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From the Departments of Orthodontics, Respiratory Medicine and Internal Medicine, Umeå University, Umeå,
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Treatment of obstructive sleep apnea with a mandibular advancement device



Akademisk avhandling

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Treatment of obstructive sleep apnea with a mandibular advancement device. Marie Marklund. From the Departments of Orthodontics, Respiratory Medicine and Internal Medicine, Umeå University, Umeå, Sweden, 2001.

Obstructive sleep apnea is associated with snoring, excessive daytime sleepiness, hypertension and an increased risk of early death.

The aims of the present studies were to evaluate the short-term and long-term effects on sleep apnea and the tolerability of a one-piece, individually-designed mandibular advancement device. We also hoped to find predictors of treatment success and evaluate the risk factors for dental side-effects of the device.

Patients with mild, moderate and severe sleep apnea were evaluated using full-night polysomnographic sleep recordings, cephalometric radiographs and dental casts.

At short-term follow-up after 0.7 ± 0.6 years (mean \pm SD), the device had reduced the apnea-hypopnea index from 25 ± 17 to 8.6 ± 7.1 ($p < 0.001$) in 44 patients. Sleep stage patterns improved with the device.

At long-term follow-up after 5.2 ± 0.4 years, the device had reduced the apnea-hypopnea index from 22 ± 17 to 4.9 ± 5.1 ($p < 0.001$) in 19 of 33 patients. These values did not differ from the short-term results in these patients who had continued treatment in the long term. Patients who had had their devices adjusted or replaced with new ones had a

larger reduction in apnea than patients using the same devices for the whole study period ($p < 0.05$). Ninety per cent of patients who had a short-term satisfactory result continued to use their devices on a long-term basis.

The odds ratios for a successful reduction in apnea with the device were 42 for supine-dependent sleep apnea ($p < 0.05$) and 21 for a short lower anterior face height ($p = 0.09$) adjusted for age, obesity and mandibular displacement.

The dental side-effects of the device were less marked with a soft elastomeric device than with a hard acrylic device and with advancements of below 6 mm compared with larger advancements.

It is concluded that the present mandibular advancement device reduces mild, moderate and severe sleep apnea in both the short and the long term. A short-term follow-up is necessary to identify patients suffering from "silent obstructive apneas" during treatment. The device is well tolerated by patients who are recommended the treatment on the basis of the results of this short-term sleep apnea recording. Supine-dependent sleep apnea predicts treatment success with the device. The device made of soft elastomer is recommended, as it has fewer side-effects on the dental occlusion than a device made of hard acrylic. It is advisable to replace the device with a new one within a period of four to five years to maintain its effects on sleep apnea.

Key words: Activator appliances; Advancement mandibular; Cephalometry; Long-term effect; Polysomnography; Sleep apnea syndromes; Snoring; Supine position.