Grinding and Clenching
Choosing Night Guards

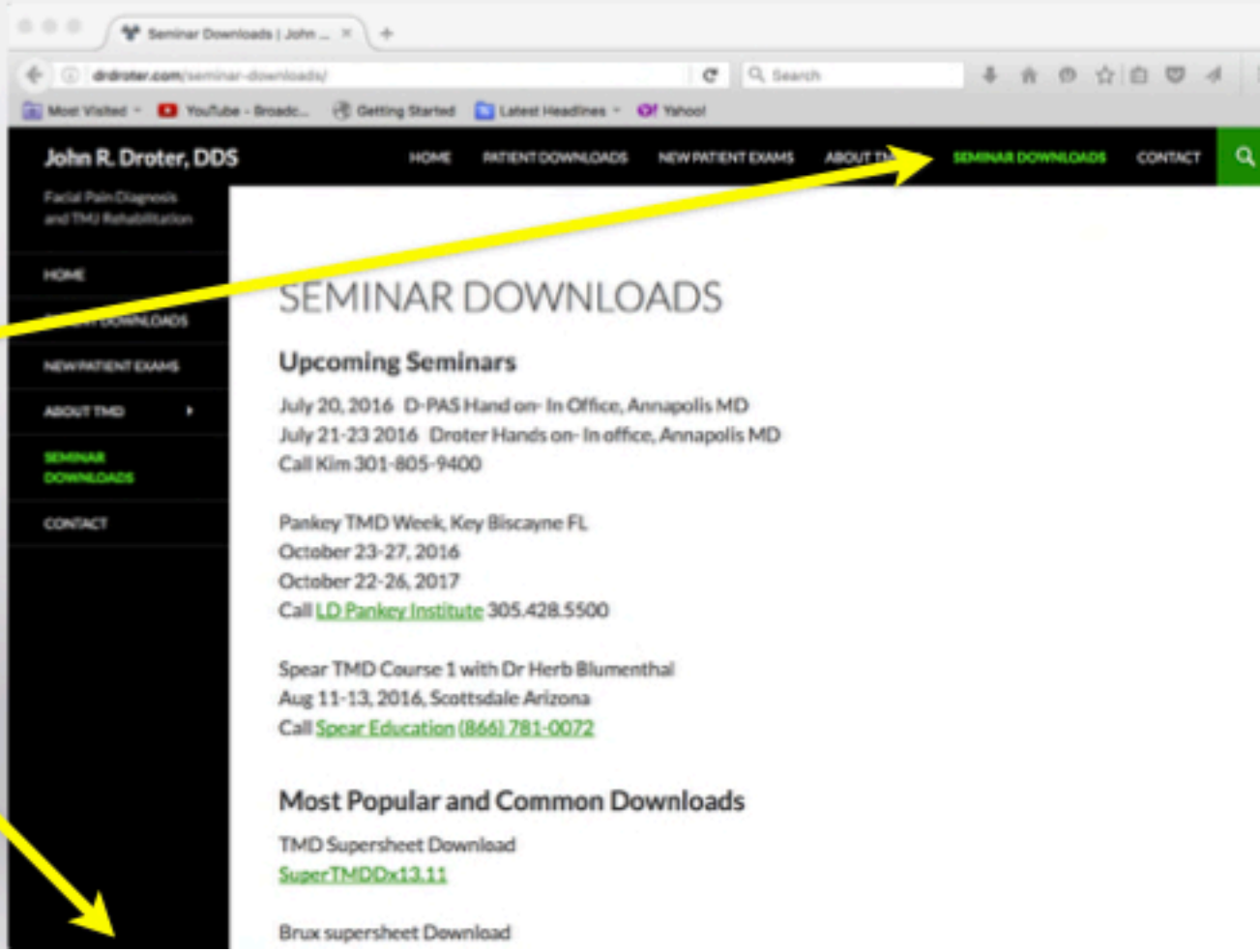
John R Droter DDS
Annapolis, Maryland

John R Droter, DDS

To get todays lecture slides:
go to www.drdroter.com

Seminar Download

Star of the North



Milestones

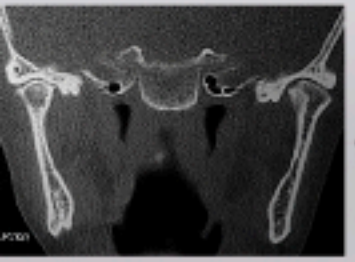
Visiting Faculty LD Pankey Institute 2008-

Visiting Faculty Spear Education 2013-2020

Visiting Faculty Orthodontic Program
Washington Hospital Center 2000-2012

Past staff AAMC: Orthopedic Rounds
In OR for TMJ Surgeries

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

Disclosures:

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

Atomic Skis- Sponsored.
I got stuff.

LD Pankey Institute TMD Course
Honorarium

Co-Owner of ArrowPath Sleep
Patent on sleep device: LatBrux

APS
ArrowPath Sleep

Living Tree Dental Lab
High Quality Dental Orthotics
License fee on my designs

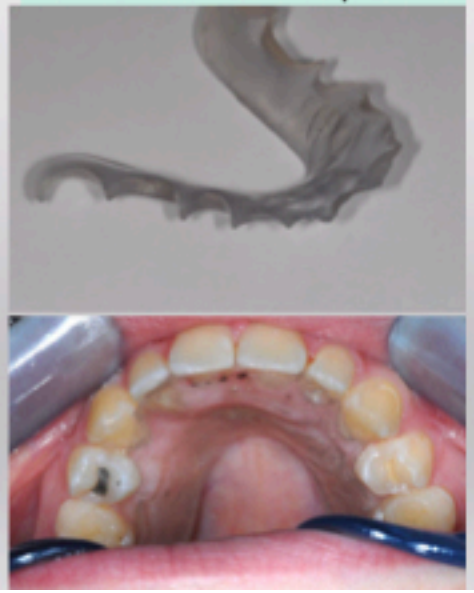
LIVING TREE
DENTAL LAB

Which Orthotic to use for Bruxing?

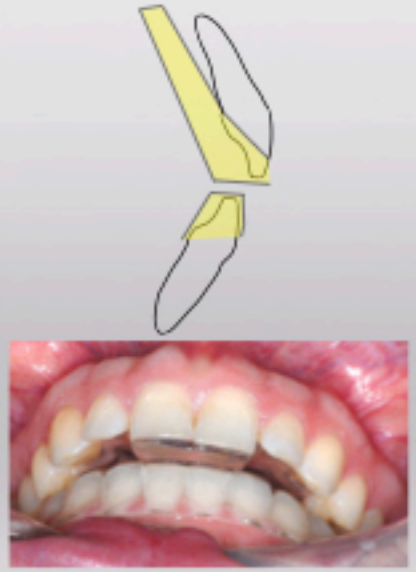
Not one disease, not one treatment

Bruxing: A diurnal or nocturnal parafunctional activity that includes clenching, bracing, gnashing and grinding of teeth.
American Academy of Orofacial Pain (2008)

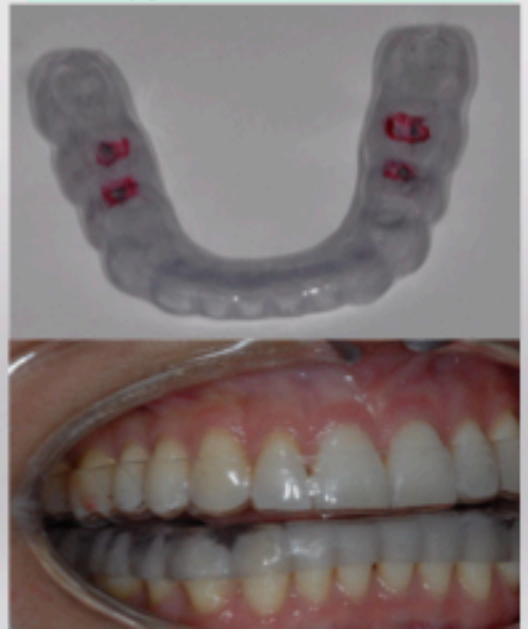
D-PAS
Diagnostic-
Palatal Anterior Stop



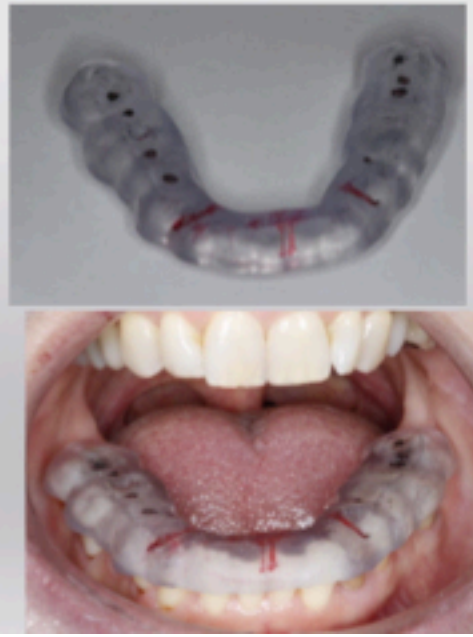
Brux-PAS
with lower Essix



Hard Lower Posterior Stop
with upper essix



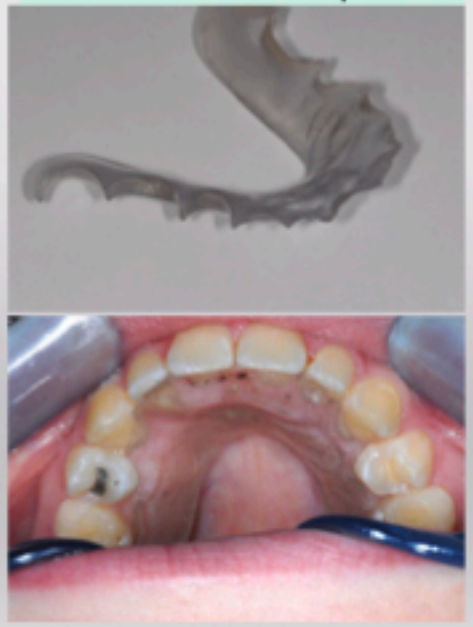
Hard Lower Full Coverage
Centric Relation Orthotic



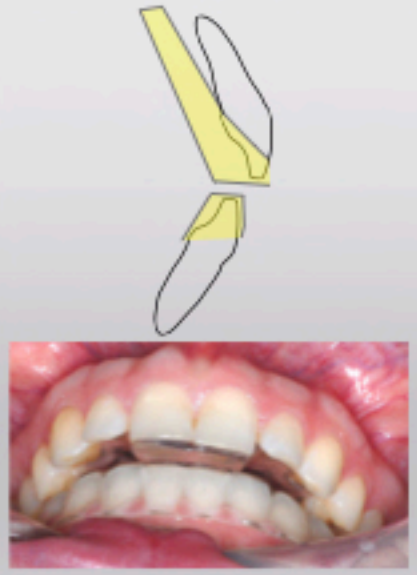
Living Tree Dental Lab
(865) 509-4509
connect@livingtreelab.com

3D Printed Orthotics

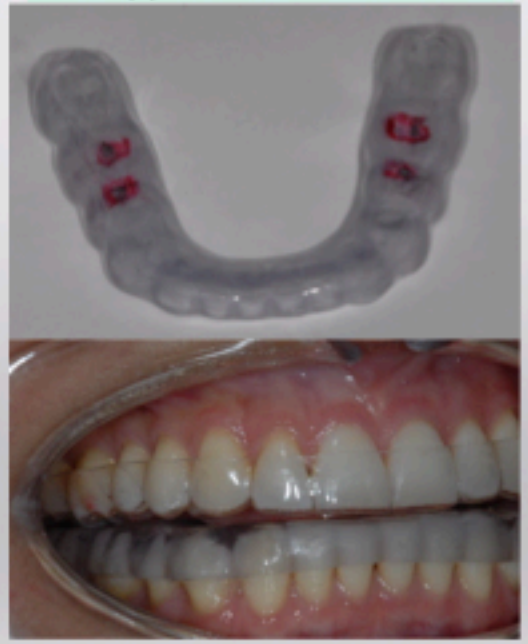
D-PAS
Diagnostic-
Palatal Anterior Stop



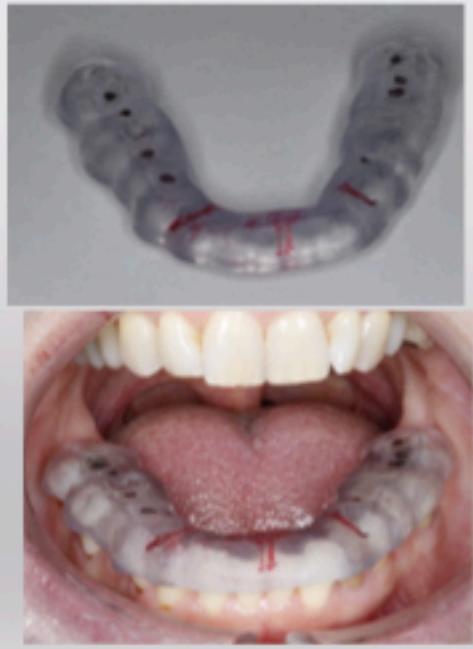
Brux-PAS
with lower Essix



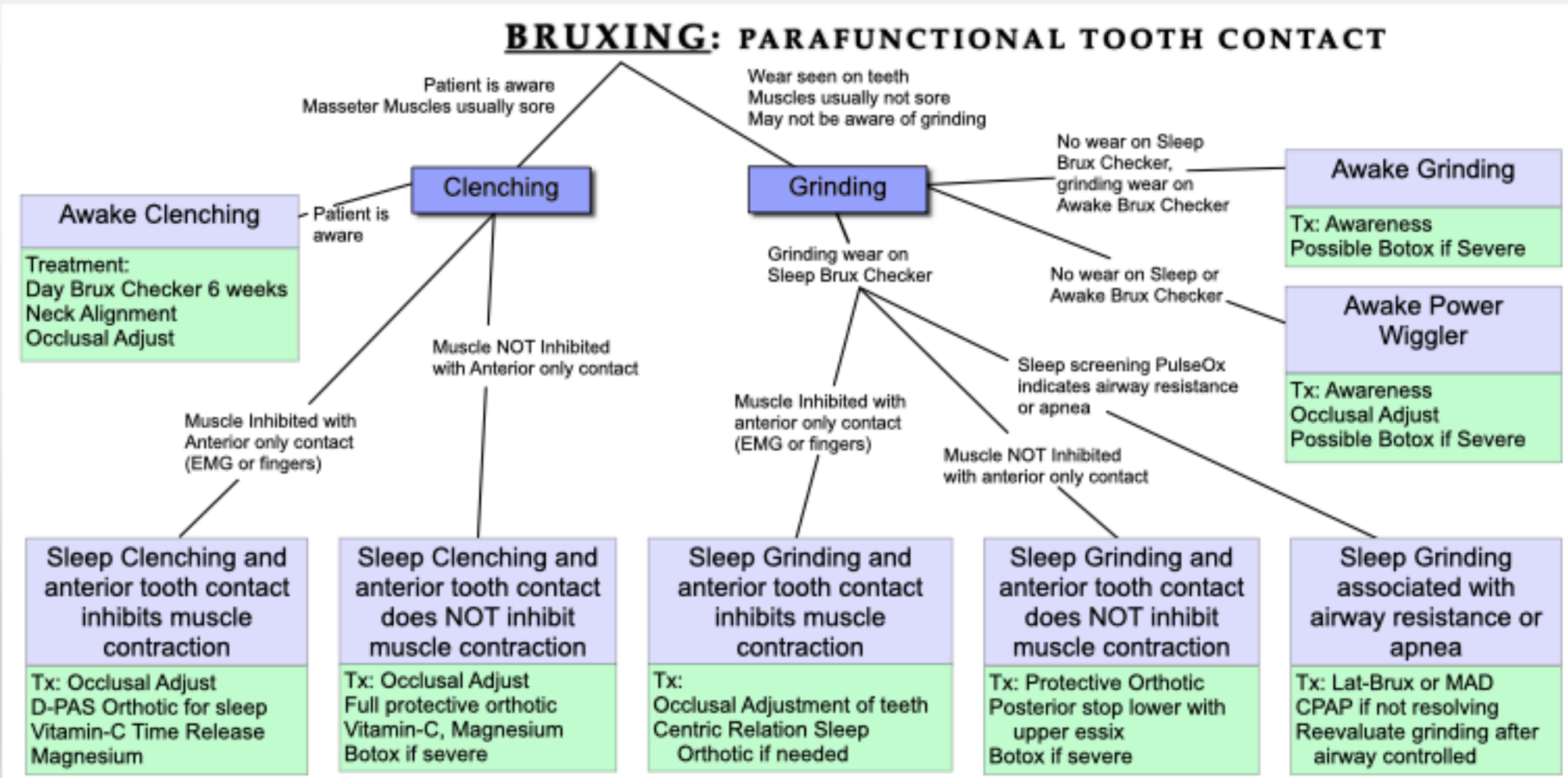
Hard Lower Posterior Stop
with upper essix



Hard Lower Full Coverage
Centric Relation Orthotic



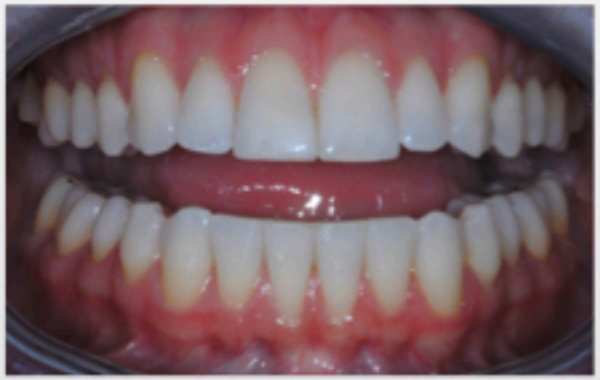
BRUXING: PARAFUNCTIONAL TOOTH CONTACT



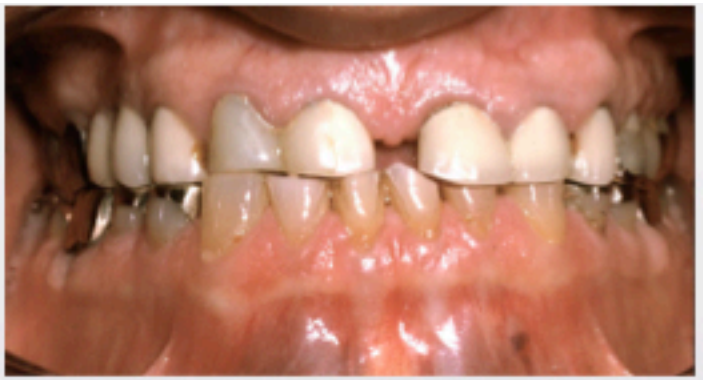
5 questions that will help identify the specific bruxing disorder:

1. Does the patient grind or clench their teeth?
2. When does/did this occur: Awake or asleep, past or present?
3. Are the TMJ muscles inhibited from full contraction with anterior only contact?
4. If sleep grinding, is there an airway issue?
5. Does the dental orthotic make the airway better or worse?

1. Does the Patient Grind or Clench?



Clenchers destroy the joint,
Grinders destroy the teeth



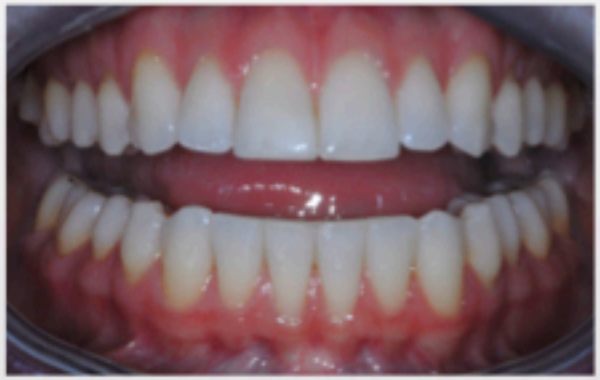
Clenching
Painful Muscles
Patient is usually aware of clenching
Fremitus
Strong Masseters
See slight wear around tooth contacts
Damage TMJ cartilage

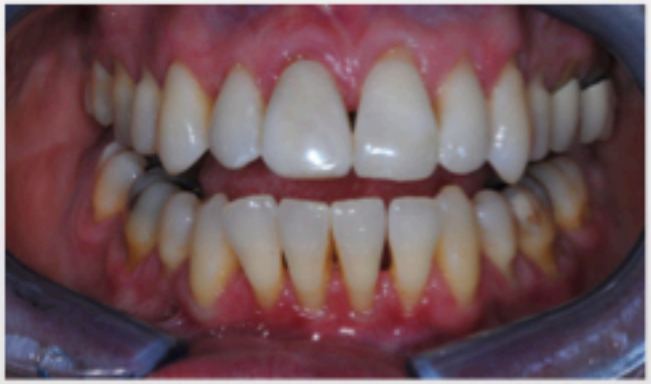
Grinding
See tooth wear
Patient is usually not aware
Buttressing bone if teeth are tight
If tooth mobility, on excursions
Strong Masseters
Slight Soreness muscles
Usually no muscle pain

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

Parker Mahan-
"Women Hurt, Men destroy"

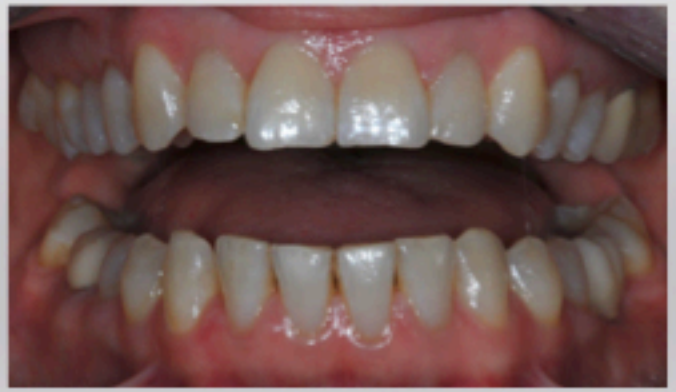
1. Does the Patient Grind or Clench?

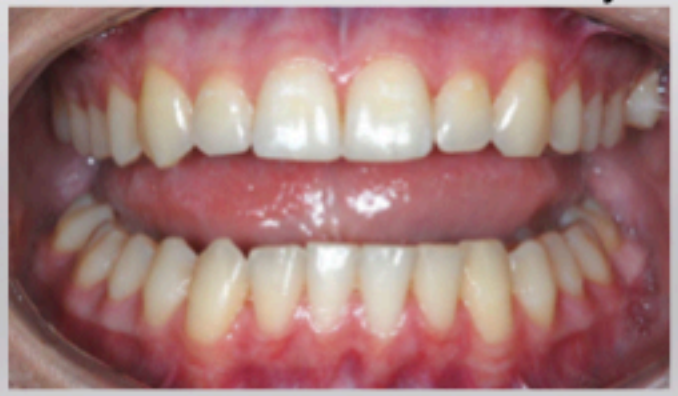




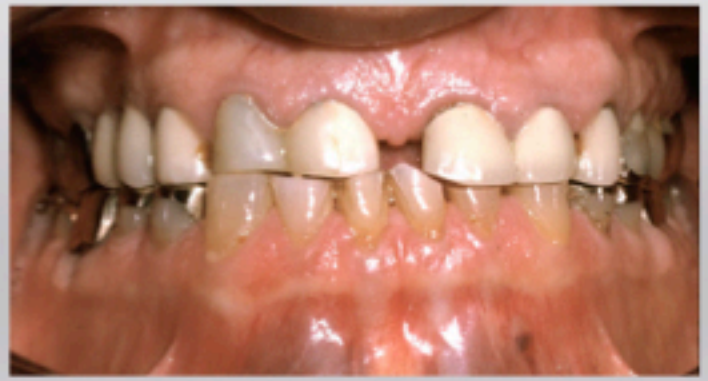
Clenching you squeeze your teeth together

Grinding you rub your teeth together





16 yo



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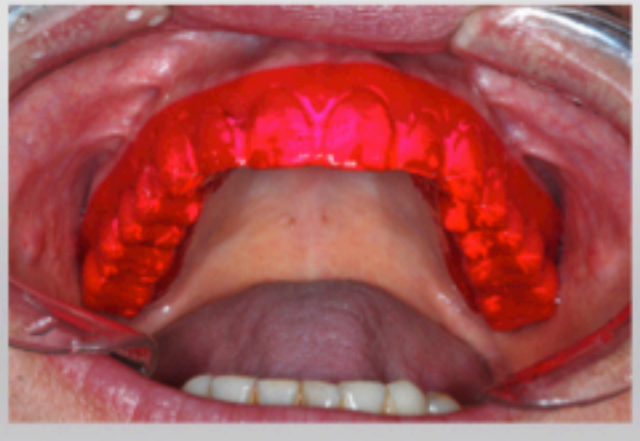
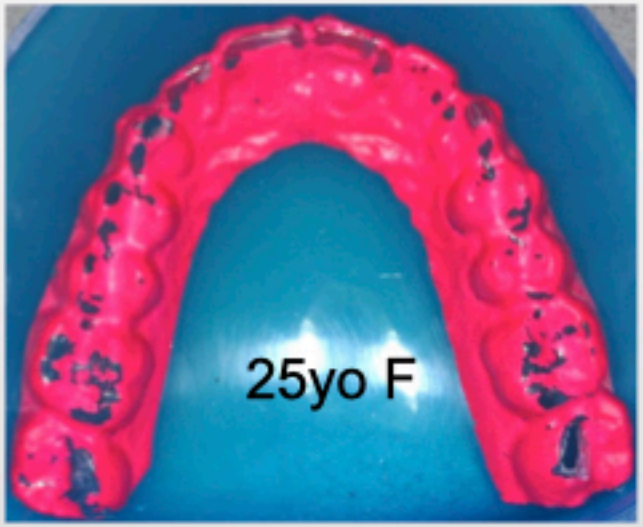
2. Does this occur awake or asleep?

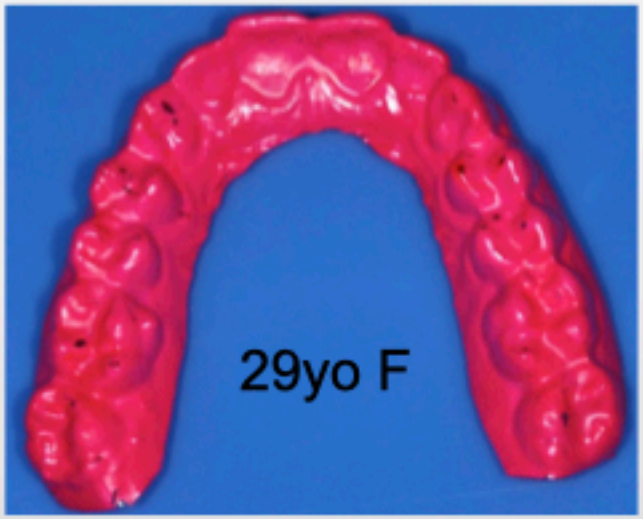
Brux Checker
Great Lakes Orthodontics

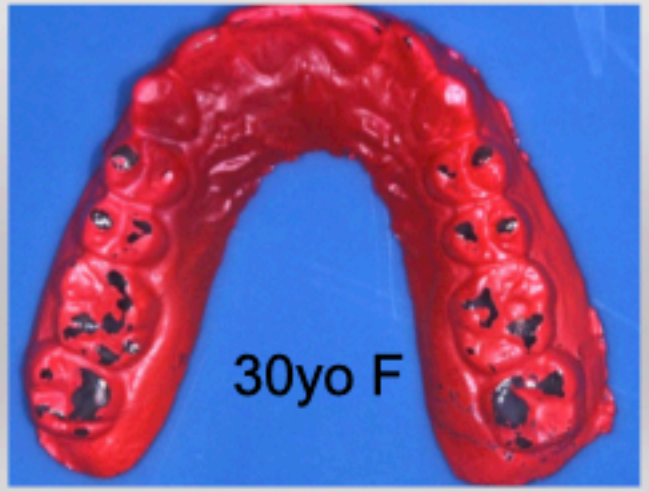
0.1mm Mylar



Made on Biostar Machine







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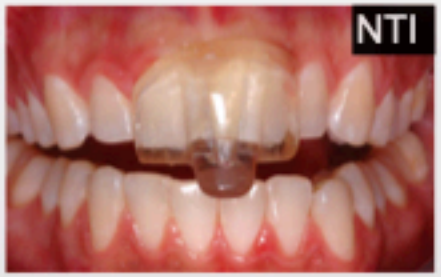
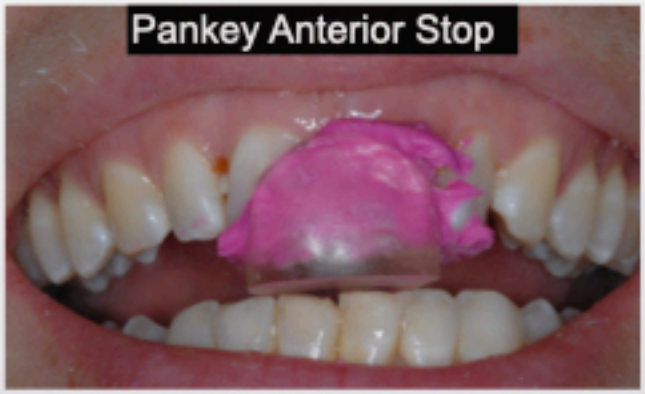
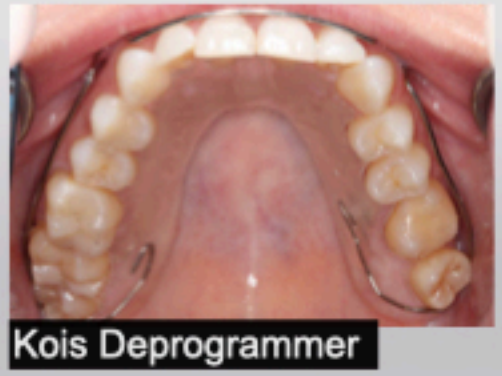
Anterior Stop Orthotics







APS
ArrowPath Sleep

APS Products
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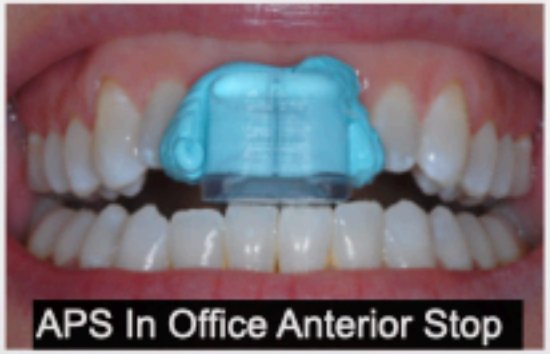
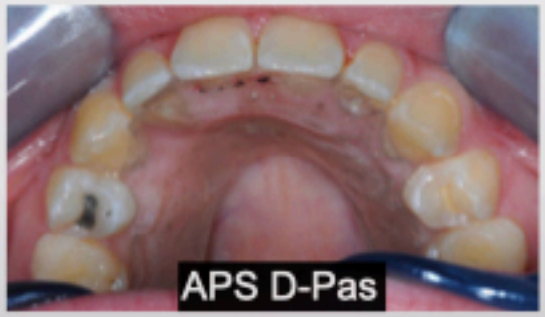
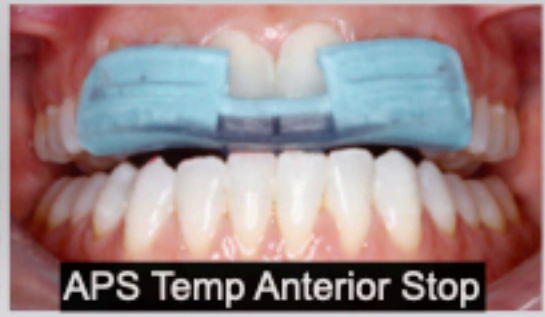
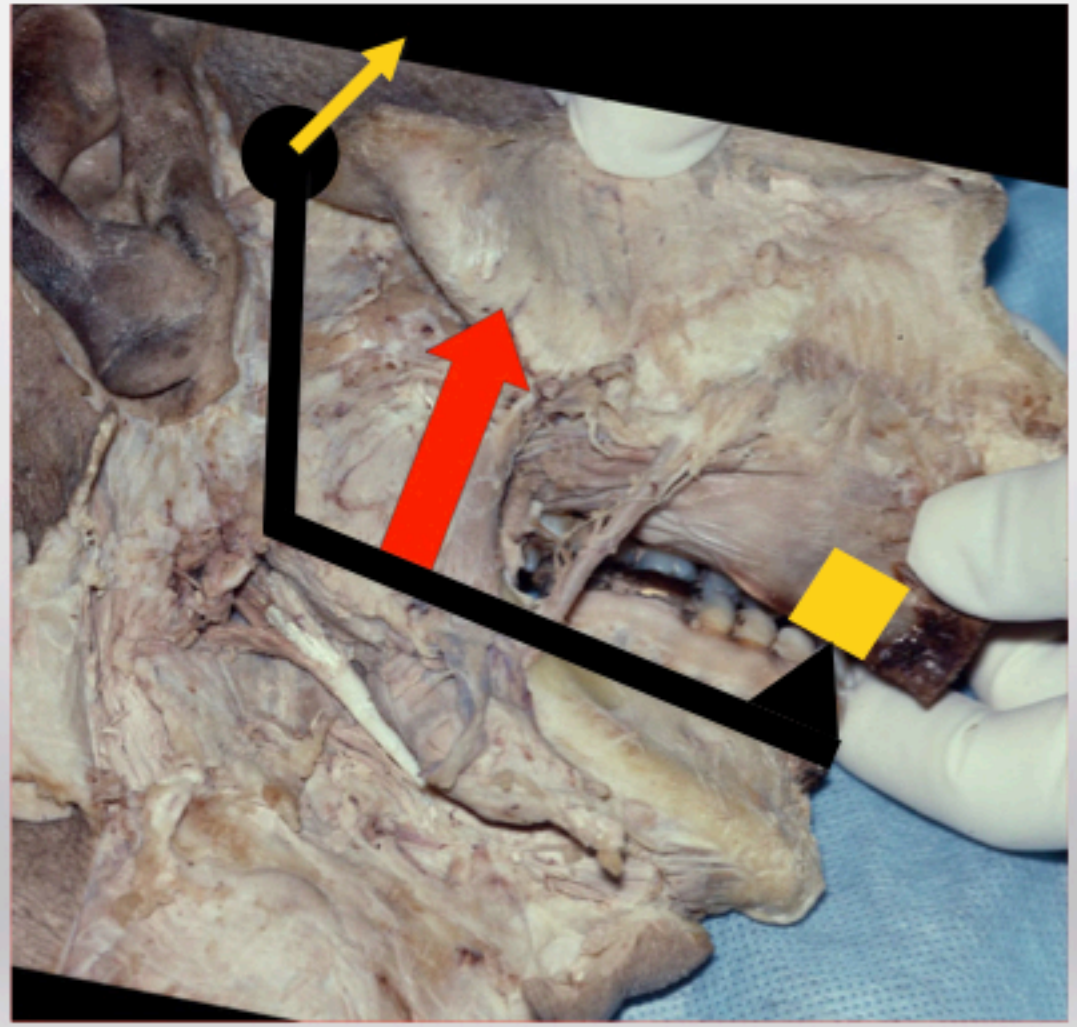




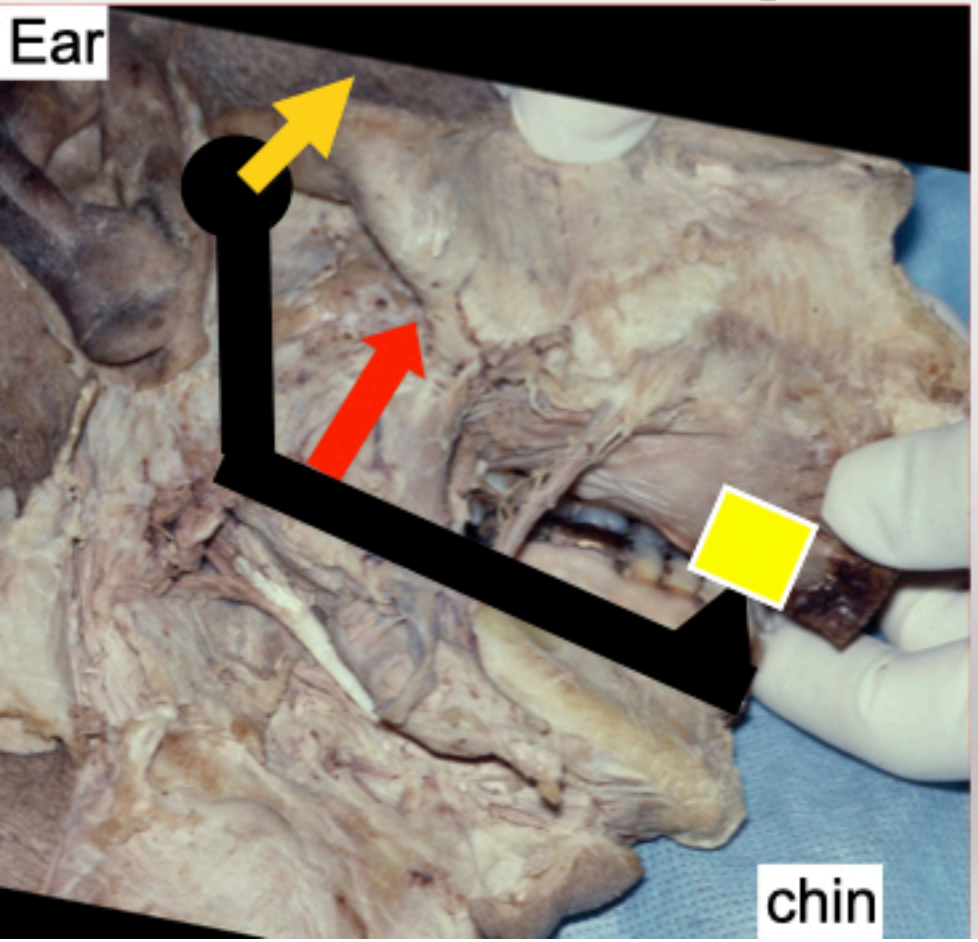


Biomechanics of Anterior Stop Orthotic

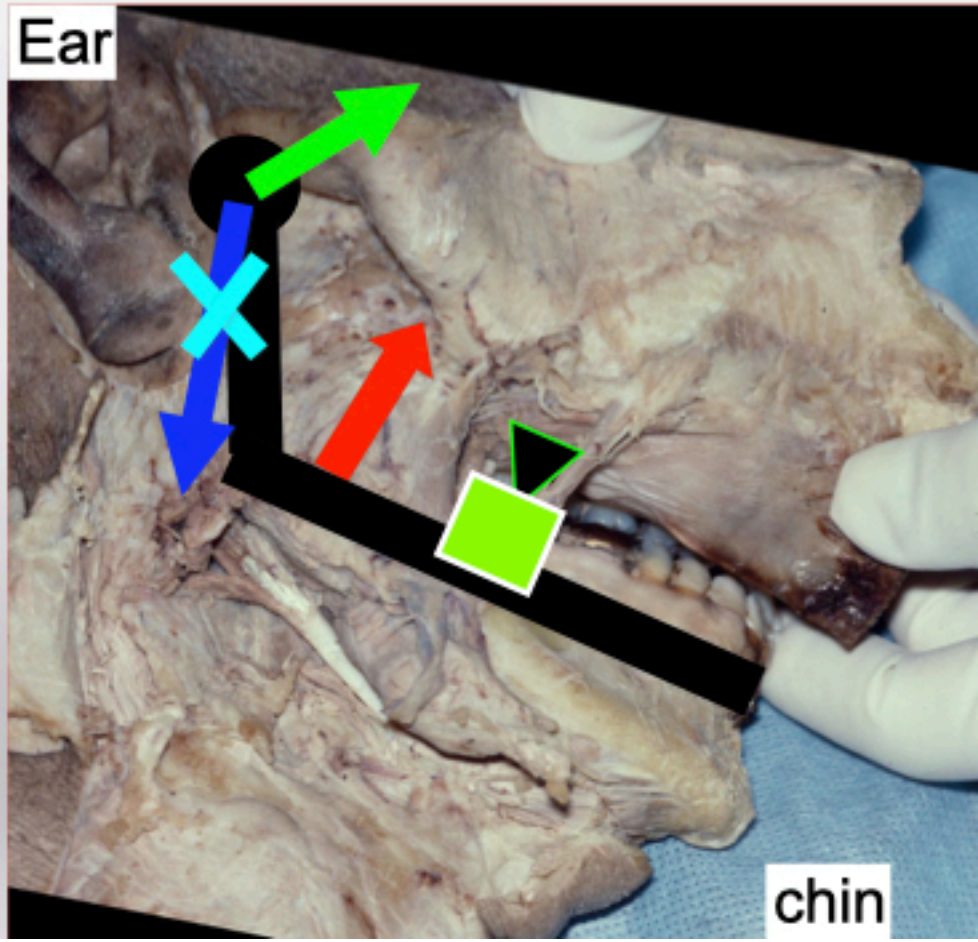


Biomechanics

Anterior Stop Orthotic

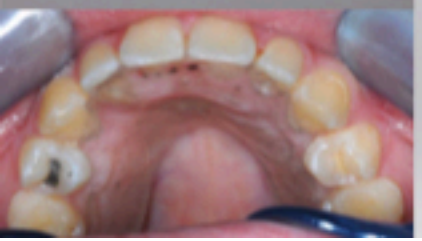


Posterior Stop Orthotic



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

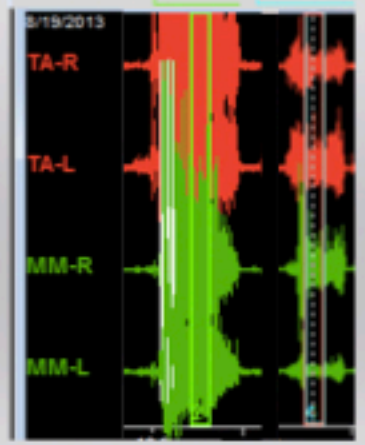
Detect with EMG or muscle palpation- Clench full power on posterior teeth and then with D-PAS orthotic.



Diagnostic
Palatal Anterior Stop
Orthotic

Patient with muscles
inhibited by anterior only contact

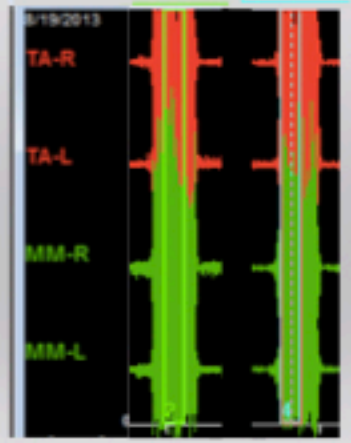
	Clench MaxIC	Anterior Stop D-PAS
	µV	µV
TA-R	100.6	15.7
TA-L	108.9	25.3
MM-R	115.4	25.5
MM-L	70.5	6.8



Major decrease in muscle power with D-PAS

Another Patient with muscles NOT
inhibited by anterior only contact

	Clench MaxIC	Anterior Stop D-PAS
	µV	µV
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

Choosing the Correct Night Guard

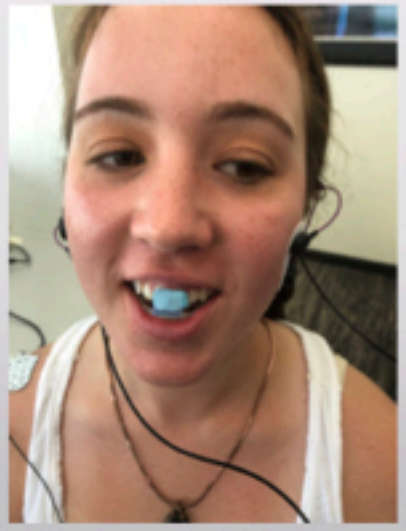
www.APSleep.com

APS
ArrowPath Sleep

M-Scan EMG
Electromyography

Clench back teeth

Clench
anterior stop



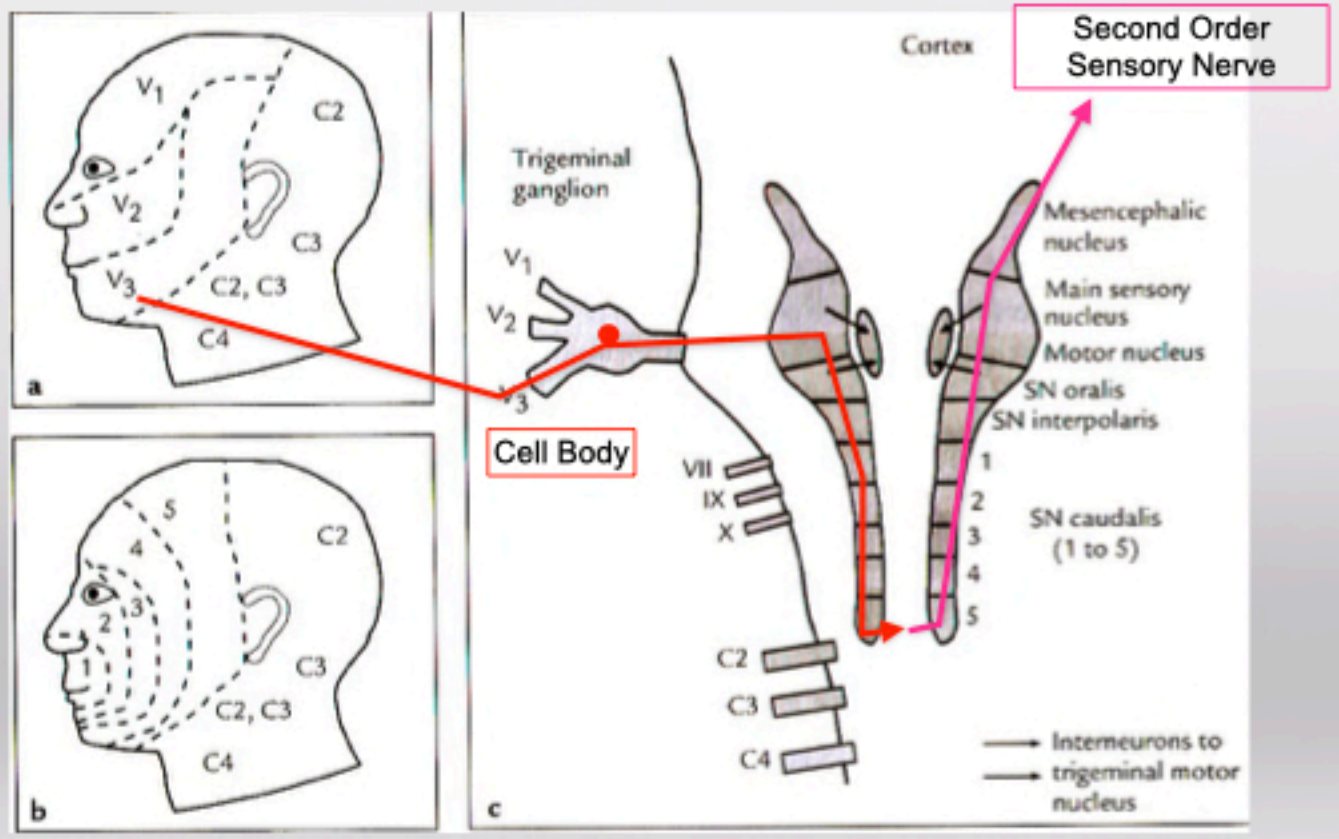
Can place moderate force on front teeth

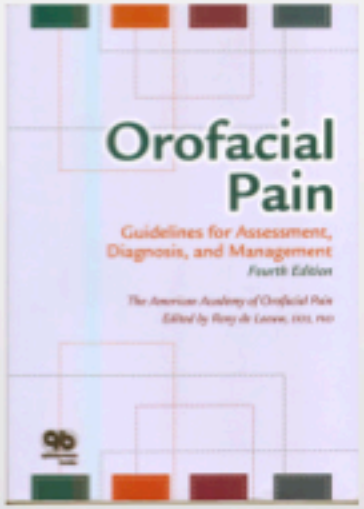
<u>Clench</u>
Back teeth +250 µv
Front teeth +121 µv

Trigeminal Ganglion-
Cell bodies of trigeminal primary sensory neurons
Trigeminal Nucleus
Connection of primary neurons with secondary neurons

Afferent
First Order
Sensory Nerve

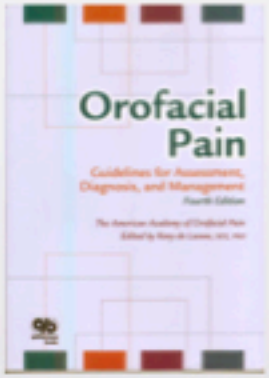
Touch cheek





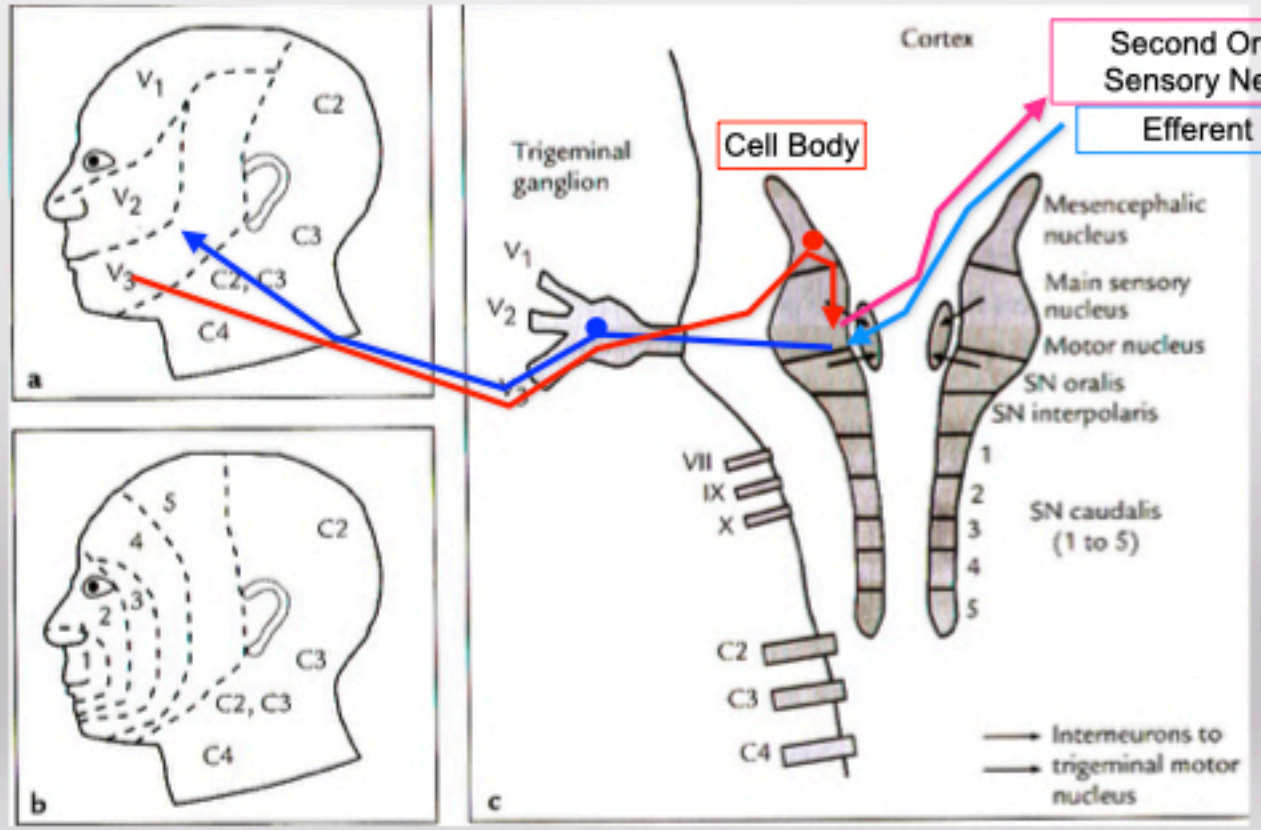
First Order PDL sensory neurons and proprioception neurons of TMJ closing muscles have their cell bodies in the upper section of the Trigeminal Nucleus and synapse with their second order neurons in the Motor nucleus

Efferent motor neurons to the TMJ muscles also synapse in the motor Nucleus



PDL Afferent
First Order
Sensory Nerve

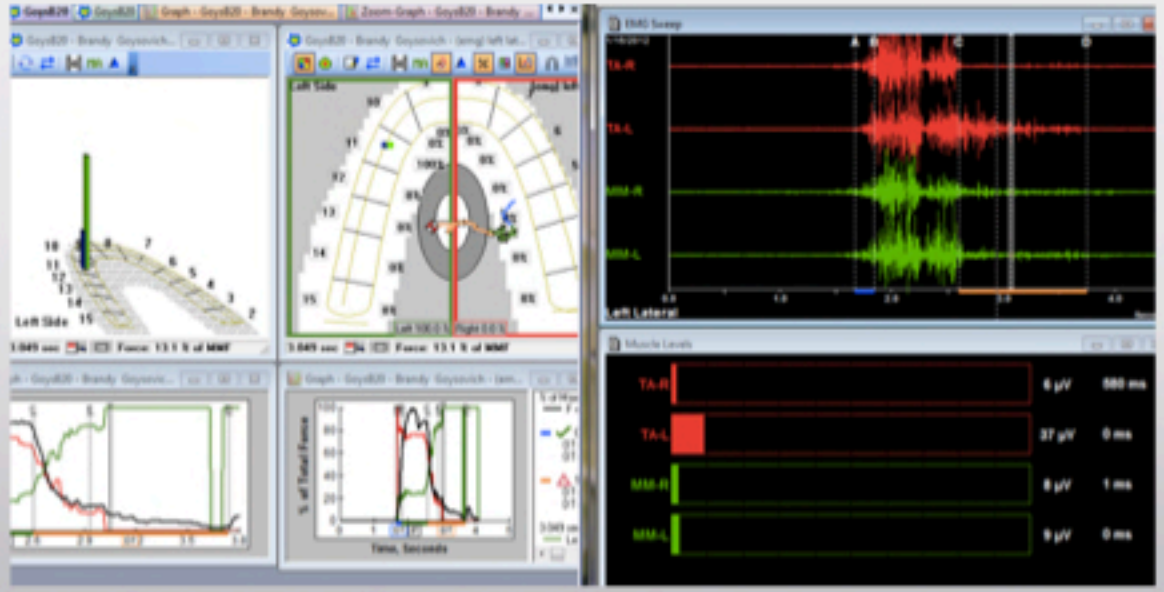
Tap Teeth
PDL Sensory



Blink and PDL only peripheral nerves with cell bodies in CNS

TScan EMG Link

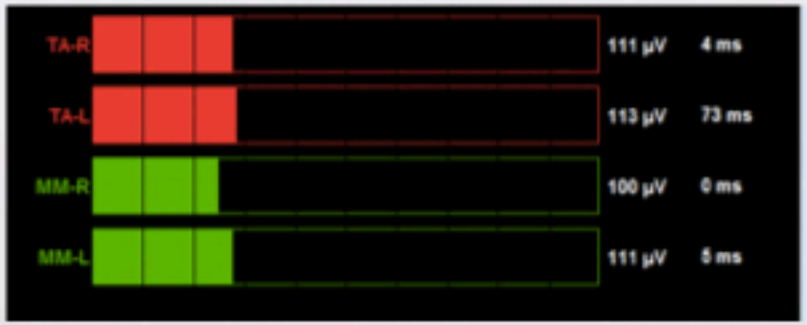
We can measure muscle activity chairside and link it to occlusal contacts
Muscles are inhibited from firing with anterior only contact
Gives endpoint to occlusal adjustment

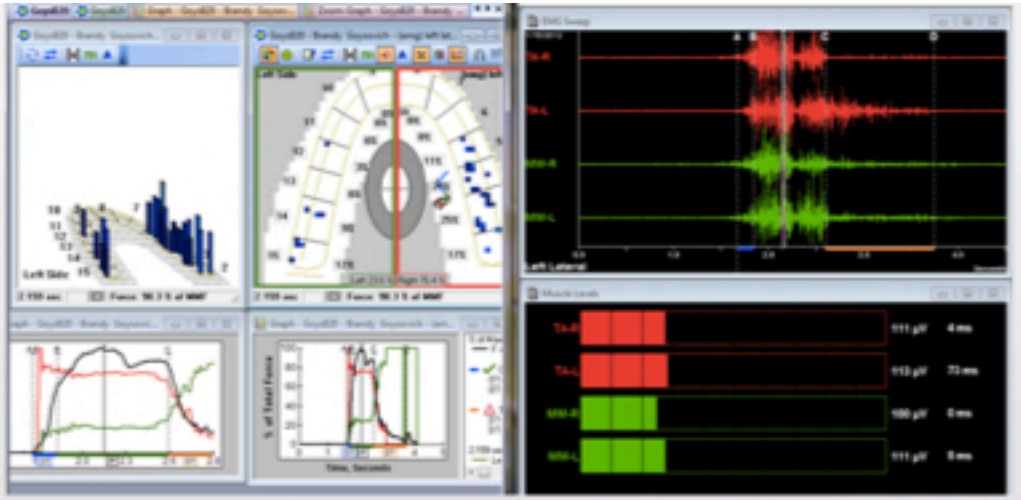


Williamson, E. H., Anterior Guidance: Its effect on electromyographic activity of the temporalis and masseter muscles. J Prosthet Dent 49-6:816-823, 1983.

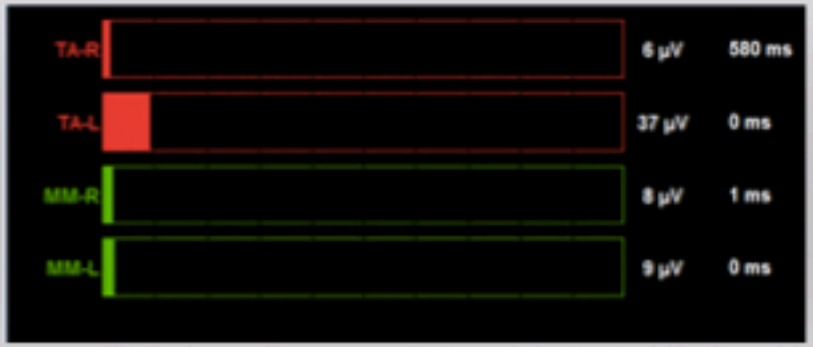
EMG Tscan- Masseter and Temporalis

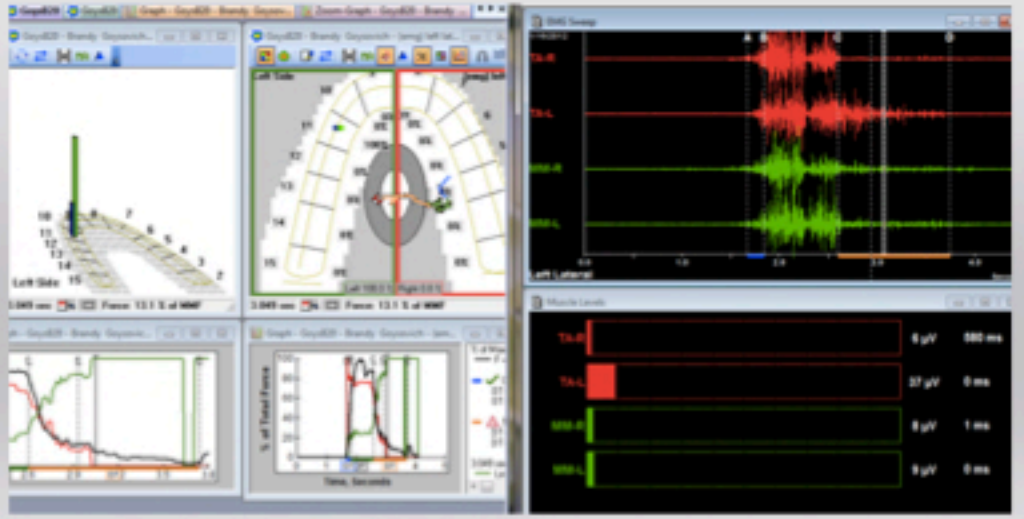
Maximum Intercuspation Clench
100-113 microvolts



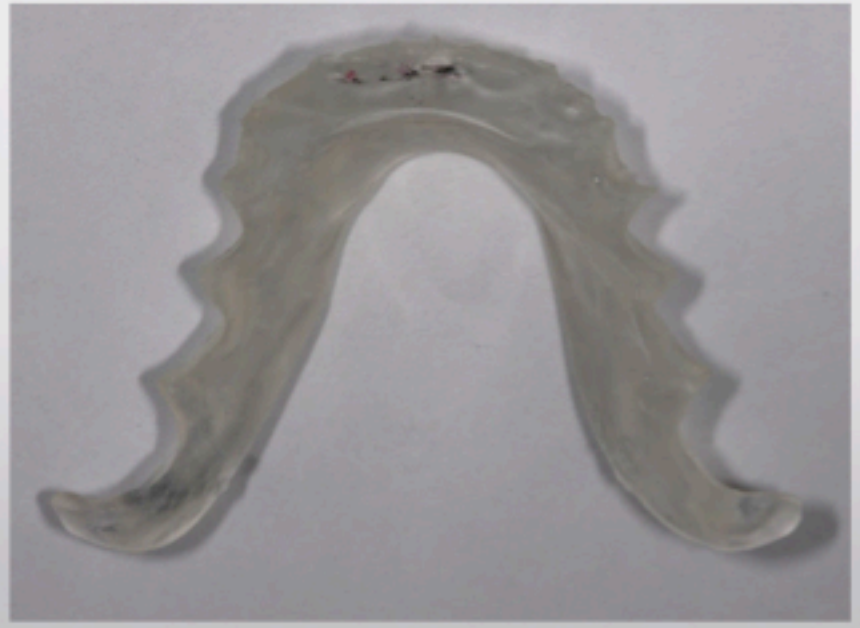


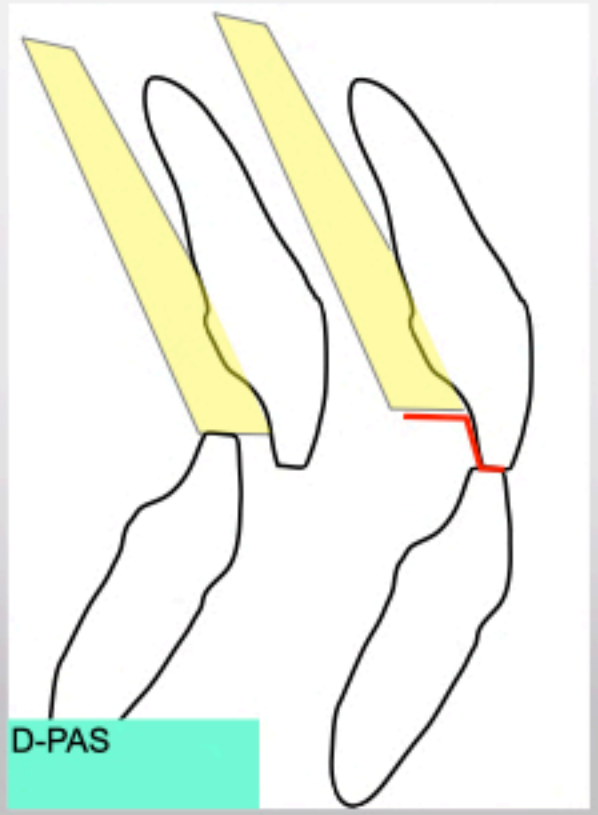
Left Lateral Excursion

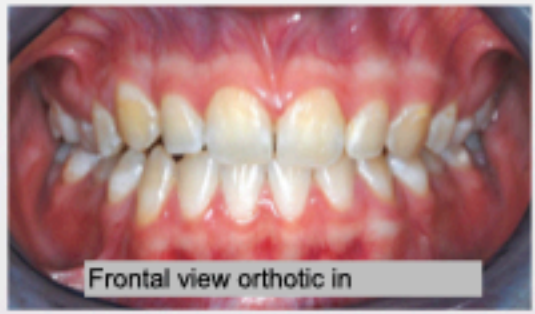


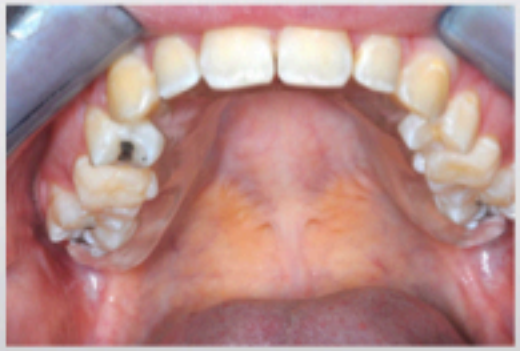


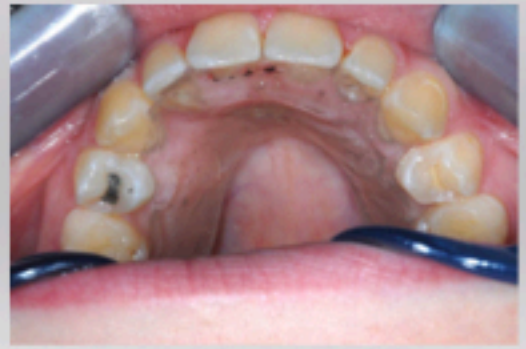
Diagnostic Palatal Anterior Stop
D-PAS











Basically an upper Hawley with anterior stop without clasps or wire

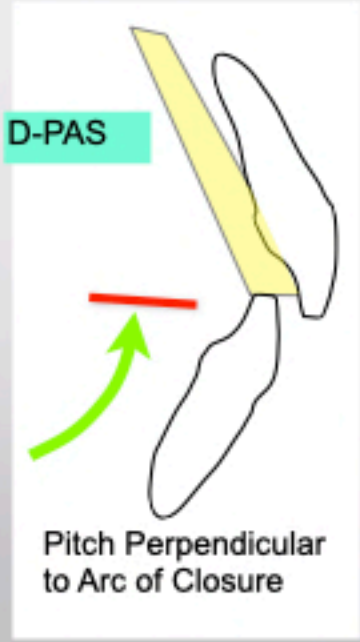
Diagnostic Palatal Anterior Stop

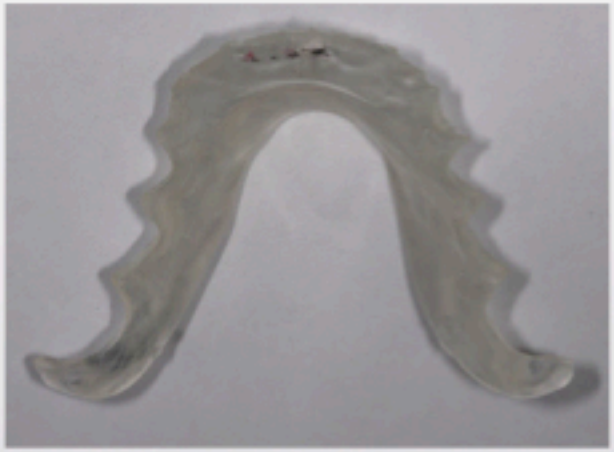
D-PAS Test: Wear 2 weeks for sleep, and occasional daytime

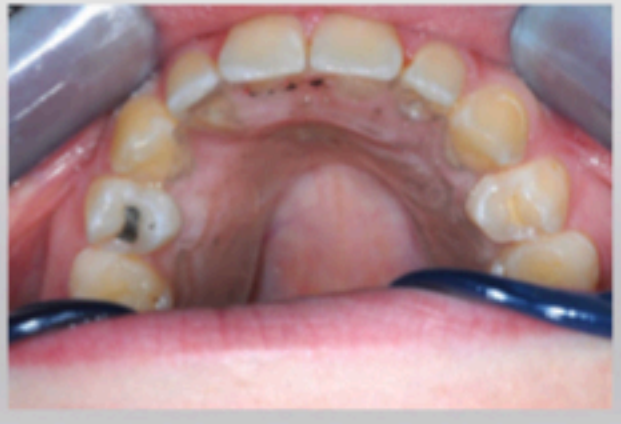
Better- Decrease in Symptoms
- Sleep Clenching Inhibited: Wear D-PAS as night guard
- Orthotic Improved Airway: D-PAS as night guard
- Occlusal Muscle Disharmony: Occlusal Adjust

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

D-PAS Burs Shape and Polish

Brassler H351G.11.070 HP G-Cutter Carbide
Brassler 295E HP E cutter
Preat F-8 Silicon Polisher
Keystone Scotch-Brite Red Polisher, Fine

D-PAS Handout to patient

D-PAS Diagnostic Palatal Anterior Stop Test

Dr John R. Droter, DDS

This is a diagnostic test, not treatment.
D-PAS Instructions:

For next 2 weeks wear for sleeping and occasionally during the daytime.
Try wearing all day for 1 or 2 days.
Put D-PAS in if you are having sore muscles or a headache.
You will need to remove to eat.

Keep track of what changes you notice.
It is not unusual for your teeth to fit together differently in the morning as your jaw becomes better aligned.

When out of the mouth always put it in its case.
Top 3 ways appliance are lost or broken:
1. Placed in a paper towel while eating and thrown out.
2. Placed in pocket and sat on.
3. Your dog finds it and uses it as a chew toy.

Clean by scrubbing off with toothbrush and toothpaste.

If facial tightness or muscle soreness increases, stop wearing for 2 nights and try again. If still sore stop wearing and contact us.

Symptoms will either get better, get worse, or stay the same.
If symptoms become worse you may have a more serious problem that will require further tests.

Diagnostic Palatal Anterior Stop

D-PAS Test: Wear 2 weeks for sleep, and occasional daytime

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Orthotic Improved Airway: D-PAS as night guard
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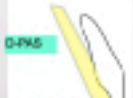
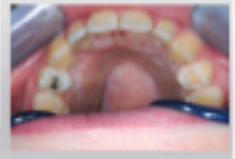
Pain not related to occlusion

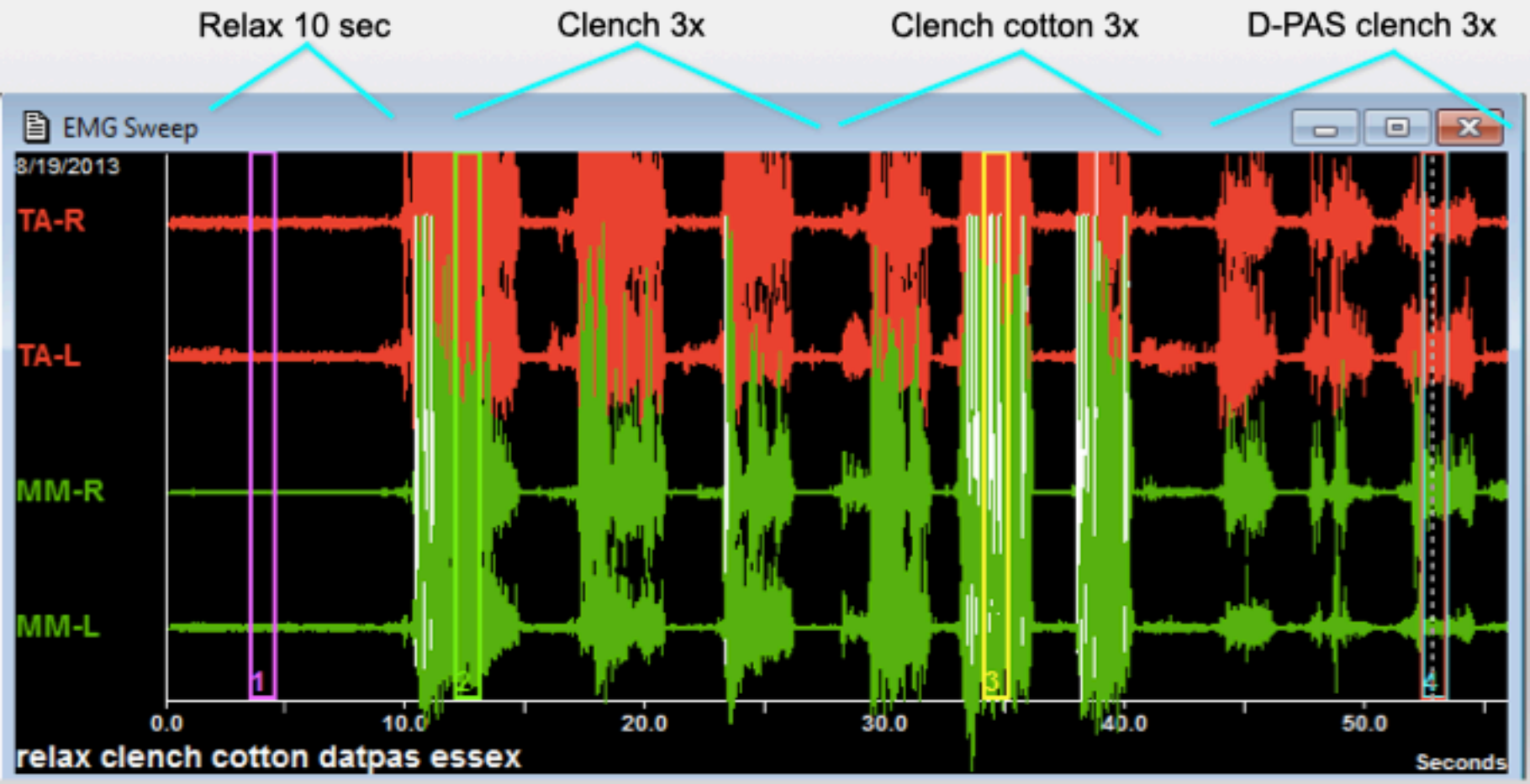




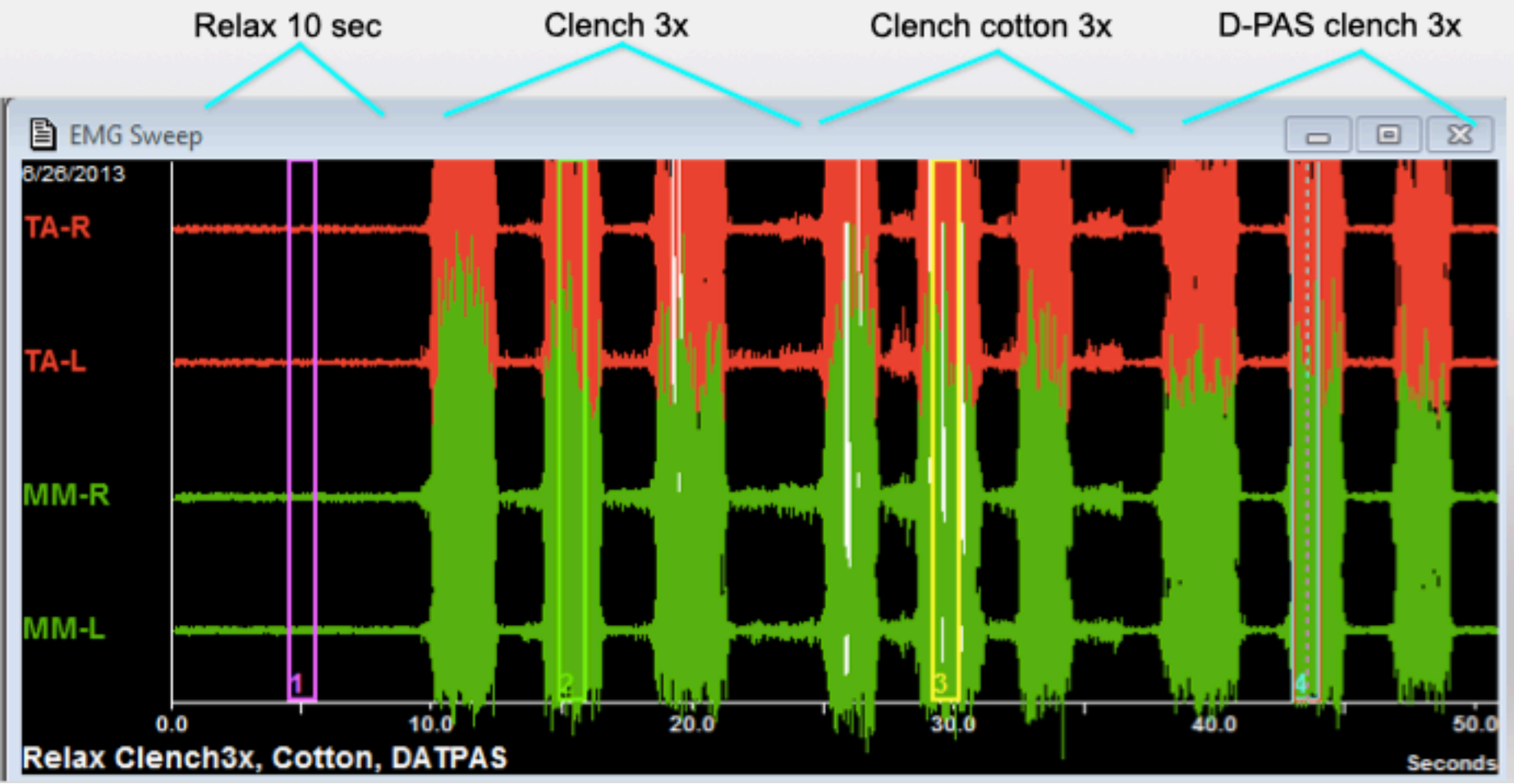
Stapelmann H, Türp JC. The NTI-tss device for the therapy of bruxism, temporomandibular disorders, and headache. ...BMC Oral Health. 2008 Jul PMID: 18662411

Muscle inhibition with anterior teeth only contact: D-PAS

50-90% decrease EMG



No muscle inhibition with anterior teeth only contact- D-PAS



5 questions that will help identify the specific bruxing disorder:

1. Does the patient grind or clench their teeth?
2. When does/did this occur: Awake or asleep, past or present?
3. Are the TMJ muscles inhibited from full contraction with anterior only contact?
4. If sleep grinding, is there an airway issue?
5. Does the dental orthotic make the airway better or worse?

4. Is there an airway issue?
(Upper Airway Resistance or Obstructive Sleep Apnea)

"Sleep Airway Screening"

High Resolution Pulse Oximetry

Data every 1 second average over 3 seconds

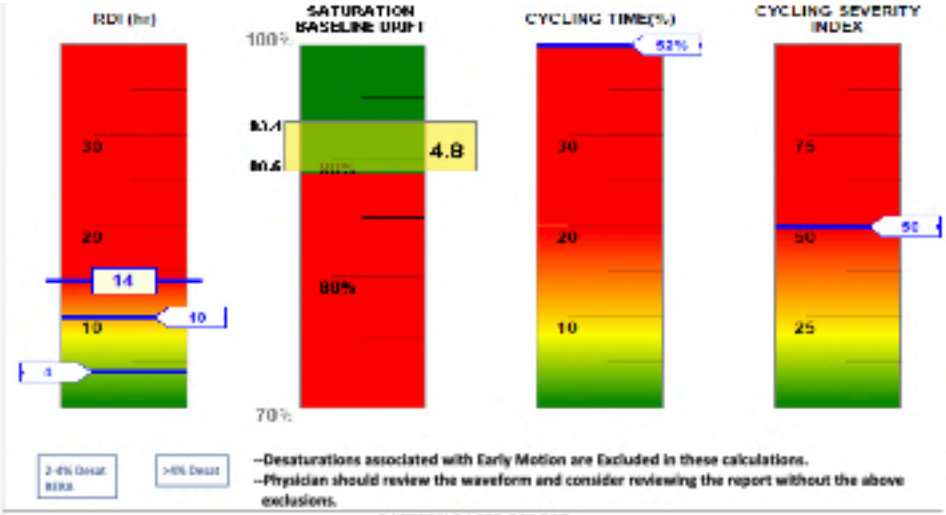
Patient Safety Inc.

SLEEPSAT

SATSCREEN

Order Pulse Ox and Software: Go to my website or www.patientsafetyinc.com

Sleep SAT is the replacement for PULSOX 300i, Konica Minolta no longer made



PATTERN BASED REPORT

OXYGEN SATURATION BASELINE ANALYSIS

Oxygen Saturation Baseline Drift(OSBD) (normal <= 3)	5
Initial Saturation Baseline	93
Lowest Saturation Baseline	89
Highest Saturation Baseline	93

Baseline is determined by the Mean SpO2 during 3 Minute window without Artifact and without Events.

SPO2 CYCLING

% Time in Cycling (Duration)	52%	(02:50:14)
Cycling Frequency	45	
96% - Lowest Sat	12	
Cycling Severity Index	50	

The total time oxygen saturation was <= 88% was 00:13:39

TRADITIONAL REPORT

ODI4:	11
Total ODI4 Events:	58
Time in ODI4 Events:	00:29:26
Avg ODI4 Event Duration:	00:00:28
<=88% ODI4 Events:	23
<=88% Longest Duration:	00:01:21
Minimum SpO2:	84
Avg Low 10% SpO2:	86
Avg Low SpO2:	89
Avg Low SpO2 <=88%:	87

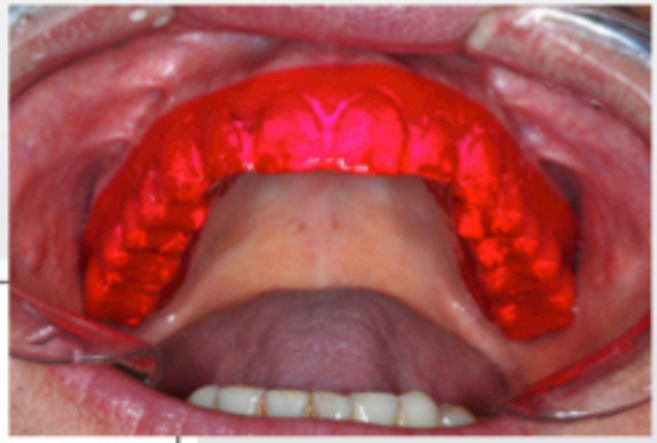
Definition of ODI4 Event: a fall in oxygen saturation of at least 4% and persisting greater than 3 seconds.

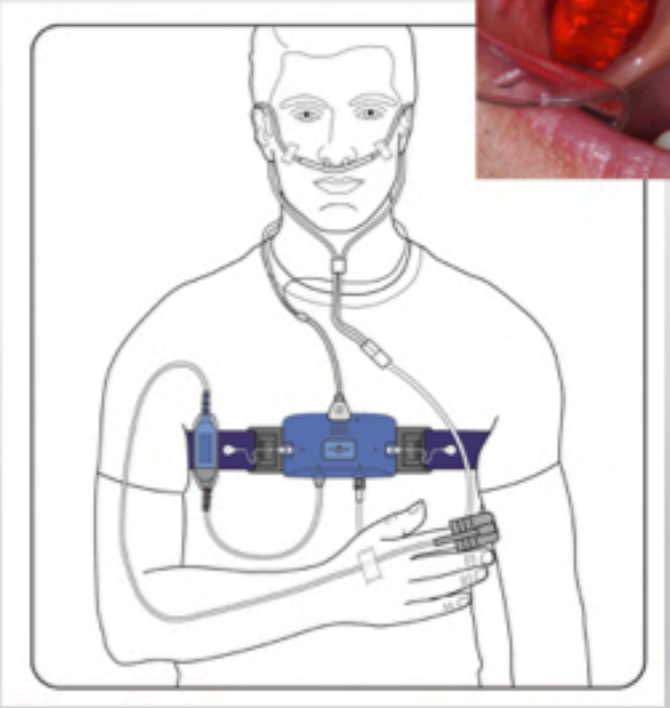
%SpO2	DURATION	%TOTAL
94-100	00:16:37	5%
88-94	04:57:26	91%
80-88	00:13:39	4%
70-80	00:00:00	0%
<= 70	00:00:00	0%
Total	05:27:42	100%
Motion Artifact	00:00:07	0.04%
Error Signal	00:00:05	0.03%

zMachine

GENERAL sleep

zMachine + Brux Checker
+ Snore Lab





Call (888) 330-4424

Use Code: DROTER to receive special offer

Patient: M Y
Study Date: 2018-09-27 Study ID: 1124990976
3% Threshold

AHI: 8.9
AHI is how many times an hour your blood oxygen goes down.

RDI: 8.9
RDI is how many times an hour your sleep is disturbed due to respiration

Date of Birth: 1998
Age: 20
Sex: F

Height: 63 Inches
Weight: 105 Pounds
BMI: 18.60

Note:

GENERAL sleep
Zmachine® Synergy
Home Sleep Test Report
Study Ordered by:
John R. Droter, DDS
Scored by: Computer

Study Details: Computer Generated Scoring
The following parameters were recorded using a Zmachine Synergy (General Sleep Corporation): EEG for sleep staging & arousals; respiratory inductance plethysmography for thoracic respiratory effort; pressure transducer for respiratory airflow & snore; pulse oximeter for SpO2, pulse, & optical plethysmograph; and tri-axis accelerometer for body position. Hypopneas were scored per AASM recommended definition of 3% desaturation.

Times and Durations	
Lights off	2018-09-27 01:47:32
Lights on	2018-09-27 08:42:54
Total Recording Time (TRT)	906.8 min.
Time in Bed (TIB)	414.0 min. (81.7% of TRT) [6 hours 54 minutes
Total Sleep Time (TST)	396.8 min. (95.9% of TIB)
Sleep Efficiency (SE)	95.9 % of TIB
Latency to Persistent Sleep (LPS)	6 min
Latency to Deep Sleep (LDEEP)	19 min
Latency to REM Sleep (LREM)	9.5 min
Total Light Sleep Time N1+N2	207.9 min. (52.4% of TST)
Total Deep Sleep Time N3 SWS	85.7 min. (34.1% of TST)
Total REM Time	93.2 min. (23.5% of TST)
SpO_2 < 89% cumulative time	0 min.
SpO_2 < 89% longest span	0 min.

Awakenings During Sleep	
Wake After Sleep Onset (WASO)	13 min
≥ 1-Epoch Awakenings	18 (2.7 per sleep hour)
≥ 3-Epoch Awakenings	0 (0 per sleep hour)

WASO is the cumulative wake time following LPS; ≥ 1-Epoch Awakenings is the number of times the patient woke for one epoch (i.e. 30 seconds) or more after LPS; and ≥ 3-Epoch Awakenings is the number of times the patient woke for three epochs or more after LPS (this is a subset of ≥ 1-Epoch

Sleep Study Ranges of Normal
Sleep Latency 10-20 min
Latency to REM 90 min
Sleep Efficiency >85%

N1 2% - 5%
N2 45% - 55%
N3 Deep Sleep 10% - 20%
If 8h: then 48 min to 96 min
REM Sleep 20% - 25%
If 8h: then 96 min to 120 min

REM to REM is about 90 min
4-5 cycle per night
REM time longer as night goes on

Deep N3 SWS slow wave sleep in first third of night. Less as we age

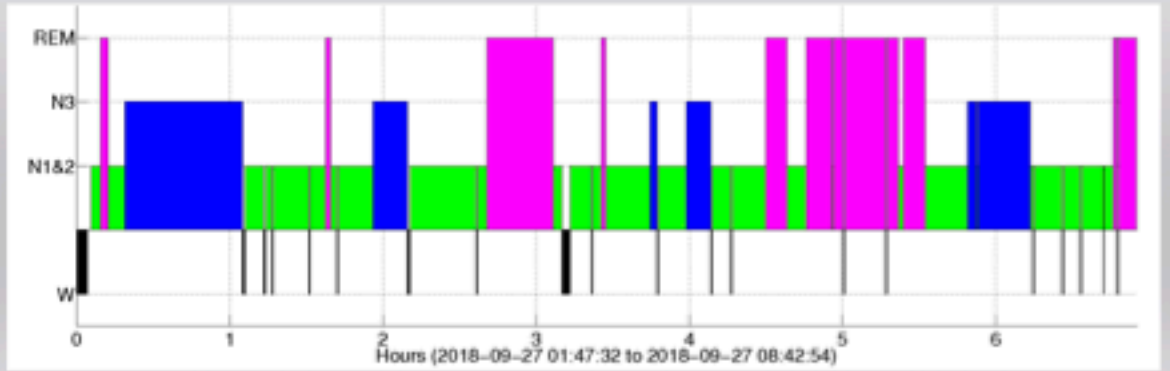
TRT is the total duration of the recording; TIB is the elapsed time from lights off to lights on; TST is the cumulative time scored as any stage of sleep; SE is 100×(TST÷TIB) expressed as a percentage; AHI is apneas + hypopneas per hour of sleep time; RDI is apneas + hypopneas + RERAs per hour of sleep time; and REI is apneas + hypopneas + RERAs per hour of recording time.

LPS is the elapsed time to the beginning of the first period in which 10 of 11 minutes are scored as any stage of sleep (i.e. the start of persistent sleep); LDEEP is the elapsed time to the beginning of first epoch of Deep Sleep; and LREM is the elapsed time to the beginning of first epoch of REM.

Respiratory Events

Body Position		
72.1%	Supine/hr	9.0
0%	Prone/hr	0
12.9%	Left/hr	4.5
14.8%	Right/hr	9.8

Sleep Stages



Apple Watch Sleep

Did not pass my initial comparison tests to zMachine

5 questions that will help identify the specific bruxing disorder:

1. Does the patient grind or clench their teeth?
2. When does/did this occur: Awake or asleep, past or present?
3. Are the TMJ muscles inhibited from full contraction with anterior only contact?
4. If sleep grinding, is there an airway issue?
5. Does the dental orthotic make the airway better or worse?

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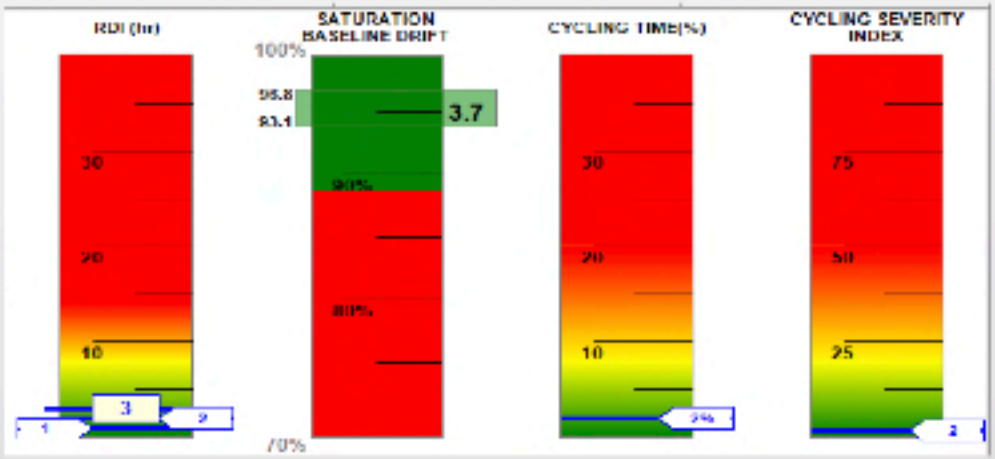
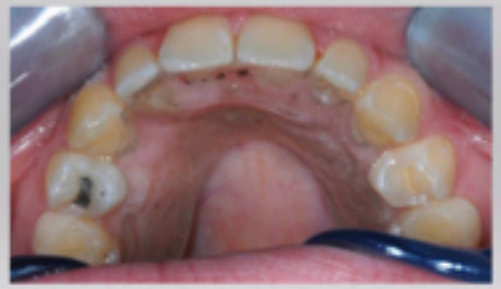
RDI= Respiratory Distress Index

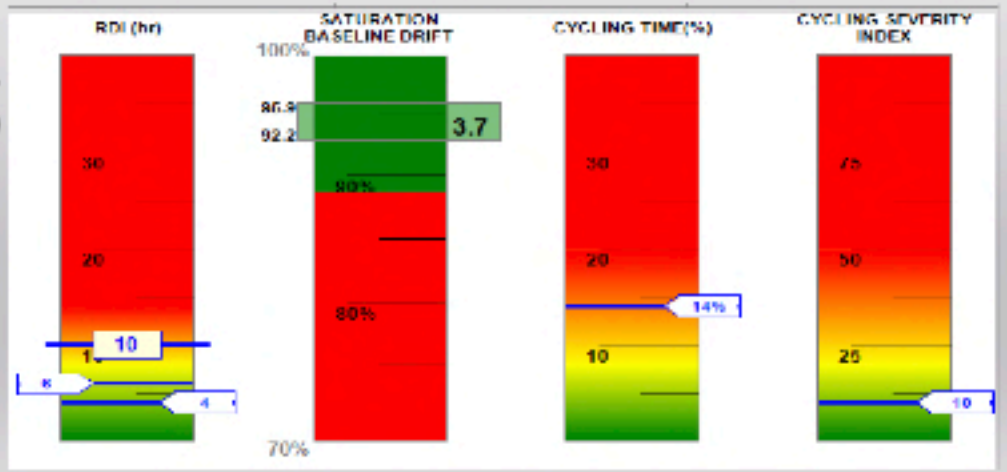
Sometimes D-PAS makes airway better, sometimes worse

No dental orthotic
RDI = 3



Dental Orthotic:
Anterior Stop: D-PAS
RDI =10

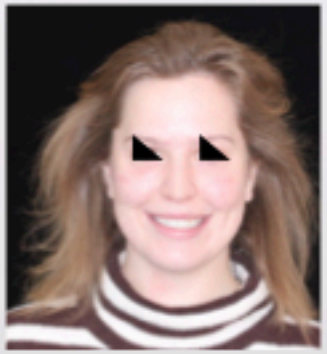




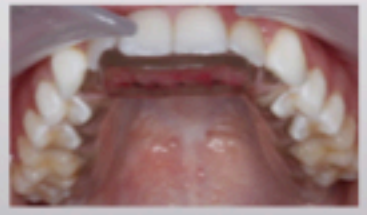
High Resolution Pulse Oximetry

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

Age 19F
cc: Severe jaw pain since 12y/o, Wiggle jaw to open

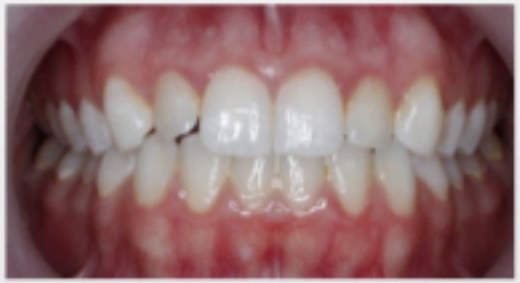


Patient Safety
Inc Pulse Ox
Sleep Screening



Brux PAS pm wear, jaw exercises

1 week, significant decrease in pain, much less wiggle to open.



4% RDI = 3/h

Autonomic Arousals 19 /h

PULSE RATE DATA

Autonomic Arousals

Index (#/hr): 19

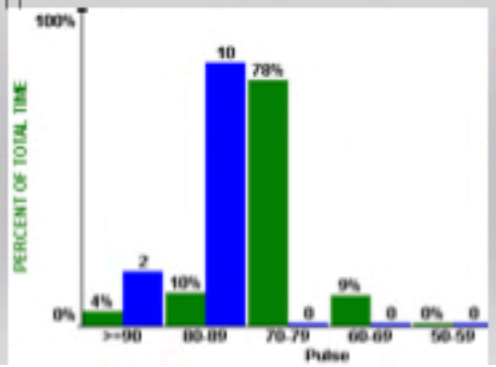
Pulse Rate Range

Mean: 76

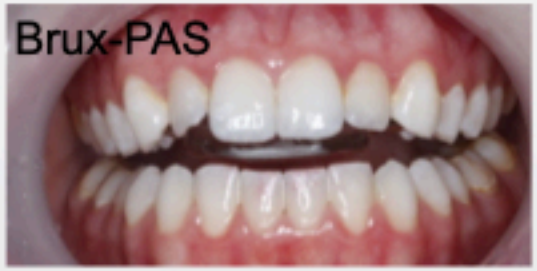
Min: 60

Max: 225

76



Brux-PAS



4% RDI = 1/hr

Autonomic Arousals 9 /h

PULSE RATE DATA

Autonomic Arousals

Index (#/hr): 9

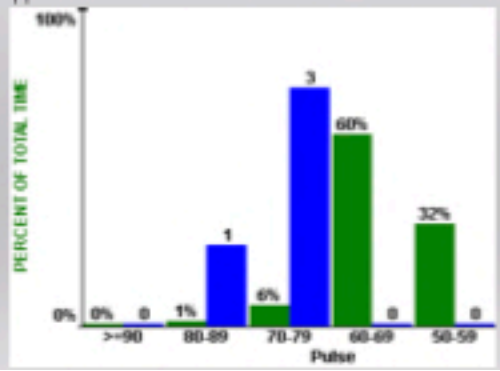
Pulse Rate Range

Mean: 63

Min: 52

Max: 120

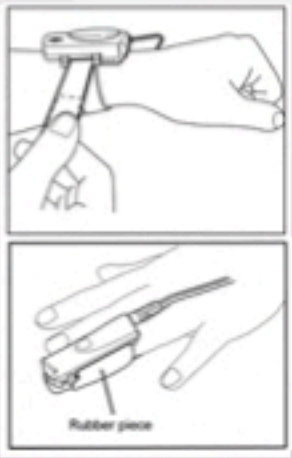
63

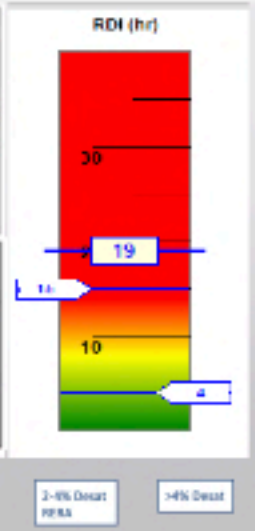


Treating Common TMDs in a General Practice

Management

Diagnosis	Pattern	Treatment
Sleep Grinding Airway Related	Worn Teeth Upper Airway Resistance	Mandibular Advancement Appliance (after MD approves)





Pulse Ox Screening

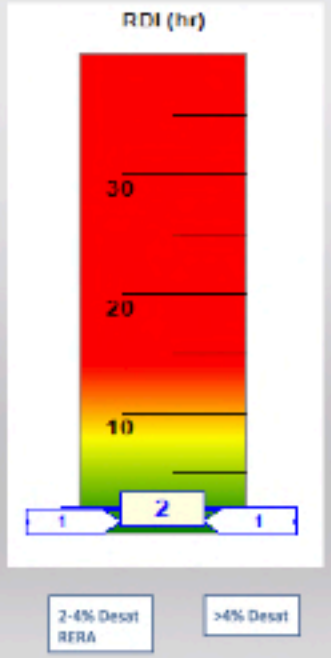
Refer to Medical Sleep Doctor

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.

Nylon MAD
Great Lakes Ortho

D-SAD

PANTHERA

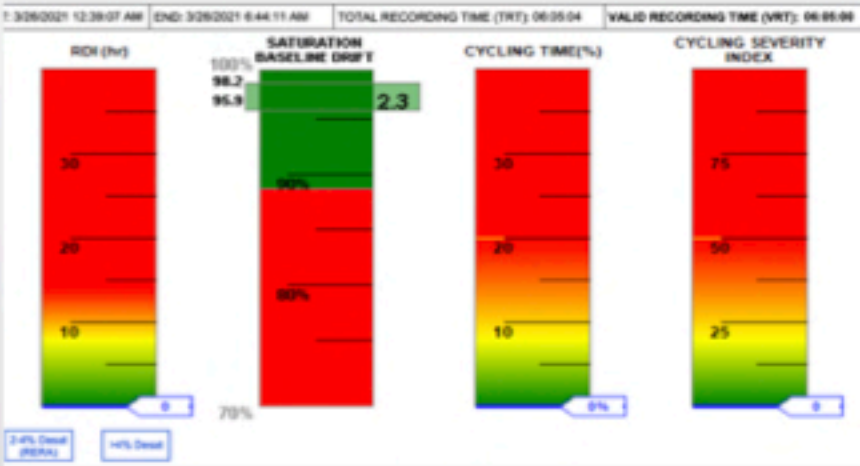
Sleep Simplified

1. Need adequate Deep and REM Sleep every night.
2. Need to get oxygen through the nose to lungs, unimpeded, all the time.
3. Parasympathetic Dominance in non REM Sleep

Sleep Complexity:
- Problems are Numerous.....
- Tests are Numerous.....
- Therapies are Numerous.....

Always go to the back to basics:
- 60+min Deep and 90+min REM
- Air from Nose to Lungs
- Large periods of calm, steady heart rate

Sat Screen by Patient Safety Inc



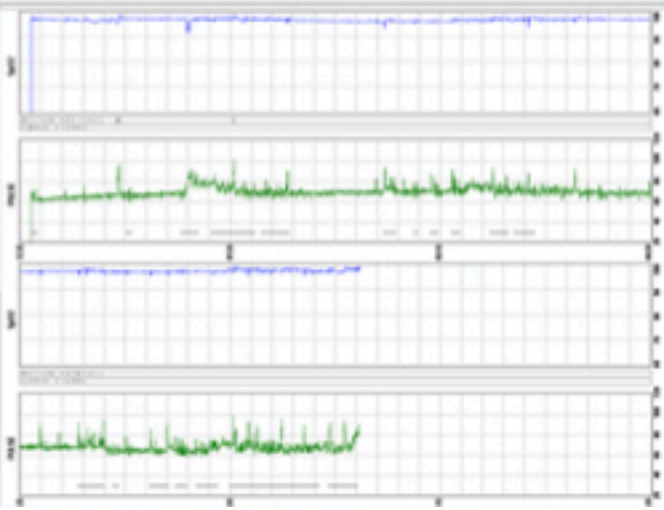
PULSE RATE DATA

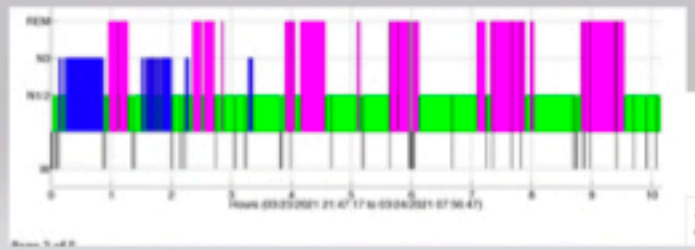
Autonomic Arousals

Index (#/hr): 23

Pulse Rate Range

Mean:	69
Min:	58
Max:	102





AHI: 0.5

AHI is how many times an hour your blood oxygen goes down.

zMachine: Interrupted Deep and REM

5 questions that will help identify the specific bruxing disorder:

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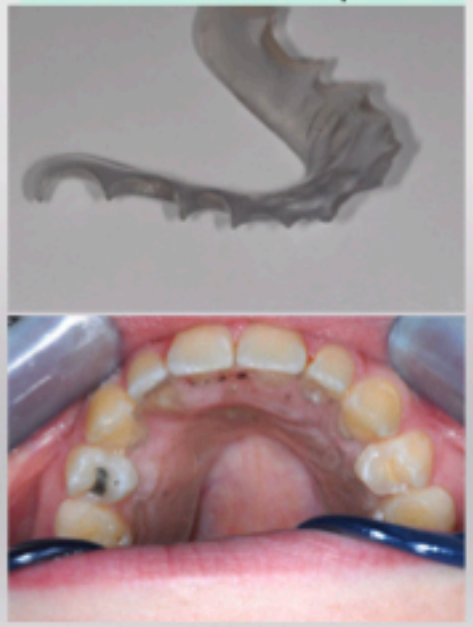
4. If sleep grinding, is there an airway issue?
5. Does the dental orthotic make the airway better or worse?

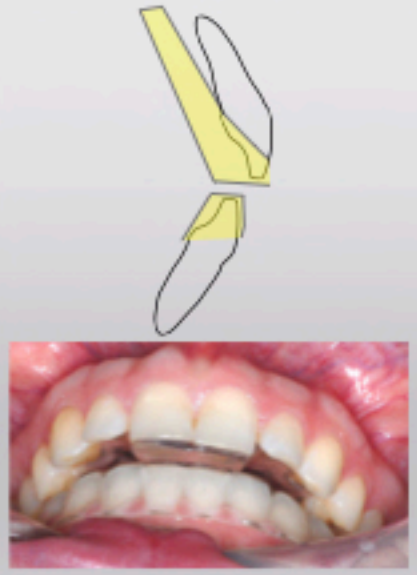
Living Tree Dental Lab
(865) 509-4509
connect@livingtreelab.com

3D Printed Orthotics

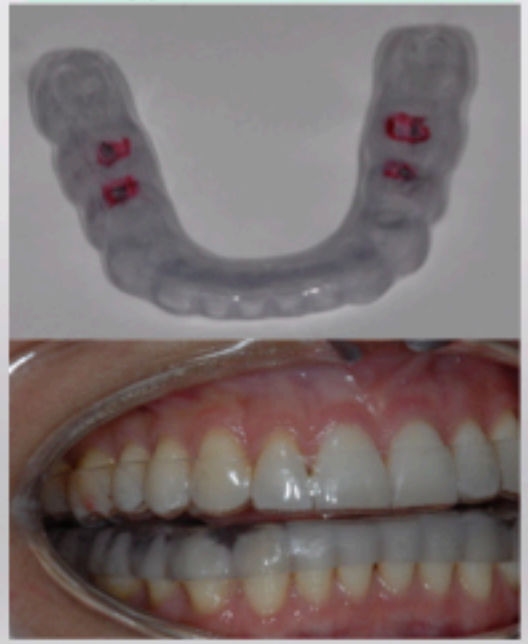
D-PAS
Diagnostic-
Palatal Anterior Stop



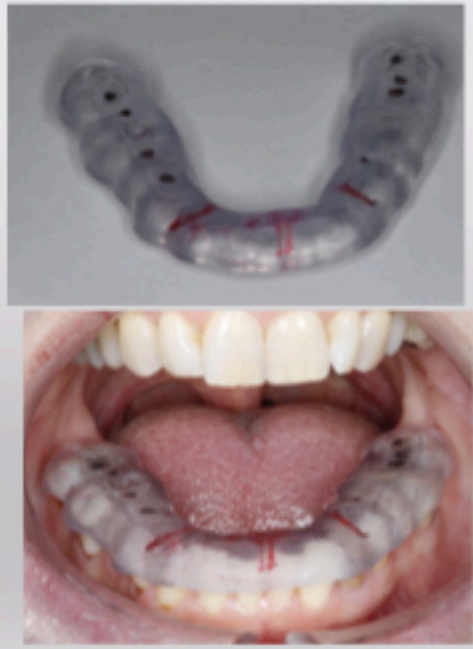
Brux-PAS
with lower Essix

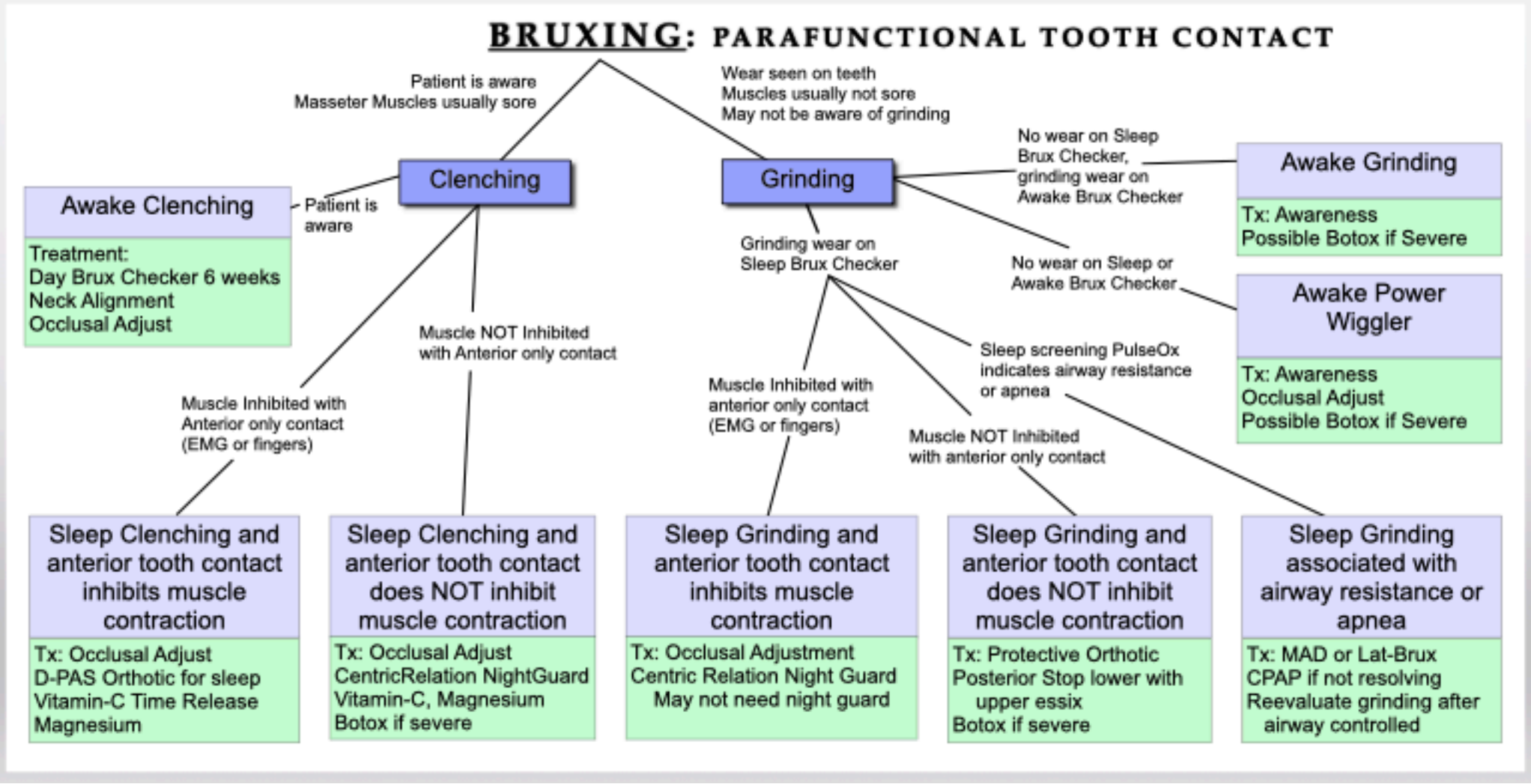


Hard Lower Posterior Stop
with upper essix

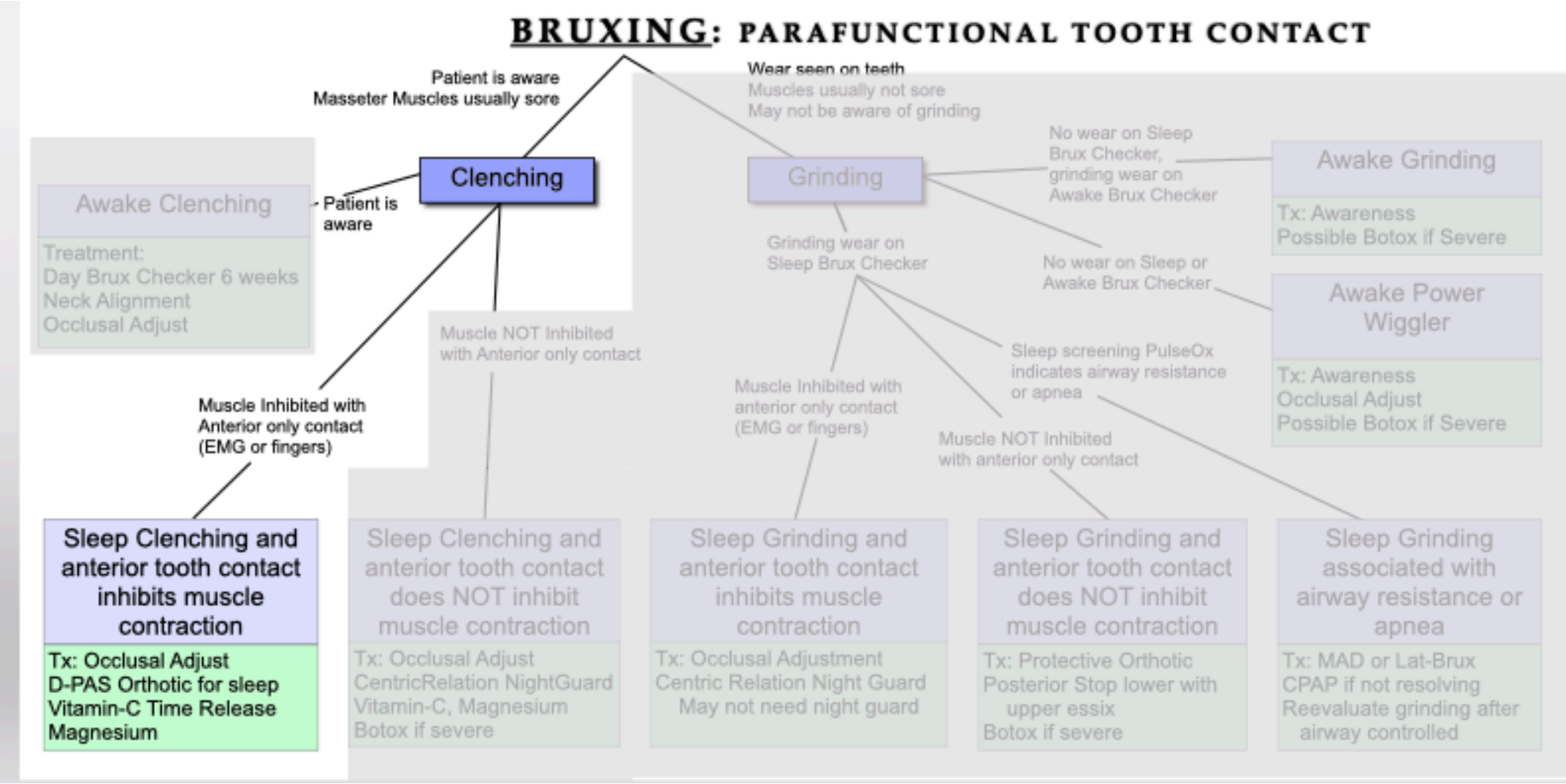


Hard Lower Full Coverage
Centric Relation Orthotic




BRUXING: PARAFUNCTIONAL TOOTH CONTACT
Patient is aware
Masseter Muscles usually sore
Wear seen on teeth
Muscles usually not sore
May not be aware of grinding
Clenching
Grinding
Patient is aware
Awake Clenching
Treatment:
Day Brux Checker 6 weeks
Neck Alignment
Occlusal Adjust
No wear on Sleep Brux Checker, grinding wear on Awake Brux Checker
Awake Grinding
Tx: Awareness
Possible Botox if Severe
Grinding wear on Sleep Brux Checker
No wear on Sleep or Awake Brux Checker
Awake Power Wiggler
Tx: Awareness
Occlusal Adjust
Possible Botox if Severe
Muscle NOT Inhibited with Anterior only contact
Muscle Inhibited with Anterior only contact (EMG or fingers)
Muscle Inhibited with anterior only contact (EMG or fingers)
Sleep screening PulseOx indicates airway resistance or apnea
Muscle NOT Inhibited with anterior only contact
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
CentricRelation NightGuard
Vitamin-C, Magnesium
Botox if severe
Sleep Grinding and anterior tooth contact inhibits muscle contraction
Tx: Occlusal Adjustment
Centric Relation Night Guard
May not need night guard
Sleep Grinding and anterior tooth contact does NOT inhibit muscle contraction
Tx: Protective Orthotic
Posterior Stop lower with upper essix
Botox if severe
Sleep Grinding associated with airway resistance or apnea
Tx: MAD or Lat-Brux
CPAP if not resolving
Reevaluate grinding after airway controlled

BRUXING: PARAFUNCTIONAL TOOTH CONTACT



Parafunctional Clenching

Signs

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

Adhesive Click- “Sticky Disc”

Symptoms

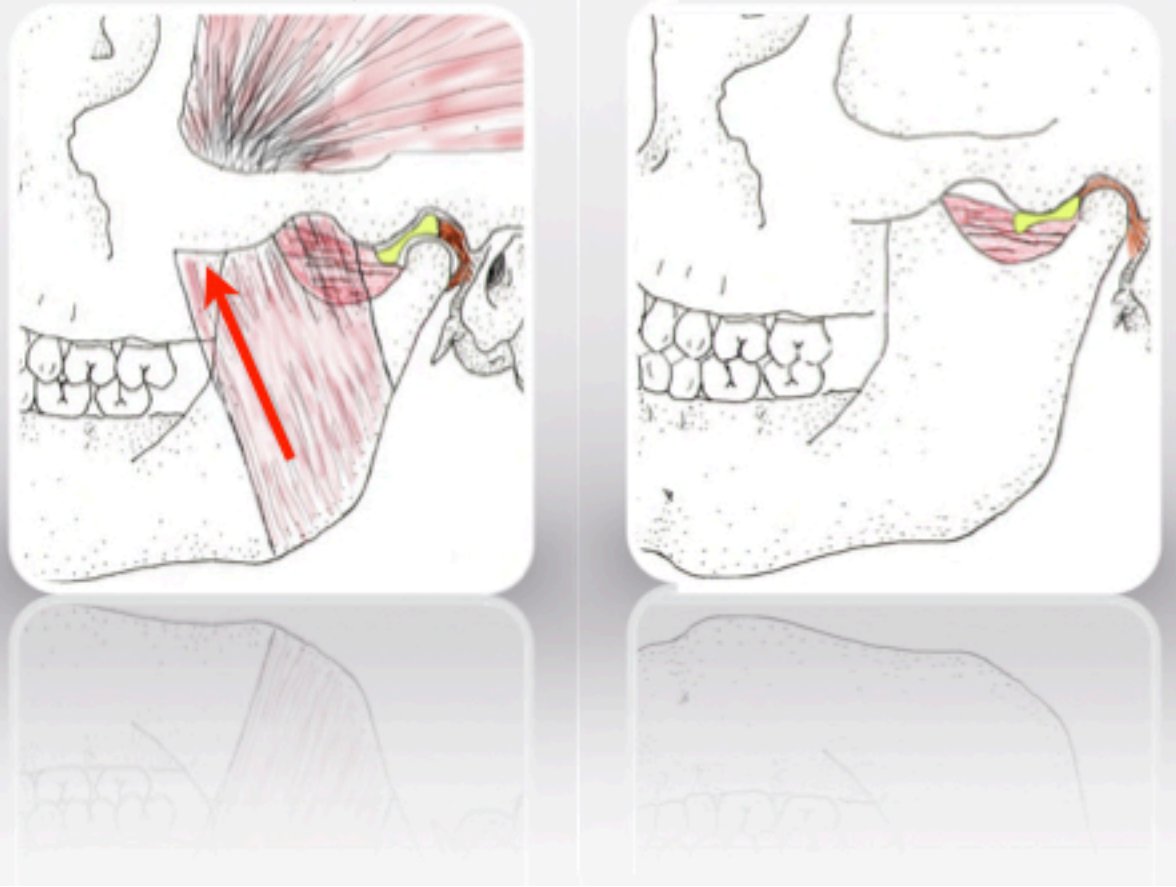
- Aware of clenching
- Sore muscles on waking
- Clicking on waking that goes away
- Headaches

Causes

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

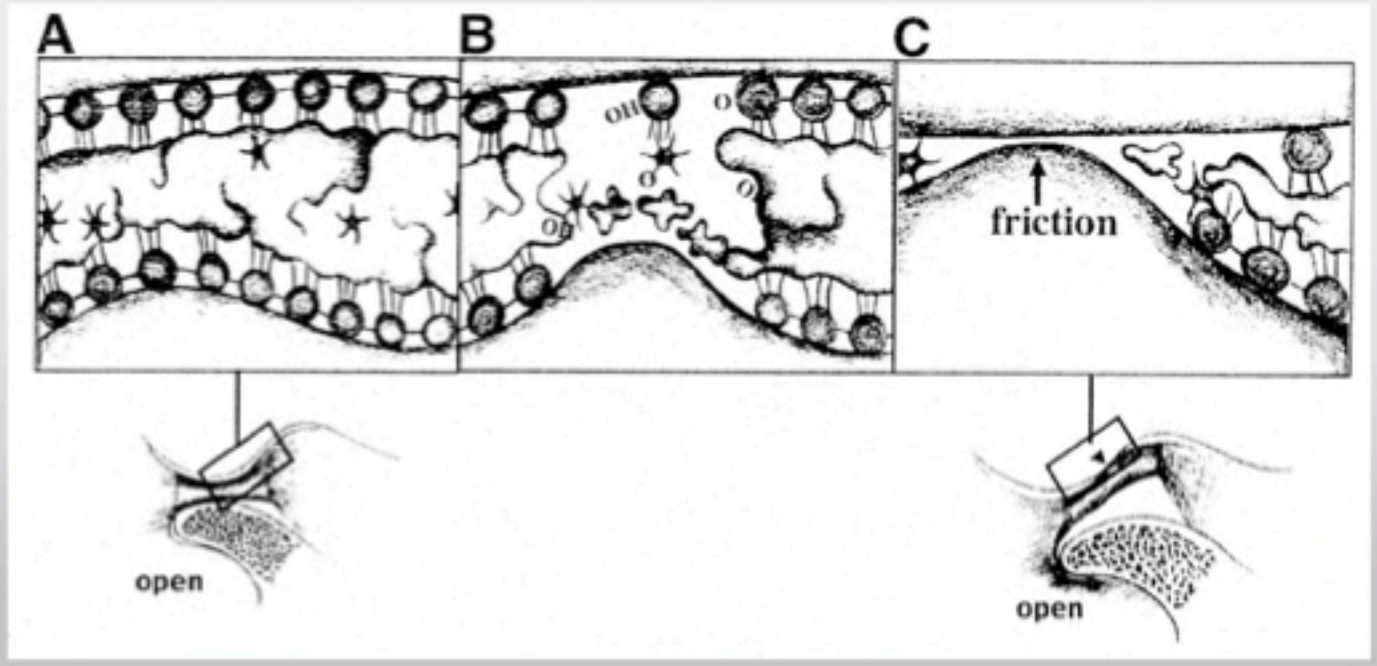
Clenching can cause disc subluxation

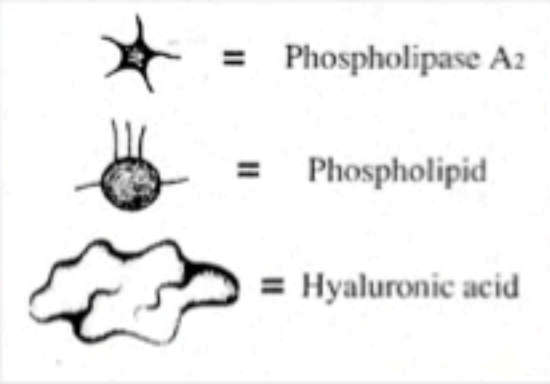
Chronic Micro Trauma from clenching



Clenching breaks down Hyaluronic Acid and Phospholipids

Creates “Sticky disc”

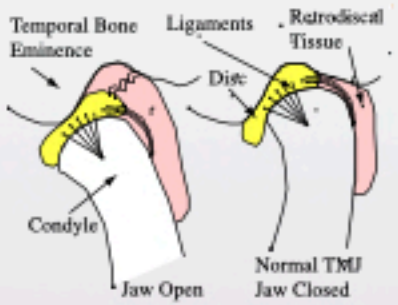




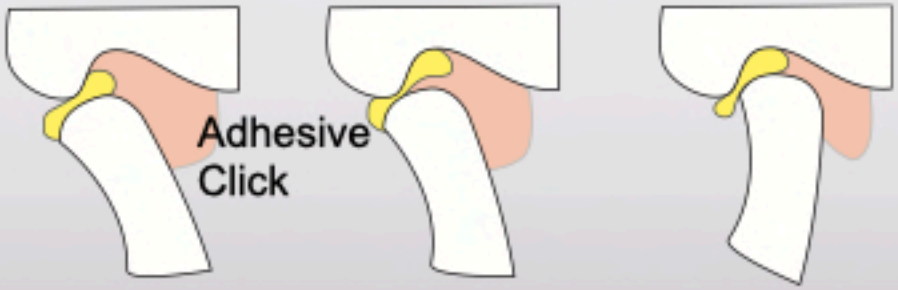
Nitzan, DW, The Process of lubrication impairment and its involvement in temporomandibular joint disc displacement: a theoretical concept, J Oral Maxillofac Surg. 59:36-45, 2001

Clenching can lead to disc dislocation

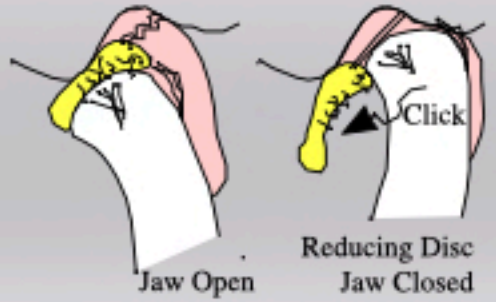
Normal



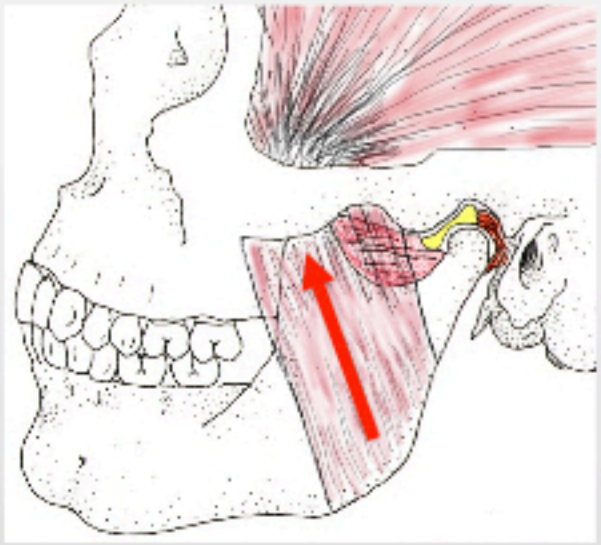
"Sticky Disc" - Clenching causes disc to stick in upper joint compartment. As condyle moves forward, disc distorts and eventually releases, making a clicking sound. On closing disc is slow to return, stretching discal ligaments.



Over time can lead to Anterior Disc Dislocation with Reduction



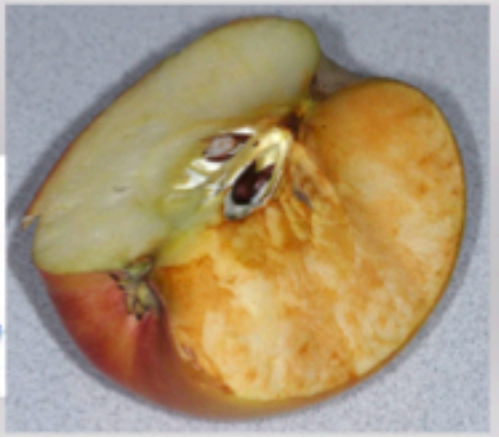
Hypoxia Re-perfusion Injury



Clenching: Static Loading No Oxygen/Hypoxia
On waking with joint motion get re-perfusion of Oxygen
Oxygen Free Radicals cause Oxidative Damage

If antioxidants (Vitamin A, C, E) around:
- Protects tissue from damage
- Vitamin C 1000 mg at dinner with other vitamins
  - NOW Vitamin C Sustained Release 1000 mg
  - Shaklee Vitamin C Sustained Release 500 mg x2

Tx for Clenchers: Vitamin C at dinner, possible add Mg++ at 8pm , D-PAS



Blake DR, Merry P, Unsworth J, Kidd BL, Outhwaite JM, Ballard R, Morris CJ, Gray L, Lunec J. Hypoxic-reperfusion injury in the inflamed human joint. Lancet. 1989 Feb 11;1(8633):289-93.

McAlindon TE, Jacques P, Zhang Y, Hannan MT, Do antioxidant micronutrients protect against the development and progression of knee osteoarthritis?, Arthritis Rheum. 1996 Apr;39(4):648-56.

Magnesium Nutritional Supplementation

Magnesium is the “Muscle Relaxation” mineral- used in ER and Obstetrics
Magnesium deficiency may increase clenching
Most Magnesium is intracellular so blood test may not detect deficiency

Supplemental Magnesium
Take 2h before bed (8pm).
Too much will cause Diarrhea. Right amount will loosen stools.
Need to be sure kidneys are healthy

Natural Calm Magnesium Citrate- 1 teaspoon (162mg)
Mother Earth Ionic Angstrom Magnesium- 0.5 teaspoon sublingual (5mg)

www.naturalvitality.com

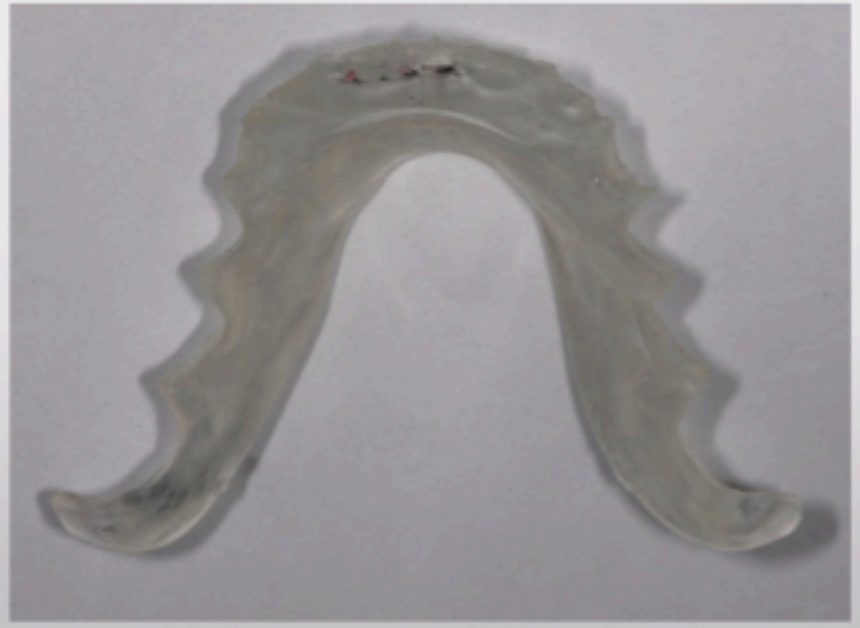
www.meminerals.com

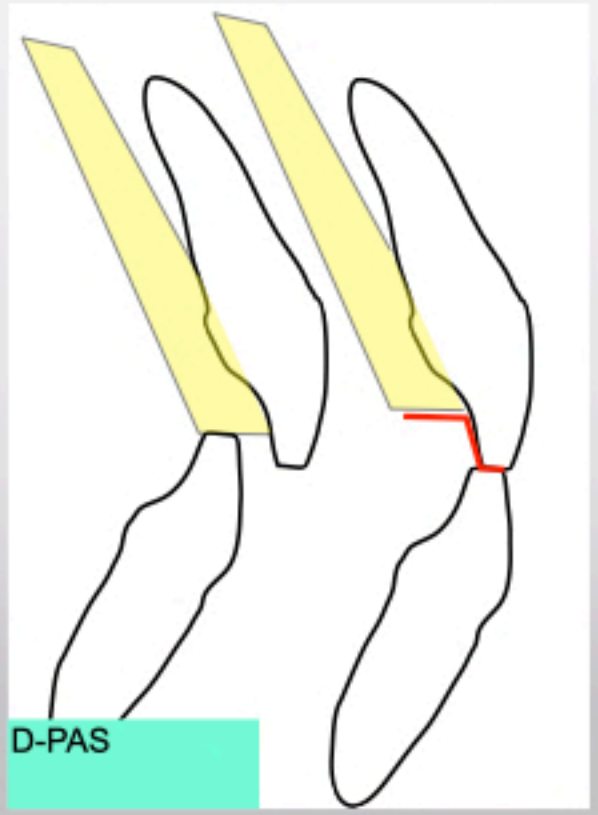
Muscle Nerve. 2014 Apr 8. doi: 10.1002/mus.24260. Extracellular magnesium and calcium reduce myotonia in isolated ClC-1 inhibited human muscle. Skov M1, de Paoli FV, Lausten J, Nielsen OB.

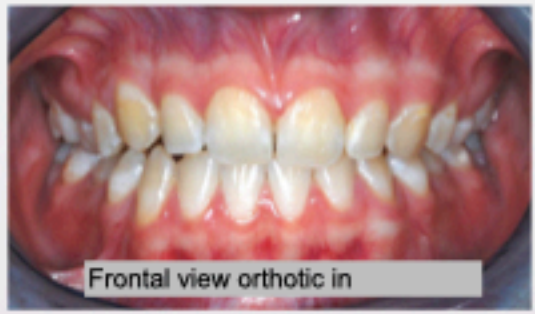
Gynecol Endocrinol. 2007 Jul;23(7):368-72. Magnesium ion inhibits spontaneous and induced contractions of isolated uterine muscle. Tica VI1, Tica AA, Carlig V, Banica OS.

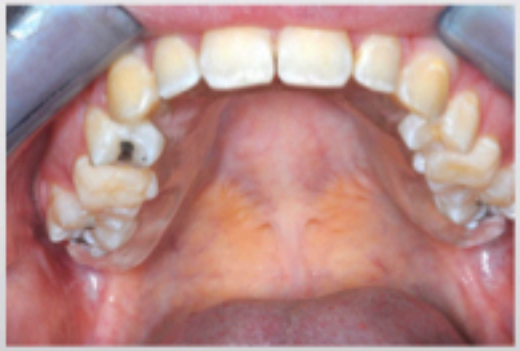
Studies on magnesium deficiency in animals: i. symptomatology resulting from magnesium deprivation. H. D. Kruse, Elsa R. Orent and E. V. McCollum. J. Biol. Chem. 1932, 96:519-539.

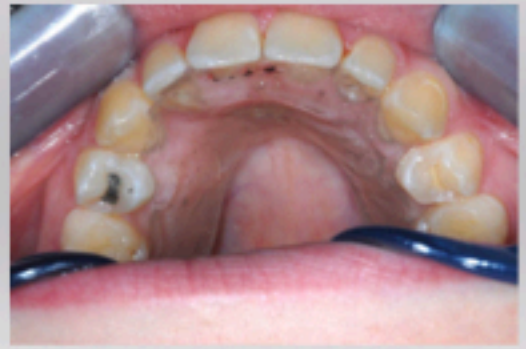
Diagnostic Palatal Anterior Stop
D-PAS











Basically an upper Hawley with anterior stop without clasps or wire

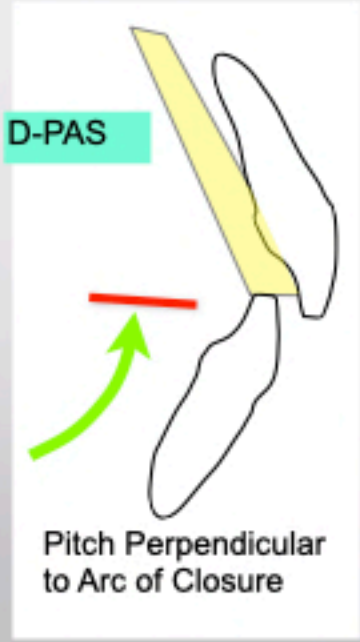
Diagnostic Palatal Anterior Stop

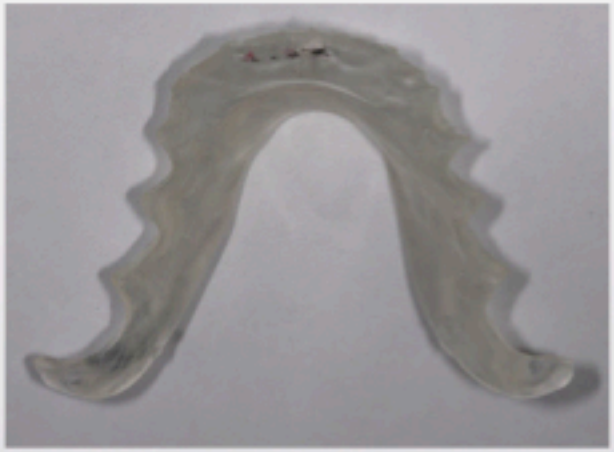
D-PAS Test: Wear 2 weeks for sleep, and occasional daytime

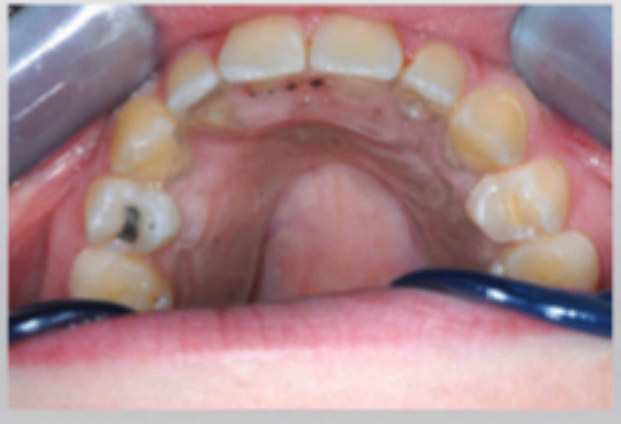
Better- Decrease in Symptoms
- Sleep Clenching Inhibited: Wear D-PAS as night guard
- Orthotic Improved Airway: D-PAS as night guard
- Occlusal Muscle Disharmony: Occlusal Adjust

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





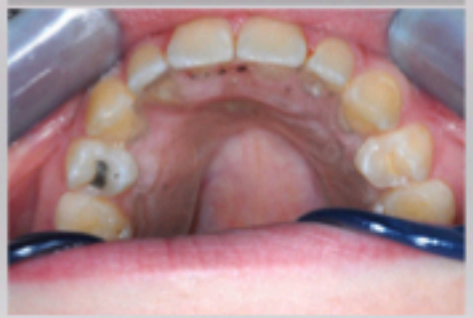


Stapelmann H, Türp JC. The NTI-tss device for the therapy of bruxism, temporomandibular disorders, and headache…..BMC Oral Health. 2008 Jul PMID: 18662411

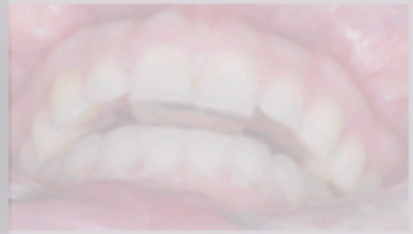
Which Orthotic to use:

Sleep Clenching with anterior inhibition

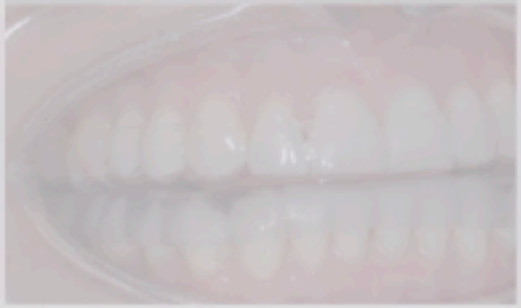
D-PAS
Diagnostic-
Palatal Anterior Stop



Brux-PAS
with lower Essix



Hard Lower Posterior Stop
with upper essix



Hard Lower Full Coverage
Centric Relation Orthotic

Parafunctional Clenching

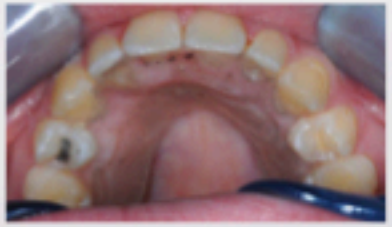
Signs

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

Diagnostic Tests

EMG M-scan
- Determine if muscle inhibition

D-PAS for sleep



Adhesive Click- "Sticky Disc"

Symptoms

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

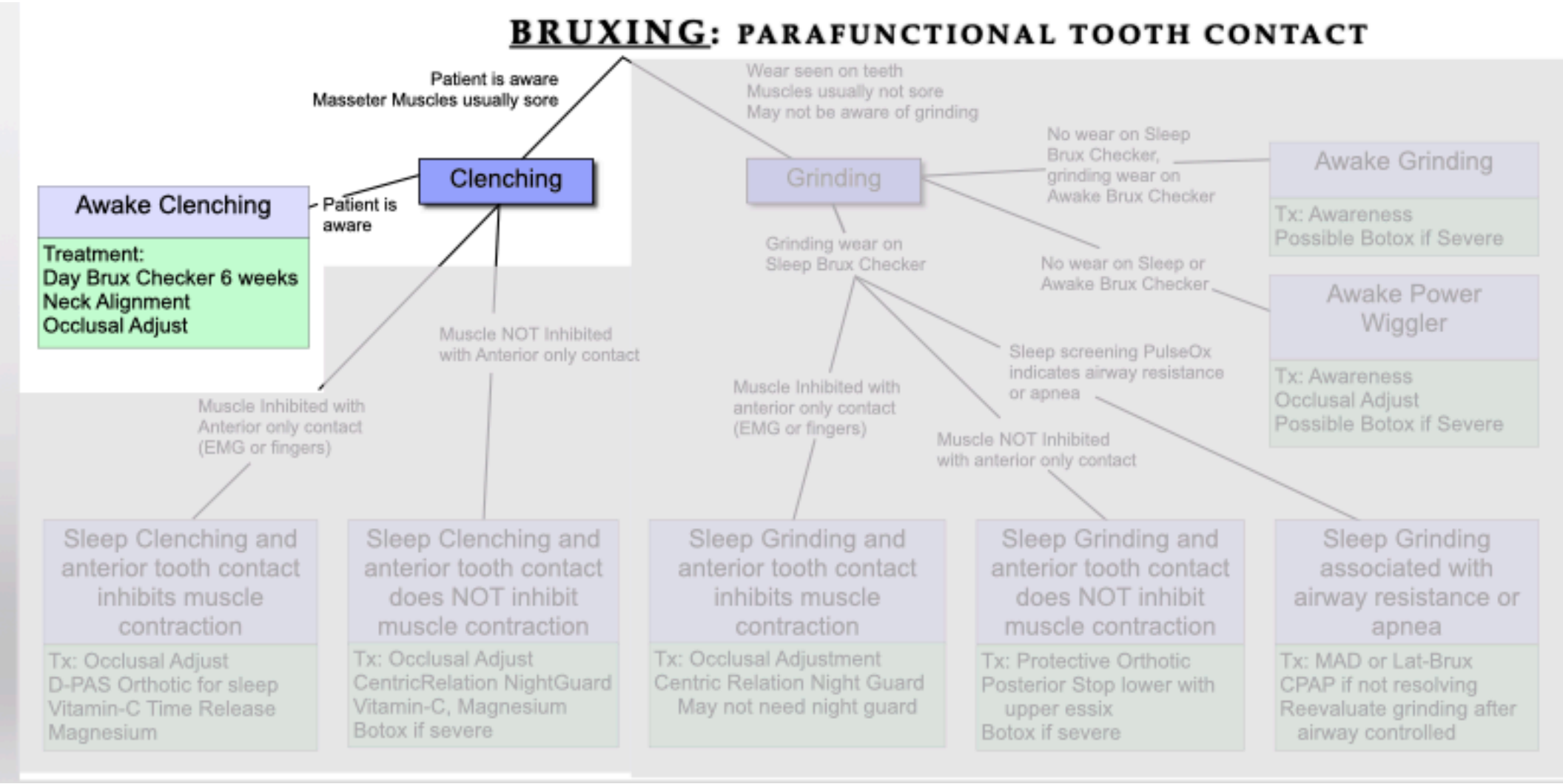
Causes

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

Treatments

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

BRUXING: PARAFUNCTIONAL TOOTH CONTACT

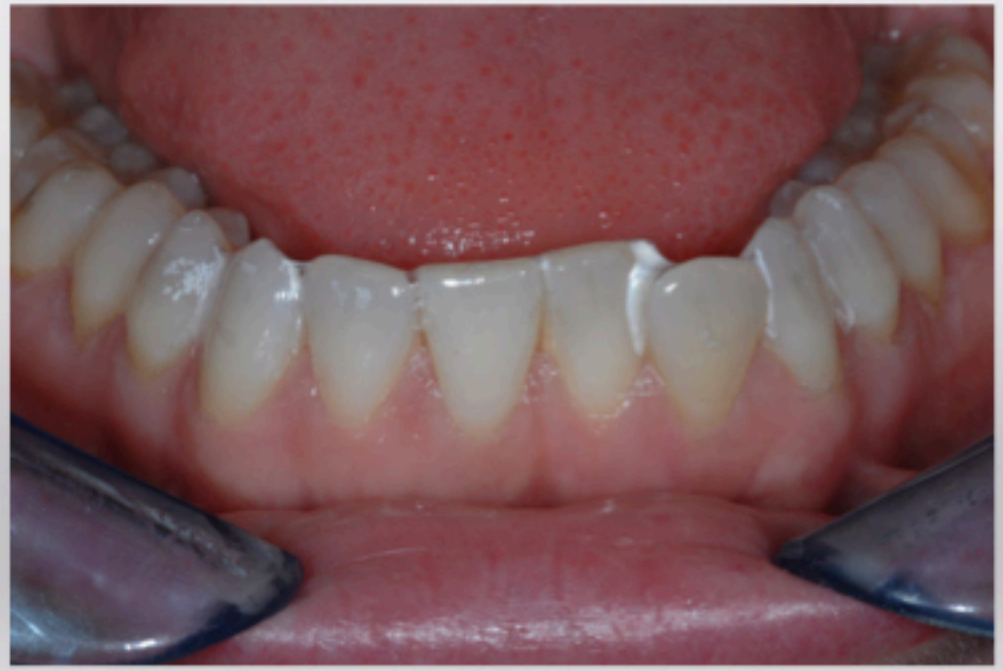


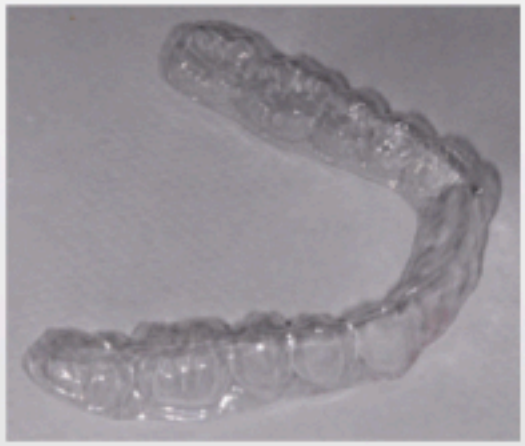
Daytime Clenching- Clear Brux Checker

Increases awareness to break habit

Very thin: Similar to mylar used for composites

50 µm thick





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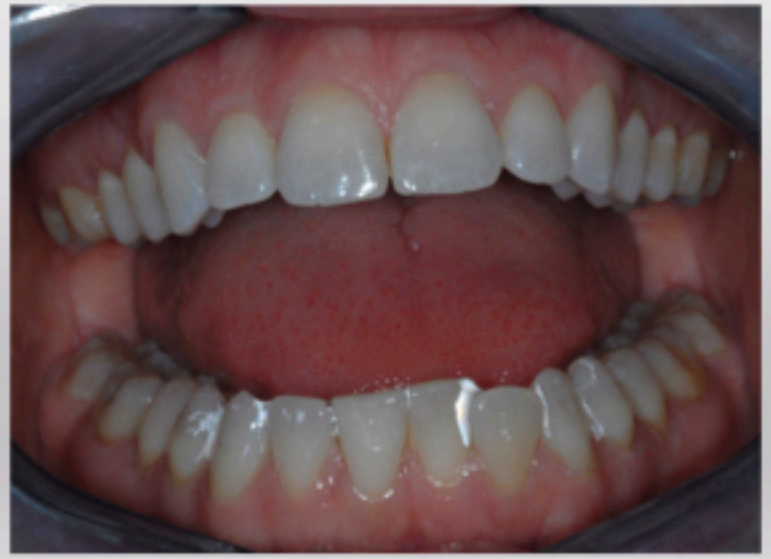
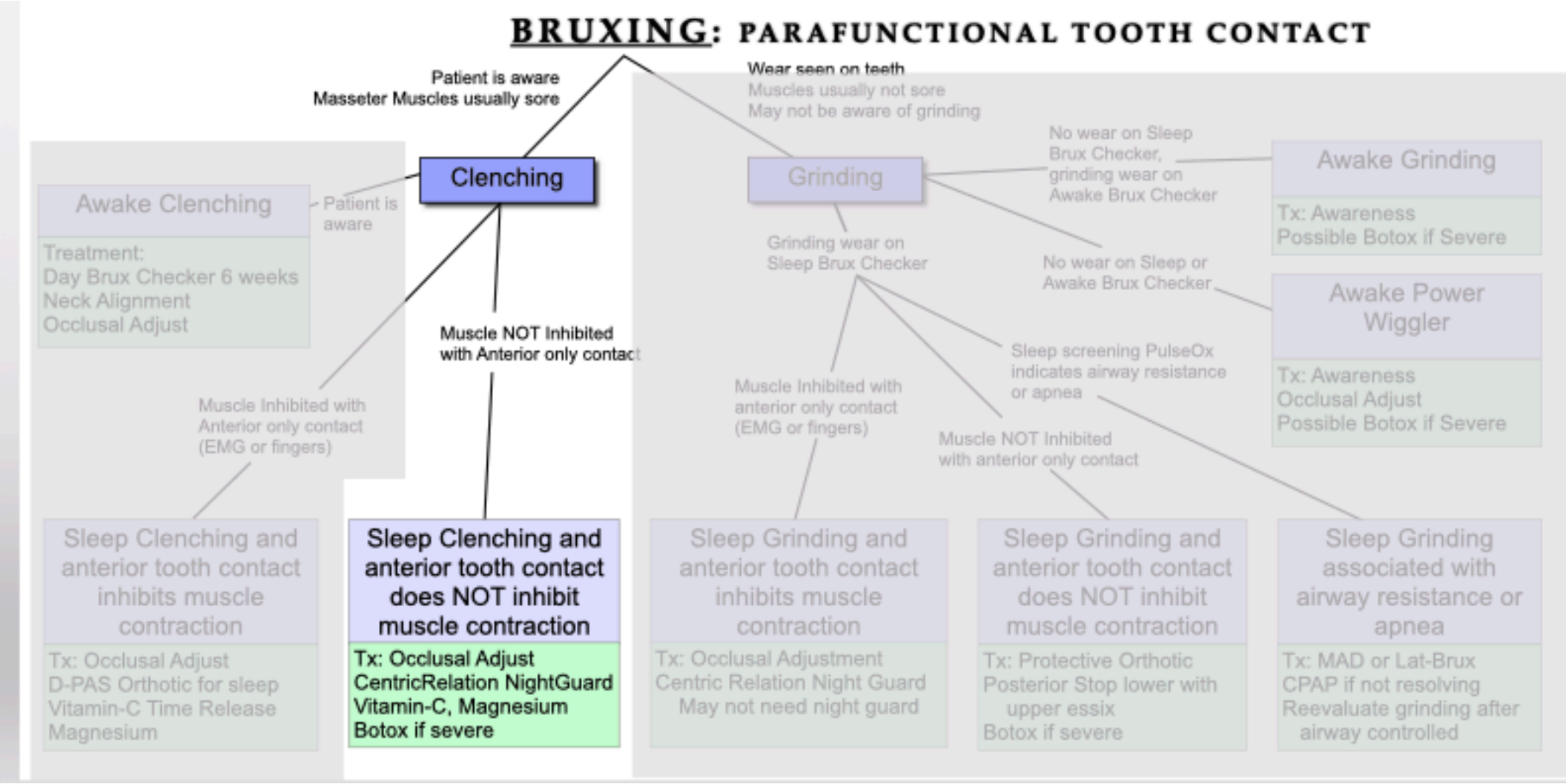
(865) 509-4509
connect@livingtreelab.com

Material from:
Great Lakes Orthodontics
Platzhalterfolie by Scheu
Scheu Ref # 3202.1



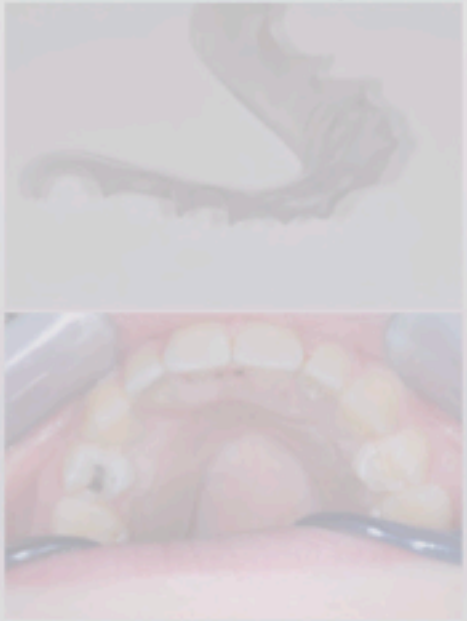
BRUXING: PARAFUNCTIONAL TOOTH CONTACT



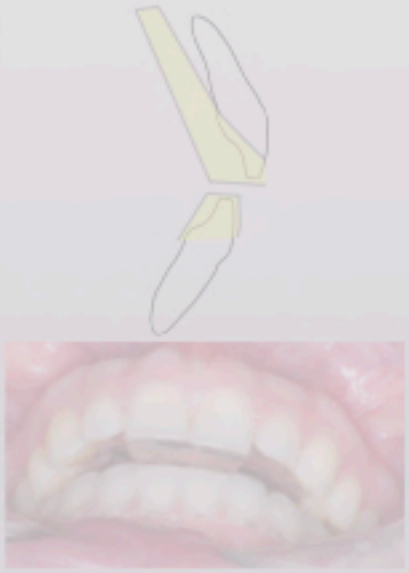
Which Orthotic to use:

Sleep Clenching with NO anterior inhibition

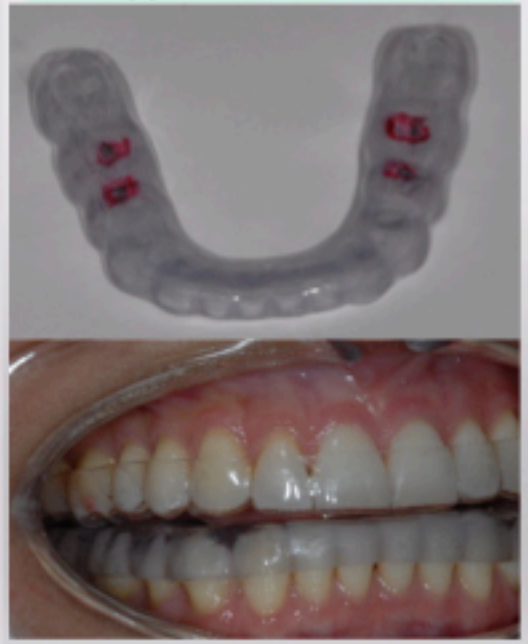
D-PAS
Diagnostic-
Palatal Anterior Stop



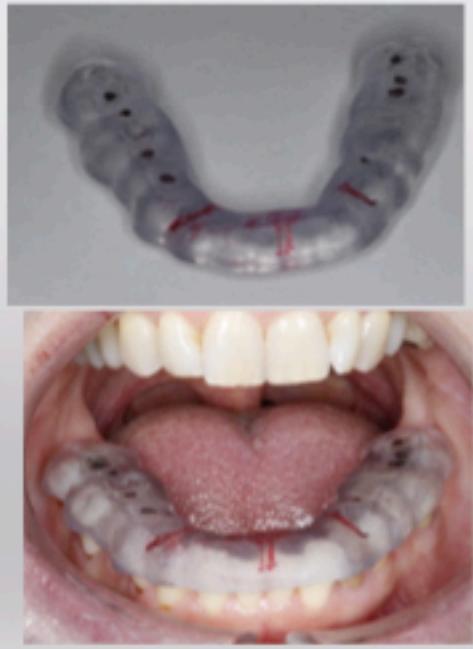
Brux-PAS
with lower Essix



Hard Lower Posterior Stop
with upper essix



Hard Lower Full Coverage
Centric Relation Orthotic



Medications that affect Parafunction

Botox will decrease strength of bruxing contraction Decrease Masseter Hypertrophy

Botox injection
Masseter Muscles

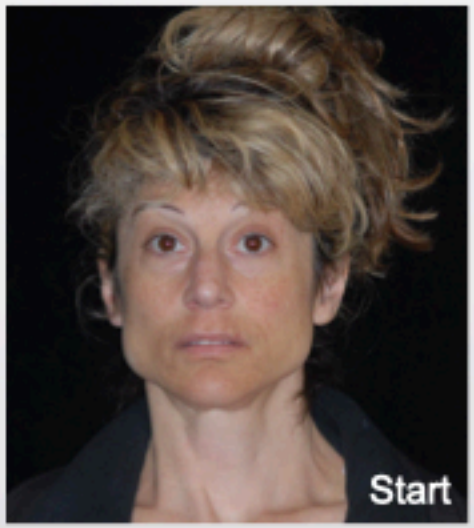
Need to address cervical and occlusal issues along with Botox therapy

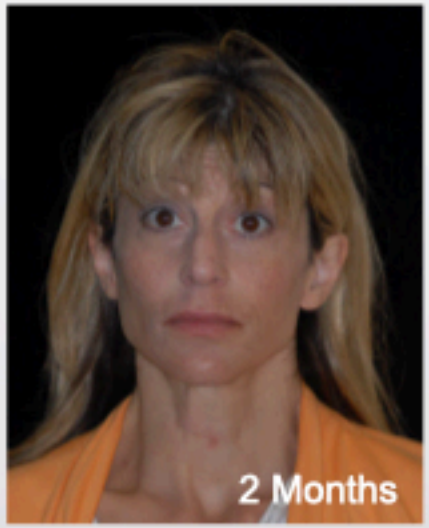
6 months

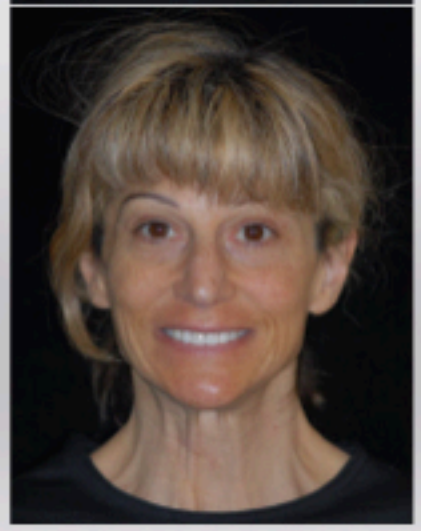
J Plast Reconstr Aesthet Surg. 2010 Dec;63(12):2026-31. Evaluation and selecting indications for the treatment of improving facial morphology by masseteric injection of botulinum toxin type A. Gaofeng L1, Jun T, Bo P, Bosheng Z, Qian Z, Dongping L.

Medications that affect Bruxing

Botox injection
Masseter
Muscles



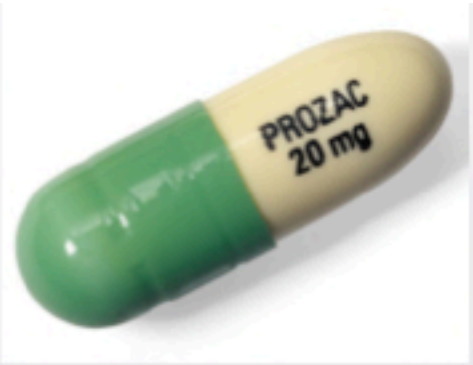


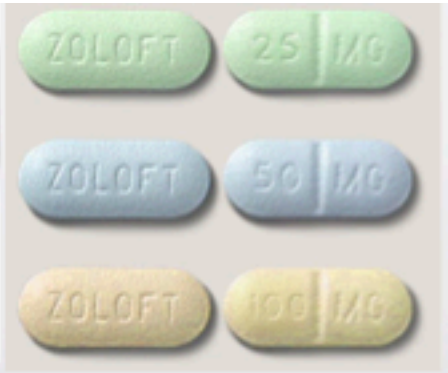


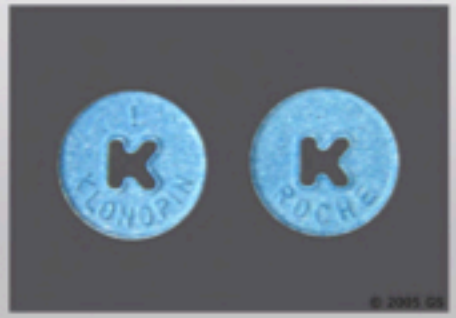
Medications that affect Bruxing

Selective Serotonin Reuptake Inhibitors
- SSRI that increase bruxing: Prozac, Zoloft
- SSRI neutral on bruxing: Cymbalta, Wellbutrin

Klonopin/Clonazepam (benzodiazepine)
- May decrease sleep bruxing
- Addiction potential, causes low BP
- Not a long term solution

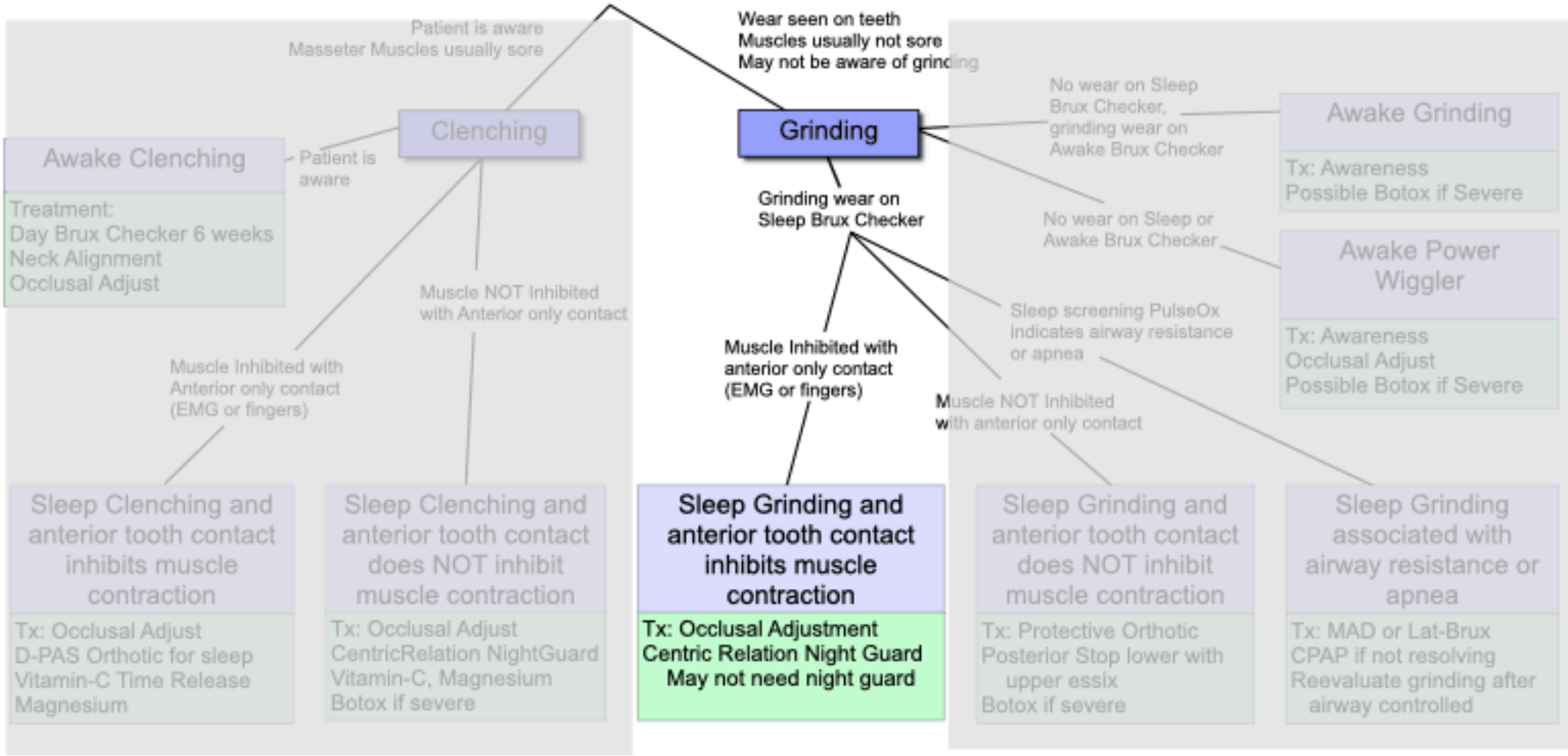






Maria Clotilde Carra DMD, Nelly Huynh PhD, and Gilles Lavigne DMD PhD FRDC
Sleep Bruxism: A Comprehensive Overview for the Dental Clinician Interested in Sleep Medicine.
Dental Clinics of NA, 56(2), 387–413. doi:10.1016/j.cden.2012.01.003

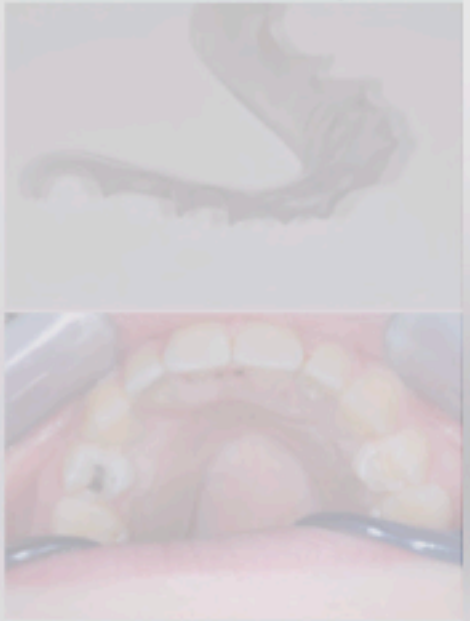
BRUXING: PARAFUNCTIONAL TOOTH CONTACT



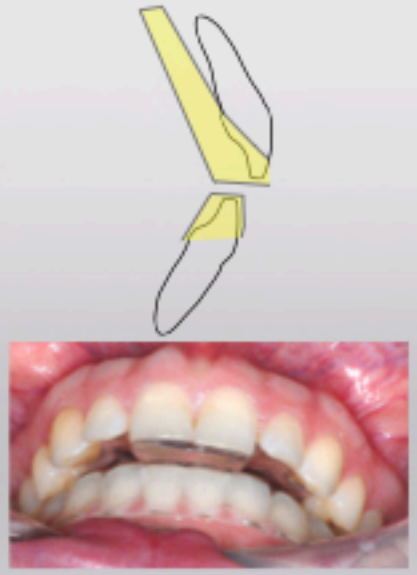
Which Orthotic to use:

Sleep Grinding with anterior inhibition

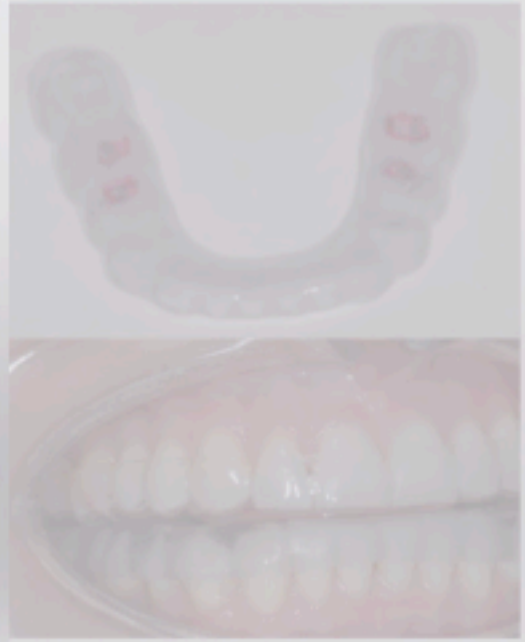
D-PAS
Diagnostic-
Palatal Anterior Stop



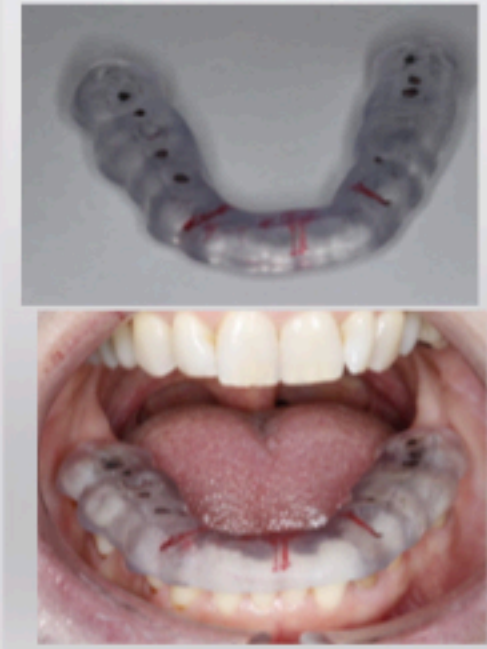
Brux-PAS
with lower Essix

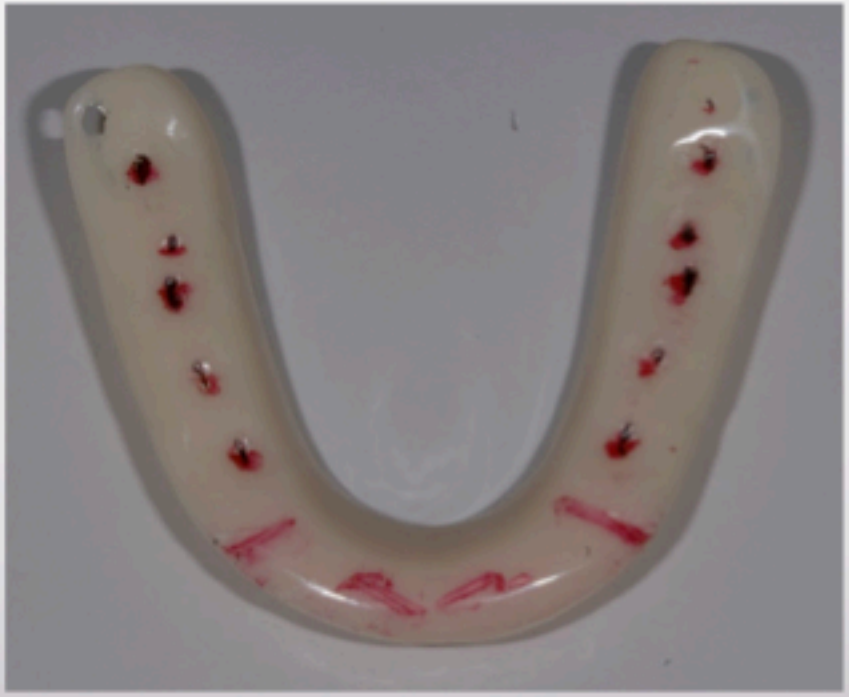


Hard Lower Posterior Stop
with upper essix

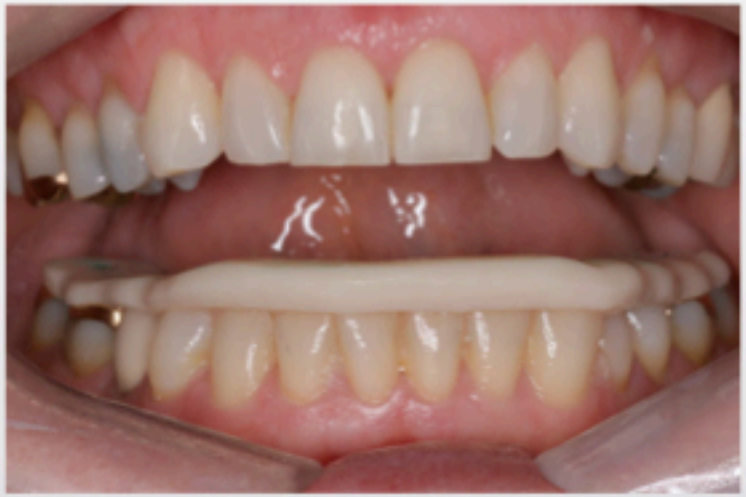


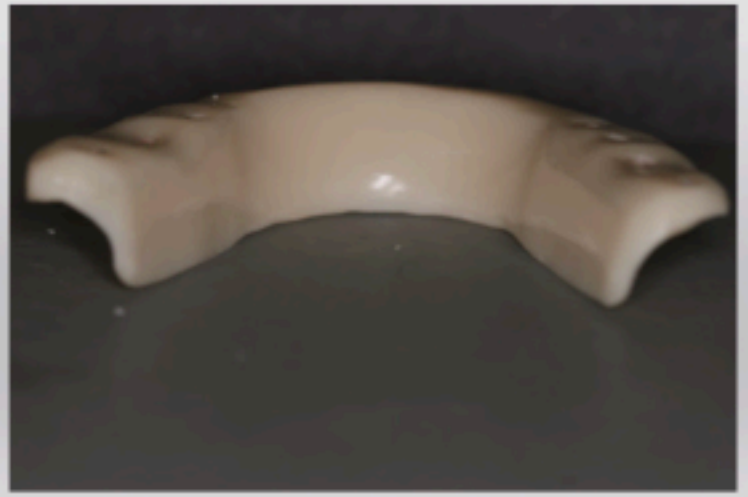
Hard Lower Full Coverage
Centric Relation Orthotic





Anatomic Orthotic by Dr. Buzz Raymond





Pankey Study Clubs
Tanner Study Clubs

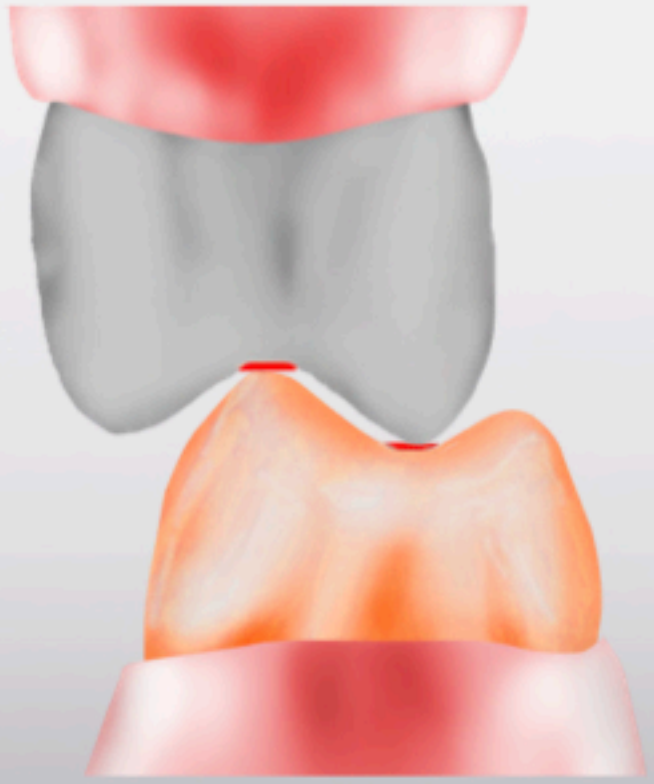
LD Pankey's 3 Rules of Occlusion

(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.

Bonus Rule- Harmonious Anterior Guidance. Cuspid guidance directs the mandible slightly forward, not backward, with smooth cross over from cuspid to anterior teeth. Protrusive contact even on both central incisors.

Bonus Observation- All the above work much better the closer the teeth are to being on the Curve of Spee and Curve of Wilson



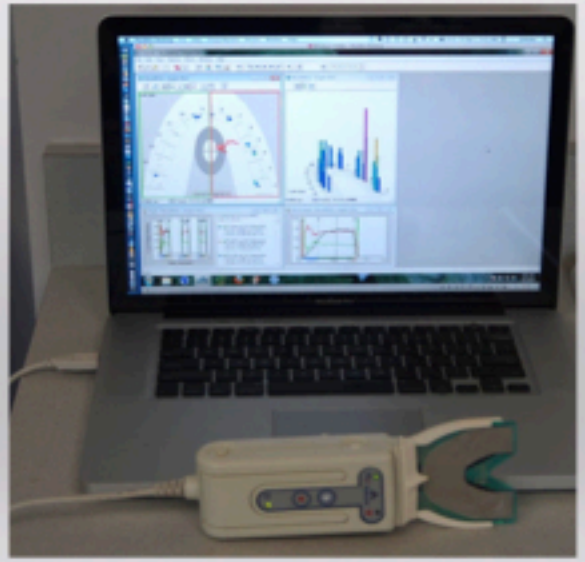
Drawing by Dr Jim Kessler

Why LD Never wrote a text book

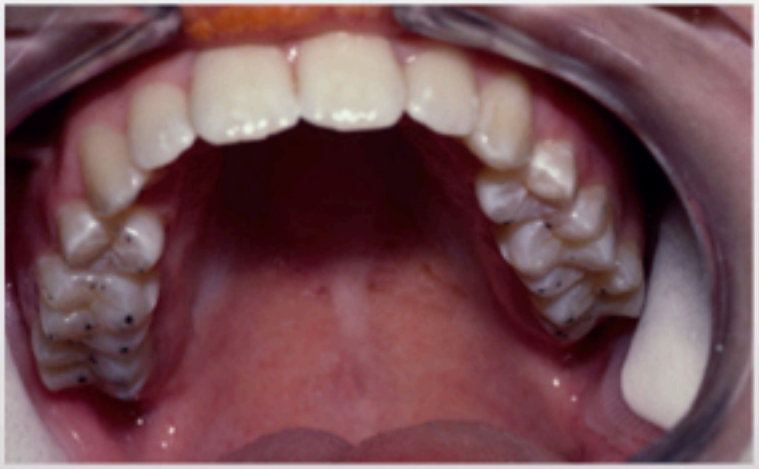
Slide by Dr John R Droter

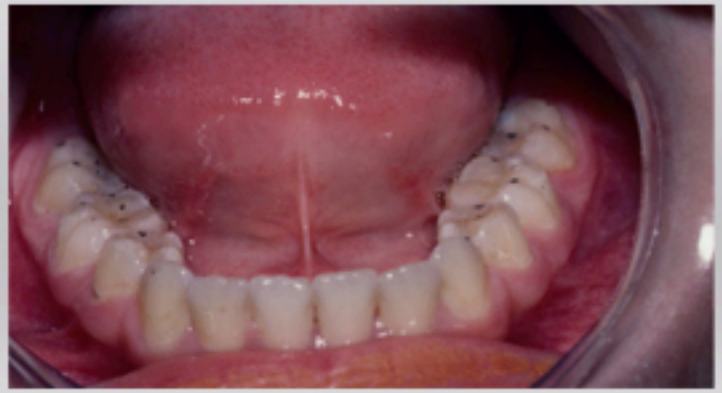
The best orthotic may be no orthotic with teeth adjusted to a disclusion time of less than 400 mSec with T-Scan

Teeth reshaped so all teeth hit even with condyles seated in fossa. Posterior teeth separate on lateral and anterior excursions.

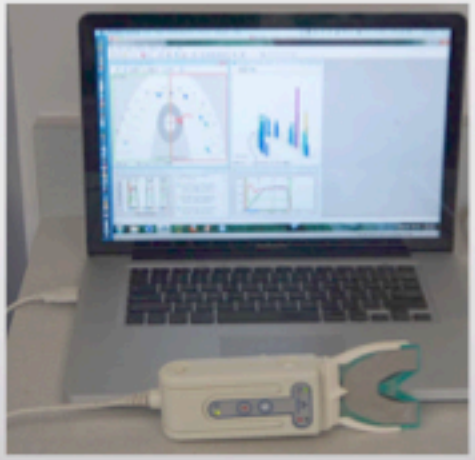


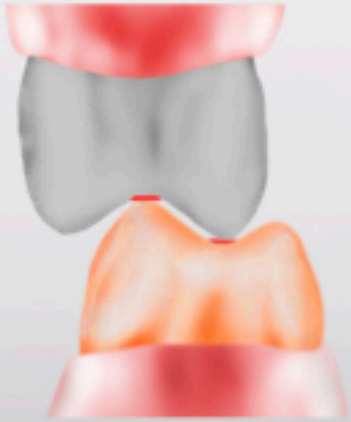
Reshape teeth

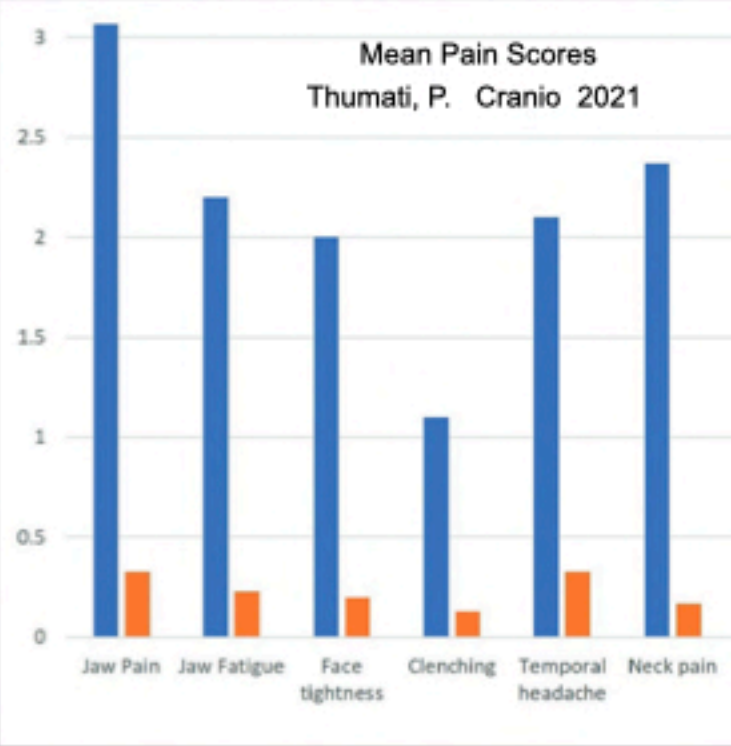




The best orthotic may be no orthotic with teeth adjusted to a disclusion time of less than 400 mSec with T-Scan





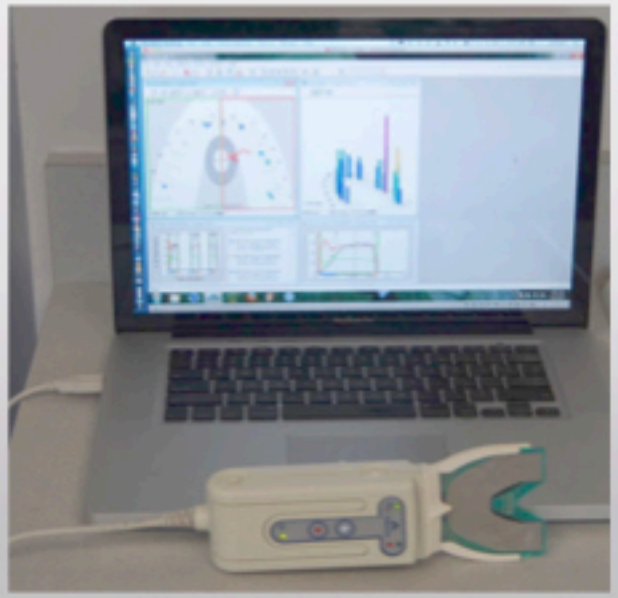


Kerstein, RB. Cranio 1995
Treatment of myofascial pain dysfunction syndrome with occlusal therapy to reduce lengthy disclusion time—a recall evaluation.

Thumati ,P. J Indian Prosthodont 2016
The effect of disocclusion time-reduction therapy to treat chronic myofascial pain: A single group interventional study with 3 year follow-up of 100 cases.

Thumati, P. Cranio 2021
A retrospective five-year survey on the treatment outcome of disclusion time reduction (DTR) therapy in treating temporomandibular dysfunction patients.

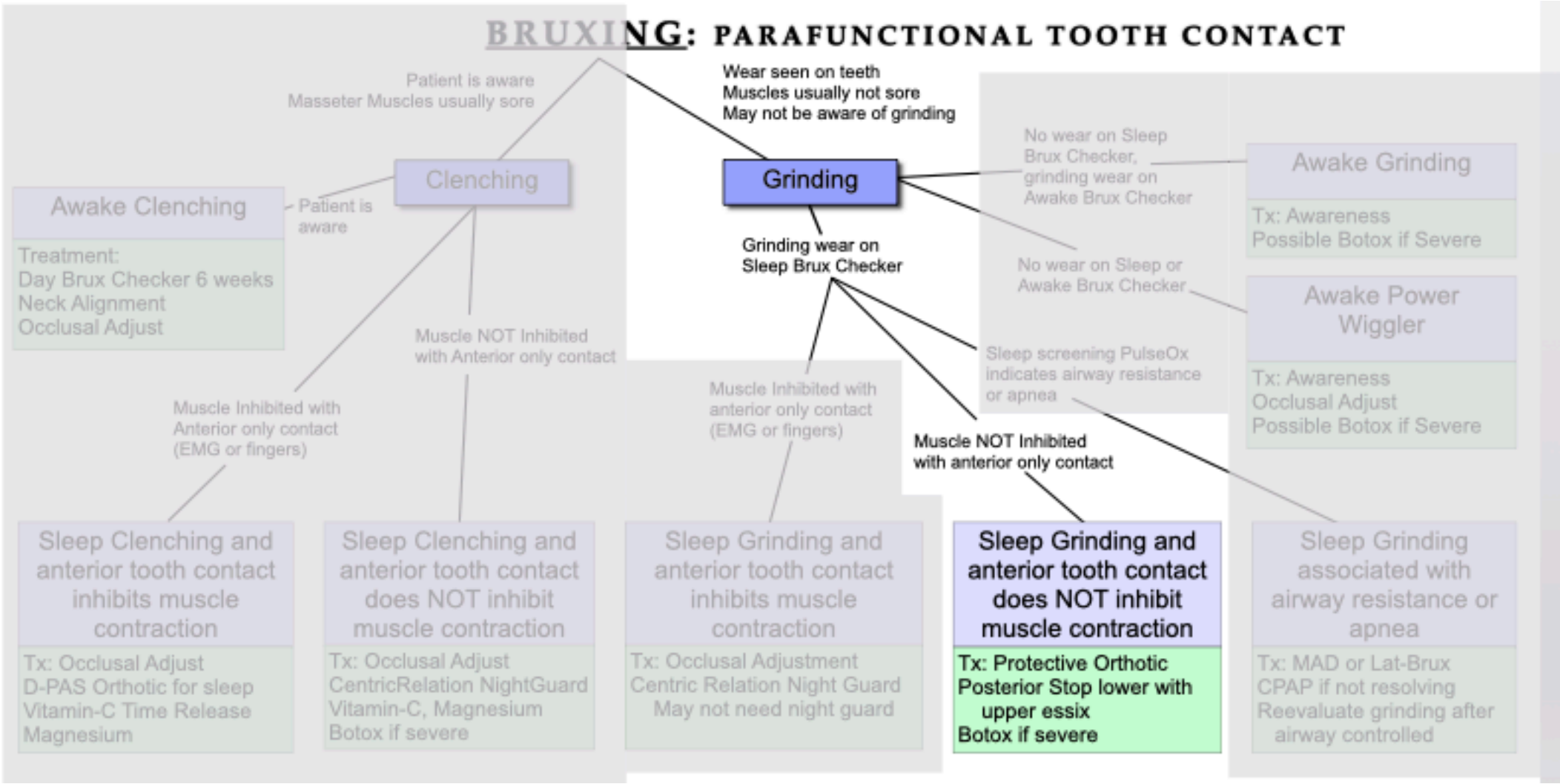
The best orthotic may be no orthotic with teeth adjusted to a disclusion time of less than 400 mSec with T-Scan



	Pre-treatment	1 Week post	12 months post
Aware of nighttime tooth grinding	88	21	11
Morning facial muscle soreness	89	2	0
Morning headache	94	23	3
Afternoon or evening headache	55	1	0
Teeth sensitive to cold	74	0	0
Daytime tooth clenching or grinding	48	9	1
Masseter muscle hypertrophy	49	15	15
Muscles tender to palpation	44	1	1
Wear facets	46	46	46
Indentations on the tongue	45	10	0
Linear Alba on inner cheek	15	4	0

Thumati, Kerstein, Radke. Advanced Dental Technologies & Techniques. December 2021
Bruxism Improvements After Disclusion Time Reduction (DTR) – A Pilot Study.

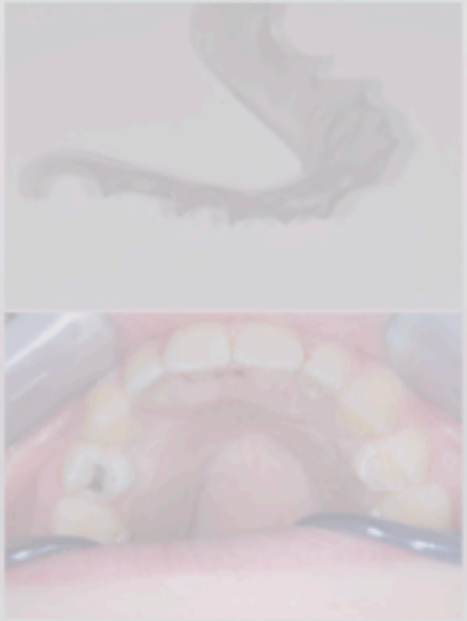
BRUXING: PARAFUNCTIONAL TOOTH CONTACT



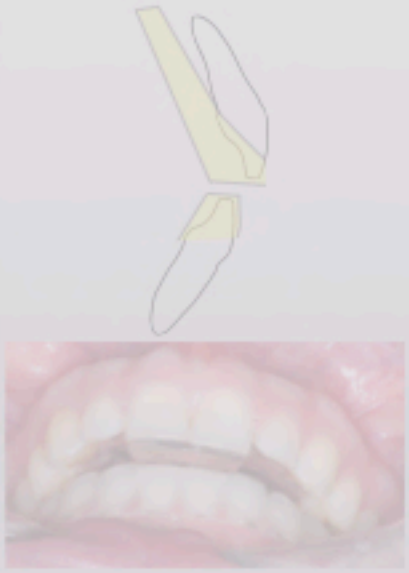
Which Orthotic to use:

Sleep Grinding with NO anterior inhibition

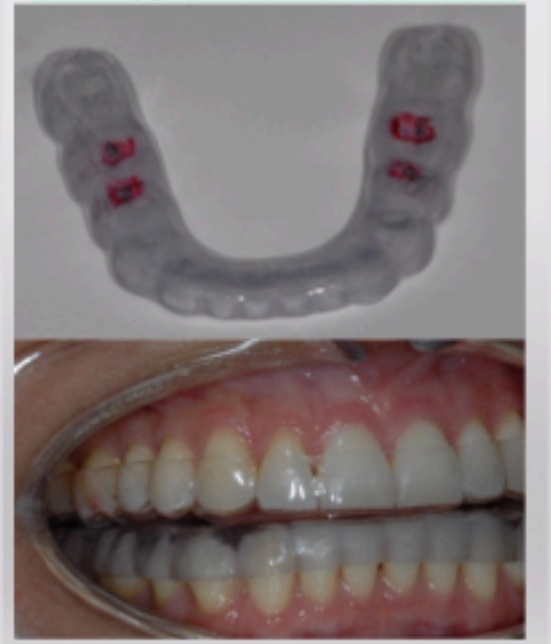
D-PAS
Diagnostic-
Palatal Anterior Stop



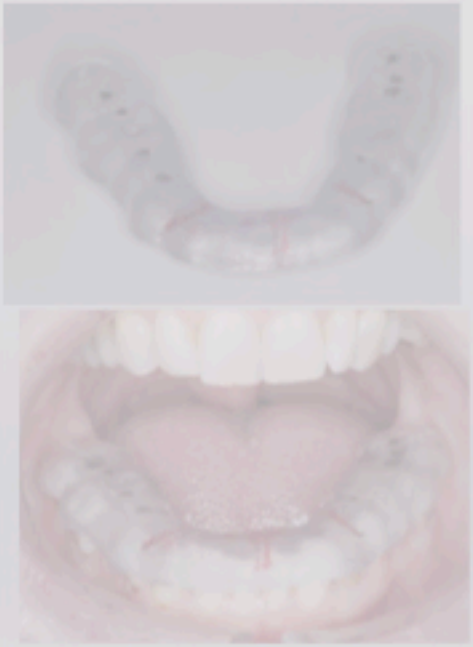
Brux-PAS
with lower Essix



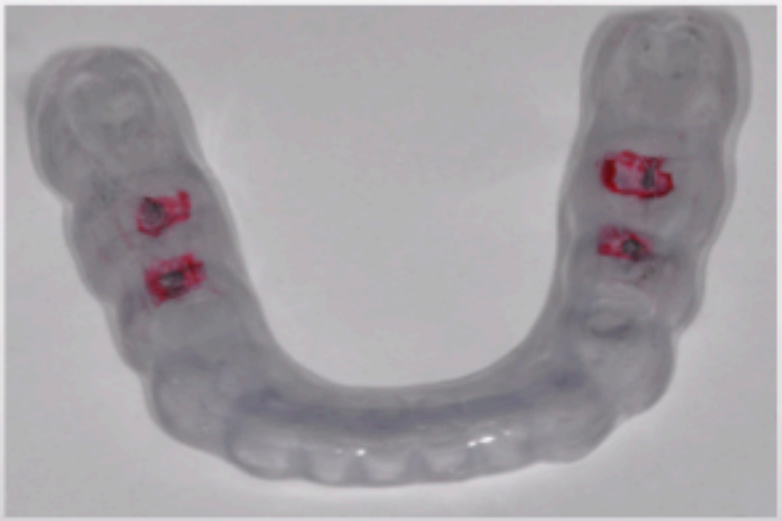
Hard Lower Posterior Stop
with upper essix

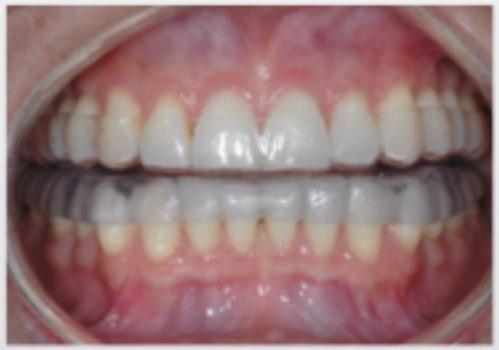


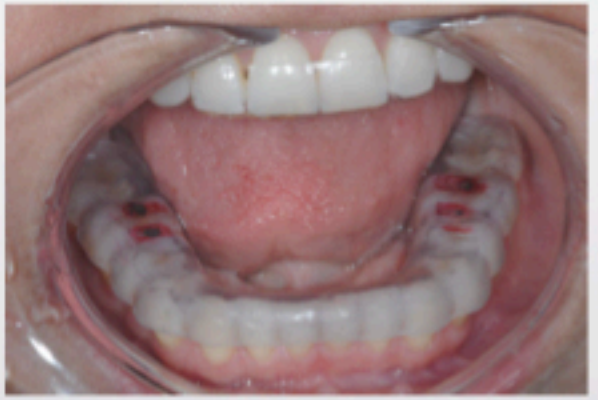
Hard Lower Full Coverage
Centric Relation Orthotic

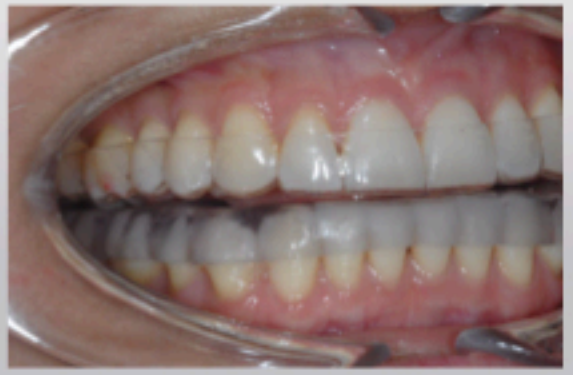


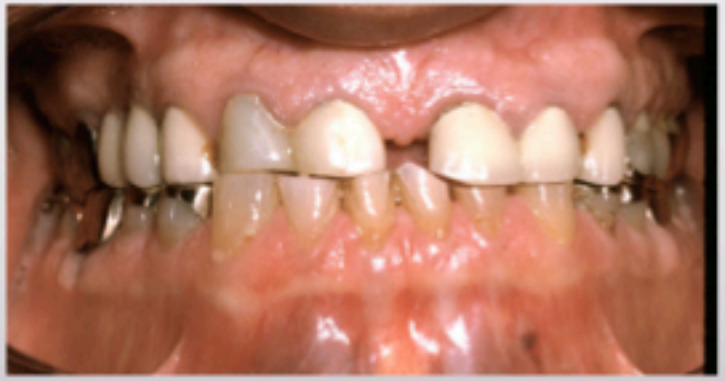
Lower Posterior Stop Night guard with upper Essix

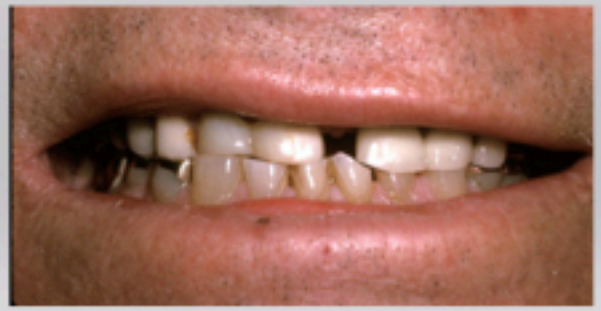








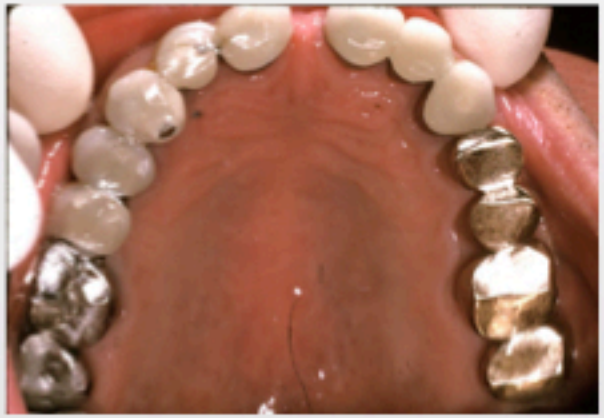


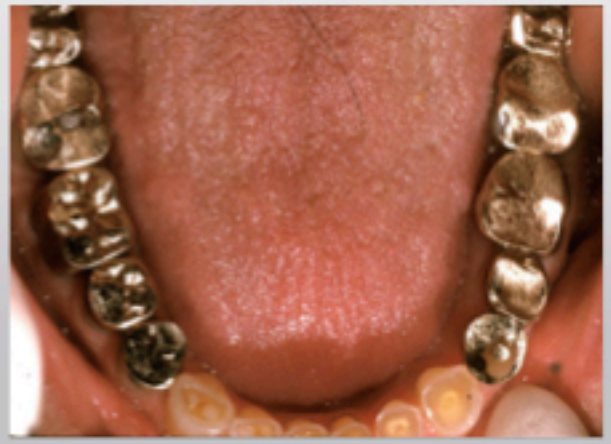


Side to Side Severe Grinding

Sleep Disorder
?Airway Related?

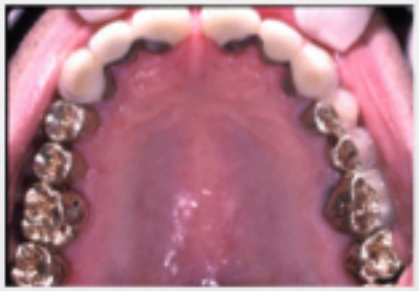
How to Restore??

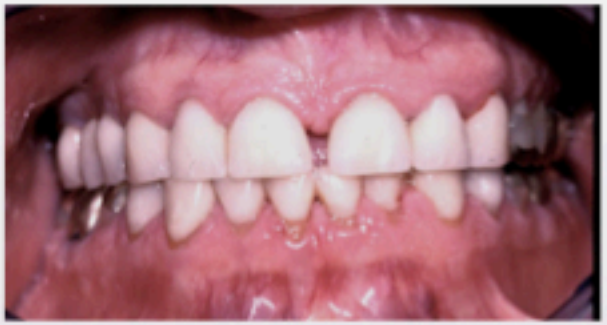


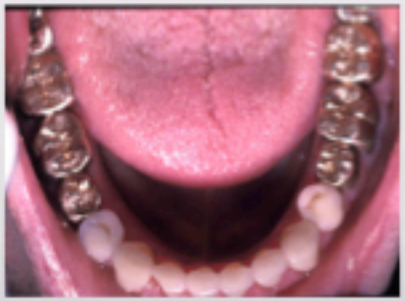


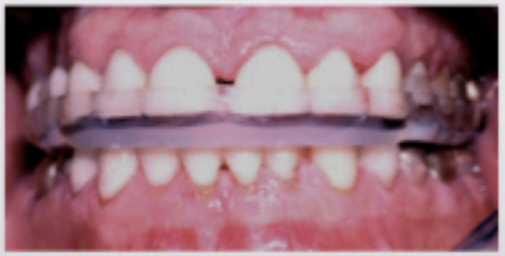
Lavigne GJ, Khoury S, Abe S, Yamaguchi T, Raphael K., Bruxism physiology and pathology: an overview for clinicians. J Oral Rehabil. 2008 Jul;35(7):476-94

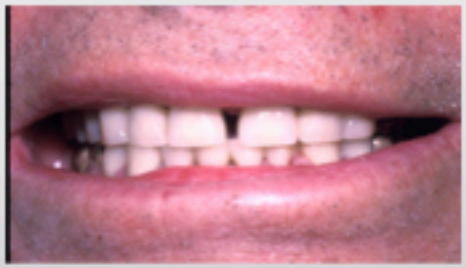
Delivery

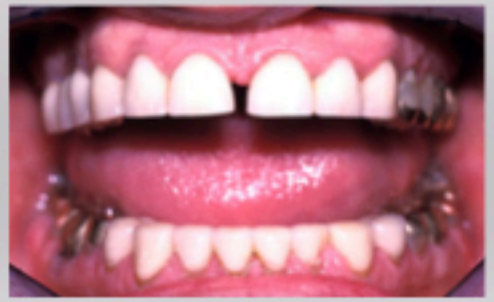


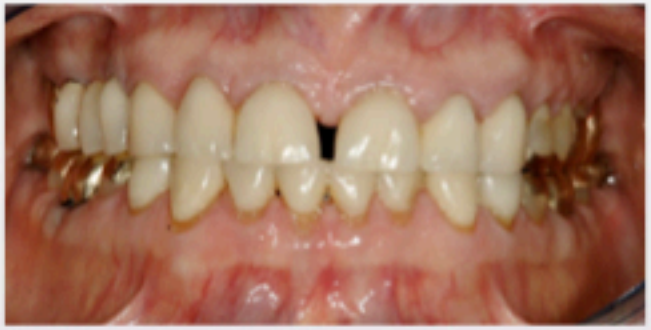


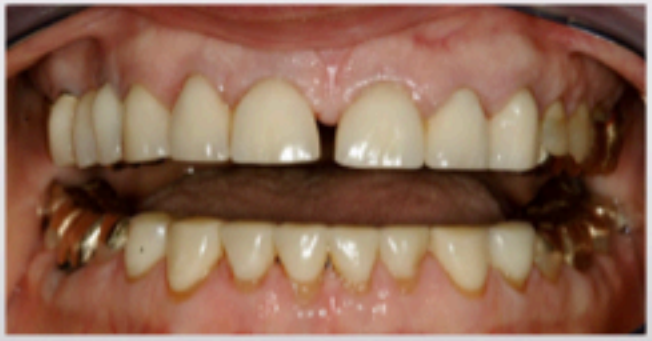




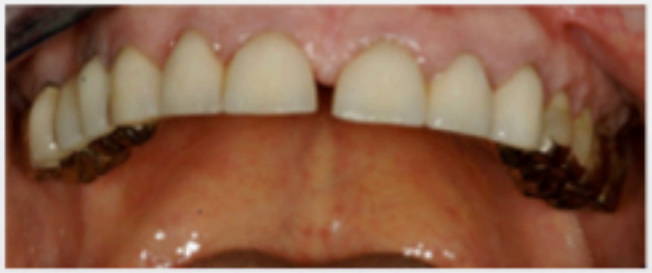




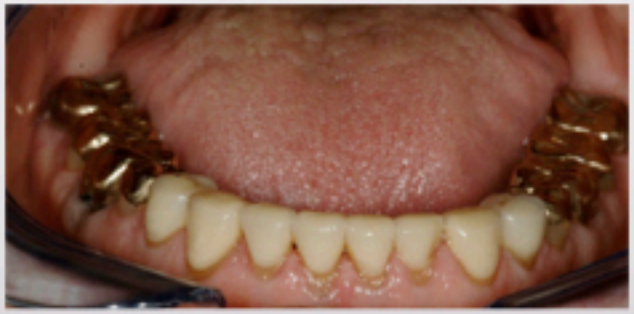


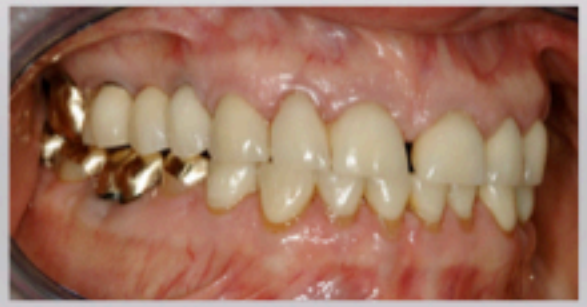


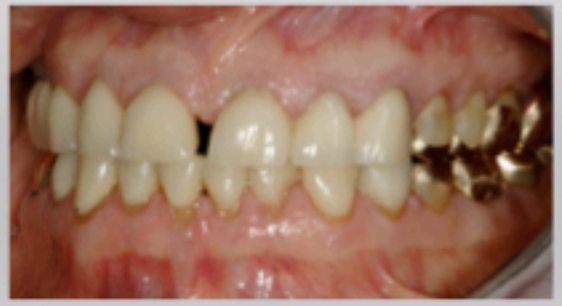
5 years post tx



Key Point:
Build in group function
Side to Side Grinders.





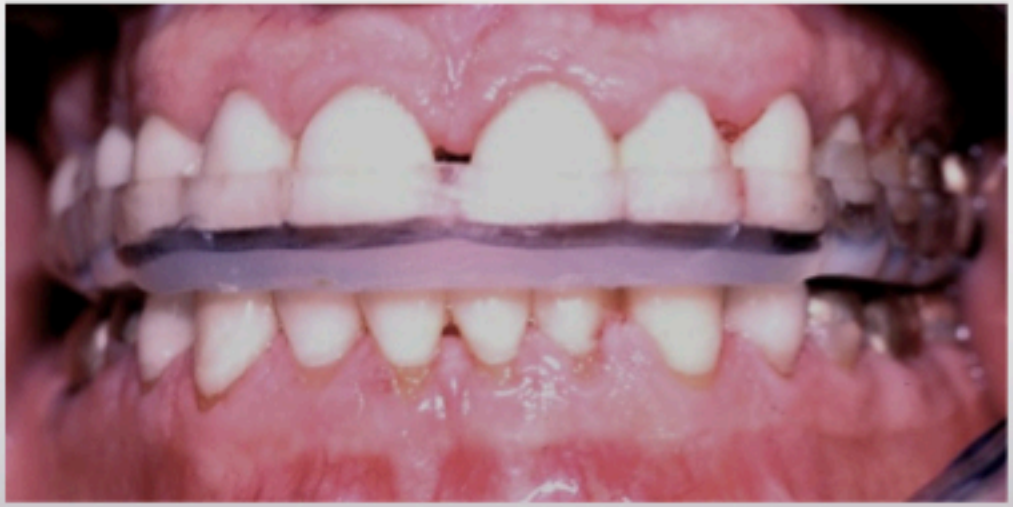


Kids 25-35% Grind

Serra-Negra JM, Paiva SM, Seabra AP, Dorella C, Lemos BF, Pordeus IA., Prevalence of sleep bruxism in a group of Brazilian schoolchildren. Eur Arch Paediatr Dent. 2010 Aug;11(4):192-5.

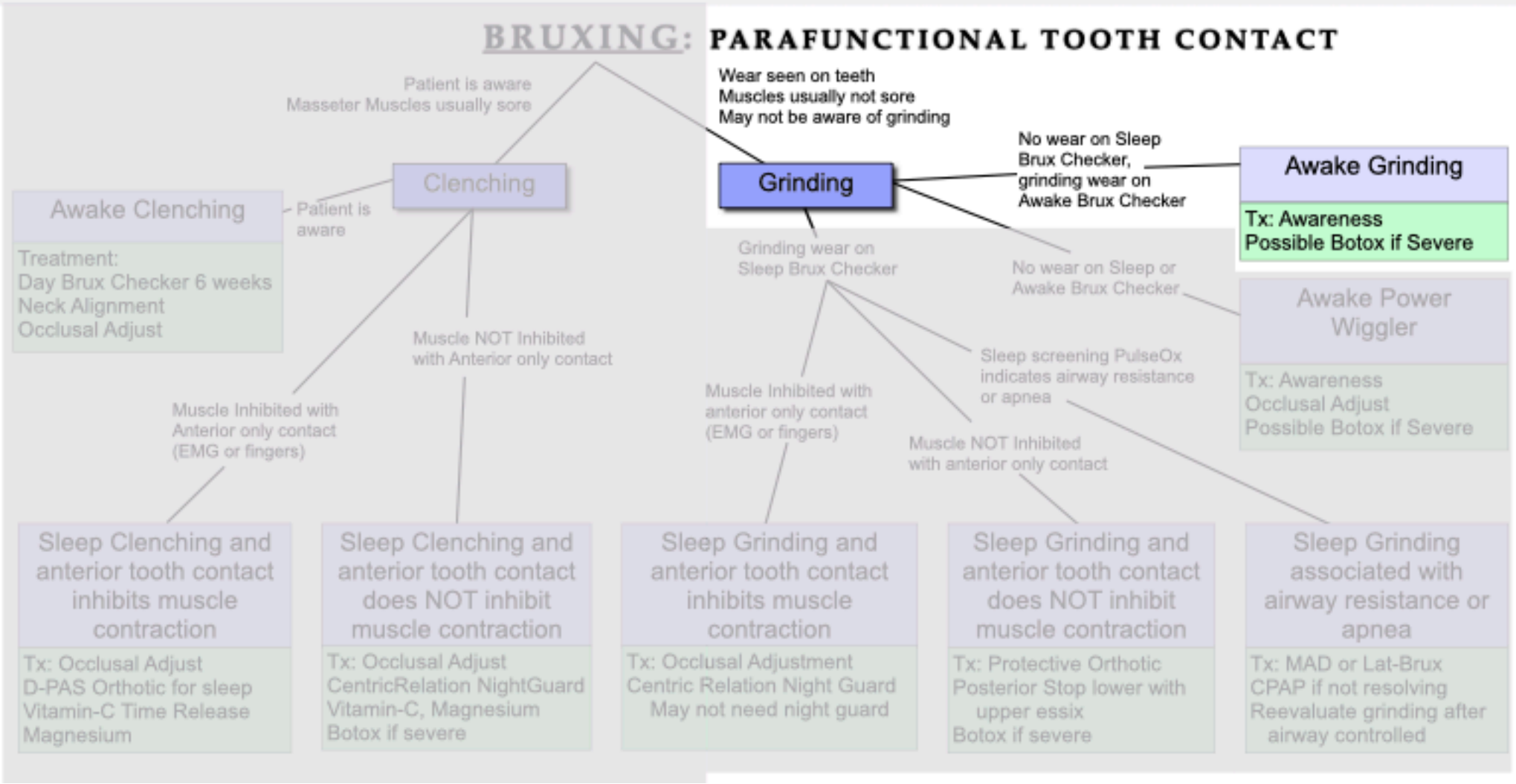
Which Orthotic to use:

Severe Severe Power

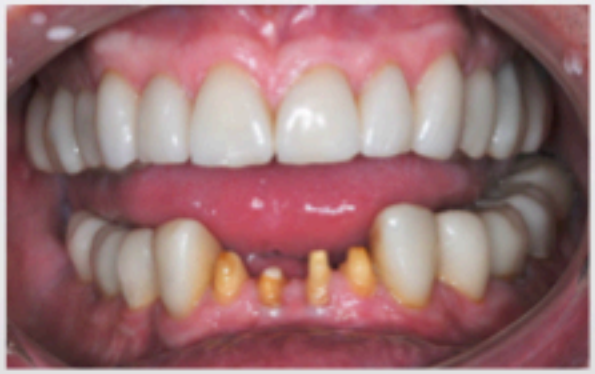


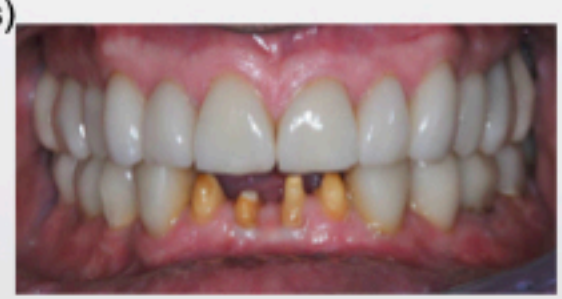
Upper Hard Flat Plane

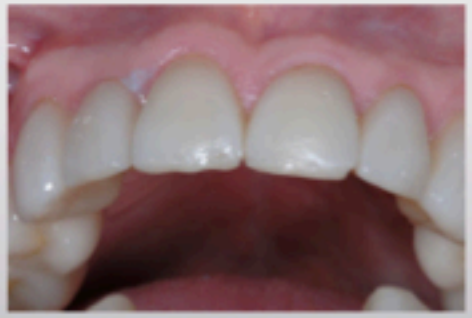
+ Botox every 7 months

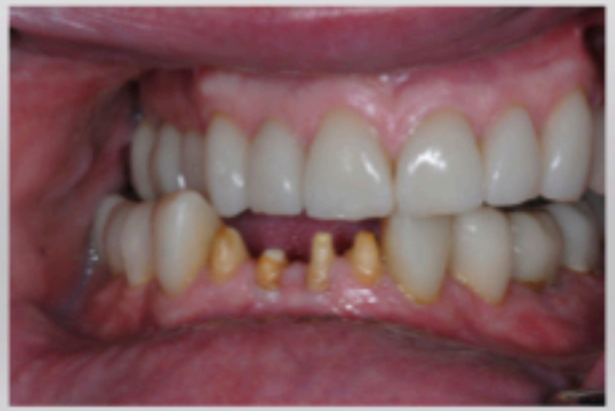

BRUXING: PARAFUNCTIONAL TOOTH CONTACT
Patient is aware
Masseter Muscles usually sore
Clenching
Patient is aware
Awake Clenching
Treatment:
Day Brux Checker 6 weeks
Neck Alignment
Occlusal Adjust
Muscle Inhibited with Anterior only contact (EMG or fingers)
Muscle NOT Inhibited with Anterior only contact
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
CentricRelation NightGuard
Vitamin-C, Magnesium
Botox if severe
Wear seen on teeth
Muscles usually not sore
May not be aware of grinding
Grinding
No wear on Sleep Brux Checker, grinding wear on Awake Brux Checker
Awake Grinding
Tx: Awareness
Possible Botox if Severe
Grinding wear on Sleep Brux Checker
No wear on Sleep or Awake Brux Checker
Awake Power Wiggler
Tx: Awareness
Occlusal Adjust
Possible Botox if Severe
Sleep screening PulseOx indicates airway resistance or apnea
Muscle Inhibited with anterior only contact (EMG or fingers)
Muscle NOT Inhibited with anterior only contact
Sleep Grinding and anterior tooth contact inhibits muscle contraction
Tx: Occlusal Adjustment
Centric Relation Night Guard
May not need night guard
Sleep Grinding and anterior tooth contact does NOT inhibit muscle contraction
Tx: Protective Orthotic
Posterior Stop lower with upper essix
Botox if severe
Sleep Grinding associated with airway resistance or apnea
Tx: MAD or Lat-Brux
CPAP if not resolving
Reevaluate grinding after airway controlled

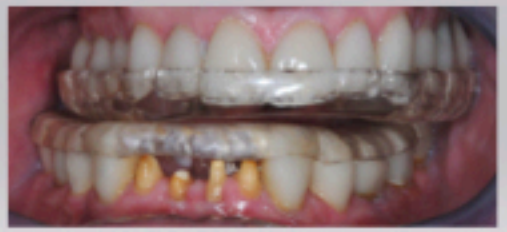
Fracture of porcelain and fracture of lower teeth 6 months
after delivery of full mouth crowns
(Not my crowns)



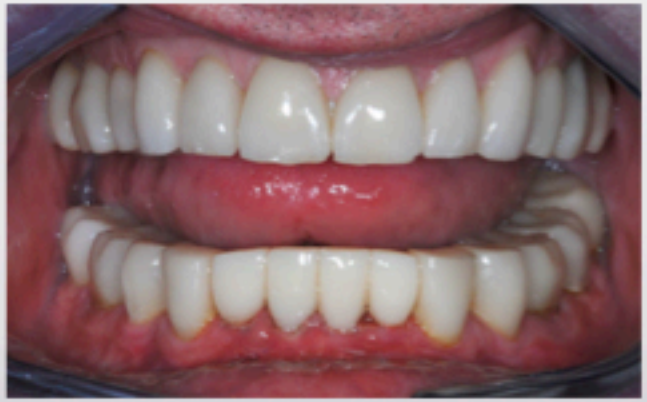


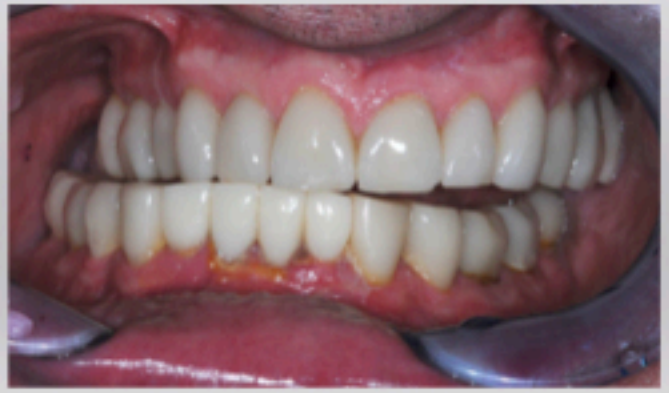


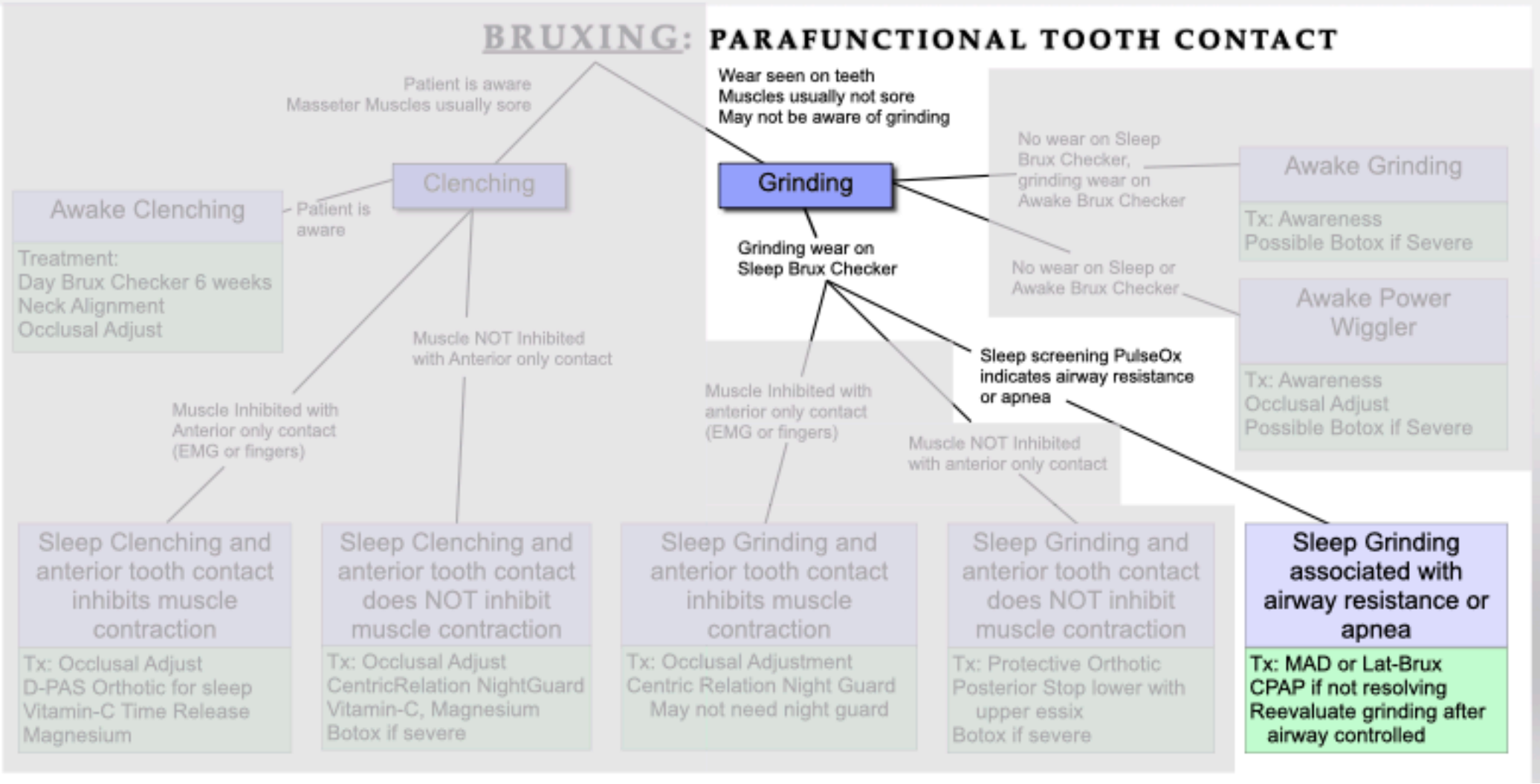




Occlusal Adjustment on curve Spee/Wilson
Set up group function
Long term Radica Temps 23-26
Pt reported crowns finally felt natural



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Sleep Clenching and anterior tooth contact does NOT inhibit muscle contraction
Tx: Occlusal Adjust
CentricRelation NightGuard
Vitamin-C, Magnesium
Botox if severe
Wear seen on teeth
Muscles usually not sore
May not be aware of grinding
Grinding
Grinding wear on Sleep Brux Checker
Muscle Inhibited with anterior only contact (EMG or fingers)
Muscle NOT Inhibited with anterior only contact
Sleep Grinding and anterior tooth contact inhibits muscle contraction
Tx: Occlusal Adjustment
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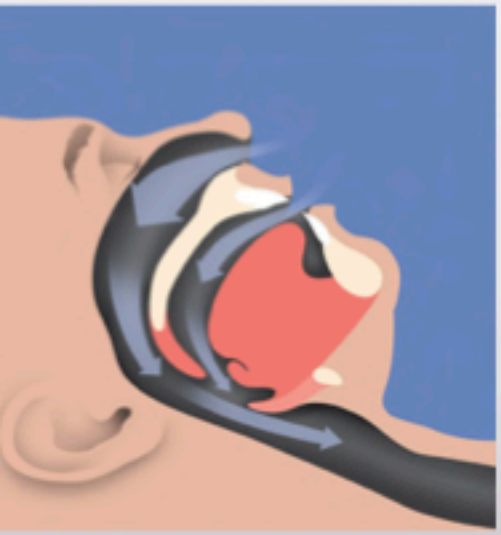
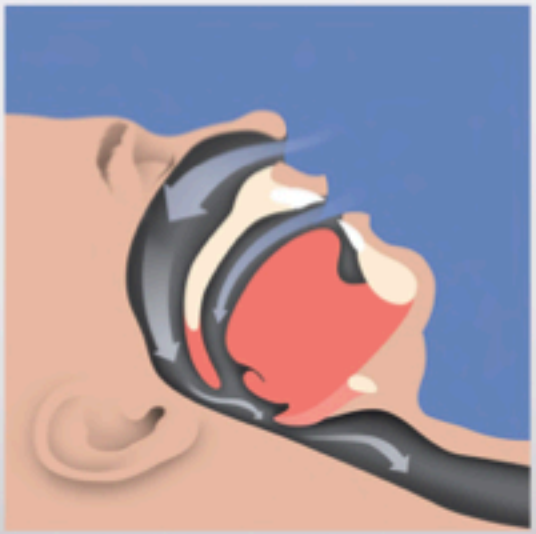
Awake Grinding
Tx: Awareness
Possible Botox if Severe
No wear on Sleep or Awake Brux Checker
Awake Power Wiggler
Tx: Awareness
Occlusal Adjust
Possible Botox if Severe
Sleep screening PulseOx indicates airway resistance or apnea
Sleep Grinding associated with airway resistance or apnea
Tx: MAD or Lat-Brux
CPAP if not resolving
Reevaluate grinding after airway controlled

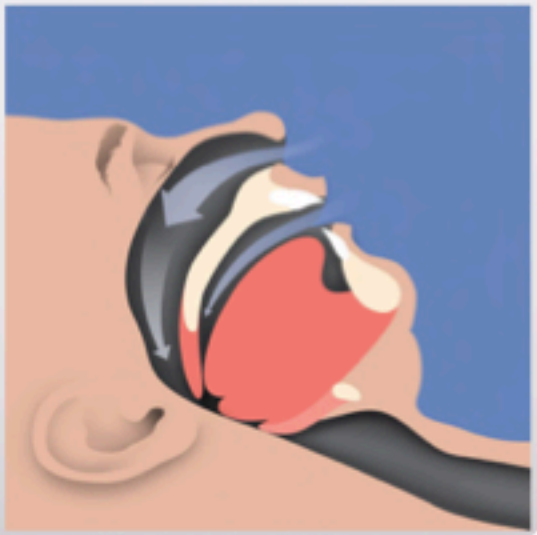
Mandibular Advancement Devices (MAD)
Open the airway by advancing the mandible and tongue



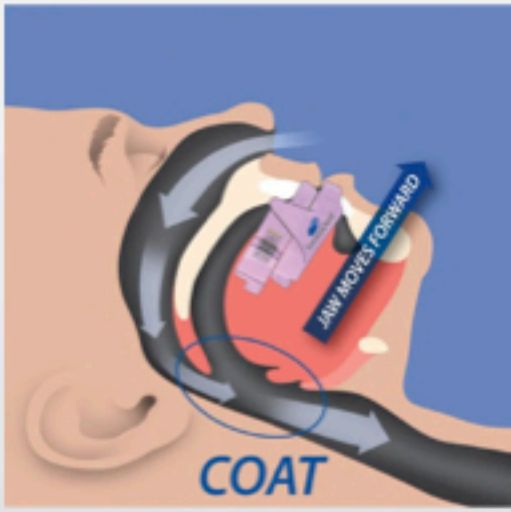
Normal Airway



Upper Airway Resistance
Snoring in men
Purring in women



Obstructed Apnea
Airway



Airway opens with
Mandibular Advancement

Better Solutions:
Treat Causes

Images from Somnodent https://somnomed.com/us

example: worldwide insulin shortage

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

Disease Stage 2

Compensation:
Airway Maintained

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

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_2 Saturation
- RERA- Respiratory Arousals
- ⬇ 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_2 Saturation
- Apnea
- Cardiovascular Damage
- Elevated BP
- GERD
- Sleep Teeth Grinding

Symptoms
- All of stage 2, 3 plus….
- Worn Teeth

John R. Droter DDS

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 3+% O_2 Desaturation

AHI 1-4	AHI 5-15	AHI 15-30	AHI 30+
"Normal" ??	Mild OSA	Moderate OSA	Severe

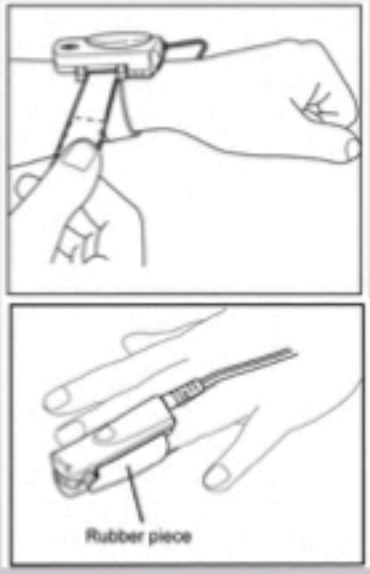
Signs
- Apnea
- 4% drop O_2 Saturation
- Cardiovascular Damage
- Elevated BP
- GERD
- Sleep Teeth Grinding

Symptoms
- Not Waking Rested, Daily Fatigue
- Cognitive Impairment
- Worn Teeth

Irreversible Damage

John R. Droter DDS

If sleep grinding, is there an airway issue?
(Upper Airway Resistance or Obstructive Sleep Apnea)

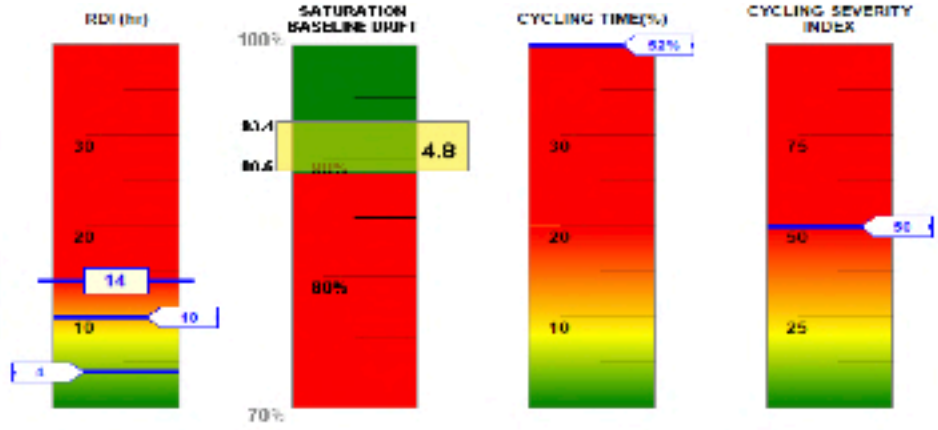


High Resolution
Pulse Oximetry

Data every 1
second average
over 3 seconds

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

Order PULSOX: Go to my website
jrdroter.com ….. Doctor Links



PATTERN BASED REPORT

OXYGEN SATURATION BASELINE ANALYSIS

Oxygen Saturation Baseline Drift(OSBD) (normal <= 3)	5
Initial Saturation Baseline	93
Lowest Saturation Baseline	89
Highest Saturation Baseline	93

Baseline is determined by the Mean SpO2 during 3 Minute window without Artifact and without Events.

SPO2 CYCLING

% Time in Cycling (Duration)	52%	(02:50:14)
Cycling Frequency	45	
96% - Lowest Sat	12	
Cycling Severity Index	50	

The total time oxygen saturation was <= 88% was 00:13:39

TRADITIONAL REPORT

ODI4:	11
Total ODI4 Events:	58
Time in ODI4 Events:	00:29:26
Avg ODI4 Event Duration:	00:00:28
<=88% ODI4 Events:	23
<=88% Longest Duration:	00:01:21
Minimum SpO2:	84
Avg Low 10% SpO2:	86
Avg Low SpO2:	89
Avg Low SpO2 <=88%:	87

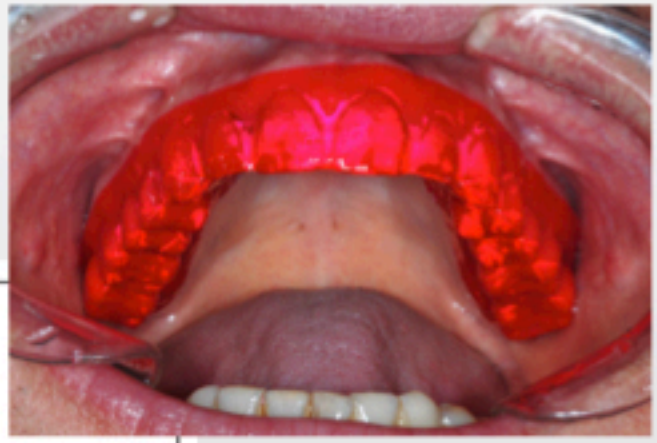
Definition of ODI4 Event: a fall in oxygen saturation of at least 4% and persisting greater than 3 seconds.

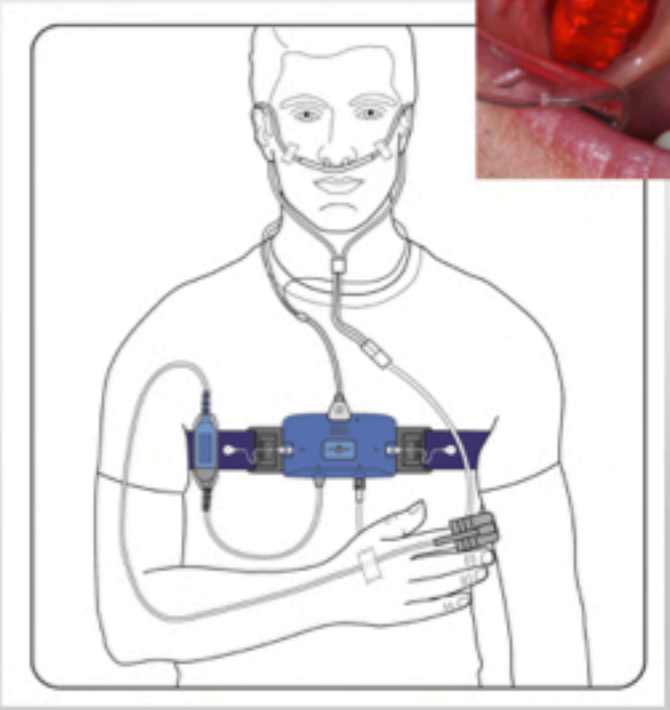
%SpO2	DURATION	%TOTAL
94-100	00:16:37	5%
88-94	04:57:26	91%
80-88	00:13:39	4%
70-80	00:00:00	0%
<= 70	00:00:00	0%
Total	05:27:42	100%
Motion Artifact	00:00:07	0.04%
Error Signal	00:00:05	0.03%

zMachine

GENERAL sleep

zMachine + Brux Checker
+ Snore Lab



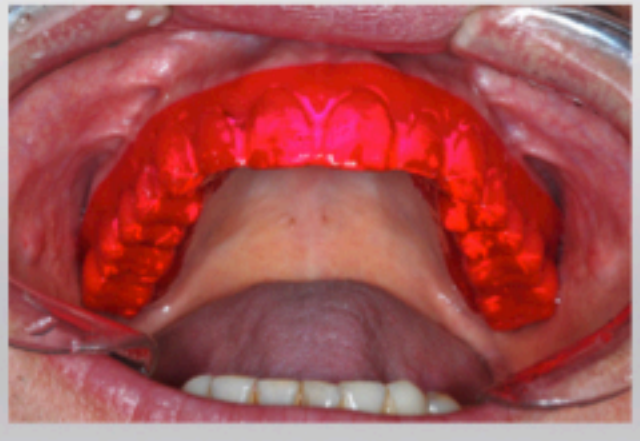


Call (888) 330-4424
Use Code: DROTER to receive special offer

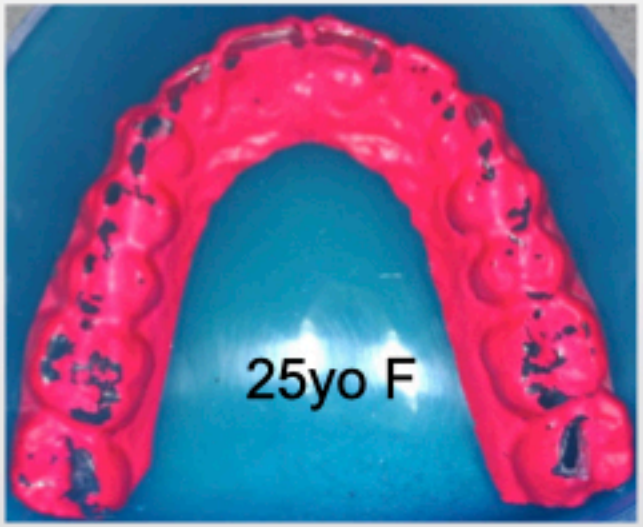
Also ask for access to Droter Modified Report

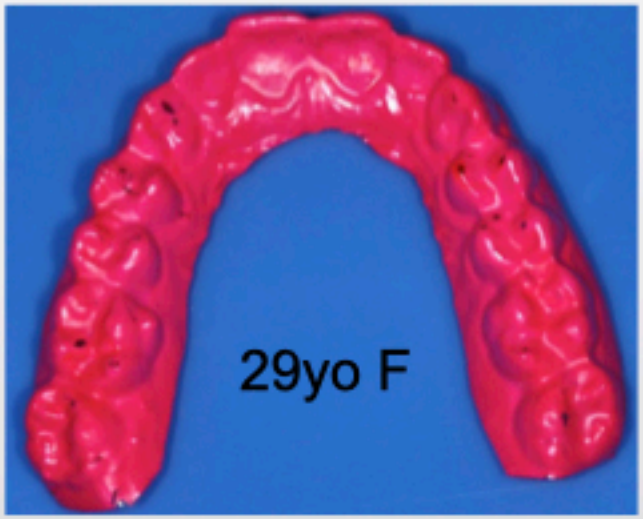
Brux Checker
Great Lakes Orthodontics

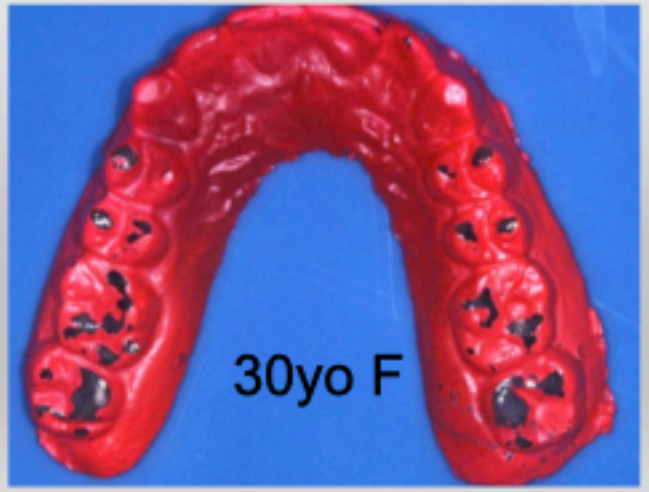
0.1mm Mylar



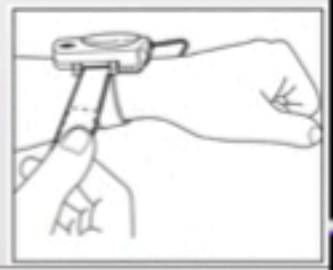
Made on Biostar Machine

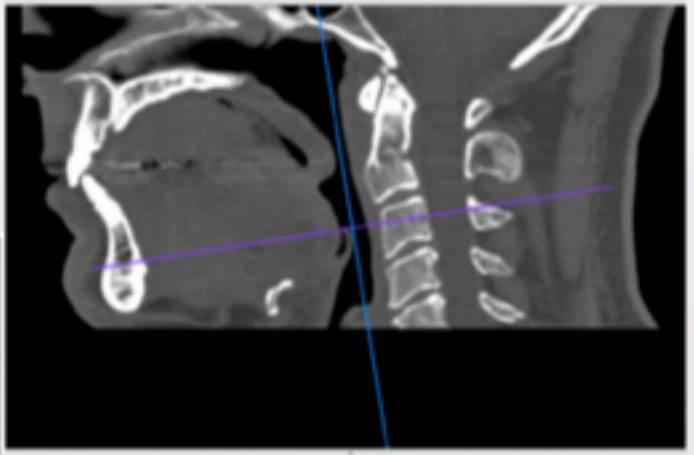


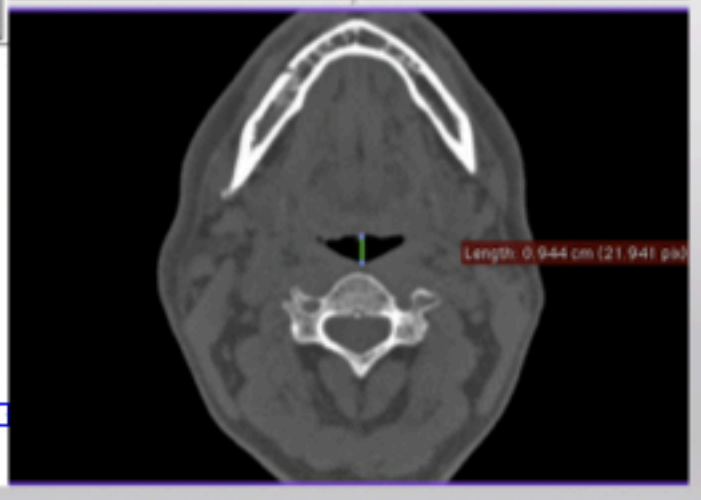


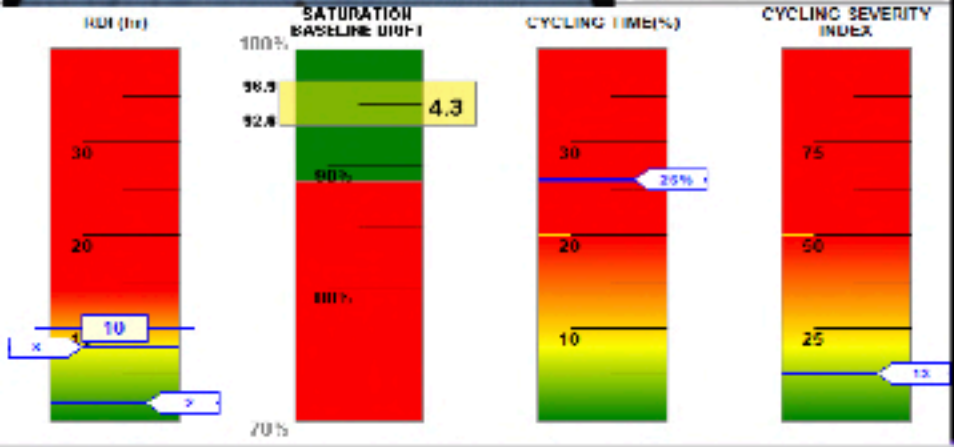


Mild Obstructive Sleep Apnea









Referred to pulmonologist
Medical Sleep Study
PSG- Polysomnogram
RDI 10

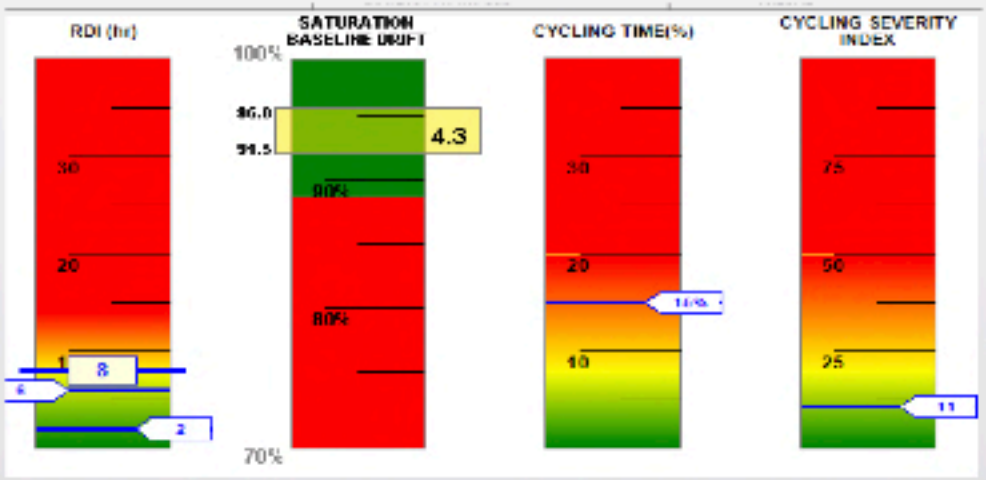
Home Sleep Airway Screening- RDI 10

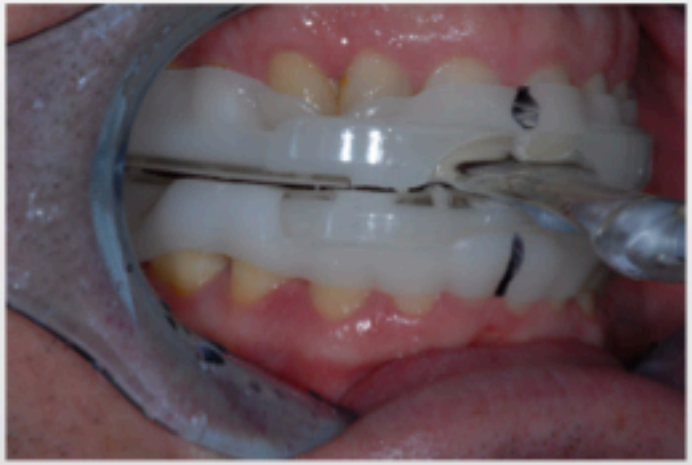
RDI= Respiratory Distress Index

Mild OSA = 5-15 Apnea/hr

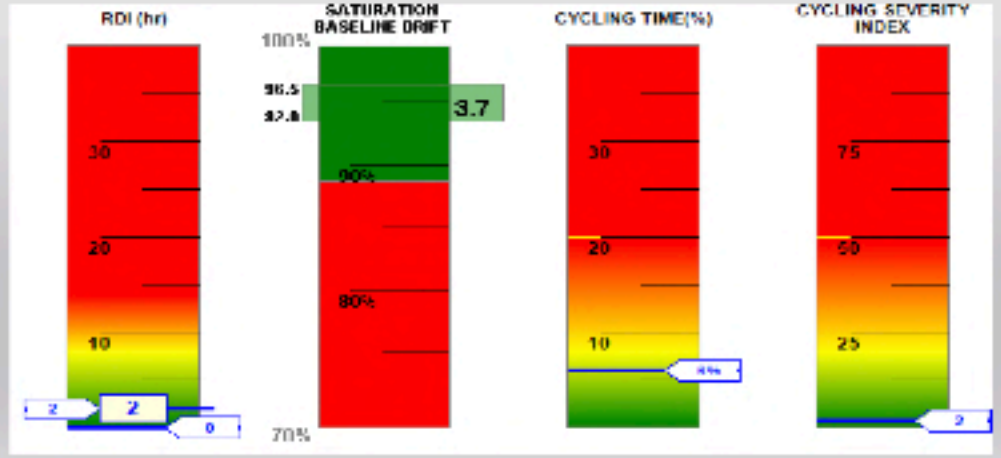
RDI= Respiratory Distress Index

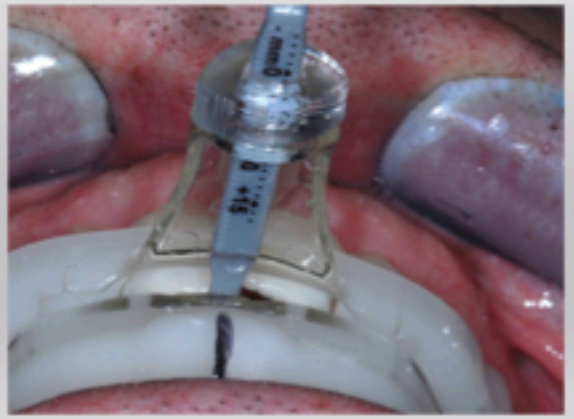
MyTAP
Mandible
Advanced 4mm
RDI 8





MyTAP
Mandible
Advanced 5mm
RDI 2





Which Orthotic to use:

Sleep Grinding with airway issues

AHI 20+
I like to use CPAP

Apnea Hypopnea Index
AHI less than 5

Obstructive Sleep Apnea
AHI 5 to 20

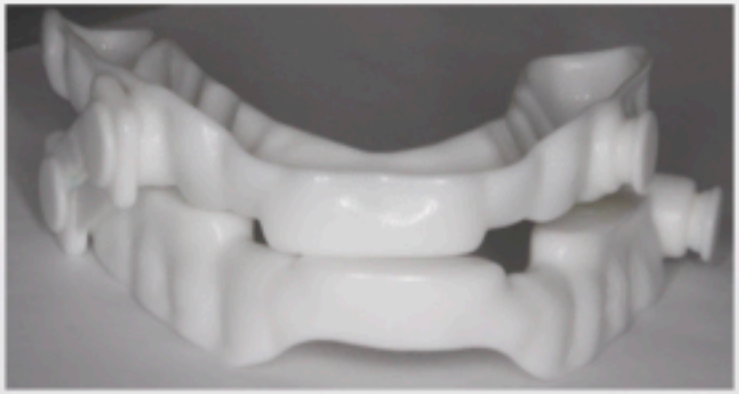
Lat-Brux
Great Lakes Ortho

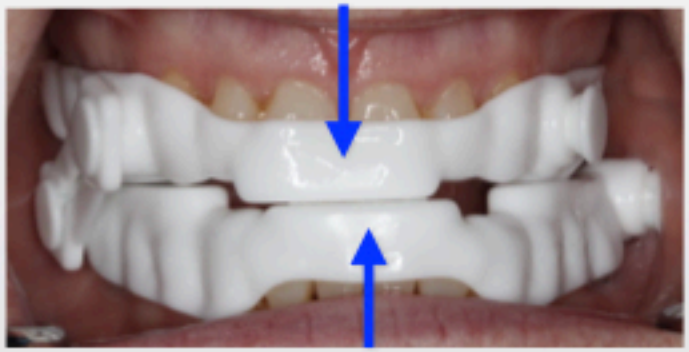
Nylon MAD
Great Lakes Ortho

Nylon Herbst
Great Lakes Ortho

APS
ArrowPath Sleep

ArrowPath Sleep
Lat Brux
Lateral Bruxing Guard

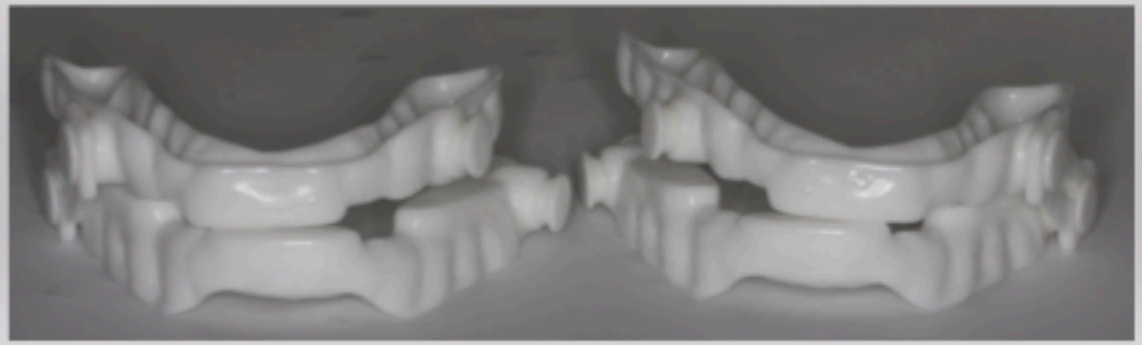




Midline sits left

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

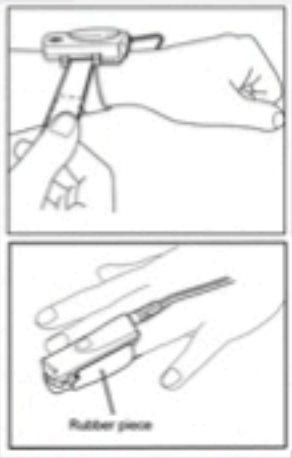
Patient will have a right and left guard.
Move the jaw right one night, left the next

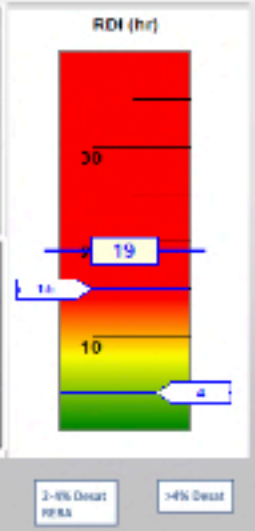


Treating Common TMDs in a General Practice

Management

Diagnosis	Pattern	Treatment
Sleep Grinding Airway Related	Worn Teeth Upper Airway Resistance	Mandibular Advancement Appliance (after MD approves)





Pulse Ox Screening

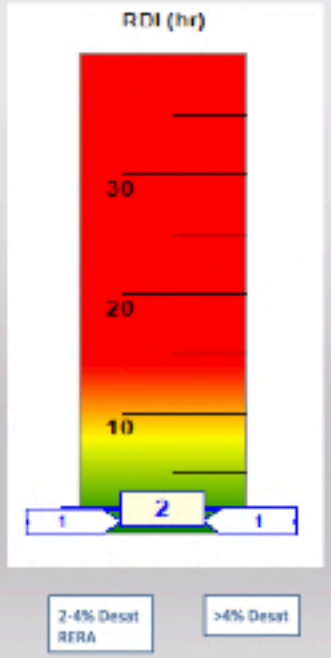
Refer to Medical Sleep Doctor

Get approval for Mandibular Advancement Appliance

Verify Airway Improves

19 events/hr before

2 events/hr with Orthotic



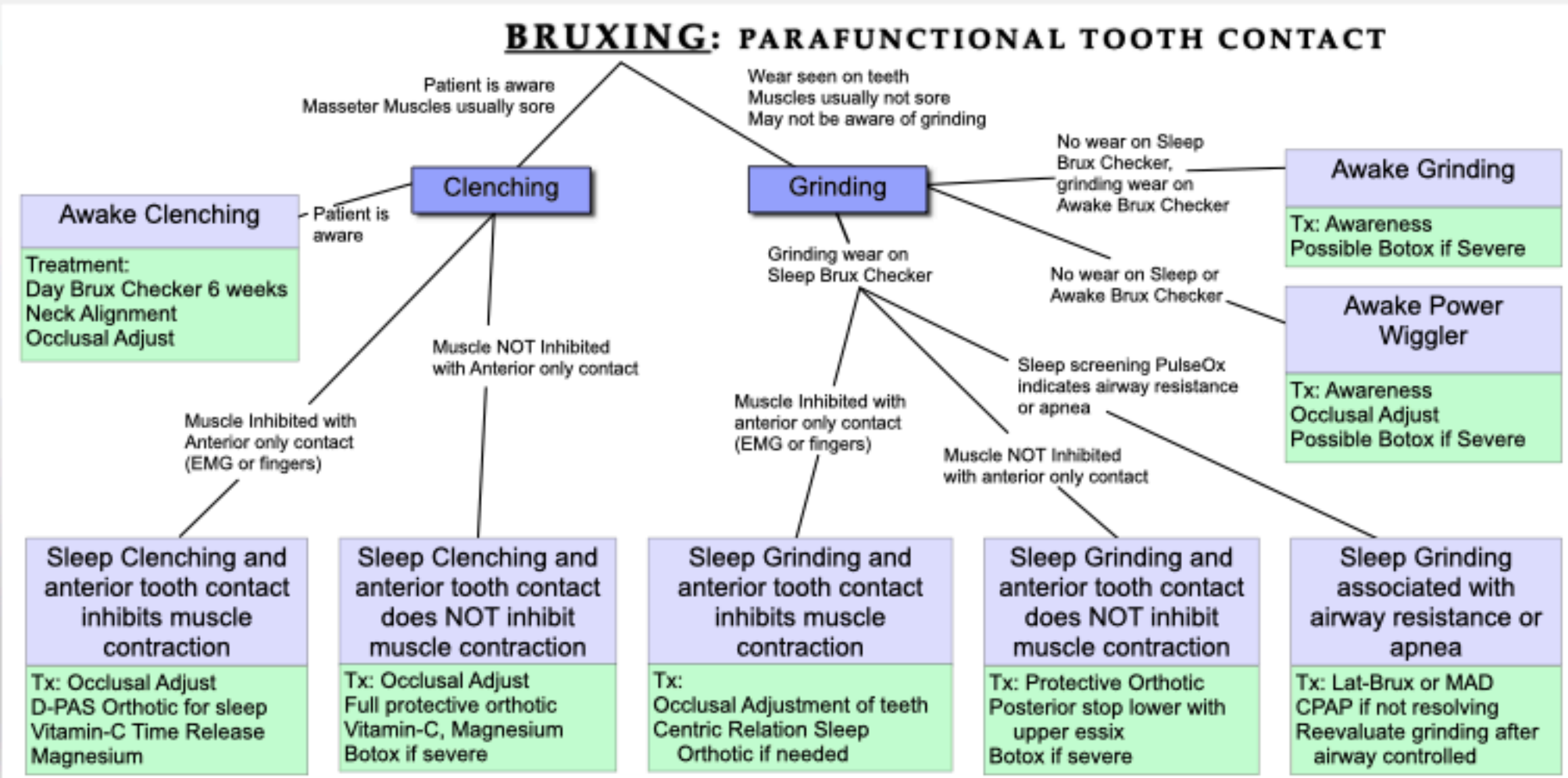
PULSOX 300i, Konica Minolta
with data analysis Patient Safety, Inc.

Nylon MAD
Great Lakes Ortho

D-SAD

PANTHERA

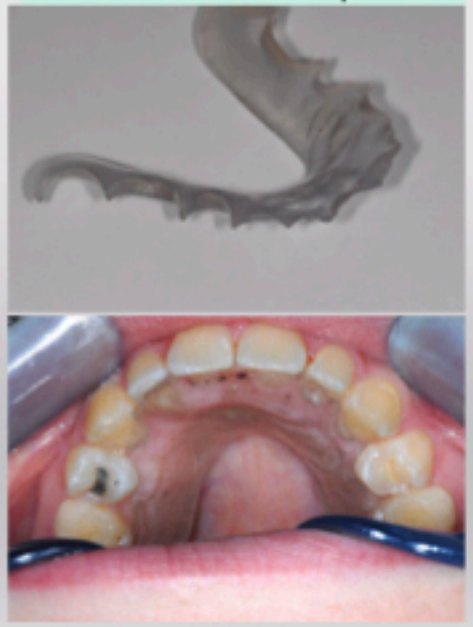
BRUXING: PARAFUNCTIONAL TOOTH CONTACT



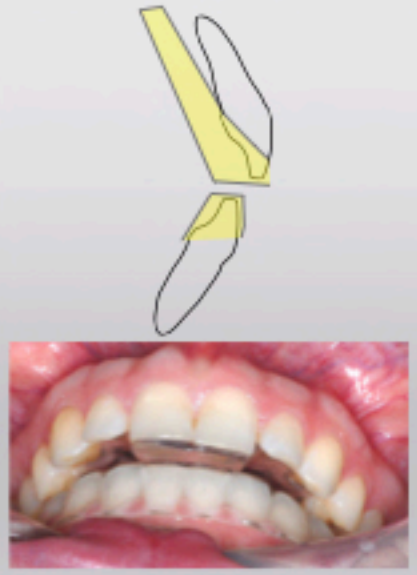
Living Tree Dental Lab
(865) 509-4509
connect@livingtreelab.com

3D Printed Orthotics

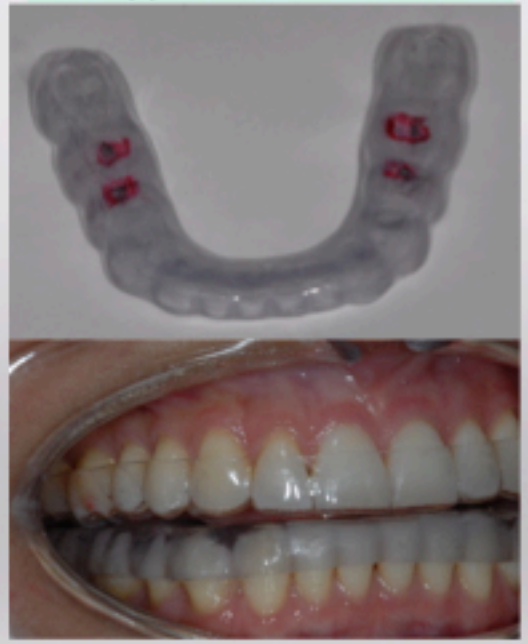
D-PAS
Diagnostic-
Palatal Anterior Stop



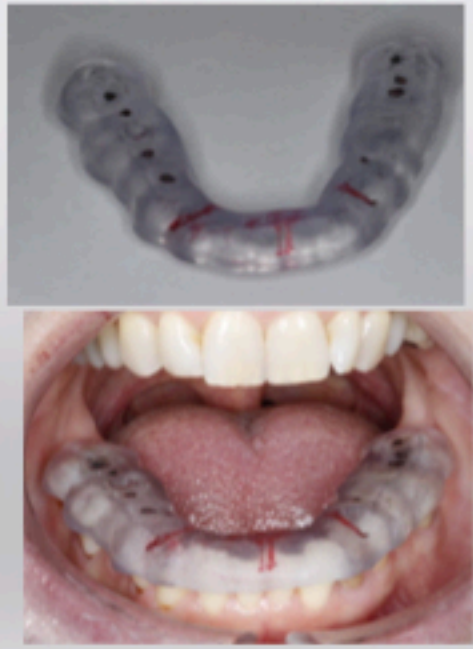
Brux-PAS
with lower Essix



Hard Lower Posterior Stop
with upper essix



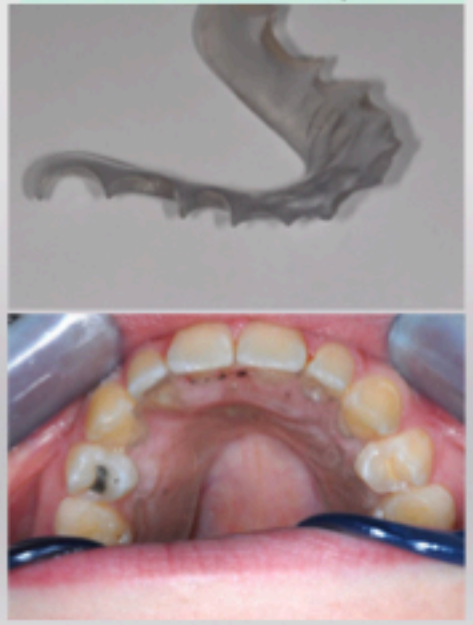
Hard Lower Full Coverage
Centric Relation Orthotic



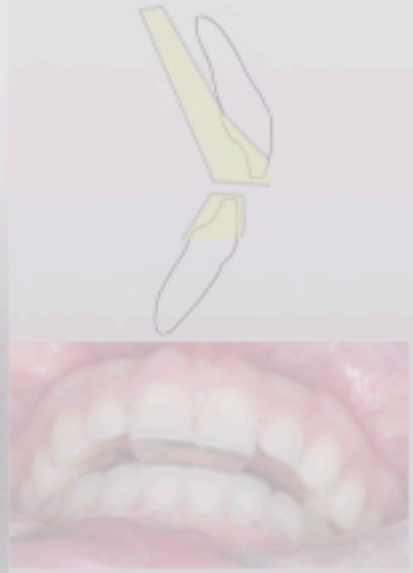
If you want super simple:

Sleep Clenching with anterior inhibition

D-PAS
Diagnostic-
Palatal Anterior Stop

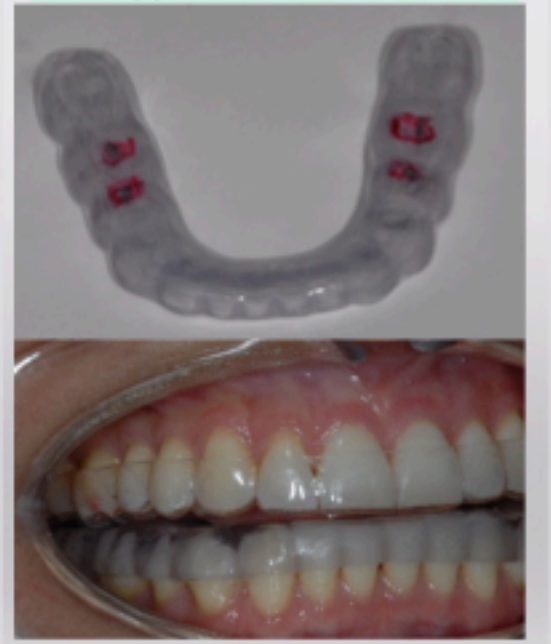


Brux-PAS
with lower Essix

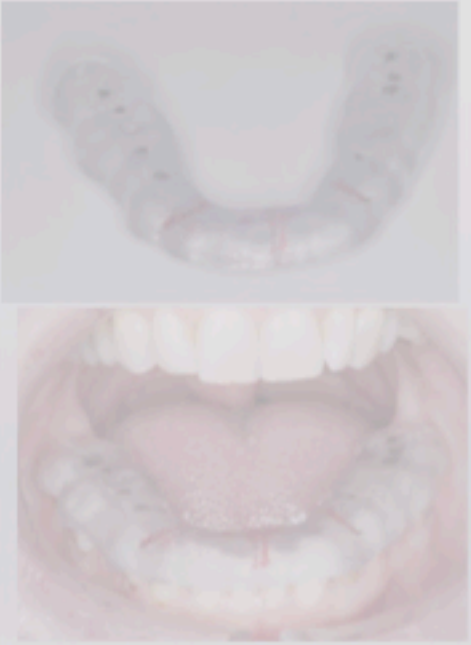


Everybody else

Hard Lower Posterior Stop
with upper essix



Hard Lower Full Coverage
Centric Relation Orthotic

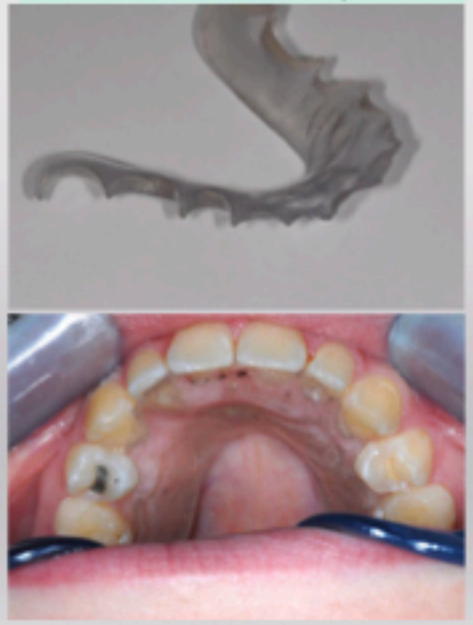


John R. Droter, DDS
drdroter@mac.com
301-805-9400

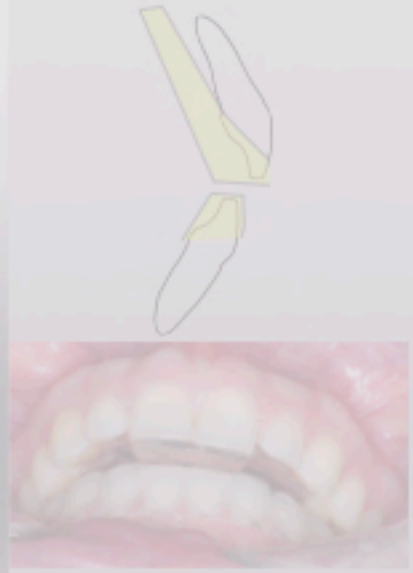
If you want super simple:

Sleep Clenching with anterior inhibition

D-PAS
Diagnostic-
Palatal Anterior Stop

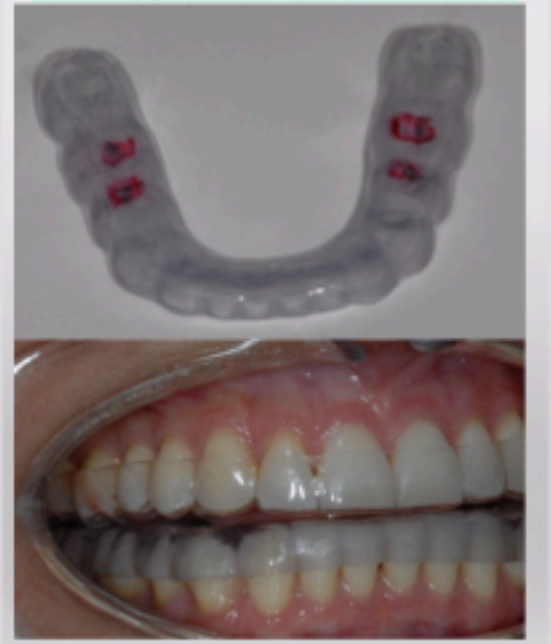


Brux-PAS
with lower Essix

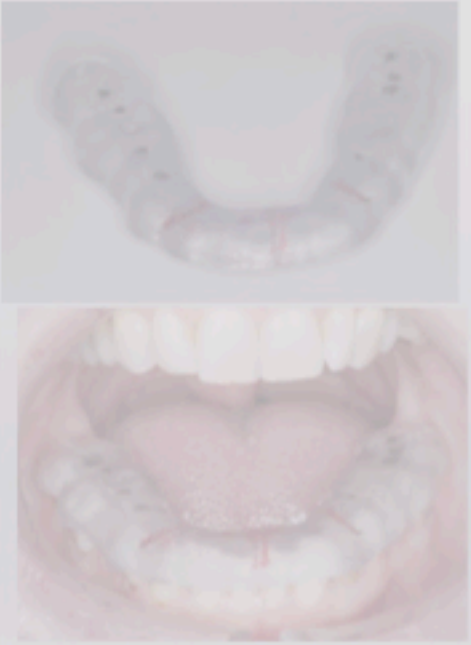


Everybody else

Hard Lower Posterior Stop
with upper essix

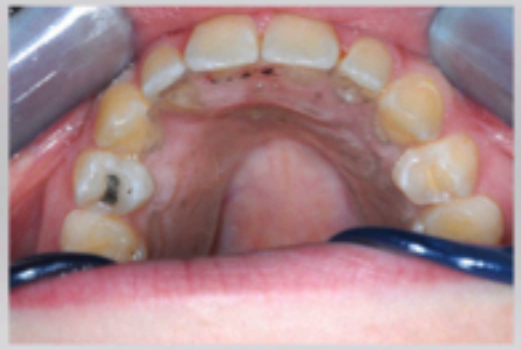


Hard Lower Full Coverage
Centric Relation Orthotic



Which Orthotic to use:

D-PAS
Diagnostic-
Palatal Anterior Stop

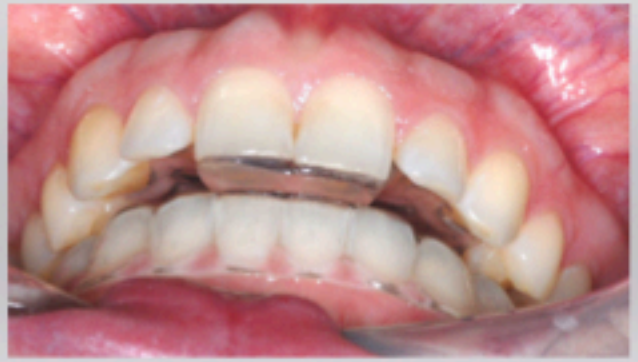


Manage Sleep Clenching with anterior inhibition
To diagnose Occlusal Muscle Dysfunction

Which Orthotic to use:

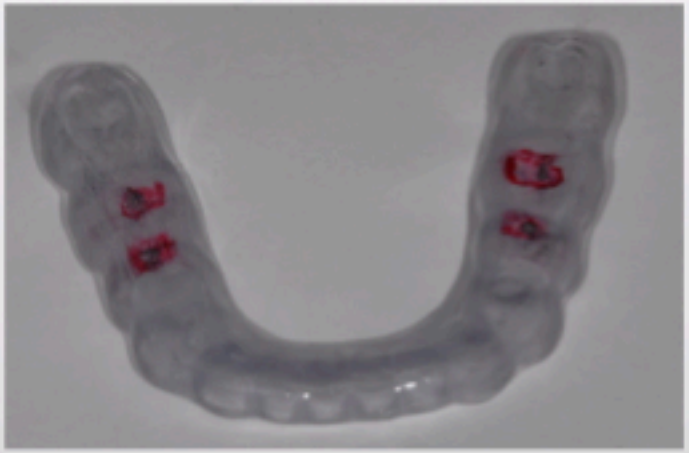
Brux-PAS
with lower Essix

Sleep grinding with anterior inhibition
Sleep grinding with slight anterior inhibition
Sleep Clenching with only slight anterior inhibition
Power Wigglers: Grind Clench

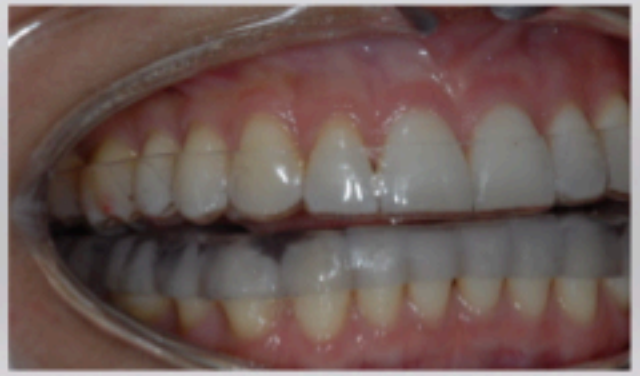


Which Orthotic to use:

Hard Lower Posterior Stop
with upper essix



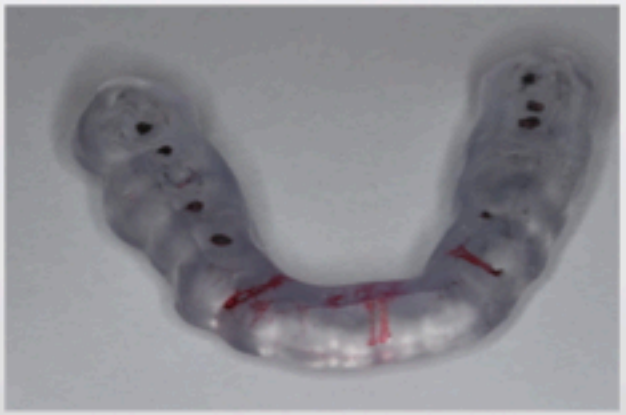
Sleep Clenching with NO anterior inhibition
Sleep Grinding with NO anterior inhibition

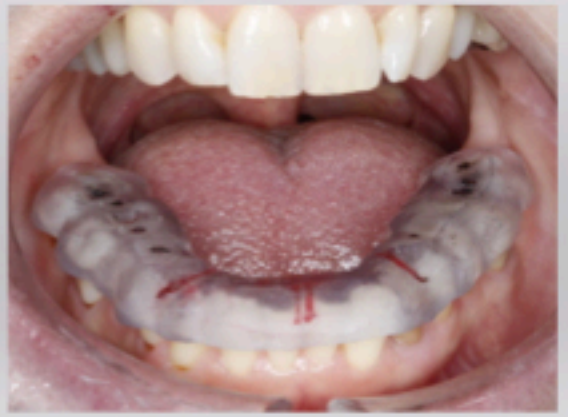


Which Orthotic to use:

Hard Lower Full Coverage
Centric Relation Orthotic

Sleep Clenching with NO anterior inhibition
Sleep Grinding with anterior inhibition
To Diagnose Occlusal Muscle Dysfunction





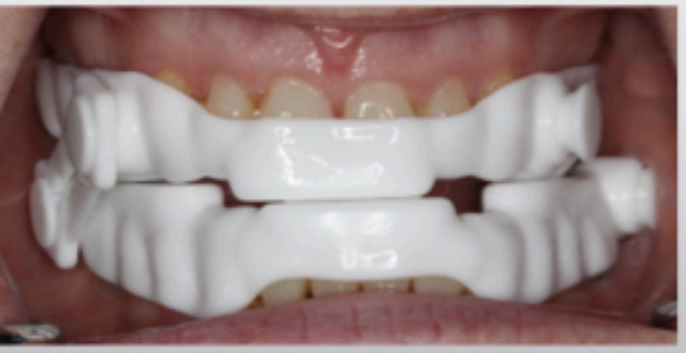
Which Orthotic to use:

Sleep Grinding with airway issues

AHI 20+
I like to use CPAP

Apnea Hypopnea Index
AHI less than 5

Obstructive Sleep Apnea
AHI 5- to 20



Lat-Brux

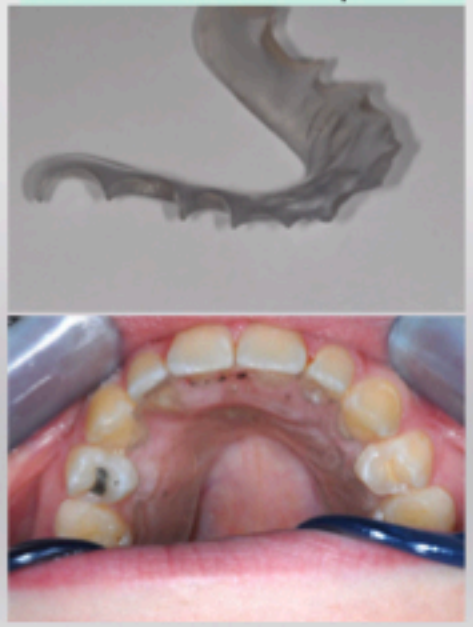
Nylon MAD
Great Lakes Ortho

Nylon Herbst
Great Lakes Ortho

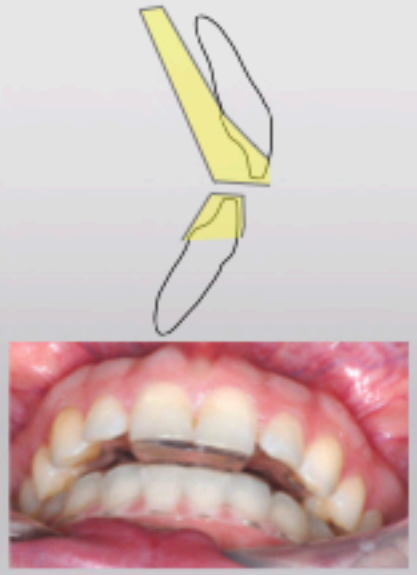
Living Tree Dental Lab
(865) 509-4509
connect@livingtreelab.com

3D Printed Orthotics

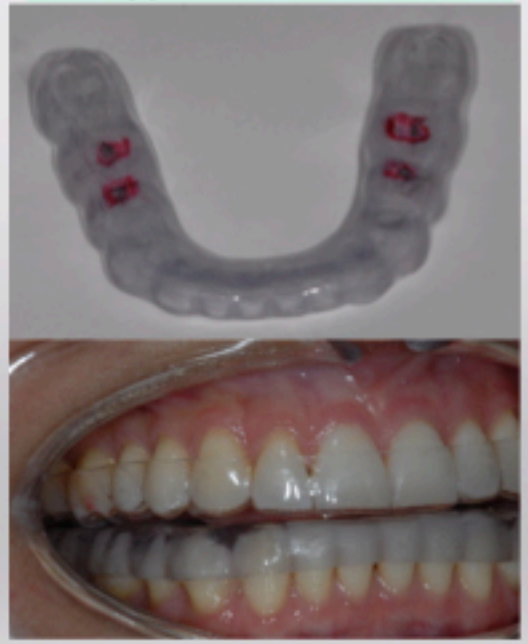
D-PAS
Diagnostic-
Palatal Anterior Stop



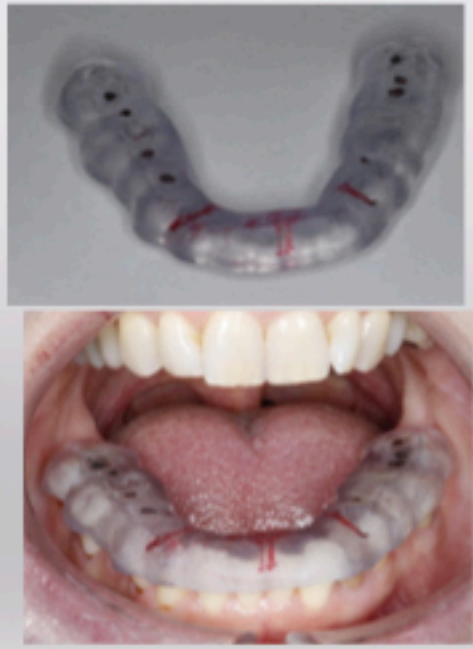
Brux-PAS
with lower Essix



Hard Lower Posterior Stop
with upper essix



Hard Lower Full Coverage
Centric Relation Orthotic



John R. Droter, DDS
drdroter@mac.com
301-805-9400