Snoring – Effects and Treatments

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Disclosures

- None
Outline

- Snoring definition
- Snoring Impact
- Evaluation
- Treatment
- Outcomes
Snoring and Sleep

- Chronic habitual snoring
  - 20% women; 40% men
  - Most common symptom of OSA (occurring in 70-95%)
- OSA
  - AHI >5 + excessive daytime sleepiness
- Primary snoring
  - AHI <5; no daytime symptoms
- Snoring risk factors
  - Age, sex, obesity, ETOH or sedative use, smoking, nasal obstruction, asthma, COPD.
Snoring - Acoustics

- Snoring = noise generated when air flows though a narrowed upper airway
- Sound source: oscillation of soft palate >> pharyngeal walls, epiglottis, tongue
- Atonia of upper airway -> narrowing/increased resistance-> turbulent airflow-> vibration of pharyngeal tissues

Measuring Snoring

- Most studies depend on self-report
- Snoring evaluation measures
  - No agreed standard
  - Subjective: bed partner report, self-report (VAS)
  - Objective:
    - microphone, airflow, vibrations
    - amplitude, frequency, duration, timing
- Studying clinical effects:
  - Snoring intensity? Sound frequency? Time spent snoring?
Effects of primary snoring
Social Impact

- Bed partner
  - Impaired sleep quality
  - Relationship disharmony

- Second-hand snoring
  - Once treated, partner QOL increased, sleepiness scores improved (Parish & Lyng. Chest 2003)
Snoring and Sleepiness

- Sleep Heart Health Cohort Study
- 6000 self-reported snoring and ESS
- ESS increases with snoring frequency and loudness

**TABLE 3**

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Heavy Snoring as a Cause of Carotid Artery Atherosclerosis

Sharon A. Lee\textsuperscript{1,2}; Terence C. Amis, PhD\textsuperscript{1,2,4}; Karen Byth, PhD\textsuperscript{2,4}; George Larcos, MBBS\textsuperscript{3,4}; Kristina Kairaitis, PhD\textsuperscript{1,2,4}; Tracey D. Robinson, PhD\textsuperscript{1,2}; John R. Wheatley, PhD\textsuperscript{1,2,4}

\textsuperscript{1}Ludwig Engel Centre for Respiratory Research, \textsuperscript{2}Westmead Millennium Institute, \textsuperscript{3}Department of Nuclear Medicine and Ultrasound, Westmead Hospital and \textsuperscript{4}University of Sydney at Westmead Hospital, Westmead, NSW, Australia

- SLEEP 2008.
- 110 Subjects; Cross-sectional study
  - PSG, snoring, carotid + femoral artery doppler U/S
  - Severe snoring (>50% sleep time) is associated with carotid – but not femoral-atherosclerosis
  - AHI was not associated with CA after adjusting for snoring severity.
  - Adjusted for AHI - Did not examine primary snorers
Mechanism of atherosclerosis

Rabbit model

- Right common carotid exposed to 6 hours of vibration
- Endothelial dysfunction: Reduced vasorelaxation
- Vibration induced vascular injury

Cho et al. Sleep. 2011
Snoring and CV events

• Prospective cohort study with 10 year followup
• 377 snorers; 264 non-snorers; AHI<5
• Self-reported snoring confirmed by close relative, no excessive daytime sleepiness
• No increased risk of fatal or nonfatal CV events in primary snorers without OSA.
Evaluation of Snoring

- Screen for OSA
- Sleepiness, daytime symptoms
- Bed partner – Separate rooms
- Patient expectations
- Exam
  - BMI
  - Nose
  - Palate/Oropharynx
  - Mandible
  - Neck
Snoring Intensity and OSA

- 1600 Habitual snorers
  - PSG and objective measures
- Significant correlation between loudness of snoring and AHI
  - AHI < 5  46dB
  - AHI >50  60dB

Figure 1—Correlation between severity of OSA and snoring intensity

Snoring Treatment

- Amazon.com ~800+ products
- Treatment Goals
- Treatment Types:
  - Behavior Modification
  - Devices
  - Surgery
Snore Aids

- Prospective randomized trial
  - Oral lubricant spray
  - Breathe right strips
  - Snore-no-more pillow
- No objective or subjective difference
Behavioral Modification

- Position
- Weight Loss
- Avoid alcohol, sedatives
- Singing/Exercises
Exercises for Snoring

- 39 patients randomized: Nasal strips plus
  1. Respiratory exercises (control)
  2. Oropharyngeal exercises (8 minutes TID)
- Decreased snoring frequency by 36%; Snore index 99.5 to 48.2
Devices – MAD and Theravent
Surgical Approaches

- Nasal
- Tonsils
- Palate
- Tongue
Treating Nasal Obstruction

- Trial with nasal steroid spray x 3 weeks
- Breathe-right strips
- Allergy and sinus management
- Surgery – Septoplasty, turbinate reduction, NSR
- Medical or surgical treatment
  - Improves quality of life
  - Reduces mouth breathing
  - Variable results on snoring
Palate Stiffening

- Injection Snoreplasty
  - 99% denatured alcohol
  - 3% sodium tetrade cyl sulfate

- Palate Radiofrequency
  - 1-3 treatments

- CAPSO – Cautery Assisted Palatal Stiffening
  - Pang OtoHNS 2007: remove mucosa
  - Subjective improvement at 3 months

- Pillar Implants
  - 3-5 in muscular layer of soft palate
  - Extrusion in up to 11%
Pillar vs. RF (one treatment)

- RCT single session implant vs RF treatment (14 per group)
- 3-month VAS improved in both: implant group better
- Objective snore maximal loudness reduced in implant group
- Snoring index reduced in RF group

Lee et al. PLOS one 2014.
Pillar Implants – Long Term

- Rotenberg and Luu. Laryngoscope 2012.
- Prospective cohort: 23 snorers, AHI < 15
- At 1 year: 95% would recommend;
- At 4 years: only 22% would recommend

Fig. 1. Comparison of mean snoring scale at baseline, week 52 and week 208. * = significant difference from baseline.
Palate Reduction

- UPPP, UPF

- LAUP – Laser Assisted Uvulopalatoplasty
  - 1-3 treatments to reshape the soft palate
  - Can reduce tonsil size
  - Laser: CO2, KTP, Argon, (electrocautery)

- Comparison of UPPP vs. LAUP 1-4 years. (Prasad 2003) – 60 patients, bed-partner queried
Palate Suture Techniques

Suture Technique

A


TranQuill Sling

Comparisons

- Measures of snoring: subjective vs. objective
  - Often results don’t match
- Most treatments have demonstrated improvement in subjective scores at 6-12 months post-procedure (short term)
- Long-term relapse rate is high
Treatment Comparisons

- Terryn et al. Oto HNS 2015.
- 200 pts treated with CPAP, MAD, or surgery (various).
- AHI < 20
Conclusions

- Snoring is prevalent and has significant impact on the patient and the bed partner.
- Evaluation should rule out OSA.
- Snoring interventions can improve snoring with varying success. Defining goals of treatment is essential.
- More work is needed to define health effects of snoring and changes with treatment.