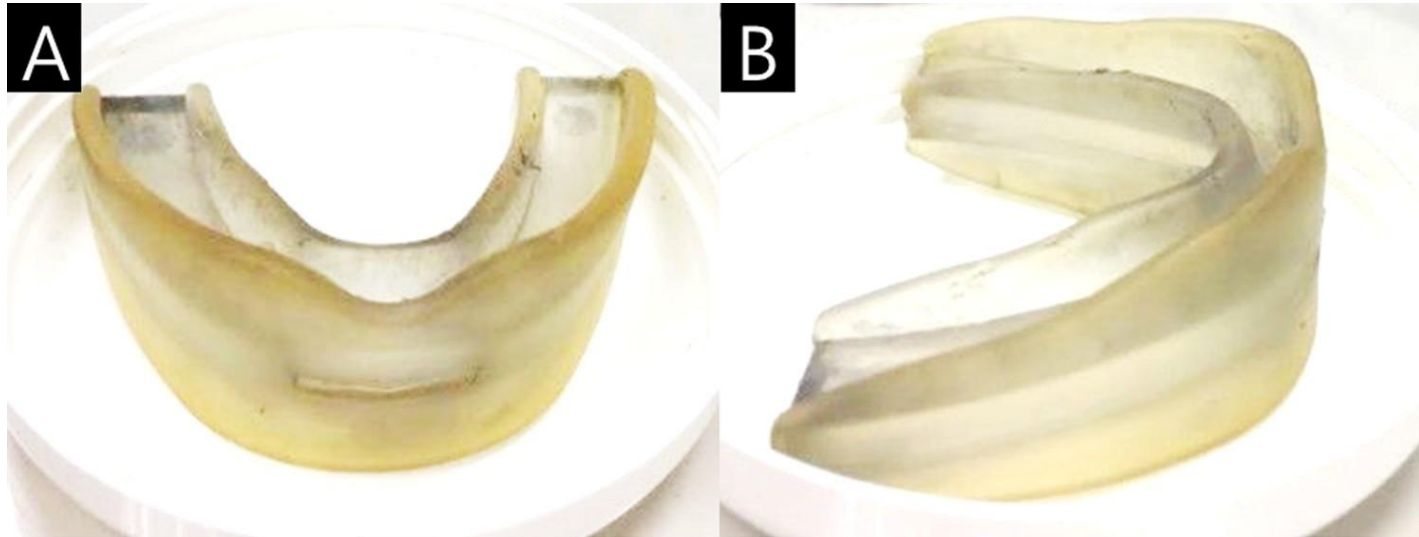
	No intervention		Conventional OA		Advanced MAD simulator		<i>P</i>
AHI							
Supine	40.36	± 5.16	8.98	± 5.46 ^a	4.41	± 5.16 ^a	<0.001*
Head Rotation	31.95	± 5.43	15.40	± 5.75 ^a	0.00	± 5.59 ^{a,b}	<0.001*
ODI							
Supine	39.73	± 5.11	9.72	± 5.59 ^a	6.72	± 5.25 ^a	<0.001*
Head Rotation	26.51	± 5.24	15.17	± 5.71	0.00	± 5.54 ^a	<0.001*
SpO₂							
Supine	82.44	± 1.69	88.33	± 1.73 ^a	91.16	± 1.77 ^a	<0.001*
Head Rotation	82.81	± 1.87	87.55	± 1.92 ^a	92.98	± 1.97 ^{a,b}	<0.001*

Notes:

^a, *P* < 0.05 vs. No Intervention; ^b, *P* < 0.05 vs. Conventional OA; *, *P* < 0.05

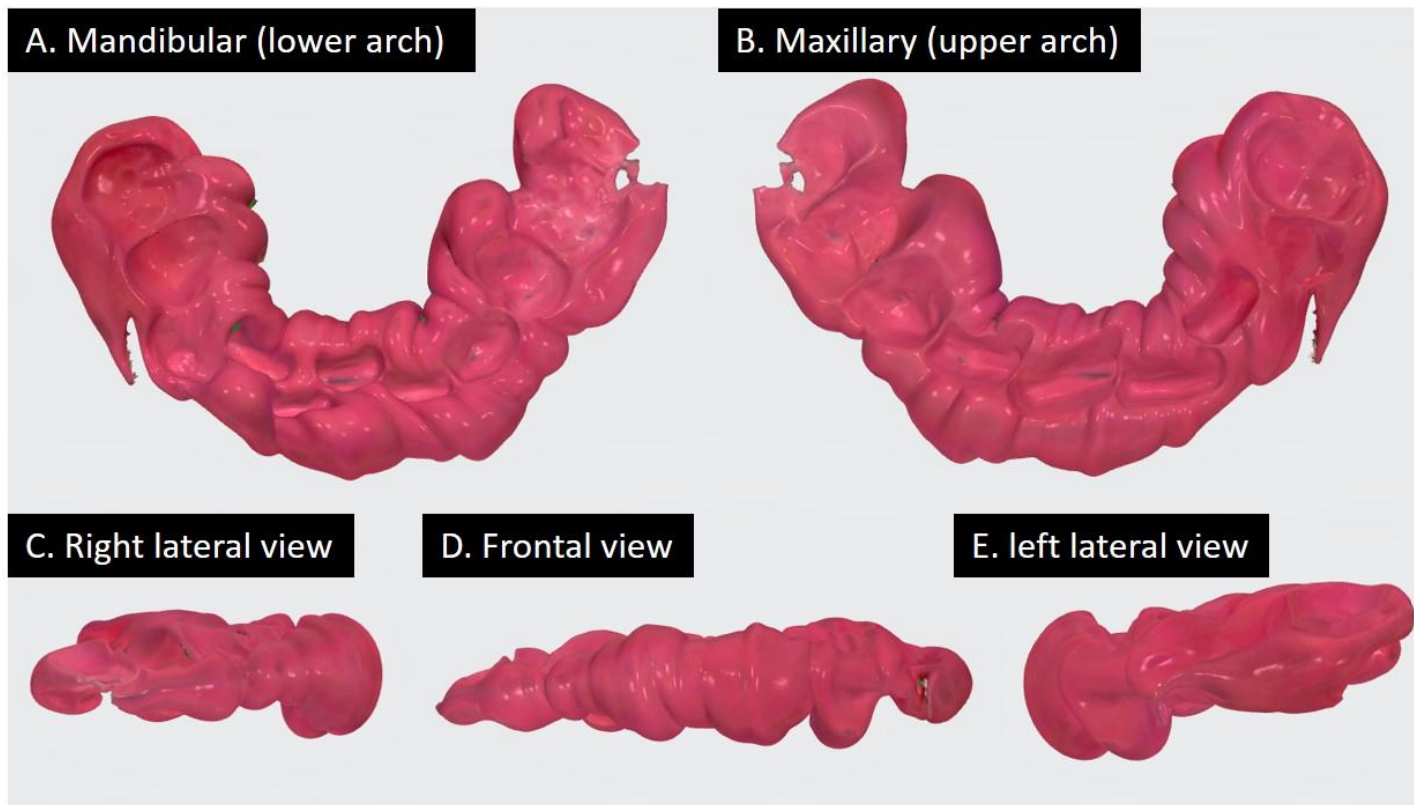
The p-values for these comparisons were adjusted using the Sequential Bonferroni method.

Abbreviations: AHI, apnea-hypopnea index; MAD, mandibular advancement device; OA, oral appliance; ODI, Oxygen desaturation index; SpO₂, peripheral oxygen saturation.



Supplementary Figure 1

Conventional edge-to-edge OA with breathing hole. The prefabricated OA used during DISE is shown from two perspectives: (A) frontal view demonstrating the central breathing hole and overall edge-to-edge design; (B) lateral view illustrating the occlusal relationship and vertical dimension of the device.



Supplementary Figure 2

Fabrication of advanced MAD simulator Using "Regidur® I". The monoblock advanced MAD simulator without a breathing hole designed for use during DISE. The images display various perspectives of the device: (A) mandibular (lower arch), (B) maxillary (upper arch), (C) right lateral view, (D) frontal view, and (E) left lateral view.