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IS THE DENTIST IN THE DRIVER'S SEAT FOR THE EARLY DETECTION AND MANAGEMENT OF SRBD?

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CLINICAL <u>CONTINUUM</u> OF SLEEP DISORDERED BREATHING (SDB)

Primary Snoring

Increased Upper Airway Resistance (?sleep bruxism)

Sleep Apnea

Progression can take months, usually years and even decades!

Theoretical impact of preventing snoring is <u>not</u> insignificant and dental medicine is in an enviable position.

Nocturnal Hypoventilation \rightarrow

Exploring the Interface between sleep bruxism and snoring/UARS

Chronic Alveolar Hypoventilation

EVOLUTION OF INCREASING UPPER AIRWAY RESISTANCE/OBSTRUCTION

"window shade" analogy of palatal ptosis.



WHAT ABOUT "SIMPLE SNO	DRING?"
Snoring in pregnancy is associated with increased hypertension and growth retardation, controlling for weight, age, smoking	• (Franklin, Chest, 2000)
Snoring is associated with cognitive decline	 (Quesnot, J Am Geriatric Soc, 1999)
Snoring medical students are more likely to fail exams, controlling for BMI, age, sex	• (Ficker, Sleep, 1999).
Snoring is a risk factor for cardiovascular disease in women.	• (Hu, J Am Coll Cardiol 2000).
Snoring is a risk factor for type II diabetes	• (Al-Delaimy, Am J Epidemiol 2002).
Snoring women have faster progression of CAD	• (Leineweber C. Sleep 2004)

SIGNS AND SYMPTOMS

Snoring #1

Excessive daytime sleepiness

Hypertension

Diabetes

Acid Reflux/GERD – tooth erosion

Bruxism

Headaches

Sexual dysfunction

Nocturia

Memory problems i.e. Alzheimer's/dementia

Large tongue w/ scalloped borders

Mallampati Score and Tonsillar Grade





NORMAL BREATHING DURING SLEEP



Nasal respiration is optimal.

ASYMMETRY OF TONGUE AND JAW SIZE MAY PREDISPOSE TO SLEEP BRUXISM (NORMAL VS ABNORMAL)



CPAP AND OA TREATMENT

(IDEALLY ENABLING NASAL RESPIRATION)





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PHARYNGEAL PATENCY

While awake, the pharynx is always held open except during swallowing.

This is accomplished by reflexes controlling the activity of pharyngeal muscles.

During sleep, reflex control of the pharyngeal muscles is lost.

During sleep, the pharyngeal airway can narrow severely or close completely.

"CHAIRSIDE" DIAGNOSIS OF SLEEP BRUXISM

Reports of tooth grinding or tapping by bed partner or family member.



Presence of tooth wear on exam.



Presence of masseter muscle hypertrophy on voluntary contraction.



Hypersensitive teeth in the AM.



Clicking or locking of TM joint.



Tongue indentations of lateral grooves.











UNUSUAL BRUXISM SIGNS/SYMPTOMS

Inadvertent tongue biting when chewing food or gum. . Inadvertent cheek chewing. Lingual grooves along lateral edge.

MANDIBULAR TORI

Benign boney growth of mandible along the surface nearest to the tongue.

Usually located bilaterally by premolars.

Associated with bruxism.

May fluctuate in size.

Caused by increased mechanical stress on tooth with secondary bone growth.

Competes with tongue for lower jaw space.

CPAP AND OA TREATMENT

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MALLAMPATI SCORE



ACID REFLUX MECHANISM

When breathing stops, the body increases effort to take in oxygen

Exaggerated abdominal contractions

Contractions squeeze stomach and force acid upward

Negative pressure builds in the esophagus and also pulls acid upward

GERD and Laryngopharyngeal Reflux Disease (LPR)





BRUXISM

Parafunction or PROTECTIVE function?

Physical behavior that is intended, whether conscious or subconscious, to improve SURVIVAL





SLEEP BRUXISM

Plays a role in maintaining upper airway patency

Occlusal splints exacerbate apneas/hypopneas in OSA patients

• (Gagnon Y, Lavigne GJ. Int J Prosthodont, 2004

During CPAP titration, complete eradication of tooth grinding events observed

• (Oksenberg A, Arons E. Sleep Med. 2002)

In children treated for SDB with T&A surgery, bruxism was eliminated in most

• (DiFrancesco, et al. 2004)

ORAL APPLIANCE THERAPY (OAT)

GOALS: Eliminate all pre-treatment subjective symptoms Mild/moderate OSA, reduce AHI to less than 10 and by 50% Severe OSA, reduce AHI by 50%

First line therapy for mild/moderate OSA diagnosis American Academy of Sleep Medicine

Vertical repositioning and mandibular advancement devices

100+ FDA approved devices for snoring, fewer for OSA treatment

Terminology: OAT, MRD, MAD, MAS, etc.

CPAP AND OA TREATMENT

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CRANIOFACIAL GROWTH & BREATHING



SDB IN CHILDREN

Lack of restorative sleep has the opposite effect to fatigue – hyperactivity, behavioral problems, and academic difficulties 2013 study in journal SLEEP, children with sleep apnea have:

 - 6x risk of behavioral problems and 7x risk of learning disability Inverse correlation: reduction in tonsil/adenoid removal and ADHD diagnoses... ??? Regular snoring and mouth breathing in children is NOT normal

We should screen children and refer for a potential sleep evaluation!



SDB IN CHILDREN (CONT.)

Incidence estimated at about 3-6% Higher in children with Down Syndrome, cerebral palsy, sickle cell disease, cleft lip/palate, and other craniofacial conditions

Overnight PSG is gold standard for diagnosis

Childhood obesity, OSA, and metabolic syndrome may be intertwined and places a child at higher risk for developing coronary artery disease and type 2 diabetes in adolescence or young adulthood

Untreated OSA children demonstrate a dosedependent decline in cognitive function, developmental delays, and mood disorders/agg ressive behaviors

SCREENING FOR PEDIATRIC OSA

Narrow maxillary arch	Long, flat face
High, narrow palatal vault	Open mouth in neutral position
Crowded dentition	Forward posturing of head
Mouth breathing	Frequent ear infections
Tonque tie	ADHD diagnosis
"Kissing" tonsils	Other behavioral problems i.e. aggression, poor attention span
	Failure to thrive (disruption of growth hormone secretion)
Acid reflux	Parental report of observed apneas
Snoring	Parasomnias i.e. sleep walking, night terrors, or bed wetting
Allergic rhinitis, asthma	Family history of SDB

FACIAL GROWTH

Superimpositions on the cranial base showing overall downward and forward direction of facial growth

Solid line: 8 years of age Broken line:18 years of age

(Mitchell, An Introduction to Orthodontics, 2007, Oxford University Press.)



MORPHOLOGIC CHANGES OF THE FACE

MAXILLA

- Wide, short face undergoes significant vertical changes in late childhood/adolescence
- Vertical nasal enlargement and expansion of the cartilaginous nasal septum helps to direct the maxilla downward and forward
- After complete eruption of permanent dentition there is only slight increase in arch width (≈ 13 years)

MANDIBLE

- Growth via condylar cartilage, posterior border of ramus, and alveolus
- Arch width complete by ≈ 12 years, arch length and height continue to grow through puberty





FUNCTIONAL MATRIX THEORY (MOSS, 1962)

NASAL respiration allows for proper soft tissue functional demand, position, and growth that in turn stimulates facial structure growth

Normal function and position of head/neck muscles, soft tissues, and airway are needed for proper hard tissue growth

EVOLUTION OF FACIAL FORM

Anthropological analysis of prehistoric skulls from ancient civilizations demonstrate a very low incidence of malocclusions

 broad U-shaped arches, well-aligned teeth, minimal decay, and significant occlusal wear

> Modern, industrialized societies demonstrate a much higher propensity for malocclusions

• dental crowding, V-shaped or narrow arches, reduced sinus cavities

Speculate on the causes?

Changes in speech/language, diet, feeding habits, breathing?





NON-NUTRITIVE SUCKING HABITS

Sucking fingers or pacifiers is associated with:

Crossbite

Reduced arch width

Open bite

Proclination/protrusion of maxillary incisors

Tongue thrust on swallowing

Increased mandibular plane angle

Displacement of maxilla anteriorly

Effect on skeletal form and dentition increases if used past age 2-3

Pacifier use reduces SIDS incidence and is often recommended until 6 months of age





CAUSES OF MOUTH BREATHING





CONSEQUENCES OF MOUTH BREATHING



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POTENTIAL ORTHODONTIC CONSIDERATIONS?

Create obligate nasal breathers!

- Treat nasal allergies or congestion
- Tonsillectomy/adenoidectomy referral as needed
- Early rapid maxillary expansion (RME)



- *Widens the nasal cavity, increases nasopharyngeal airway dimension, and reduces nasal airway resistance
- *Nasal dimensional changes are stable over the long-term and promote nasal breathing
- Literature strongly supports RME and its impact on breathing and airway
- Premolar extraction and incisor retraction may <u>perpetuate</u> disordered breathing!
- Achieve lips together, tongue against palate for easy breathing.

RECOGNITION OF SLEEP DISORDERS AT THE "CHAIRSIDE"

Dentists are literally in the best position to screen and identify patients with potential sleep disorders, through their clinical interviews and oral examinations.

With the support of sleep specialists, it is likely that more patients will receive the necessary care.

Screening strategy towards all snorers, bruxers, clenchers, mouth breathers, high arched palates, retrognathics for SRBD.

Early identification before the onset of OSA is key.

UNIQUE POSITION OF SLEEP DENTISTRY

What other healthcare professional spends so much time at the "point of origin" or "ground zero" of OSA? What other healthcare professional can directly observe the oral-pharyngeal airway when supine and possibly during episodes of sleep? What other healthcare professional actually can have their patient "sleeping" while they do all the work?

CLOSING THOUGHTS



CLOSING THOUGHTS

Dentists are in the driver's seat when it comes to recognizing the earliest elements that identify SRBD in both children and adults.

The early recognition and appropriate management of SRBD can have a huge impact in the wellness of patients with early SRBD.

"Do no harm" is a principle subscribed to all by providers of care whether medical or dental.

Dental care that adversely impacts the cozy relationship between mouthsize and tongue size needs to be respected on all fronts.

To not do so, places an unsuspecting patient in potential harms way by lowering the threshold for the evolution of a SRBD over time.

CLOSING THOUGHTS

Develop a supportive relationship with local dentists that are not satisfied to just make a "snore guard" without a sleep assessment.

Implement a sleep protocol that supports the dentist who is cognizant of the importance of sleep and the screening for SRBD within their practice.

View yourself as an supporting member of the healthcare community and a colleague to your local dentist seeking "best practice" alternatives.

Ideally, all oral appliances should be paid by patients' medical insurance!!!

THANK YOU FOR YOUR ATTENTION

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