Nocturnal Bruxism
Functional vs Parafunctional forces

Causes: Truth vs Myth
Relationship to arousals
Understanding and Controlling the Damaging Forces of Parafuction

Dr. Barry Glassman
Northeast Dental Sleep Medicine Symposium
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Clearwater, FL
“The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn”

Alvin Toffler
“Education: the path from cocky ignorance to miserable uncertainty.”
— Mark Twain
What we know? ..... Or do we?

Paraphrase of Reagan Quote

“ITS’ NOT THAT DENTISTS ARE IGNORANT....
.........”
“Education is the ability to listen to almost anything without losing your temper or your self-confidence.”
— Robert Frost
Occlusion vs. Occluding

DENTISTRY STIPULATES OCCUDING

Remember Bob...we’ll look at him later
BRUXISM ERASURE EFFECT ON INTERFERENCES

CONNECTS PAIN AND RESTORATIVE THERAPY

RAMFJORD 1961


Interference Causation of Bruxism

- Rugh demonstrates the lack of causation
- Michelotti study


WE ALL KNOW THAT OCCLUSION MATTERS

○ WHY
  Interference theory debunked

○ WHEN
  Stipulation of occlusion

QUESTIONS RARELY ASKED!!
The real issue is more than occlusion in the static sense; but what we do with what we have is the key.

Parafuction

Learning to Control the Forces that Threaten our Patients....
And the Dentistry We Do For Them
Bruxism as a Movement Disorder of Sleep

- Redefined from Parasomnia

- Purposeless movement
bruxism has been suggested to be part of a sleep arousal response. In addition, bruxism appears to be modulated by various neurotransmitters in the central nervous system. More specifically, disturbances in the central dopaminergic system have been linked to bruxism. Further, factors like smoking, alcohol, drugs, diseases and trauma may be involved in the bruxism aetiology. Psychological factors like stress and personality are frequently mentioned in relation to bruxism as well. However, research to these factors comes to equivocal results and needs further attention. Taken all evidence together, bruxism appears to be mainly regulated centrally, not peripherally.

Proposed theory of the purpose of nocturnal Bruxism

- Review Prehn and Simmons
- Review Lavigne and Kato

- Causes of Bruxism?
Lack of relationship between occlusion, occlusal changes, and bruxism

Lack of relationship between occlusion and pain


“The take-home message for clinicians is that it is important to understand the concept of "non-linear" relationships between bruxism and craniofacial pain to avoid oversimplification of diagnosis and management.”

DOES BRUXISM CAUSE PAIN?

- Lack of direct relationship
- Discussion of Bradford Hill criteria for causation (dose/response curve)
- Rafael Discussion
General Dentist

Education

Trigeminally Mediated Headache (Sensory)

Education

Trigeminally Mediated (Motor) Disorder

Questions re: Headache; TMD; Sleep

Education

General Dentist

Supportive & occlusal therapy

Education

PARAFUNCTIONAL CONTROL

Referral

Sleep disorder

Sleep lab, MD
Structures in the Craniomandibular System...

Dental Resistance
Box of Dentistry
Dental Interface

Muscles ignored
Joint ignored
Ligaments insertions ignored

Trigeminal Nerve Ignored
Structures of the Craniomandibular System are Interrelated

- Teeth
- Joints
- Muscles
- Ligaments
- Bones
- The Trigeminal Nerve and the ANS
The Nature of Parafunction and Parafunctional Control

Description of Bruxism and it’s CAUSE
Function – Role of Occlusion

Rest
Mastication
Swallowing
Other functions
  Talking
  Repetitive Movement of Gum Chewing
REIVEW of Functional Forces

- Discussion of Ligament Trigger
- Forces become pathological with posterior contact for increased periods of time
- Resting Forces about 2 micro volts or less
- Swallowing Forces
- Forces during mastication: Time and force factors (bolus concepts)

- Compare to Parafunctional Forces
  - Which Are More Likely To Cause The Destruction of the Structures of the System?
Normal Resting EMG's

EMG Sweep

TA-R
TA-L
MM-R
MM-L
SCM-R
SCM-L
DA-R
DA-L

EMG Summary

<table>
<thead>
<tr>
<th>Muscles</th>
<th>Ave. µV</th>
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<tbody>
<tr>
<td>TA-R</td>
<td>1.5</td>
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<tr>
<td>DA-R</td>
<td>0.8</td>
</tr>
<tr>
<td>DA-L</td>
<td>1.1</td>
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</tbody>
</table>
EMG's During Three Separate Swallows
EMG During Gum Chewing LEFT
Muscle Activity in Parafunction: Clench

- Duration now a factor
- Compare microvoltage to function
AMPSA

- Force vectors biggest advantage
  - Hatori and others
  - Multiple EMG studies
- Possible untoward effects
  - AOB and Posterior Open Bite Discussion
- Myths
  - Super eruption
  - Joint Loading
An appliance is fabricated to disengage the posterior teeth and a second series of EMG readings are taken to record lowered EMG readings. The vector forces of the reduced EMG's recordings demonstrate reduced condylar compression during macro-clenching.

EMG of Parafunctional Clench
EMG Comparison #1
EMG Comparison #2
EMG Comparison #3
(Four Leads Only)
<table>
<thead>
<tr>
<th></th>
<th>Rest</th>
<th>Swallow</th>
<th>Chew Left</th>
<th>Clench</th>
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</thead>
<tbody>
<tr>
<td><strong>TA – R</strong></td>
<td>1.5</td>
<td>23.2</td>
<td>15.8</td>
<td>149.1</td>
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<tr>
<td><strong>TA – L</strong></td>
<td>1.9</td>
<td>20.3</td>
<td>28.8</td>
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<tr>
<td><strong>MM – R</strong></td>
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<td>8.9</td>
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<tr>
<td><strong>MM – L</strong></td>
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<td>12.7</td>
<td>14.9</td>
<td>123.2</td>
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</table>
So when teeth/porcelain/veneers fracture: What caused that?

When abfractions occur: What caused that?

When teeth without decay abcess: What caused that?

When patients complain of fillings that are high: When did they meet?

Concept: The same forces that threaten the teeth threaten the other components of the system. We can evaluate all the components to reveal the potential of the force!
How did it get that way?

- Therefore: When patients have clicking joint: What caused that?
- When patients have facial pain? What caused that?
- When patients have headache and even migraine? What caused that?

- The same forces may be significant contributors to their pain patterns
Bruxism in Children: Discussion
Pediatric B splint
WHY DOES IT STAY THAT WAY?

- FORCES WHICH DESTROY
  - Micro trauma
  - Macro trauma

- FORCES WHICH ALLOW ADAPTATION
  - Previous Injuries
  - Congenital factors
Data based on 512 reporting dentists, representing 78,711 placed appliances. There were no cases of aspiration verified by radiographic imaging.

The results showed that unopposed molars were more commonly found in the upper jaw and that unopposed molars showed 4.9 times higher risk of overeruption of ≥2 mm (95% CI 1.5-15.3) than opposed molars during the 12-year observation period. The average overeruption for the unopposed molars was 4.5% (s.d. 7.6), which corresponds to approximately 0.9 mm. The degree of overeruption increased with decreased bone.

Full Arch Splints with Posterior Contacts

- Can provide improved parafunctional control
- Still will provide canine rise; but that canine contact may produce forces beyond the patient’s adaptive capacity
- Tends to be tight; increasing sympathetic tone
- Allows for posterior contact in the primary clench
Dr. W clench on natural teeth

<table>
<thead>
<tr>
<th></th>
<th>Ave. µV</th>
<th>80%</th>
<th>84%</th>
<th>95%</th>
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<tr>
<td>TA-L</td>
<td>51.6</td>
<td>80%</td>
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<tr>
<td>MM-R</td>
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<tr>
<td>MM-L</td>
<td>38.9</td>
<td>95%</td>
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<td>70%</td>
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</table>

EMG Summary

EMG Sweep

02/23/2010
Dr. W Clench on CR splint

clench with balanced CR SPLINT...
Sleep Bruxism and Arousals

- Sleep bruxism is secondary to sleep-related micro-arousals (defined by a rise in autonomic cardiac and respiratory activity that tends to be repeated 8-14 times per hour of sleep).

Sleep Bruxism Associated with RMMA

- Sleep bruxism (SB) is reported by 8% of the adult population and is mainly associated with rhythmic masticatory muscle activity (RMMA) characterized by repetitive jaw muscle contractions (3 bursts or more at a frequency of 1 Hz).

RMMA and Bruxism and OSA

- RMMA exists without bruxism
- RMMA occurs three times more frequent and with higher amplitude in SB patients
- RMMA involves different muscular pattern of elevators and depressors than normal function
- **RMMA** during sleep may help increase airway patency

Summary

SUMMARY

- MEDICAL VS DENTAL SCIENCE
- WE ARE NO BETTER THAN THE SCIENCE
- KEEP YOUR EYE ON THE TARGET OF PATIENT CARE
- TAKE NOTHING PERSONALLY
- DEFINITION OF “FAILURE” OFTEN SHROUDS THE TRUTH
FOOD FOR THOUGHT

- BEWARE OF LOGIC OF MECHANISMS OF THERAPY

- LOGIC IN THE ABSENCE OF SCIENCE IS ILLOGICAL
WE ARE NO BETTER THAN THE SCIENCE

- THE NEED TO SIMPLIFY IS OUR OWN MISGIVING
- "This reduction to a few laws, to one law, is not a choice of the individual, but it is the tyrannical instinct of the mind.