Articles of the Month – December 2022

MAD

Sleep Breath. 2022 Nov 30.

 doi: 10.1007/s11325-022-02754-4. Online ahead of print.

Link: [Self-reported improvement in obstructive sleep apnea symptoms compared to treatment response with mandibular advancement device therapy: a retrospective study (springer.com)](https://link.springer.com/content/pdf/10.1007/s11325-022-02754-4.pdf?pdf=button)

# Self-reported improvement in obstructive sleep apnea symptoms compared to treatment response with mandibular advancement device therapy: a retrospective study

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**Purpose:**Mandibular advancement device (MAD) is recognized as the treatment option for management of obstructive sleep apnea (OSA) in mild-moderate cases or those unable to tolerate positive airway pressure therapy. Post-treatment sleep study is recommended to establish MAD efficacy when maximal therapeutic benefit is achieved based on OSA symptom improvement or maximum anatomical protrusion. The aim of this study was to investigate the difference between responders and non-responders in OSA symptom improvement and predictors of treatment success.

**Methods:**Medical charts of patients referred to the Orofacial Pain Clinic between 2016 and 2021 for management of OSA with MAD were retrospectively evaluated. Participants with post-treatment sleep study with MAD in situ were included. Participants were categorized as responders according to different criteria: 50% reduction in apnea-hypopnea index (AHI) compared to baseline; post-treatment AHI ≤ 10 with ≥ 50% reduction from baseline; AHI ≤ 5 with ≥ 50% reduction. OSA symptoms included snoring, apneas, sleep quality, tiredness upon awakening, daytime sleepiness, and subjective improvement. Differences in pre- and post-treatment variables within/between groups and predictors were analyzed with t test and logistic regression.

**Results:**Among 53 participants (30 females), mean age was 64.2 ± 10.7 and pre-treatment was AHI 23.3 ± 17.2. Depending upon the criteria, responders ranged between 26 and 57%. At first follow-up after MAD delivery, non-responders reported less tiredness upon awakening (p = 0.003), better sleep quality (p = 0.005), and greater subjective improvement (p = 0.012) than responders. Among significant OSA symptoms, tiredness upon awakening, poorer sleep quality, and less subjective improvement were consistently found as predictors of treatment response.

**Conclusion:**Subjective improvement, sleep quality, and tiredness upon awakening significantly improved in non-responders at first follow-up compared to responders, according to the strictest definition of treatment response. Therefore, a post-treatment sleep study is crucial to confirm proper management of OSA with MAD.

*EADSM* comment: Important findings for clinicians about placebo effects from MAD therapy, indicating even better subjective effects in non-responders than in responders in terms of AHI reduction. Compare with results from new study about placebo effects below

Dent J (Basel). 2022 Nov 30;10(12):226.

 doi: 10.3390/dj10120226.
Link; [Dentistry Journal | Free Full-Text | Daytime Sleepiness and Quality of Life in Obstructive Sleep Apnoea Patients before and after Long-Term Mandibular Advancement Device Treatment (mdpi.com)](https://www.mdpi.com/2304-6767/10/12/226)

# Daytime Sleepiness and Quality of Life in Obstructive Sleep Apnoea Patients before and after Long-Term Mandibular Advancement Device Treatment

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This study compared daytime sleepiness and quality of life in OSA patients with healthy controls and compared sleepiness and quality of life in OSA patients before and after long-term treatment with a mandibular advancement device (MAD). A total of 27 OSA patients (18 men, 9 women, mean age 52.3 years) and 32 healthy age- and sex-matched controls (20 men, 12 women, mean age 51.1 years) were included. At baseline and after MAD treatment, daytime sleepiness and quality of life were recorded by the Epworth Sleepiness Scale (ESS) and Short Form-36 questionnaires (SF-36). Daytime sleepiness occurred significantly more often in OSA patients compared to controls at baseline (*p* = 0.01). The quality of life domains Energy and vitality (*p* &lt; 0.0001), General perception of health (*p* = 0.0002), Mental health (*p* = 0.0031), Social functioning (*p* = 0.0119), Role limitations due to emotional problems (*p* = 0.0173) and Physical functioning (*p* = 0.0226) were significantly poorer in OSA patients compared to controls at baseline. After long-term MAD treatment, daytime sleepiness decreased (*p* &lt; 0.01) and the quality of life domain Energy and Vitality increased (*p* &lt; 0.01) in OSA patients compared to baseline. The results of the present study support the relevance of MAD treatment as an effective tool for decreasing daytime sleepiness and increasing the quality of life in OSA patients-also in the long term.

*EADSM* comment: Long-term results show the ultimate usefulness of a therapy. Whether long-term placebo effects exist, as shown in the previous study, remains, however, to be proven.

J Oral Rehabil . 2022 Dec 7.

 doi: 10.1111/joor.13400. Online ahead of print.

Link: [Online information on mandibular advancement device for the treatment of obstructive sleep apnea: A content, quality and readability analysis (wiley.com)](https://onlinelibrary.wiley.com/doi/epdf/10.1111/joor.13400)

# Online information on mandibular advancement device for the treatment of obstructive sleep apnea: A content, quality and readability analysis

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**Background:**Despite increasing scientific interest in the effectiveness of mandibular advancement device (MAD) for the treatment of obstructive sleep apnoea (OSA), laypeople lack knowledge about this treatment option.

**Objectives:**To investigate content, quality and readability of the online information regarding MAD.

**Methods:**Google, Yahoo and Bing were searched for 'sleep apnea', 'mandibular advancement device' and 'oral appliance'. Websites were analysed for content (multidisciplinary care team, qualified dentist, treatment contraindications and side effects), as well as for quality (DISCERN instrument, HONcode) and readability scores (Flesch Reading Ease, FRE and Flesch-Kincaid Reading Grade, FKG).

**Results:**Totally, 155 websites were included: 53% from health professionals, 20% commercial, 17% academic and 10% from non-health professionals. Content was incomplete, especially for commercial ones. 71.61% websites failed to acknowledge treatment contraindications, approximately 40.00% did not mention side effects and the need for a multidisciplinary care team, while 22.58% did not address the need to consult a qualified dentist. Quality and reliability were poor. Mean DISCERN score was 39.93 (95% CI 37.90-41.96), with lower scores for commercial websites compared with others. Only nine websites displayed HONcode certification. Readability was quite difficult, with mean FRE score of 59.50 (95% CI 57.58-61.42) and mean FKG level of 6.92 (95% CI 6.64-7.21).

**Conclusion:**Health care professionals should be aware that currently available online information do not fulfil the most important aspects of MAD therapy and may be difficult to understand by laypeople. This could contribute to cause delays in appropriate OSA care and unrealistic treatment expectations, increasing the risk of treatment discontinuation.

*EADSM* comment: Study highlighting the need to provide better information for laypeople about MAD therapy.

Editorial

Respirology 2023 Jan 8.

 doi: 10.1111/resp.14443. Online ahead of print.

Link: [Australasian Sleep Association position statement on consensus and evidence based treatment for primary snoring - Sarkis - Respirology - Wiley Online Library](https://onlinelibrary.wiley.com/doi/10.1111/resp.14443)

# Australasian Sleep Association position statement on consensus and evidence based treatment for primary snoring

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Primary snoring impacts a significant portion of the adult population and has the potential to significantly impair quality of life. The purpose of these guidelines is to provide evidence-based recommendations to assist Australasian practitioners in the management of adult patients who present with primary snoring without significant obstructive sleep apnoea. The Timetable, Methodology and Standards by which this Position Statement has been established is outlined in the Appendix S1. The main recommendations are: Weight loss, and reduced alcohol consumption should be recommended, where appropriate If clinical judgement dictates, benzodiazepine and opioid reduction or avoidance may be advised Positional therapy should be considered in supine dominant snorers In dentate patients, Mandibular advancement devices (MAD) should be recommended as a first line treatment following assessment by both an appropriate Dentist and Sleep physician Continuous positive airway pressure (CPAP) devices may be recommended in patients with primary snoring in those already committed to their use or willing to try Surgical treatment of primary snoring by an appropriately credentialled surgeon may be advised and includes nasal (adjunctive), palatal and other interventions This position statement has been designed based on the best available current evidence and our combined expert clinical experience to facilitate the management of patients who present with primary snoring. It provides clinicians with a series of both non-surgical and surgical options with the aim of achieving optimal symptom control and patient outcomes. This is the first such set of recommendations to be established within Australasia and has also been reviewed and endorsed by the Australasian Sleep Association.

*EADSM* comment: Very good that more and more attention is directed towards the treatment of snoring.

J Clin Med . 2022 Dec 19;11(24):7539.

 doi: 10.3390/jcm11247539.

Link: [JCM | Free Full-Text | Dental and Occlusal Changes during Mandibular Advancement Device Therapy in Japanese Patients with Obstructive Sleep Apnea: Four Years Follow-Up (mdpi.com)](https://www.mdpi.com/2077-0383/11/24/7539)

# Dental and Occlusal Changes during Mandibular Advancement Device Therapy in Japanese Patients with Obstructive Sleep Apnea: Four Years Follow-Up

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Dentoskeletal changes caused by the long-term use of mandibular advancement devices (MADs) for obstructive sleep apnea (OSA) have rarely been investigated in Japan. We assessed the long-term dentofacial morphological changes in 15 Japanese patients with OSA who used two-piece MADs for an average of 4 years. Lateral cephalography analyses were performed initially and 4 years later (T1). The dental assessment included overjet, overbite, upper anterior facial height, lower anterior facial height (LAFH), total anterior facial height (TAFH), and anterior facial height ratio. Dental casts were digitized and analyzed using a 3D scanner. Changes in the apnea hypopnea index (AHI) and other sleep-assessment indices were assessed using polysomnography and out-of-center sleep testing. Radiography revealed lingual inclination of the maxillary central incisors, labial inclination of the mandibular central incisors, clockwise rotation of the mandible, and an increase in the TAFH and LAFH at T1. In the dental cast analysis, the diameter width and palatal depth tended to decrease and increase, respectively. There was a significant decrease in the AHI and other sleep assessment indices after using the MADs for approximately 4 years. However, these findings do not provide a strong basis and should be interpreted cautiously. Future studies should have a larger sample size and should further investigate the long-term occlusal and dental changes caused by the original MADs in Japanese patients with OSA.

*EADSM* comment: Study confirming previous results regarding dental and craniofacial side effects from MAD therapy.

OSA

Meta-Analysis

 Front Endocrinol (Lausanne). 2022 Nov 17;13:1013771.doi: 10.3389/fendo.2022.1013771. eCollection 2022.

Link: [Relationship between obstructive sleep apnea-hypopnea syndrome and osteoporosis adults: A systematic review and meta-analysis (nih.gov)](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9712780/pdf/fendo-13-1013771.pdf)

# Relationship between obstructive sleep apnea-hypopnea syndrome and osteoporosis adults: A systematic review and meta-analysis

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**Objective:**This study is undertaken to explore the relationship between obstructive sleep apnea-hypopnea syndrome (OSAHS) and osteoporosis, including the relationship between OSAHS and osteoporosis incidence, lumbar spine bone mineral density (BMD), and lumbar spine T-score.

**Method:**Cochrane Library, PubMed, Embase, Web of Science, and other databases are searched from their establishment to April 2022. Literature published in 4 databases on the correlation between OSAHS and osteoporosis,lumbar spine BMD,lumbar spine T-score is collected. Review Manager 5.4 software is used for meta-analysis.

**Results:**A total of 15 articles are selected, including 113082 subjects. Compared with the control group, the OSAHS group has a higher incidence of osteoporosis (OR = 2.03, 95% CI: 1.26~3.27, Z = 2.90, P = 0.004), the lumbar spine BMD is significantly lower (MD = -0.05, 95% CI: -0.08~-0.02, Z = 3.07, P = 0.002), and the lumbar spine T-score is significantly decreased (MD = -0.47, 95% CI: -0.79~-0.14, Z = 2.83, P = 0. 005).

**Conclusion:**Compared with the control group, the OSAHS group has a higher incidence of osteoporosis and decreased lumbar spine BMD and T-score. In order to reduce the risk of osteoporosis, attention should be paid to the treatment and management of adult OSAHS, and active sleep intervention should be carried out.

*EADSM* comment: Interesting findings about the association between OSA and osteoporosis.

Sleep Med . 2023 Jan;101:429-436.

 doi: 10.1016/j.sleep.2022.11.025. Epub 2022 Nov 26.Link: [Sex differences in polysomnographic findings in patients with obstructive sleep apnea | Elsevier Enhanced Reader](https://reader.elsevier.com/reader/sd/pii/S1389945722012333?token=26B6BB3E05818695A88AD7EA7509CF52E18F2692731725617053C9C531CBC69DC748DC210C905893E7240C856D29956C&originRegion=eu-west-1&originCreation=20230111075757)

# Sex differences in polysomnographic findings in patients with obstructive sleep apnea

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**Background and purpose:**Sex differences in the clinical findings and the polysomnographic presentation of patients with obstructive sleep apnea (OSA) are compelling current research issues. For example, patients suffering from obstructive sleep apnea are predominantly male. While women are older than men and tend to have a higher body mass index, men typically present with a more severe form of obstructive sleep apnea. Using polysomnography, we investigated a German cohort, subdivided per severity levels of obstructive sleep apnea (apnea-hypopnea index: ≥5 to < 15/h (mild), ≥15 to < 30/h (moderate), and ≥30/h (severe)) to provide a detailed analysis of breathing and sleep parameters, accounting for body position effects and severity of illness. A deeper understanding of sex differences may allow targeted diagnosis and treatment adjustment.

**Patients and methods:**This retrospective study included a cohort of 1242 German patients (940 male, 302 female) who underwent overnight polysomnography at the private sleep laboratory "Intersom Köln", Center for Sleep Medicine and Sleep Research. In 1125 subjects (878 male, 247 female), obstructive sleep apnea was diagnosed. All patients were examined between January 01, 2018 and December 31, 2020, comparing anthropometric, sleep morphological, and respiratory polysomnographic findings.

**Results:**Female patients with obstructive sleep apnea were significantly older than male patients (60.9 ± 12.3 vs. 56.9 ± 12.5 years, P < .001), also among OSA subgroups per OSA severity. The body mass index was similar in male and female patients (29.6 ± 5.1 vs. 29.2 ± 7.3 kg/m2, P > .05), including the three subgroups. Men were more likely to have severe obstructive sleep apnea (46.9%) than women (35.2%). Women exhibited a higher proportion of slow-wave sleep than men (129.4 ± 52.8 vs. 104.2 ± 53.2 min; P < .001). The apnea-hypopnea index of total sleep time was significantly greater in male than female patients (32.9 ± 21.2 vs. 27.2 ± 20.2 per hour; P < .001). Female patients had a higher apnea-hypopnea index during rapid-eye-movement (REM) sleep (34.0 ± 23.8 vs. 31.8 ± 22.3 per hour; P = .171). A statistically significant difference in the apnea-hypopnea index during REM sleep between sexes was found when the obstructive sleep apnea severity was considered. Women had a lower apnea-hypopnea index in non-rapid eye-movement (NREM) sleep than men (25.7 ± 21.1 vs. 32.7 ± 22.3 per hour; P < .001). The oxygen desaturation index (29.9 ± 20.3 vs. 22.4 ± 19.4%; P < .001) and an oxygen desaturation below 90% (9.4 ± 14.0 vs. 6.8 ± 11.7%; P = .003) was greater in men than in women. In severe obstructive sleep apnea, the oxygen desaturation index was similar between the sexes (45.0 ± 17.8 vs. 41.1 ± 20.9%; P = .077). Male patients showed a higher supine apnea-hypopnea-index than female patients. (45.7 ± 26.7 vs 36.1 ± 22.7 per hour; P < .001).

**Conclusion:**The present noninvasive, retrospective registry study is the first to examine sex differences in OSA in such a large German population in terms of respiratory and sleep parameters, taking into account the effects of body position and severity of the disease. We could confirm and extend observations from previous studies. Female patients were significantly older than the male patients. The apnea-hypopnea index was higher in male than in female patients. Women showed a higher apnea-hypopnea index in REM sleep and a lower one in NREM sleep. Men were desaturated more often and were more affected by supine-dependent obstructive sleep apnea than women. Contrary to the literature, there were no significant differences in body mass index (BMI) between the sexes. With increasing age and BMI, the gender differences become less significant.

*EADSM* comment: Good summary of important sex differences in disease expression in a very large sample.

J Clin Sleep Med . 2022 Dec 19.

 doi: 10.5664/jcsm.10382. Online ahead of print.

# Characteristics of patients with positional OSA according to ethnicity and the identification of a novel phenotype-Lateral Positional Patients: a MESA study

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**Study objectives:**We investigated the characteristics of obstructive sleep apnea (OSA) positional patients' (PP) phenotypes among different ethnic groups in the Multi-Ethnic Study of Atherosclerosis (MESA) dataset. Moreover, we hypothesized the existence of a new OSA PP phenotype we coined "Lateral PP", for whom the lateral apnea-hypopnea index (AHI) is at least double the supine AHI.

**Methods:**From 2,273 adults with sleep information, we analyzed data of 1,323 subjects that slept more than 4 hours and had at least 30 minutes of sleep in both the supine and the non-supine positions. Demographics and clinical information were compared for the different PP, and ethnic groups.

**Results:**861 (65.1%) patients had OSA, and 35 (4.1%) were Lateral PP. Lateral PP patients were mainly females (62.9%), obese (31.4 median body mass index), had mild-moderate OSA (94.3%), and mostly were non-Chinese American (97.1%). Among all OSA patients, 550 (63.9%) were Supine PP, and 17.7% were supine-isolated OSA (siOSA). Supine PP and Lateral PP were present in 73.1% and 1.0% of Chinese Americans, 61.0% and 3.4% of Hispanics, 68.3% and 4.7% of White-Caucasian, and 56.2% and 5.2% of Black-African American OSA patients.

**Conclusions:**Chinese-American have the highest prevalence of Supine PP, whereas Black-African American patients lean towards less Supine PP and higher Lateral PP. Lateral PP appears as a novel OSA phenotype. However, Lateral PP was observed in a small group of OSA patients and thus its existence should be further validated.

*EADSM* comment: Important findings about phenotypic differences regarding positional OSA.

**PLACEBO**

Review

Sleep Med Rev . 2022 Nov 21;67:101720.

 doi: 10.1016/j.smrv.2022.101720. Online ahead of print.

Link: [Placebo response in objective and subjective measures of hypersomnia in randomized clinical trials on obstructive sleep apnea. A systematic review and meta-analysis | Elsevier Enhanced Reader](https://reader.elsevier.com/reader/sd/pii/S1087079222001332?token=DB6341B3678DE0DD8A99AEFAFD0A4C7AC27A8A18677D93E0084BC12E7C03F0A5C5D1248CC37B809E62A59B396773CE61&originRegion=eu-west-1&originCreation=20230111073031)

# Placebo response in objective and subjective measures of hypersomnia in randomized clinical trials on obstructive sleep apnea. A systematic review and meta-analysis

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Sleepiness is one of the outcomes most used in randomized clinical trials (RCT) on the effect of treatments for obstructive sleep apnea (OSA). Furthermore, it is known that there is a placebo effect, especially in subjective measures. Therefore, given that sleepiness is a subjective measure, the objective of this systematic review with meta-analysis and three-level meta-regression was to assess the response to different placebos (pills and sham-CPAP) used in RCTs in OSA, both on subjective (Epworth Sleepiness Scale [ESS]) and objective (Multiple Sleep Latency Test [MSLT], Maintenance Wake Test [MWT], the Osler test and the Psychomotor Vigilance Task [PVT]). We observed a statistically significant placebo effect in both subjective and objective measures of hypersomnia, and in both sham-CPAP and pills. This placebo effect was greater, even clinically significant, in subjective measures (ESS: -2.84 points) and in those RCTs that used pills as a placebo. In the meta-regression, only a higher baseline value of the ESS and Osler test was related to the placebo effect.

*EADSM* comment:

Study that highlights the difficulties to evaluate sleep apnea symptoms, with important placebo effects that might influence the results. Compare with results from MAD therapy, above.