Snoring and Obstructive Sleep Apnea:
Patient's Guide to Minimally Invasive Treatments
Chapter 3

DIAGNOSIS OF SNORING AND SLEEP APNEA

Patients with snoring should be carefully evaluated for the anatomical site most likely to contribute to their snoring. Questionnaires should be used to help qualify the degree to which snoring impacts the patient and the patient's bed partner. Patients should also be carefully questioned to see if they have any signs of symptoms of obstructive sleep apnea – often associated with snoring. Several questionnaires exist to assist with this evaluation. One such questionnaire is the Epworth Sleepiness scale[1], [2] shown below:

Use the following scale to choose the most appropriate number for each situation:

0 = would *never* doze or sleep.
1 = *slight* chance of dozing or sleeping
2 = *moderate* chance of dozing or sleeping
3 = *high* chance of dozing or sleeping

Situation	**Chance of Dozing or Sleeping**
Sitting and reading	____
Watching TV	____
Sitting inactive in a public place	____
Being a passenger in a motor vehicle for an hour or more	____
Lying down in the afternoon	____

Situation	Chance of Dozing or Sleeping
Sitting and talking to someone	____
Sitting quietly after lunch (no alcohol)	____
Stopped for a few minutes in traffic while driving	____
Total score (add the scores up) (This is your Epworth score)	____

Any evaluation for snoring or sleep apnea should include a thorough history and physical examination. Patients should be screened for pertinent co-morbidities such as high blood pressure, obesity, daytime sleepiness, diabetes, reflux, and stroke. The nose, nasal passage, mouth, oral cavity, tongue, soft palate, uvula, mandible (jaw), tonsils, adenoids, and neck soft tissues should all be carefully examined as possible sources for snoring and OSA. Simple, quick, and painless procedures are available for otolaryngologists (ear, nose, and throat doctors) to help pinpoint the source of the problem. Spending the time on the front end to locate the correct site of the problem will save a lot of time and frustration later if treatments are directed at the incorrect site.

A sleep study (to qualify and quantify the degree of OSA) should also be considered for patients who complain of snoring and who endorse signs of symptoms consistent with OSA. The American Academy of Sleep Medicine has stated that an accurate diagnosis of OSA requires objective testing such as a sleep study[3]. While sleep studies measure many factors, the Apnea-Hypopnea Index (AHI) (sometimes referred to as the Respiratory Disturbance Index – RDI) is often considered the primary measurement of a sleep study. The AHI is defined as the number of times an hour that the airflow is reduced. AHI of 5-15 is consistent with mild OSA, AHI of 15-30 is consistent with moderate OSA, and AHI greater than 30 is consistent with severe OSA. For instance, a patient whose sleep study shows an interruption/cessation of airflow for greater than 10 seconds that occurs 7 times per hour (7 apneas), along with a decrease/reduction in airflow

that last at least 10 seconds and that occurs 5 times per hour (5 hypopneas) would have an AHI of 12 (7 apneas + 5 hypopneas). This is consistent with mild OSA. There is a similar but distinct measurement system used for children.

Sleep studies typically will also measure a patient's oxygen levels (saturation). While levels normally should hover in the mid to upper 90s (ie-97% oxygen saturation), they can dip quite low in patients with OSA. This makes sense, since when patient's stop breathing they stop filling their lungs with air thereby slowing the delivery of oxygen. As our bodies demand high levels of oxygen to work effectively, this desaturation – if high enough– can have a significant impact on bodily functions.

Recent years have seen the introduction of home sleep studies in which patients wear a monitor while they sleep in the comfort, and natural environment of own bed, instead of sterile sleep labs [FIGURE 1]. There continues to be an increasing abundance of data in support of the efficacy, accuracy, and ease of use of these home sleep studies[4 5 6 7 8].

FIGURE 1 – Image of patient having a sleep study while sleeping in his own bed. A variety of sensors transmit information to the wrist-worn device shown here.

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[1] Johns M. "A New Method for Measuring Daytime Sleepiness: the Epworth Sleepiness Scale." Sleep. 1991;14:540-545.

[2] Lee NR. "Evaluation of the Obstructive Sleep Apnea Patient and Management of Snoring." Oral Maxillofacial Surg Clin N America. 2009;21:377-387.

[3] Kushida C, Littner M, Morgenthaler T, et al. "Practice Parameters for the Indications for Polysomnography and Related Procedures: an Update for 2005." Sleep. 2005;28(4):499-521.

[4] Pittman S, Ayas N, Macdonald M, Malhotra A, et al. "Using a Wrist-Worn Device Based on Peripheral Arterial Tonometry to Diagnose Obstructive Sleep Apnea: In-Laboratory and Ambulatory Ventilation." Sleep. 2004;27(5):923-932.

[5] Madani M, Frank M, Lloyf R, Dimitrova D, Madani F. "Polysomnography Versus Home Sleep Study: Overview and Clinical Application." Atlas Oral Maxillofacial Surg Clin N Amer. 2007;15(2):101-109.

[6] Michaelson P, Allan P, Chaney J, Mair E. "Validations of a Portable Home Sleep Study with Twelve-Lead Polysomnography: Comparisons and Insights Into a Variable Gold Standard." Annals of Otol Rhinol Laryngol. 2006;115(11):802-809.

[7] Bar A, Pillar G, Dvir I, Sheffy J, et al. "Evaluation of a Portable Device Based on Peripheral Arterial Tone for Unattended Home Sleep Studies." Chest. 2003;123(3):695-703.

[8] Patel M, Davidson T. "Home Sleep Testing in the Diagnosis and Treatment of Sleep Disordered Breathing." Otolaryngologic Clin N America. 2007;40(4):761-784.