

# Hinman 2023

## Common TMDs

John R Droter DDS  
Annapolis, Maryland

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John R Droter DDS

[www.jdroter.com](http://www.jdroter.com)

John R Droter, DDS

To get today's lecture slides:  
go to [www.drdroter.com](http://www.drdroter.com)

Seminar Download

Hinman 2023

Seminar Downloads | John R. Droter, DDS

HOME PATIENT DOWNLOADS NEW PATIENT EXAMS ABOUT TMD **SEMINAR DOWNLOADS** CONTACT

## SEMINAR DOWNLOADS

### Upcoming Seminars

July 20, 2016 D-PAS Hand on- In Office, Annapolis MD  
July 21-23 2016 Droter Hands on- In office, Annapolis MD  
Call Kim 301-805-9400

Pankey TMD Week, Key Biscayne FL  
October 23-27, 2016  
October 22-26, 2017  
Call [LD Pankey Institute](http://LDPankeyInstitute.com) 305.428.5500

Spear TMD Course 1 with Dr Herb Blumenthal  
Aug 11-13, 2016, Scottsdale Arizona  
Call [Spear Education](http://SpearEducation.com) (866) 781-0072

### Most Popular and Common Downloads

TMD Supersheet Download  
[SuperTMDQx12.11](#)

Brux supersheet Download



**Hello. I am:**

**John R Droter DDS  
Annapolis, Maryland**

*Annapolis, Maryland  
John R Droter DDS*

# Milestones



Visiting Faculty Spear Education 2013

Visiting Faculty LD Pankey Institute 2008

Visiting Faculty Orthodontic Program  
Washington Hospital Center 2000

On staff AAMC: Orthopedic Rounds  
In OR for TMJ Surgery

Devoted Facial Pain Practice 1996  
(No Hygiene to Check!!)

CT and MRI Imaging Joints 1992  
Guy Haddix, DDS: Mentor  
(3,000+ images and rising)

Post Grad CE- GPR, LD Pankey Institute, Dawson, Mahan, Gremillion, Spear, Kois



JC101



# TMD Therapies: (70 therapies)

## Physical

Ice  
Hot Cold Hot  
Cold Laser  
TENS in office  
TENS home use  
Range of motion exercises  
Active Stretching: Manual, Tongue Blades, Dynasplint  
Refer to Physical Therapy: Rocabado mobilization  
Refer to Physical Therapy: Postural Restoration Therapy  
Refer to Physical Therapy: Various Muscle Therapies  
Refer to Chiropractic: Atlas Orthogonist  
Refer to Osteopathic MD: Body alignment  
Breathe, Walk , Exercise

Brux Checker  
Upper full coverage hard CR guard  
BiArch Posterior Deprogrammer  
Mandibular Advancement Device  
Lateral Bruxing Device  
Lingual Light Wire  
Condylar Distraction

## Medicinal

Anti Inflammatory:  
NSAIDs,  
Doxycycline low dose  
CBD Topical  
Glucosamine/Chondroitin MSM  
Vitamins: Vit C, Vit D, Vit B12  
Minerals: Magnesium, Electrolytes  
Minerals: Iron  
Refer to MD for Lyme therapies  
Refer to MD Rheumatoid Arthritis therapies  
Refer Botox Masseter injections  
Refer Botox Lateral Pterygoid Injections  
Food

## Occlusal Orthopedic

Lingual Light Wire  
Planas Tracks  
Lower soft sectional orthotic  
Sectional orthodontics  
Expansion orthopedics/ orthodontics  
Restorative Dentistry  
Occlusal Adjustment with DTR, TekScan  
Condylar distraction  
Occlusal Adaptation

## Tongue Parafunction

Refer for Cervical Alignment/ Stabilization  
Myobrace  
Upper Lingual light wire  
Clear Brux Checker  
Frenectomy  
Myofunctional therapy

## Dental Orthotics

In Office Trial Anterior Stop  
Temporary home use anterior stop  
Diagnostic Palatal Anterior Stop  
Brux-PAS  
Lower full coverage CR  
Lower posterior deprogrammer  
Lower TMJ Rehab flat plane  
Lower Indexed  
Brux Checker

Upper full coverage hard CR  
Posterior Stop Night Guard  
Mandibular Advancement Device  
Anterior Stop Airway Bite  
Facebow Verification  
Lateral Bruxing Device  
Condylar Distraction  
Lingual Light Wire  
Lower Soft Sectional

Athletic Mouthguard  
Anterior Repositioning  
Occlusal Adjust Assist  
Aqualizer  
Myobrace

## Sleep/ Fatigue

Mouth taping  
Diet Modification  
Positional Therapy  
Vitamins: Vitamin D, Vitamin B12, Vit C  
Minerals: Magnesium, Iron  
Lateral Bruxing Device guided plane  
Lateral Bruxing Device Elastomeric  
Mandibular Advancement Device  
CPAP

## Surgical

Refer: Arthrocentesis w/ PRP  
Refer: Discectomy w/ Fat Graft  
Refer: Total Joint Replacement  
Refer: Orthognathic Surgery



# Lingual Light Wire- Crozat Arch Expansion

Age 29

Start



7 months LLW

Age 30





# Anterior Openbite with Active Osteolysis due to Inflammatory Tissue Bone Resorption

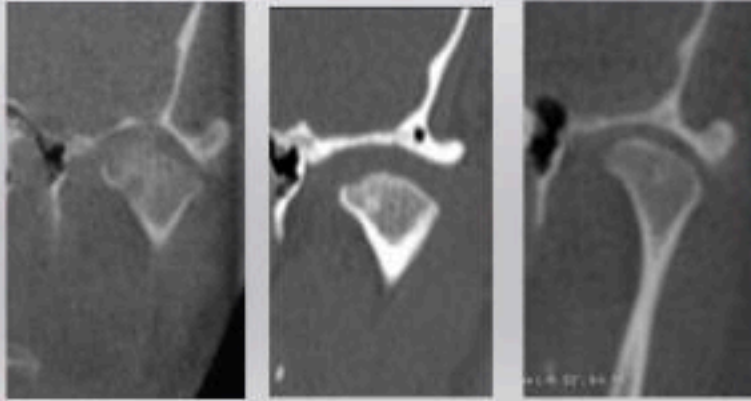
Non Surgical Therapies



Condylar Distraction



Anti Inflammatory Therapies





# Restorative Dentistry

Pathological Occlusion

??Airway Related Bruxing?



Restore Function

Composite Trial Occlusion

AHI + 26 CPAP



Anterior guidance  
or group function?



# Disclosures:

Atomic Skis- Sponsored.  
I got stuff.

LD Pankey Institute TMD Course  
Honorarium

Spear Education TMD Course  
Honorarium

Droter Seminars  
My own Hands on TMD Courses

Co-Owner of ArrowPath Sleep  
High Quality Dental Orthotics  
Patent on sleep device: LatBrux

Ski Coach for National Ski Patrol  
Level 3 Certified Professional Ski Instructors of America







Nate Brock, CDT  
 (865) 509-4509  
[connect@livingtreelab.com](mailto:connect@livingtreelab.com)

ArrowPath Sleep  
 3.9 mm Anterior Stop  
 Muscle Deprogrammer  
 Airway bite  
 Facial Analyzer



ArrowPath Sleep  
 D-PAS  
 Diagnostic-  
 Palatal Anterior Stop



ArrowPath Sleep  
 Lower Posterior Stop  
 Night Guard



ArrowPath Sleep  
 Trial Anterior Stop Night Guard







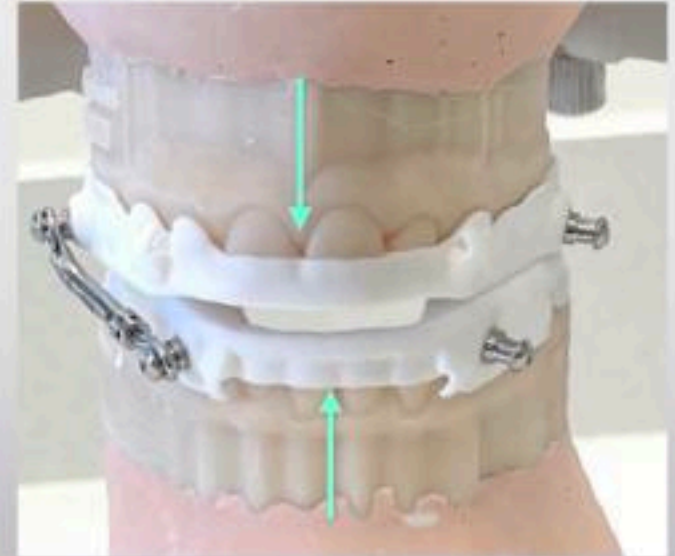
Great Lakes<sup>®</sup>  
DENTAL TECHNOLOGIES

greatlakesdentaltech.com  
716.871.1161

Available May 1, 2023

ArrowPath Sleep  
Lat Brux  
Lateral Bruxing Guard

Moves lower jaw laterally  
Arm only attached on one side  
Printed nylon  
Can convert to MAD if needed



Patient will have a right and left guard.  
Move the jaw to the right one night, left the next

# Common TMDs

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[www.jdroter.com](http://www.jdroter.com)

## 6 Common TMDs

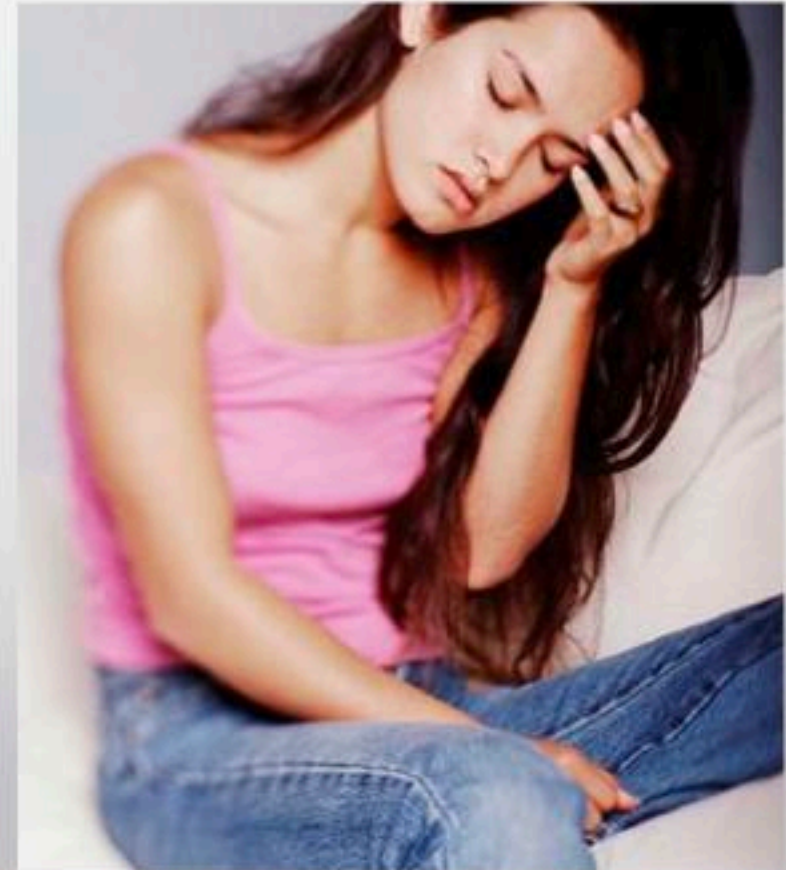
- Parafunctional Clenching
- Parafunctional Grinding
- Occlusal Muscle Dysfunction
- Osteoarthritis
- Acute Sprain
- Acute Closed lock of TMJ disc

## 5 Common Obstacles

- Neck and Postural Instability
- Wobbly TM Joint (Subluxation)
- Compromised Breathing/Airway
- Avascular Necrosis
- Referred Pain Muscle Triggerpoints

## 1 TMD that **usually** does not need therapy

- TMJ Clicking





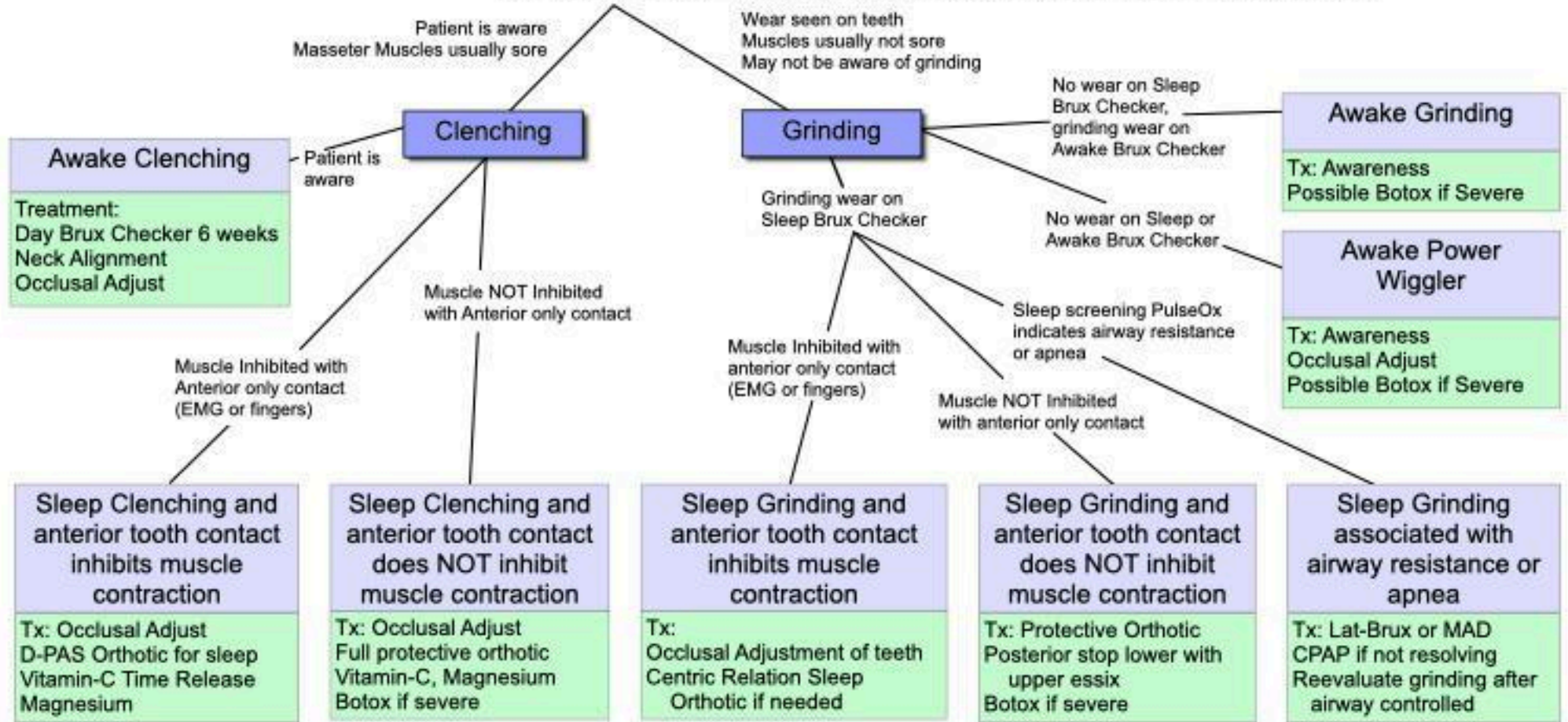
## 6 Common TMDs

Diagnosis	Pattern	Treatment
Clenching	Patient is aware Masseters Ache Morning TMJ clicking that resolves	Occlusal Adjust D-PAS Night Guard (if inhibition) Magnesium and Vitamin C hs
Sleep Grinding	Worn Teeth	Protective night guard Airway night night guard
Occlusal Muscle Dysfunction	Sore muscles when chewing Sore Lateral Pterygoid, Headaches Day D-PAS Relieves Symptoms	Occlusal Adjustment
Osteoarthritis of TMJ	Arthralgia CBCT shows worn bone loss MRI T2, STIR ++	NSAID for 6-12 weeks Occlusal Adjustment Do not put in a night guard
Sprain Discal Ligament TMJ, Acute	Sudden onset pain TMJ, sore TMJ Limited opening Soft end point active stretch	Cold Laser, Ice 15 min 3x a day Rest, Soft diet, NSAID 7 days Anterior Reposition Orthotic 7 days
Acute Closed Lock TMJ	Sore TMJ Limited opening Hard end point active stretch	Arthrocentesis with PRP

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# BRUXING: PARAFUNCTIONAL TOOTH CONTACT







Clenchers destroy the joint,  
Grinders destroy the teeth



### Clenching

Painful Muscles

Patient is usually aware of clenching

Fremitus

Strong Masseters

See slight wear around tooth contacts

Damage TMJ cartilage

If patient is unaware of clenching-

Plant seed at hygiene visit

Do you clench?

### Grinding

See tooth wear

Patient is usually not aware

Buttressing bone if teeth are tight

If tooth mobility, on excursions

Strong Masseters

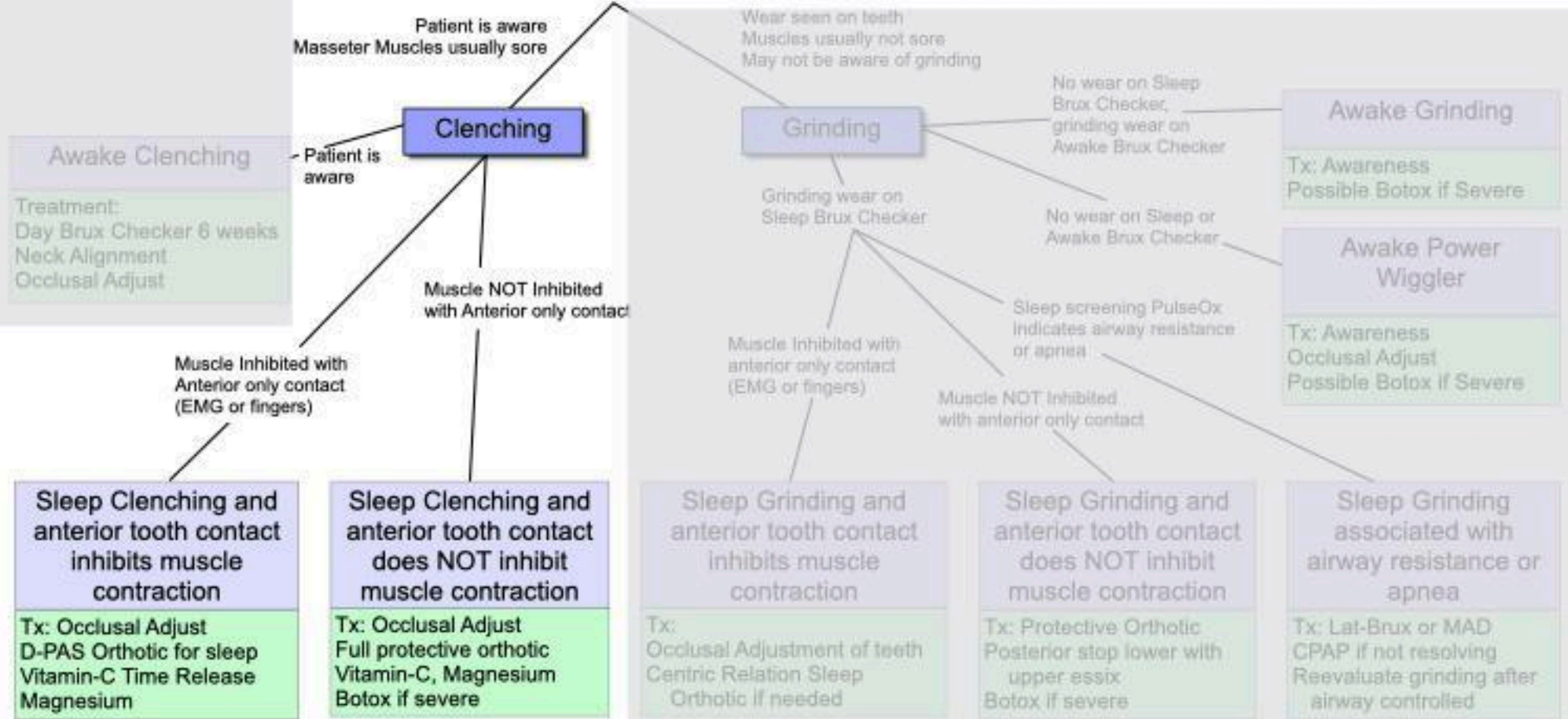
Slight if any soreness muscles

Usually no muscle pain

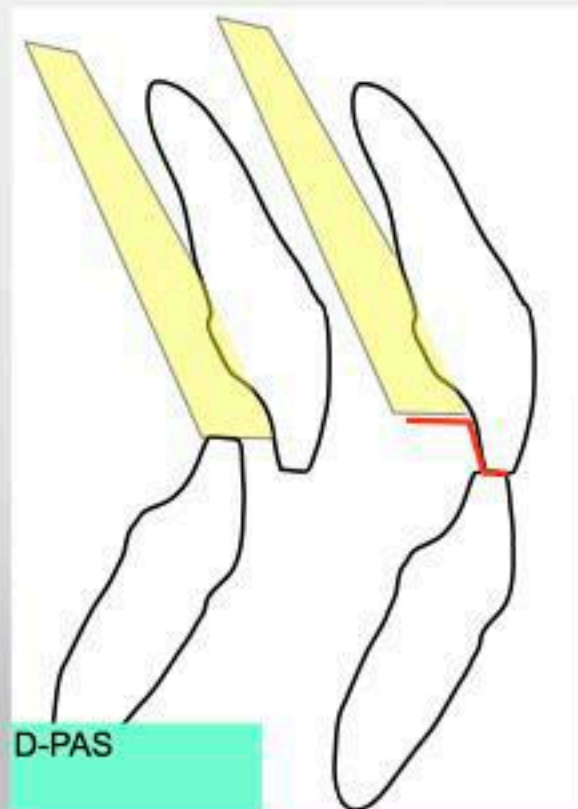
Parker Mahan-

"Women Hurt, Men destroy"

# BRUXING: PARAFUNCTIONAL TOOTH CONTACT



## Diagnostic Palatal Anterior Stop D-PAS



Basically an upper Hawley with anterior stop without clasps or wire



# Diagnostic Palatal Anterior Stop

D-PAS Test: Wear for 2 weeks, 24/7, take out to eat

## Better- Decrease in Symptoms

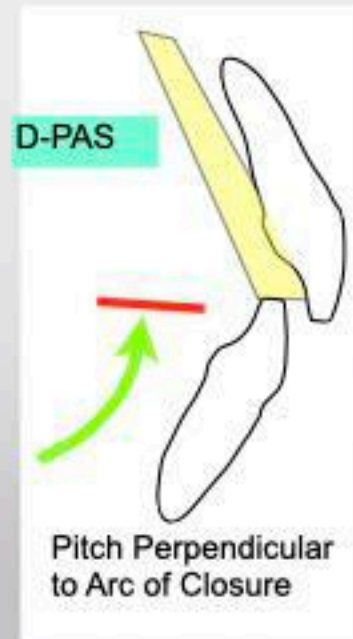
- Sleep Clenching Inhibited: Wear D-PAS as night guard
- Orthotic Improved Airway: D-PAS as night guard
- Occlusal Muscle Disharmony: Occlusal Adjust

## Worse- Increase in Symptoms

- Mechanically Unstable TMJ, joint subluxation
- Intracapsular Problem TMJ
- Orthotic Made Sleep Airway Worse

## Stays the Same- No Change in Symptoms

- Damaged TMJ are mechanically stable
- Pain not related to occlusion



Stapelmann H, Türp JC. The NTI-tss device for the therapy of bruxism, temporomandibular disorders, and headache.....BMC Oral Health. 2008 Jul PMID: 18662411

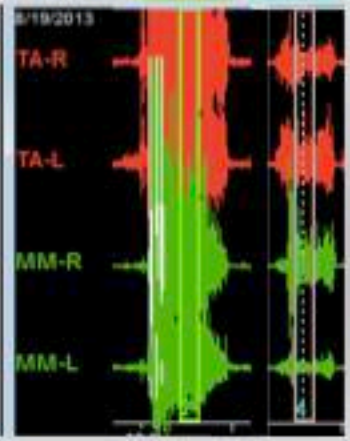
Are the TMJ muscles inhibited from full contraction with anterior only tooth contact?

Detect with EMG or muscle palpation- Clench full power on posterior teeth and then with D-PAS orthotic.



**Patient with muscles inhibited by anterior only contact**

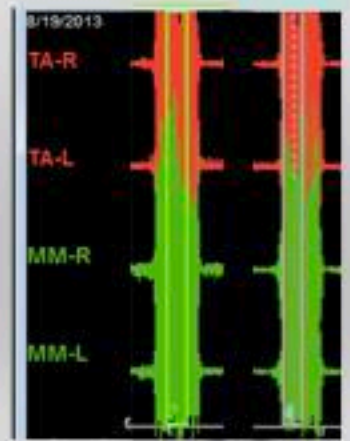
	Clench MaxIC $\mu V$	Anterior Stop D-PAS $\mu V$
TA-R	100.6	15.7
TA-L	108.9	25.3
MM-R	115.4	25.5
MM-L	70.5	6.8



Major decrease in muscle power with D-PAS

**Another Patient with muscles NOT inhibited by anterior only contact**

	Clench MaxIC $\mu V$	Anterior Stop D-PAS $\mu V$
TA-R	82.2	77.9
TA-L	124.6	103.6
MM-R	185.0	169.0
MM-L	79.9	86.6



Muscle power same with D-PAS



Diagnostic Palatal Anterior Stop



BioResearch EMG

# Choosing the Correct Night Guard

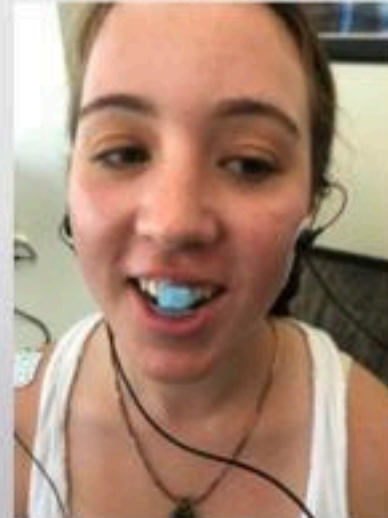
## M-Scan EMG Electromyography



Clench back teeth



Clench  
anterior stop



Can place moderate force  
on front teeth

Clench  
Back teeth +250  $\mu\text{v}$   
Front teeth +121  $\mu\text{v}$





## Parafunctional Clenching

### Signs

- Strong Masseters
- No major wear on teeth
- Slight wear around tooth contacts
- Fremitus
- Tori
- Slight scratch vibration doppler/ JVA



### Symptoms

- Aware of clenching
- Sore muscles on waking
- Clicking on waking that goes away
- Headaches



### Causes

- Uneven occlusion, especially heavy anterior
- Neck stabilization
- SSRI

### Diagnostic Tests

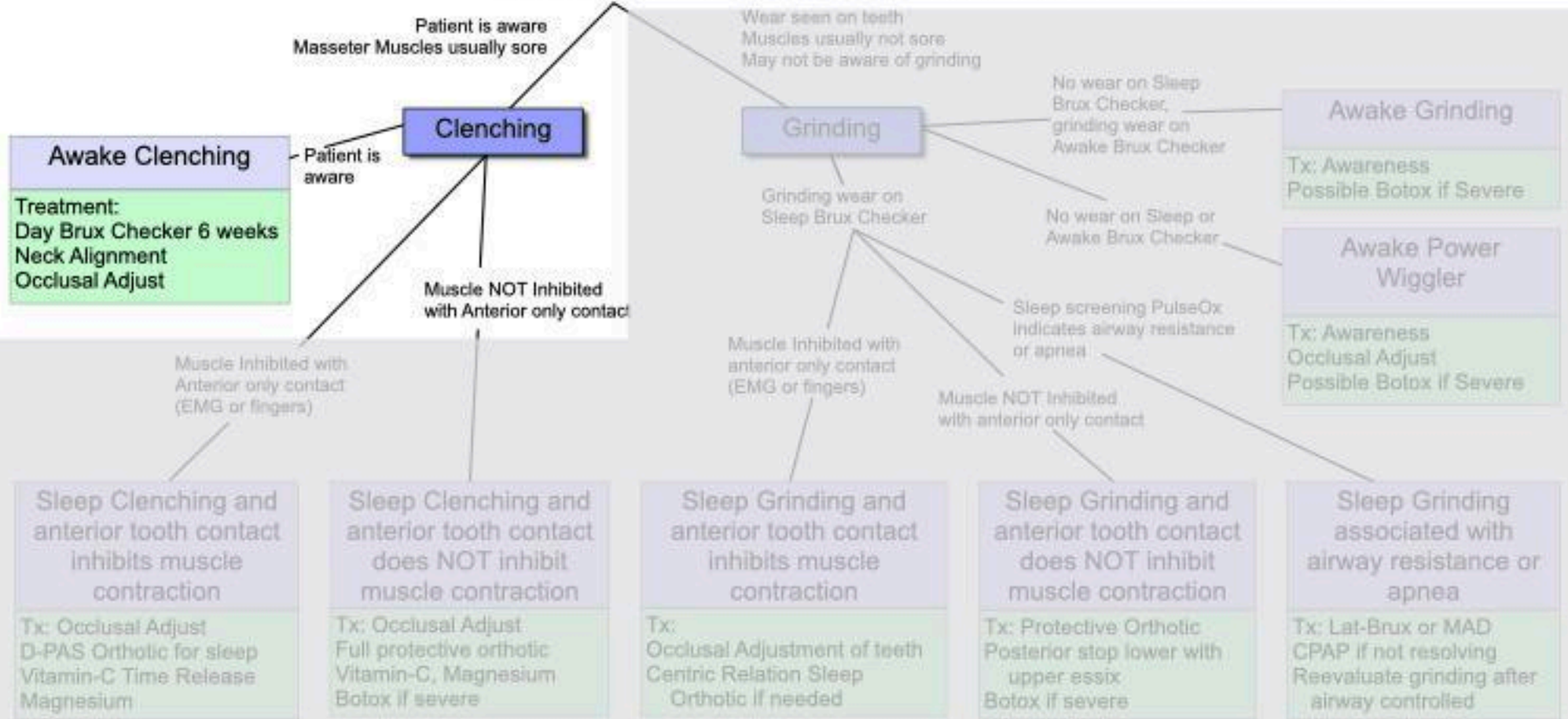
- EMG M-scan
- Determine if muscle inhibition
- D-PAS for sleep



### Treatments

- Occlusal Adjustment
- Neck alignment/ stabilization
- D-PAS as night guard
- Time Release Vitamin C
- Angstrom Magnesium
- Clear Brux Checker daytime for 6 weeks

# BRUXING: PARAFUNCTIONAL TOOTH CONTACT



## Daytime Clenching- Clear Brux Checker Increase awareness to break habit

Very thin: Similar to mylar used for composites  
50  $\mu\text{m}$  thick



Great Lakes Orthodontics  
Platzhalterfolie by Scheu  
Scheu Ref # 3202.1

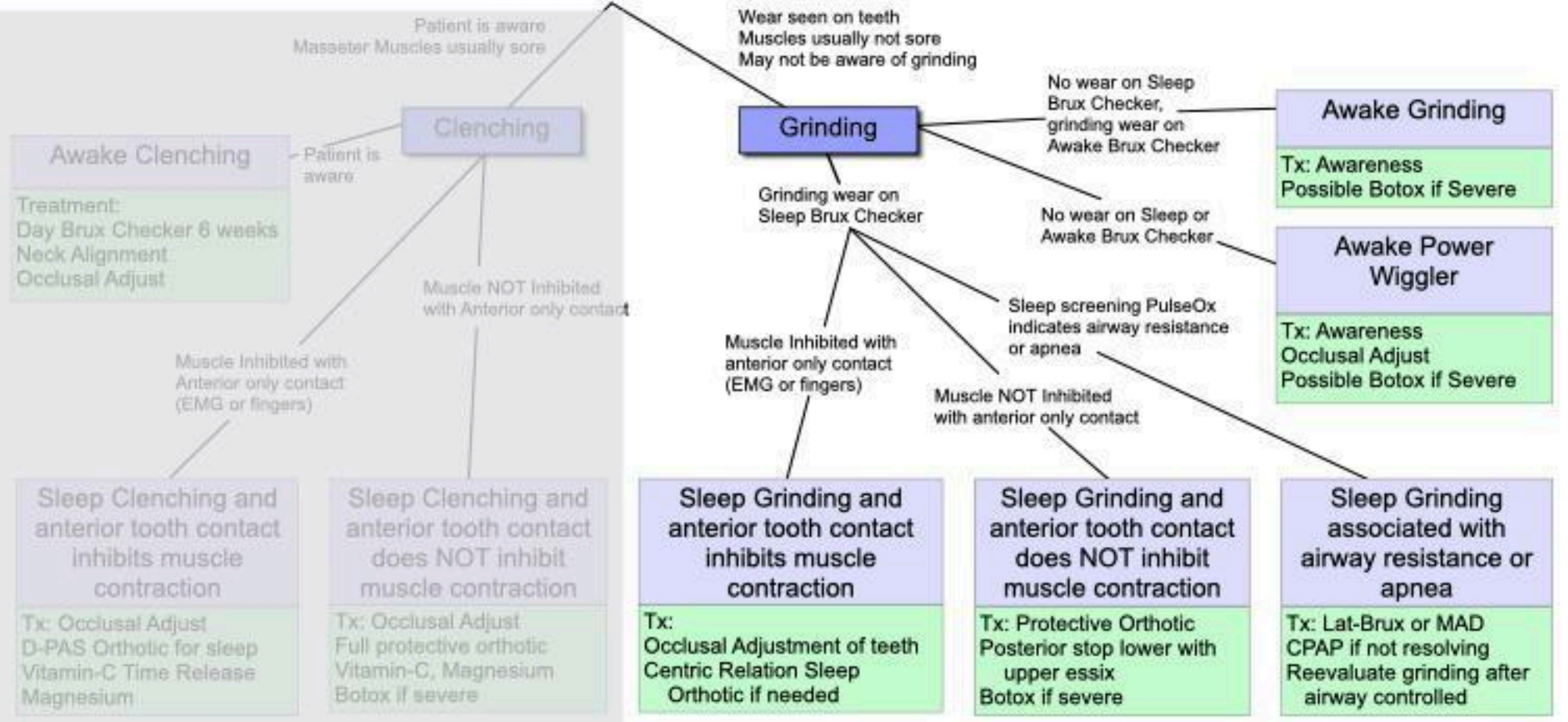




## 6 Common TMDs

Diagnosis	Pattern	Treatment
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<b>Sleep Grinding</b>	<b>Worn Teeth</b>	<b>Protective night guard</b> <b>Airway night guard</b>
Occlusal Muscle Dysfunction	Sore muscles when chewing Sore Lateral Pterygoid, Headaches Day D-PAS Relieves Symptoms	Occlusal Adjustment
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Acute Closed Lock TMJ	Sore TMJ Limited opening Hard end point active stretch	Arthrocentesis with PRP

# BRUXING: PARAFUNCTIONAL TOOTH CONTACT



**Awake Clenching**

Treatment:  
Day Brux Checker 6 weeks  
Neck Alignment  
Occlusal Adjust

**Clenching**

Patient is aware  
Masseter Muscles usually sore

Patient is aware

Muscle NOT inhibited with Anterior only contact

Muscle Inhibited with Anterior only contact (EMG or fingers)

**Sleep Clenching and anterior tooth contact inhibits muscle contraction**

Tx: Occlusal Adjust  
D-PAS Orthotic for sleep  
Vitamin-C Time Release  
Magnesium

**Sleep Clenching and anterior tooth contact does NOT inhibit muscle contraction**

Tx: Occlusal Adjust  
Full protective orthotic  
Vitamin-C, Magnesium  
Botox if severe

**Grinding**

Wear seen on teeth  
Muscles usually not sore  
May not be aware of grinding

No wear on Sleep Brux Checker, grinding wear on Awake Brux Checker

**Awake Grinding**

Tx: Awareness  
Possible Botox if Severe

No wear on Sleep or Awake Brux Checker

**Awake Power Wiggler**

Tx: Awareness  
Occlusal Adjust  
Possible Botox if Severe

Grinding wear on Sleep Brux Checker

Muscle Inhibited with anterior only contact (EMG or fingers)

**Sleep Grinding and anterior tooth contact inhibits muscle contraction**

Tx:  
Occlusal Adjustment of teeth  
Centric Relation Sleep  
Orthotic if needed

Sleep screening PulseOx indicates airway resistance or apnea

**Sleep Grinding and anterior tooth contact does NOT inhibit muscle contraction**

Tx: Protective Orthotic  
Posterior stop lower with upper  
essix  
Botox if severe

Muscle NOT inhibited with anterior only contact

**Sleep Grinding associated with airway resistance or apnea**

Tx: Lat-Brux or MAD  
CPAP if not resolving  
Reevaluate grinding after  
airway controlled



Clenchers destroy the joint,  
Grinders destroy the teeth



Clenching  
Painful Muscles  
Patient is usually aware of clenching  
Fremitus  
Strong Masseters  
See slight wear around tooth contacts  
Damage TMJ cartilage

If patient is unaware of clenching-  
Plant seed at hygiene visit  
Do you clench?

Grinding  
See tooth wear  
Patient is usually not aware  
Buttressing bone if teeth are tight  
If tooth mobility, on excursions  
Strong Masseters  
Slight if any soreness muscles  
Usually no muscle pain

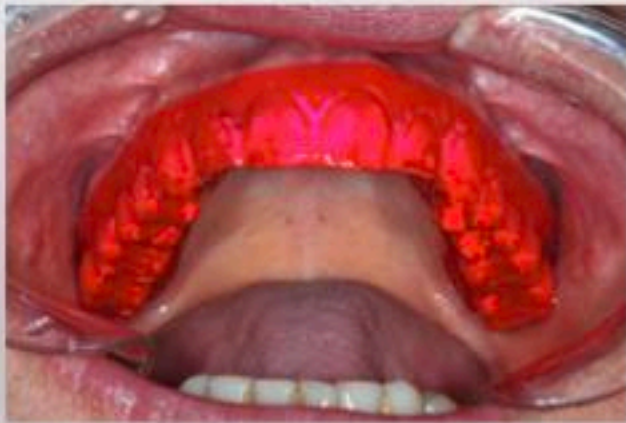
Parker Mahan-  
"Women Hurt, Men destroy"



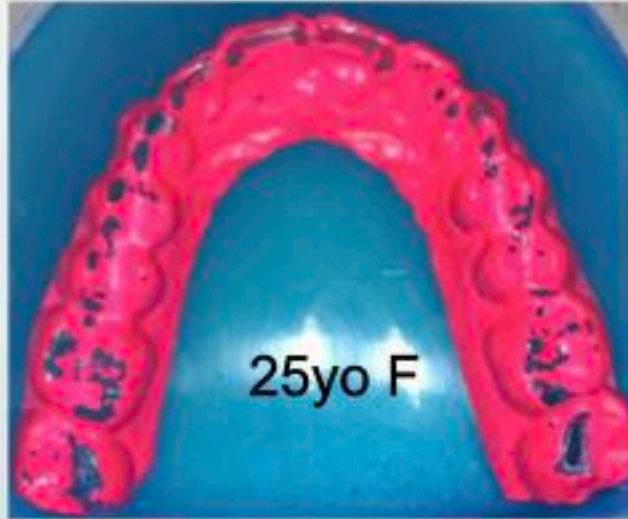
2. Does this occur awake or asleep?

Brux Checker  
Great Lakes Orthodontics

0.1mm Mylar



Made on Biostar Machine



25yo F



29yo F



30yo F

# Which Occlusal Orthotic for Grinding?

Lower Posterior Stop with upper essix



Upper Hard CR Orthotic

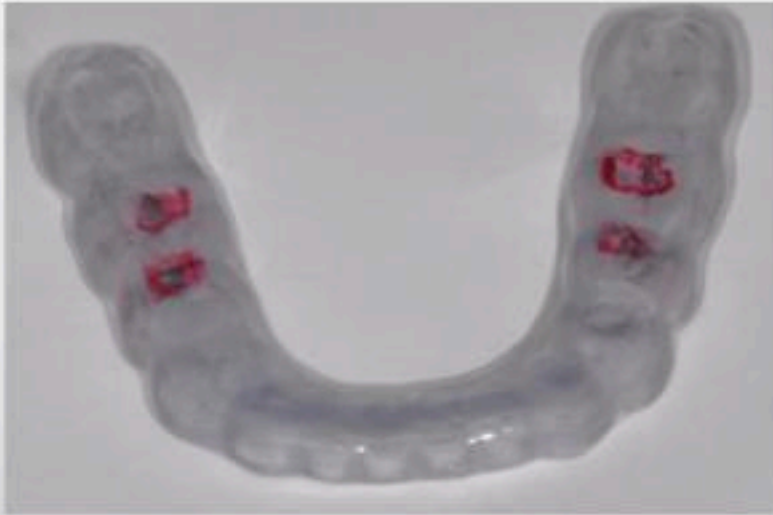


Lat-Brux  
Great Lakes Ortho



Nylon Herbst  
Great Lakes Ortho

## Lower Posterior Stop Night guard with upper Essix



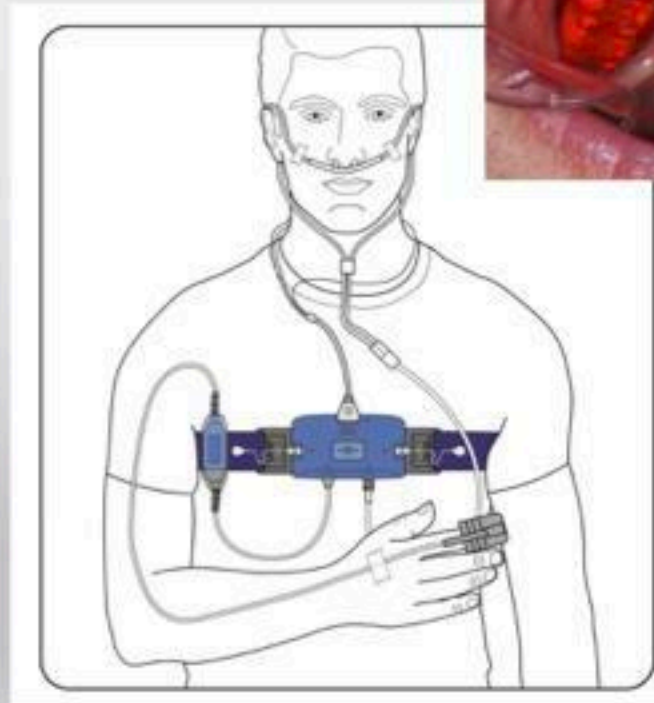
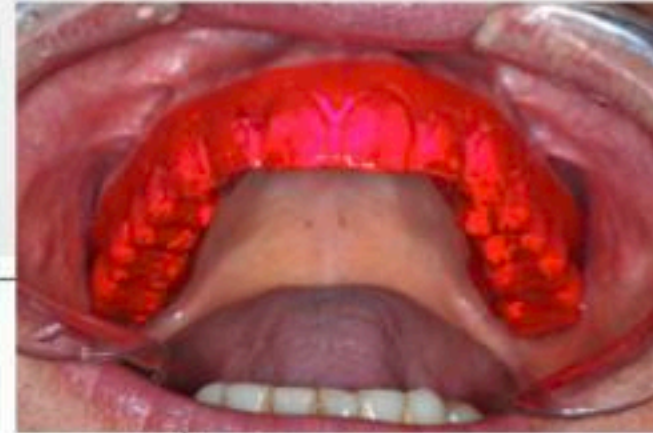


# zMachine

GENERAL  
sleep



zMachine + Brux Checker  
+ Snore Lab



Call (888) 330-4424  
Use Code: DROTER to receive special offer  
Also ask for access to Droter Modified Report

# Treating Common TMDs in a General Practice

## Management

### Diagnosis

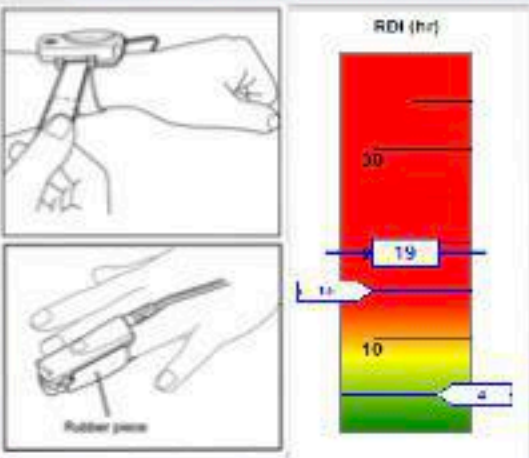
Sleep Grinding Airway Related

### Pattern

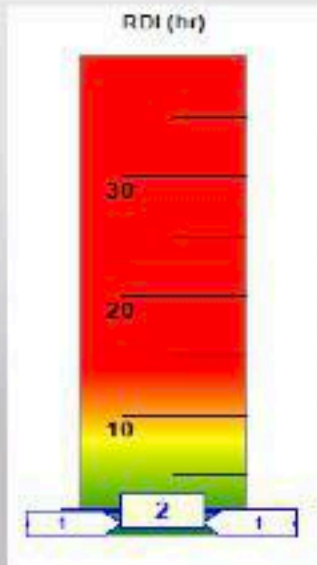
Worn Teeth  
Upper Airway Resistance

### Treatment

Mandibular Advancement  
Appliance (after MD approves)



Pulse Ox Screening  
 Refer to Medical Sleep Doctor  
 Get approval for Mandibular Advancement Appliance  
 Verify Airway Improves  
 19 events/hr before  
 2 events/hr with Orthotic



PULSOX 300i, Konica Minolta  
with data analysis Patient Safety, Inc.

Panthera Nylon D-SAD  
Great Lakes Ortho



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# Occlusal Muscle Disharmony

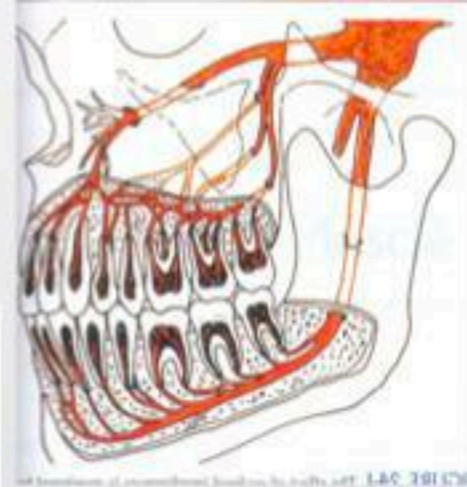
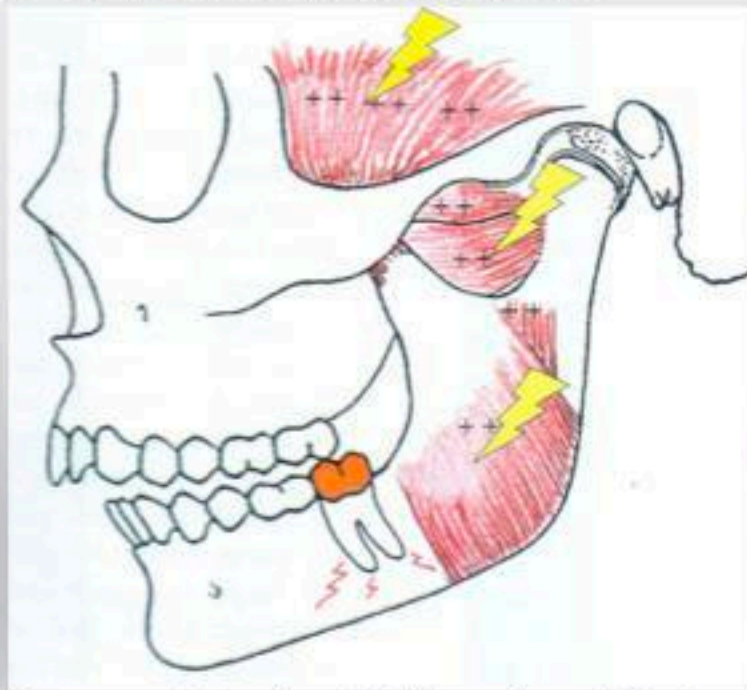
Uneven tooth contact with condyles fully seated triggers muscle activity

Lateral pterygoid fires out of sequence to create even tooth contact on closure

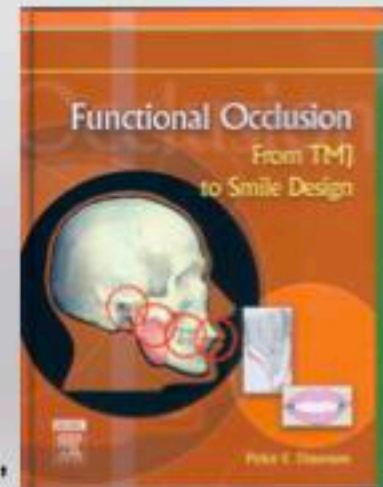
Disharmony in all muscles: Splinting/Bracing

Muscles sore from overuse

Muscles do not think- CNS input

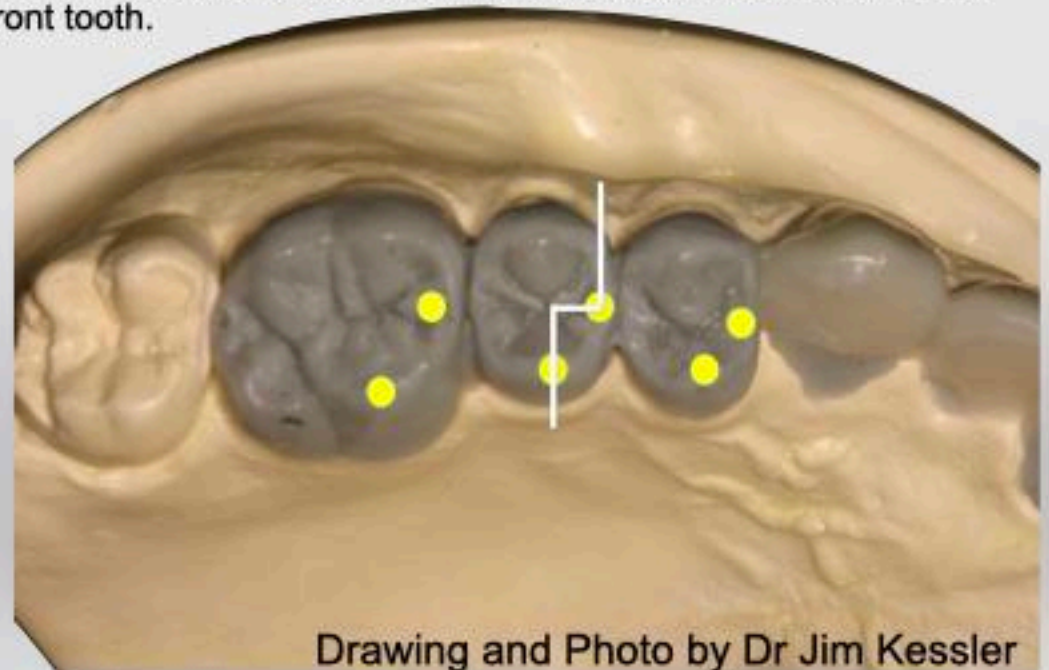
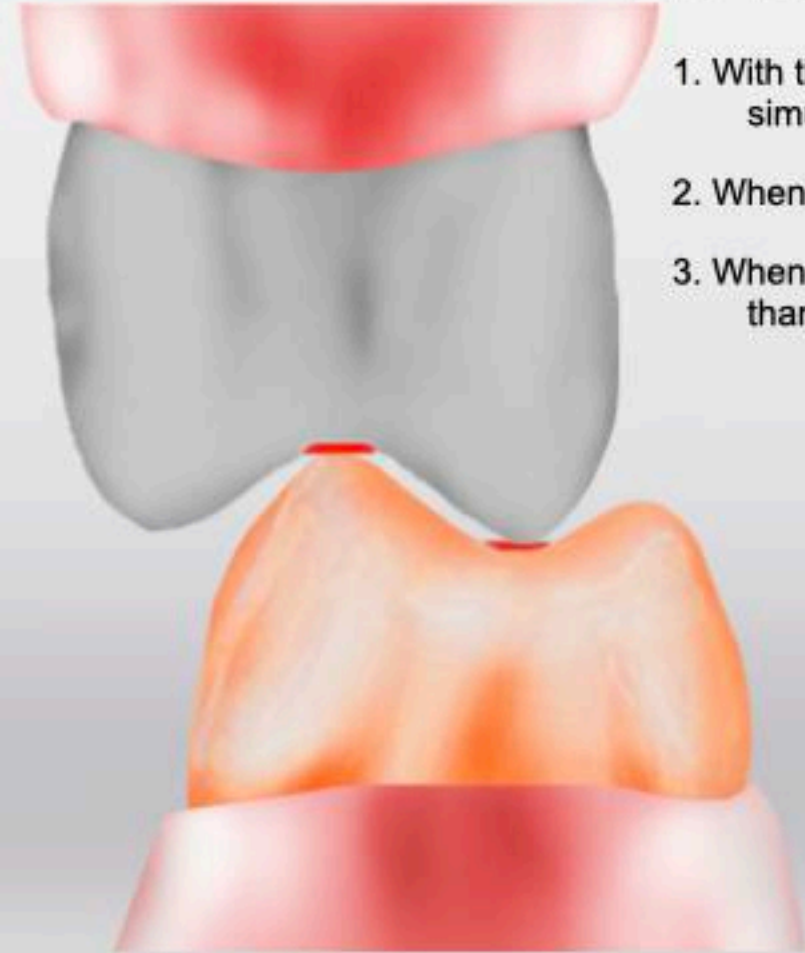


from Dawson's Textbook, "Functional Occlusion"



## LD Pankey's 3 Rules of Occlusion (Clyde Schuyler)

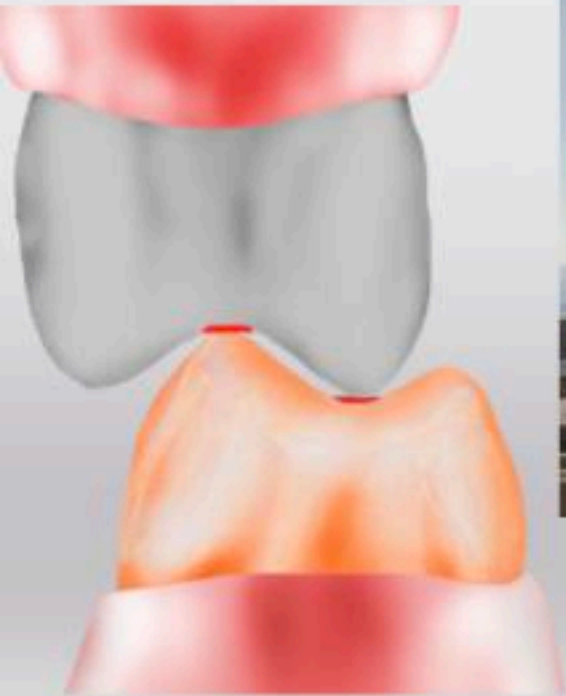
1. With the condyles fully seated in the fossa, all the posterior teeth touch simultaneously and even, with the anterior teeth lightly touching.
2. When you squeeze, neither a tooth nor the mandible moves (in a lateral direction).
3. When you move the mandible in any excursion, no back tooth hits before, harder than, or after a front tooth.



Drawing and Photo by Dr Jim Kessler

2. When you squeeze, neither a tooth nor the mandible moves (in a lateral direction).

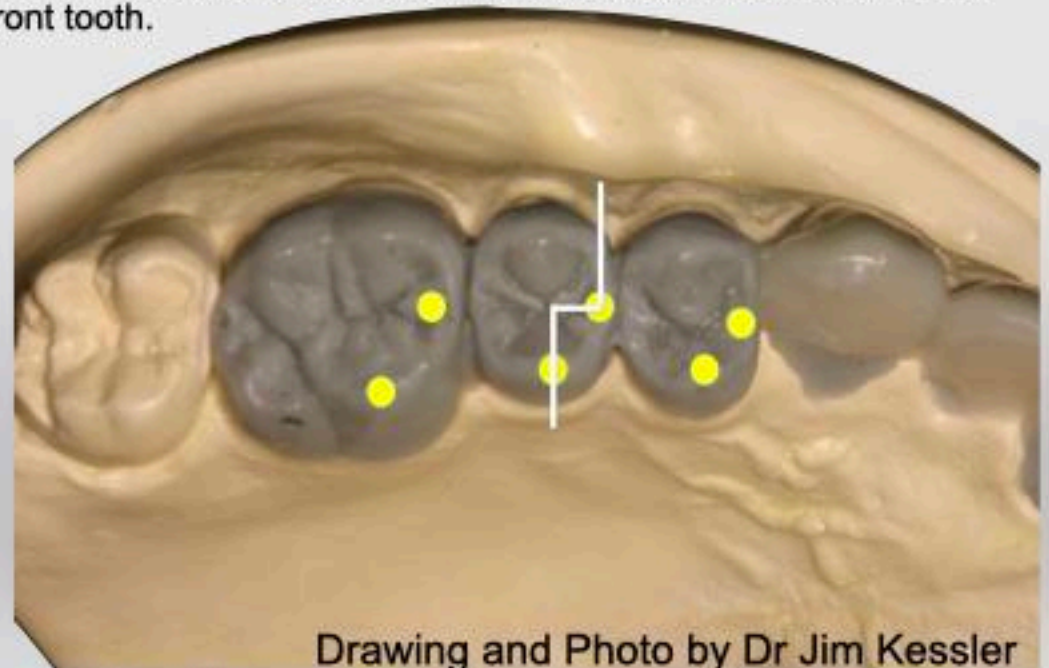
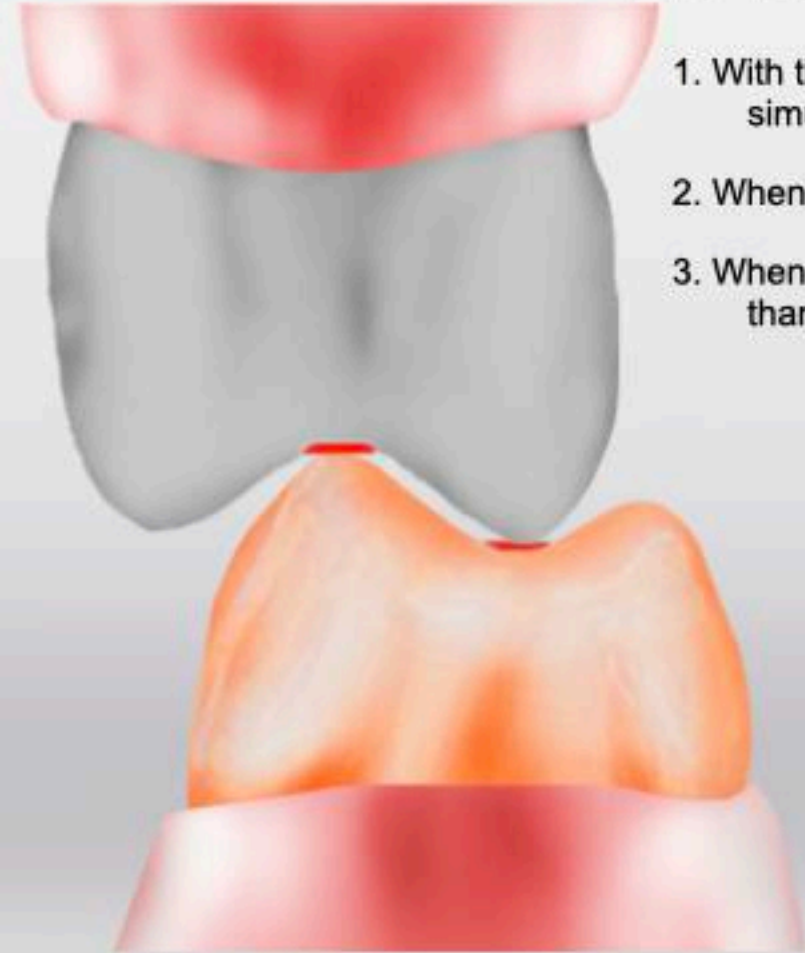
## Rule #2 = Flat Landing Area





## LD Pankey's 3 Rules of Occlusion (Clyde Schuyler)

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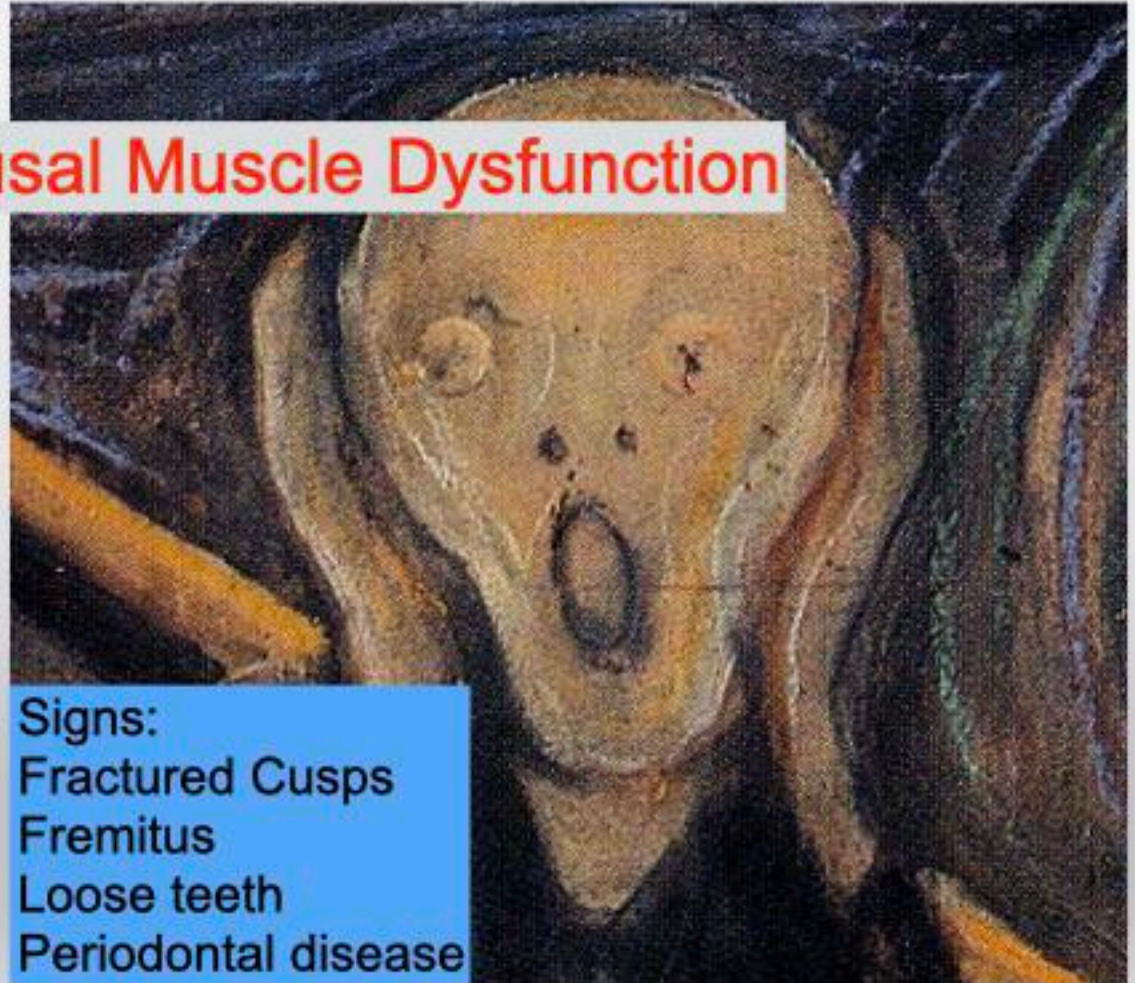
Drawing and Photo by Dr Jim Kessler

## TMD Symptoms

Sore TM Joint  
Sore TMJ muscles  
Difficulty chewing  
Headaches  
Eye pain  
Ear pain  
TMJ clicking  
Jaw locking  
Limited opening  
Difficulty open jaw  
Difficulty closing jaw  
Anterior Open Bite

## Occlusal Muscle Dysfunction

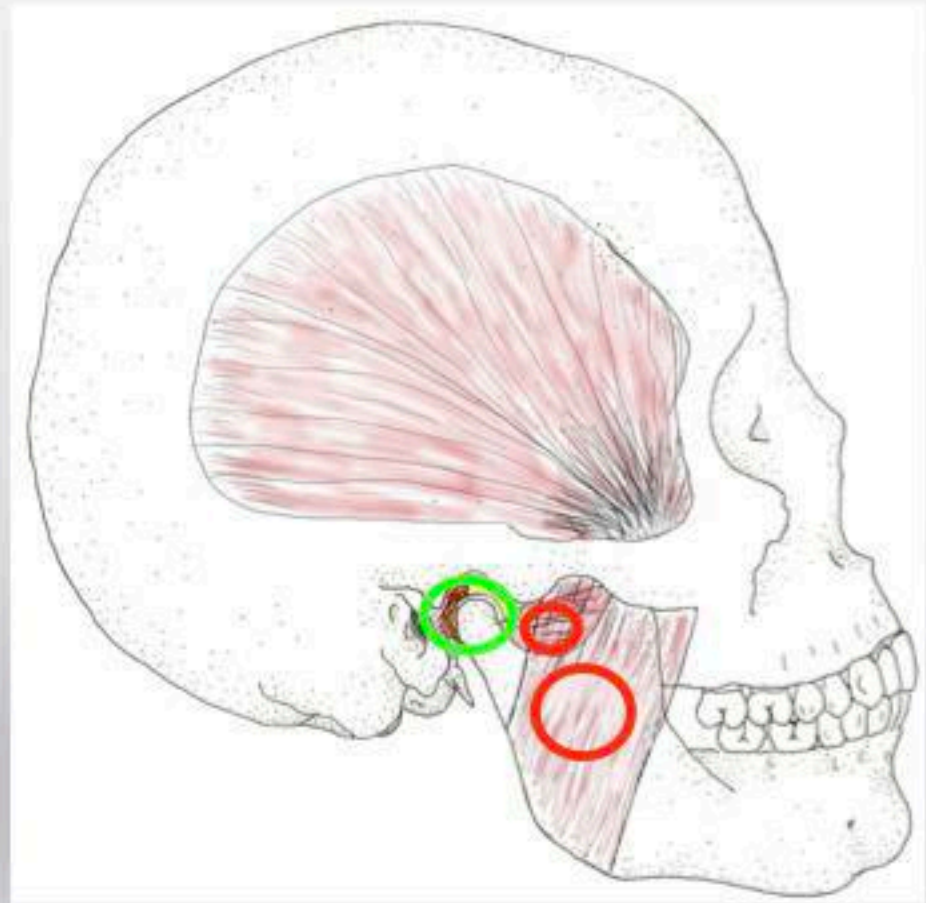
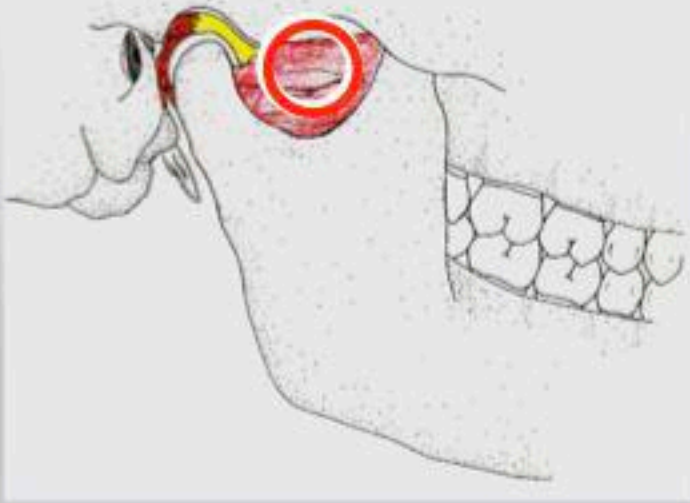
Signs:  
Fractured Cusps  
Fremitus  
Loose teeth  
Periodontal disease





## Occlusal Muscle Dysfunction Pattern

Sore muscles when chewing  
Sore Lateral Pterygoid  
TMJ is not sore  
Day orthotic relieves symptoms



Drawings by Gretta Tomb DDS and John Droter DDS



## Occlusal Muscle Dysfunction Diagnostic Tests

Occlusal Muscle Dysfunction is a daytime problem

Clenching can be both a daytime and nighttime problem

>30% of headaches have an occlusal component

D-PAS 2 week trial



OR

3-6 week lower CR orthotic



Occlusal adjustment in patients with craniomandibular disorders including headaches. A 3- and 6-month follow-up. Vallon D, Ekberg E, Nilner M. Acta Odontol Scand. 1995

Response to occlusal treatment in headache patients previously treated by mock occlusal adjustment. Forssell H, Kirveskari P, Kangasniemi P. Acta Odontol Scand. 1987

# Diagnostic Palatal Anterior Stop

D-PAS Test: Wear for 2 weeks, 24/7, take out to eat

## Better- Decrease in Symptoms

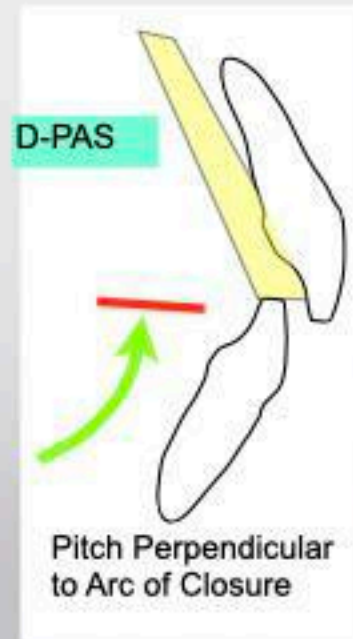
- Sleep Clenching Inhibited: Wear D-PAS as night guard
- Orthotic Improved Airway: D-PAS as night guard
- Occlusal Muscle Disharmony: Occlusal Adjust

## Worse- Increase in Symptoms

- Mechanically Unstable TMJ, joint subluxation
- Intracapsular Problem TMJ
- Orthotic Made Sleep Airway Worse

## Stays the Same- No Change in Symptoms

- Damaged TMJ are mechanically stable
- Pain not related to occlusion



Stapelmann H, Türp JC. The NTI-tss device for the therapy of bruxism, temporomandibular disorders, and headache.....BMC Oral Health. 2008 Jul PMID: 18662411

# Occlusal Sculpting Tools, including Zirconia



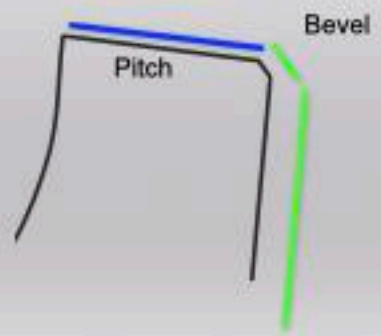
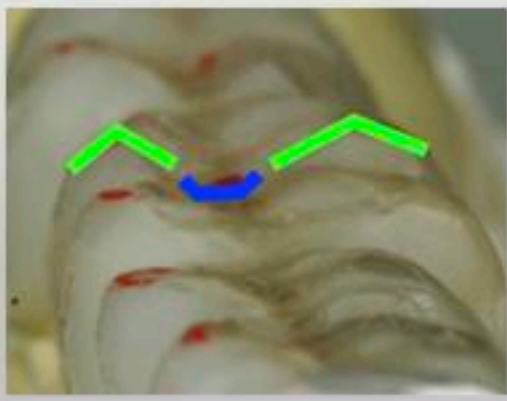
**Wheel**  
 Create Cusp Landing Zone  
 Flatten Incisal edges  
 Bulk reduction of inclines



Move and Shape Cusps,  
 Inclines, Facial Surfaces



Brassler Brio Shine  
 FLBCER-1  
 FLBF-2

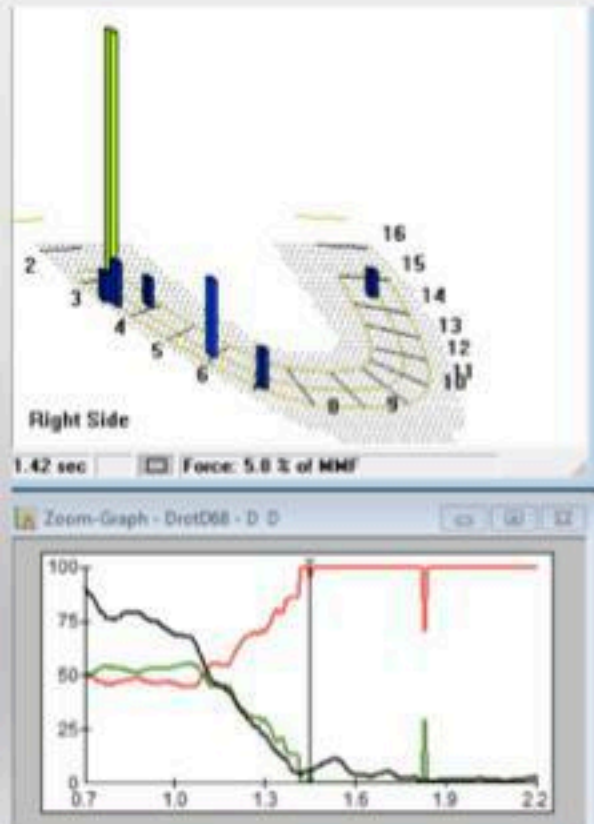


Premier 860.9 F Wheel Diamond  
 Premier 230 F Barrel Diamond  
 Neodiamond 1118.7F Roundend taper  
 Dedco Green Stone  
 White Arkansas stone  
 Filtek Supreme- B1B, Albond



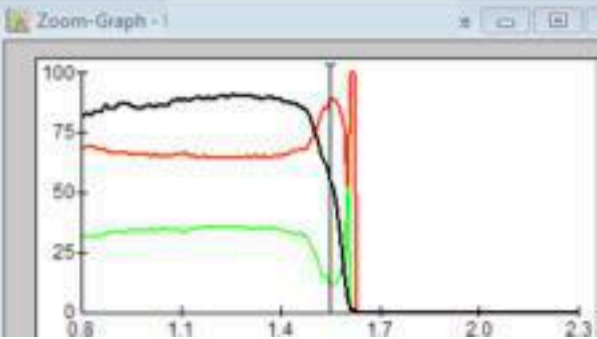
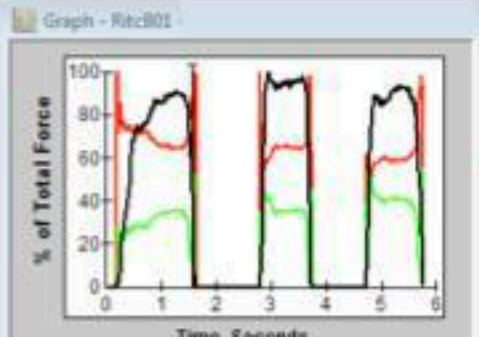
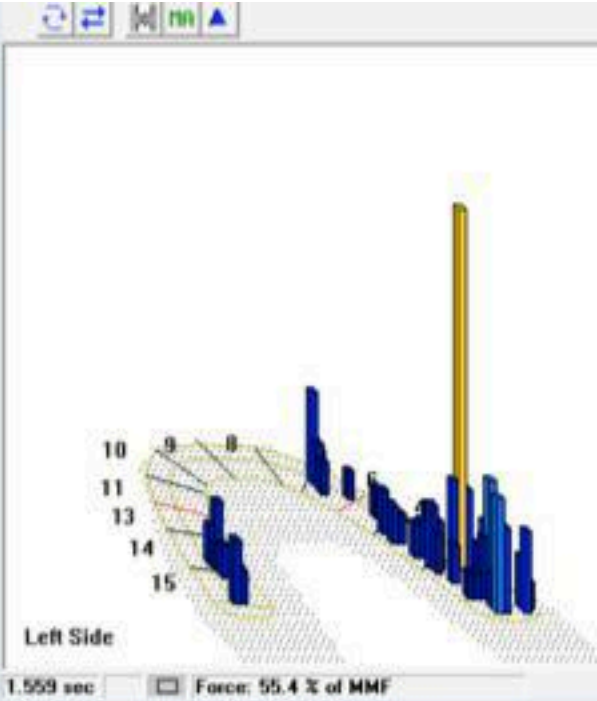
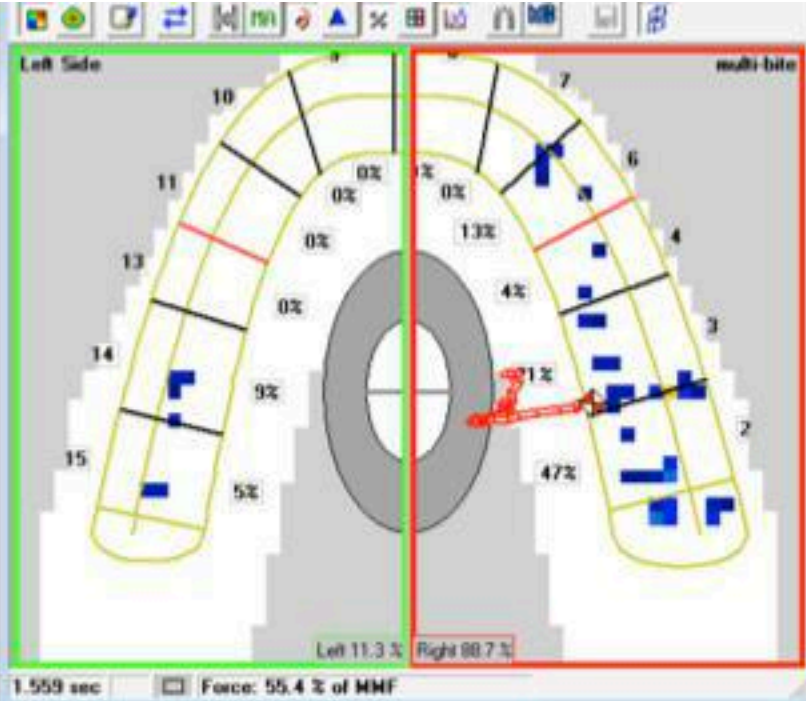
The indispensable value of T-Scan is not in finding heavy CR contacts, but working and nonworking contacts.

Is that a smudge or a muscle activating interference?



Remove too much and you decrease the ability to chew, especially lettuce. Chewing lettuce requires posterior inclines coming close enough to chew, but far enough apart to not touch and activate muscle.

T-Scan is excellent for Patient Education of Occlusal Pathology



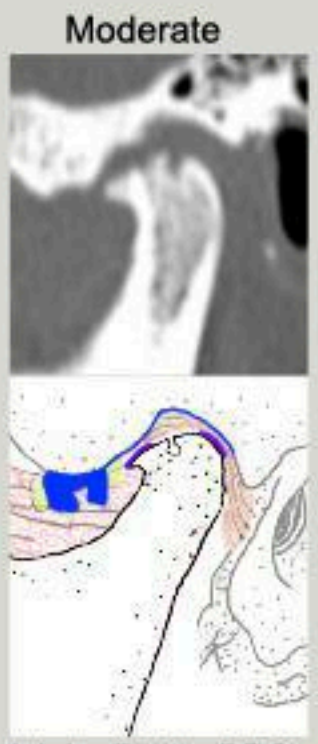
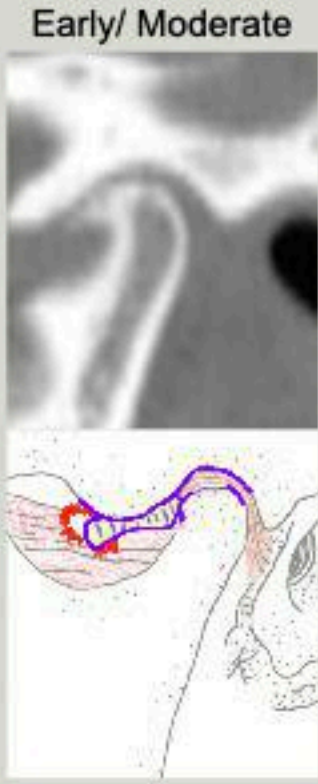
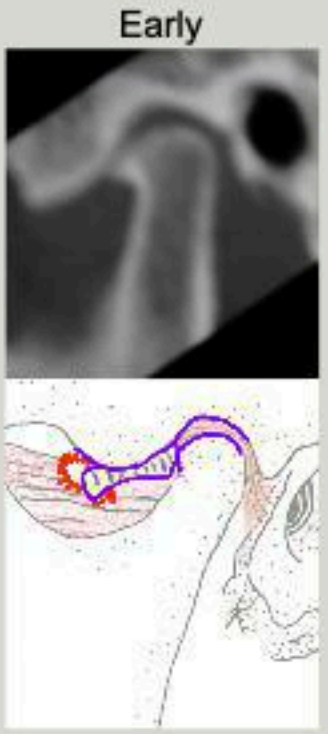
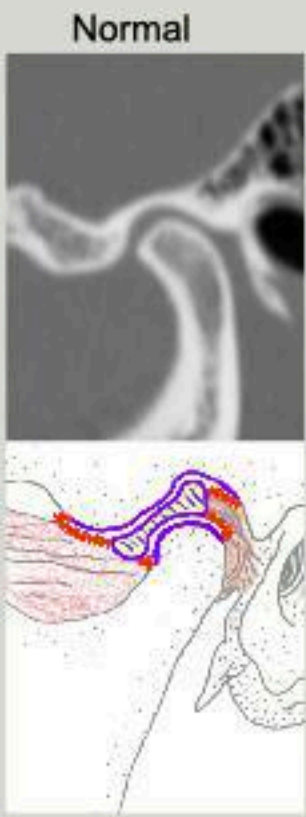
## 6 Common TMDs

Diagnosis	Pattern	Treatment
Clenching	Patient is aware Masseters Ache Morning TMJ clicking that resolves	Occlusal Adjust D-PAS Night Guard (if inhibition) Magnesium and Vitamin C hs
Sleep Grinding	Worn Teeth	Protective night guard Airway night night guard
Occlusal Muscle Dysfunction	Sore muscles when chewing Sore Lateral Pterygoid, Headaches Day D-PAS Relieves Symptoms	Occlusal Adjustment
<b>Osteoarthritis of TMJ</b>	<b>Arthralgia</b> <b>CBCT shows worn bone loss</b> <b>MRI T2, STIR ++</b>	<b>NSAID for 6-12 weeks</b> <b>Occlusal Adjustment</b> <b>Do not put in a night guard</b>
Sprain Discal Ligament TMJ, Acute	Sudden onset pain TMJ, sore TMJ Limited opening Soft end point active stretch	Cold Laser, Ice 15 min 3x a day Rest, Soft diet, NSAID 7 days Anterior Reposition Orthotic 7 days
Acute Closed Lock TMJ	Sore TMJ Limited opening Hard end point active stretch	Arthrocentesis with PRP



# Osteoarthrosis/Osteoarthritis

Healthy joints have no friction or wear.  
Damaged joints have Friction. Friction causes wear.  
OA is a wearing out of a joint which starts in cartilage.  
**Parafunction increases wear.**



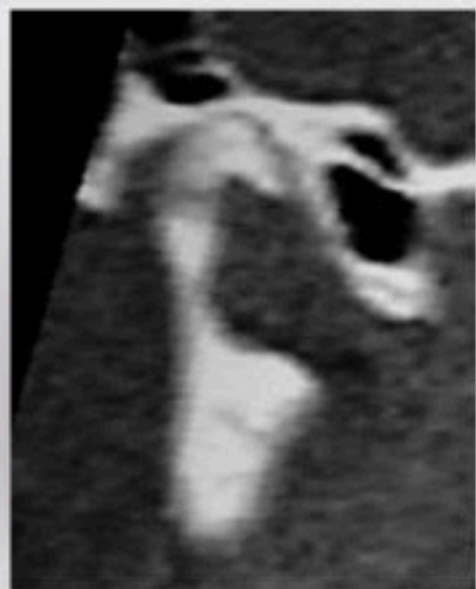
Representative examples of OA in different patients

Drawings by Gretta Tomb DDS and John Droter DDS

# Adaptation Chronic Bilateral Osteoarthritis

Mandible recedes Slowly  
Teeth Move/ Adapt  
Anterior Guidance gets steeper as Condylar Guidance get shallower

OA Right and Left Bone Loss  
#8 Ankylosed



# Treatment OA

## Osteoarthrosis

Glucosamine 1500mg /Chondroitin 600 mg per day

Minimize parafunction:

If sleep grinding due to airway  
CPAP or Dental Airway Device



Shea Brand CBD

## Osteoarthritis

All of the above plus eliminate inflammation.....

NSAIDs for 6+ weeks

Cold Laser

If still inflamed arthrocentesis with  
Platelet Rich Plasma (PRP)



MLS Laser  
9 sessions over 4 weeks



# MLS Laser: BioResearch

Multiwave Locked System Laser

808 nm Continuous, 905 nm Pulsed

Diode Laser

- Stimulates metabolic processes in cells
- Increase release NO from cells
- Decrease inflammation
- Pain Reduction
- Faster Healing
- Eliminates Trigger Points
- Much better than Dry Needling



Chung, H., Dai, T., Sharma, S. K., Huang, Y.-Y., Carroll, J. D., & Hamblin, M. R. (2012). The nuts and bolts of low-level laser (light) therapy. *Annals of Biomedical Engineering*, 40(2), 516–533.

Ilbuldu E, Cakmak A, Disci R, Aydin R. Comparison of laser, dry needling, and placebo laser treatments in myofascial pain syndrome. *Photomed Laser Surg*. 2004 Aug;22(4):306-11.

# Treatment OA

## Osteoarthrosis

Minimize parafunction:

If sleep grinding due to airway:

CPAP or Dental Airway Device

Glucosamine 1500mg /Chondroitin 600 mg per day

## Osteoarthritis

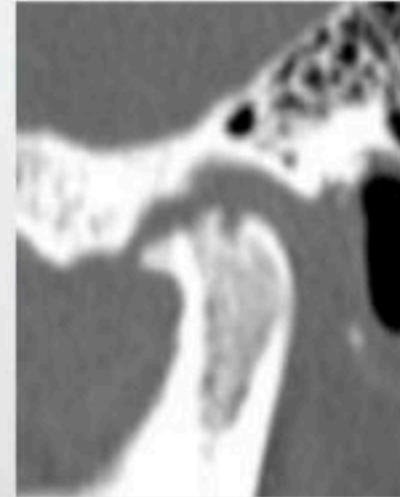
All of the above plus eliminate inflammation.....

NSAIDs

Cold Laser

If still inflamed arthrocentesis with Platelet Rich Plasma (PRP)

If still pain in 6 -12 weeks of NSAID:  
Arthrocentesis  
Platelet Rich Plasma



## 6 Common TMDs

Diagnosis	Pattern	Treatment
Clenching	Patient is aware Masseters Ache Morning TMJ clicking that resolves	Occlusal Adjust D-PAS Night Guard (if inhibition) Magnesium and Vitamin C hs
Sleep Grinding	Worn Teeth	Protective night guard Airway night night guard
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Osteoarthritis of TMJ	Arthralgia CBCT shows worn bone loss MRI T2, STIR ++	NSAID for 6-12 weeks Occlusal Adjustment Do not put in a night guard
Sprain Discal Ligament TMJ, Acute	Sudden onset pain TMJ, sore TMJ Limited opening Soft end point active stretch	Cold Laser, Ice 15 min 3x a day Rest, Soft diet, NSAID 7 days Anterior Reposition Orthotic 7 days
Acute Closed Lock TMJ	Sore TMJ Limited opening Hard end point active stretch	Arthrocentesis with PRP



## TMD Symptoms

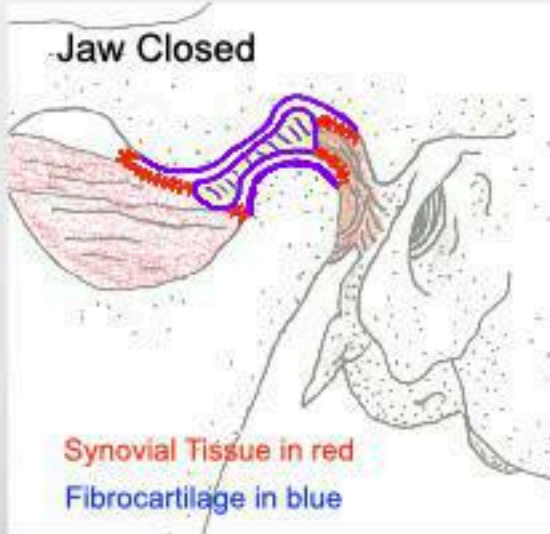
### Limited Opening

Diseases to consider and rule out:

- Pain Avoidance Sore Joint
- Pain Avoidance Sore Muscle
- Hematoma
- Muscle Spasm
- Masseteric Space Infection
- Nonreducing Disc (4b,3b Acute)
- Joint Fibrosis, Muscle Fibrosis
- Other

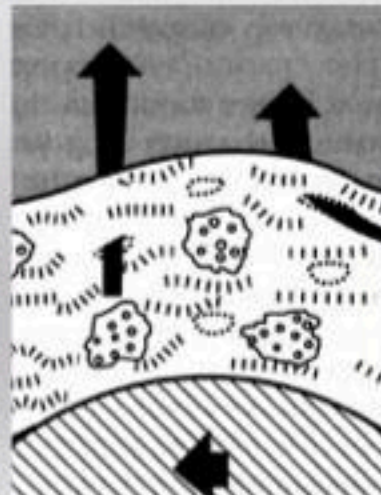
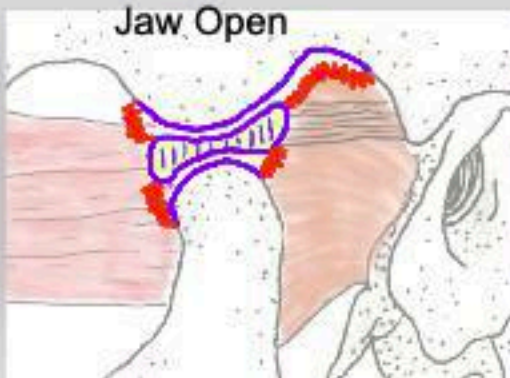
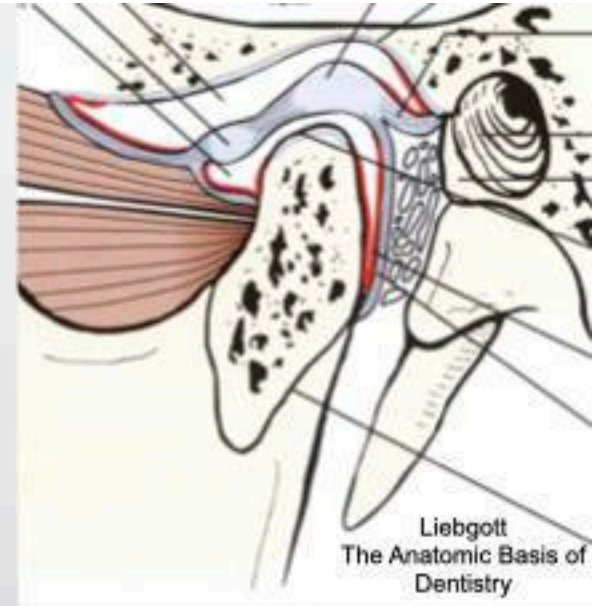


# Normal TMJ- Synovium, Cartilage



Fibrocartilage-  
Slope of Eminence  
Disc  
Top of Condyle

Synovial Tissue makes Synovial Fluid  
No blood vessels in a health joint  
Nutrition to the cartilage cells  
Lubrication- Hyaluronic Acid and Lubricin





# Differential Diagnosis: Limited Joint Motion

Muscle Spasm

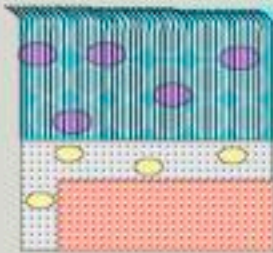
Painful to Move  
Joint Pain  
Muscle Pain

Mechanically Blocked  
4b Acute  
Adhesion

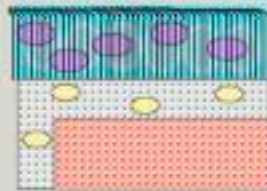
Masseteric Space  
Infection  
Hematoma



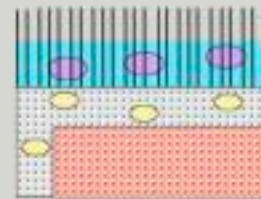
Healthy Cartilage



4 Weeks



8 Weeks



Lose 50% height of cartilage  
Proteoglycans not being produced by Chondrocytes  
Loss of 50% proteoglycans and water  
Collagen still intact  
Process is reversible

Move joint with light force/repetitive motion next 30 days

You have 6-8 weeks to get jaw moving  
before cartilage is irreversibly damaged,  
independent of the cause of the  
immobilization



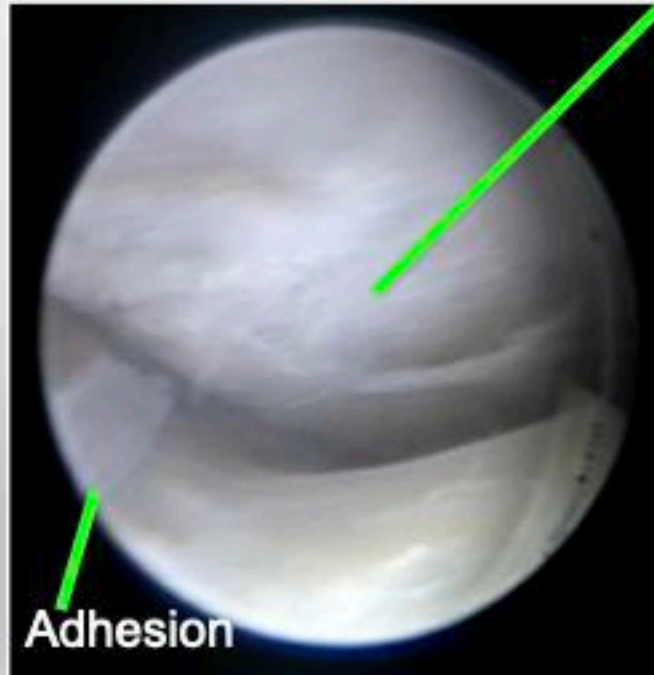
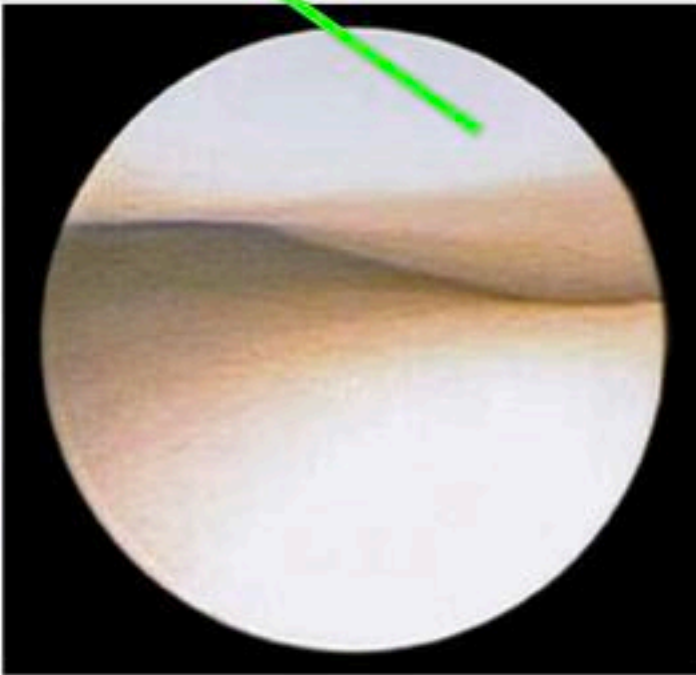
E.B. Evans, GWN Eggers, J.K. Butler, and J. Blumel, Experimental immobilization and remobilization of rat knee joints, J Bone Joint Surg Am, 1960 vol. 42 (5) pp. 737-758  
Enneking WF, Horowitz M. The intra-articular effects of immobilization on the human knee. J Bone Joint Surg Am. 1972 Jul;54(5):973-85. PMID: 5068717



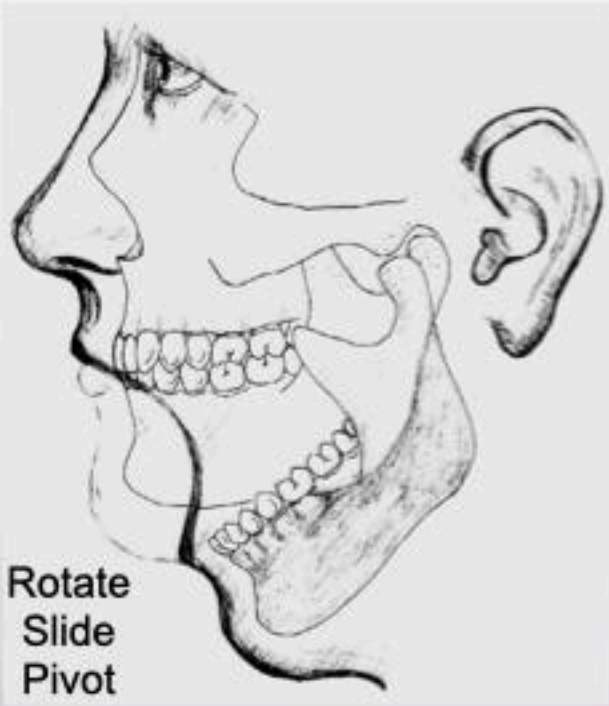
# Arthroscopic View Left TMJ

Eminence Healthy Cartilage

Eminence Necrotic Cartilage



Not Same Patient



Rotate  
Slide  
Pivot

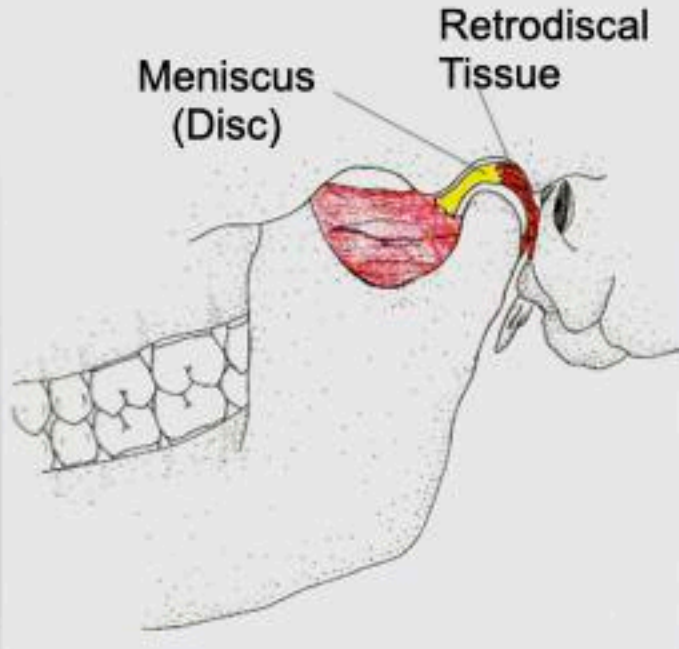
Rotation only 25mm

Max Open	40-55mm
Right Lateral	10-12mm
Left Lateral	10-12mm
Protrusive	10-12mm



TMJ has 2 Joint Compartments:

Upper- Translation  
Lower- Rotation



Acute non-Reducing Disc  
Limits Translation.

"Old Adapted" may have  
full range of motion.



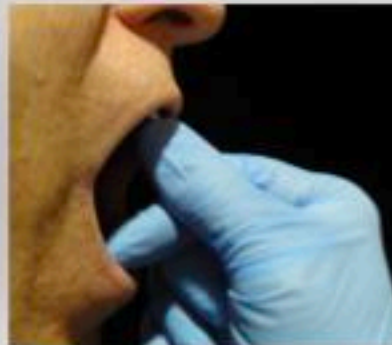
# Limited Opening Algorithm

## Differential Diagnosis Limited Opening:

- Pain Avoidance Sore Joint
- Pain Avoidance Sore Muscle
- Hematoma
- Muscle Spasm
- Masseteric Space Infection
- Nonreducing Disc (4b,3b Acute)
- Joint Fibrosis, Muscle Fibrosis
- Other

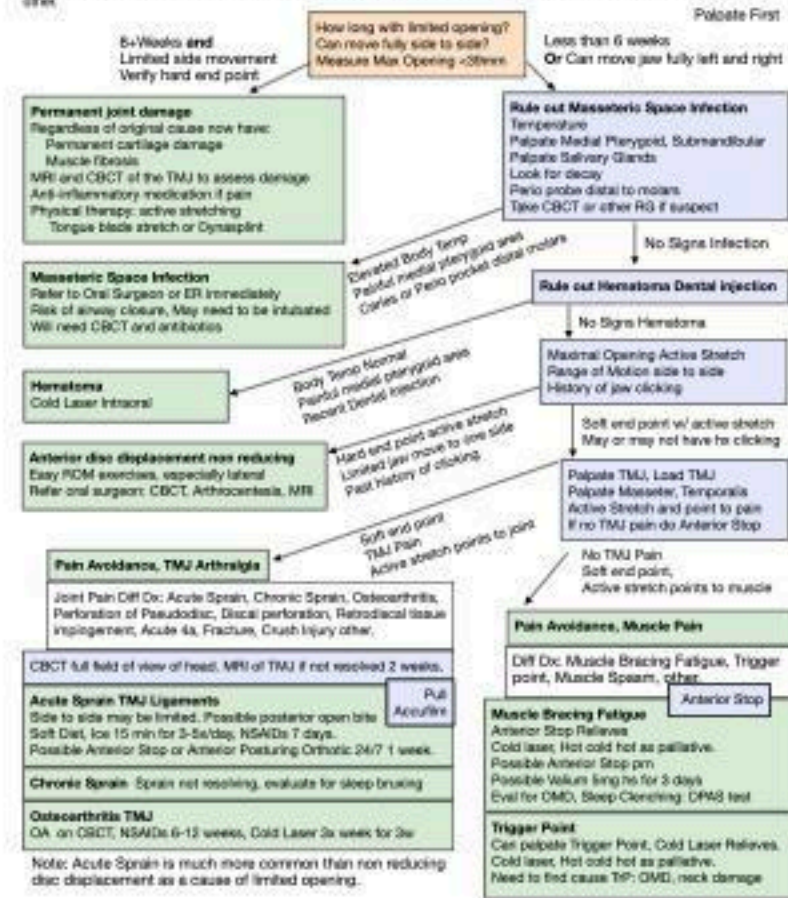
## Diagnostic Tests:

- History: How long limited
- Body Temperature
- Caries Exam, Perio exam
- ROM open, side to side
- Gentle Active stretch
- Point to area of pain
- Anterior Stop
- If needed CBCT, MRI



## Dr Droter's Limited Opening Algorithm

Differential Diagnosis Limited Opening (Less than 30mm): Pain Avoidance Sore Joint, Pain Avoidance Sore Muscle, Hematoma, Muscle Spasm, Masseteric Space Infection, Nonreducing Disc (4b,3b Acute), Joint Fibrosis, Muscle Fibrosis, other





**Subjective:**

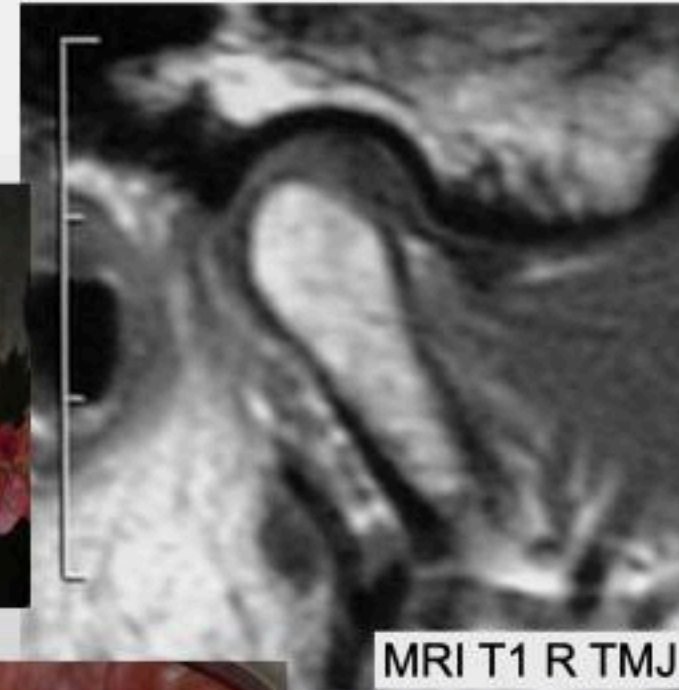
Dentist doing crown prep #30 1 week ago  
Severe pain Right TMJ after moving jaw at end of appt  
Constant deep pain Right TMJ  
Limited opening

**Objective:**

Limited opening 32mm, Mandible shifts Left  
Normal side to side motion  
98 temp, normal perio probe 2nd molars, no caries  
No pain palpation RL Medial Pterygoid  
Soft end point on active stretch, 45mm, R TMJ pain  
Right TMJ pain to palpation, Left TMJ normal  
Posterior openbite Right, does not hold Accufilm

**Assessment:**

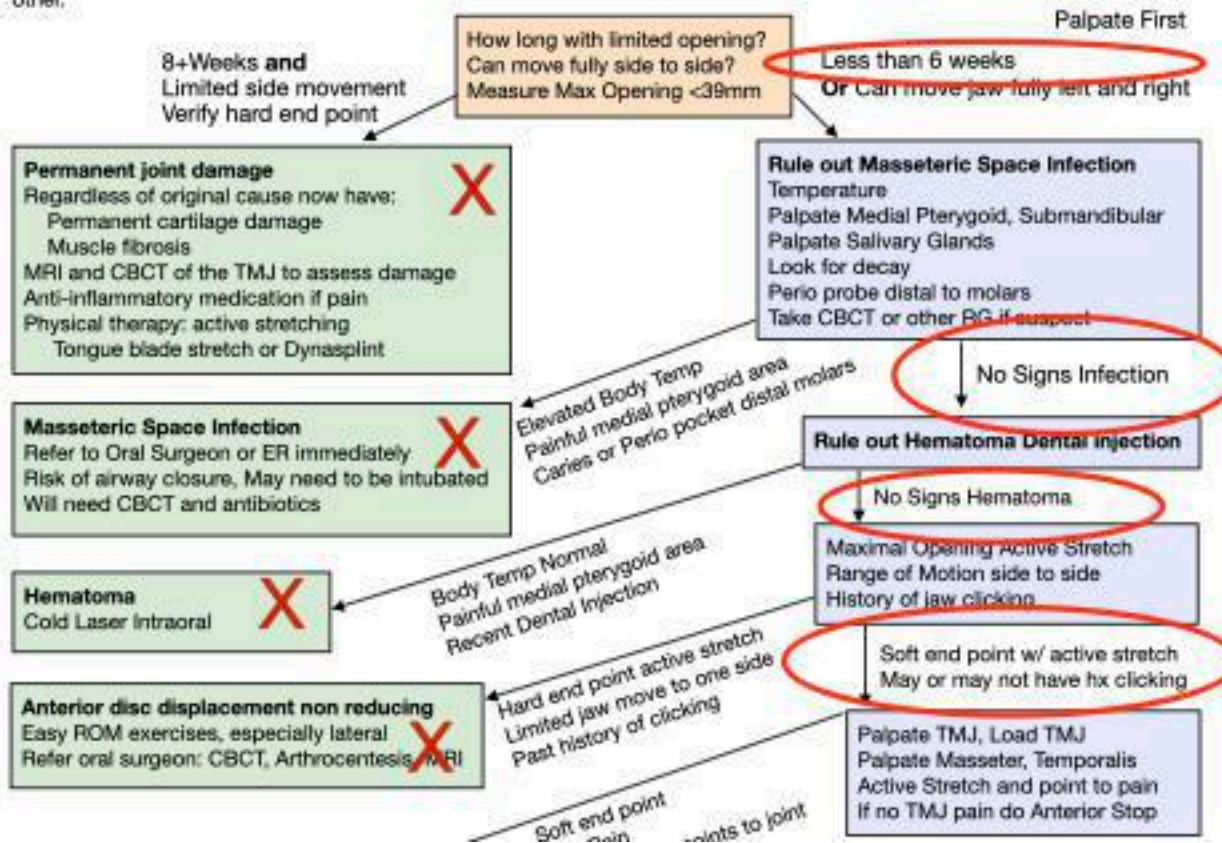
Limited opening due to Right TMJ pain avoidance  
Acute Sprain Right TMJ Ligaments



## Dr Droter's Limited Opening Algorithm

22.3

Differential Diagnosis Limited Opening (Less than 39mm): Pain Avoidance Sore Joint, Pain Avoidance Sore Muscle, Hemtoma, Muscle Spasm, Masseteric Space Infection, Nonreducing Disc (4b,3b Acute), Joint Fibrosis, Muscle Fibrosis, other.



## Objective:

Limited opening 32mm, Mandible shifts Left

Normal side to side motion  
98 temp, normal perio probe 2nd molars, no caries

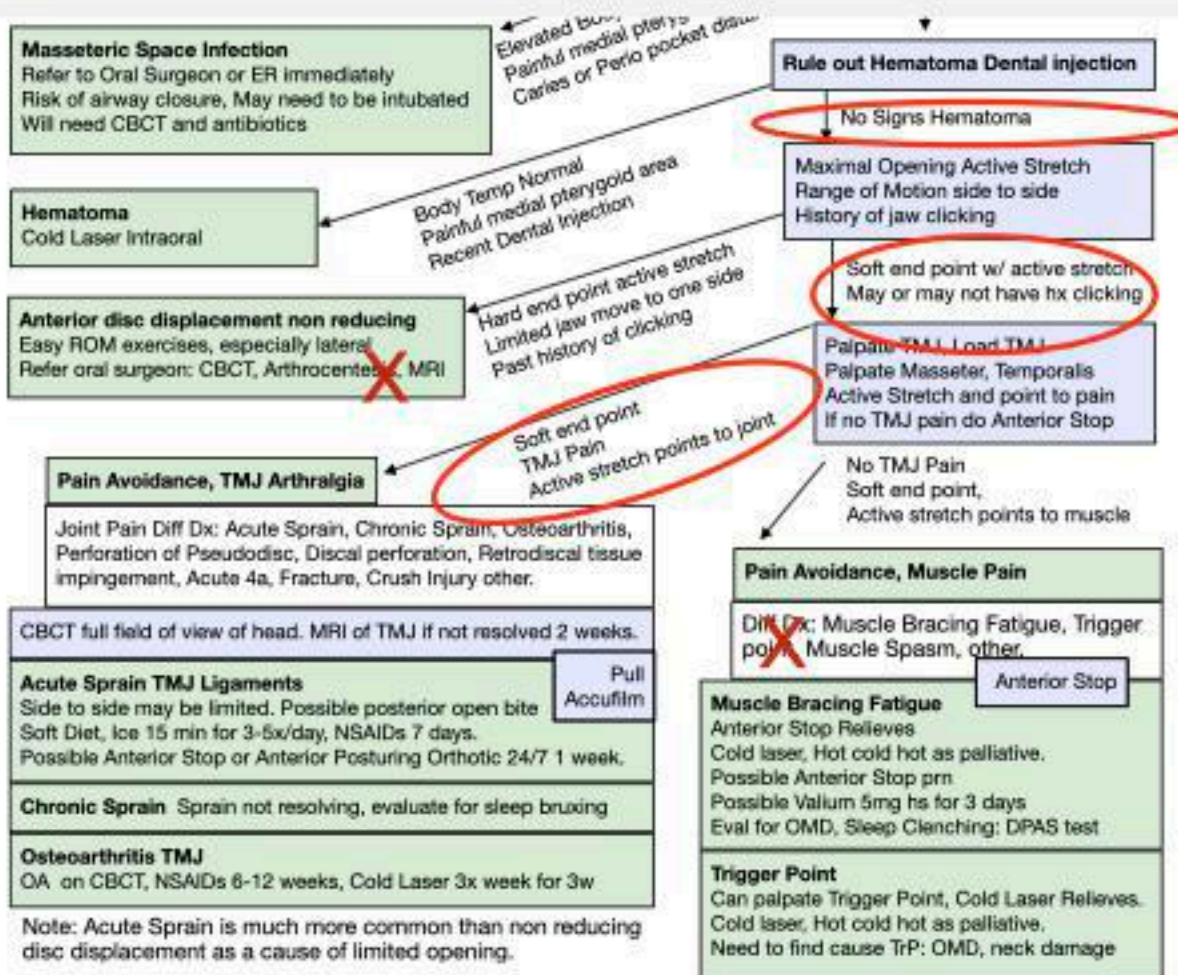
No pain palpation RL Medial Pterygoid

Soft end point on active stretch, 45mm, R TMJ pain

Right TMJ pain to palpation, Left TMJ normal

Posterior openbite Right, does not hold Accufilm





**Objective:**

- Limited opening 32mm, Mandible shifts Left
- Normal side to side motion
- 98 temp, normal perio probe 2nd molars, no caries
- No pain palpation RL Medial Pterygoid
- Soft end point on active stretch, 45mm, R TMJ pain
- Right TMJ pain to palpation, Left TMJ normal
- Posterior openbite Right, does not hold Accufilm



**Pain Avoidance, TMJ Arthralgia**

Soft end point  
TMJ Pain  
Active stretch point

Joint Pain Diff Dx: Acute Sprain, Chronic Sprain, Osteoarthritis, Perforation of Pseudodisc, Discal perforation, Retrodiscal tissue impingement, Acute 4a, Fracture, Crush Injury other.

CBCT full field of view of head. MRI of TMJ if not resolved 2 weeks.

**Acute Sprain TMJ Ligaments**

Side to side may be limited. Possible posterior open bite  
Soft Diet, Ice 15 min for 3-5x/day, NSAIDs 7 days.  
Possible Anterior Stop or Anterior Posturing Orthotic 24/7 1 week.

Pull  
Accufilm

**Chronic Sprain** Sprain not resolving, evaluate for sleep bruxing

**Osteoarthritis TMJ**

OA on CBCT, NSAIDs 6-12 weeks, Cold Laser 3x week for 3w

Note: Acute Sprain is much more common than non reducing disc displacement as a cause of limited opening.

Objective:

Limited opening 32mm, Mandible shifts Left

Normal side to side motion

98 temp, normal perio probe 2nd molars,  
no caries

No pain palpation RL Medial Pterygoid

Soft end point on active stretch,

45mm, R TMJ pain

Right TMJ pain to palpation, Left TMJ normal

Right posterior openbite does not hold Accufilm

Working Diagnosis: S03.40xxA Sprain Discal Ligament TMJ, acute with joint edema.  
Pain Avoidance Sore Joint. Muscle bracing painful joint.

**Treatment:**

Ice 15-20 minutes for 3-5x 2 days only

Anterior repositioning orthotic 24/7 one week

NSAID for 5 days- 800mg Advil Liquid gel caps, q8h

Soft chew diet

At 1 week Anterior repositioning orthotic sleep only for second week

Week 3, no orthotic, reintroduce harder foods



Verify Orthotic does not rub  
lingual tissue of mandible



At 4 weeks patient had full ROM  
No clicking

New addition to protocol  
Cold Laser (MLS Laser- 1500 hz 15  
seconds, 10 hz 30 seconds)

# Current Sprain Protocol

Soft chew diet

Ice over TMJ 15 minutes 3-5 times a day for 3-5 days, 2-3x a day for additional 3 days

NSAID: Advil Liquid Gel Caps 200mg, 3 caps 3x a day

or Aleve Liquid Gel Caps 220mg, 1 cap twice a day for 5 days or

In 1 week if still sore fabricate temporary upper Anterior Stop

Can add Cold Laser 350 hz both joints: 30 seconds open, 30 seconds closed

If still sore in 1 week will need TMJ imaging: CBCT and MRI



MLS Cold Laser  
BioResearch



Temporary Anterior Stop  
ArrowPath Sleep



Ms MY

## 6 Common TMDs

Diagnosis	Pattern	Treatment
Clenching	Patient is aware Masseters Ache Morning TMJ clicking that resolves	Occlusal Adjust D-PAS Night Guard (if inhibition) Magnesium and Vitamin C hs
Sleep Grinding	Worn Teeth	Protective night guard Airway night night guard
Occlusal Muscle Dysfunction	Sore muscles when chewing Sore Lateral Pterygoid, Headaches Day D-PAS Relieves Symptoms	Occlusal Adjustment
Osteoarthritis of TMJ	Arthralgia CBCT shows worn bone loss MRI T2, STIR ++	NSAID for 6-12 weeks Occlusal Adjustment Do not put in a night guard
Sprain Discal Ligament TMJ, Acute	Sudden onset pain TMJ, sore TMJ Limited opening Soft end point active stretch	Cold Laser, Ice 15 min 3x a day Rest, Soft diet, NSAID 7 days Anterior Reposition Orthotic 7 days
Acute Closed Lock TMJ	Sore TMJ Limited opening Hard end point active stretch	Arthrocentesis with PRP

## 6 Common TMDs

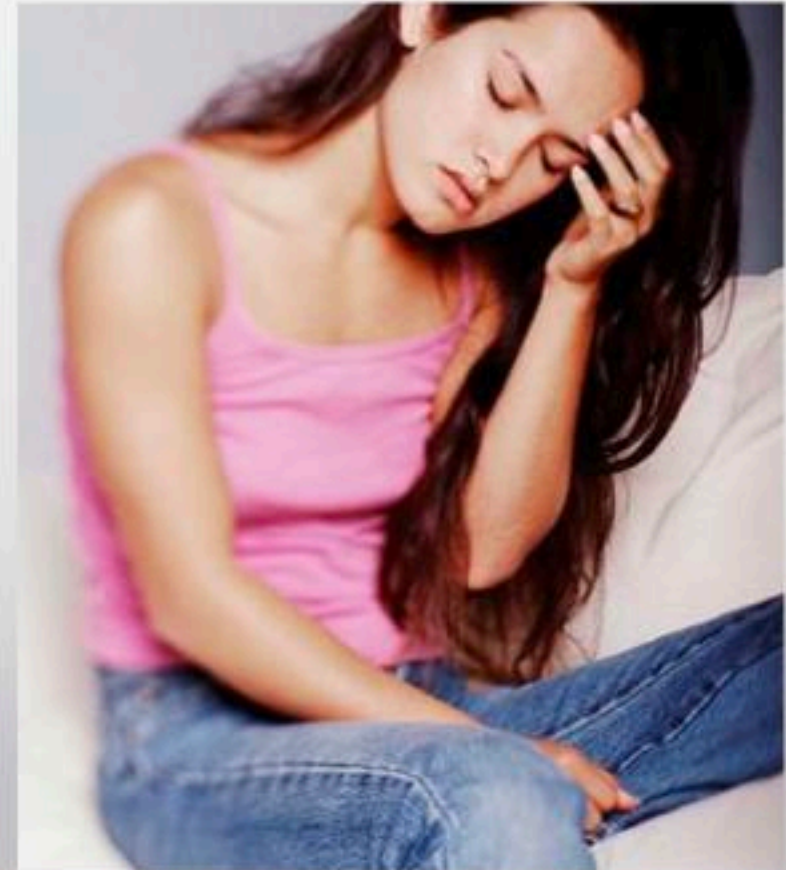
- Parafunctional Clenching
- Parafunctional Grinding
- Occlusal Muscle Dysfunction
- Osteoarthritis
- Acute Sprain
- Acute Closed lock of TMJ disc

## 5 Common Obstacles

- Neck and Postural Instability
- Wobbly TM Joint (Subluxation)
- Compromised Breathing/Airway
- Avascular Necrosis
- Referred Pain Muscle Triggerpoints

## 1 TMD that **usually** does not need therapy

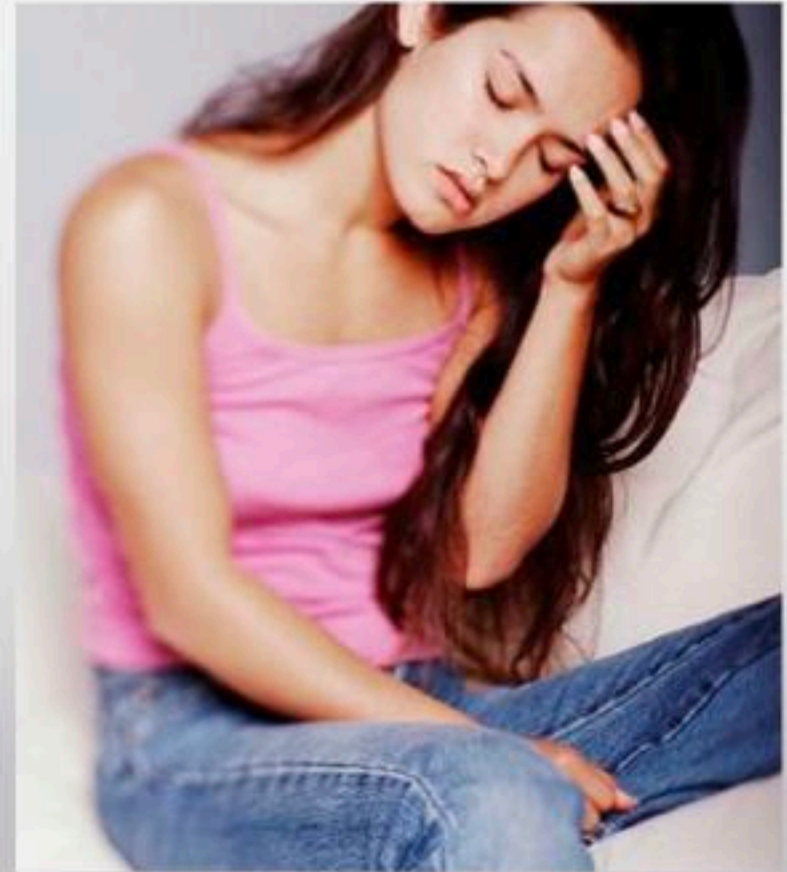
- TMJ Clicking





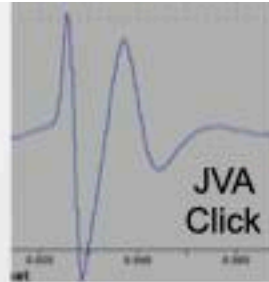
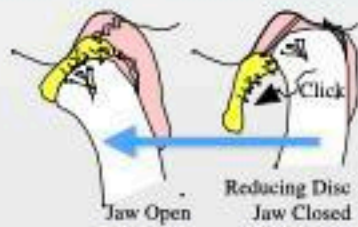
1 TMD that **usually** does not need therapy

TMJ Clicking

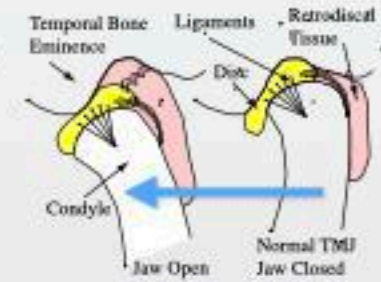


## Differential Diagnosis of TMJ Clicking

### Disc Reduction



### Normal

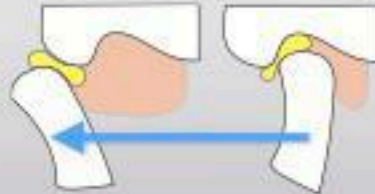


### Adhesive Click



“Sticky Disc” - Disc sticks after prolonged clenching, then releases

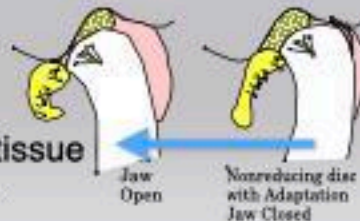
### Eminence Thud



A hypermobile condyle moves past the crest of the eminence and makes a thud sound

### Adhesion Crackle

A small piece of fibrous tissue 4b joint is moved across



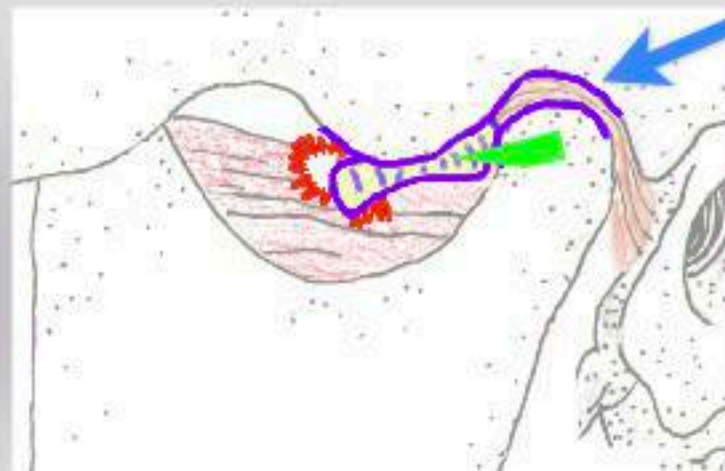
# Basic Orthopedics

Joints are either  
Healthy or  
Damaged

If damaged, joints will be either:  
Actively Breaking Down  
Adapting  
Adapted  
Structurally, Mechanically  
Favorably, Unfavorably



Majority of damaged  
TMJs adapt favorably



Posterior ligament, synovium,  
and retrodiscal tissue adapt to  
form a  
**Pseudo-disc**

Tissue Fibrosis



# **Symptoms of Temporomandibular Joint Osteoarthritis and Internal Derangement 30 years after Non-Surgical Treatment.**

**Leeuw, Boering, Stegenga, Bont,**

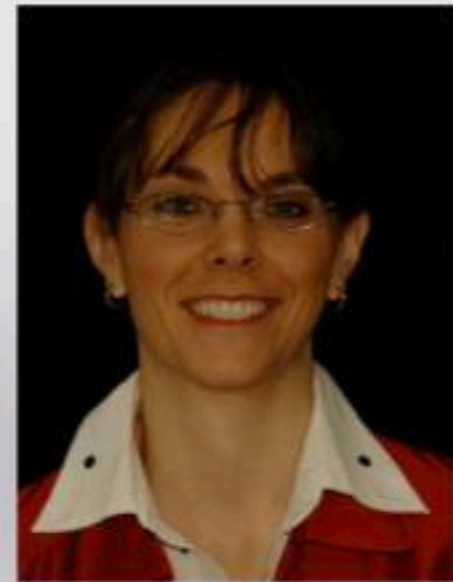
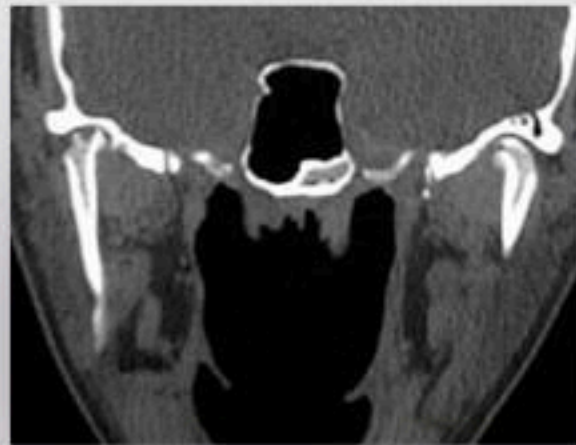
**Journal of Craniomandibular Practice, April 1995, vol. 13, No. 2**

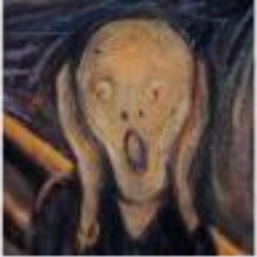
- University Hospital, Netherlands: 134 TMD patients, 30 year follow up
- Patients received good clinical work up and diagnosis 30 years ago, but basically no treatment
  - ┆ (Reassurance, PT, exercise, limited occlusal adjust)
- 70% satisfied with results
- 25% still had pain on movement
- 15% not able to eat hard foods
- 35 control patients had no apparent symptoms

**If you have a disease that is  
one in a thousand, it is 100% for you**

*There is no love sincerer than the love of food.*

*G. B. Shaw*





## Damaged TMJs



**Adapt Favorably 85%**  
**Adapt Fairly 14%**  
**Adapt Poorly <1%**



Occlusal Muscle Dysfunction  
Osteoarthritis



Avascular Necrosis  
Progressive Condylar Resorption

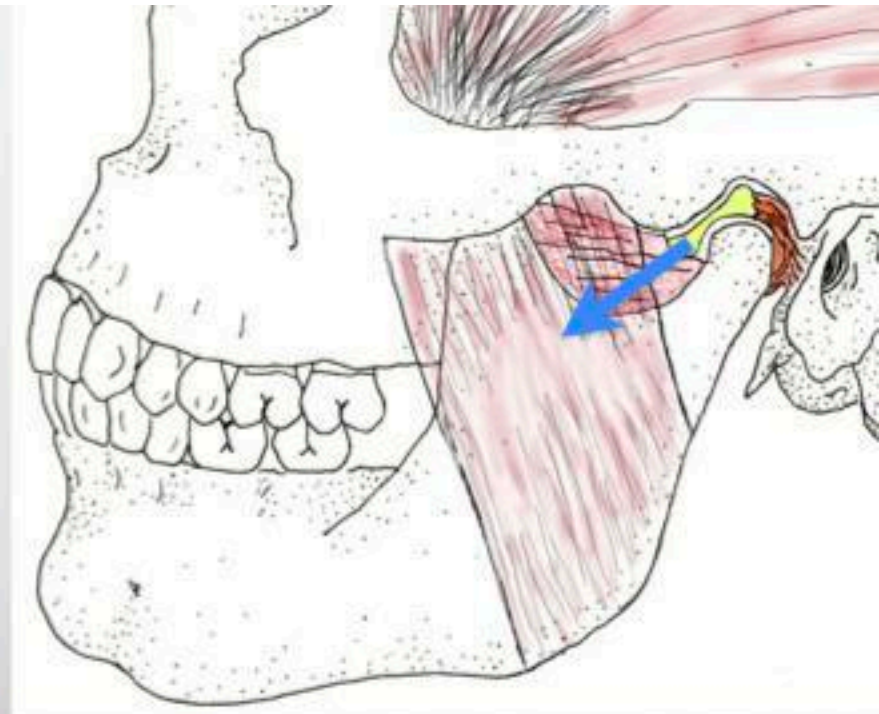
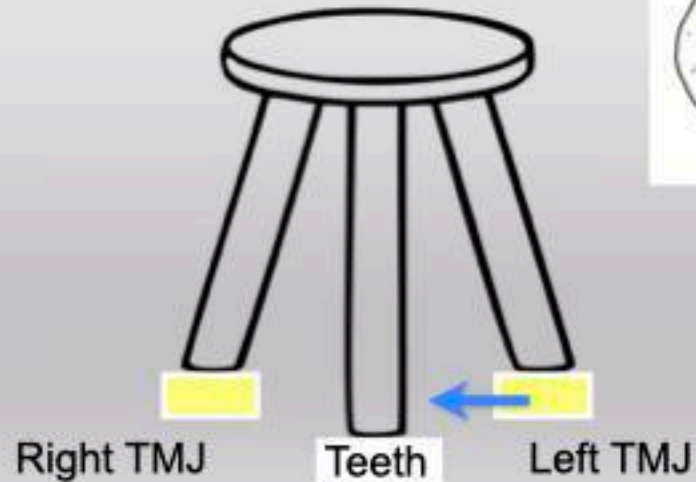
\*These are my guesses on %, no research to back up to backup



# Normal Joint with Normal Occlusion

All teeth touch evenly with condyles seated in fossa

What happens to the occlusion if the disc is dislocated?



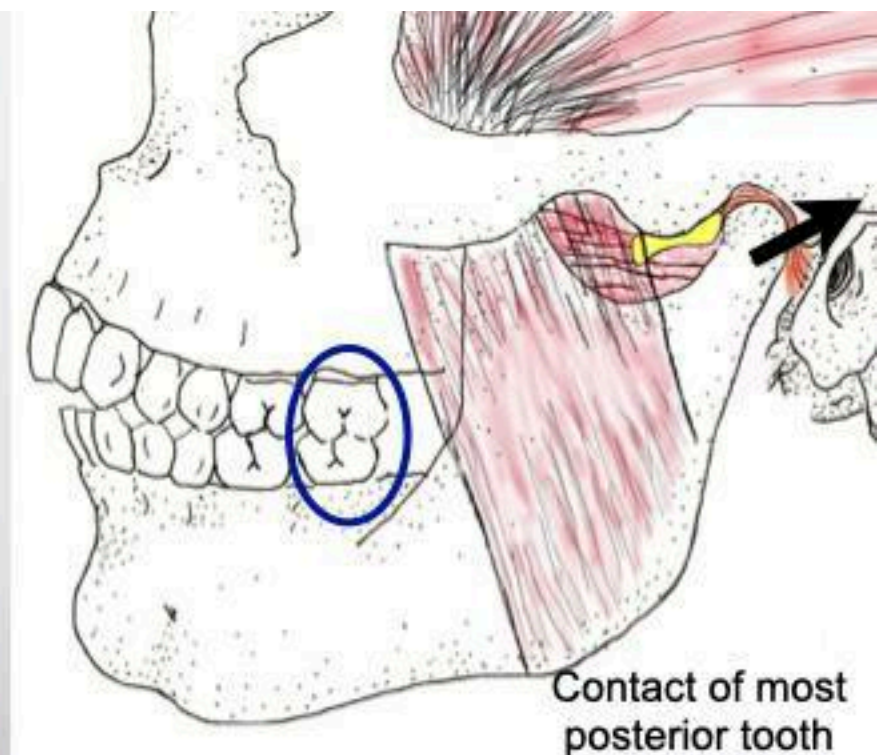
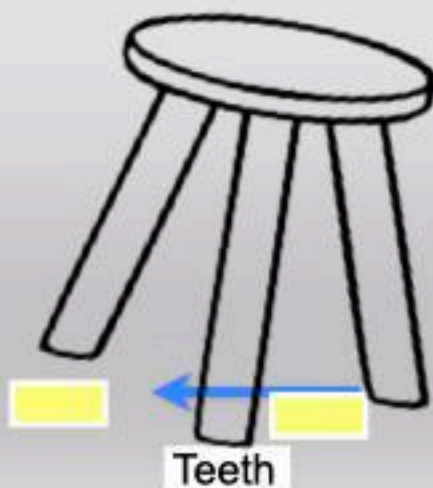
# Damaged Joint with Malocclusion

85% damaged joints adapt favorably with respect to the TMJ.

Anteriorly Dislocated Disc, Mandible shifts:  
Inadequate Anterior Guidance, Posterior Disclusion  
Uneven Occlusion,  
CR≠MaxIC  
Occlusal Muscle Disharmony develops.

Treat Adapted joints with OMD  
the same as healthy joints with OMD:  
Occlusal Adjustment

CR≠MaxIC should be 2mm or less.  
(Anterior Posterior 2mm)  
If >2mm something else is going on.



# Occlusal Muscle Disharmony

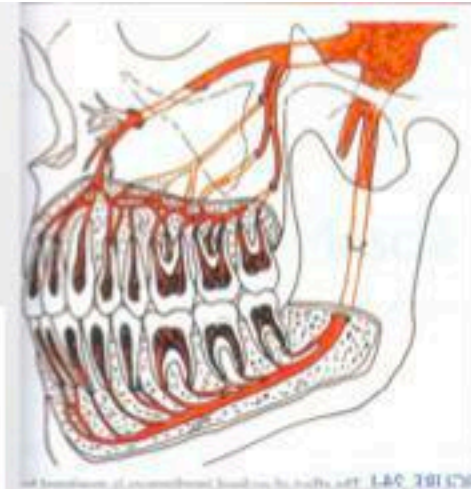
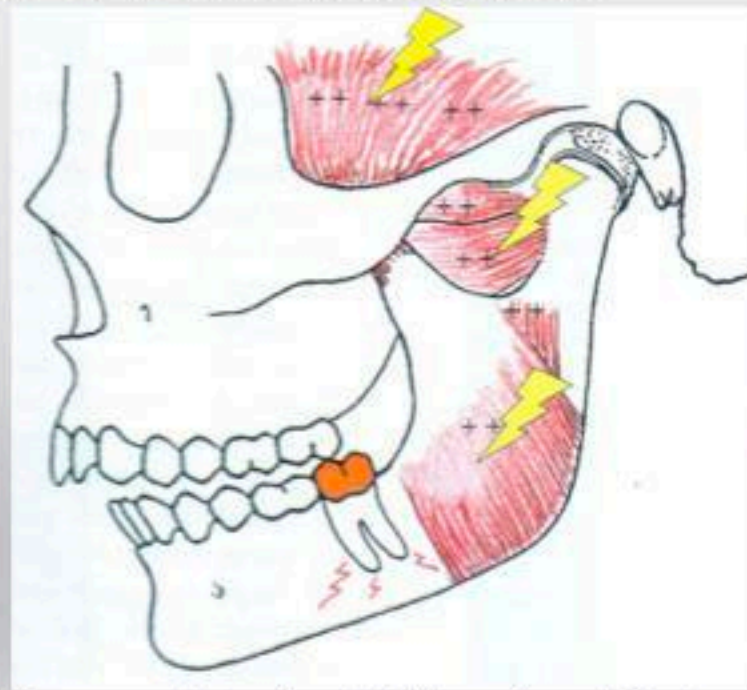
Uneven tooth contact with condyles fully seated triggers muscle activity

Lateral pterygoid fires out of sequence to create even tooth contact on closure

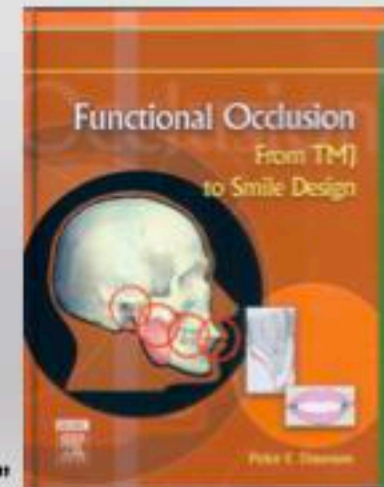
Disharmony in all muscles: Splinting/Bracing

Muscles sore from overuse

Muscles do not think- CNS input



from Dawson's Textbook, "Functional Occlusion"





# Occlusal Sculpting Tools, including Zirconia



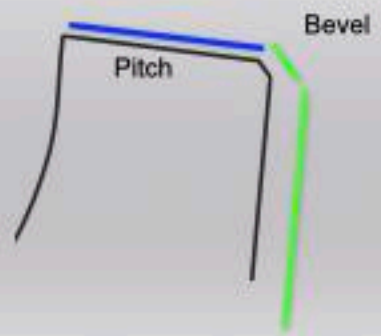
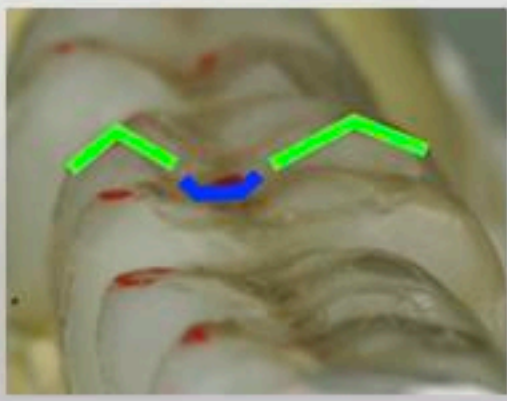
**Wheel**  
 Create Cusp Landing Zone  
 Flatten Incisal edges  
 Bulk reduction of inclines



Move and Shape Cusps,  
 Inclines, Facial Surfaces



Brassler Brio Shine  
 FLBCER-1  
 FLBF-2



Premier 860.9 F Wheel Diamond  
 Premier 230 F Barrel Diamond  
 Neodiamond 1118.7F Roundend taper  
 Dedco Green Stone  
 White Arkansas stone  
 Filtek Supreme- B1B, Albond

## 6 Common TMDs

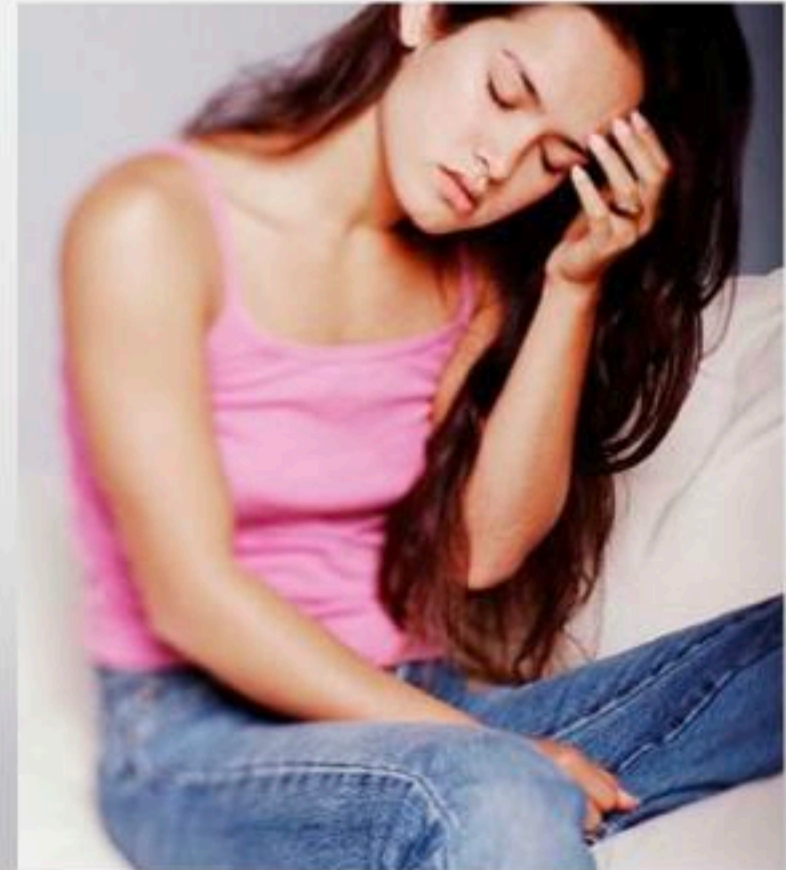
- Parafunctional Clenching
- Parafunctional Grinding
- Occlusal Muscle Dysfunction
- Osteoarthritis
- Acute Sprain
- Acute Closed lock of TMJ disc

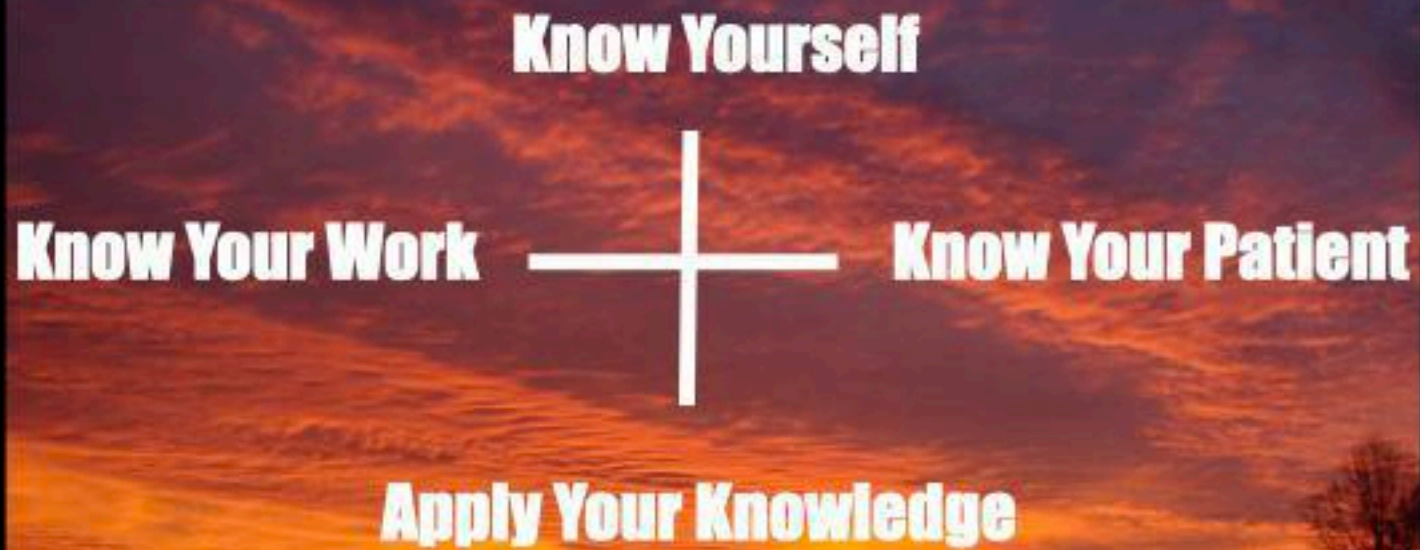
## 5 Common Obstacles

- Neck and Postural Instability
- Wobbly TM Joint (Subluxation)
- Compromised Breathing/Airway
- Avascular Necrosis
- Referred Pain Muscle Triggerpoints

## 1 TMD that **usually** does not need therapy

- TMJ Clicking





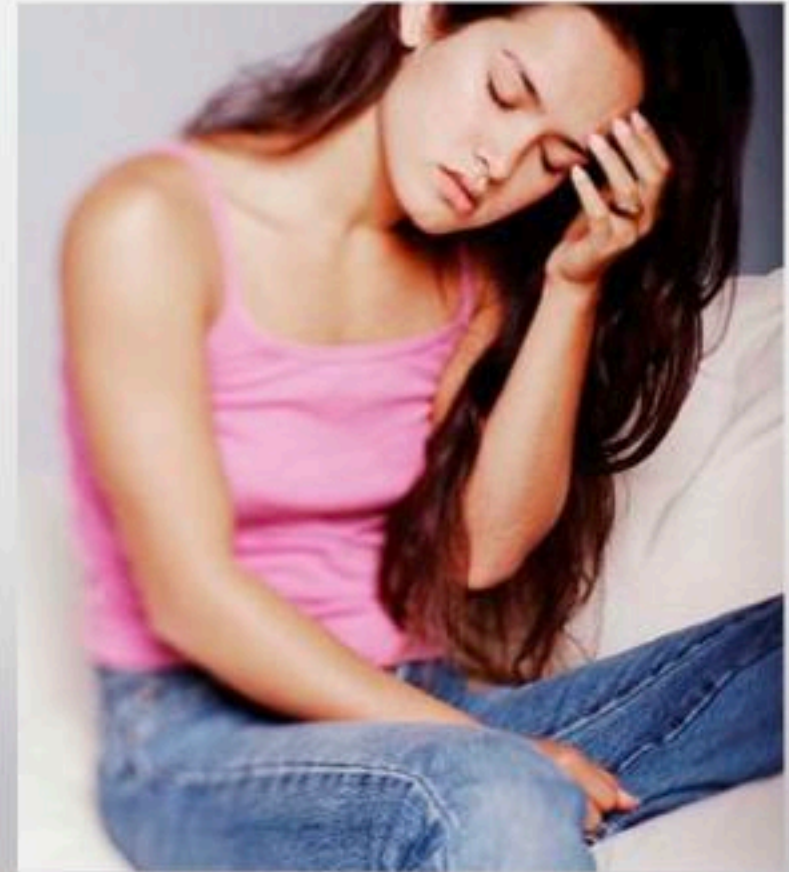
LD Pankey Institute

Write your Dream



## 5 Common Obstacles

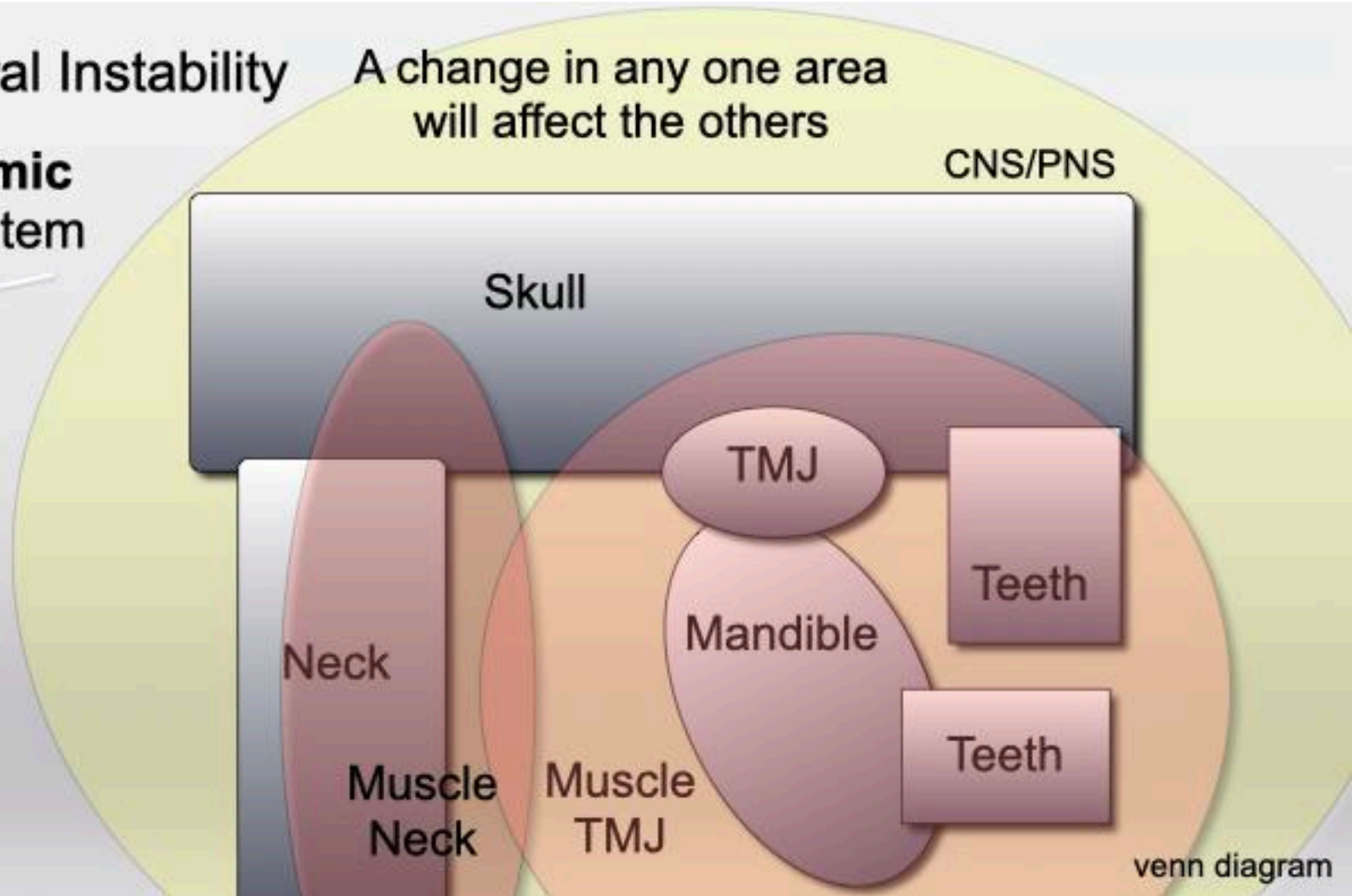
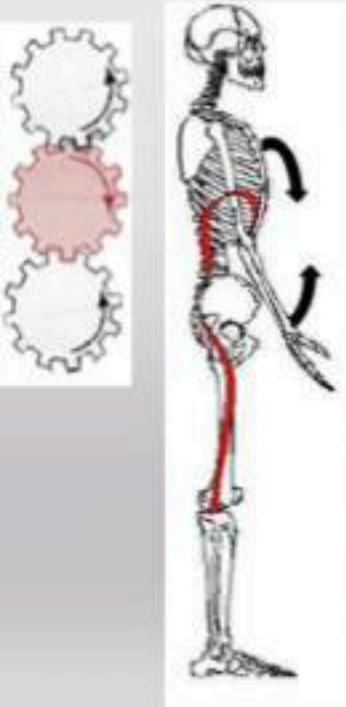
Neck and Postural Instability  
Wobbly TM Joint (Subluxation)  
Compromised Breathing/Airway  
Avascular Necrosis  
Referred Pain Muscle Triggerpoints



# Neck and Postural Instability

A change in any one area will affect the others

This is a **dynamic** orthopedic System



venn diagram

# Non-Linear Joint Deformity- Mechanically Unstable TMJs- “Wobbly Joint”

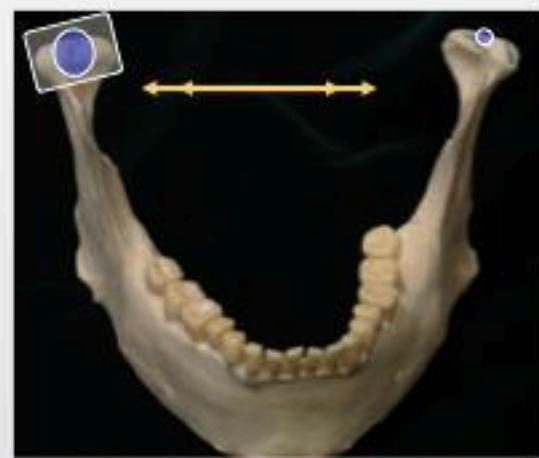
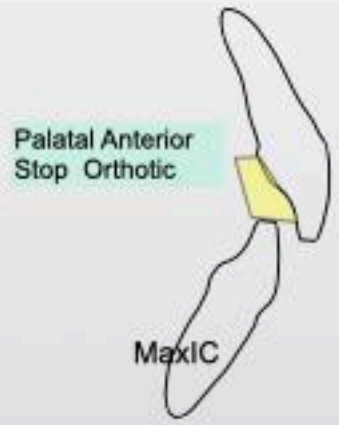
TM Joint subluxates under load  
Adapted CR “wobbles”

TMJ Muscle hyperactivity  
Looks similar to OMD  
Muscles must stabilize the joint  
Deep temporalis especially sore

Clinically:  
Hypersensitive bite  
Increase muscle pain with anterior deprogrammer  
Continued muscle disharmony with flat plane orthotics  
CT Scan- CR load zone not medial  
JVA- after tooth tap see “wobble- 50hz vibration

How to Avoid Missing Dx- Offer complete exam to crown patients  
Include anterior stop dx test  
Let patients decide which risk to take.

Treatment: Lock-in Orthotic 6 months, the CR orthotic, then D-PAS.





# Diagnostic Palatal Anterior Stop

D-PAS Test: Wear for 2 weeks, 24/7, take out to eat

## Better- Decrease in Symptoms

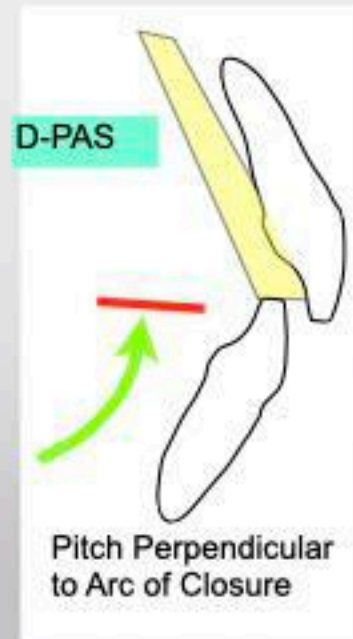
- Sleep Clenching Inhibited: Wear D-PAS as night guard
- Orthotic Improved Airway: D-PAS as night guard
- Occlusal Muscle Disharmony: Occlusal Adjust

## Worse- Increase in Symptoms

- Mechanically Unstable TMJ, joint subluxation
- Intracapsular Problem TMJ
- Orthotic Made Sleep Airway Worse

## Stays the Same- No Change in Symptoms

- Damaged TMJ are mechanically stable
- Pain not related to occlusion



Stapelmann H, Türp JC. The NTI-tss device for the therapy of bruxism, temporomandibular disorders, and headache.....BMC Oral Health. 2008 Jul PMID: 18662411



Nate Brock, CDT  
 (865) 509-4509  
[connect@livingtreelab.com](mailto:connect@livingtreelab.com)

ArrowPath Sleep  
 3.9 mm Anterior Stop  
 Muscle Deprogrammer  
 Airway bite  
 Facial Analyzer



ArrowPath Sleep  
 D-PAS  
 Diagnostic-  
 Palatal Anterior Stop



ArrowPath Sleep  
 Lower Posterior Stop  
 Night Guard

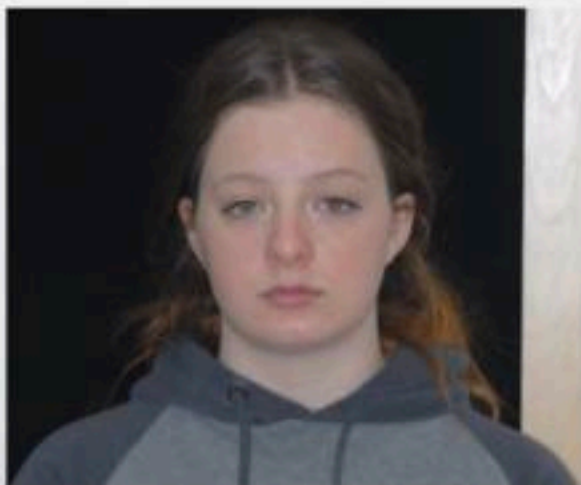


ArrowPath Sleep  
 Trial Anterior Stop Night Guard





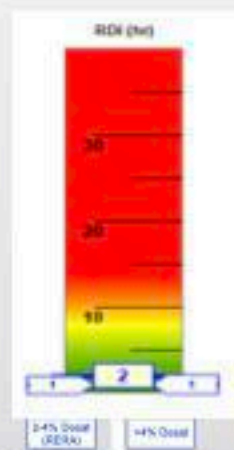
Age 16F  
cc: Facial Pain, Excessive Daytime Fatigue



Medical Sleep Study in Lab RDI = 1  
Dx: Snoring without evidence of gas exchange abnormalities or sleep disruptions

Sleep Latency Test  
Dx: Narcolepsy  
Recommend daytime medication

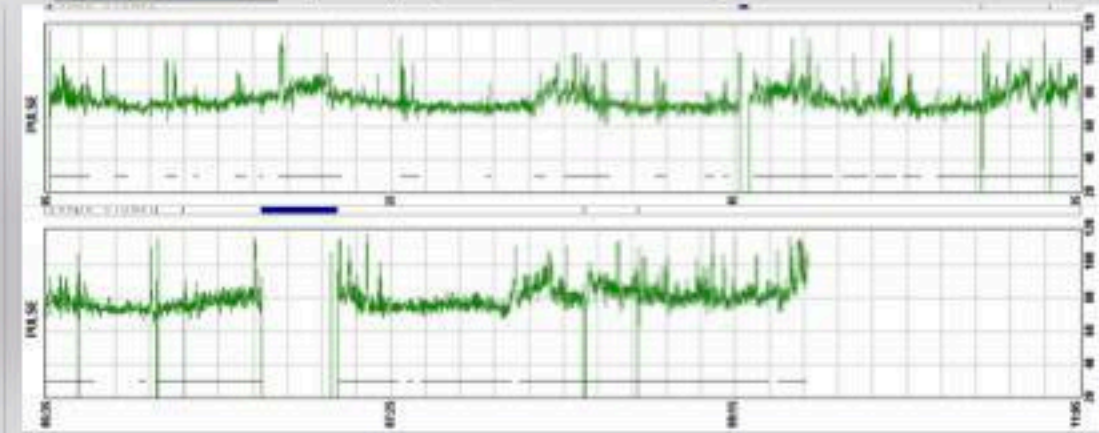
Patient Safety Inc Pulse Ox Sleep Screening  
RDI = 2, Autonomic Arousal **31 /h**



PULSE RATE DATA	
<b>Autonomic Arousal</b>	
Index (#/hr):	31
<b>Pulse Rate Range</b>	
Mean:	78
Min:	34
Max:	122
<b>Tachycardia - Sleep (&gt;90 bpm)</b>	
Duration:	00:34:56
% (VRT):	6%
<b>Bradycardia - Sleep (&lt;50 bpm)</b>	
Duration:	00:00:35
% (VRT):	0%



Heart Rate >90 bpm for 35 min





# Disordered Breathing Disease Progression

## Disease Stage 1

### Predisposing Factors

#### Small Airway

Tongue Tie, Lip Tie  
Bottle Fed as Infant  
Dysfunctional Swallow  
Allergies  
Nasal Obstruction  
Large Tonsil  
Large Adenoids  
Large Tongue  
Mid-face Deficient  
Mandibular Deficient  
4 Bicuspid Extraction

## Disease Stage 2

### Compensation: Airway Maintained

#### Signs

Mouth Breathing  
Head Postured Forward  
Jaw Postured Forward  
Tongue Bracing  
Indents in Tongue  
Sore Masseters  
Sore Neck Muscles

#### Symptoms

Facial Ache  
Not Waking Rested  
Daily Fatigue  
Neck Soreness

## Disease Stage 3

### Sleep Airway Partial Collapse

#### Signs

All of stage 1 and 2 plus.....  
Upper Airway Resistance  
2-4% Drop O<sub>2</sub> Saturation  
RERA- Respiratory Arousals  
Sleep Teeth Grinding  
↓ Growth Hormone

#### Symptoms

Heart Rate Fluctuation  
Snoring or "Purring"  
Weight Gain  
Cognitive Impairment, ADD  
Hyperactivity

## Disease Stage 4

### Sleep Airway Full collapse

#### Signs

All of stage 1, 2, 3 plus....  
4%+ drop O<sub>2</sub> Saturation  
Apnea  
Cardiovascular Damage  
Elevated BP  
GERD

#### Symptoms

All of stage 2, 3 plus....  
Worn Teeth

# Disordered Breathing Disease Stage 4

OSA- Obstructive Sleep Apnea

AHI- Apnea Hypopnea Index

Apnea and Hypopnea events per hour

Apnea- Stop airflow for 10 seconds

Hypopnea- <50% airflow or 4+% O<sub>2</sub> Desaturation

Disease Stage 1	Disease Stage 2	Disease Stage 3	Disease Stage 4
<p><b>Predisposing Factors</b></p> <p><b>Small Airway</b></p> <p>Tongue Tie, Lip Tie Bottle Fed as Infant Dysfunctional Swallow Allergies Nasal Obstruction Large Tonsil Large Adenoids Large Tongue Mid-face Deficient Mandibular Deficient 4 Buccal Extraction</p>	<p><b>Compensation: Airway Maintained</b></p> <p><b>Signs</b></p> <p>Mouth Breathing Head Postured Forward Jaw Postured Forward Tongue Beating Indents in Tongue Sore Masseters Sore Neck Muscles</p> <p><b>Symptoms</b></p> <p>Facial Ache Not Waking Rested Daily Fatigue Neck Soreness</p>	<p><b>Sleep Airway Partial Collapse</b></p> <p><b>Signs</b></p> <p>All of stage 1 and 2 plus.... Upper Airway Resistance 2-4% Drop O<sub>2</sub> Saturation RERA- Respiratory Arousal Sleep Teeth Grinding ↓ Growth Hormone</p> <p><b>Symptoms</b></p> <p>Heart Rate Fluctuation Snoring or "Purring" Weight Gain Cognitive Impairment, ADD Hyperactivity</p>	<p><b>Sleep Airway Full collapse</b></p> <p><b>Signs</b></p> <p>All of stage 1, 2, 3 plus.... 4%+ drop O<sub>2</sub> Saturation Apnea Cardiovascular Damage Elevated BP GERD</p> <p><b>Symptoms</b></p> <p>All of stage 2, 3 plus.... Worn Teeth</p>

John R. Droter DDS

AHI 1-4  
"Normal" ??

AHI 5-15  
Mild OSA

AHI 15-30  
Moderate OSA

AHI 30+  
Severe

Signs

- Apnea
- 4% drop O<sub>2</sub> Saturation
- Cardiovascular Damage
- Elevated BP
- GERD

Symptoms

- Not Waking Rested, Daily Fatigue
- Cognitive Impairment

**Irreversible Damage**

John R. Droter DDS

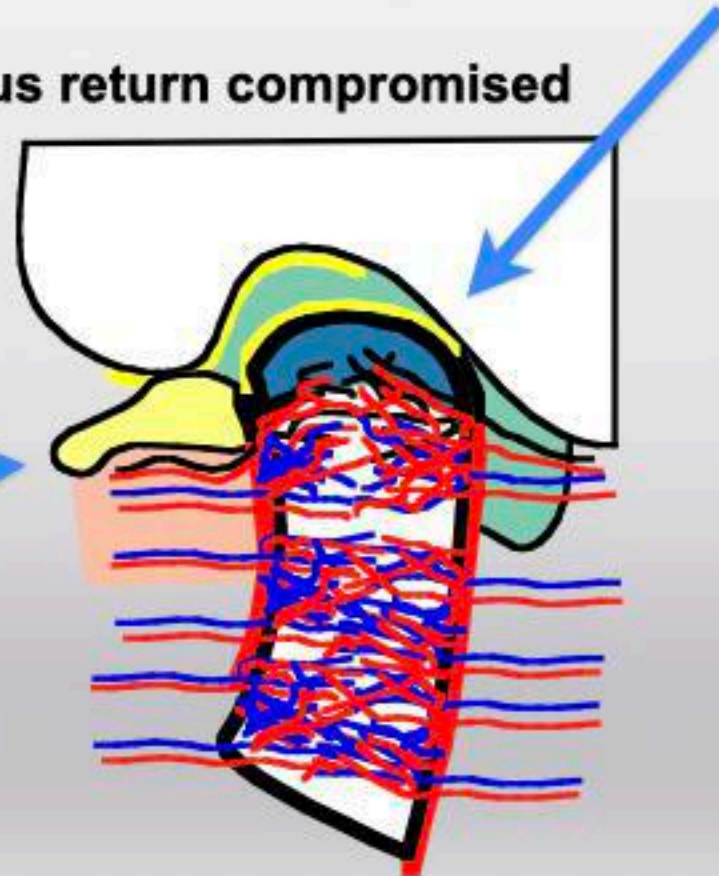
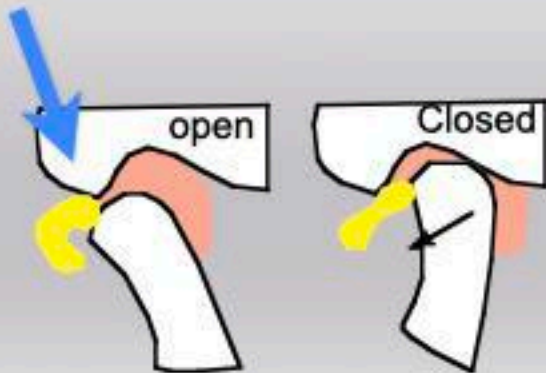
When the clicking stops (4a to 4b):

Condyle Distalized

**Compromised Condylar Perfusion**  
Blood flow through condyle is decreased

**Venous return compromised**

Disc Anterior





**4 Outcomes of Compromised Condylar Perfusion**



**Avascular Necrosis**

Bone cells die



Condyle collapses 1y later  
Occlusion shifts once, AVN is finished.



**Inflammatory Tissue Bone Resorption**

Cortex Collapses, Cartilage tears  
Inflamed tissue contacting bone  
Inflammatory cells activate Osteoclasts



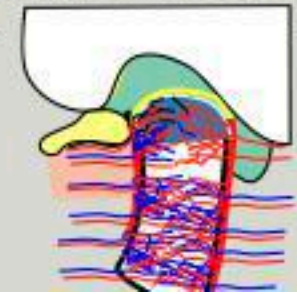
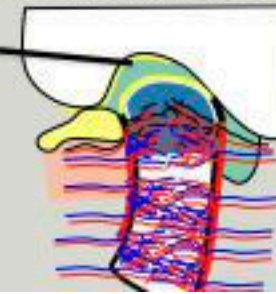
Repeated Hypoxia and Reperfusion

**Nothing**

Compromised but adequate.  
99% no problems,  
but if you are the 1.....

**Hypoxic Progressive Condylar Resorption**

Missing Cortex



Droter JR, An orthopaedic approach to the diagnosis and treatment of disorders of the temporomandibular joint. Dent Today 2005 Nov;24(11):82, 84-8

# Anterior Open Bite Differential Diagnosis

TMJ Bone loss



Iatrogenic



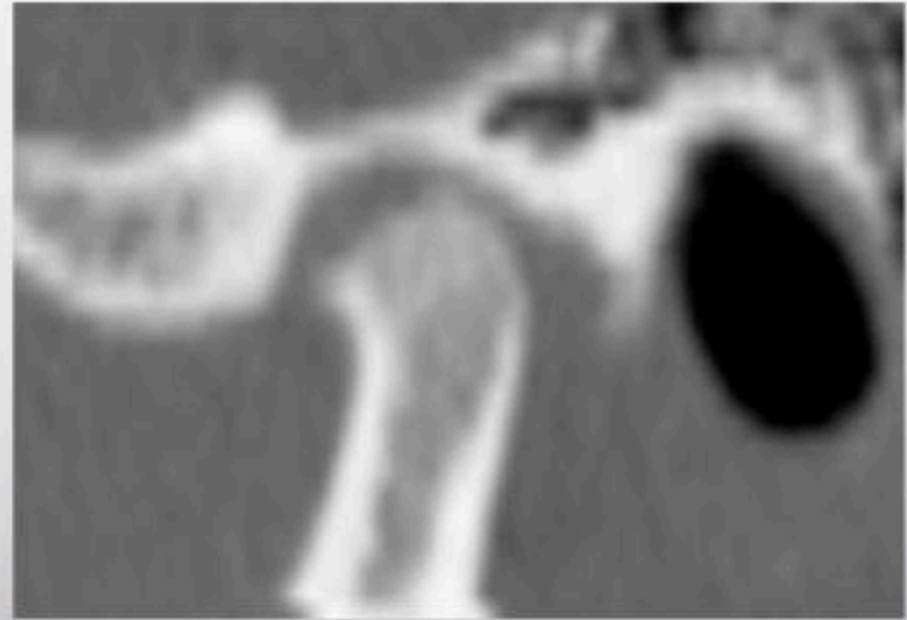
Tongue moved teeth



# Hypoxia Induced Progressive Condylar Resorption HI-PCR

On CT see Flat condylar surface  
Missing Subchondral Cortex During Active Phase  
Slow, Progressive Condylar Resorption

Occlusion will constantly be changing





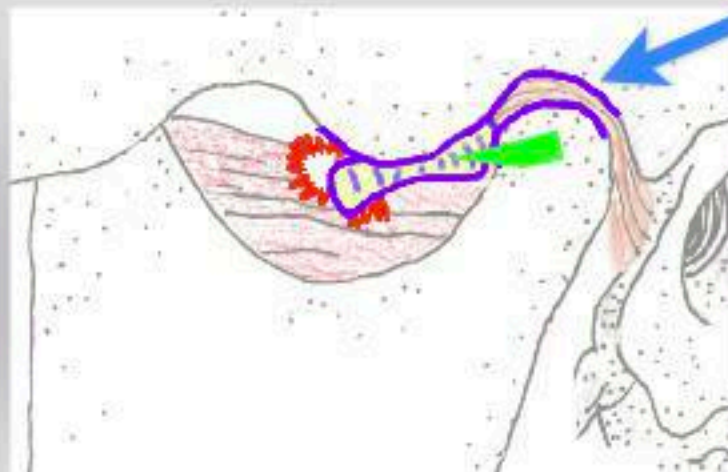
# Basic Orthopedics

Joints are either  
Healthy or  
Damaged

If damaged, joints will be either:  
Actively Breaking Down  
Adapting  
Adapted  
Structurally, Mechanically  
Favorably, Unfavorably



Majority of damaged  
TMJs adapt favorably



Posterior ligament, synovium,  
and retrodiscal tissue adapt to  
form a  
**Pseudo-disc**

Tissue Fibrosis

# Adult Onset Anterior Open Bite Differential Diagnosis

## Developed Post-Puberty



TMJ has changed

TMJ Bone Loss (See bone loss choices)

Recent Large Disc Displacement

Condylar Fracture

Teeth have moved

Tongue- used as occlusal cushion

Tongue used to stabilize neck or TMJ

Iatrogenic- Orthotics, Retainers

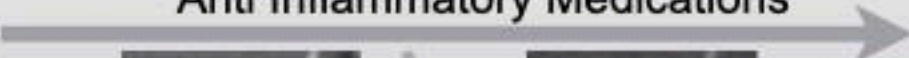
Both have loss of anterior coupling

# Anterior Openbite with Active TMJ Bone Loss

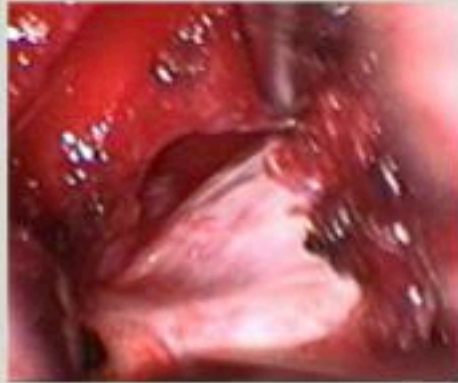
Non Surgical Therapies



Condylar Distraction  
Anti Inflammatory Medications







## 2 Possible Outcomes of Avascular Necrosis

AVN Finished- Condyle Remodels



Cortex Collapses  
 Cartilage intact  
 Remodels fast- 3-6 weeks  
 Condyle can look smooth  
 and normal, only smaller  
 Retrodisical Tissue  
 Fibroses  
 OA develops gradually



or

Inflammatory Tissue Bone Resorption



Cortex Collapses, Cartilage tears  
 Inflamed tissue contacting bone  
 Inflammatory cells activate Osteoclasts  
 Progressive Condylar Resorption  
 Does not have to be very painful  
 Eventually OA also develops



# Anterior Open Bite Differential Diagnosis

Iatrogenic



TMJ Bone loss



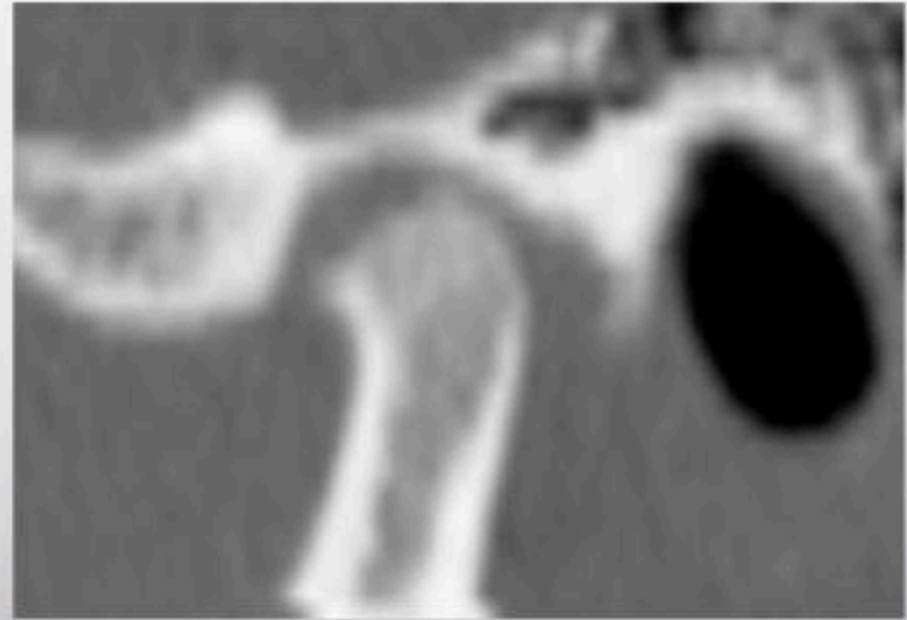
Tongue moved teeth



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Adapting  
Adapted  
Structurally, Mechanically  
Favorably, Unfavorably



Healthy

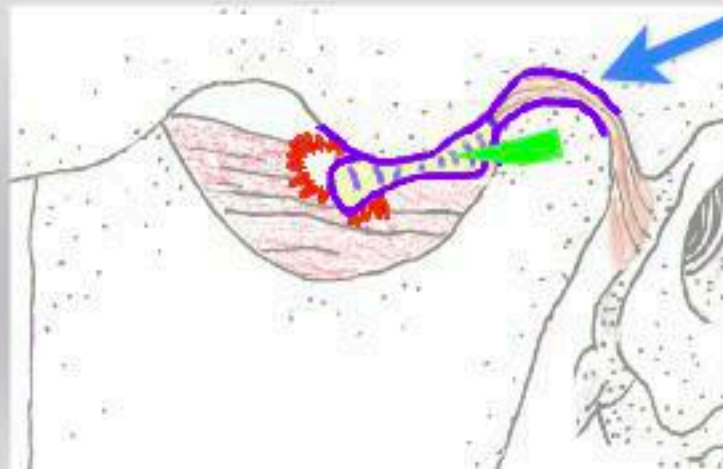


Damaged



Actively Breaking Down

Majority of damaged  
TMJs adapt favorably



Posterior ligament, synovium,  
and retrodiscal tissue adapt to  
form a  
**Pseudo-disc**

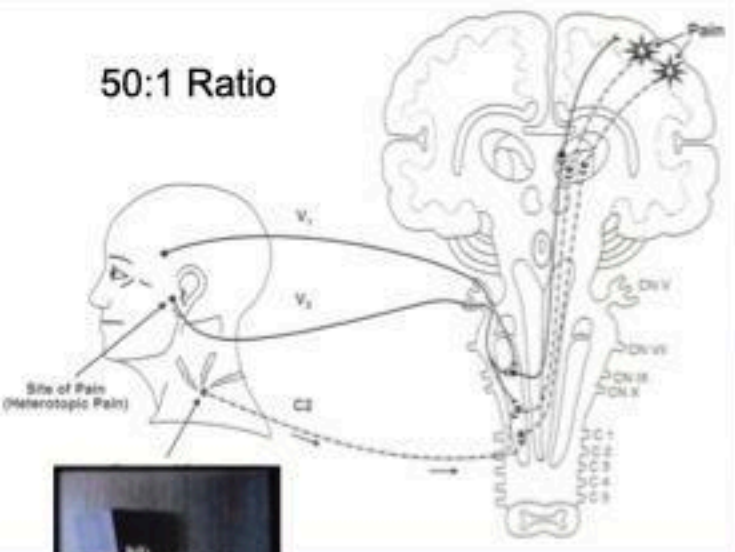
Tissue Fibrosis

# Referred Pain

## Convergence

More primary sensory neurons than secondary neurons that travel to brain

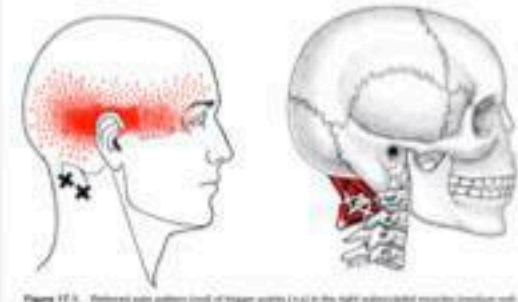
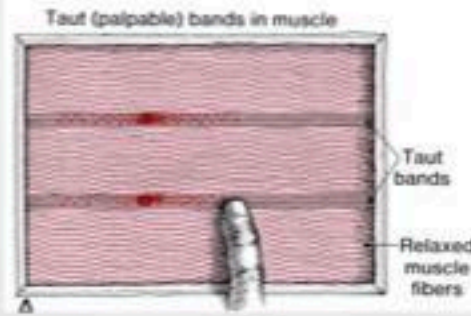
50:1 Ratio



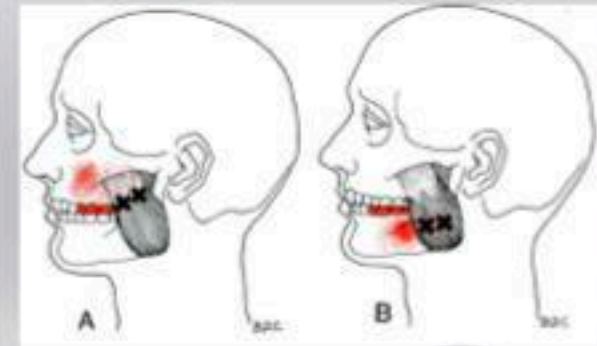
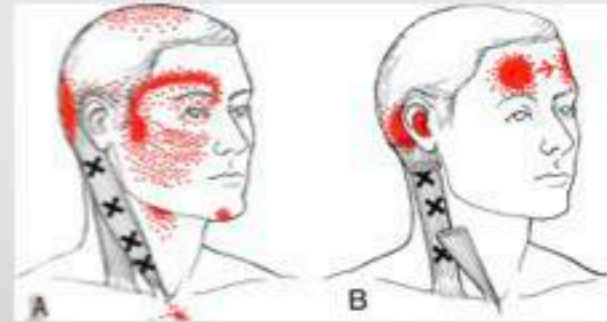
"Bells Orofacial Pain"  
Jeffery Okeson

# Trigger Points

Contracted mass of actin, myosin and histamine

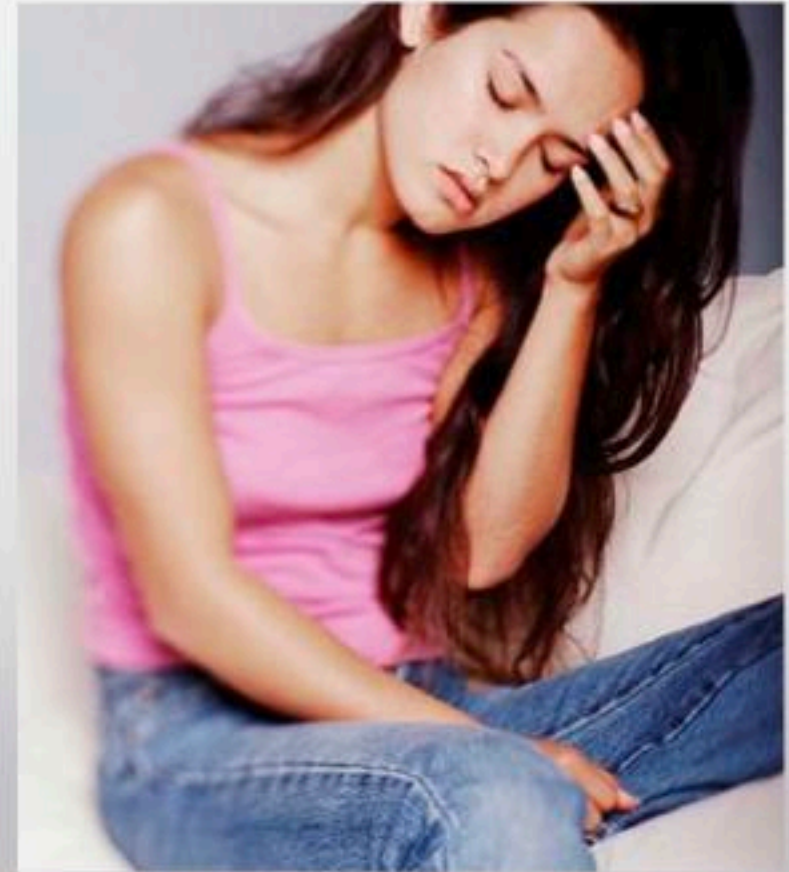


"The Trigger Point Manual"  
Janet Travell, MD

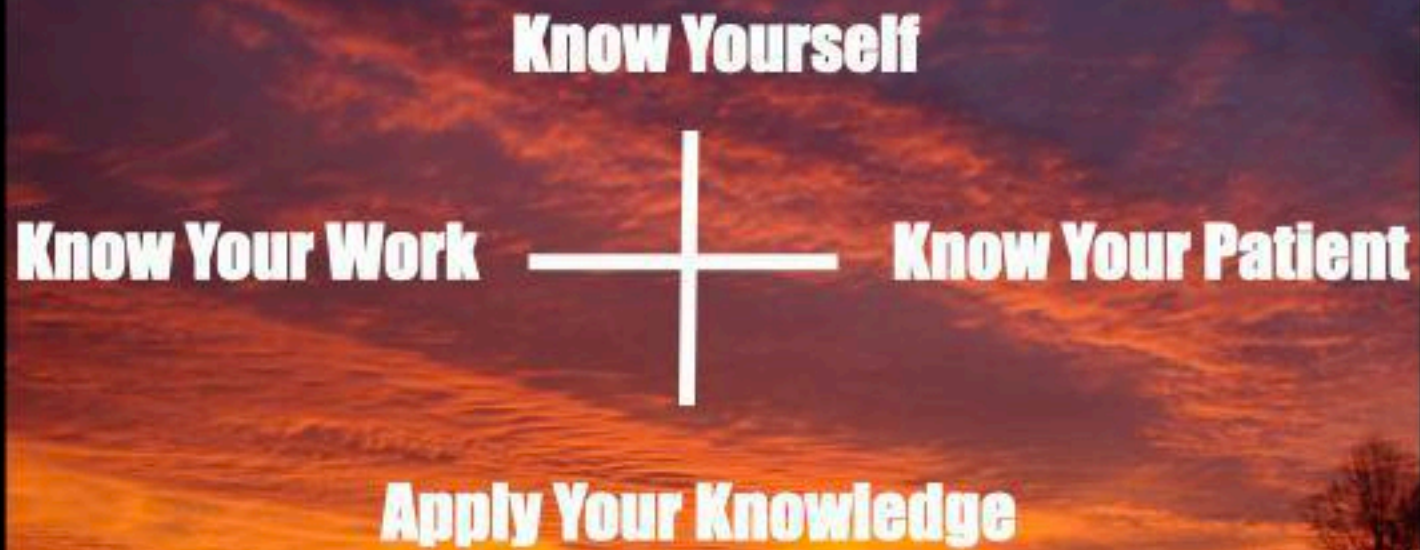


## 5 Common Obstacles

Neck and Postural Instability  
Wobbly TM Joint (Subluxation)  
Compromised Breathing/Airway  
Avascular Necrosis  
Referred Pain Muscle Triggerpoints







LD Pankey Institute

Write your Dream