Articles of the Month – September 2022

MAD

Link: NSS_A_377758 1611..1622 (dovepress.com)

Differences in Predicted Therapeutic Outcome of Mandibular Advancement Determined by Remotely Controlled Mandibular Positioner in Canadian and Chinese Apneic Patients

Wen-Yang Li [1], Jean-Francois Masse [2], Simon Gakwaya [3], Zhenjin Zhao [4], Wei Wang [#1], Frédéric Sériès [#3]

Background: In-lab mandibular protrusive titration using a remotely controlled mandibular positioner (RCMP) could predict the success rate of mandibular advancement device (MAD) and reliably determine the Optimal Protrusive Position (OPP) for obstructive sleep apnea (OSA) patients. The aim of this study was to compare MAD success rate using in-lab RCMP manual titration performed in Caucasian and Chinese OSA patients.

Methods: Manual RCMP titration was performed during an in-lab sleep study using the same procedure that had been previously reported in untreated Caucasian and Chinese OSA patients. Success rate was determined according to classical success criteria or to those previously used for RCMP titration.

Results: A total of 160 subjects were included in this study, and conclusive data were obtained from 141 (71 Chinese and 70 Caucasian OSA patients). Chinese patients were significantly younger, with lower BMI and more severe OSA disease than the Canadian counterparts. Among patients with predicted success, the OPP expressed in % of full protrusion position did not differ between the two ethnic groups. Chinese ethnicity, younger age and lower baseline AHI were significant determinants of RCMP success. In a multivariate analysis, only ethnicity and AHI were found to significantly account for success, the odds ratio for success in Chinese compared to Caucasians corrected for AHI being 3.7 and 4.6 depending on criteria used to define success.

Conclusion: Although the OSA disease was more severe in Chinese patients, the predicted success rate of MAD according to RCMP titration was higher in Chinese than in Caucasians. This study was registered on ClinicalTrials.gov (NCT03231254).

==*EADSM* comment==: New aspect of possibilities to predict the outcome of MAD therapy, by considering differences in facial anatomy between groups of people.

Is the response rate of oral appliance therapy for subjects with and without position-dependent obstructive sleep apnoea different?

Lingling Pu [1], Hu Long [1]

Critical review of an article published online in May 2022 in American Journal of Orthodontics and Dentofacial Orthopedics.(Fransson, A.M.C., Isacsson, G., et al. 2022)(unfortunately the wrong reference was written online, but will be corrected) The reviewed article is described as follows:

Description of article: Objective To compare the effect of oral appliance (OA) treatment on non-position-dependent obstructive sleep apnoea (non-POSA) and position-dependent obstructive sleep apnoea (POSA).Methods The investigational sample was 205 patients with obstructive sleep apnoea at baseline and they were classified as non-POSA and POSA. Polygraphic registration was employed to compare the proportion of treatment responders between non-POSA and POSA groups at eight-week and one-year follow-ups. The treatment responder was defined as apnoea-hypopnoea index (AHI) <10 and/or ≥50% reduction in AHI.Results At the eight-week follow-up, the proportions of responders were 56% and 69% for the non-POSA and POSA groups (not significant), respectively. The responder proportions were increased to 68% and 77% for the two groups, respectively, at the one-year follow-up (not significant between the two groups). At the two follow-ups, there was no significant difference in absolute change in overall AHI between the two groups. However, the decrease in supine AHI was significantly greater in the POSA group, while the decrease in non-supine AHI was significantly greater in the non-POSA group.Conclusions The response rate for OA treatment did not differ between POSA and non-POSA groups. However, greater decreases in supine AHI and non-supine AHI were found among POSA and non-POSA patients, respectively.

The critical review of the above cited article concluded that :
"There is no reliable evidence for comparing the treatment effects of oral appliances between positional and non-positional OSA participants."
The criticism concerned e.g.:
- Classification of the article as a randomised controlled trial, since the randomisation was based on appliance design, not POSA. Then it is a cohort study.
- High drop-out rate 32% in combination with no description of the number of patients that dropped out because of lack of efficacy.
- No consideration about the fact that patients changed classifications between POSA and non-POSA with time.
- No consideration about variability in success rate in relation to disease severity and balance of that factor between the POSA and non-POSA groups.

EADSM comment: EADSM included the reviewed article in Literature from May 2022, where more comments are provided.

OSA

Link: Defining the Profile of Obstructive Sleep Apnea in Women Compared to Men | Journal of Women's Health (liebertpub.com)

Defining the Profile of Obstructive Sleep Apnea in Women Compared to Men

Sofia Romero-Peralta [1][2], Francisco García-Río [3][4], Pilar Resano Barrio [1], Jose Luis Izquierdo Alonso [1][5], María Esther Viejo-Ayuso [1], Rosa Mediano San Andrés [1], Laura Silgado Martínez [1], Leticia Álvarez Balado [1], Jorge Castelao Naval [1], Jesús Fernández Francés [1], Olga Mediano [1][4][5]

Introduction: The importance of understanding the presentation of obstructive sleep apnea (OSA) in women has been increasingly recognized. Although there is some insight that there are significant differences in presentation between women and men, the consequences of such differences, particularly for treatment have not yet been fully identified. Thus, the objective of this study was to determine the phenotype of OSA in women. *Materials and Methods:* Study of a population-based clinical cohort of 2022 patients with OSA confirmed by polygraphy or polysomnography (apnea-hypopnea index [AHI] >5/hour). Comorbidities, symptoms, physical examination, current medical treatments, and sleep parameters were recorded. *Results:* A total of 709 women and 1313 men were included in this study. After adjustment for anthropometric characteristics, morphological alterations, and previous treatment, women were found to have lower AHI values (25.3 ± 1.2 vs. 35.0 ± 0.9; $p < 0.001$), desaturation index (24.4 ± 1.2 vs. 33.2 ± 0.9; $p < 0.001$), and saturation time <90% (18.8 ± 1.3 vs. 24.1 ± 1.0; $p < 0.001$) compared with men. Furthermore, women had a lower risk of witnessed apnea (odds ratio adjusted [ORa] for baseline characteristics and sleep parameters), (ORa: 0.53, 95% confidence interval [CI]: 0.40-0.71), reduced sensation of restful sleep (ORa: 0.50, 95% CI: 0.38-0.66), greater fatigue (ORa: 2.68, 95% CI: 1.86-3.86), headache (ORa: 3.00, 95% CI: 2.26-3.97), memory disorders (ORa: 1.836, 95% CI: 1.40-2.41), insomnia (ORa: 2.09, 95% CI: 1.50-2.93), and excessive daytime sleepiness (ORa: 1.41, 95% CI: 1.03-1.92), with interference in their daily activities (ORa: 1.54, 95% CI: 1.17-2.03). Likewise, after adjustment for anthropometric characteristics and sleep parameters, women also showed higher risk of depression (ORa: 4.31, 95% CI: 3.15-5.89) and anxiety (ORa: 3.18, 95% CI: 2.38-4.26). *Conclusions:* Our findings suggest that women present a specific OSA phenotype, with a probable implication for clinical, diagnostic, and therapeutic management.

EADSM comment: A study of a large cohort of OSA patients confirming the differences in presentation of the disease between men and women. This might lead to underdiagnoses of women; a phenotype that previously has also been found to be undertreated.(Schiza, S.E. and Bouloukaki, I. 2020)

Link: IJERPH | Free Full-Text | Effects of Exercise on Patients with Obstructive Sleep Apnea: A Systematic Review and Meta-Analysis (mdpi.com)

Effects of Exercise on Patients with Obstructive Sleep Apnea: A Systematic Review and Meta-Analysis

Jiale Peng [1], Yuling Yuan [1], Yuanhui Zhao [1], Hong Ren [1]

With exercise being more frequently utilized in treatment for obstructive sleep apnea (OSA), a systematic review of the intervention efficacy of exercise on OSA is necessary. PubMed, EBSCO, Web of Science, VIP, and CNKI databases were searched to collect randomized controlled trials (RCTs) of exercise applied to OSA from January 2000 to January 2022. The literature screening, data extraction, and risk of bias assessment of included studies were conducted independently by two reviewers. Meta-analysis was then performed using Rev Man 5.4 software. A total of 9 RCTs were included, including 444 patients. Compared with the control group, exercise made an improvement in apnea-hypopnea index (AHI) [MD = -6.65, 95% CI (-7.77, -5.53), $p < 0.00001$], minimum oxygen saturation (SaO_{2min}%) [MD = 1.67, 95% CI (0.82, 2.52), $p = 0.0001$], peak oxygen uptake (VO_{2peak}) [SMD = 0.54, 95% CI (0.31, 0.78), $p < 0.00001$], Pittsburgh sleep quality index (PSQI) [MD = -2.08, 95% CI (-3.95, -0.21), $p = 0.03$], and Epworth Sleepiness Scale (ESS) values [MD = -1.64, 95% CI, (-3.07, -0.22), $p = 0.02$]. However, there were no significant changes in body mass index (BMI). As for the results of subgroup analysis, aerobic exercise combined with resistance exercise [MD = -7.36, 95% CI (-8.64, -6.08), $p < 0.00001$] had a better effect on AHI reduction than aerobic exercise alone [MD = -4.36, 95% CI (-6.67, -2.06), $p = 0.0002$]. This systematic review demonstrates that exercise reduces the severity of OSA with no changes in BMI, and the effect of aerobic exercise combined with resistance training is better than aerobic exercise alone in AHI reduction. Exercise also improves cardiopulmonary fitness, sleep quality, and excessive daytime sleepiness.

==EADSM== comment: Study confirming the many benefits of exercise.

MUSCLE TRAINING

Link: The effect of tongue elevation muscle training in patients with obstructive sleep apnea: A randomised controlled trial (wiley.com)

The effect of tongue elevation muscle training in patients with obstructive sleep apnea: A randomised controlled trial

William Poncin [1][2][3], Nils Correvon [1], Jonathan Tam [4][5], Jean-Christian Borel [6], Mathieu Berger [7], Giuseppe Liistro [3], Benny Mwenge [3], Raphael Heinzer [7], Olivier Contal [1]

Background: Oropharyngeal myofunctional therapy is a multi-component therapy effective to reduce the severity of obstructive sleep apnoea (OSA). However, existing protocols are difficult to replicate in the clinical setting. There is a need to isolate the specific effectiveness of each component of the therapy.

Objective: To assess the effects of a 6 weeks tongue elevation training programme in patients with OSA.

Methods: We conducted a multicentre randomised controlled trial. Eligible participants were adults diagnosed with moderate OSA who presented low adherence to continuous positive airway pressure therapy (mean use <4 h per night). The intervention group completed a 6 weeks tongue elevation training protocol that consisted in anterior tongue elevation strength and endurance tasks with the Iowa Oral Performance Instrument. The control group completed a 6 weeks sham training protocol that involved expiratory muscle training at very low intensity. Polygraphy data, tongue force and endurance, and OSA symptoms were evaluated pre- and post-intervention. The primary outcome was apneoa-hypopnea index (AHI).

Results: Twenty-seven patients (55 ± 11 years) were recruited. According to modified intention-to-treat analysis (n = 25), changes in AHI and c did not significantly differ between groups. Daytime sleepiness (Epworth Sleepiness Scale) and tongue endurance significantly improved in the intervention group compared to the control group (p = .015 and .022, respectively). In the intervention group, 75% of participants had a decrease in daytime sleepiness that exceeded the minimal clinically important difference.

Conclusion: Six weeks of tongue elevation muscle training had no effect on OSA severity.

EADSM comment: Yet no consensus about the benefits from various specific muscle exercises for OSA patients. This study finds no effect from tongue training alone.

CPAP

Link: [Should we treat with continuous positive airway pressure severe non-sleepy obstructive sleep apnea individuals without underlying cardiovascular disease? (silverchair.com)](silverchair.com)

Should we treat with CPAP severe non-sleepy OSA individuals without underlying cardiovascular disease?

[Martino F Pengo](#)[1], [David Gozal](#)[2], [Miguel Angel Martinez-Garcia](#)[3][4]

The majority of the current international obstructive sleep apnea (OSA) guidelines base the recommendation to treat OSA with continuous positive airway pressure (CPAP) on the presence of symptoms (principally, albeit not exclusively on daytime hypersomnolence). In non-sleepy patients, even with severe OSA, controversies remain, as clear evidence supporting CPAP treatment of this subgroup of OSA patients is lacking. However, given the non-negligible proportion of non-sleepy OSA patients, clinicians often face a serious dilemma since CPAP treatment in these patients may prove to be not cost-effective. Here, we propose a simple 3-steps-based algorithm that attempts to better phenotype non-sleepy OSA patients prior to reaching a CPAP treatment decision while also considering a series of clinically relevant elements in the process that may improve with CPAP therapy. Such algorithm focuses on the presence of several OSA symptoms that are susceptible to benefit from treatment and also relies on OSA phenotypes that need to be considered in an effort to achieve optimal cardiovascular prevention. Here, we attempt to establish a framework for clinicians who are evaluating severe non-sleepy OSA patients in their practices. However, the algorithm proposal needs to be extensively validated before being systematically implemented in clinical settings.

EADSM comment: The need of treating non-sleepy OSA patients without cardiovascular disease has been extensively discussed. This is an important document regarding how to look at this group of patients, based on the present knowledge, treatment with CPAP, or not. And also indirectly for MAD, in CPAP intolerant patients. The article stresses, that untreated patients must be carefully followed-up and that much more knowledge is needed.

Continuous positive airway pressure reduces the incidence of atrial fibrillation in patients with obstructive sleep apnea: A Meta-Analysis and Systematic Review

Ziad Affas [1], Saif Affas [2], Kutiba Tabbaa [1]

Introduction: Obstructive sleep apnea (OSA) and atrial fibrillation (AF) are disorders that have increased in the United States during recent years. Earlier investigations have shown that underlying undiagnosed and unmanaged OSA plays a significant role in high rates and also as a trigger for newly diagnosed AF. Since the introduction of continuous positive airway pressure (CPAP) as a main therapy for OSA, more studies have evaluated the effect of CPAP on the development or recurrence of AF in OSA patients. However, sample sizes in a limited number of studies have been too small to conclude whether CPAP therapy has a significant effect on the development of AF in patients with OSA. The authors report results of their systematic review and meta-analysis summarizing what is currently known about the efficacy of CPAP for mitigating AF in patients with OSA.

Method: The authors systematically reviewed the published reports on CPAP use and the incidence of AF from PubMed, Google Scholar, EMBASE, Web of Science, meeting abstracts, and Cochrane databases published between January 2015 and November 2021. Study data were extracted by two reviewers and a random-effects meta-analysis was performed using RevMan version 5.4.

Results: A total of 17 studies that met inclusion criteria were identified Studies included a total of 6,523 patients, 3,248 (49.8%) who used CPAP and 3,275 (50.2%) who did not use CPAP. In a random effects model, patients treated with CPAP showed a decrease in the incidence of AF (OR, 0.51; 95% CI; 0.27; 0.97, p = 0.04). High heterogeneity among the included studies was also observed (I2 = 97%).

Conclusion: Our results add to the increasing evidence that CPAP therapy may reduce the incidence of development of AF in patients with OSA. Prospective future studies and clinical trials are needed to refine our understanding of the relationship between OSA and AF and how CPAP may reduce cardiovascular disease development.

EADSM comment: Important confirmation about possible benefits of CPAP treatment to reduce the risk of a less studied consequence of untreated OSA, atrial fibrillation.

REFERENCES

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Schiza SE, Bouloukaki I (2020) Does gender matter: sex-specific aspects of symptoms, outcome, and therapy of obstructive sleep apnea. Current Opinion in Pulmonary Medicine 26: 642-649