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POSITION PAPER

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

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## Abstract

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.

KEYWORDS
non-surgical, primary snoring, sleep, surgery, treatment

## INTRODUCTION

Snoring, defined as audible vibrations of the upper airway during respiration in sleep, affects up to 50% of the population.[1] There is likely to be a complex continuum of snoring that ranges from primary snoring, upper airway resistance syndrome, to snoring that occurs as a cardinal symptom of sleep disordered breathing (SDB). Confirming the intricate relationship of snoring and SDB, the Sleep Heart Health Study[2] identified that a third of participants with obstructive sleep apnoea (OSA) reported they were non-snorers and over a third of habitual snorers demonstrated no OSA (Apnoea Hypopnoea Index [AHI] < 5). The natural history of snoring and movement along this hypothetical

continuum is difficult to study in the absence of objective polysomnography.

The prevalence of *habitual snoring*—that is, the observation that a person consistently snores when asleep, varies widely. The results of a 2012 meta-regression indicate a male predominance, with the 35 included studies reporting a range of snoring of 2.6%–83% in men and 1.5%–71% in women that may reflect variation in geographical areas, snoring frequency criteria and method of random sampling across studies.[3] The prevalence of primary snoring (i.e., habitual snoring in the absence of significant sleep apnoea or oxygen desaturation) has been rarely studied due to the difficulties associated with polysomnography in population studies and the limited reliability of OSA diagnosis from self-report or screening questionnaires. A recent study in the large UK Biobank ($n$ = 408,317, white British ancestry, aged 40–69 years) recruited from National Health Service patient registers identified that 37% of participants reported having a partner or close relative/friend complain about their snoring.[4] In contrast, a survey by the National Health Sleep foundation of 1000 Australian adults reported a prevalence of primary snoring of 8% when defined as loud snoring at least three nights per week in those free of self-reported diagnosed OSA (with an overnight sleep study) and breathing pauses.[5]

Given the proportion of people affected, the clinical significance of snoring, independent of OSA, requires attention. While OSA is a risk factor for cardiovascular disease (CVD) and stroke events, limited and sometimes conflicting evidence suggests that primary snoring may not be benign.[6] Recent findings from the SAVE Study[7] support the notion that snoring vibrations and mechanical stress from OSA-related snoring and apnoeas may be hazardous to the adjacent vasculature,[8] although these patients all had coexistent OSA. Primary snoring (self-reported) and objectively assessed snoring, have been associated with increased risk of carotid atherosclerosis,[9] increased intima-media thickness[10] (independent of OSA) and the metabolic syndrome.[11] Lee et al. suggested that heavy snoring (>50% snoring sleep time) may induce endothelial injury within the carotid bifurcation given its proximity to the hypopharyngeal walls resulting in atherosclerosis in heavy snorers.[9] However, snoring was not associated with all-cause mortality, or incident CVD or stroke over 17 years in the Busselton Health Study.[12] In addition, following adjustment for AHI, primary snorers (AHI < 5) were not found to be at increased risk of cardiovascular death in a Spanish clinical cohort.[13]

Other studies have also identified cross-sectional associations of self-reported snoring and subjective snoring with depression[14] and mental health conditions. Perhaps more pertinent to clinical presentation is the co-sleeper interaction and the audible disruption of sleep affecting both mental health and quality of life for both the patient and bed partner, with recent studies indicating the potential for bed partner chronic sleep deprivation, depression and fatigue.[15]

Currently, no consensus exists on what AHI criterion constitutes isolated primary snoring, with little research supporting the most accepted and widely cited definition of <5 events/h based on the 2005 AASM ICSD-2.[16] For the purposes of these guidelines, an AHI < 15 has been utilized when referring to primary snoring based on a recent comprehensive review,[17] and given there is no evidence that a sole cut off AHI of five differentiates benign from adverse health outcomes. Unless otherwise stated, the use of the term snoring in this position statement refers to patients with primary snoring and an AHI < 15.

## METHODS AND PURPOSE

The purpose of this statement is to provide evidence based clinical guidance regarding the management of patients with primary snoring, and specifically an AHI < 15. Target patients for this statement are adults, aged 18 years of age and older. A panel of expert reviewers was dedicated to each arm of management and a set of recommendations have been derived based on best available evidence (Table 1).

A comprehensive literature search using a validated filter strategy of multiple databases including the Cochrane central register of controlled trials, Embase, SCOPUS, PubMed (MEDLINE) was then conducted to identify clinical practice guidelines, position statements, systematic reviews and randomized and non-randomized controlled trials pertaining to the treatment of primary snoring. Screening was then performed of each individual abstract by individual assigned experts in their respective fields to determine whether each article answered the PICO question (see Appendix S1 in the Supporting Information), otherwise they were excluded. Articles were also included that the clinical committee had identified and deemed suitable, however were not evident in the initial search. The panel all agreed this was a requirement, given the paucity of literature on primary snoring and required extrapolation from the OSA literature. The panel subsequently met on multiple occasions over a 12-month period to discuss both the outline of the position statement, collectively review the best available evidence and subsequently derive a series of recommendations. A committee-based approach was then adopted to assigning an aggregated grade of evidence for each treatment modality and a recommended level of certainty based on the quantity, consistency, precision and generalizability of the aggregated evidence combined with panel consensus as has been previously employed.[18,19]

The target audience of this position statement includes clinicians including General practitioners, Dentists, Sleep Physicians, Respiratory Physicians, Otolaryngology Head and Neck Surgeons and Oral and Maxillofacial surgeons involved in the care of patients with primary snoring.

This position statement combines published data with expert opinion to provide an approach to treatment of patients with primary snoring to achieve optimal symptom control of snoring noise, sleep disruption and outcomes relevant to patient and partner. It is recognized that there is complexity in measuring outcomes related to significant subjectivity, in the absence of consensus-agreed objective

**TABLE 1** Key recommendations for treatment of primary snoring

| | Key recommendation | Level of evidence | Level of certainty |
|---|---|---|---|
| *Non-surgical treatment* | | | |
| Weight loss | Recommended in appropriate snoring patients in view of the additional health benefits | D | High |
| Alcohol | Alcohol consumption reduction should be recommended in all patients | D | High |
| Medications | Advice may include avoidance of long term use of benzodiazepines and opioids should be avoided in patients with primary snoring | D | Moderate |
| Complementary and alternative remedies | Minimally harmful but uncertain long-term utility and not advisable | D | Low |
| EPAP | Minimally harmful with some treatment effect but costly long-term use | C | Low |
| Positional therapy | Considered a reasonable, mostly low risk trial option in supine dominant snorers | C | Moderate |
| Oral appliance therapy | MAD should be considered first line treatment in patients with primary snoring following occlusal examination by an appropriate Dentist combined with Sleep Physician assessment | B | High |
| CPAP | Option if patients are willing to trial and/or committed to CPAP use | B | High |
| Myofunctional therapy | Low risk option but significant commitment is required to achieve a small reduction in snoring | B | Low |
| *Surgical treatment* | | | |
| Nasal surgery | Recommended in patients who also complain of nasal obstruction and have objective evidence of septal deviation ± turbinate hypertrophy on nasal endoscopy | C | High |
| Radiofrequency palatal surgery | May be effective as a short-term option but patients may require additional therapy. | B | Moderate |
| Uvulopalato-pharyngoplasty | Recommended treatment modality for soft palate surgery, offered to patients who have considered MAD or CPAP therapy | B | High |
| Palatal soft tissue implants | Effective treatment in the short term, however have an unacceptably high rate of extrusion and limited sustained clinical benefit with the potential to worsen OSA | C | Moderate |
| Injection snoreplasty | May be offered in patients with palatal flutter, however results are not consistently predictable and unlikely to be sustained long term | C | Low |
| Combination therapy | Reasonable in clinical context when the risks of each and combination therapies have been discussed | B | Moderate |

measures. In the absence of high-quality evidence regarding a treatment modality, a consensus approach was adopted to derive recommendations.

## RECOMMENDATIONS FOR TREATMENT

### Conservative approaches and non-surgical treatment

A personalized approach to management is recommended with a focus on prevention and maintenance of health. Lifestyle factors are a key target in snorers, not only to improve symptoms, but also to prevent the development of OSA and overweight/obesity related adverse health outcomes.

#### Weight loss

It has been well recognized from clinical observations that weight loss may reduce snoring frequency. However, most inferences are made based on data indicating weight gain increases snoring and OSA, rather than studies demonstrating reduction in snoring with weight loss. The effect of weight loss is not universal and cannot be predicted.[20] In snorers with OSA, weight loss has been shown to reduce

OSA severity.[21] Clinical observation would suggest this would be the case for primary snoring also.

*Level of Evidence*: D.
*Recommendation with level of certainty*: *High*.

Weight loss may be recommended to overweight and obese patients with snoring (and in view of the additional health benefits of reduced cardiovascular and metabolic disease complications).

## Alcohol

Alcohol consumption, which reduces tone in pharyngeal dilator muscles, has been associated with increased snoring in patients with primary snoring[22,23] but the effect of reducing or eliminating alcohol has not been evaluated in randomized controlled trials (RCTs) or observational studies. However, it is almost universally observed by patients and their families that their snoring is worse following alcohol consumption.

*Level of Evidence*: D.
*Recommendation with level of certainty*: *High*.

Alcohol consumption reduction should be recommended in patients with primary snoring in view of other potential health benefits.

## Medications that exacerbate snoring

Benzodiazepine use has been associated with increased non-REM sleep snoring and increased upper airway resistance in healthy volunteers.[24]

The effect of opioids and other hypnotics on snoring severity has not been assessed. A meta-analysis reviewing the effect of these agents in adults with OSA demonstrated no deleterious effect on sleep disordered breathing severity, but the studies were of short duration with methodological limitations.[25] A subsequent randomized control trial (RCT) of acute oral morphine administration demonstrated inter individual variability on SDB severity which was attributed to OSA phenotype, and may imply snoring in certain individuals with SDB is influenced by such drugs.[26]

*Level of Evidence*: D.
*Recommendation with level of certainty*: *Moderate*.

Avoidance of long-term use of benzodiazepines and opioids is advised for patients with primary snoring.

## Complementary and alternative remedies

A number of over-the-counter devices and complementary or alternative remedies are available for the treatment of snoring. These include external and internal nasal valve dilators, lubricating nasal and oral sprays and medications.

Small studies including a RCT have shown that nasal valve dilator therapy is effective and safe in reducing subjective and objective snoring severity in patients with mild–moderate OSA.[27,28] There are no studies reporting sustained long-term use of these devices and studies have not shown improved OSA control.

There is insufficient evidence to suggest effectiveness of oral and nasal lubricants or herbal remedies in reducing objective snoring severity, and some theoretical safety concerns in relation to developing lipoid pneumonia have been highlighted.[29,30]

*Level of Evidence*: D.
*Recommendation with level of certainty*: *Low*.

Recommendation for use of complementary/alternative remedies is not advised as there remains uncertainty regarding long-term reduction of snoring and commitment to use (despite minimal harm), along with potential cost.

## EPAP devices

Nasal EPAP devices consist of disposable one-way resister valves fitted over the nostrils. These valves create a positive end-expiratory pressure, which leads to stabilization of the upper airway. A meta-analysis of nasal EPAP studies in OSA[31] demonstrated an overall improvement in polysomnography parameters such as AHI and ODI but less than those associated with CPAP. Not all of these studies assessed the objective effect on snoring but in those studies that did, a reduction in snoring severity was uniformly seen.[32–34] EPAP use has been shown to be sustained at up to 12 months, well tolerated by people who find it effective and associated with minor side effects. A downside is cost with long term use.

*Level of Evidence*: C.
*Recommendation with level of certainty*: *Low*.

EPAP devices are minimally harmful with some treatment effect but may be costly in the long-term.

## Positional therapy devices

The severity of snoring (and OSA) is more prevalent in the supine posture of sleep.[35] Positional therapy (PT) devices either create a physical barrier to prevent supine sleep or monitor body position and respond with an electrical vibration when the supine position is detected. A number of these devices which promote avoidance of supine sleep are now available. PT devices have been evaluated in non-randomized studies to assess their effect on snoring and

described in RCTs in positional OSA. The studies demonstrated a reduction in snoring frequency and rate in the majority of non-apnoeic snorers (AHI <5) but not in those with OSA.[36–40] Long term adherence with older PT devices appears poor,[41] due to a number of factors including ineffectiveness, discomfort and claims that patients learn to avoid supine sleep. Long term adherence with newer vibratory devices is uncertain.

*Level of Evidence*: C.
*Recommendation with level of certainty*: *Moderate*.

PT devices are considered a reasonable, mostly low risk therapeutic option in supine dominant primary snorers without OSA.

## Oral appliance therapy

Oral appliance therapy (OAT) for the treatment of primary snoring is well established. The 2015 Guidelines of the American Academy of Sleep Medicine recommend that sleep physicians prescribe oral appliances, rather than no therapy, for adult patients who request treatment of primary snoring (without obstructive sleep apnoea).[42]

Oral appliances work primarily by protruding the mandible, which pulls the tongue forward and widens the oropharynx. This secondarily pulls the soft palate anteriorly and inferiorly via the palatoglossus muscles, causing forward displacement of the velopharynx.[43] This controls the vibration of airway soft tissues thus preventing or controlling snoring. The majority of oral appliance therapy is in the form of Mandibular Advancement Splints or Devices (MAS or MAD).

Three studies have objectively measured control of snoring with a Mandibular advancement device (MAD) compared to not wearing a MAD.[44–46] All snoring parameters recorded from microphone during polysomnography showed improvement, without standardization between them. A crossover trial compared the effectiveness of MAD compared to CPAP on quality of life outcomes and snoring, however showed no difference between the two groups.[47] MAD therapy was able to significantly reduce the snoring outcome score. In two RCTs, MAD therapy showed superior reduction in snoring compared to placebo splints, including patients with mild OSA.[48,49]

Clinically, interest in the use of an inexpensive MAD is strong, especially as a trial or interim appliance. Limited evidence shows a custom made titratable MAD is more efficacious than a thermoplastic, or 'boil and bite' MAD.[50] A RCT assessing the effectiveness of a partially titratable Thermoplastic MAD, showed a decrease in snoring but more interim side effects were noted. A sham placebo exacerbated snoring.[51]

A recent comprehensive systematic review of MAD treatment in primary snoring supports its use as a first line treatment option.[52] Given the potential for MAD therapy to adversely affect dental occlusion and the temporomandibular joint, long term customized follow-up is advised.

*Level of Evidence*: B.
*Recommendation with level of certainty*: *High*.

MAD should be considered as first line treatment in patients with primary snoring following occlusal assessment by an appropriate dentist.

## CPAP therapy

The effect of CPAP therapy on snoring has primarily been studied in patients with co-existent OSA.[53,54] CPAP, when deliberately titrated in OSA to eliminate snoring has been shown to be effective and safe but compliance with therapy is highly variable ranging from 29% to 83%.[55] In non-apnoeic snorers, low CPAP levels of 4–6 cm $H_2O$ have been proven to be effective in eliminating snoring.[54] In another study, a prospective cross-over trial comparing CPAP with a mandibular advancement splint in 20 snorers, improvements in Snoring Outcome Survey outcomes were found and five patients chose to continue CPAP therapy long-term.[47] Our universal clinical experience is when tolerated, CPAP provides an excellent way to reduce or eliminate snoring.

*Level of Evidence*: B.
*Recommendation with level of certainty*: *High*.

CPAP therapy should be considered as an option if patients are willing to trial or are already committed to CPAP use.

## Myofunctional therapy

Myofunctional therapy (MT) has been demonstrated to reduce snoring severity, generally in the presence of OSA.[56,57] It has traditionally been delivered by a Speech Pathologist over a three-month period and utilizes isotonic and isometric exercises that target the tongue, soft palate and lateral pharyngeal walls.

Improvements in snoring severity have been seen both subjectively on validated scales and objectively on polysomnography.[58] The only RCT administering oropharyngeal exercises in snorers with minimal OSA (AHI <15/h) demonstrated that a 15 min upper airway exercise regimen performed daily through smartphone gameplay for 8 weeks, decreased mean snoring rate (measured acoustically) by 22% and reduced snoring frequency and volume (reported by partners).[56] Thus, whilst this intervention appears safe, further RCTs are warranted in non-apnoeic snoring populations.

*Level of Evidence*: B.
*Recommendation with level of certainty*: *Low*.

Use of MT should be limited to certain settings with experienced speech pathology input. It is considered a low risk

option but significant commitment is required to achieve a small reduction in snoring.

## Surgical treatment of primary snoring

Surgical treatment of snoring is anatomically driven, being guided by a thorough evaluation of the nasal and upper airway, including dynamic assessment performed by a qualified Otolaryngologist. In primary snoring, the soft palate is implicated as a contributor in more than 90% of cases.[59] Evidence for specific surgical techniques is described below.

### Nasal obstruction

Studies assessing the clinical effectiveness of nasal surgery in improving snoring symptoms are limited to retrospective case series with few studies using objective means to measure snoring. Sabbe et al.[60] found an improvement in overall snoring scores in 61% of their patients following septoplasty and turbinoplasty. Ertugay et al.[61] in their study of 64 consecutive patients who underwent septoplasty alone for nasal obstruction and socially disruptive snoring found a statistically significant improvement in snoring severity index and also Epworth Sleepiness scale (ESS) and Nasal obstruction symptoms evaluation (NOSE). Similarly, Wu et al.[62] evaluated the clinical effectiveness of nasal surgery and on subgroup analysis found a significant improvement in patient snore outcomes, ESS and their Spouse/Bed partner's survey score indicating improved quality of life.

*Level of evidence*: C.
*Recommendation with level of certainty*: *High*.

Septoplasty with concurrent turbinate reduction is only recommended in patients with primary snoring who have both symptoms and objective nasendoscopic evidence of nasal obstruction. Its benefit as a primary procedure to treat snoring is uncertain and inconsistent, however it may be considered preliminary or adjunctive to subsequent non-surgical therapies.

### Soft palate surgery

*Radiofrequency palate surgery*
Radiofrequency (RF) palatal surgery involves volume reduction and/or stiffening of soft tissue of the palate, using temperature-controlled radiofrequency to selectively induce submucosal tissue change. A RCT assessed the impact of radiofrequency surgery of the soft palate in 26 patients with primary snoring (performed under local anaesthesia). Findings included a significant reduction in snoring scores in the surgery group compared to placebo.[63] Similarly Lee et al.[64] in their parallel-arm RCT, using both subjective (visual analogue scale and snoring outcome survey) and objective parameters (external microphone), compared 14 patients who underwent RF versus palatal implants, and found a significant improvement in partner based visual analogue scales (VAS) measuring intensity of snoring in both groups over a period of 3 months. Other prospective cohort studies have produced similar results in the short term,[65] however the long term clinical utility of RF palatal surgery has not been as promising.[66]

*Level of evidence*: B.
*Recommendation with level of certainty*: *Moderate*.

RF palatal surgery is a safe and effective short-term option for snoring with minimal morbidity but patients may require additional therapy.

*Uvulopalatopharyngoplasty*
The modified Uvulopalatopharyngoplasty (modUPPP) is a reconstructive procedure which replaces the original ablative operations. A well designed, rigorously executed RCT including modUPPP as a component has demonstrated efficacy in the treatment of OSA.[67] In a separate RCT, German researchers also identified a reduction in snoring with a UPPP variant in patients with OSA.[68] Other studies, involving patients with mild OSA, showed similar improvements.[69,70] There is a paucity of data assessing clinical effectiveness of UPPP variants in the management of snoring without OSA. Previous studies have shown the original ablative versions of UPPP were effective in the short term, however the benefit of reduction in snoring declines with time.[71] In a Belgian prospective cohort study of 30 patients who underwent uvulopalatopharyngoplasty for snoring (patients with mean AHI of 13.1), 88% achieved a significant reduction in snoring score at 6 months, indicating that patients whose primary symptom was snoring achieved clinical benefit.[60] Recently, a single centre Australian cohort study has demonstrated that modUPPP in combination with coblation tongue channelling is highly efficacious in the treatment of primary snoring with an AHI < 15. Amongst 68 patients, a significant reduction in both snoring severity scale (SSS) and ESS was achieved, with a notably large effect size and a low complication rate.[72]

There has been one RCT comparing radiofrequency assisted uvulopalatoplasty (RAUP) to laser assisted uvulopalatoplasty (LAUP) which showed a reduction in post-operative pain and complications in the RAUP group, both yielding a significant improvement in snoring VAS and ESS.[73] RAUP and LAUP have the advantage of being able to be performed under local anaesthesia, however unpredictable scarring is a major concern.

*Level of evidence*: B.
*Recommendation with level of certainty*: *High*.

The Modified UPPP can be offered to patients whose primary symptom is snoring, with appropriate anatomy

assessed by nasendoscopy, and following consideration of CPAP and MAD therapy.

*Palatal soft tissue implants*

Palatal soft tissue implants involve the deployment of permanent soft tissue implants, usually three into the midline soft palate musculature, designed to initiate a fibrotic chronic inflammatory response and submucosal scarring without tissue volume reduction. The most recent meta-analysis based on seven case-controlled studies using partner-based VAS scores of snoring showed the pillar implant reduced snoring significantly, albeit with a standardized mean extrusion rate of 9.3%. However, the authors recognized that coexistent OSA could be persistent or exacerbated.[74] Rotenburg et al., in a prospective longitudinal study of 23 patients over a 4 year period, found the clinical effect of implants deteriorated significantly over time.[75]

*Level of evidence*: C.
*Recommendation with level of certainty*: *Moderate*.

Palatal implants are an effective treatment of snoring in the short term. However, they have an unacceptably high rate of extrusion and limited sustained clinical benefit with the potential to worsen OSA.

*Injection snoreplasty*

Injection snoreplasty involves the injection of a sclerosing agent into the submucosa of the soft palate to target those patients with palatal flutter. It is performed under local anaesthesia in the office, often as a single injection, aimed at inducing scarring within the palatal mucosa. The two most common agents used are sodium tetradecyl sulfate (STS) and a combination of 2% lidocaine and ethanol with no reported difference in effectiveness. Prospective cohort studies have highlighted the impact of injection snoreplasty in reducing both total snoring time and snoring intensity at 6–12 months with minimal side effects,[76–78] however its efficacy reduces over time.[79]

*Level of evidence*: C.
*Recommendation with level of certainty*: *Low*.

Injection snoreplasty may be offered to patients whose primary issue is palatal flutter, however results are hard to predict and not likely to be sustained in the long term.

### Other surgical options

Office based treatments such as laser assisted uvulopalatoplasty (LAUP) and use of the Er:YAG laser (Nightlase) have limited clinical effectiveness to support implementation with potential long-term side effects. Published literature is limited to small patient number case series with only minor treatment effect. Although more invasive procedures such as maxillomandibular advancement and midline glossectomy have shown high efficacy in the management of OSA, there is limited data on their use in primary snoring, and at present are not recommended as a primary surgical modality given the potential for significant morbidity.

## Combination therapy

Combination Therapy has been defined in the *OSA* literature (80) as combining pre-phase + adjunctive, *or* adjunctive + mainstream, *or* more than one mainstream treatment, a concept that may be applicable to *primary snoring*.

However, the effect of combination treatments to manage residual snoring after initial intervention has not been adequately assessed.

Two RCTs assessed the effect of combination therapy with oral and PT devices on OSA severity, both resulting in higher therapeutic efficacy.[81,82]

*Level of Evidence*: B.
*Recommendation with level of certainty*: *Moderate*.

Combination therapy can be considered when the risks of each modality, and combination therapies have been discussed.

## CONCLUSION

The optimal treatment of primary snoring is in evolution, and currently there are a range of modalities available to the clinician. As the body of evidence specifically assessing primary snoring with objective parameters grows, treatment paradigms will become better defined. A multidisciplinary team approach incorporating patient and anatomical factors, combined with expert clinical opinion achieves the best patient outcomes following treatment. This position statement summarizes the current available evidence, incorporating clinical experience into a series of recommendations aimed at guidance on the symptomatic treatment of primary snoring in patients with an AHI < 15.

### AUTHOR CONTRIBUTION

**Leba M. Sarkis:** Conceptualization (equal); data curation (equal); formal analysis (equal); investigation (equal); methodology (equal); project administration (equal); writing – original draft (equal); writing – review and editing (equal). **Andrew C. Jones:** Conceptualization (equal); data curation (equal); formal analysis (equal); methodology (equal); writing – original draft (equal); writing – review and editing (equal). **Andrew Ng:** Conceptualization (equal); data curation (equal); formal analysis (equal); investigation (equal); methodology (equal); writing – original draft (equal); writing – review and editing (equal). **Christopher Pantin:** Conceptualization (equal); data curation (equal); formal analysis (equal); writing – original draft (equal); writing – review

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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