

# Systematic Review of Oral Appliances for Pediatric Obstructive Sleep Apnea

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## BACKGROUND

Obstructive sleep apnea (OSA) is a disorder that involves the constriction of the airway, which leads to decreased oxygen levels<sup>7</sup>. The diagnosis of obstructive sleep apnea (OSA) is determined with the Apnea-Hypopnea Index (AHI) from a polysomnography test (PSG). Oxygen saturation can be assessed by measuring SaO<sub>2</sub> or SpO<sub>2</sub>. The gold standard for OSA treatment in children is adeno-tonsillectomy<sup>1</sup>. However, recurrent OSA can occur due to the skeletal nature of the disease. Oral appliances (OA) have been shown to be an effective treatment in treating malocclusions, primarily class II<sup>2</sup>. In the treatment of OSA, OAs aim to redirect forces and prevent the mandible and tongue from constricting the airway as a less invasive treatment option.

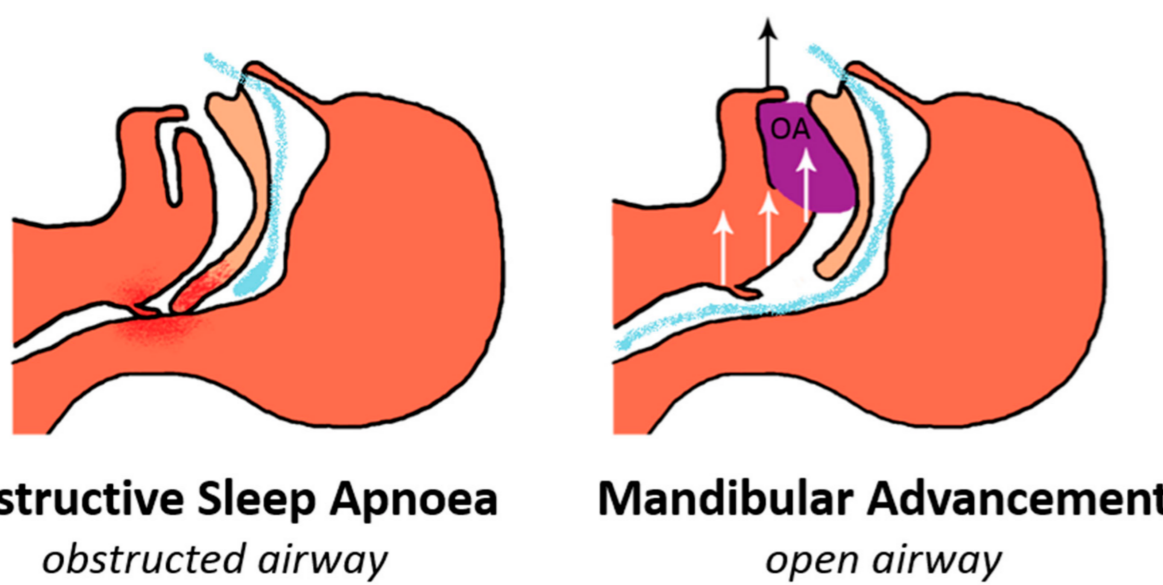


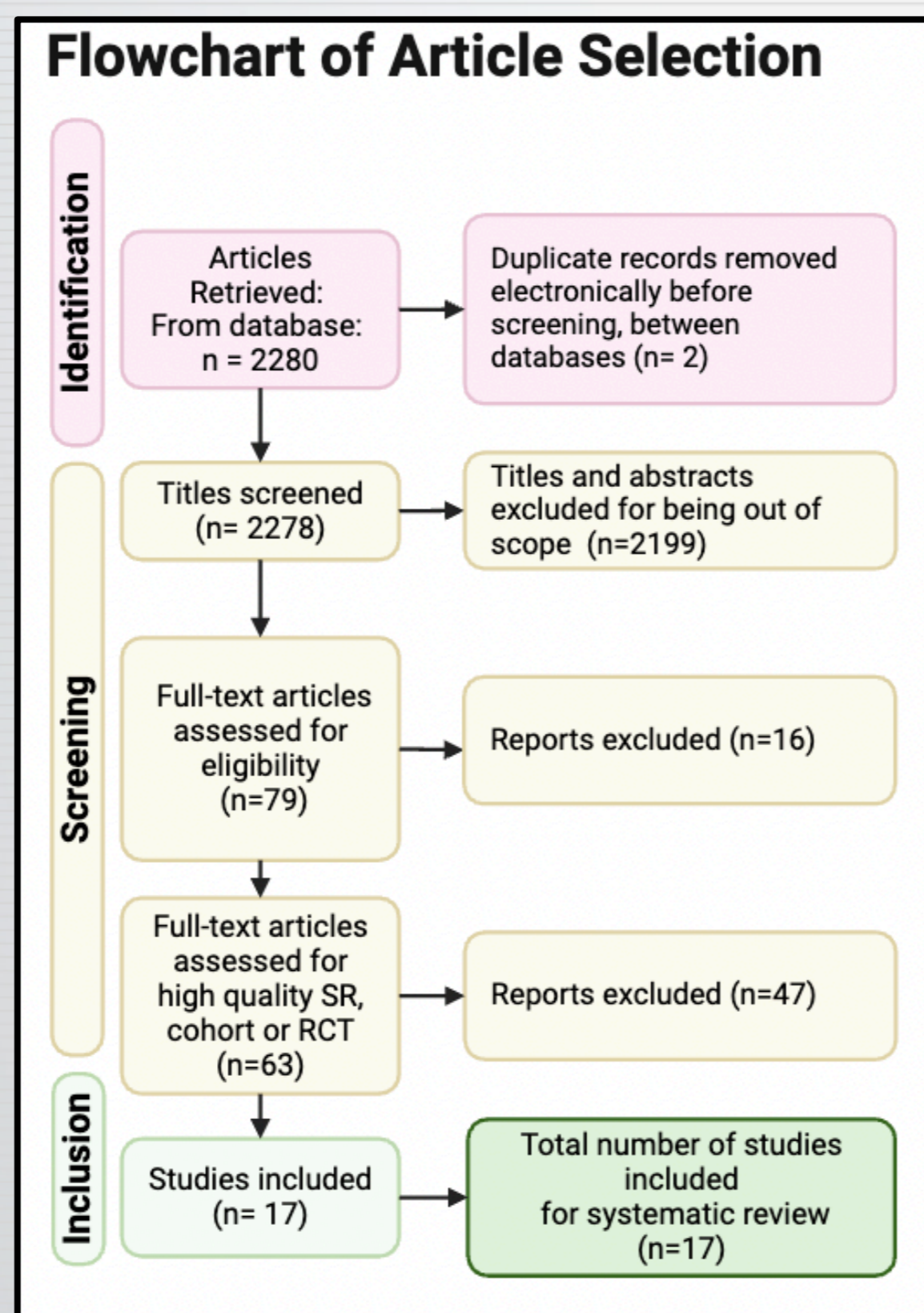
Figure from reference 3

## OBJECTIVE

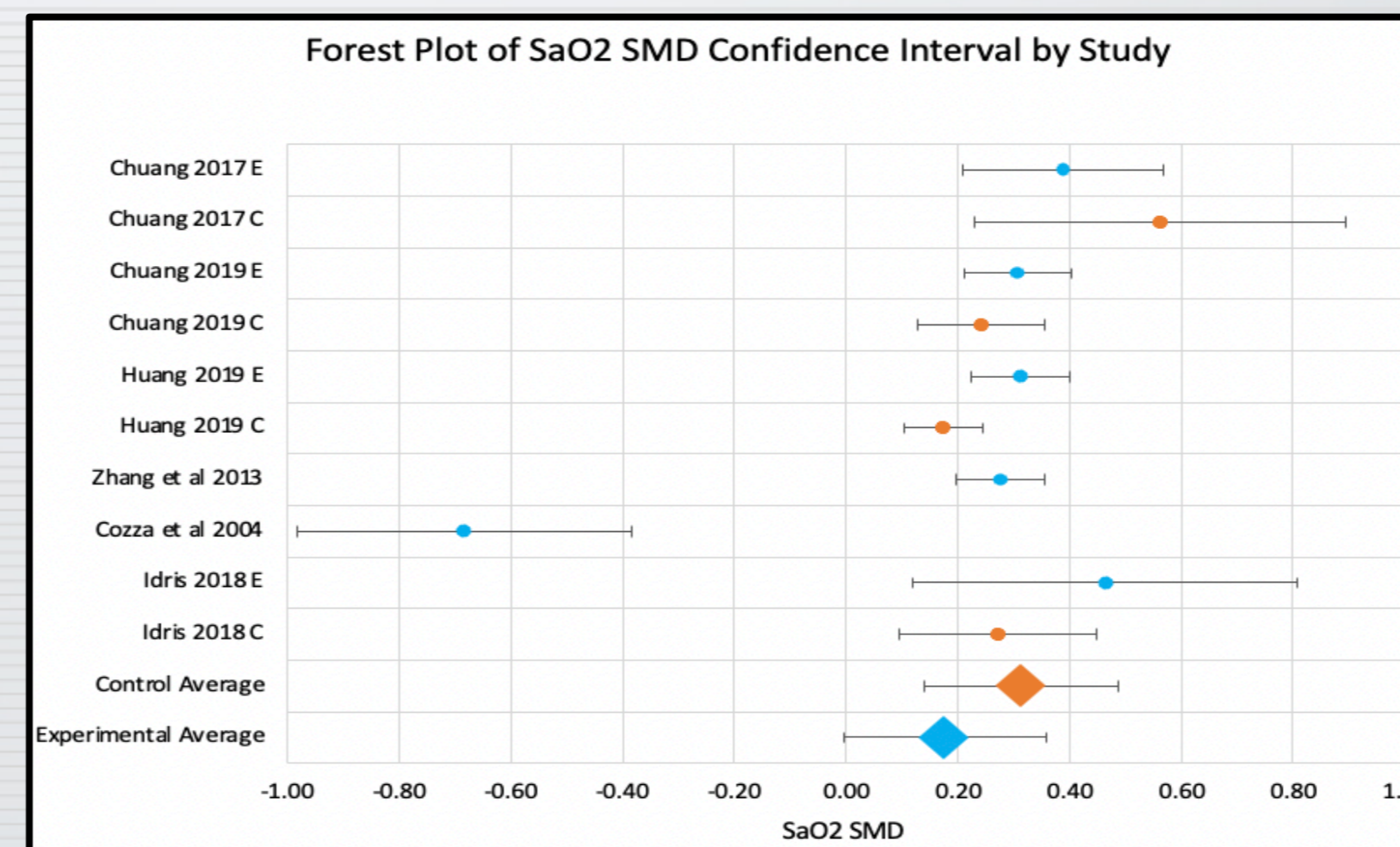
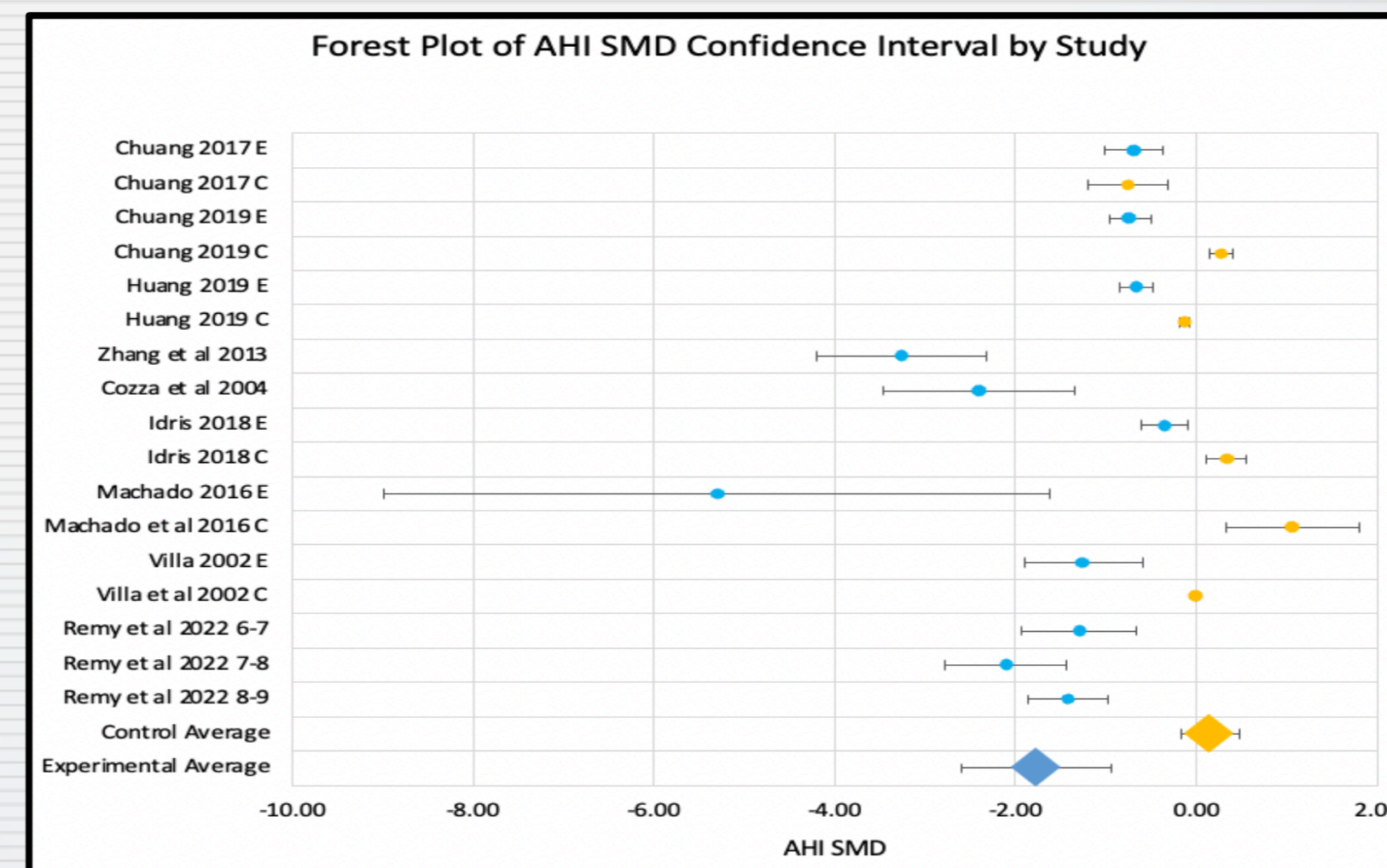
To evaluate the quality of the existing literature and research that has been conducted in using oral appliances and non surgical therapy to treat children with obstructive sleep apnea.

## MATERIALS AND METHODS

The PRISMA 2020 guidelines serve as the framework for this project. The PICO strategy was used to determine eligibility. **Population** = children and adolescents up to 18 years old; **Intervention** = Mandibular oral appliances or non-surgical treatments. **Comparison**: pre and post treatment, or no treatment; **Outcomes**: AHI and SaO<sub>2</sub> or SpO<sub>2</sub>. Studies were excluded for duplications, studies on adult patients (>18 years of age), studies on patients treated with surgical therapy. Abstracts were screened by three independent reviewers. Data extraction was completed on 63 articles. Articles included in the review were systematic reviews and meta-analyses, randomized and non-randomized clinical trials, and cohort studies. Studies that satisfied the inclusion criteria underwent quality assessment, using the JBI Critical Appraisal checklists. Risk of bias was conducted using Risk of Bias Visualization Tool (Robvis). Statistical analyses for standard mean differences was calculated with Cohen's test. Forest plots were constructed in Excel for the primary outcomes of AHI and SaO<sub>2</sub>.



Legend: AHI=apnea-hypopnea index, SaO<sub>2</sub>=arterial oxygen saturation, SMD=standardized mean difference, C=control, E=experimental.



## RESULTS AND DISCUSSION

The findings of this review demonstrate the lack of high quality studies that exist in the literature. 9 clinical studies (cohort/RCT/NRCT) and 8 systematic reviews were included in the review and satisfied the inclusion criteria. A cohort study by Remy et al in 2022 showed that AHI significantly decreased, with a greater proportion in the younger age group (6-7). However, it is possible the effects of the oral appliance were confounded by the effects of rapid maxillary expansion used in conjunction with the oral appliance. All experimental groups of the existing studies in the analysis demonstrated a decrease in AHI (-1.77) compared to the control groups (0.31), except Machado et al (2016), and an overall increase in SaO<sub>2</sub> (0.18) with the use of oral appliances. Each study had specific issues involving a lack of randomization, high drop out rate, short treatment duration, or small sample sizes. Systematic reviews from Carvalho et al 2016 and Bernardes et al 2023 drew similar conclusions, further validating this study's findings.

## CONCLUSIONS

1. Oral appliances are a viable treatment option for children with OSA.
2. Literature in the topic is limited by the number of high-quality studies, with small sample sizes.
3. Further clinical research needs to be conducted to produce quality studies that support the use of oral appliances in children.

## REFERENCES

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