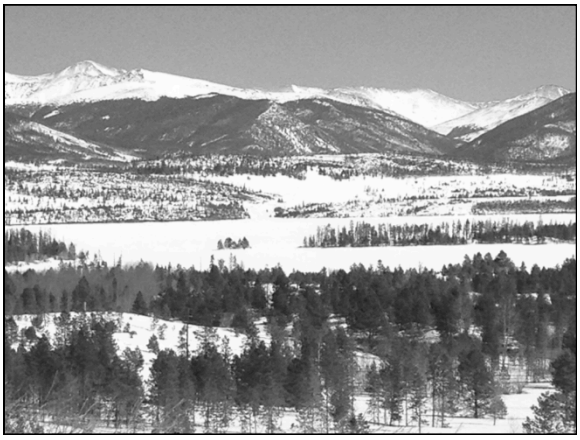


EVALUATION OF THE
SLEEP DISORDERED PATIENT

The Dentist's Role

The Role of the Dentist

- Many dentists expressed an interest for further training Dec 2008 BMJ
- 65% of adults age 18 to 65 and 58% of adults > 65 visit the dentist during a 12 month period JADA Jan 2010
- Dentist is important access point for identification & treatment of OSA

Sleep and Breathing 2007

The Knowledge, Opinions and Clinical Experience of the Dentist – OSA & OA

- Survey of 500 Dentists in Indiana – 192 responses
- 58% could not identify signs and symptoms of OSA
- 55% do not know mechanism for OAs

"Knowledge, Opinions, and Clinical Experience of General Dentists toward Obstructive Sleep Apnea and Oral Appliances"
Hui Bian, MA. *Sleep and Breathing*, Vol 8, No2, 2004, p85-90

If You Think Training is Expensive

Try Ignorance

Mark Twain

The Role of Dentistry In the Treatment of SRBD

- Adopted by the ADA House of Delegates 2017
- Summarizes SRBD – findings and consequences
- Dentists are "encouraged to screen patients for SRBD" – part of evaluation – even children
- Review of oral appliances for treatment
- Be able to manage side effects (outcomes)
- Maintain communication with MDs
- Follow-up testing by the MD
- Plus: Evidence Brief on Oral Appliances

The Role of the Dentist in Sleep Medicine

1. The Indirect Approach
2. The Direct Approach

INDIRECT APPROACH

1. Recognizing that a sleep disorder may be present
2. Educating the patient and making the proper referral

DIRECT APPROACH

1. Involved with the direct treatment of the patient to aid with the management of the patient's sleep disorder
2. Most often involves the use of an Oral Appliance or possibly surgery

Sleep Apnea Screening For Dentists – political Means and Practical Performance

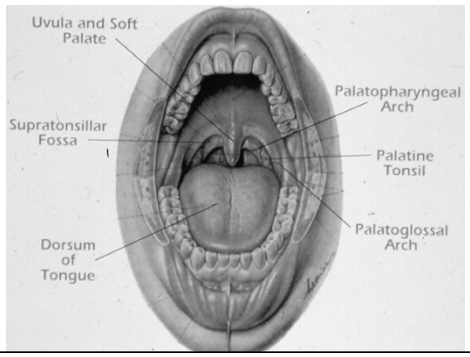
- 95% of sleep apnea patients undiagnosed
- Sleep Disorders Dentists see as many patients as GP physicians
- Dentists play an increasing role in the recognition & diagnosis of sleep apnea

Abstract: Sleep Utah 2006
Schwarting S and Netzer NC

Your Practice and OSA

- 1 in 4 younger / middle aged men
- 7 in 10 of the Medicare population

What the Dentist Sees Every Day



What the Dentist Sees Daily that Indicates the Potential for having a Sleep Disorder

- Bruxism / Tooth Wear
- GERD
- Narrow Maxilla / High Palate
- Loss of the Gag Reflex
- Headaches
- Mouth Breathing Habit
- Orofacial pain
- Coated Tongue / Scalloped Tongue
- Crossbite
- Malocclusion / Dental Crowding
- Abfraction / Cervical Erosion / Recession
- Tongue Thrust

Clinical Findings By Category

- The Tongue
- Teeth & Periodontal Structures
- Airway
- Extra-Oral
- Nose / Nasal Airway
- Posture of the Head / Neck

The Tongue

- Coated
- Enlarged
- Crenations (Scalloping)
- Obstructs view of Oropharynx (Malampatie Score or FTP)
- Grooved at midline

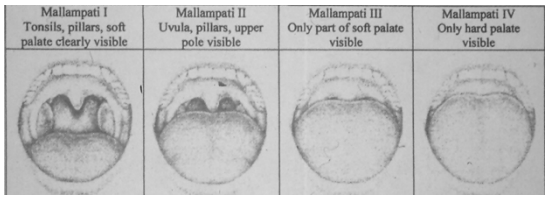
Scalloping / Crenations

Scalloping of the Tongue (Crenation)

- 71% specific for ↓ sleep efficiency
- 70% specific for abnormal AHI
- 86% specific for ↓ oxygen saturation of >4%
- Presence & Severity correlates with Malampati score

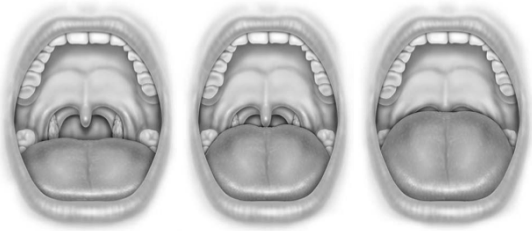
  Otolaryngology – Head Neck Surg
  December 2005 p.966-971

Risk for Sleep Apnea



Friedman Tongue Position

FTP I FTP IIA FTP IIB



FTP III FTP IV

Malampati Score predicting Sleep Apnea

- For every one point increase in score odds of OSA increases 2-fold
- Also for every one point increase AHI increases 5 events per hour
- Results independent of airway anatomy, BMI and medical history

Teeth & Periodontal Structures

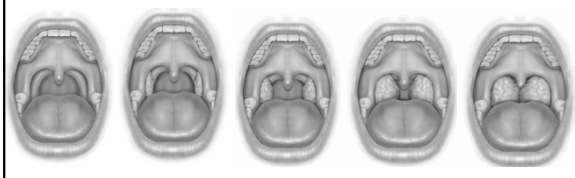
- Gingival inflammation
- Gingival bleeding
- Dry Mouth
- Gingival Recession
- Tooth wear
- Abfraction

Airway

- Long slopping soft palate
- Enlarged / swollen / elongated uvual
- Enlarged tonsils

Grading of Tonsils

0 1 2 3 4



Tonsils
Look 3-Dimensionally

Extra-Oral

- Chapped lips - cracking at corners of the lips
- Poor lip seal
- Mandibular retrognathia (beard effect)
- Doliocephalic (long face)
- Enlarged Masseter muscles

Posture

- Forward head posture (FHP)
- Loss of lordotic curve
- Posterior rotation
- Limited ROM of neck

The History and the Clinical Evaluation - Screening

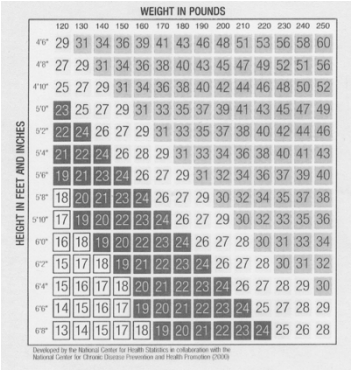
- The History
  - Add Questions to Current Health History
  - Had a previous sleep study or treatment
  - The Epworth Sleepiness Scale (ESS)
  - Nasal Obstruction Symptom Evaluation (NOSE) Scale
  - STOP Questionnaire
- The Clinical Evaluation
  - Head / Neck / Airway Evaluation

Risk Factors

Body Mass Index (BMI)
Neck size: Males > 17 inches
Females > 15.5 inches
Waist Size: Males > 40 inches
Females > 35 inches
Others: Hypertension
Elevated Glucose
Physical Inactivity
High LDL "bad Cholesterol"
Low HDL "good Cholesterol"
CVD (family history)

BMI Chart

<18 underweight
18.5 - 24.9 normal
25 - 29.9 overweight
>30 obese



Add Questions to the Health History - 5 Questions

- Do you Snore?
- Wake up Tired? Tired During the Day?
- Fall Asleep in Meetings or Social Situations?
- Have High Blood Pressure?
- Experience or Observed to Stop Breathing During Sleep?

Questionnaires

- Epworth Sleepiness Scale (ESS)
- STOP-Bang
- Berlin
- Pittsburgh Sleep Quality Index (PSQI)
- NOSE scale

The Epworth Sleepiness Scale (ESS) Sleep 1991;149(6):540545

Name_____Age_____ Sex_____ Date_____

THE EPWORTH SLEEPINESS SCALE

How likely are you to doze off or fall asleep in the following situations, in contrast to feeling just tired? This refers to your usual way of life in recent times. Even if you have not done some of these things recently try to work out how they would have affected you.

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

0 = would never doze
1 = slight chance of dozing
2 = moderate chance of dozing
3 = high chance of dozing

Situation	Chance of dozing
Sitting and reading	
Watching TV	
Sitting, inactive in public place (e.g. theater or meeting)	
As a passenger in a car for an hour without a break	
Lying down to rest in afternoon when circumstances permit	
Sitting and talking to someone	
Sitting quietly after lunch without alcohol	
In car, while stopped for a few minutes in the traffic	
Total score	

BEHAVIOR DURING SLEEP

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

0 = never during a usual night
1 = less than once a week
2 = once to about half the nights per week
3 = half the nights to almost always
4 = almost always or every night
? = don't know or haven't been told.

During your usual sleep, you have noticed or have been told you do the following: (0 - 4, ?)

1. Snore loudly
2. Stop breathing
3. Choke, struggle for breath
4. Toss and turn frequently
5. Wake up with headache

Usual number hours of sleep per night _____
Number of times you rise to use toilet _____

STOP - BANG

- Do you SNORE loudly?
- Often feel TIRED - fatigued - sleepy?
- Been OBSERVED to stop breathing while sleeping?
- Being treated for or have high blood PRESSURE?
- BMI over 35?
- AGE > 50
- NECK circumference >15.75 inches
- GENDER male

Results: ≥3 yes answers: high risk for OSA
<3 yes answers: low risk for OSA

UCLA OROFACIAL PAIN AND DENTAL SLEEP MEDICINE CLINIC

STOP-BANG Sleep Questionnaire

Patient Name:_____ Height:_____inches Age:_____

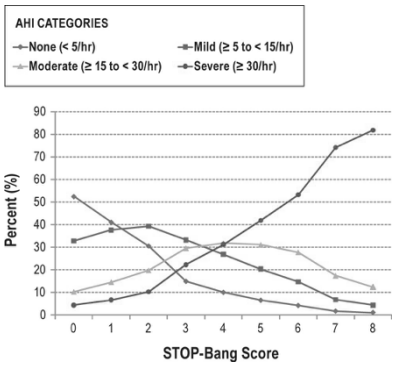
Gender:_____ Neck Circumference:_____ inches

	Patient Questionnaire	Yes	No
Snoring:	Do you snore loudly? (Louder than talking or loud enough to be heard through closed doors)		
Tired	Do you often feel tired, fatigued, or sleepy during the daytime?		
Observed	Has anyone observed you stop breathing during your sleep?		
blood Pressure	Do you have or are you being treated for high blood pressure?		
	Clinician Observations		
BMI	Is BMI more than 35 kg/m2		
Age	Is Age over 50 years old?		
Neck Circumference	Is the neck circumference greater than 16 (female) or 17 (male)?		
Gender	Is the gender male?		

Score of 3

- 14.9% chance no OSA
- 33.2% chance for mild OSA
- 29.6% chance for moderate OSA
- 22.3% chance for severe OSA
- Overall - 85% chance for any level of OSA

AHI Categories:



Berlin

SLEEP EVALUATION

1 Complete the following:
height _____ age _____
weight _____ male/female ____

CATEGORY 1

2 Do you snore?
- yes
- no
- don't know

If you snore:

3 Your snoring is?
- slightly louder than breathing
- as loud as talking
- louder than talking
- very loud. Can be heard in adjacent rooms.

4 How often do you snore?
- nearly every day
- 3-4 times a week
- 1-2 times a week
- 1-2 times a month
- never or nearly never

5 Has your snoring ever bothered other people?
- yes
- no

6 Has anyone noticed that you quit breathing during your sleep?
- nearly every day
- 3-4 times a week
- 1-2 times a week
- 1-2 times a month
- never or nearly never

CATEGORY 2

7 How often do you feel tired or fatigued after your sleep?
- nearly every day
- 3-4 times a week
- 1-2 times a week
- 1-2 times a month
- never or nearly never

8 During your wake time, do you feel tired, fatigued or not wake up to par?
- nearly every day
- 3-4 times a week
- 1-2 times a week
- 1-2 times a month
- never or nearly never

9 Have you ever nodded off or fallen asleep while driving a vehicle?
- yes
- no

If yes, how often does it occur?
- nearly every day
- 3-4 times a week
- 1-2 times a week
- 1-2 times a month
- never or nearly never

CATEGORY 3

10 Do you have high blood pressure?
- yes
- no
- don't know

BMI =

Nasal Obstruction Symptom Evaluation (NOSE)

Over the past 1 month how much of a problem were the following conditions for you ?

	Not a problem	very mild problem	moderate problem	fairly bad problem	severe problem
1. Nasal congestion or stuffiness	0	1	2	3	4
2. Nasal blockage or obstruction	0	1	2	3	4
3. Trouble breathing through my nose	0	1	2	3	4
4. Trouble sleeping	0	1	2	3	4
5. Unable to get enough air through my nose during exercise or exertion	0	1	2	3	4

Visual Analog Scale

Mark on this line how troublesome it is breathing through your nose on average

None ——— Severe

Testing for Sleep Disorders

- Indicated primarily for Sleep Disordered Breathing
- May be used for other disorders:
  PLMs – RBD for example
- Gold Standard is the PSG (Polysomnogram)
- Today is mostly HST / HSAT (Home Sleep Apnea Test)
- Pulse Oximetry has some validity (screening?)

"Now snore."

The NOSE

The Portal to the Airway

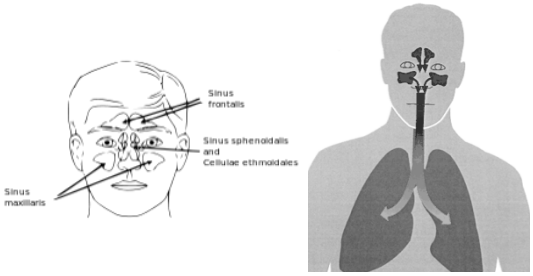
Warms and Humidifies Air
Humidifies the Air to ~ 80%
Warms air to ~ 90º
Filters the Air
Paranasal Sinuses release NO

The Nasal Airway

- We know it as the carburetor of the body for humidification and warming (also filters)
- Nasal airway also contains Nitric Oxide as a gas from the paranasal sinuses – delivered continuously into the nasal airway
- The nitric oxide is a vasodilator – enhances uptake of O_2 by the blood
- Another reason to nose breath – not mouth breathing – blood oxygen levels 10% higher with nose breathing

Acta Physiol Scand

Paranasal Sinuses



Anatomy of the Nose

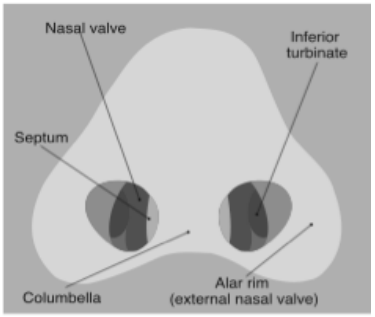
External

- Nasal Vestibule
- Alar Rim (External nasal valve)
- Columella

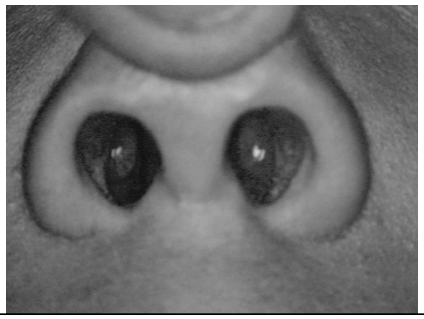
Internal

- Turbinates
- Nasal Swell Bodies
- Nasal Septum
- Choanae
- Nasal Valve
- Retropalatal Area (Nasopharynx)

Nasal Anatomy



The Nose / Nasal Airway



Mechanism of How Nasal Airway Obstruction leads to Sleep Disordered Breathing

Nasal Airway Resistance
↓
Increased Inspiratory Pressure
↓
Increased Intra-thoracic Pressure
↓
Airway Collapse (Snoring & Sleep Apnea)

The Nose and Sleep Disordered Breathing (SDB)

- SDB can result from or be made worse by nasal obstruction
- Nasal breathing increases ventilatory drive
- Nasal Occlusion (any cause) decreases nasal patency in normal subjects
- Nasal congestion (any cause) predisposes SDB
- Oral breathing in children leads to facial structure abnormalities

CHEST 2003

Archie Brusse, DDS

In July, 1935

ORTHODONTICS AS AN AID TO THE RHINOLOGIST*

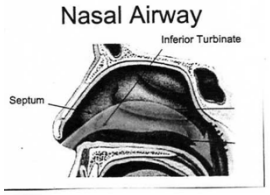
*Presented to the American Board of Orthodontia

Mosby's International J of Orthodontia and Dentistry for Children

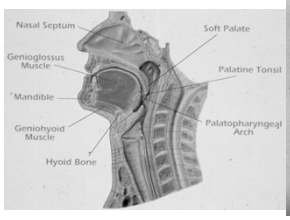
Orthodontics as an Aid To the Rhinologist

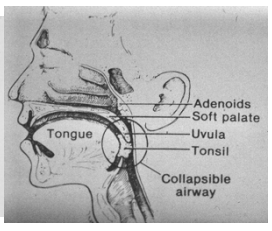
- Size and Shape of the Nasal Cavity are Determined by the Surrounding Bony Structures
- "…nasal septum, unable to accommodate its height to the practically unyielding floor and roof, follows the lines of least resistance and buckles."
- Relates this to Narrow Maxilla, Distocclusion and Mouth Breathing

The Nasal Airway



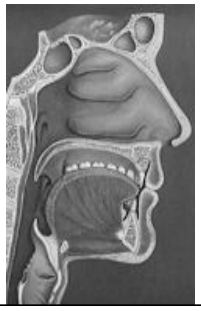
Airway Anatomy

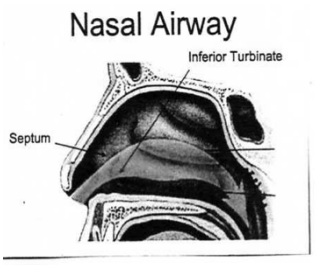




Nasal Airway / Airflow

Critical: Nasopharynx & Nasal Valve



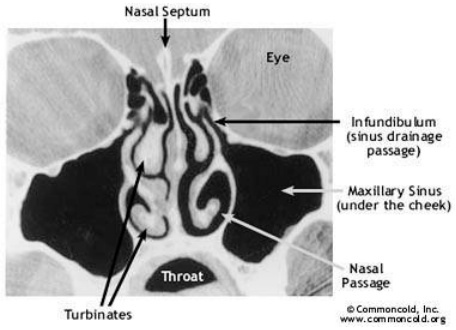


The Nasal Valve

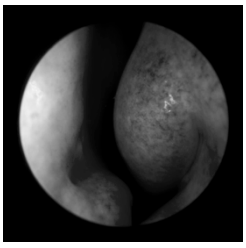
Accounts for 1/2 of all the Respiratory Resistance

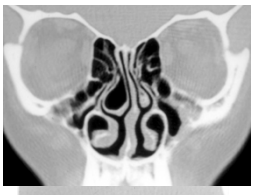
Nasal Valve Dysfunction is A dynamic problem causing impaired nasal airflow

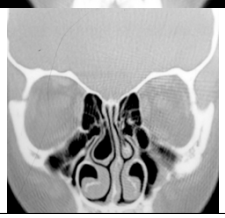
The Nasal Valve



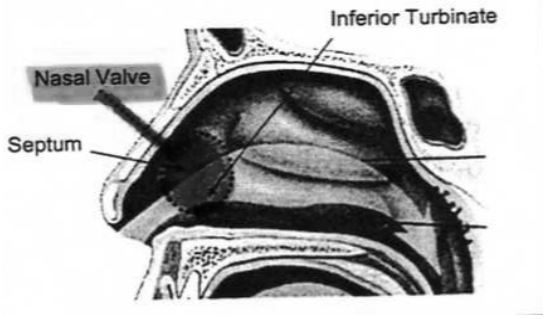
Nasal Valve







Nasal Valve



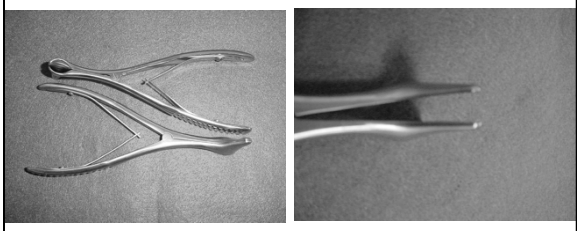
Impact of Nasal Airway Dilation on the Nasal Valve

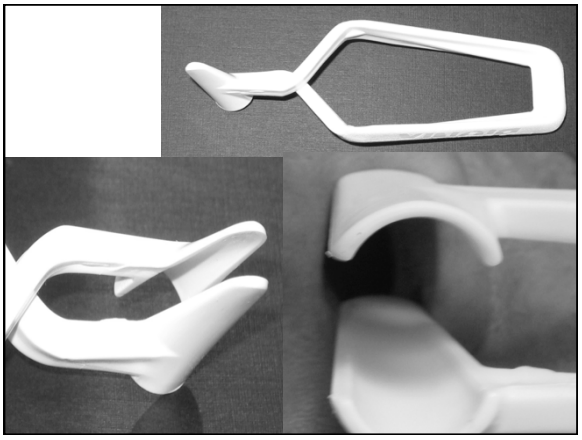
- Cottle Test
- Valve Stabilization using a Q-tip

Nasal Exam

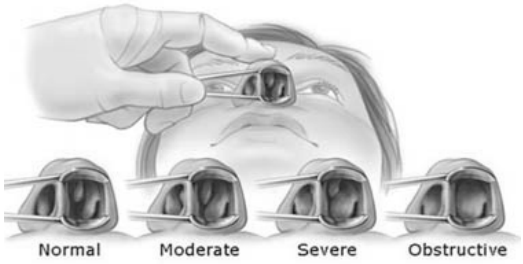
- External exam - columella - nasal vestibule (external nasal valve)
- Subjective findings: open - stuffy - obstructed - totally blocked
- Internal exam (with speculum) nasal valve - turbinates - septum - nasal swell bodies
- Testing - forced inspiration (alar rim collapse) nasal dilation - columella pinch test

Nasal Speculum

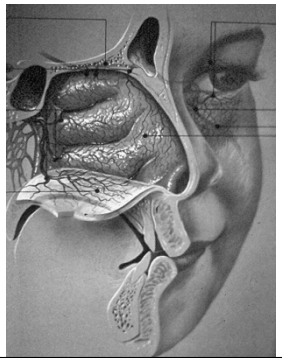




Turbinate Hypertrophy



Nasal Turbinates



Function of the Nasal Turbinates

- Inferior:
  largest ones – airflow direction
  filter the air – humidify and heat the air
- Middle:
  protect the opening of the maxillary and ethmoidal sinuses – buffers to protect the sinuses from pressurized airflow
- Superior: protect olfactory bulbs

Poiseulle's Law
(pwah-zwez)

Flow = Radius^4

Increase caliber - flow increases to the 4th power

Nasal Congestion and Decongestion

Mediated by variations in Orthosympathetic tone

A positional component

Chronic Rhinitis

Most Frequently Caused by Allergy to:

Pollen (Seasonal)
House Dust Mites

Management of Nasal Airway Obstruction

Nasal Dilation and / or Nasal Cleansing
Olive Oil (Oleocanthal)
Palatal Expansion
Nasal Sprays
Mandibular Repositioning
Surgery (nasal valve suspension)

Crystal Mill near Marbel, CO