

Use of flow-volume curves to predict oral appliance treatment outcome in obstructive sleep apnea

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Background: It has been recognized that mandibular advancement splint (MAS) treatment is effective in some, but not all, patients with obstructive sleep apnea (OSA). Hence there is a need for a simple and reliable clinical tool to assist in the differentiation of treatment responses. We hypothesized that abnormalities of flow-volume curves, together with other clinical variables, may have clinical utility in the prediction of MAS treatment outcome.

Methods: Fifty-four patients with known OSA underwent MAS treatment. Expiratory and inspiratory flow-volume curves were measured in the erect and supine positions to derive midinspiratory flow (MIF(50)) and the ratio of expiratory to inspiratory flow at 50% of vital capacity (MEF(50):MIF(50)). Multivariable logistic regression was performed to identify additional significant clinical variables in the prediction of treatment outcome.

Results: The mean (\pm SD) apnea-hypopnea index (AHI) in 35 responders was significantly reduced from 28.9 \pm 13.7 to 6.7 \pm 5.8/hour ($p < 0.001$). In 19 nonresponders there was no significant change in AHI. MIF(50) was lower (6.04 \pm 1.80 vs. 6.88 \pm 1.08 L/second; $p = 0.035$) and the MEF(50):MIF(50) ratio was higher (0.82 \pm 0.23 vs. 0.61 \pm 0.15; $p = 0.001$) in responders than nonresponders. Logistic regression analysis revealed that the MEF(50):MIF(50) ratio was the most important predictive factor for MAS treatment outcome, but that body mass index, age, and baseline AHI were also contributory.

Conclusions: These data suggest that flow-volume curves, in combination with other factors such as body mass index, age, and baseline AHI, may have a useful clinical role in the prediction of treatment outcome with MAS.