The Missing Link Between TMD and SDB

Start with basic TMD
Review of SDB
Integrate the two
Four Parts Work in Harmony:
1. Hinge (TMJ)
2. Teeth
3. Alveolar bone & gingiva
4. Muscles

TMJ FUNCTION

TEETH
BONE
MUSCLE
TM JOINT

TM Joint Degenerates
like any other joint

Risk Factors
Degeneration
Adaptation
Intervention
Risk Factors

- Pain
- Sleep disorders
- Bruxing
- Gender
- Malocclusion

- Stress/Habits
- Systemic Arthritides
- Autoimmune
- Fibromyalgia
- Hormones

Basic orthopedic principle:

The key to the health of the TM joint is LUBRICATION.

The lack of lubrication causes three main TMJ issues:

- disc instability (gets sticky –drags)
- lack of nutrients to surface of condyle
- pain from inflammation

Goal of TMJ therapy is to restore the lubrication
What ever is driving the clenching muscles is what the treating dentist, must address.

**Contributing Factors**

**Clenching**

**Daytime** – later in this presentation

Can be influenced by behavior modification

**Clenching**

**Nighttime** - Many theories

1) Occlusal trigger
2) Anxiety driven
3) Brain stem arousal
4) Airway protection
Airway protection Theory

Clenching as a compensatory mechanism to stabilize a collapsing airway

AIRWAY Determinants:

Size?
Collapsibility?
Bernoulli's principle

“As the speed of a moving fluid (liquid or gas) increases, the pressure within the fluid decreases.”

**Increased speed = decreased pressure**

Examples: shower curtains, sail boats and jet wings

Problem: Airway Obstruction at Base of Tongue

"The upper airway reflex opposes the negative pressure collapsing forces generated during inhalation. This reflex is accomplished through activation of pharyngeal dilator muscles ("and increase activity in the genioglossus"), which can increase airway patency. ... Most of these receptors seem to be located in the upper trachea and transmit information through the superior laryngeal nerve as well as the glossopharyngeal and trigeminal nerves"

Guilleminault, C., Savani, A., Neurological Basis of Sleep Breathing Disorders; Sleep Med Clin 7 (2012), 557
1. Drop in esophageal pressure
2. Reflex signal to brain
3. Reflex to clench advance tongue
4. Reflex to expand chest at greater force causing more negative pressure in Thoracic Cavity

COMPENSATORY MECHANISM
- Airway collapse
- Drop in esophageal pressure
- Activation of the sympathetic nervous system
- Increase effort to breath
- Activation of the clenching muscles and tongue to thrust anterior
- Airway opens

Problem:
*Effort* (not the apnea)
The Battle is to maintain the airway and blood oxygen. If the battle is being lost... then apnea occurs. “The Battle” is the main problem.

OSA VS. UARS

- Airway collapse
- Effort: clench, expand chest, toss and turn
- Aroused to lighter stages of sleep
- RERA (respiratory effort related arousal)

Effort fails - OSA
Arousals cause fragmented sleep
Airway opens: NO OSA - YES UARS

Fatigue, TMJ, HA & other medical issues (HBP, blood sugar, drowsiness)

“Battle” causes sleep fragmentation
- Fatigue and/or drowsiness
- Metabolic syndrome
- Weight gain
- Daytime hyperactivity (to compensate for fatigue)
- Nocturia
- Insomnia
- Anxiety and/or depression
- More
Airway collapse causes Negative Esophageal Pressures

- Cardiovascular stress
- HBP
- Epithelial dysfunction
- Increased clenching
- TM joint
- Facial changes
- Dental issues
- Headaches

Problem: Airway Obstruction at Base of Tongue

Image courtesy of Jerald H. Simmons MD from the Sadler Sleep Disorders Clinic

Solution: Brux to activate the tongue to bring forward

Image courtesy of Jerald H. Simmons MD
Solution: Advance the Mandible or Positive Pressure

Definition:

Sleep related bruxism is an oral activity characterized by grinding or clenching of the teeth during sleep, usually associated with sleep arousals.

The International Classification of Sleep Disorders, second edition, pg. 189
Muscle Tone Inversely Related to Upper Airway Obstruction

Higher Pes (more negative pressure from greater obstruction)
Lower Pes (less negative pressure from less obstruction)

Decreased Muscle Tone
Increased Muscle Tone

Why people brux and clench at night...
...to protect the collapsing airway!!!
Do muscle relaxant splints make OSA worse?

“Conclusion: This open study suggested that the use of an occlusal splint is associated with a risk of aggravation of respiratory disturbances. It may therefore be relevant for clinicians to question patients about snoring and sleep apnea when recommending an occlusal splint.”

Yves Gagnon, DMD, MSc; Pierre Mayer, MD; Florence Morisson, DMD, PhD; Pierre H. Rompré, MSc; Gilles J. Lavigne, DMD, MSc, PhD. Aggravation of Respiratory Disturbances by the Use of an Occlusal Splint in Apneic Patients: A Pilot Study. Int J Prosthodont 2004;17:447–453.

Do muscle relaxant splints make OSA worse?

“Conclusion: The use of an occlusal stabilization splint IS associated with a risk of aggravation of OSA...”


Clenching is secondary to the activation of the sympathetic nervous system

Day time clenching
• anxiety  (stress - psychological)
• pain  (neuropathic, muscular, inflammatory, etc)
• headaches  (migraine, muscle tension, sinus)
• fatigue  (unresolved sleep drive)
Night time clenching

• Compensatory clenching to protect airway
• Effort to breath causes RERAs
• RERAs causes fragmented sleep
• Fragmented sleep causes fatigue
• Result is SDB (UARS or OSA)

Recent Study 25 subjects:

Conclusion: RERA's are associated with marked increase in cardiac sympathetic modulation, especially in females. Patients with a high RERA index, even in the setting of low or normal AHI, may be exposed to elevated sympathetic tone during sleep.”

The Occurrence of Sleep Disordered Breathing (SDB) in Patients With Temporomandibular Joint Disease (TMD)

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CONCLUSION: Our study demonstrated that 75% of all TMD patients have clinical findings to suggest the presence of SDB. Of those who had NPSG testing, we found that clinical suspicion was correct 100% of the time in our group tested. This supports the fact that there is a high correlation between SDB and TMD. With these and previous results we postulate that the driving mechanism behind bruxing and clenching during sleep is a protective mechanism of an airway that has a propensity for collapsing, to prevent the obstruction from occurring. This protective phenomenon over time can be a major etiological factor that leads to TMD in many patients. It is therefore recommended that to treat TMD, one should screen for SDB and treat that as well in order to treat the entire clinical range of this disorder.

Exam and History
Stabilize the TMJ
Evaluate sleep with a PSG
Stabilize airway with CPAP if needed
When TMJ stable, transition to MAS
Combination therapy if needed

No one cares how much you know
*until*
They know how much you care!
Thank You!

I hope this information has fueled your flame to learn more!