



## **Assessment of snorers in primary care: straight path to treatment**

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This viewpoint article describes a model for primary care management of snorers. Our model is designed to provide a guide for general practitioners (GPs) to group snorers based on the two dimensions of sleepiness and nocturnal hypoxaemia. We have carefully avoided the topic of whether one could use pulse oximetry in place of polysomnography as an initial investigation for Obstructive Sleep Apnoea (OSA) within a *specialist* facility. Rather, we are offering a way to think about snoring patients in primary care. Some of those snorers will include people with OSA, but the model does not purport to diagnose those patients specifically.

### **Why is snoring something that medical practitioners need to take seriously?**

Heavy snoring is an important health issue for both those who snore, and those who live with snorers. Epidemiological studies suggest the prevalence of snoring may be 20%-60% of the adult population. The prevalence increases with age, particularly among men.<sup>1-3</sup> Snoring is characterised by recurrent inspiratory noise arising from oropharyngeal vibration. Habitual snoring is the most common symptom of OSA,<sup>4</sup> a condition which has been shown to be associated with disturbed sleep, excessive daytime sleepiness and hypertension. Snoring itself is independently associated with hypertension in both men and women even when frank OSA is absent.<sup>5</sup>

There are social consequences to snoring. Habitual snoring is a cause of familial disruption particularly when it leads to use of separate beds or even bedrooms. Not surprisingly, sleeping partners of heavy snorers are more frequently affected by symptoms of fragmented sleep and chronic fatigue than are partners of non-snorers.<sup>6</sup>

### **What are the current guidelines for management of snorers?**

Current practice guidelines urge GPs to refer patients who present with snoring and daytime sleepiness to specialist sleep services for comprehensive investigation using polysomnography.<sup>7</sup> Polysomnographic investigation is a robust and well established method for detecting sleep disorders that are often associated with snoring (OSA and Upper Airway Resistance Syndrome (UARS)), and particularly other less prevalent sleep disorders. Unfortunately patient access to polysomnographic investigation can be limited through lack of local facilities. A recent position paper prepared by the New Zealand branch of the Thoracic Society of Australia and New Zealand described long waiting times for polysomnographic investigation in most centres due to limited health care delivery resources.

Those patients who are referred for management of snoring to non-sleep specialists without initial polysomnographic investigation risk having a potentially debilitating sleep disorder remain undiagnosed.<sup>8</sup> Those who are referred to sleep specialists in the first instance often face considerable delays before receiving appropriate treatment for snoring or for OSA. The dilemma for the GP is whether to refer a patient suffering

from disruptive snoring to a specialist (and how to decide which specialist) or to advise conservative treatment.

### **There are alternative investigations that could guide primary practice management of snoring – a two-dimensional approach.**

Partner-reporting has been validated against polysomnography and found to be very reliable for establishing the presence of habitual snoring.<sup>4,6</sup> Polysomnography is not needed to confirm a diagnosis of snoring.

We believe it would be useful for GPs to assess two further symptomatic dimensions before deciding on the next appropriate management step for snorers - excessive (or problematic) daytime sleepiness, and nocturnal hypoxaemia. Together, those two dimensions reflect the increased morbidity associated with snoring. The Epworth Sleepiness Scale (ESS)<sup>9</sup> can be used to assess excessive daytime sleepiness, and recording pulse oximetry can be used to assess nocturnal hypoxaemia. Both these tools could easily be used in general practice.

The ESS has been used extensively in both clinical and research settings. It is an eight-item questionnaire that asks patient to self-rate their propensity for dozing in a range of everyday situations. The rating (0-3) for all items are added to give an ESS score of 0 (insignificant daytime sleepiness) to 24 (excessive daytime sleepiness). While it does not correlate particularly well with polysomnography-based tests designed to measure sleepiness (Maintenance of Wakefulness Test, and Multiple Sleep Latency Test) it has been argued that the ESS contains a psychosocial element that relates better than those tests to the lifestyle *impact* of sleepiness.<sup>10</sup> The ESS has been found to be a good predictor of long-term adherence to nasal continuous positive airway pressure therapy (nCPAP), the treatment of choice for OSA.<sup>11</sup> Most importantly, the severity of OSA rated according to the frequency of obstructive events is not predictive of long term adherence to therapy in those patients who are not also suffering excessive daytime sleepiness (ESS = 10).<sup>12</sup>

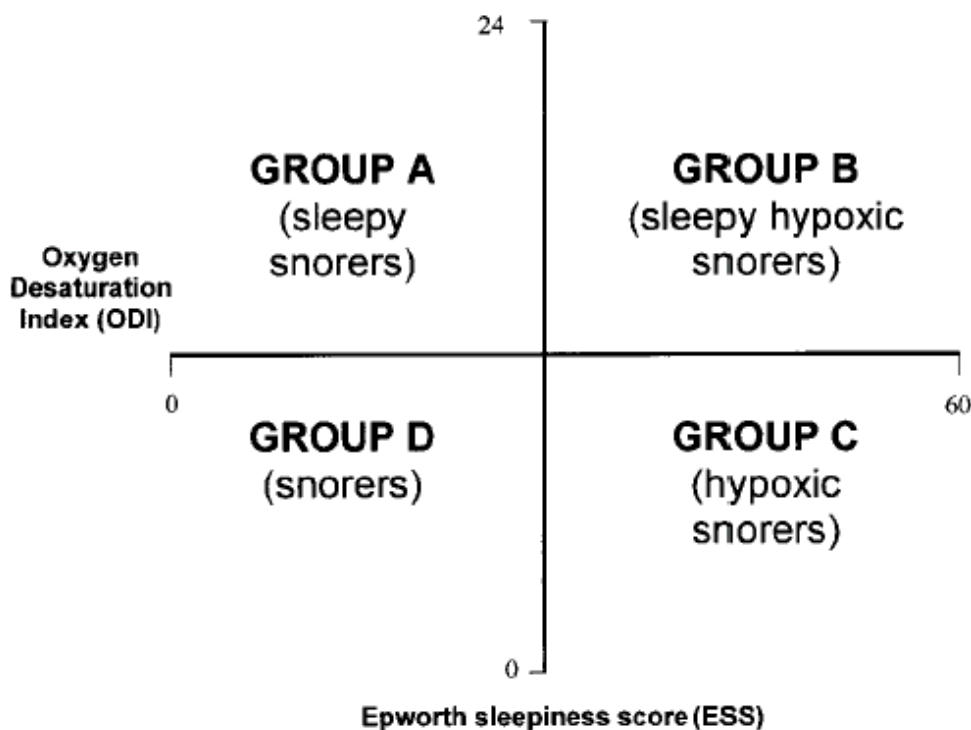
Pulse oximetry has been used increasingly over the last two decades to measure absolute nocturnal hypoxaemia and, more recently, patterns of desaturation.<sup>13</sup> It has been used as a case-selection tool in the first published mechanical-placebo controlled randomised trial of nasal continuous positive airway pressure treatment for obstructive sleep apnoea.<sup>14</sup> There is a close correlation between oxygen saturation dips and obstructive respiration,<sup>15-29</sup> particularly among patients who have normal daytime lung function.<sup>30</sup> It is important for GPs to have some indication of the frequency of desaturation before choosing the next step in managing problematic snoring. An independent relationship between frequency of obstructive respiration and systemic hypertension has been reported from the initial phase of the Sleep Health Heart Study, a large cohort study designed to investigate the relationship between sleep-disordered breathing and cardiovascular disease.<sup>31</sup>

### **Putting the dimensions together – the Sparks Chart.**

Most studies reported in the literature have focused on using ESS and/or pulse oximetry to assist in the *diagnosis* of sleep-disordered breathing in a secondary healthcare setting. We suggest that combining the two dimensions of sleepiness (ESS) and hypoxaemia (oxygen desaturation index (ODI)) would provide *primary care*

providers with a system for grouping their otherwise healthy snoring patients, and that management decisions could be made based on those groupings (Figure 1).

**Figure 1. The Sparks Chart – grouping snorers according to combined Epworth Sleepiness Score (ESS) and  $\geq 4\%$  oxygen desaturation index (ODI).**



#### Where do the axes cross?

The distribution of ESS scores for 72 normal subjects have been published elsewhere<sup>32</sup> showing a reference range of 0-10 for ostensibly healthy male and female workers, aged 22-59 years, in Australia. Evidence from a recent randomised controlled trial suggested that an initial ESS score below 10 predicts a patient is unlikely to tolerate nCPAP therapy even if they have a high frequency of obstructive respiratory events.<sup>12</sup> When considering how best to manage snoring, we suggest applying a group demarcation at ESS = 10. The ESS contributes to the assessment by identifying those snorers in whom non-respiratory sleep disorders might need to be considered, and also by identifying those who are unlikely to tolerate nCPAP even if OSA is the primary diagnosis.

The correlation between the frequency of obstructive respiratory events and ODI strengthens as the frequency increases.<sup>25</sup> When considering how best to manage snoring, we suggest applying a group demarcation at ODI = 20. This could be adjusted according to availability of local resources. The ODI contributes to the assessment by identifying those snorers who are thought to be more likely to develop cardiovascular morbidity if left untreated.<sup>5,31</sup>

#### The groups in detail.

**Group A – Sleepy snorers.** This group will mostly contain those snorers who have mild OSA or UARS, but may also contain snorers with co-existing non-respiratory

sleep disorders such as periodic limb movement syndrome, or narcolepsy. As such, they should be referred to a specialist sleep service for further management that may include polysomnographic investigation, although the specific approach will vary between centres.<sup>33</sup> Treatment outcomes should include elimination of snoring and normalisation of ESS.

**Group B – Sleepy hypoxic snorers.** This group will mostly contain snorers who have moderate or severe OSA, but may also contain snorers with co-existing cardiac dysfunction. As such they should be referred to a specialist sleep service for urgent consideration of nCPAP therapy.<sup>14</sup> Treatment outcomes should include elimination of snoring and normalisation of both ESS and ODI.

**Group C – Hypoxic snorers.** This group will mostly contain snorers who have moderate or severe OSA, but may also contain snorers with co-existing cardiac dysfunction. However, nCPAP is unlikely to be tolerated as a long-term therapeutic option without considerable specialist intervention.<sup>12</sup> They should be referred to a specialist cardiorespiratory service on an urgent basis. Intensive support may improve nCPAP response in this group.<sup>34</sup> However, these patients require additional investigative procedures before commencing therapy. Treatment outcomes should include elimination of snoring and normalisation of ODI.

**Group D – Snorers.** This group will mostly contain those who have snoring alone, but may also contain snorers with co-existing mild OSA. However, nCPAP is unlikely to be tolerated as a long-term therapeutic option without considerable intervention. Therefore other treatment options should be discussed with the patient, and consideration given to conservative management, or referral to orthodontic/ENT specialist services.<sup>35,36</sup> Treatment outcomes need only include elimination of snoring.

**How does this look in practice?**

A retrospective analysis of 100 consecutive patients with problematic snoring who presented over twelve months to a general practice located in the city of Christchurch (population 350 000) was performed, and the patients were grouped according to the criteria outlined earlier (ESS = 10 and ODI = 20, Table 1).

**Table 1. 100 patients presenting with snoring to a Christchurch general practice, grouped according to combined Epworth Sleepiness Score (ESS) and ≥4% oxygen desaturation index (ODI).**

Group	A (ESS≥10, ODI<20)	B (ESS≥10, ODI≥20)	C (ESS<10, ODI≥20)	D (ESS<10, ODI<20)
Number	48	14	3	35

35% of the study sample (Group D) were identified as uncomplicated snorers who would likely benefit from specialist ENT or specialist dental assessment, or who could try conservative treatment co-ordinated through their GP.<sup>35</sup> 14% (Group B) were identified as needing urgent consideration for nCPAP. Three percent (Group C) were hypoxic snorers who did not report daytime sleepiness and hence would likely benefit from further assessment from a specialist respiratory physician. 48% of the sample (Group A) were found to be sleepy snorers in need of further assessment by a specialist sleep service, but *not* on an urgent basis.

## Summary

Habitual snoring needs to be taken seriously, both as a symptom of other sleep disorders and as a condition in its own right. GPs approached by patients with problematic snoring face a dilemma regarding whether (and to which service) those patients should be referred for a specialist opinion. Using the Sparks Chart, snoring patients can be grouped according to the two symptomatic dimensions of excessive daytime sleepiness and nocturnal hypoxaemia. We believe that the approach outlined in this article offers GPs a coherent and pragmatic guideline for referring and/or managing problematic snoring by using a simple questionnaire and pulse oximetry. The method has the potential to improve primary and secondary liaison. Most importantly, it offers patients a straight path to treatment.

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