Conflusion

Occlusion **Confusion**

Presentation Outline

Sources of conflusion

Signs and symptoms

Treatment options

Conclusion

without conflusion?

On average,
American dental schools spend two hours teaching students about CMD

CMD: craniomandibular dysfunction
MAP: myoarthropathology
TMD: temporomandibular dysfunction

affects
10-20%
of population

sometimes bruxism is obvious

Yes,
we started
with a splint

Empress
12 years

Occlusion adjusted and 34 restored

21 years later

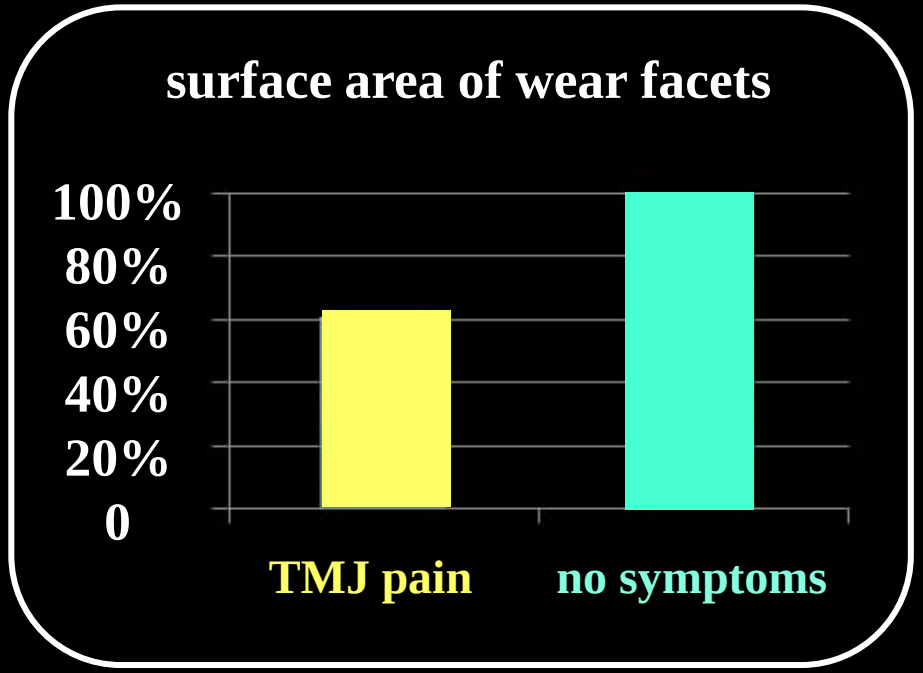
Bruxism

The first thing to forget

Wear Facets

(Problem patients)

Grinders



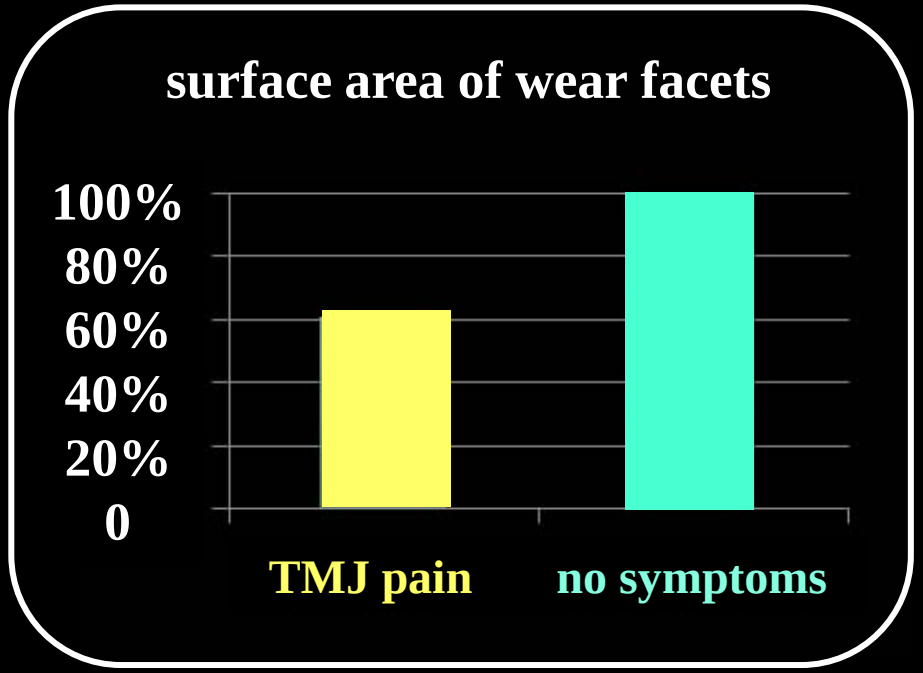
Patients with TMJ pain have fewer wear facets than symptom free controls

Sakaguchi T.
J Dent Res 2008

If stupidity could kill you, it might be his last paper

Then his conflusion: "Bruxism does not cause symptoms"

Grinders



Patients with TMJ pain have fewer wear facets than symptom free controls

Sakaguchi T.
J Dent Res 2008

An acceptable conclusion

"Grinding your teeth does not cause TMJ symptoms"

Association of Malocclusion and Functional Occlusion with Subjective Symptoms of TMD in Adults: Results of the Study of Health in Pomerania

Dietmar Gesch, et.al. The Angle Orthodontist 2004

OR for wear facets = 0.7 (30% less risk than average)

the same negative correlation as in other studies

OR for "clenching" = 3.4 (340% higher risk than average)

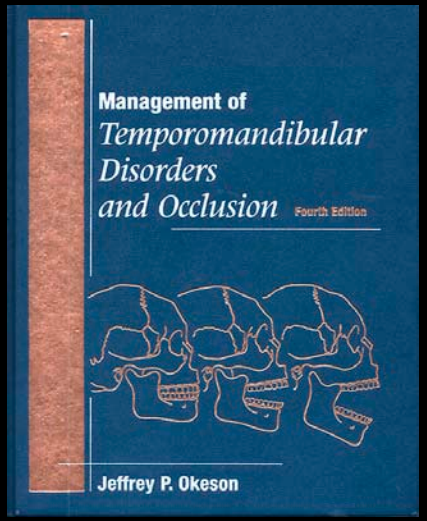
This study lets us make this conflusion

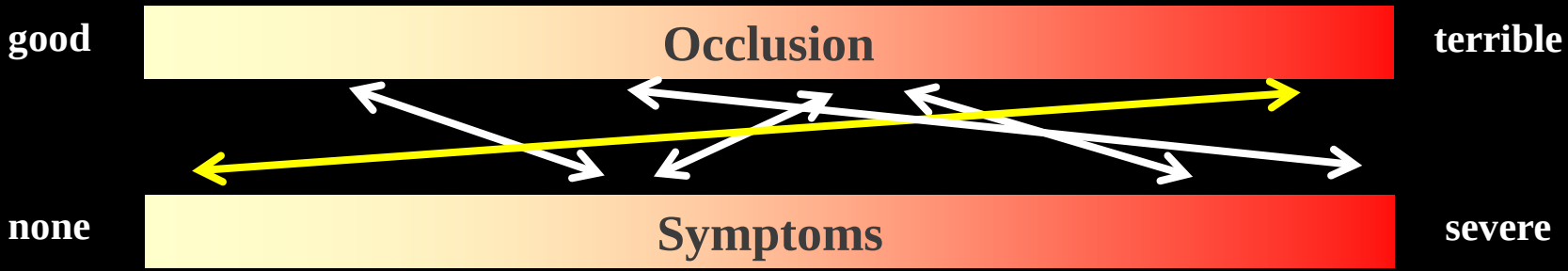
"Bruxism increases and decreases the risk of CMD at the same time"

Some studies have found increased risk for specific occlusal factors:

balancing contacts, unilateral crossbite, assymetrical opening, anterior open bite, CR > 4mm from CO, canine guidance, etc.

but the same factors show no correlation in other studies





Occlusion is not the primary cause of parafunction

Some studies have found increased risk for specific occlusal factors:

balancing contacts, unilateral crossbite, assymetrical opening, anterior open bite, CR > 4mm from CO, canine guidance, etc.

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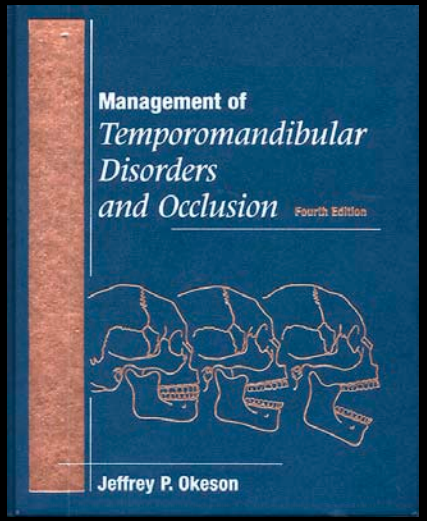
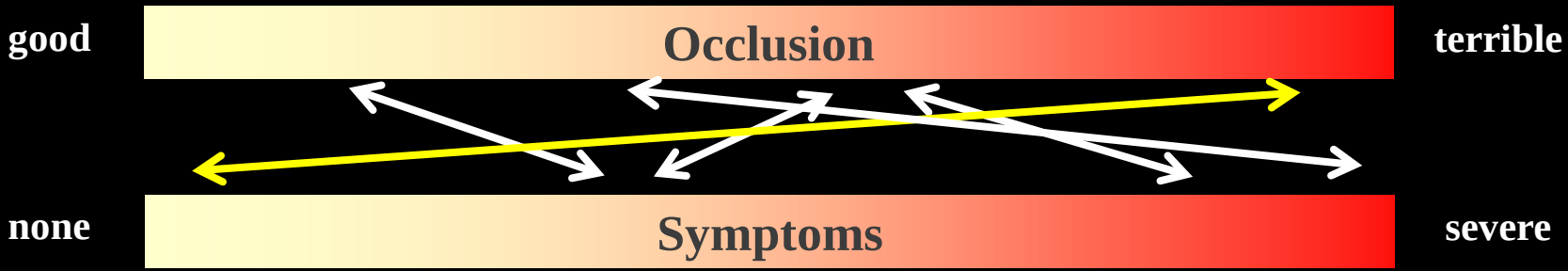
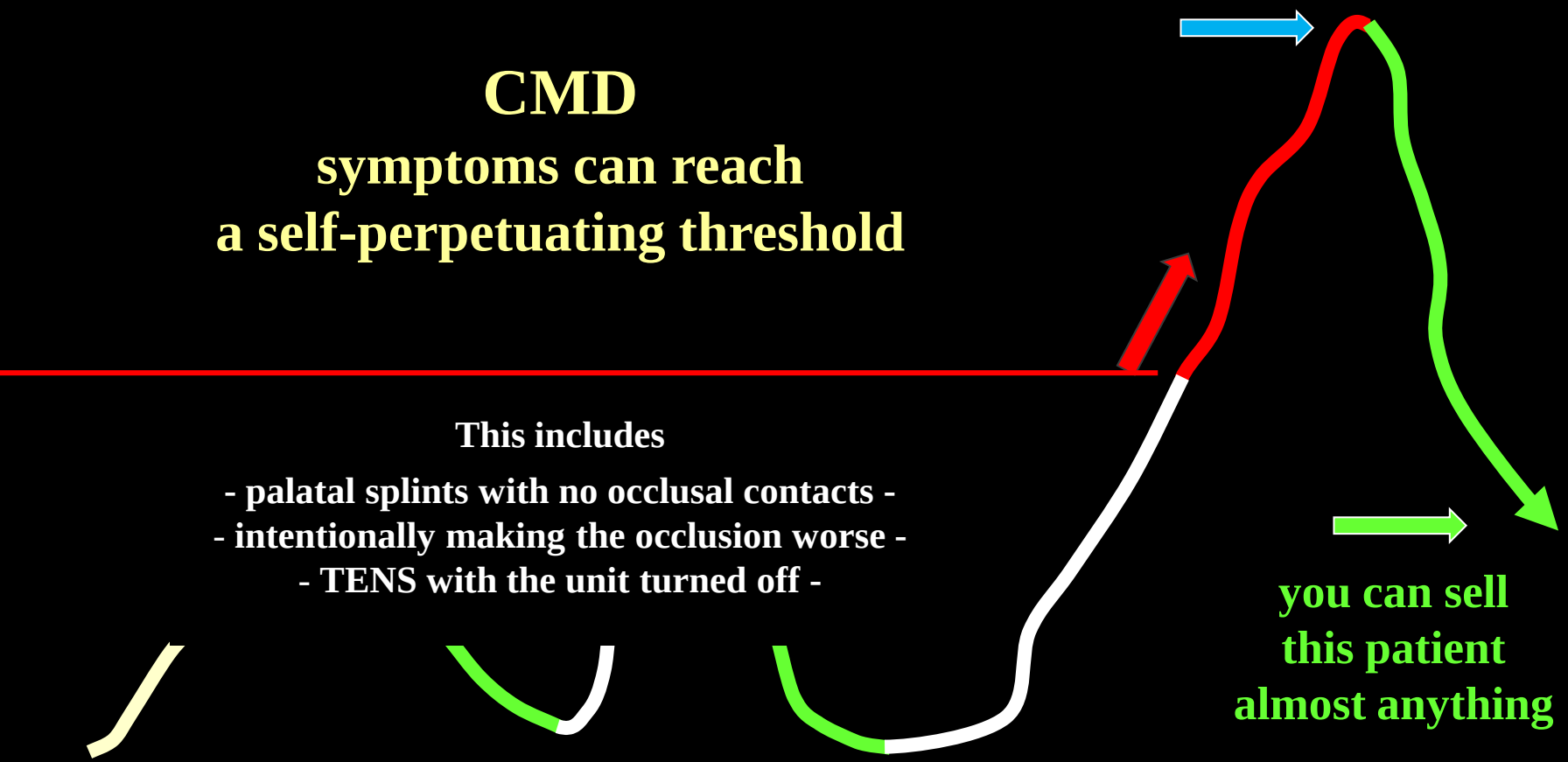




Canine guidance shows a trend toward increased risk!

CMD
symptoms can reach a self-perpetuating threshold



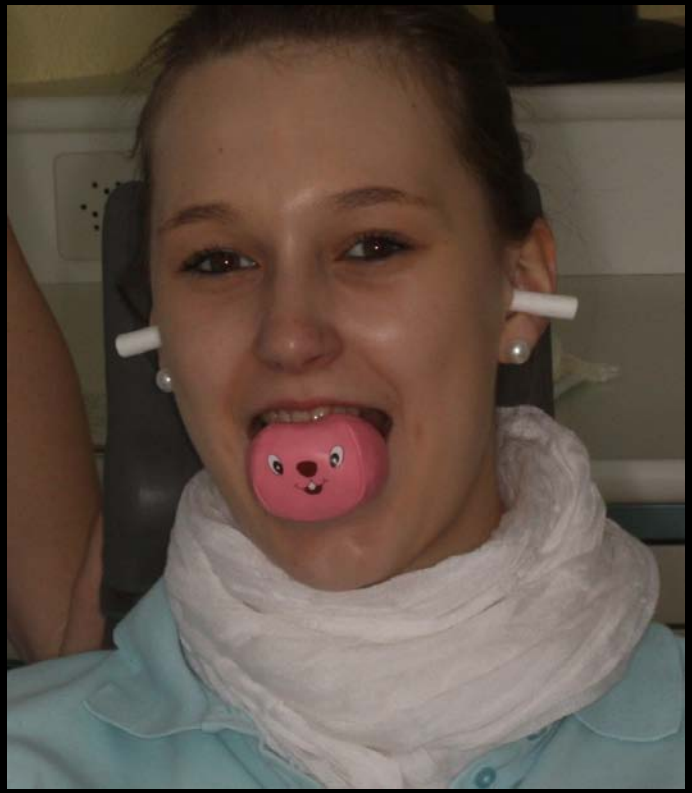
This includes

- palatal splints with no occlusal contacts -
- intentionally making the occlusion worse -
- TENS with the unit turned off -

you can sell this patient almost anything

Any intervention can provide significant relief of symptoms

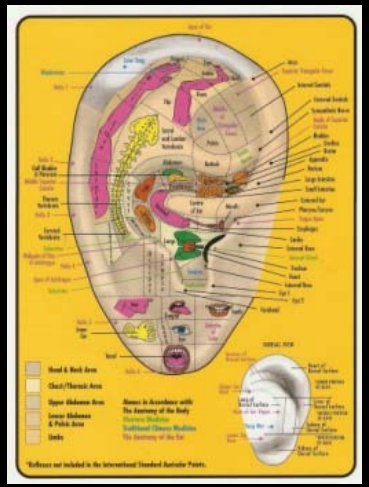
A cute case

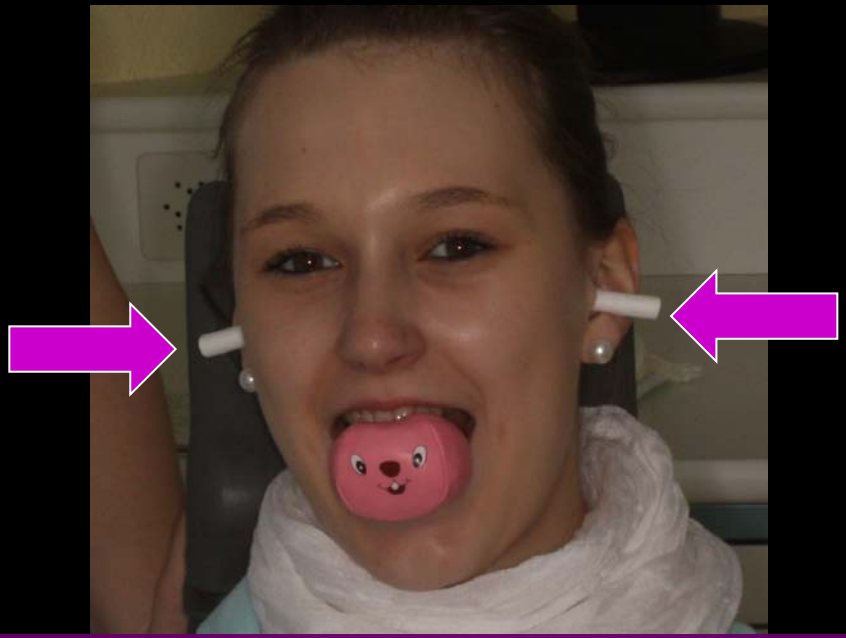


Everyone is successful, so why worry about the science?

A cute case

Why not
go esoteric?



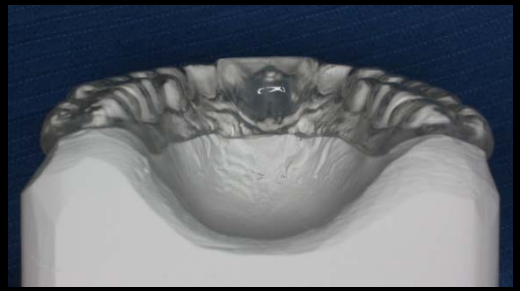


Does she have
french or
chinese ears?

This splint works best
when combined with auricular reflexology

Even without science, you still have to make decisions!

Position at contact with voluntary retralization



Minor orthodontics, veneers on the laterals, and a deprogramming retainer

Signs

which ones are important and what do they mean?

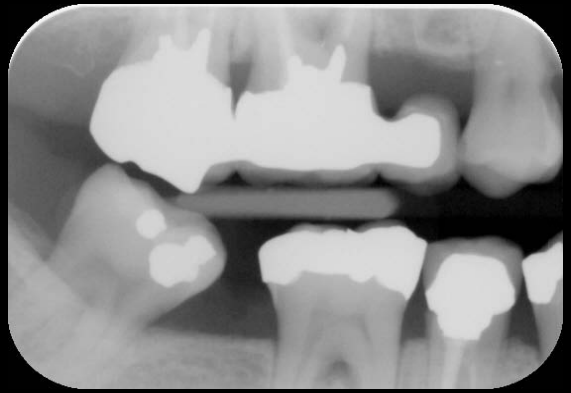
Signs

Symptoms

The fish are very small?

Falling over backwards is prohibited?

Signs of Pressing



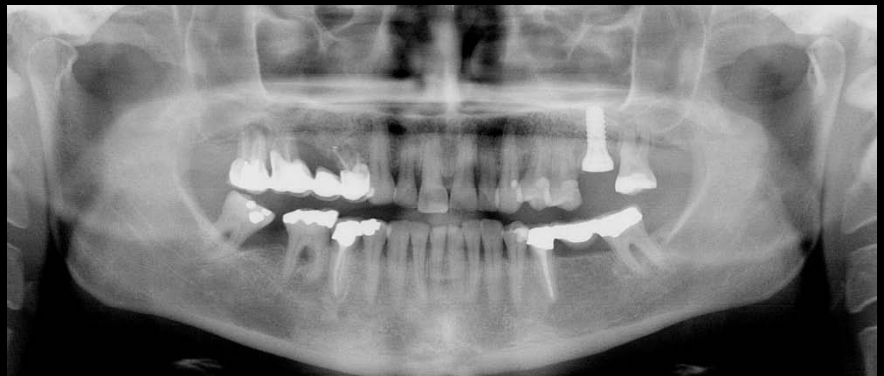
First visit as emergency: 1996 (female age 30)

1996-2001

12 unscheduled visits (8x fractures, 4x pain)
Localized periodontal pockets > 5 mm
Increased tooth mobility despite good hygeine
Moderate but constant sensitivity to cold
2001 – requested extraction of all teeth and full dentures

Tension headaches 3-4x per week,
neck and shoulder pain on right side

New NTI when the first one fractured
(she wore the first one ca. 2500 nights)



and twelve years ago
she wanted complete dentures

Signs of Pressing

short clinical crown length

scalloped tongues

frequent fractures of teeth or restorations

Cervical defects have a multifactorial etiology

CARIES

The role of occlusion should not be controversial

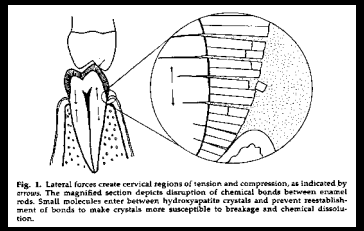


Fig. 1. Lateral forces create cervical regions of tension and compression, as indicated by arrows. The magnified section depicts disruption of chemical bonds between enamel rods. Small molecules enter between hydroxyapatite crystals and prevent reestablishment of bonds to make crystals more susceptible to breakage and chemical dissolution.

Lee and Eakle

Higher incidence of non-carious Class 5 lesions on buccal surfaces due to anatomy and deformation patterns

Whittaker DK
J Anat 1978

Borcic, et.al.
J Oral Rehab 2006

Lee HE, et.al.
J Dent 2002

Teeth bend under occlusal load

The elasticity modulus of dentin is similar to maple wood

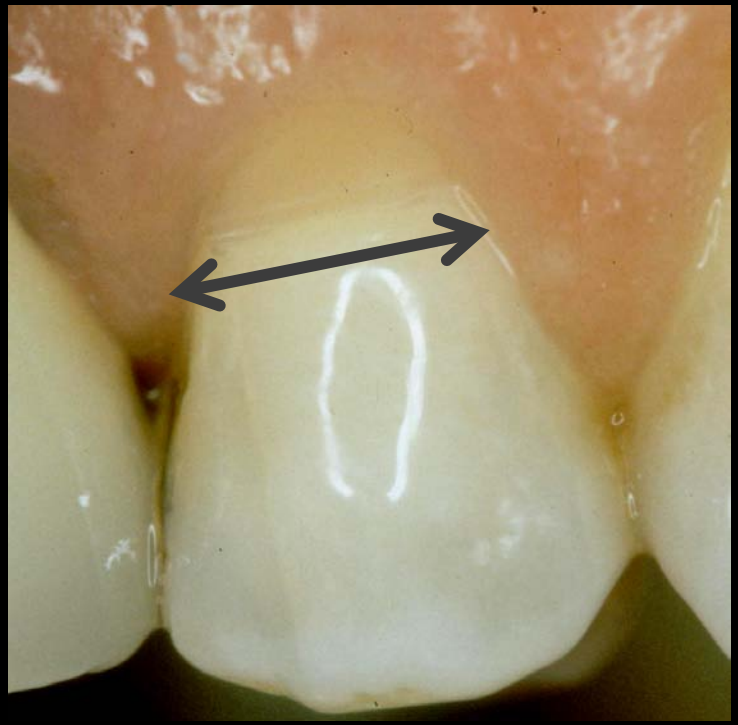
Mandras RS, et.al.
Dent Materials 1981

Davidson CL, et.al.
Am J Dent 1994

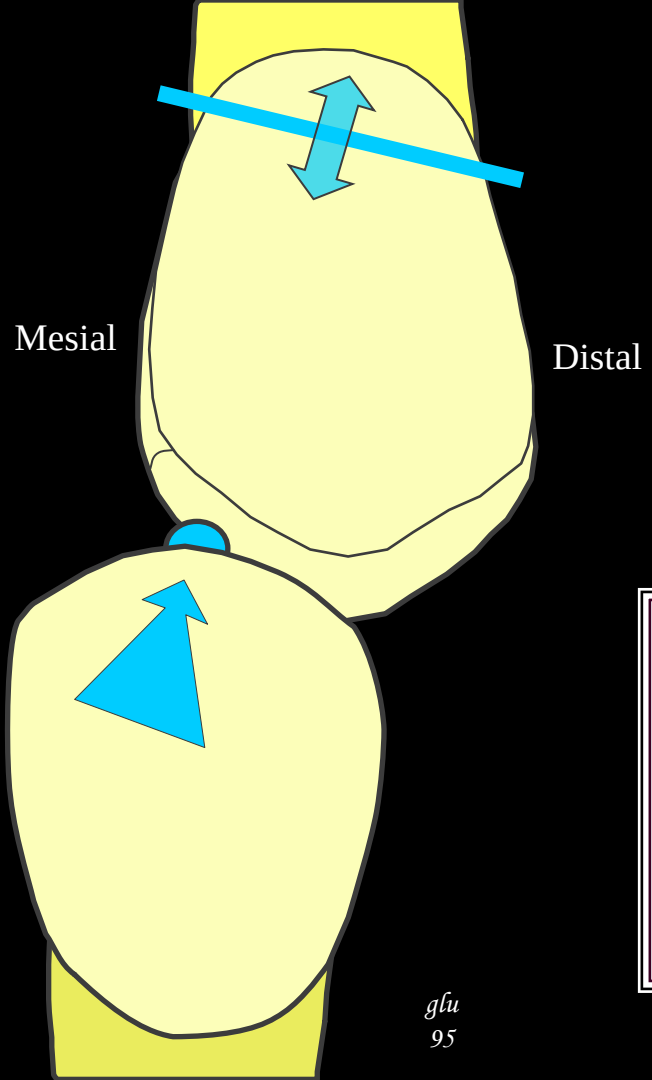
Rees J, Jacobsen P
J Dent 1998

Fruits TJ, et.al.
J Dent Res 1999

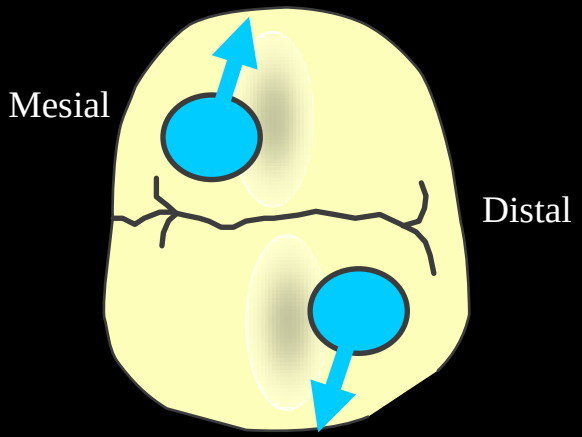
Always look closer at teeth with altered CEJ contour



Caution: undermined enamel may also fracture in a straight line!



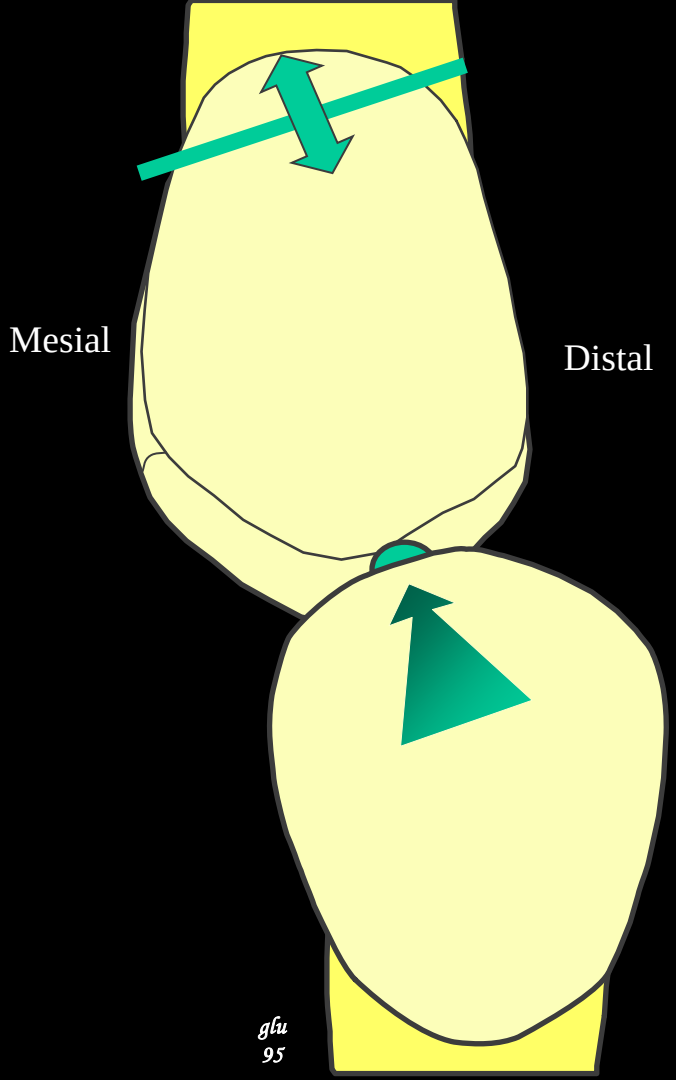
Force Vector



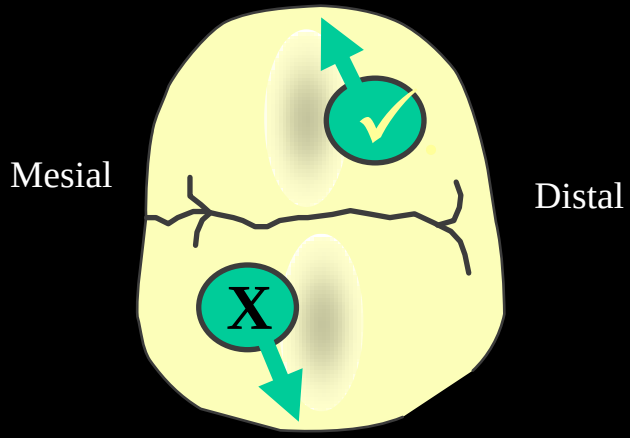
Enamel margin angle
and
occlusal contact

can be in centric occlusion

glu
95



Force Vector



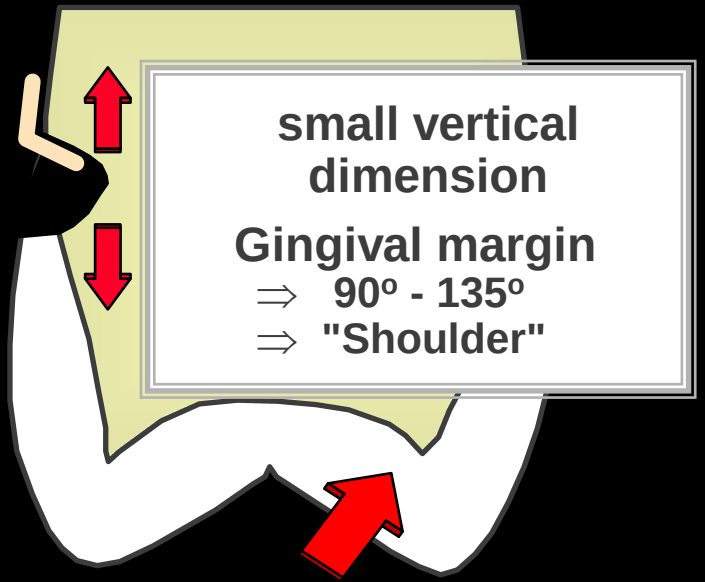
Enamel margin angle
and
occlusal contact

can be in centric occlusion

glu
95

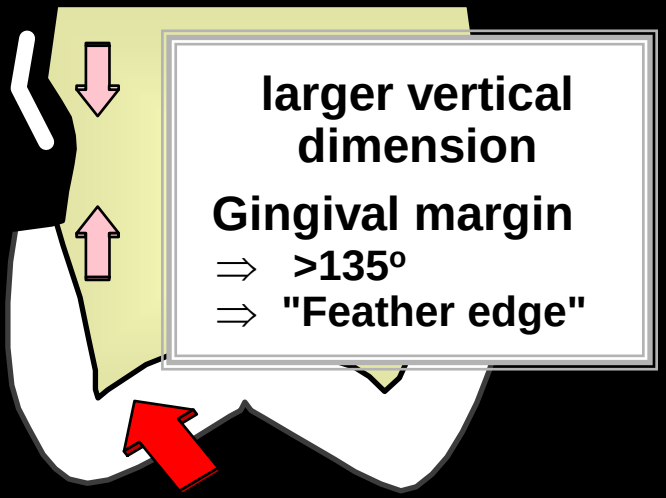
Tensile Morphology

tensile stress is localized and concentrated at defects



Class V defects can be produced in the laboratory with occlusal load (an acid was used, but not a toothbrush)

Whitehead SA, Wilson HFN, Watts DC. J Esthet Dent 1999; 11: 332-337



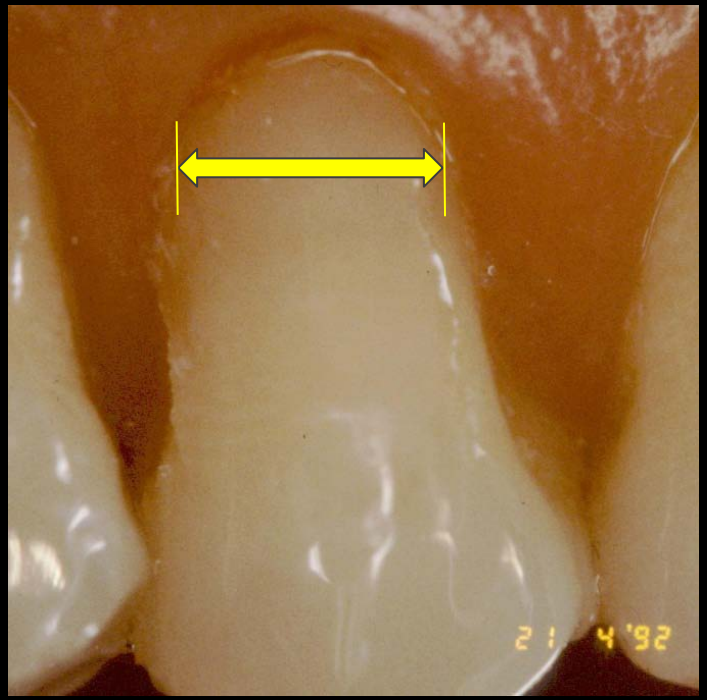
Compressive Morphology

compressive forces are diffuse and less destructive

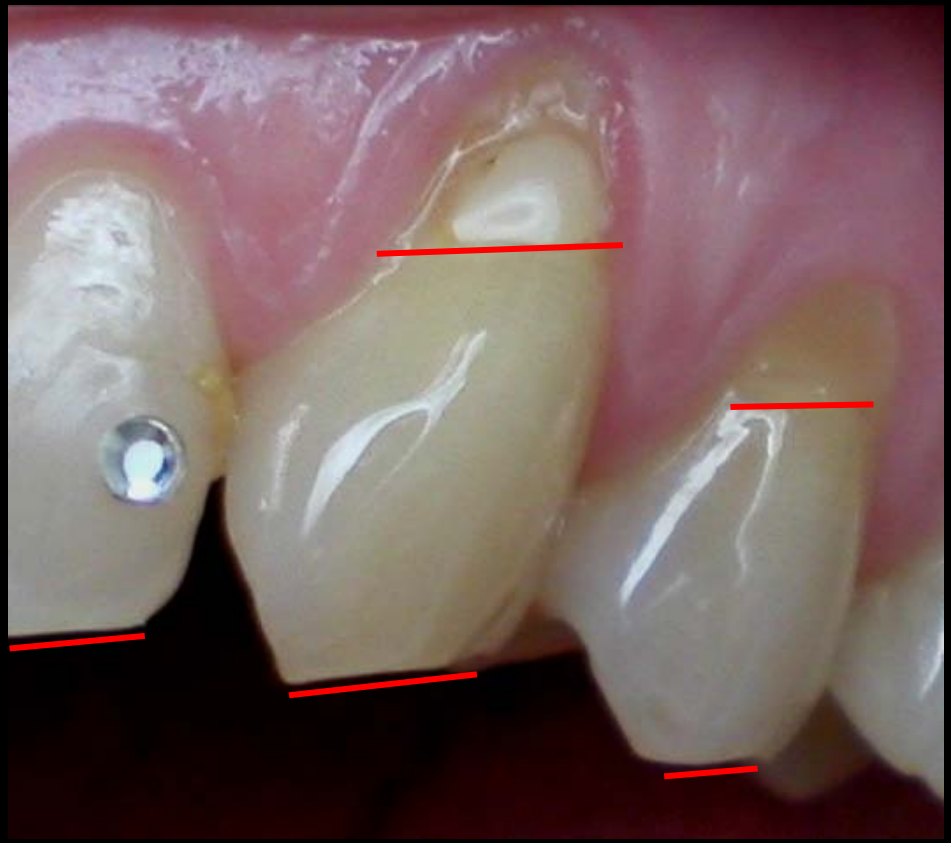
this cervical defect restored three times in < 18 months

Better results with Class V's
if occlusion adjusted at the same time
Zhu TJ. Shanghai Kao Quiang Yi Xue 2005

嵌合位をたいせつに



Teeth with narrow cervical cross-section bend more, which is why
Southeast Asians have more angular cervical defects than Europeans,
and Europeans more than Africans.



It cannot be an accident that these angles are the same

Another proven correlation:
Teeth with increased mobility almost never have cervical defects

Hand JS, et.al. Gerodontics 1986
Aw TC, et.al. J Am Dent Assoc. 2002
Miller N, et.al. J Clin Periodontol 2003

Low force and movement causes wear facets, high force without movement causes cervical lesions

These are slow processes, and most patients do both

Mechanical loading

accelerates acid erosion, bacterial caries progression, and increases toothbrush abrasion

toothbrush abrasion

STRESS CORROSION

(piezoelectric?)

J. Grippo, G. McCoy required reading

Amagarn, et.al. J Dent Res 1997

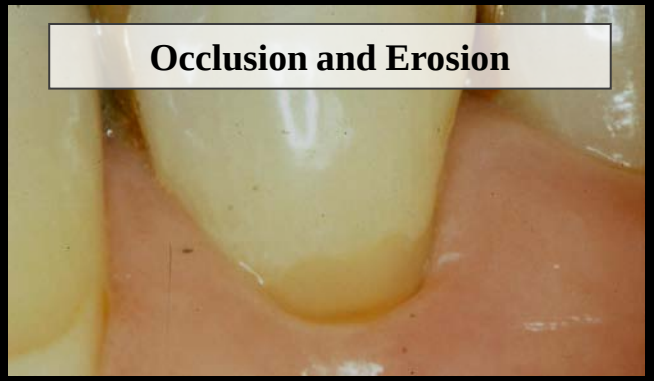
Whitehead, et.al. J Dent Res 1999

Palamara, et.al. Dent Materials 2001

Staninec, et.al. J Dent Res 2005

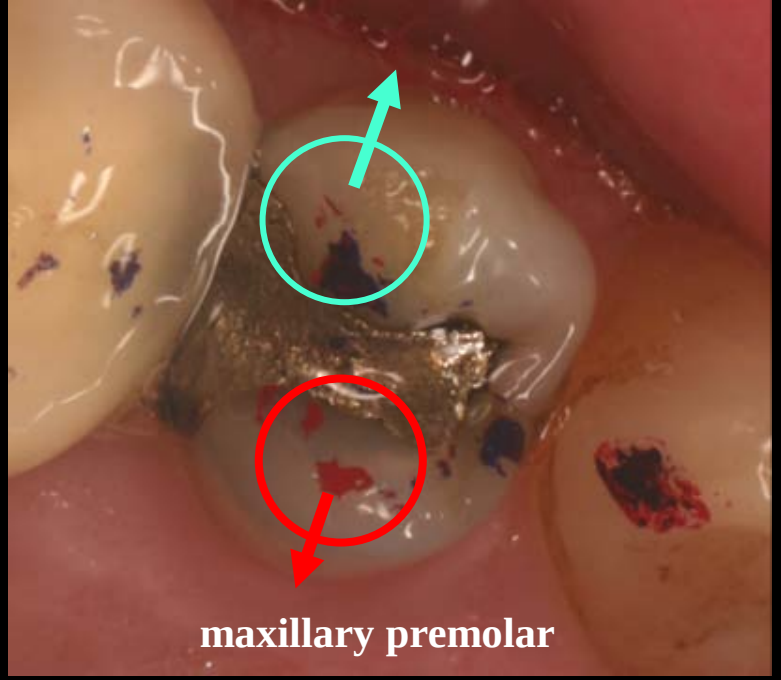
All of these causes frequently interact and modify lesion form

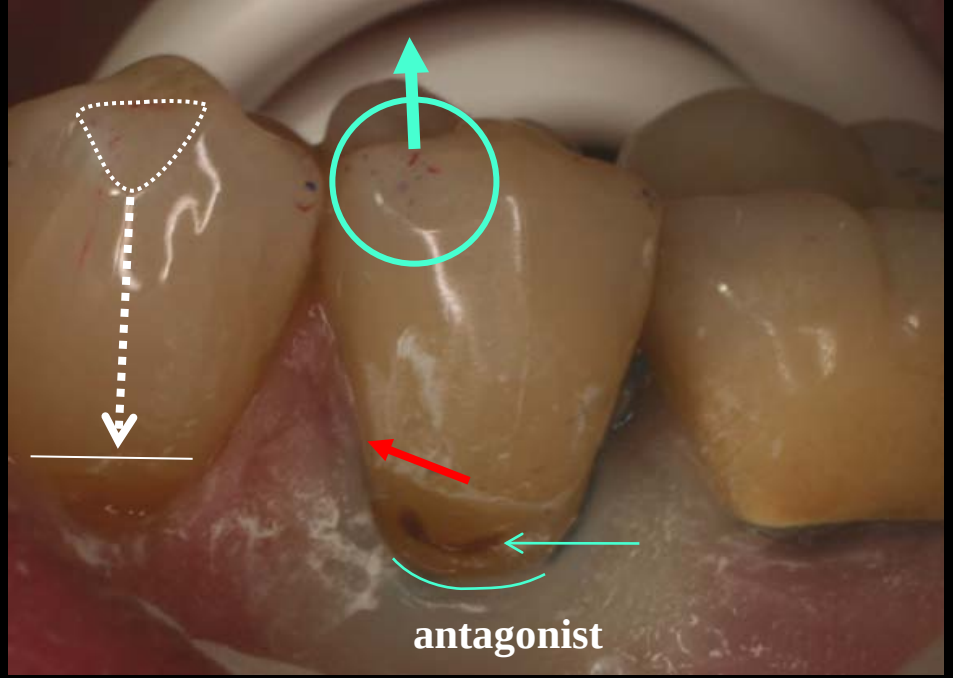
Occlusion is involved in at least 50% of cervical lesions



"Angular cervical defects are considered a sign of functional overload."

Schwahn B. ZMK 1999; 7/8: 432

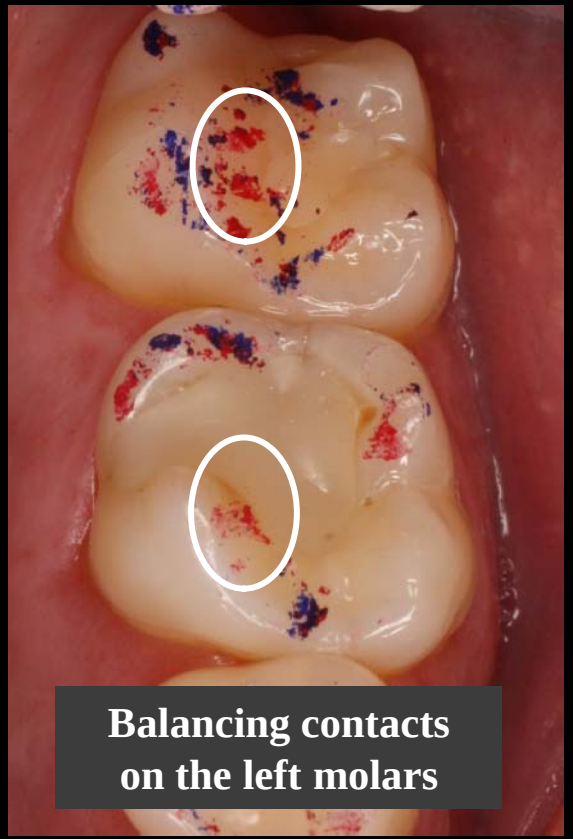




The cervical lesion on 35 is a mixture of tensile and compressive morphology

The mixture of forces explains the morphology

Why is this patient grinding to the right?



Cervical lesions without wear facets

Compressive morphology

frequently found on canines, then premolars and laterals

CROSS-ARCH INTERACTION

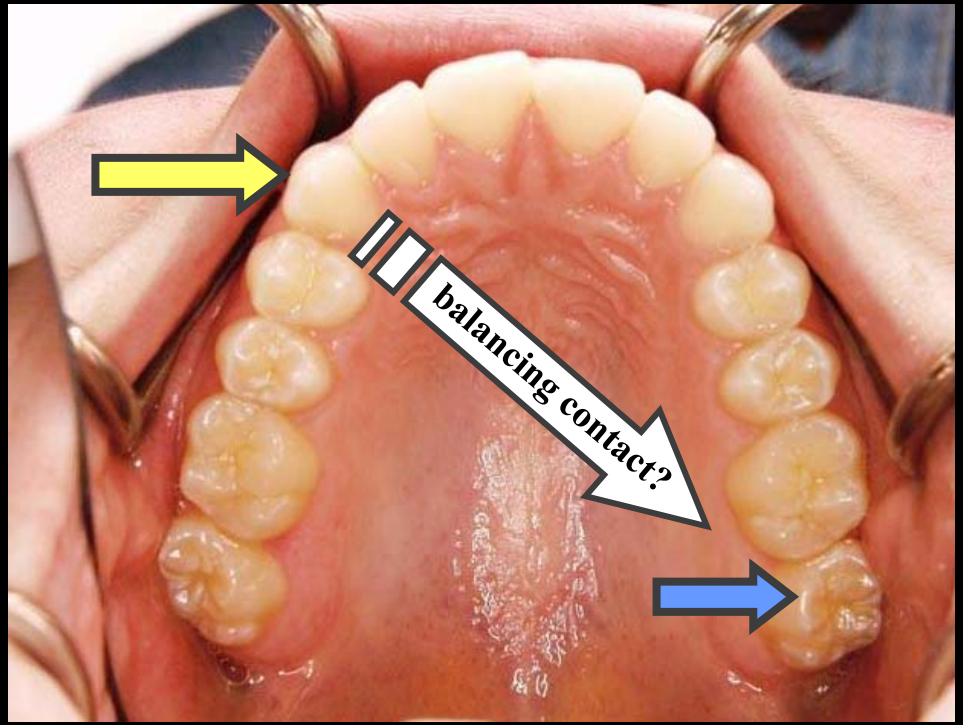
"Thielemann Diagonal"
1946

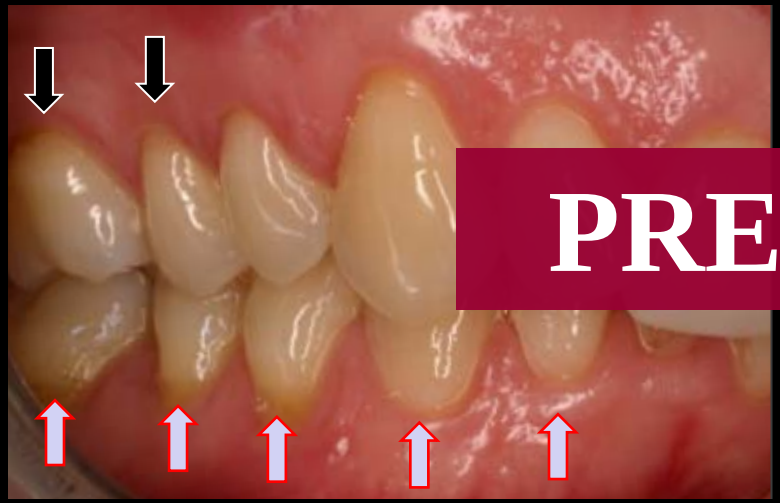
These patients usually do not grind their teeth!

They "only" clench...

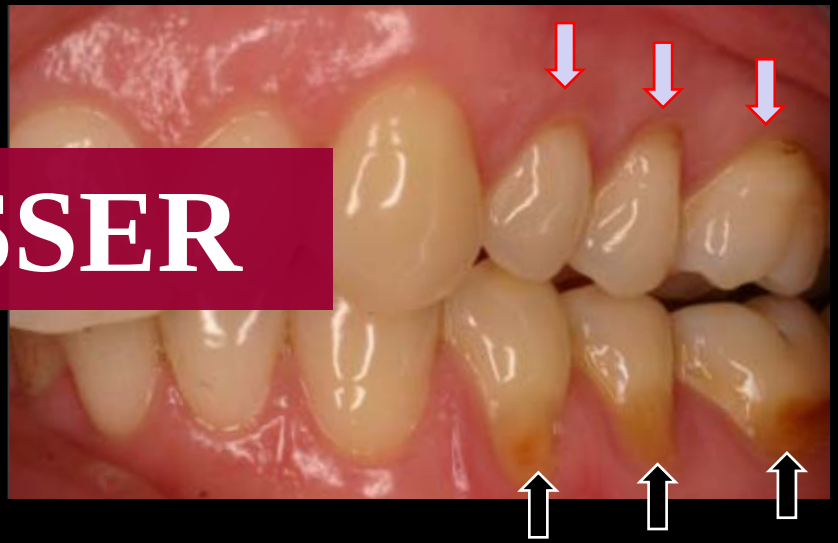
if unilateral
these contacts determine
- chewing pattern -
- sleep position -

Compressive Defect Morphology
canine, premolar or lateral on one side





PRESSER



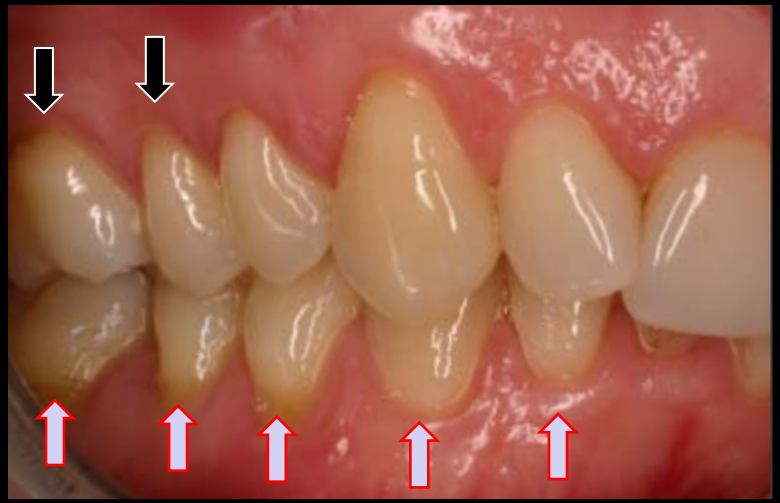
Class II / Division 2 Occlusion, multiple cervical defects

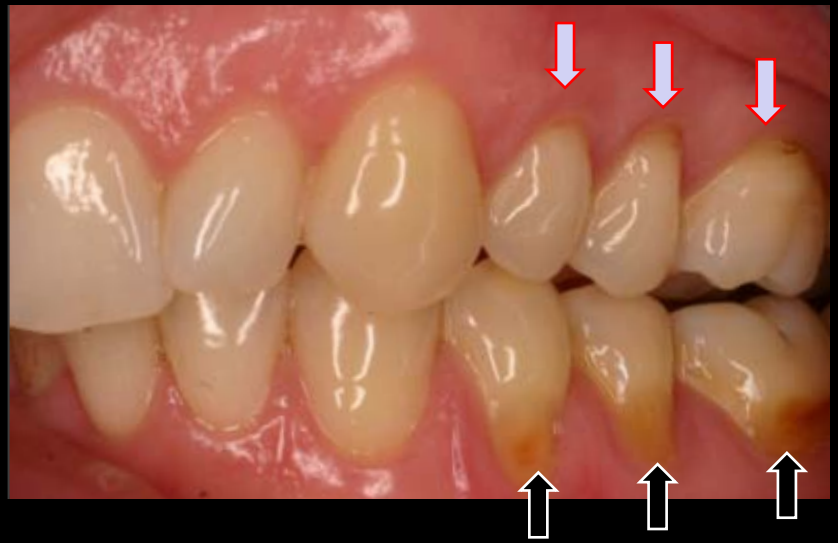
Minimal wear facets: no sign is a sign

Tension **Compression**

Symptoms

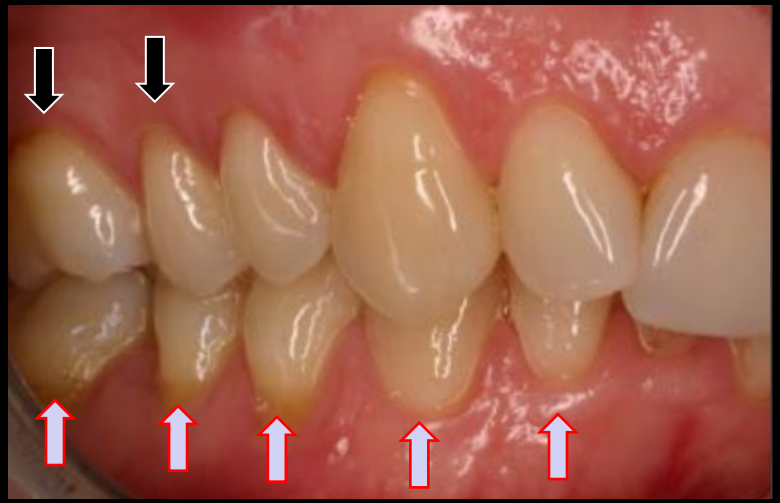
Teeth extremely sensitive to cold, chronic headaches left side (temporal)

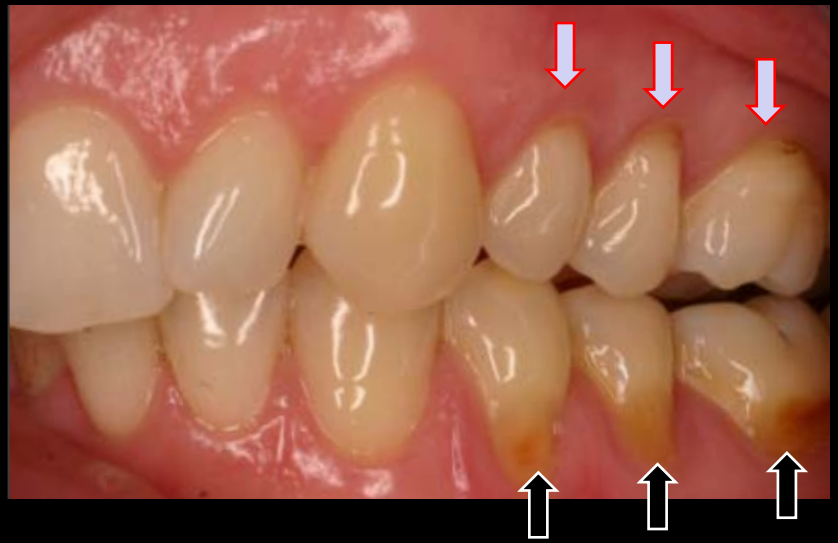




What does this make you think?

She bruxes – presses – to the right (lesion morphology)
with a protrusive component (lesion distribution)

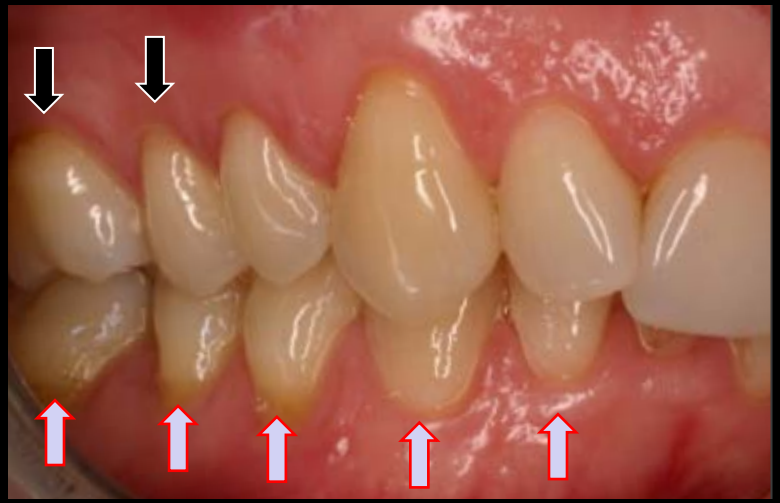


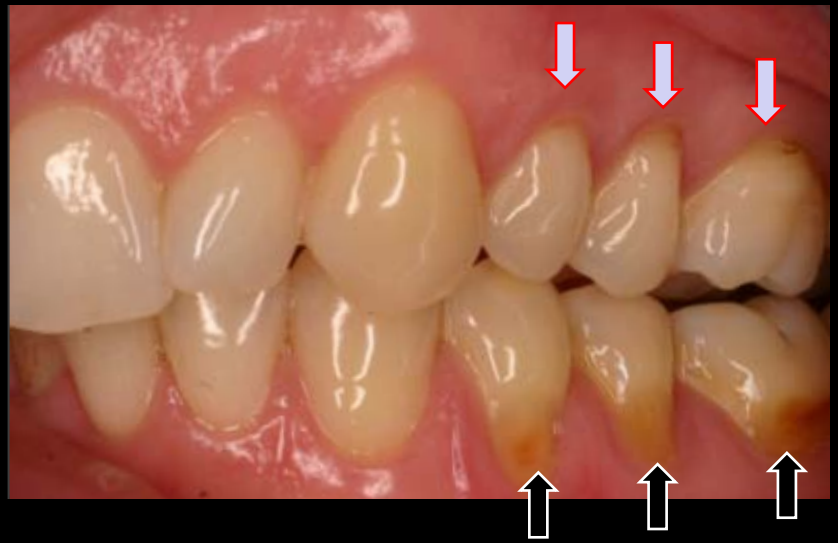


Unilateral function

does she chew mostly on the left side?

If she is not sure, give her something to chew.



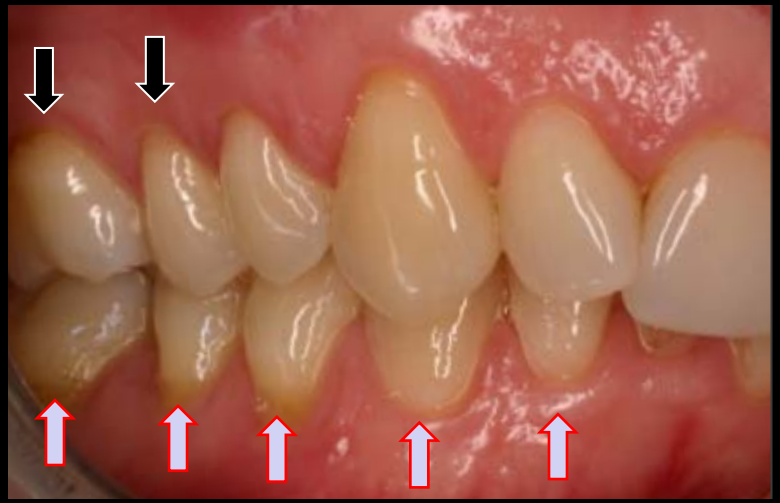


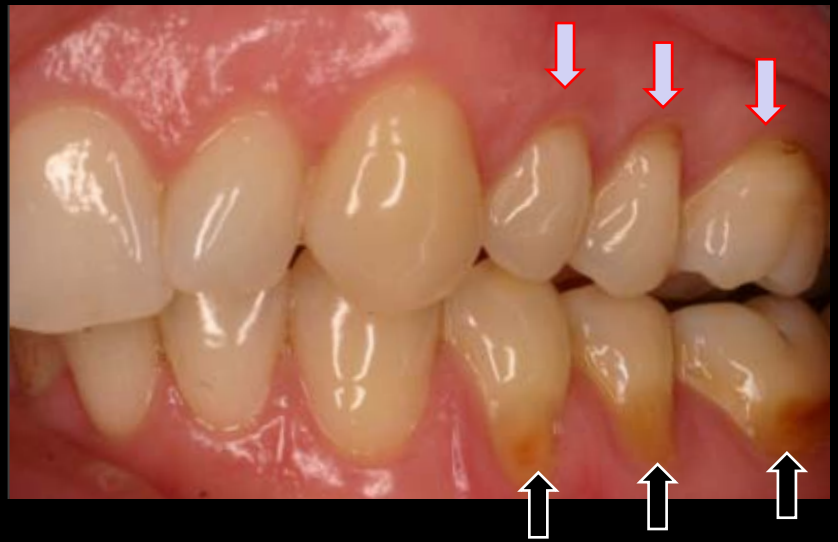
Unilateral function

does she chew mostly on the left side?

Sleeping position

right side, or on her stomach with her head turned left?





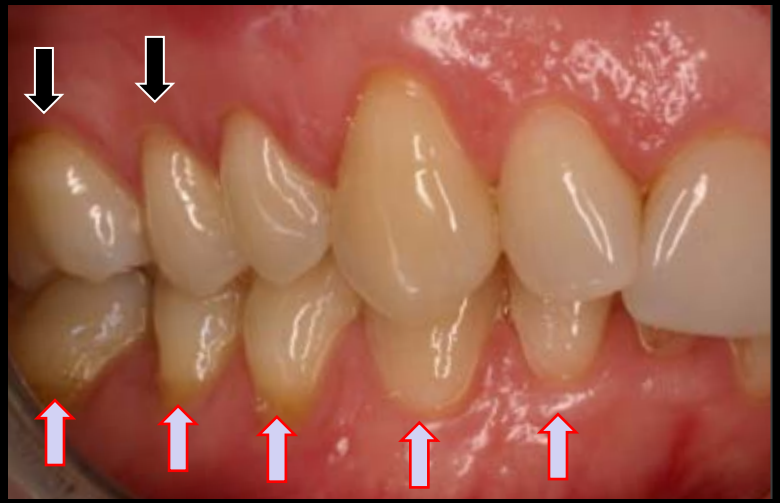
Unilateral function

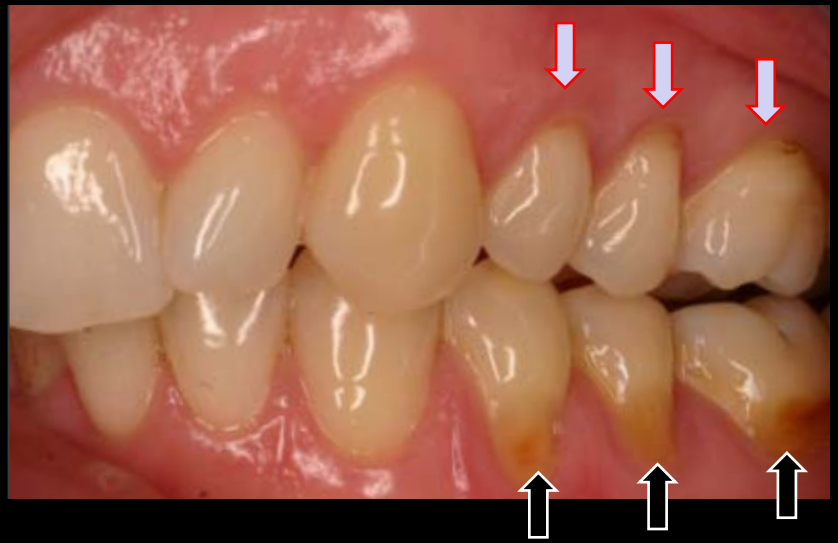
does she chew mostly on the left side?

Sleeping position

right side, or on her stomach with her head turned left?

If she is not sure, you can invite her to your "sleep laboratory".





Unilateral function

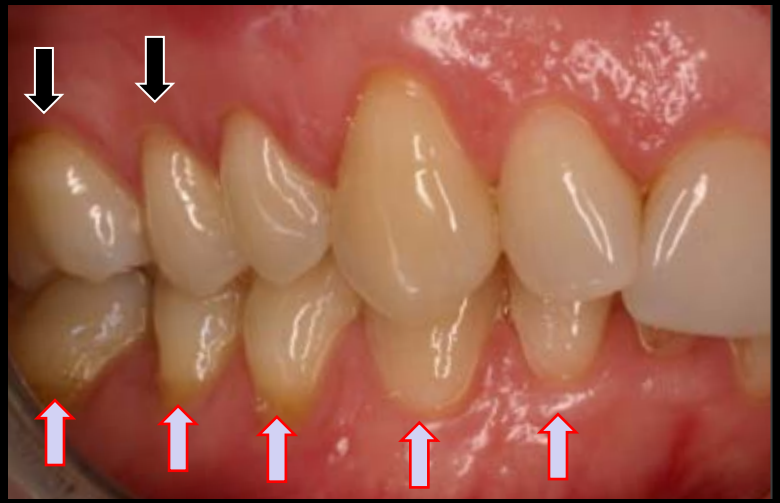
does she chew mostly on the left side?

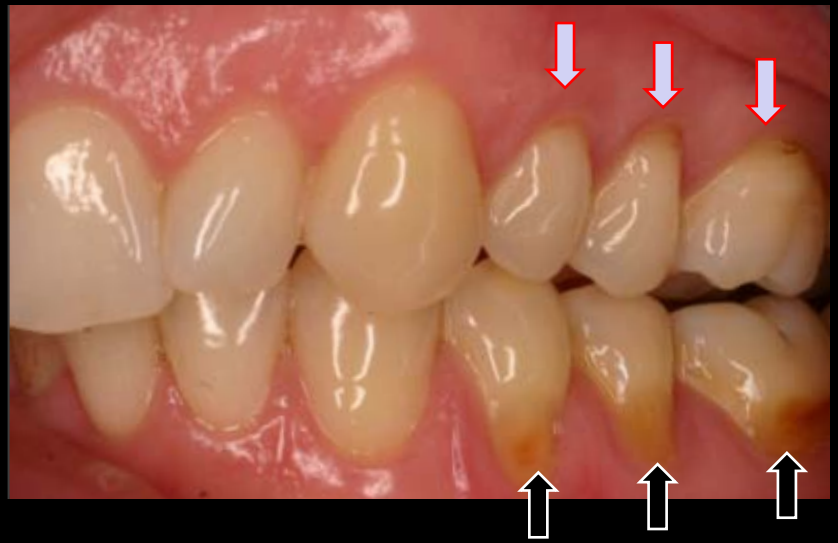
Sleeping position

right side, or on her stomach with her head turned left?

Eccentric contacts

m-l inclines of d-b cusps of mandibular molars on left side?





Unilateral function

does she chew mostly on the left side?

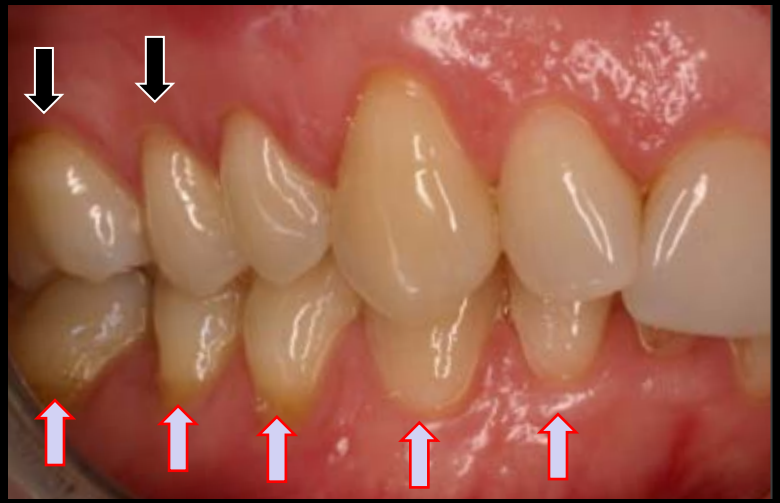
Sleeping position

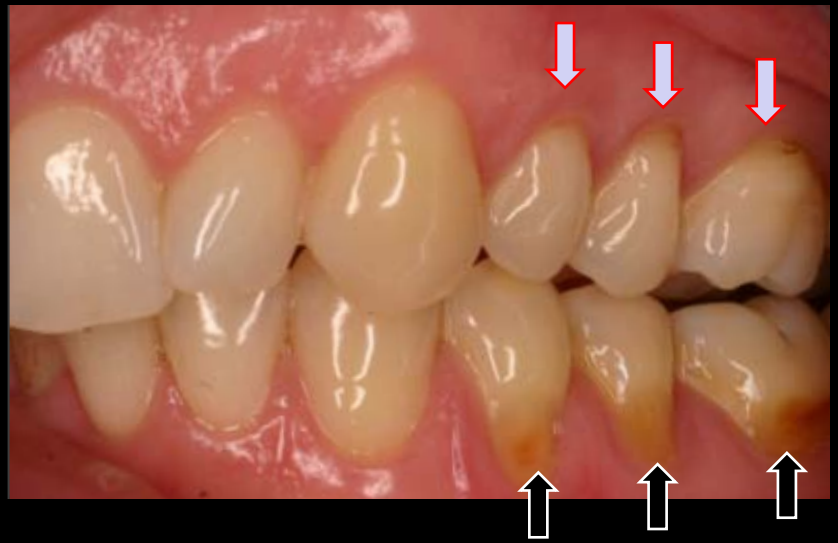
right side, or on her stomach with her head turned left?

Eccentric contacts

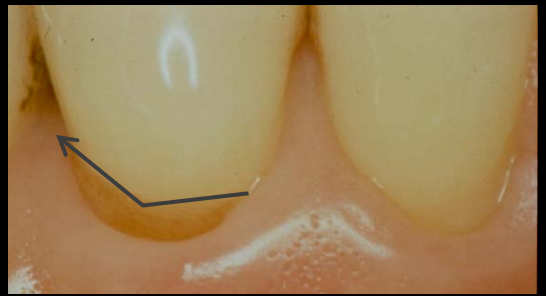
m-l inclines of d-b cusps of mandibular molars on left side?

Anterior fremitis? Mandatory adjustment!





She came to the dental office because of the sensitivity, but trying to treat it is a complete waste of time if you do not control the parafunction



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Clinical insight

Occlusion and cervical lesions: a controversial connection

By Dr Gary Unterbrink

The problems at the cervical aspect of teeth are prevalent. Patients retain their teeth longer due to advancements in prevention and the increase in endodontic treatment. Most of us work in countries with an aging population. Sensitivity, stained restoration margins, aesthetic compromises; how many of your patients have these problems?

Introduction: Cervical lesions are multi-factorial

The loss of tooth substance at the necks of the teeth clearly has a variety of causes (1-5). No one questions the influence of the toothbrush and the brushing technique, acid erosion and caries as additional causes are also universally accepted. It is, however, nearly impossible to cause a cervical defect in enamel with a toothbrush alone, no matter which

The influence of occlusion remains controversial. The first theoretical models were proposed more than 100 years ago, but are generally still regarded as theories. Here we will examine this relationship more closely.

Terminology

Many different expressions have been used to

cervical defects, many dentists remain sceptical. Numerous studies have examined the relationship between wear facets and cervical defects and have not found a correlation (49-51). Results of course depend on patient selection, a better but still not statistically significant correlation is seen if only defects with sharp borders are included. This lacking correlation is frequently cited as proof that occlusion does not play a major role. Once again, I feel we should examine this more closely.

Bruxism is classically divided into two types: grinding and clenching. The muscles responsible for closing and

was measured rather than just looking for wear facets, and in this study a significant correlation with cervical defects was found (52). An exhaustive review of the literature concerning bruxism is beyond the scope of this short article, but it should not surprise anyone that wear facets do not correlate with TMJ problems. In fact, the opposite is true. Patients with extensive wear facets have a lower than average risk of developing craniomandibular dysfunction (53).

The high risk patients are those with cervical defects but minimal wear facets. TMJ problems, as well as chronic headaches or other symptoms,

Figure 5: A classic tensile stress defect, localized and with minimal vertical extension. A balancing contact was present on the palatal cusp.

Figure 6: Two discrete angles of the enamel border. One occlusal contacts on the distal incline of the buccal cusp, which bends the tooth to the mesiolingual. The second contact is near the cusp tip on the mesial incline.

Two clinical observations can be

scientific evidence, at least in my opinion, is sufficient and conclusive.

Perhaps the occlusal aetiology of cervical defects will remain controversial. The extreme biological variation in anatomy, the even higher variability of human behaviour in relation to diet and oral hygiene and the overlapping causes of cervical lesions make things difficult. Occlusion itself is dynamic and changes occur both naturally through attrition and artificially with dental treatment. A new crown on an upper right molar can cause a lesion on the lower left canine, or remove the cause of an existing defect.

as a "locus minoris resistencia" (15). For example, there are clear micro-anatomical differences at the enamel-dentin interface if compared to cusp tips. Cervical enamel is poorly bonded to the dentin and breaks off fairly easily, a phenomenon which all dentists have observed when extracting teeth. The frequency of developmental defects is higher in cervical enamel, and the proportion of organic material is higher (16).

The hard and brittle enamel covers the relatively soft and flexible dentin. The deformation of dentin with fairly small forces is documented in countless studies (17-19). Laboratory investigations with cervical restorations in extracted teeth are interesting. If an occlusal load is applied, more gaps and higher microleakage is the result, a clear proof of deformation (20-23). It is also worthy of note that the elasticity of dentin varies with the position of the applied load; the elasticity modulus is approximately 14 GPa if the tooth is loaded mesially or distally, but only 9 GPa if bent in a buccal or lingual direction (24). A final comment on elasticity; the elasticity modulus of dentin is lower than that of maple wood (25). Look at the trees during the next storm and think about teeth. Enamel and dentin are anisotropic; i.e. their physical properties such as flexibility or strength change depending on the direction of load (26-30). Enamel can be fractured quite easily parallel with the prisms, but is much stronger if the load is perpendicular to them. Dentin also has a structure, in this case it can be fractured perpendicular to the tubules more easily than parallel with them.

Understanding anisotropic behaviour is important when we try to interpret the scientific papers.Occlusion is a mechanical stress. The effect of this stress will depend on many factors; these include the anatomy of the root, the level of bony support, the force and angle of loading, etc. The 'weakest link in the chain' will suffer and will vary from patient to patient. Bone can be resorbed, often followed by gingival recession. The enamel can be abraded and we find wear facets.

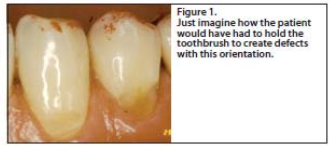

Figure 1. Just imagine how the patient would have had to hold the toothbrush to create defects with this orientation.

FEA is a design tool of mechanical engineers and is routinely employed for the design of dams, skyscrapers, bridges, airplanes, etc.

In dental studies using FEA, upper premolars are generally modelled. These are the teeth with the highest incidence of cervical lesions. If the periodontal support is normal, we find

permit modelling anisotropic behaviour and if the correct anatomy of the teeth has been observed, including the asymmetrical dentin, then the highest stress concentrations are always found in buccal cervical enamel (33, 34).

Parafunction does not correlate with occlusion, but it does correlate with psychological stress. This factor is also dynamic and a further complication for our clinical diagnosis and treatment planning.There is the old saying 'You only see what you know'. When you begin to see, your clinical observations will continuously confirm the relationship between occlusion and cervical defects.

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significant information. Tensile stresses are generally localized and are the most destructive, a defect caused by tension has a small vertical dimension and tends to have very sharp enamel and dentin borders. Compressive stress is less destructive and not as localized, these lesions will show a larger vertical dimension and the perimeters are not as sharply defined. An angular load naturally causes angular stress and the borders of the lesions will reflect this. Lesion morphology usually will tell you where the occlusal contacts are located before they are even marked with articulating paper.

Epidemiological studies have repeatedly established an interesting correlation: teeth with mobility do not have cervical defects (45-47). A tooth that moves does not bend. Cervical defects can also be created in the laboratory with occlusal loading in an acidic environment, without a toothbrush, toothpaste or bacteria (48). There could hardly be clearer evidence that teeth are subject to stress corrosion.

Bruxism and parafunction

Now we have arrived at the last source of confusion. Despite the clear scientific evidence concerning the role of occlusion in initiation and progression of

Figure 2: If the enamel was not missing, it would reach the gingival margin. Why is the defect on one tooth extensive, and quite small on the adjacent tooth?

Figure 3: A very small enamel lesion which certainly has nothing to do with a toothbrush. It correlates perfectly with the stress concentrations created by the position of the occlusal contacts.

Figure 4: Clearly both acid and the toothbrush are involved here. But why is the lesion on the first premolar so large and why is the cusp tip fractured?

Watanabe LG, Nonomura G, et.al. Dentin erosion simulation by cantilever beam fatigue and pH change. J Dent Res 2005;84:371-5 stress corrosion

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I have chosen only representative papers from a large number of publications. My apologies to those whose work has not been cited.

Gary Unterbrink graduated from dental school before completing mandatory military service in an Army dental clinic in Germany. Gary then spent three years working in private practice in Regensburg, then a year at a government clinic in Austria. Fifteen years with Ivoclar-Vivadent followed, including positions as director of clinical research and later, director of professional services. In 2001, Gary joined a former department employee in private practice in Liechtenstein, while continuing to lecture. Gary has delivered more than 3,000 lectures in more than 60 different countries.

19 year old male
centric and slightly open

At 40 mm. opening, pain TMJ right side,
reciprocal click left side

Masseter bilateral +,
Temporal bilateral +, SCM left ++

Frequent headaches
frontal and occipital

What is the first thing you see?

19 year old male
centric and slightly open

At 40 mm. opening, pain TMJ right side,
reciprocal click left side

Masseter bilateral +,
Temporal bilateral +, SCM left ++

Frequent headaches
frontal and occipital

Immediate deviation on opening:
< 2 mm

Sleeping position? **Preferred side in function?**

Chews on the side with the balancing contacts (on the left)

Sleeps with the balancing contacts toward the ceiling (on his right side)

Mediotrusive balancing contact on the left

No headaches unless he sleeps four or five nights without the deprogrammer

Other symptoms all significantly reduced

Patient informed about options, desires no further treatment at this time

Patient has a few problems, has seen > ten medical specialists

Neck and back pain, constant headaches, sleep disturbances

In comparison, his dental problems are minimal: pain in right TMJ at IID 35 mm, sensitive teeth

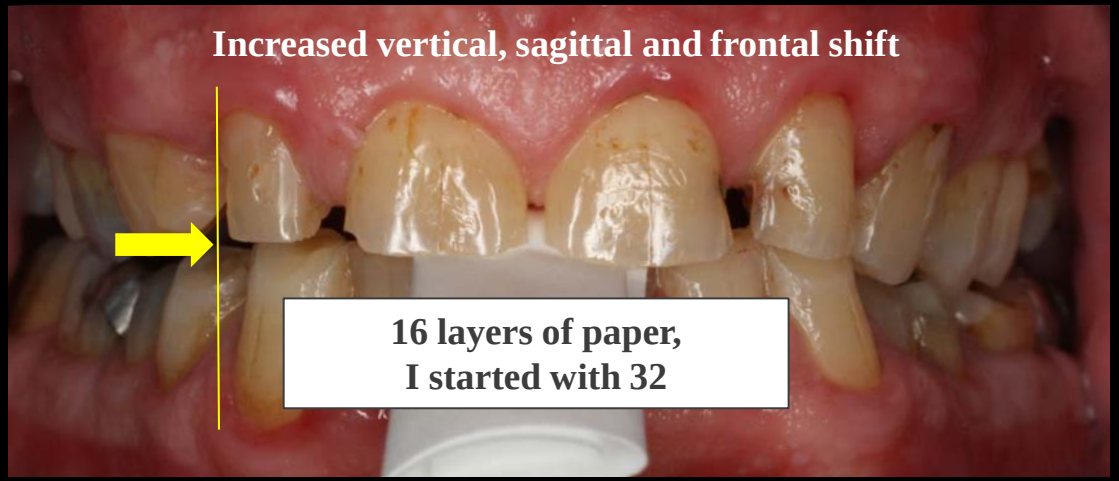
The other things that happen when you always feel like shit.
Problems at work. Financial difficulties. Depression.

Optimal treatment plan

Radiographs, hygiene program, etc. (which was of course done)
Deprogrammer, registration when symptoms reduced and mandibular shift is stable
Model analysis, laboratory splint at defined new vertical dimension
Onlays and crowns for at least twelve of the posterior teeth
E-max partial crowns for eight to ten anterior teeth

Probably another splint

In Liechtenstein, ca. 50,000 CHF



High-tech deprogrammer

Thick enough for complete disclusion

**Open slightly,
go protrusive then retrusive,
close just enough to "hold" the paper.
Repeat every few minutes.**

Reduce the thickness until first contact

(in this case 22 with 33)

"Economy" treatment plan

Anterior deprogrammer

Reduction of symptoms and consistent "interference" when removed?

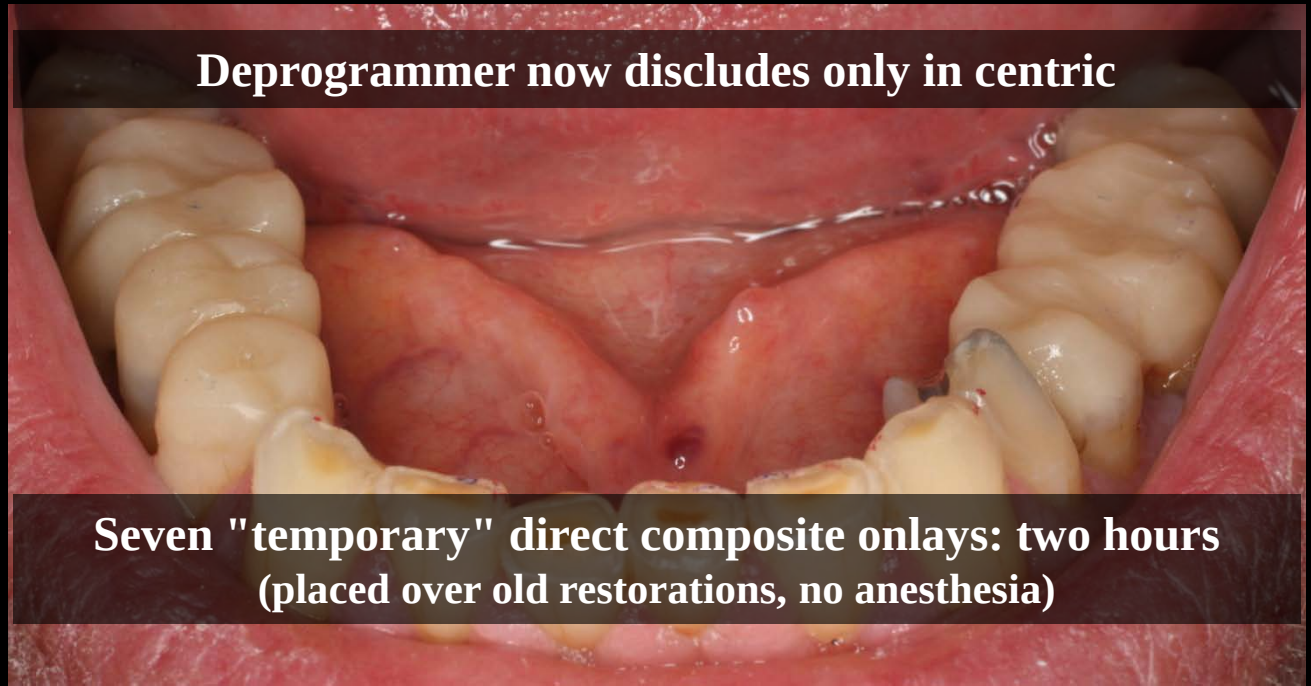
"Economy" treatment plan

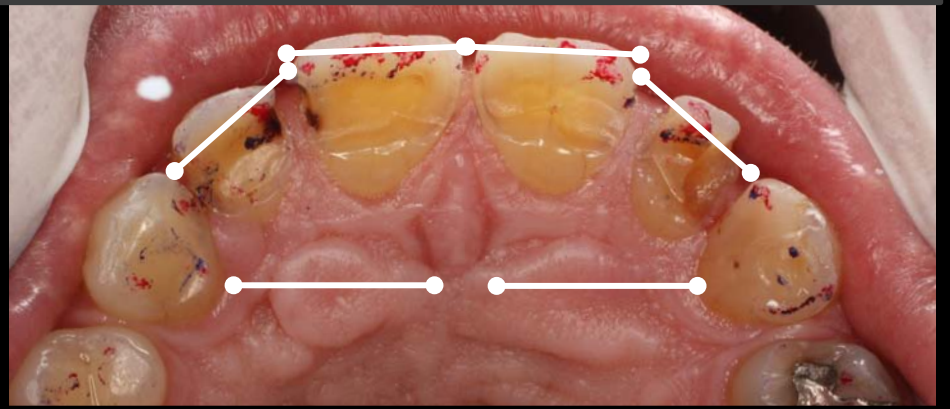
Anterior deprogrammer

Reduction of symptoms and consistent "interference" when removed?

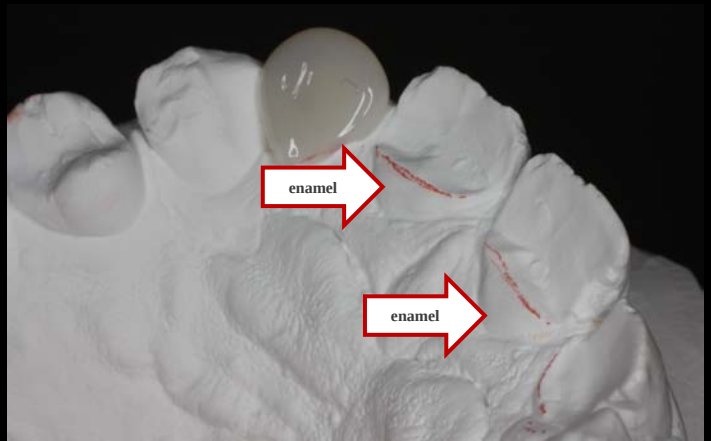
Registration with deprogrammer, occlusal analysis with models

Establish stable centric of posterior teeth with composite





Five weeks later: no return of symptoms, minor posterior corrections
Mock up 11 and the decision not to close the diastemas to the laterals



"Economy" treatment plan

Anterior deprogrammer
Reduction of symptoms and consistent "interference" when removed?

Registration with deprogrammer, occlusal analysis with models

Establish stable centric of posterior teeth with composite

Continue with deprogrammer, posterior occlusion stable?
Establish new anterior guidance with direct composites

At least temporarily, continue with the deprogrammer

The treatment plan of his previous dentist
included lots of crowns but no splint: cost estimate > CHF 20,000

Planned according to the "DIM" concept

(dumbest imaginable methods)

At least temporarily, continue with the deprogrammer

The treatment plan of his previous dentist
included lots of crowns but no splint: cost estimate > CHF 20,000

Total cost including diagnosis, hygiene, composites, and the deprogrammer
CHF 4,800

Naturally, we do not ignore wear facets

Die Okklusion und der Zahnhals: eine umstrittene Verbindung

Kaum ein zweites Problem in der Zahnheilkunde ist so verbreitet wie Zahnhalsdefekte. Erfolge bei der Prävention, die Zunahme der endodontischen Behandlungen und eine immer älter werdende Bevölkerung tragen alle dazu bei. Empfindliche Zahnhälse, verfärbte Füllungsränder, ästhetische Probleme am Gingivalrand; wie viele Ihrer Patienten sind betroffen?
Dr. med. dent. Gary Unterbrink Dimensions 2009

The combination of wear facets and cervical defects (and naturally the symptoms) provide significant information about how your patient parafunctions

Wear facets are not just to estimate bruxism intensity, but also how they brux

This mandibular position
explains everything I see

**Frequently you must give the patient a mirror
to show them how to occlude on the facets**

(and this means they only do it at night)

Why would anyone press on their teeth in this position?

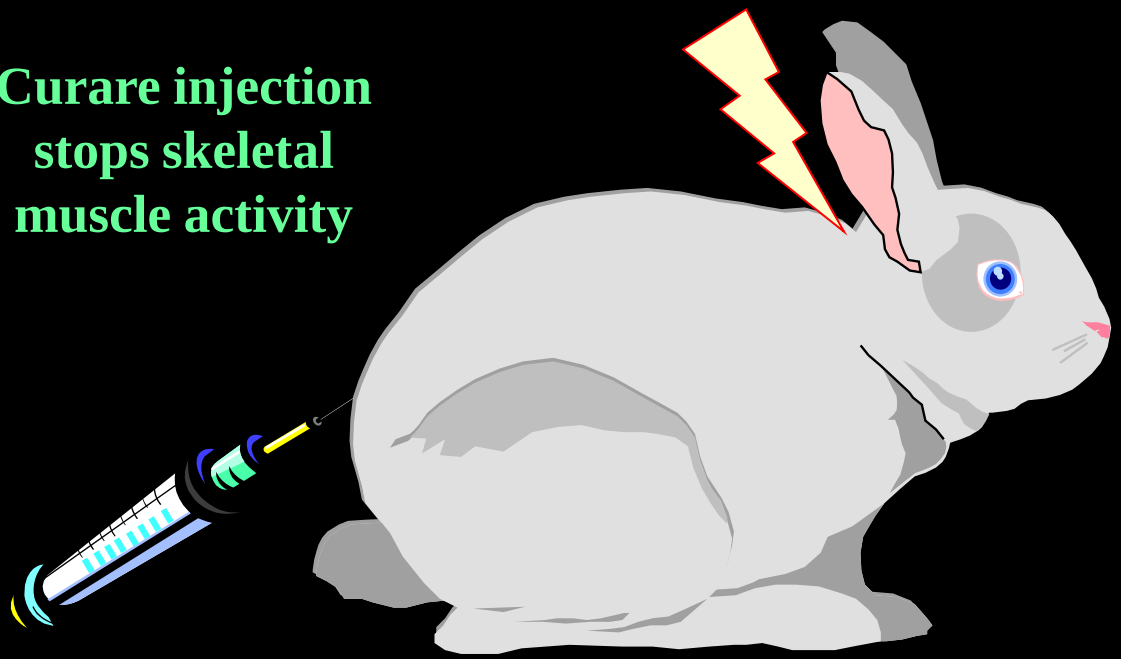
My theory

His grandmother was a camel

Almost everyone bruxes, but why?

A brief excursion into neurology and anatomy

Curare injection stops skeletal muscle activity



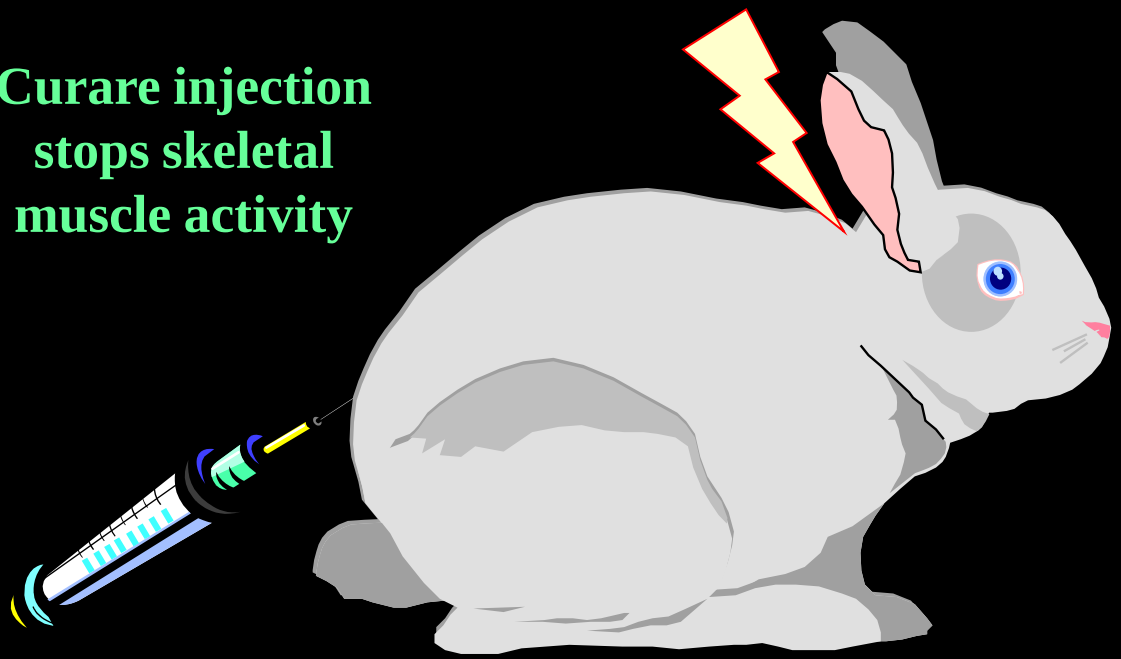
Stimulation of cervical sympathetic nerves

Jaw muscle contraction
(also SCM + trapezius)

The trigeminal nerve exits the CNS at C2-C4

Some jaw and neck muscles have *sympathetic motor* innervation!

Curare injection stops skeletal muscle activity



Stimulation of cervical sympathetic nerves

⬇

Jaw muscle contraction

(also SCM + trapezius)

Bible: Mathew 8, 22, 25; Job 16; Lam 2; Lucas 13

Stress

Epinephrine release, activation of sympathetic nervous system

⬇

increased muscle tone

Buzzi MG, Bonamini M, Moskowitz MA. Cephalgia 1995;15:277-80

Stress

Epinephrine release, activation of sympathetic nervous system

⬇

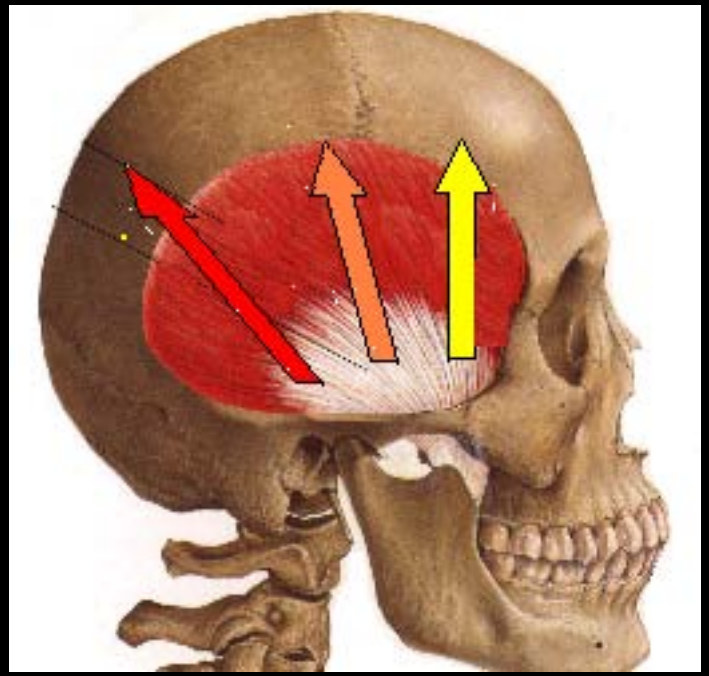
increased muscle tone

Buzzi MG, Bonamini M, Moskowitz MA. Cephalgia 1995;15:277-80

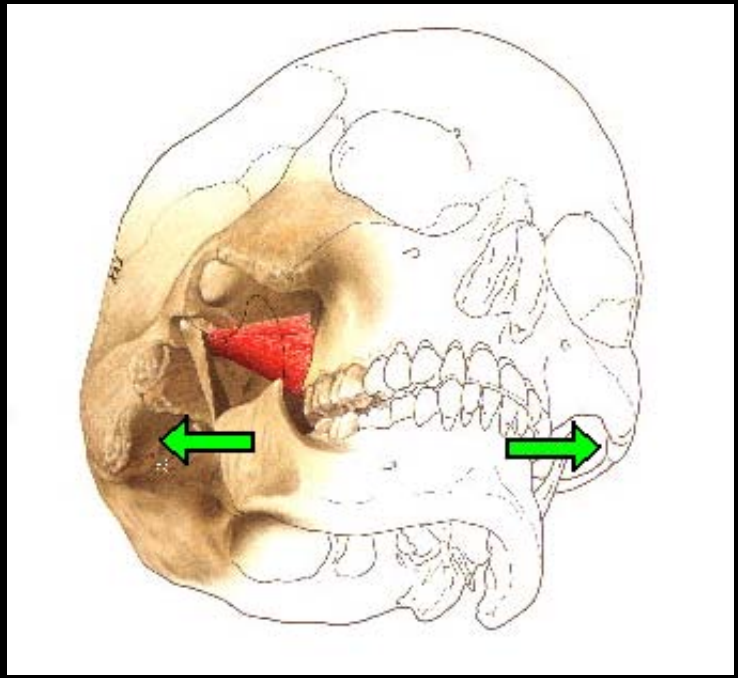
Muscles with a high proportion of spindle fibres are activated by psychological stress

Schleifer 1994, Warstead 1996

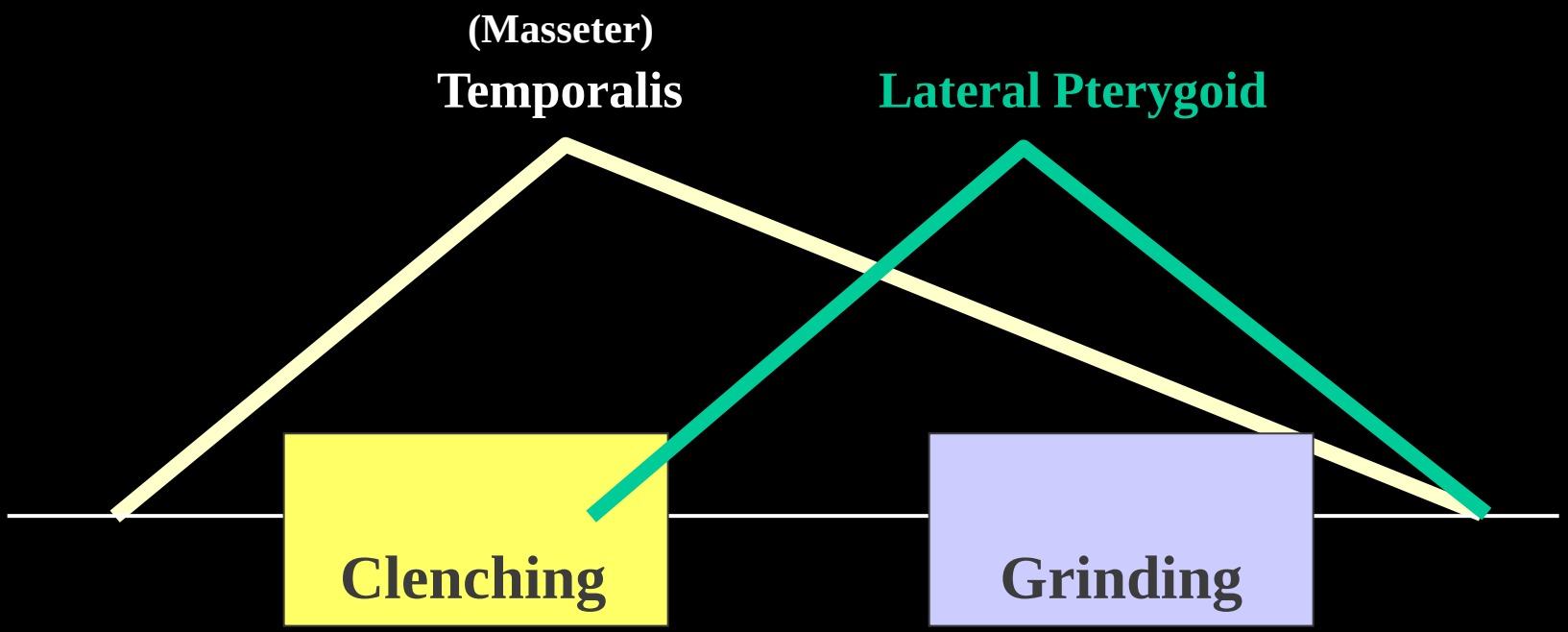
Temporalis



Lateral Pterygoid

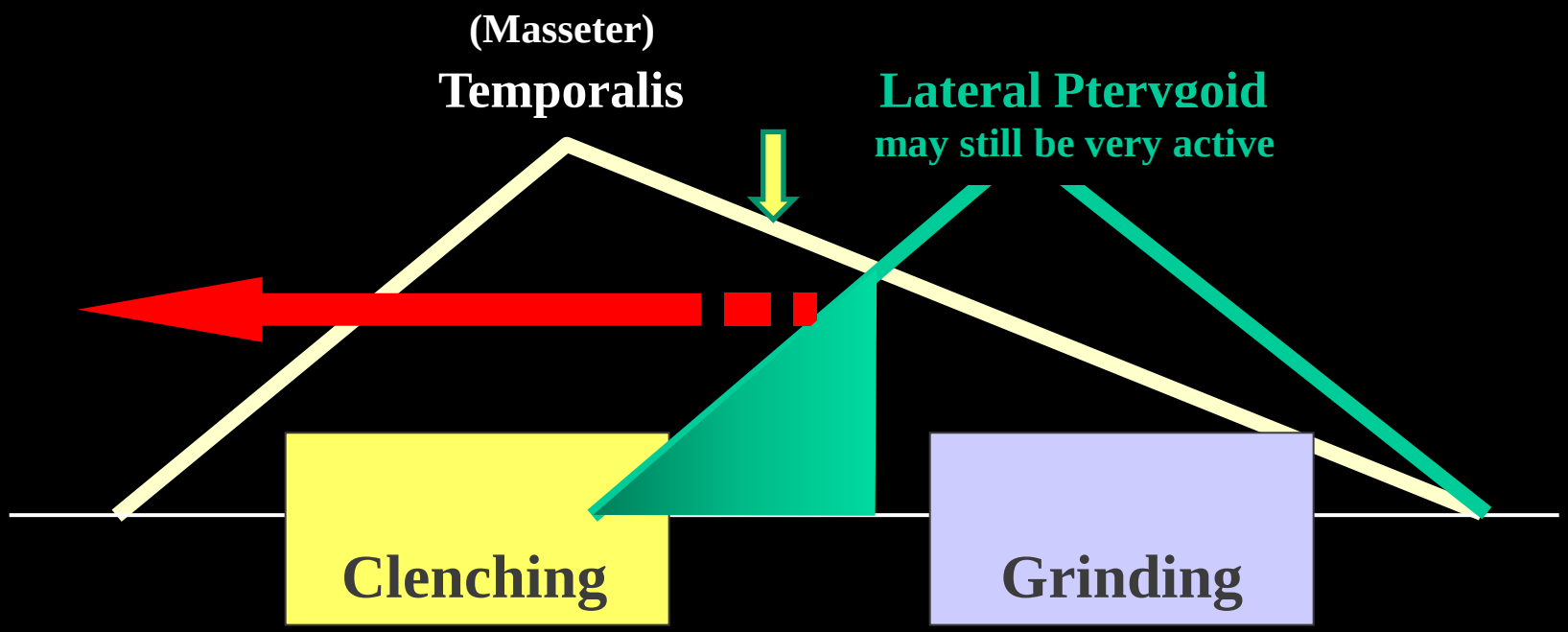


Press your teeth together as hard as you can,
keep pressing, and grind your teeth right and left at the same time.



Bruxism

Nonfunctional tooth contact with or without mandibular movement



Destructive Bruxism

If a muscle is working, but not moving anything, the patient has a problem.

(Masseter)

Temporalis

Lateral Pterygoid

may still be very active

Clenching

Grinding

headache intensity

correlates with temporalis EMG's during the previous night

Visser A, et.al. J Oral Rehab 1995

Study participants were instructed to press in centric occlusion for 30 minutes

69% of the 58 chronic headache patients
17% of the 30 control patients

got headaches

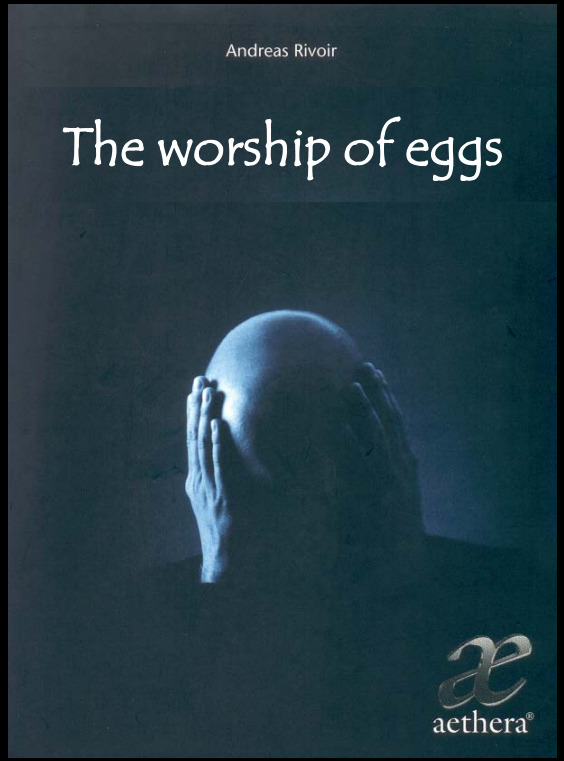
Study participants were instructed to press in centric occlusion for 30 minutes

69% of the 58 chronic headache patients
17% of the 30 control patients

got headaches

during the next 24 hours

Jensen R and Okesen J
Cephalagia 1996;16:175-182



Stress study in Switzerland

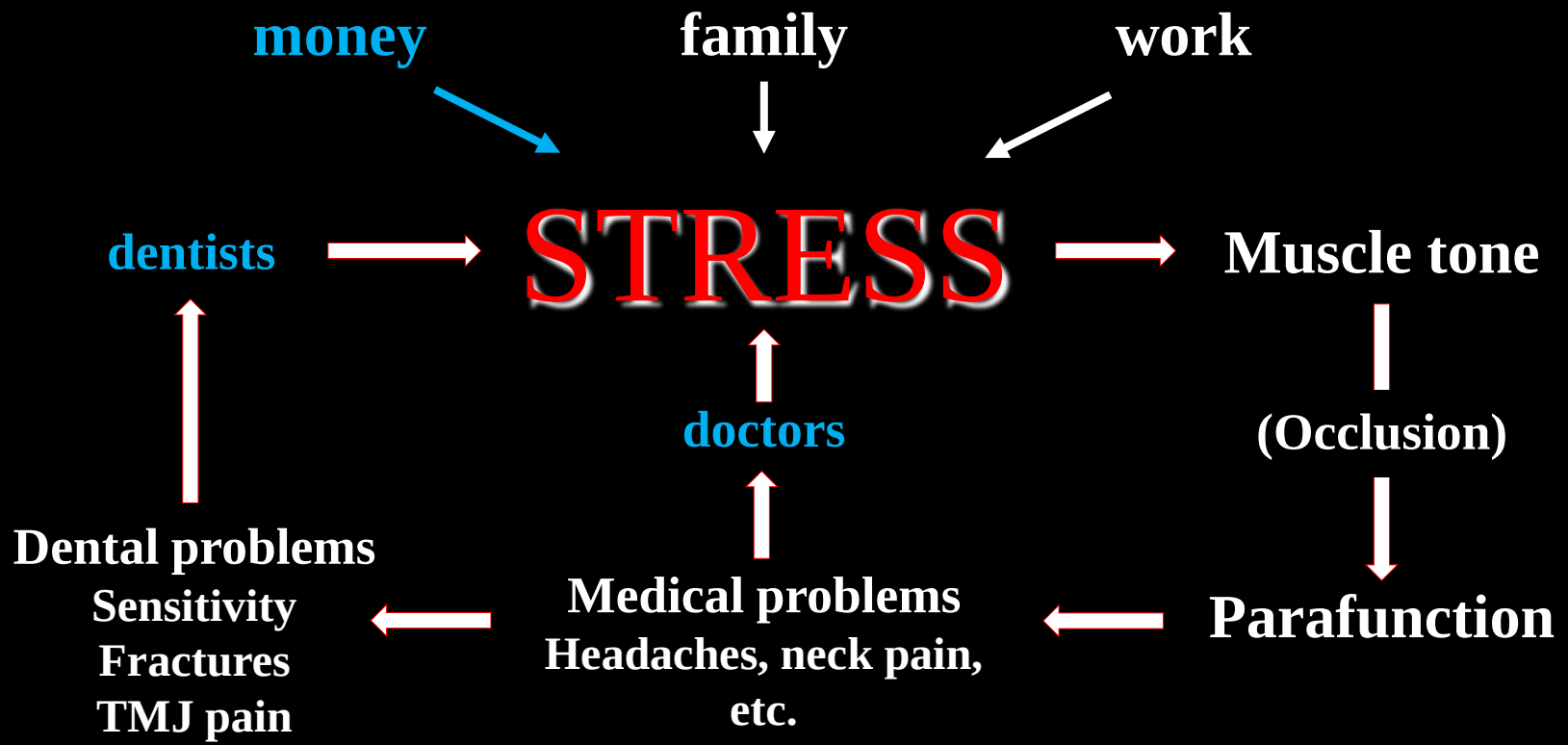
(Ministry of Economics)

Symptoms that are important for dentists

pain or stiffness in neck (18%)
sleep disturbances (18%)
tension headaches or migraines (12%)
depression or anxiety (8%)

Bruxism correlates with depression, fear, and stress susceptibility according to psychological testing.

Manfredini D, Landi N, Romagnoli M, Bosco M, Australien Dent J. 2004



Be sure your patient understands that their teeth are NOT the problem, they are only making the problem worse.

Three interrelated "co-factors"

Psychologic

Neurologic

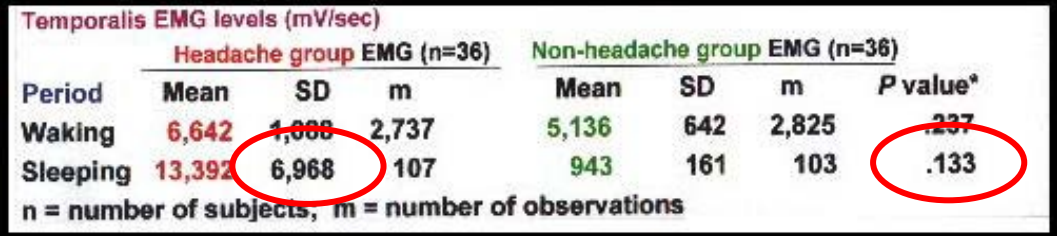
What came first?
Who cares?

Anatomic

Occlusion

Think about your decisions to begin endodontic treatment.
Is 87% probability really different than 95% probability?

Temporalis EMG levels (mV/sec)	Function	Sleep
Control patients	5,136	943
Headache patients	6,642	13,392



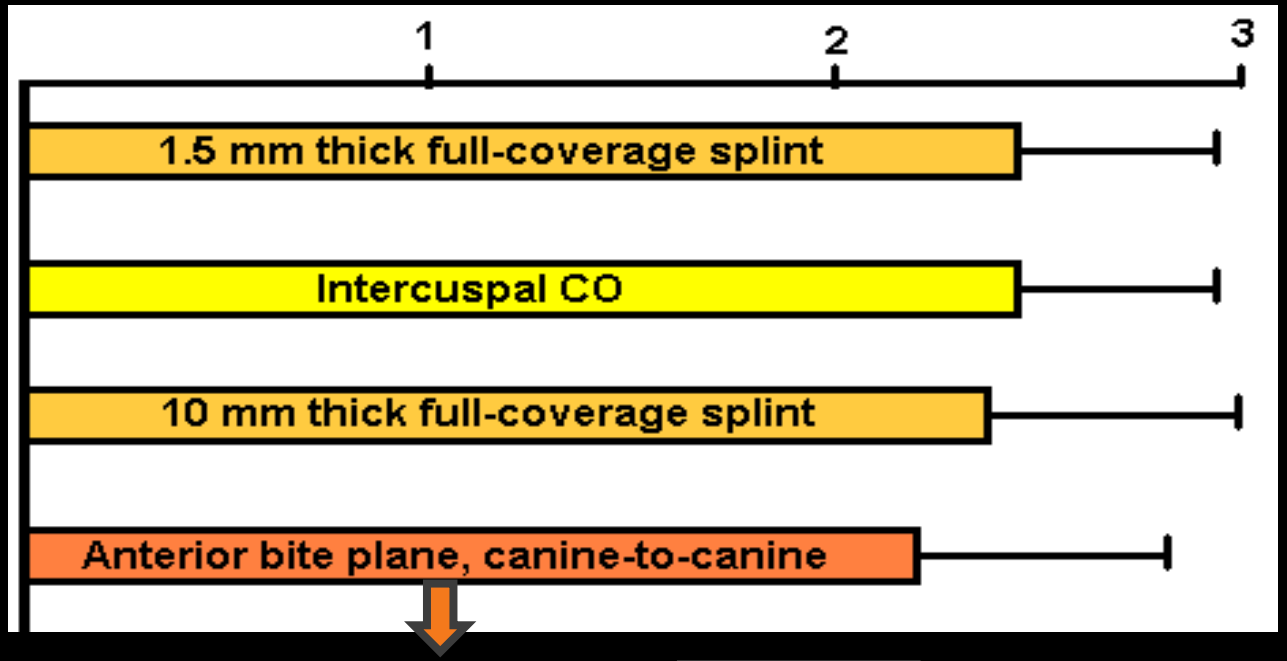
Temporalis EMG levels (mV/sec)

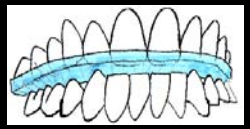
	Headache group EMG (n=36)			Non-headache group EMG (n=36)			
Period	Mean	SD	m	Mean	SD	m	*P* value*
Waking	6,642	1,088	2,737	5,136	642	2,825	.237
Sleeping	13,392	6,968	107	943	161	103	.133

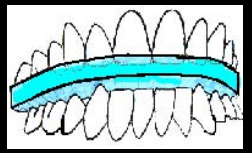
n = number of subjects, m = number of observations

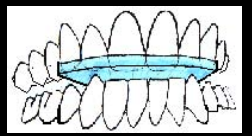
This publication is frequently cited with "no statistically significant differences"

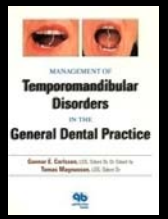
Temporalis contraction: maximum voluntary intensity

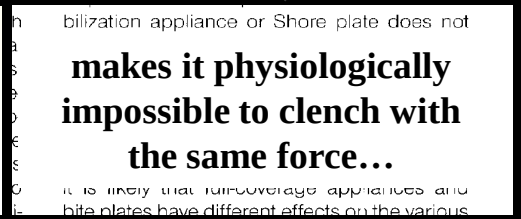


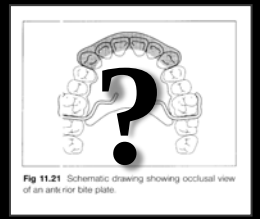








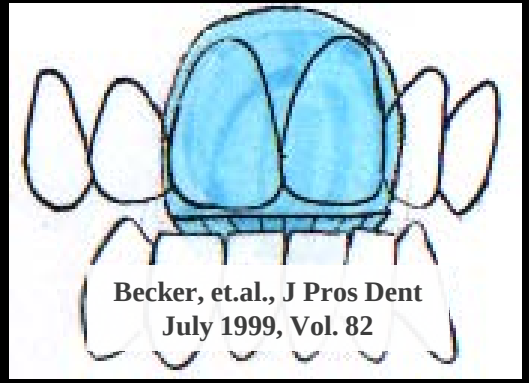




Gibbs C, et.al.
J Pros Dent 1984
(51): 691-701

Effect of a prefabricated anterior bite stop on electromyographic activity of masticatory muscles

contact of incisors only
(no canine or posterior contact in any mandibular position)
reduces temporalis contraction intensity by 60-70%.



Becker, et.al., J Pros Dent
July 1999, Vol. 82

Nociceptive Trigemimal Inhibion

NTI

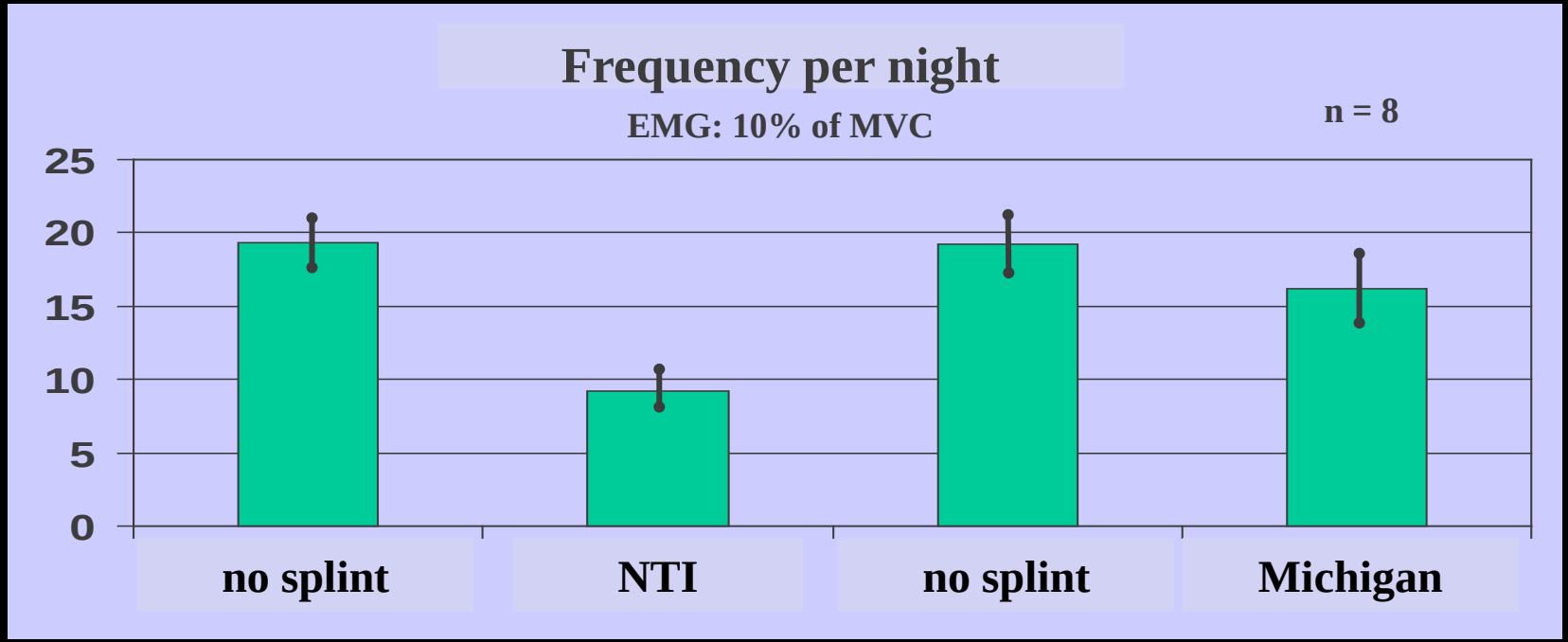
We do not want canine disclusion, we want disclusion of the canines!

An incisal splint (NTI) reduced the activity of the temporalis with all sleeping positions, whether right side, left side, or on their backs, the conventional splint (Michigan) had no effect.

Ishigaki S, et.al., J Dent Res 2004

Clenching has three components: intensity, frequency and duration

A deprogrammer can reduce all three



Clinical study: randomised crossover design

every two weeks: no splint - NTI or MS - no splint - NTI or MS

Baad-Hensen L, et.al. J Oral Rehabil 2007;34(2):105-11

36 year old female

Tension type headaches (ca. 10-15 days per month)

Cervical lesions, sensitivity, immediate deviation on opening, anterior abrasion

- two equilibration splints in last five years -

Six month recall
with deprogrammer

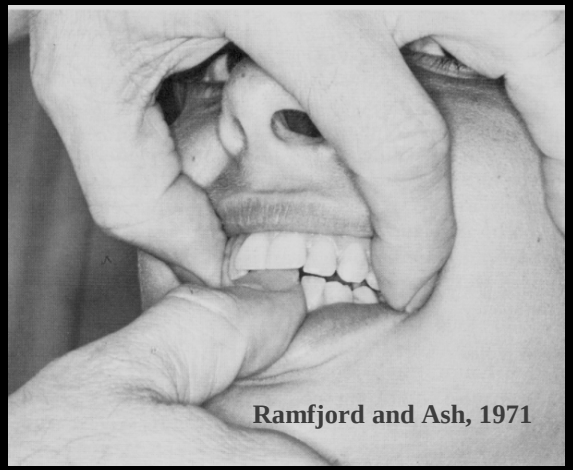
very few headaches, sensitivity reduced

She was comfortable with this vertical dimension, minimal wear on NTI
(and her occlusion had been equilibrated)

Occlusion on most recent flat plane splint at six month control

"Centric" on flat plane splint: where are the condyles?

Centric Registration



Her eyes prove she is relaxed

"one of the most complicated and error-prone steps"

"a simple recommendation…cannot be given"

"retralization of the mandible must be avoided"

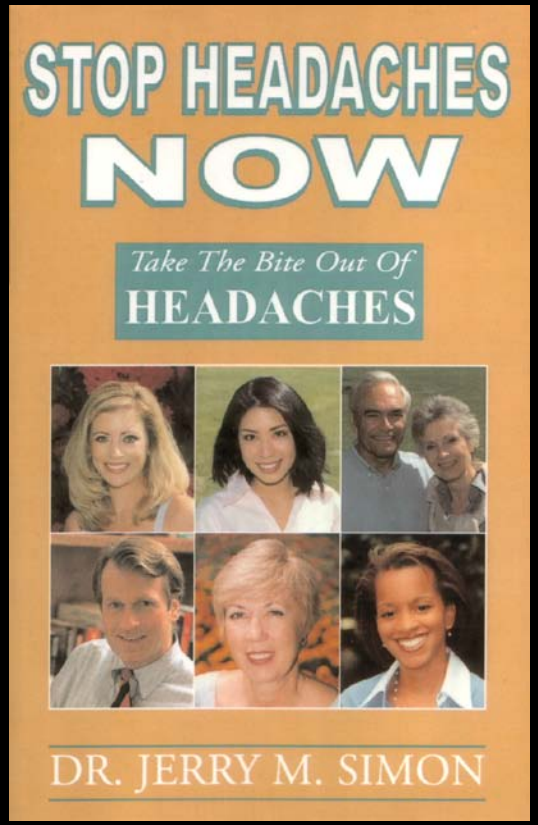
"remains a question of experience"

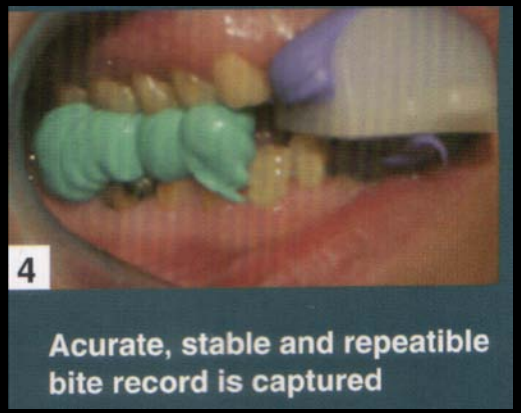
"muscles must be relaxed"

Kordass and Mundt, Quintessenz 54, 2003:1179-88

Bite registration with a symptomatic patient is a lottery
(and you know the probability of winning the lottery)

Anterior deprogrammers are not new, this book is from 1972



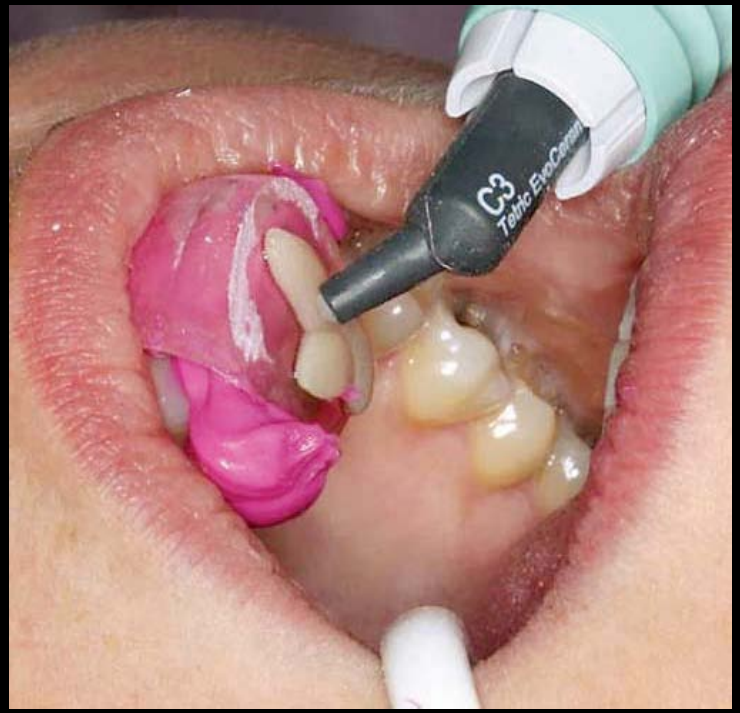


Famous lecturers need "their own"

Cranham Deprogrammer

Kois Deprogrammer

Anterior deprogrammer (Peter Dawson)



The time required for deprogramming is highly variable

(studies claim everything from fifteen minutes to three months)

Pain on left side (TMJ, Temporalis, SCM, Masseter)

Other symptoms such as vertigo, but she does not have headaches

"High tech" deprogrammer: registration after 15 minutes

Midline shift corresponded with deviation on opening

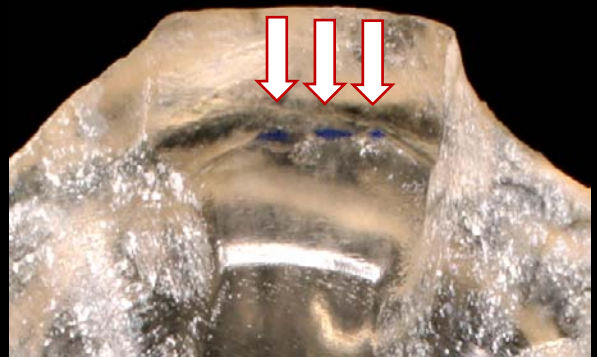
Aqualizer

1964
Lucia Jig

If you are only deprogramming diagnostically, why make it expensive?

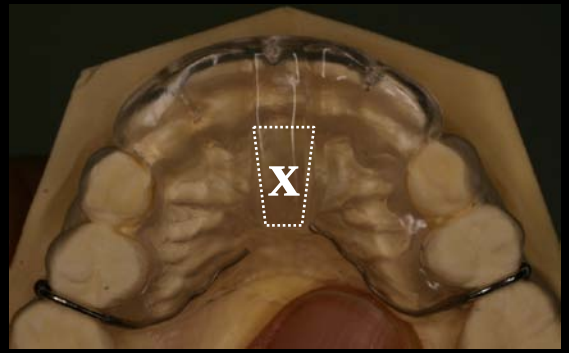
Addition of a disclusion element to orthodontic retainer

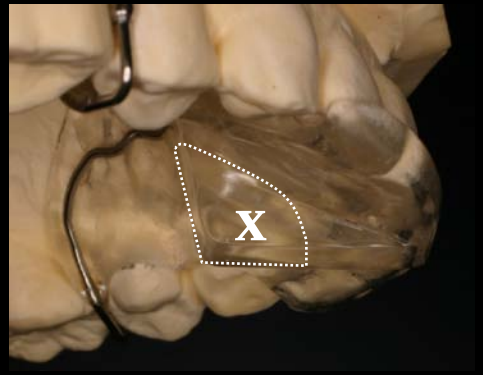
Existing splint "converted" to the deprogrammer concept

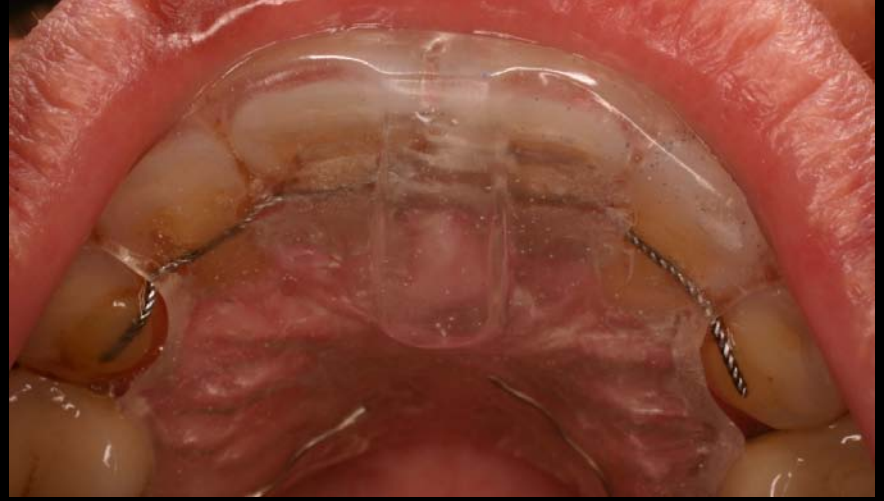


I would use laboratory splints more often if dental technicians in Liechtenstein were less expensive

(32 year old female with chronic headaches)





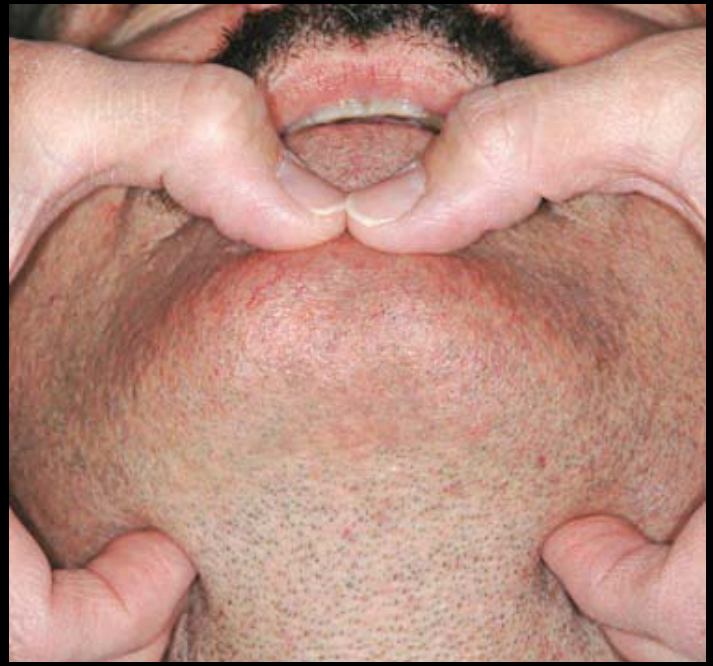


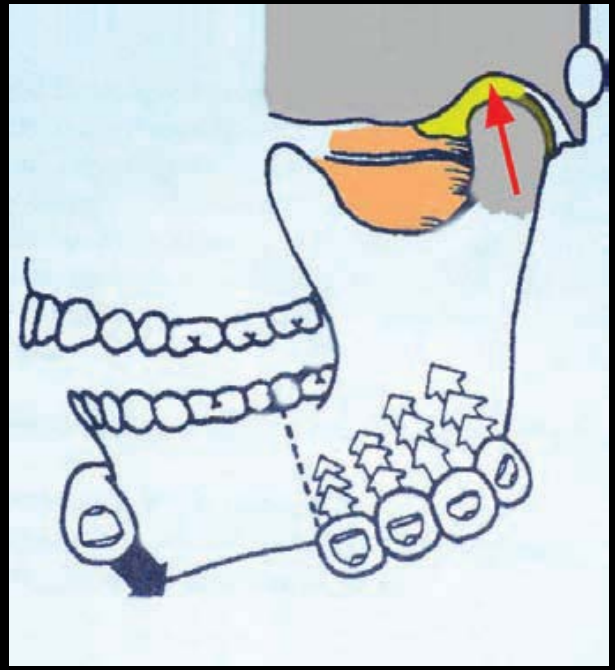
Deprogrammer

she also had a previous equilibration splint which did not help

Symptom free at four year recall, uses splint "most nights".

Bilateral manipulation (Peter Dawson)

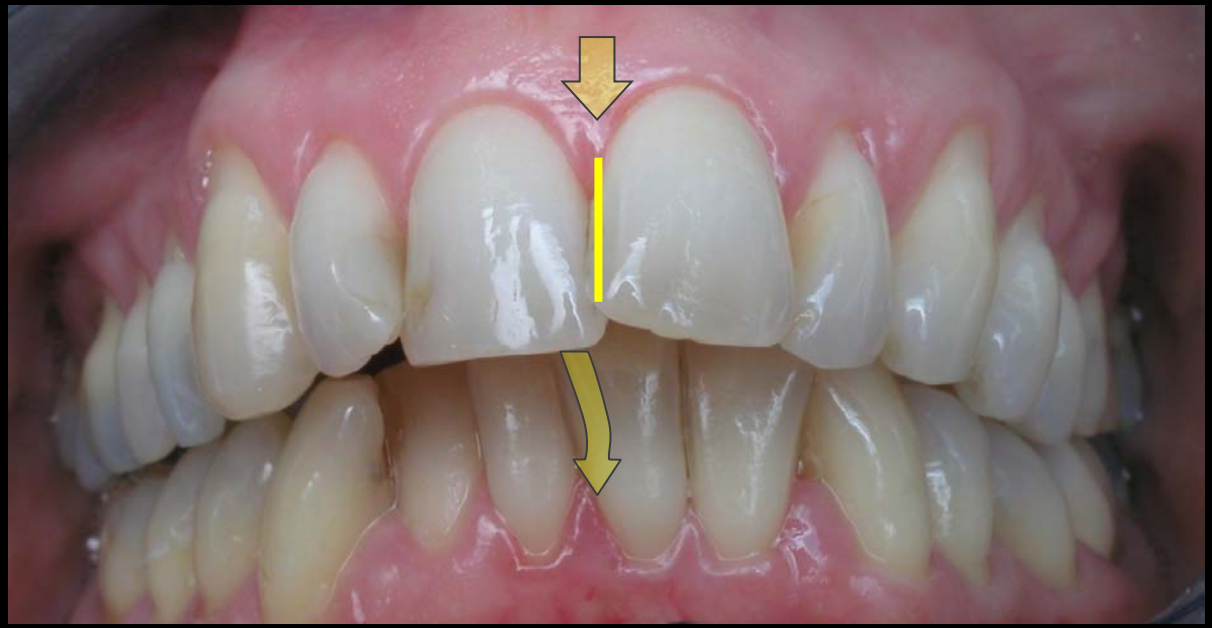




Dentist manipulated CR positions demontrate good reliability but poor validity

(You can consistently reproduce the same position, but this does not mean it is correct)

Pain and clicking in right TMJ, IID 28 mm
(immediate deviation on opening, chronic headaches)



Occlusal engram: the muscles know the position of the teeth

During the night, her muscles will "forget" the location of centric occlusion.

Patient should note first contact and direction of "slide to centric".

First contact in the morning: 33 with 22

Closure in centric occlusion: the mandible moves to the right and retrally

Should we "correct" the occlusion?

Symptoms completely relieved after three months

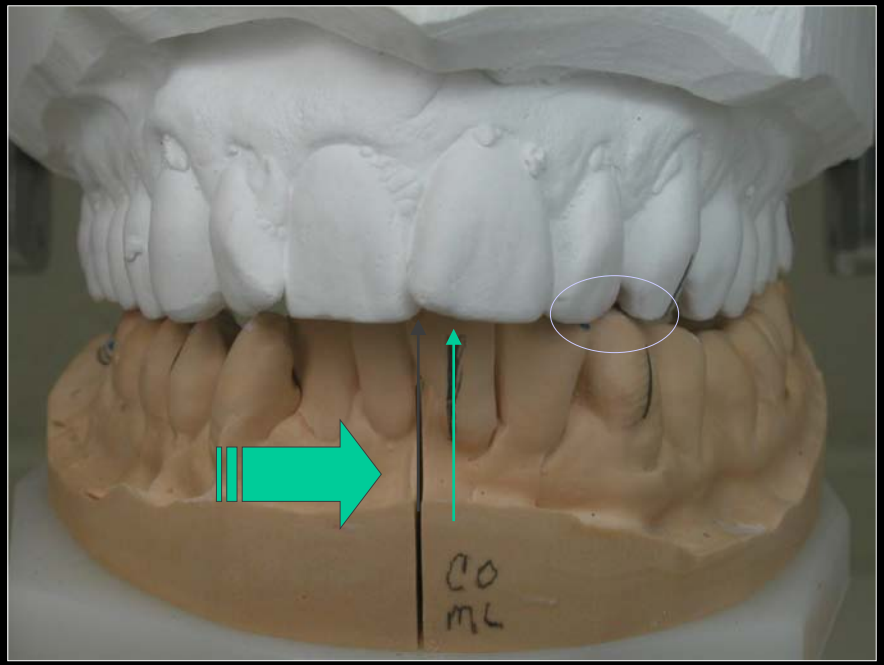
Registration with the deprogrammer, mount models, close in hinge axis

As a general rule, eliminate symptoms before considering occlusal changes

Mandible rotates left

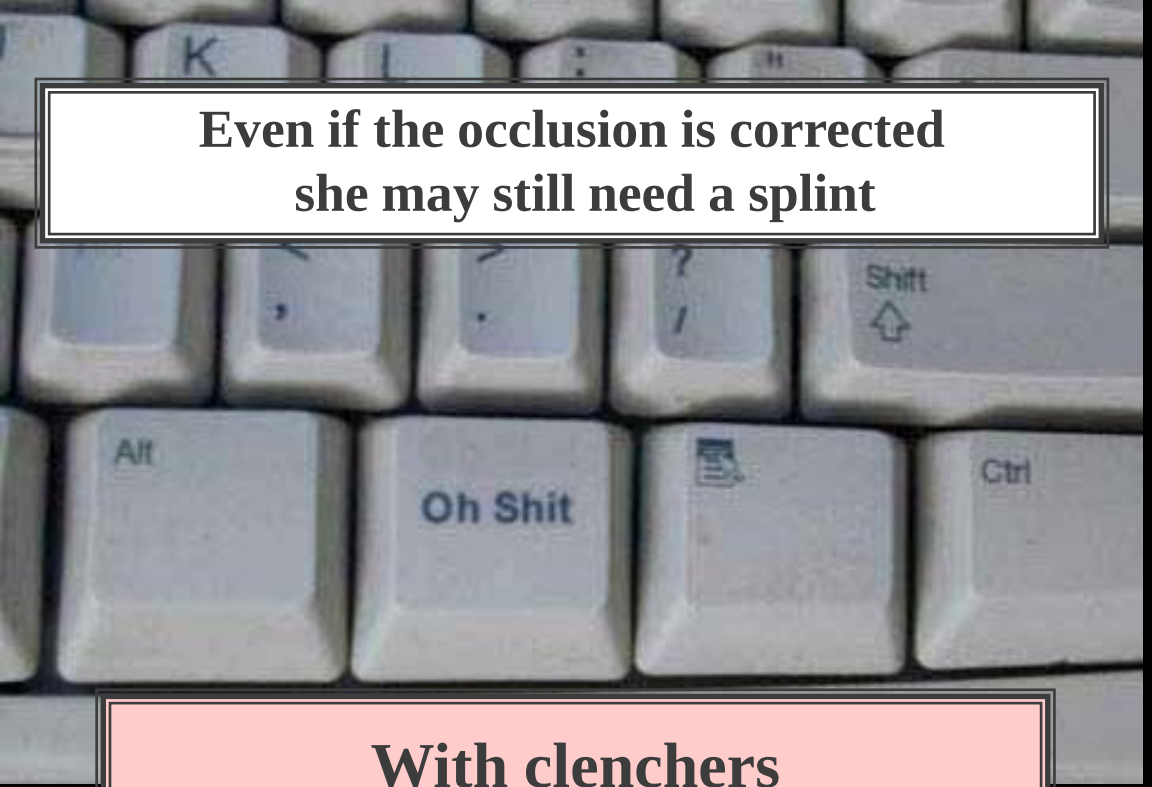
anterior movement of condyle on right

Occlusal treatment would require extensive changes, patient decided to continue wearing the splint



First occlusal contact on models is the same as reported by patient

NTI registration with models in CO



Even if the occlusion is corrected
she may still need a splint

With clenchers

changing the occlusion
may only change the symptoms

Still using the same splint
nine years later

- wears it 3-4 nights per week -
- no TMJ problems -
- occlusion unchanged -

Signs?

Presser or Grinder?

Symptoms?

Tension headaches nearly every day

wear facets do not mean that a patient does not press

Deviation to left

TMJ pain bilateral
(worse on left side)

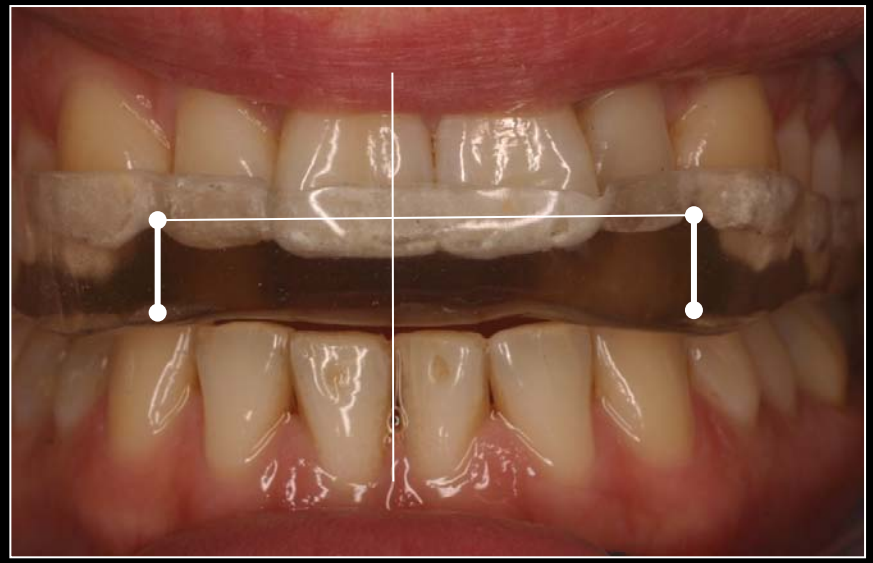
Disc dislocation left
with repositioning

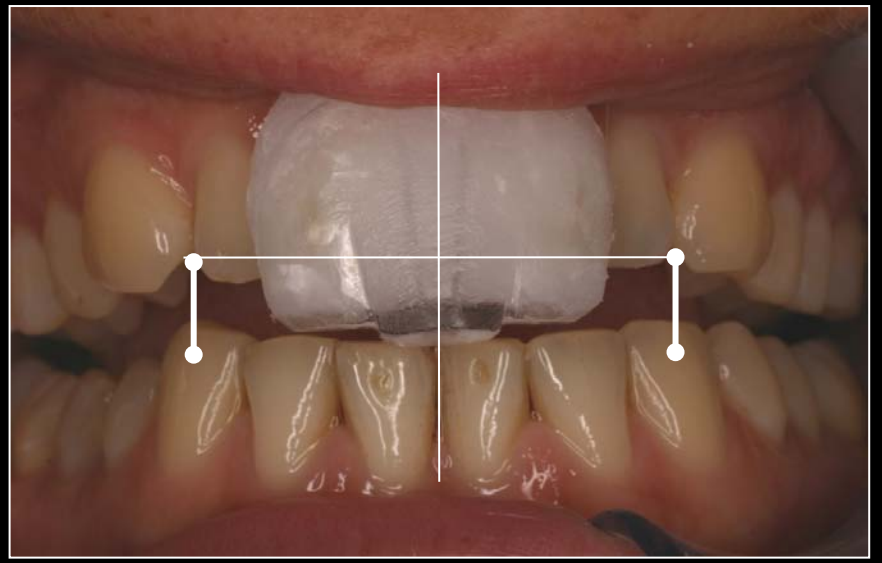
Headaches
practically every day
upon awakening
(temporal, bilateral)

Has tried to wear
this Michigan splint
for 3.5 years

"at least twenty control appointments"

The Michigan splint might have worked
if the midline had been correct and vertical dimension reduced





Success rate with a (properly adjusted) Michigan splint for TMJ symptoms is from 50-80%, with a reduction of tension headache frequency of ca. 20%.

Clark, GT. Perspectives in Temporomandibular Disorders. 1987.

Schankland W. J Craniomand Pract 2001:269-78

Deprogrammer significantly reduced TMJ symptoms and completely eliminated headaches within three months.

Risk of Supraeruption

Eight days of continuous disclusion was necessary before any supraeruption of the molars was observed

Kinoshita et.al. Arch Oral Biol 1982; 27(10):881-5

Molars at least 10 years with no antagonists

18% no movement,
58% < 2 mm, 24% > 2 mm

Even the worse cases only average 15 µm/month

Kiliaridis S, et.al.
Int J Prosthodont 2000;13(6): 480-6

Dahl splint

Cast metal anterior splint

permanently cemented

average time required until posterior supraeruption measurable: 6-10 months

Dahl BL, Krogstad O, Karlsen K. J Oral Rehabil 1975; 2: 209-214

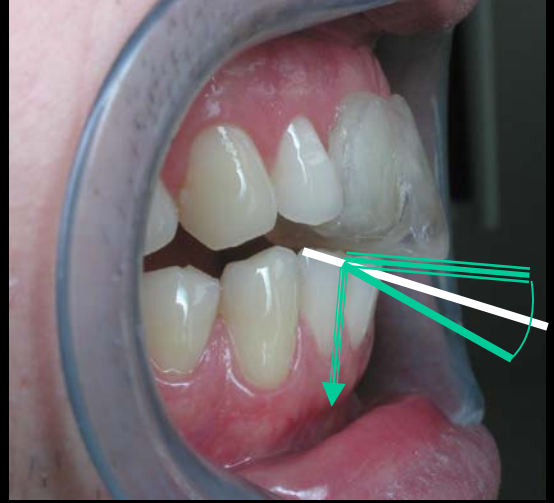
Poyser NJ, et.al. Br Dent J. 2005 Jun 11;198(11):669-76

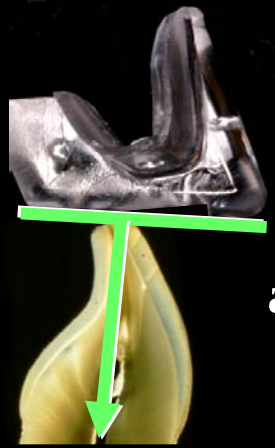
Few studies but sufficient information to conclude:

Supraeruption is generally not a rapid process
Short term occlusal changes have a different cause

Supraeruption with an anterior splint worn only at night is not very likely

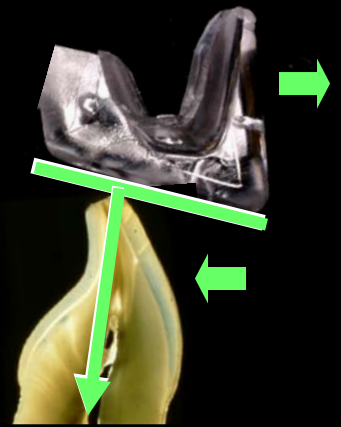
(and I have not seen a single case)





axial is
ideal

but not always possible



Supraeruption would cause an anterior open bite,
but unintentional orthodontic tooth movement also.

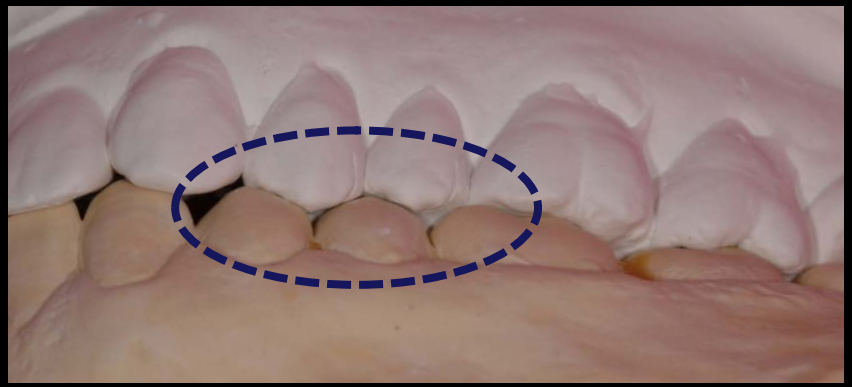
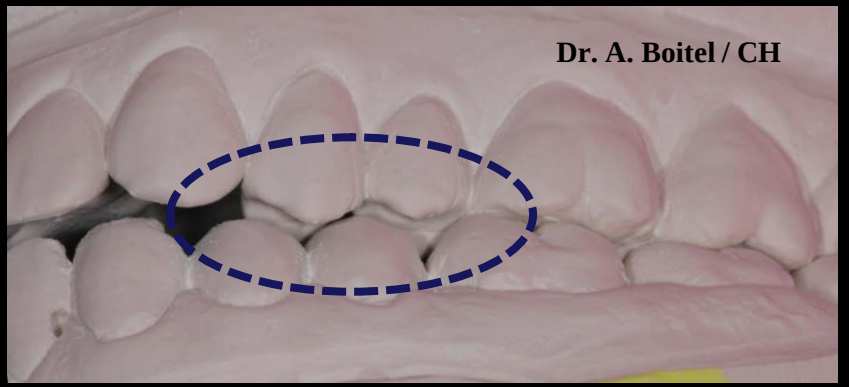
This depends on contact angles, duration of use, and periodontal support

Orthodontic tooth movement will open proximal contacts

If you cannot achieve axial loading of the teeth with an anterior deprogammer,
let your technician fabricate the splint.



Anterior open bite, but anterior proximal contacts are unchanged

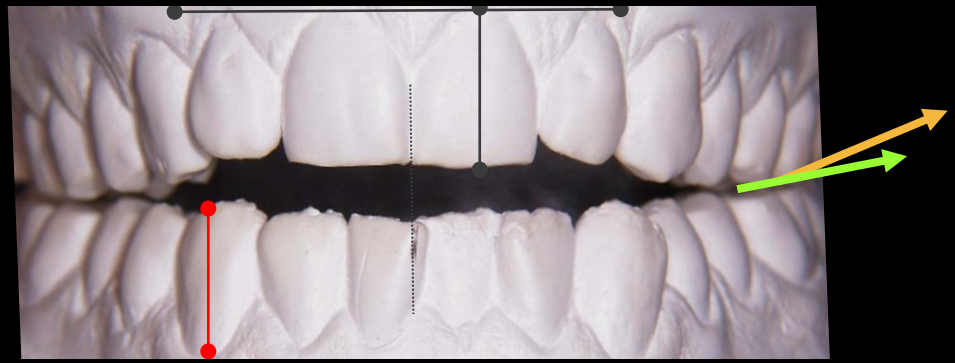



March 2005 ⇒ Deprogrammer ⇒ December 2007

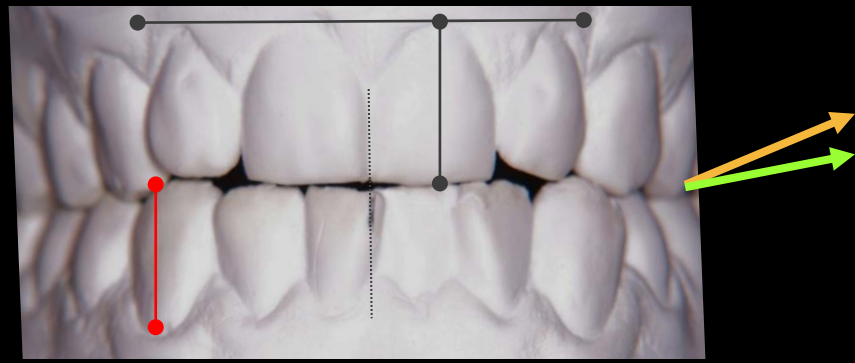
How can an anterior splint move the premolars laterally?

Claimed supraeruption but clearly mandibular repositioning

Clinical case: Dr. Ritter, Switzerland



models with bite registration from 8.11.06



same models hand occluded

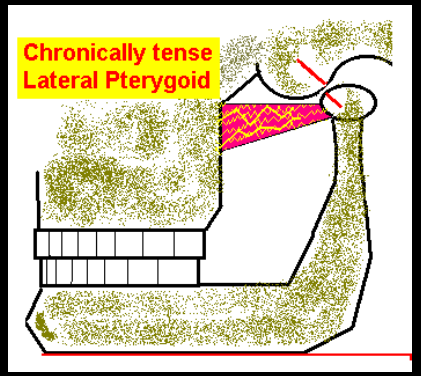
If the occlusion is stable at the new mandibular position,
there is a high probability that this will become new habitual centric.

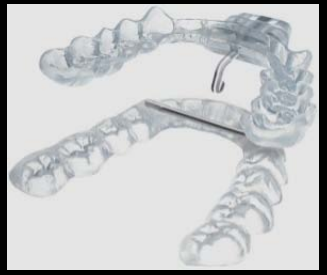
Mandibular repositioning

"There may occur… a loss of ability to function comfortably after the disturbance to ICP produced by the appliance."

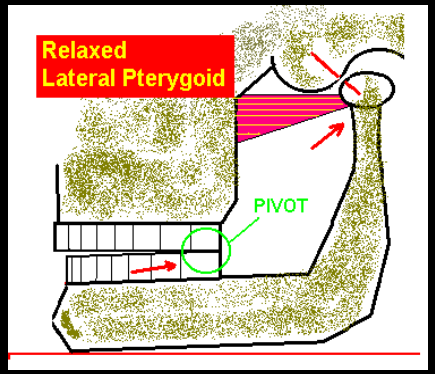
"Such adverse mandibular repositioning may be a consequence of <u>any</u> occlusal splint therapy."

Wise M D. Failure in the restored dentition: management and treatment. 393-394 London: Quintessence Publishing Co. Ltd, 1997.





Mandibular repositioning and anterior open bite has also been reported with snoring splints.



Mandibular repositioning

"There may occur… a loss of ability to function comfortably after the disturbance to ICP produced by the appliance."

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Wise M D. Failure in the restored dentition: management and treatment. 393-394 London: Quintessence Publishing Co. Ltd, 1997.

If the mandibular position is contributing to the parafunction, why is repositioning a bad thing?

Mandibular repositioning

"There may occur… a loss of ability to function comfortably after the disturbance to ICP produced by the appliance."

"This favourable mandibular repositioning can be achieved most effectively with an anterior deprogrammer."

Wise M D. Failure in the restored dentition: management and treatment. 393-394 London: Quintessence Publishing Co. Ltd, 1997.

If the occlusion is stable, it can become the patient's "new" centric occlusion. If not stable, it remains an occlusal interference.

Slight repositioning of the mandible caused an "anterior open bite"

The occlusion was not stable in this position, no change of centric

Anterior change did not disturb patient

Daily headaches prior to the deprogrammer

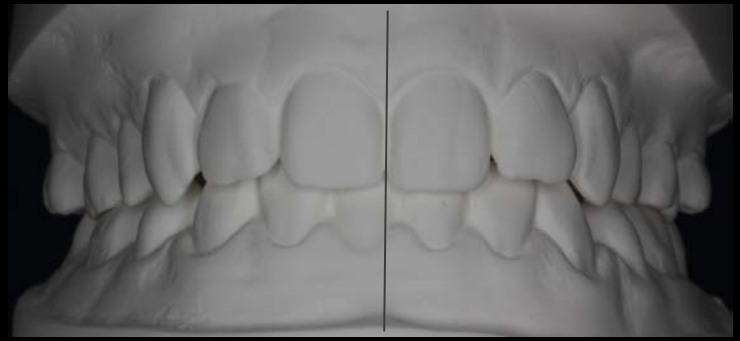
Memorize first contact and direction of slide

Occlusion adjusted

Patient discontinued use of the splint, no return of symptoms

Without the deprogrammer, you do not know where to adjust the occlusion.

Models from March 2008



Symptoms

TMJ pain bilateral
(worse on left, IID < 35 mm)

Neck pain
SCM++, Trapezius+, Temporalis+

Mild headaches every day
(temporal und frontal, left)

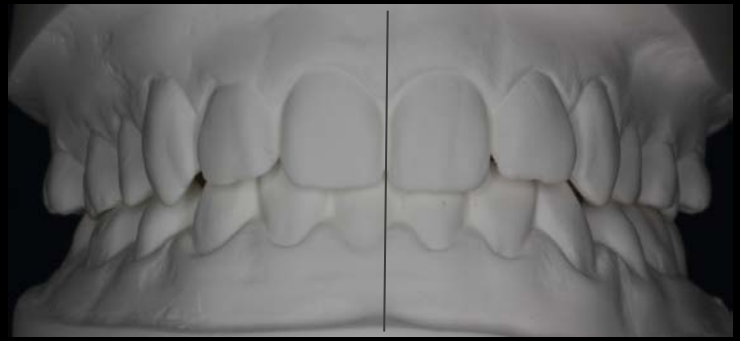
Deprogrammer in June 2009

Symptoms reduced significantly by September

Called for an appointment in March 2010

"My occlusion has changed."

Models from March 2008



"Centric" in March 2010

Symptoms

TMJ pain bilateral
(worse on left, IID < 35 mm)

Neck pain
SCM++, Trapezius+, Temporalis+

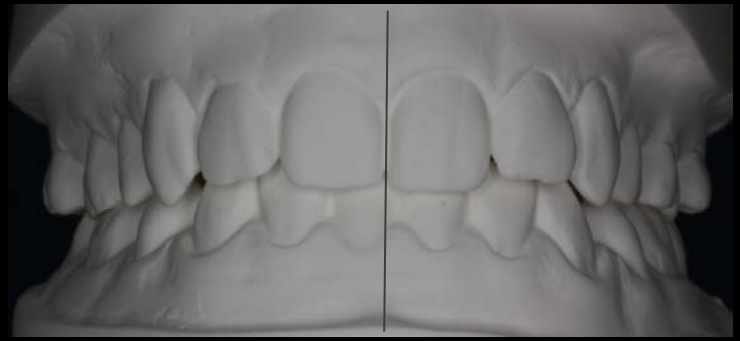
Mild headaches every day
(temporal und frontal, left)

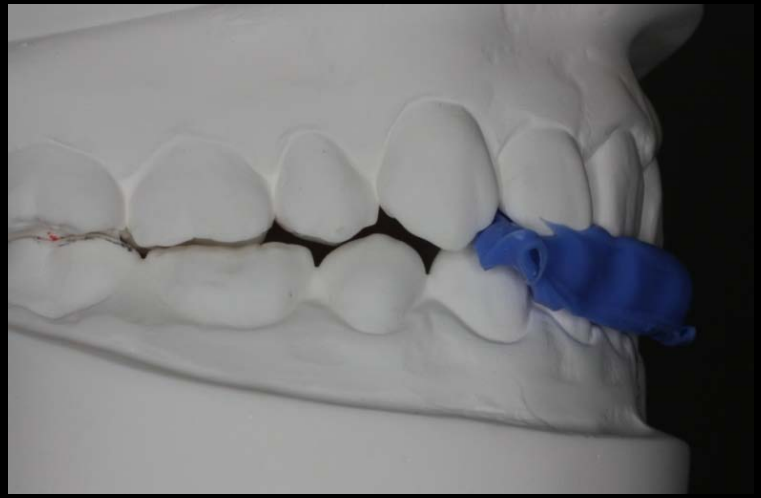
Patient has no symptoms

and I told her at the beginning of treatment that this could happen

Bite Registration

Models from March 2008





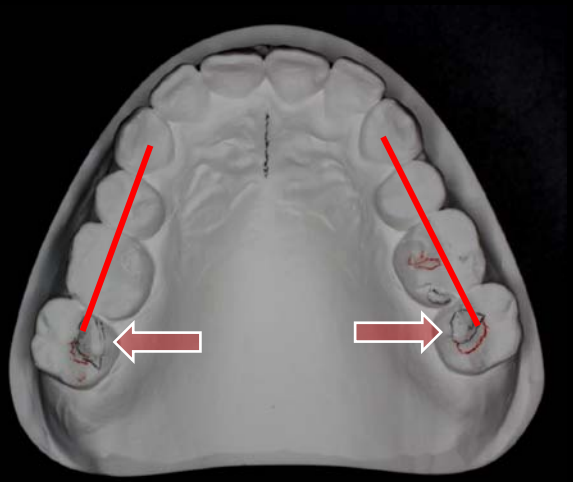
"Centric" in March 2010

Patient has no symptoms

and I told her at the beginning of treatment that this could happen

Bite Registration

What should we do?

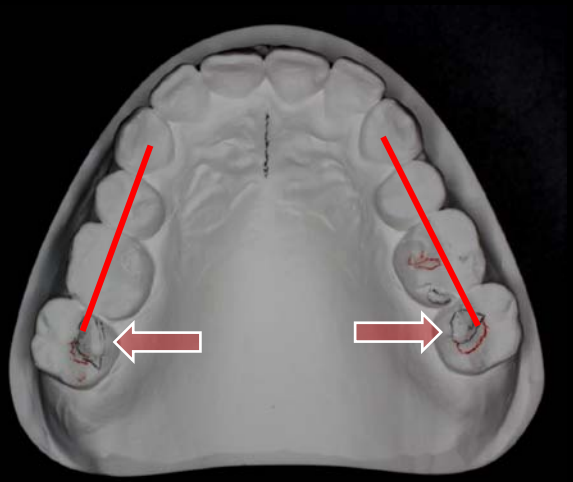


EBD: no scientific evidence for **occlusal therapy**
(neither equilibration nor restorative/prosthodontic treatment)

Koh H, Robinson PG. J Evid Based Dent Pract 2006;6:167-8

Balancing contacts created with acid etch and composite on molars caused symptoms if the patients showed signs of stress or anxiety

Päivi, et.al. Acta Odontologica Scandinavica 2006;64(5):300-305

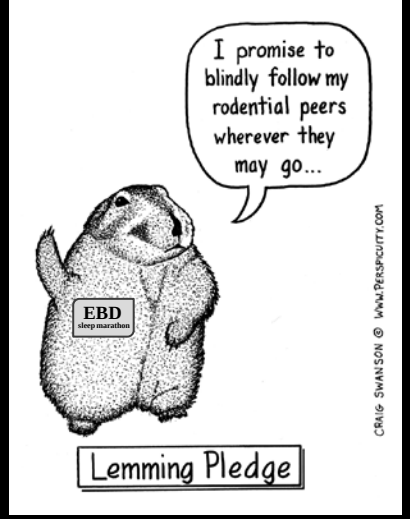


What should we do?

EBD: no scientific evidence for **occlusal therapy**
(neither equilibration nor restorative/prosthodontic treatment)

Koh H, Robinson PG. J Evid Based Dent Pract 2006;6:167-8

"No scientific evidence" does not mean
"contraindicated" or "wrong"



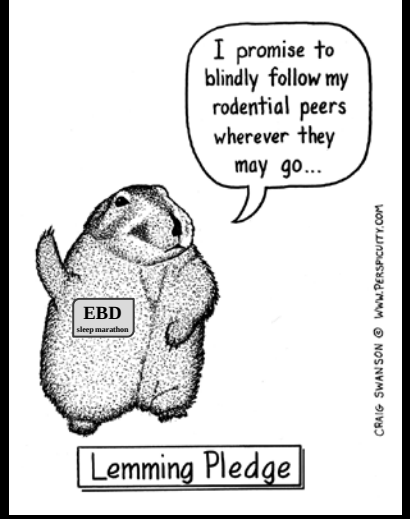
What should we do?

EBD: no scientific evidence for **occlusal therapy**
(neither equilibration nor restorative/prosthodontic treatment)

Koh H, Robinson PG. J Evid Based Dent Pract 2006;6:167-8

They should have written:

Many published studies relied on wear facets for the diagnosis of bruxism, these "researchers" obviously had no idea what they were doing.



What should we do?

EBD: no scientific evidence for **occlusal therapy**
(neither equilibration nor restorative/prosthodontic treatment)

Koh H, Robinson PG. J Evid Based Dent Pract 2006;6:167-8

"The primary impetus for EBD comes from insurance companies and public institutions, whose intentions may be honorable.

Amid Ismail, University of Michigan, May 2005

U$A: National Institute of Health Conference 1996
"International Expert Commission" in 2000

Two absolutely correct conclusions

"Occlusion is not at all, or only weakly, correlated with TMD."

- - - - - - -

"The belief that TMD can be treated with occlusal therapy leads to massive overtreatment."

Consequently, occlusion was removed from the list of causes for TMD

(and treatment costs no longer covered by insurance)

U$A: National Institute of Health Conference 1996
"International Expert Commission" in 2000

1996 conference sponsored by

Delta Dental Insurance

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estimated "savings" per year: $ 1,000,000,000.00

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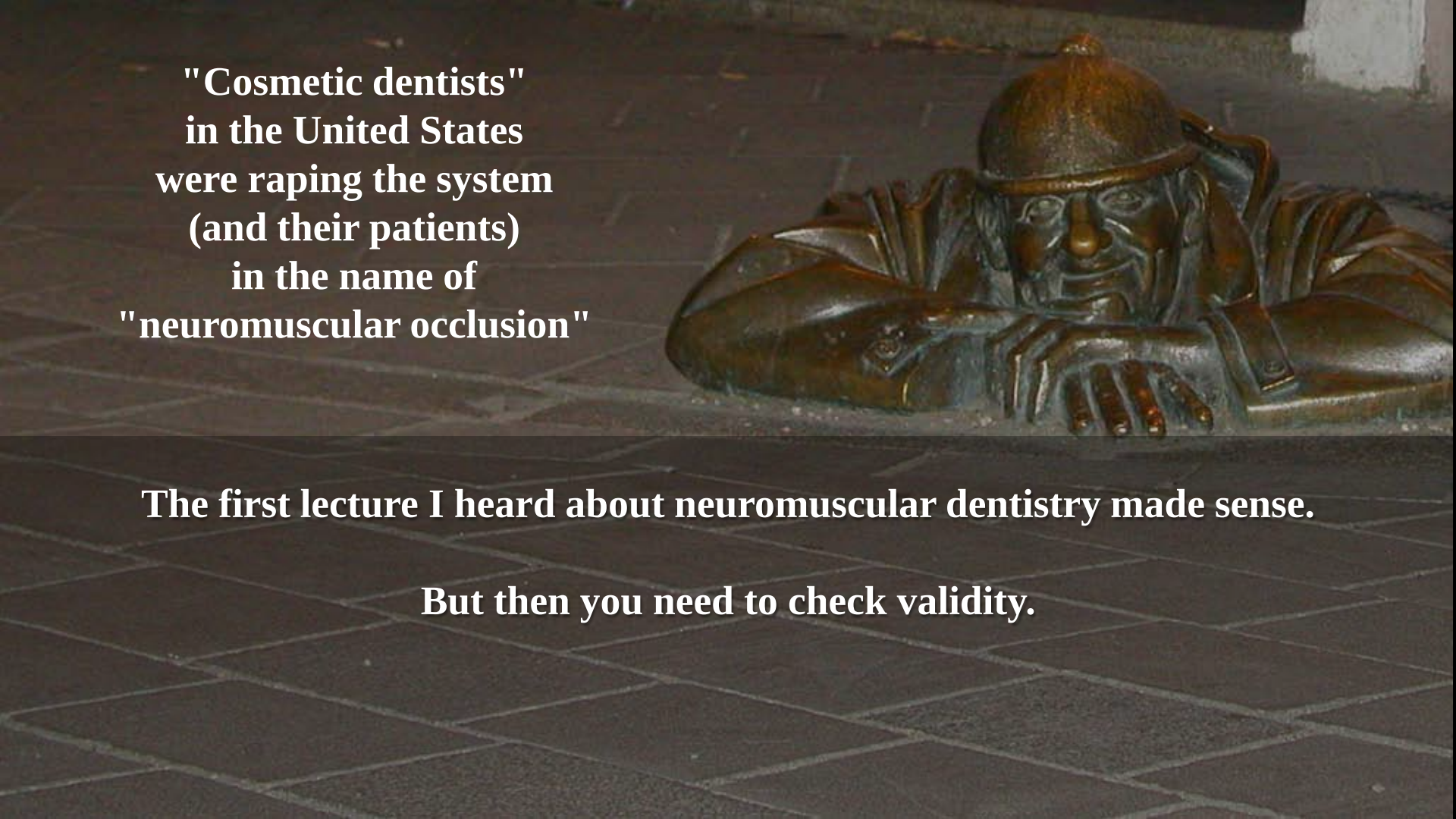
estimated "savings" per year: $ 1,000,000,000.00

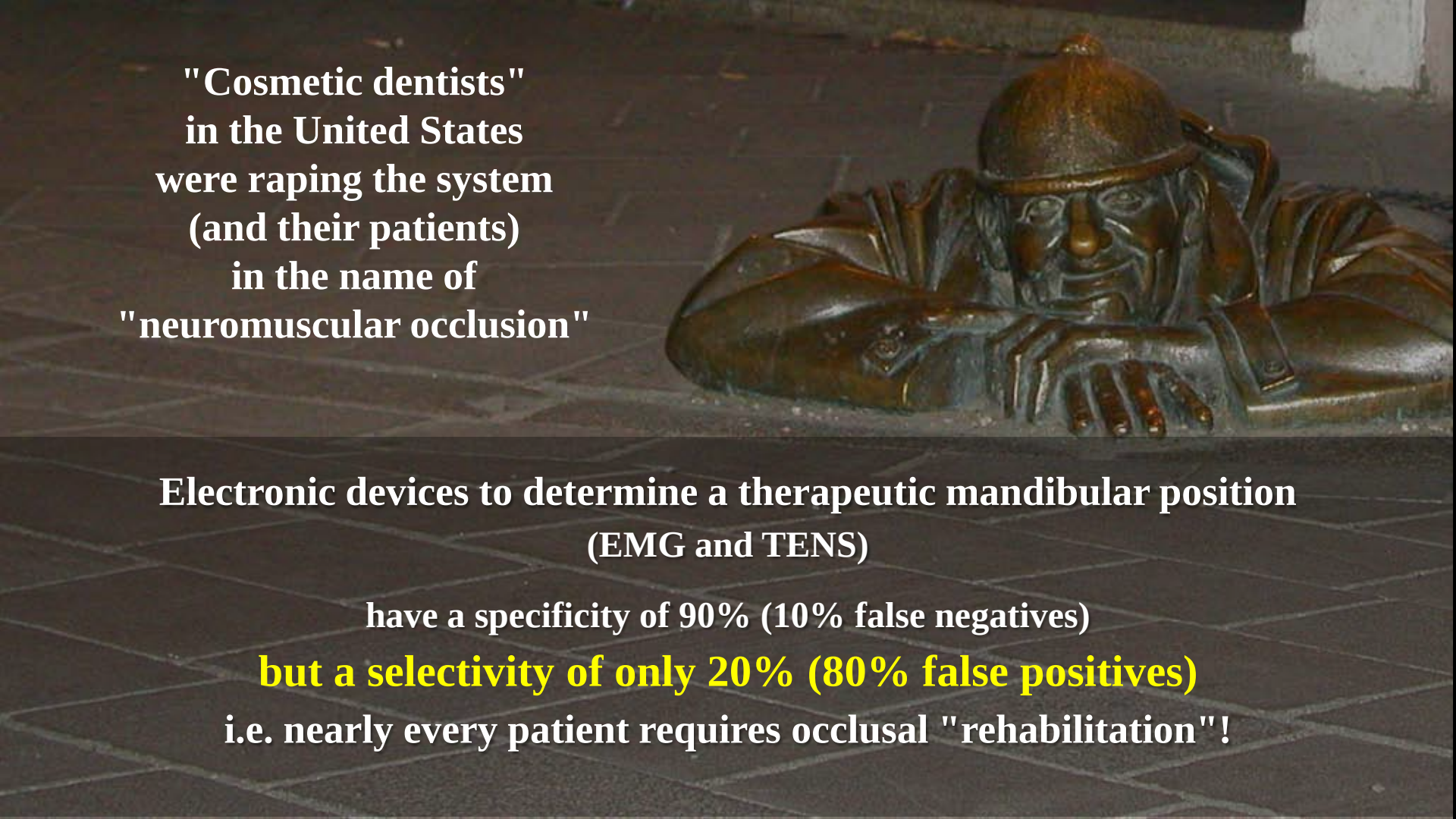
The insurance company was forced to do this

Consequently, occlusion was removed from the list of causes for TMD
(and treatment costs no longer covered by insurance)



The first lecture I heard about neuromuscular dentistry made sense.

But then you need to check validity.



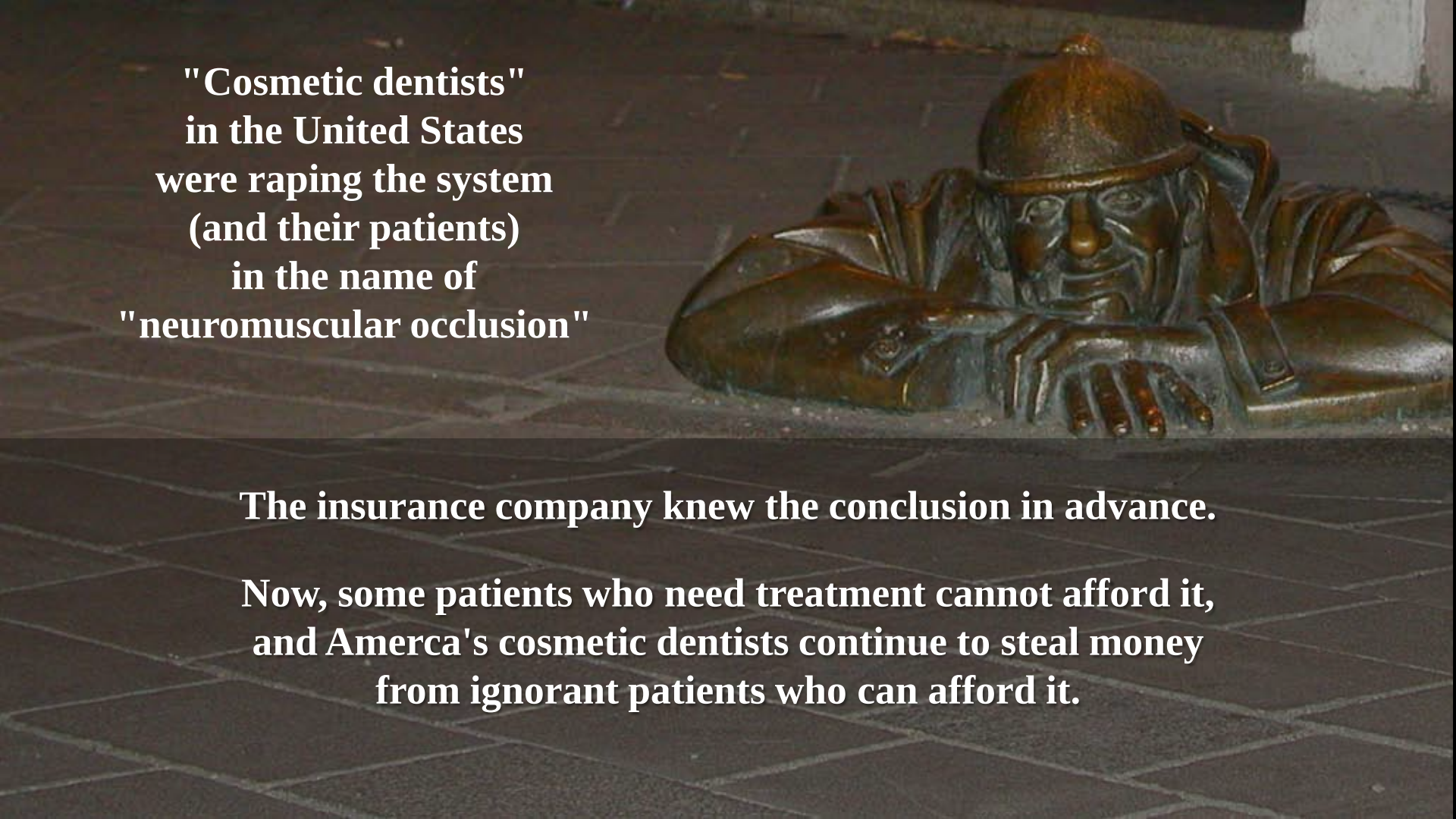
"Cosmetic dentists"
in the United States
were raping the system
(and their patients)
in the name of
"neuromuscular occlusion"

Electronic devices to determine a therapeutic mandibular position
(EMG and TENS)

have a specificity of 90% (10% false negatives)

but a selectivity of only 20% (80% false positives)

i.e. nearly every patient requires occlusal "rehabilitation"!



"Cosmetic dentists"
in the United States
were raping the system
(and their patients)
in the name of
"neuromuscular occlusion"

The insurance company knew the conclusion in advance.

Now, some patients who need treatment cannot afford it,
and Amerca's cosmetic dentists continue to steal money
from ignorant patients who can afford it.

Neuromuscular Dentistry

"Our advanced techniques let us take occlusal refinement to a higher level of micro-occlusion."

Centric registration:"reproducibility of 0.3 mm is a good result"

This is with a single patient!

Kordass and Mundt. Quintessenz 2003;54(11):79-88

Occlusal contacts change with posture and the time of day.

Berry DC and Singh BP.
Journal of Prosthetic Dentistry 1983;50:386–391

McLean LF, Brenman HJ, Friedmam MGF.
J Dent Res 1973:1041-5

There is no logical reason to believe
that occlusal rehabilitation will provide
a higher success rate than an equilibration splint

CMD: ca. 50-80%
Headaches: ca. 20% (tension) to 35% (migraine)

Occlusal rehabilitation can be indicated, for example,
as a necessary requirement to meet aesthetic desires,

but it takes a strange combination of ignorance and arrogance
to claim it is indicated for treatment of symptoms!

Phase 1 (maxillary 7's)

palatal cusps reduced at the same time

Phase 2
Equilibration with the NTI

Avoid the engram!

after NTI (and no symptoms)

1

after Phase 1

2

after Phase 2

3

all posterior teeth (except 25/35) in contact, no observable deviation

Vertical dimension of deprogrammer permits contact with lateral movement.

No symptoms occurred, so apparently she does not grind her teeth eccentrically at night.

What happens if she stops wearing the splint?
- after three or four days her headaches begin to return –

October 2010: uses the splint 4-5 nights per week

physical therapy, cognitive behavior changes (i.e. reduce stress)

The Enigma of TMJ Dysfunction

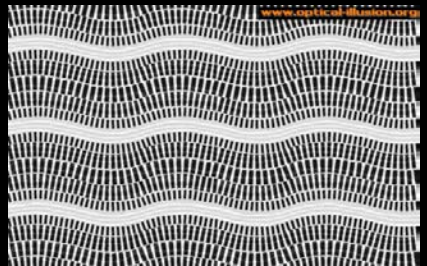
There are many different schools of thought regarding the causative factors.

They can be lumped into two basic groups:
1) psychologic or central etiology.
2) occlusal or peripheral etiology.

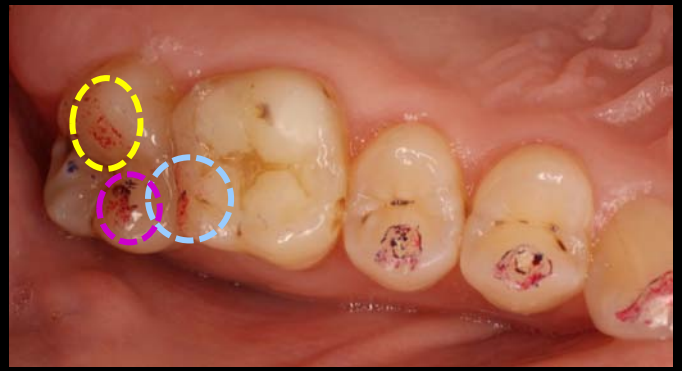
Psychologists treat these patients with a program of stress management.
Dentists treat them by the elimination of occlusal interferences.

Physicians have generally chosen to ignore this disease altogether.

Charles J. Arcoria, DDS, MBA



Her concern is anterior aesthetics, has headaches 4-5x per week
(I do adjust the occlusion immediately if the problem is obvious)



Balancing, protrusive and right lateral molar contacts eliminated, headaches quickly reduced in intensity, none after four weeks

28 year old M.D.

unterstands nothing about dentistry

34-89% of the population have balancing contacts.

(Ingervall 1972, Sadowski 1980 und 1984, Rinchuse 1983,
Shefter 1984, de Laat 1985, Gazit 1985, Egermark-Eriksson 1987)

Approximately 5% of these contacts are "interferences" which require adjustment.

Brian Fitzpatrick. Int J Prosthodont 2008

Balancing "interferences" which require adjustment

- if they cause fremitus or visible tooth movement -
- if they provoke a deviation on closing from rest position -

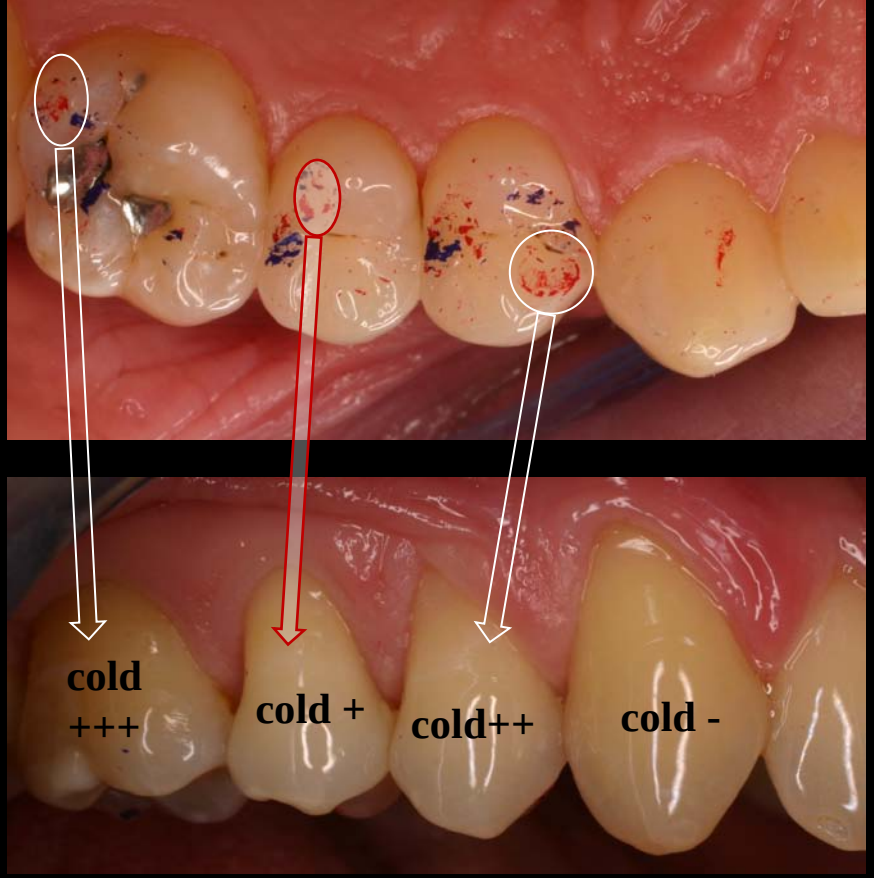
Rinchuse DJ, Rinchuse DJ, Kandasamy S
American Journal of Orthodontics and Dentofacial Orthopedics 2005;245-54

- if a cross-arch interaction correlates with the signs and symptoms -

To find the balancing contact on the left,
the patient must "grind" to the right (all teeth with lesions/wear)
All lateral contacts in red, then blue in centric only

Hanel: 12 µm

without the occlusal foil on the right, movement will be artificial
all lateral and laterotrusive movements in vertical and supine positions



Toothbrush
Oral B rotary soft

Toothpaste
Elmex green

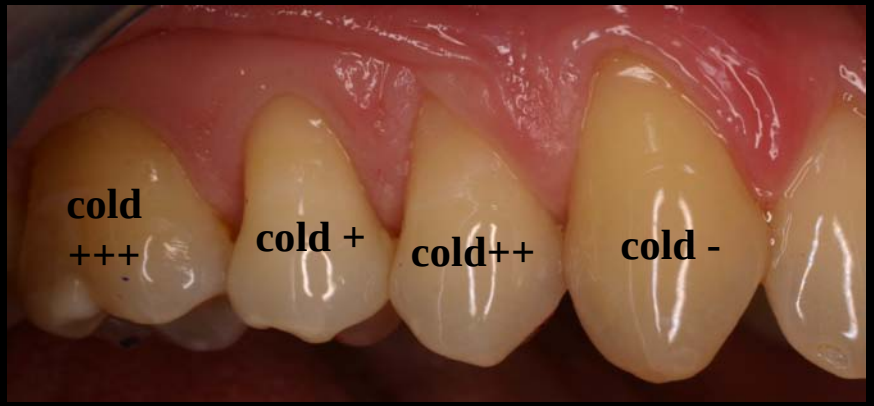
Diet: Ø

Headaches
2x per month
bilateral, frontal

Neck pain constant
(SCM, right side worse)
"treated" with Botox

Sleeps usually on back,
sometimes right side

Presses on 14 und 16 because of balancing contact 7's left side
(occlusal adjustment on the opposite side reduced sensitivity significantly in < 2 weeks)



Creating canine guidance with composite is another option

but in this case the guidance would have been nearly vertical

Our first goal is to relieve symptoms.
Then we would like to eliminate the splint.

We have found out where the mandible should be, so is alteration of the occlusion indicated or not?

I try it with about 50% of my patients

Success with TMJ pain > 60%

Success with migraines ca. 40%

Success with tension headaches < 30%

Most prosthodontists destroy more enamel every week than I remove in a year with my equilibrations

If the adjustment is minimal, it is definitely worth trying

36 year old male patient

TMJ pain right side

Temporalis +, Masseter +, SCM ++, Trapezius +; bilateral but more sensitive on the right

Tension headaches: variable intensity, frontal, almost every day

Deprogrammer reduced symptoms almost immediately

Restorative required on premolars
Equilibrated prior to preparation

Original contacts

Equilibration and restorative

Contacts at two year recall, but I cheated…

Contralateral canine guidance with composite

He still sleeps with his deprogrammer "sometimes"

Our first goal is to relieve symptoms.
Then we would like to eliminate the splint.

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I try it with about 50% of my patients

Success with TMJ pain > 60%

Success with migraines ca. 40%

Success with tension headaches < 30%

With the other 50%
it is either impossible or simply not indicated

Centric Cl. I, Skeletel Cl. II
Deviation on opening
Constant headache (tension type)

Within three months
no more headaches
Mandible moves retrally and to left
Occlusion ist not stable in this position

Occlusal therapy?

< 1mm clearance of 7's
> 6 mm anterior opening

Recommendation: Orthognathic surgery

Tension headaches almost every day, neck pain on right
(Immediate deviation on opening, cervical lesions on all posterior teeth)

Physical therapy for neck pain for several years, makes the pain "tolerable"

Mandibular repositioning is 100% certain

Should she be equilibrated or "comprehensively rehabilitated"?

Anterior teeth are nearly edge on edge, with 6 mm increase in vertical dimension
Tension headache patients demonstrate the lowest success rates

Should she be equilibrated or "comprehensively rehabilitated"?

Recommendation: Orthodontic retreatment

48 years old, centric occlusion

No visible deviation on opening, minimal wear facets

Migraines

> 20 years

2-3x / week

48 years old, centric occlusion

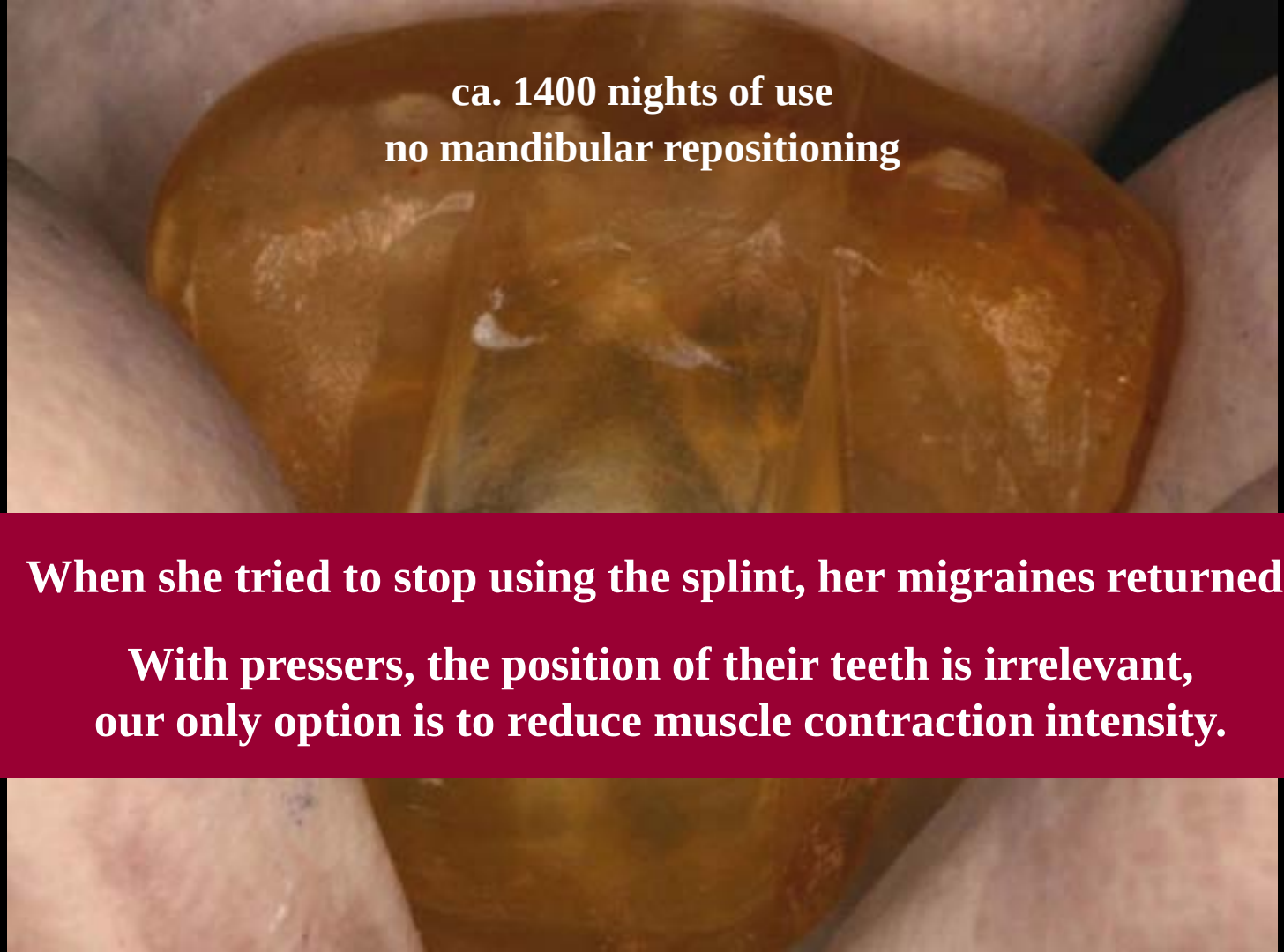
No visible deviation on opening, minimal wear facets

Migraines
>20 years
2-3x / week

2009: 4 year recall

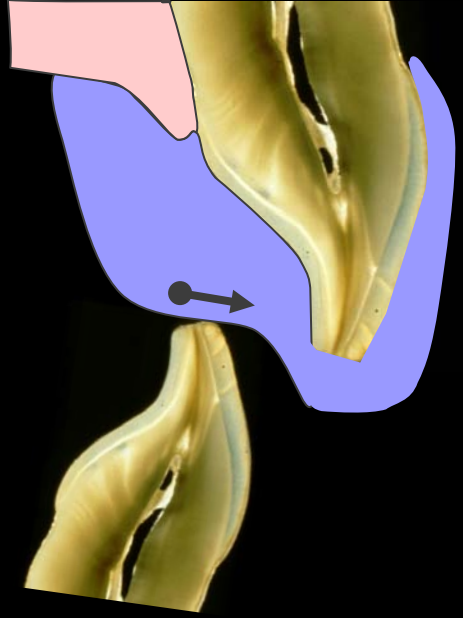
has used the deprogrammer "practically every night" for four years

Migraine: 3x in 2007, 1x in 2008
(instead of 50+)



When she tried to stop using the splint, her migraines returned.

**With pressers, the position of their teeth is irrelevant,
our only option is to reduce muscle contraction intensity.**



Yes, a lot of NTI's
will fracture quickly

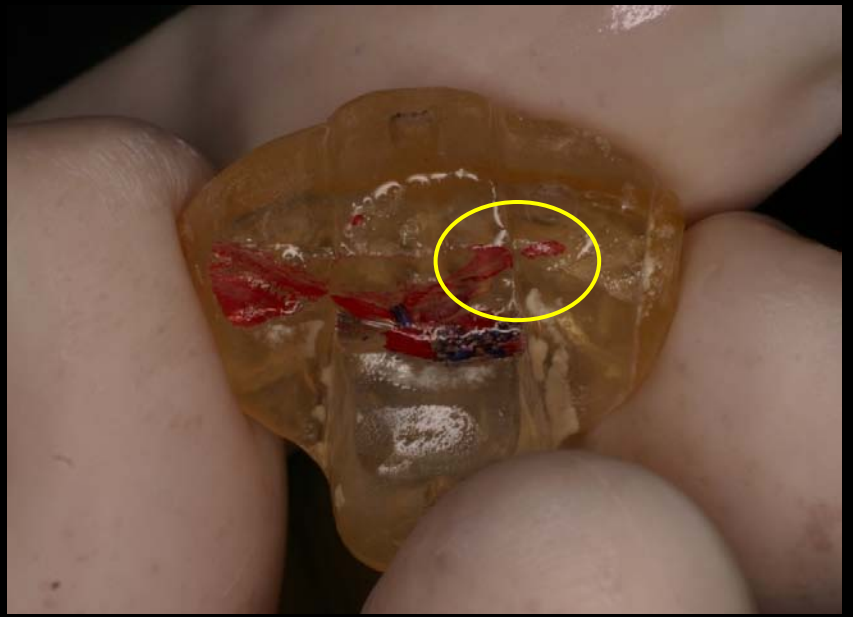
Dr. Jim Boyd

"no increased vertical with protrusive"
"increases tension in the joint and the risk of disc compression"

Her symptoms began to return after 15 months

(grinds at night right-protrusive, >10 mm!)

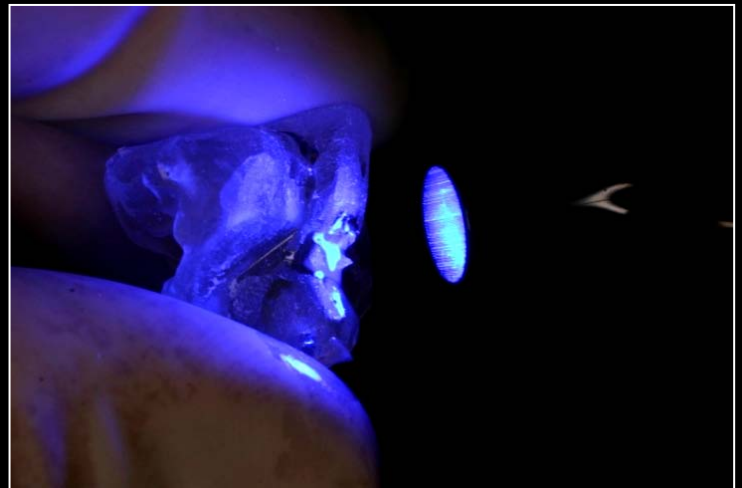
Contact of 33 with the deprogrammer, which allows her to press

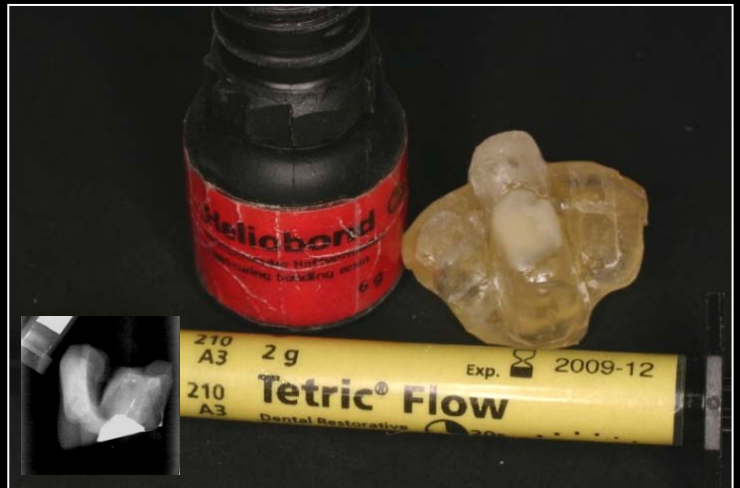


Loss of vertical dimension,
posterior contact

mechanical
retention

Polycarbonate is weakend by contact with monomethacrylates

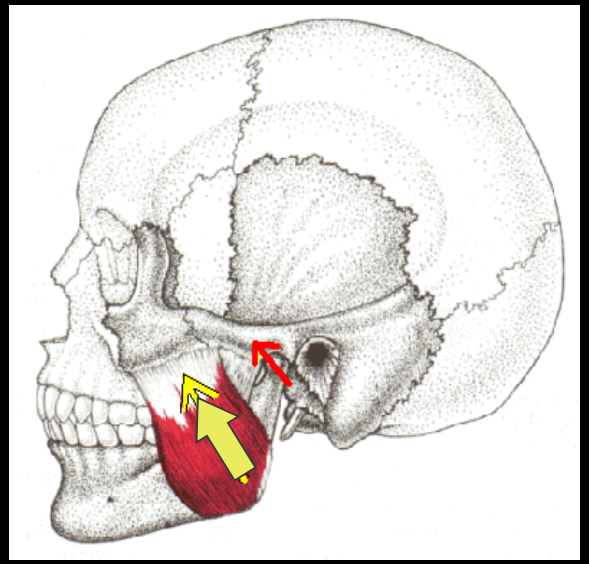


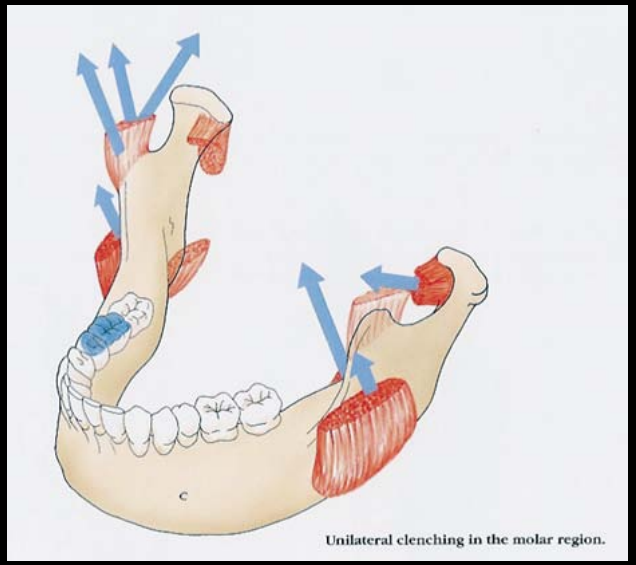


Disc compression?

Anatomically, the force vectors are always retral to any occlusal contacts.

A pivot splint is also anterior to all muscles.

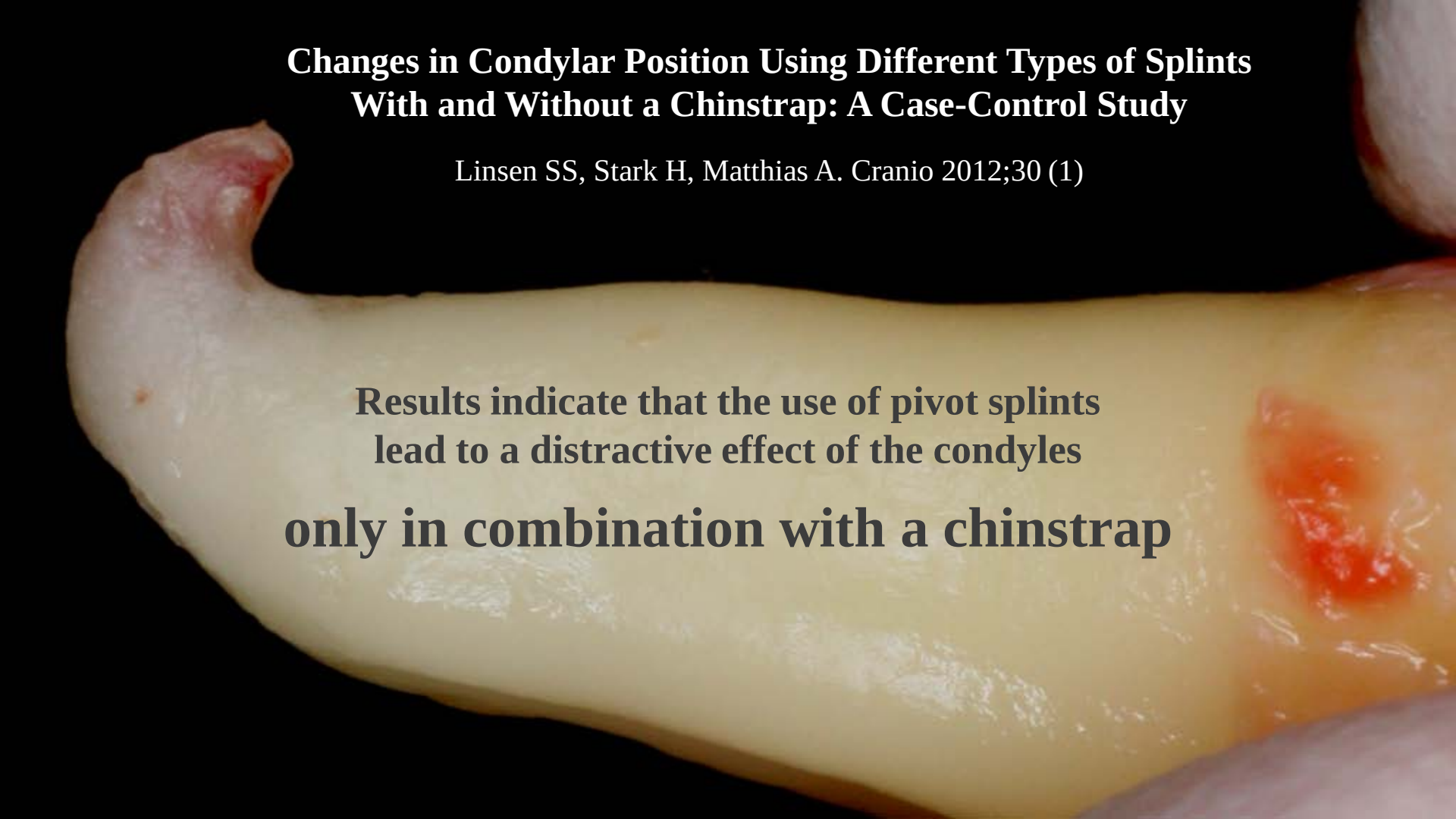




Bilder: Y Ide, K Nakazawa. Anatomical Atlas of the Temporomandibular Joint. Quintessence Publishing 2001

Changes in Condylar Position Using Different Types of Splints With and Without a Chinstrap: A Case-Control Study

Linsen SS, Stark H, Matthias A. Cranio 2012;30 (1)



Results indicate that the use of pivot splints lead to a distractive effect of the condyles

only in combination with a chinstrap

Has used this deprogrammer for > 9 years, nearly every night (ca. 200,000 hours)

No changes in centric occlusion

Discoloured
Fractured reliner

after ca. 3000 nights
> 20,000 hours of use

Temporal and frontal headaches
if he does not use the deprogrammer
for more than two nights

Is informed about equilibration
and probability of success
(ca. 25%)

Has no problem using a splint
"forever if necessary"

AP-System requires significant
internal and external adjustment for most patients
and is completely impossible to adjust for many.

If relined at the correct angle for axial loading of lower incisors.
Labial flange is more than 4 mm from cervical of the teeth.
Adjustment to acceptable thickness means grinding off half of the splint.

If the flange is adapted to the labial surface of the teeth.
Lower incisors occlude on posterior edge, and would be pushed forward.
Adustment to correct angle and acceptable vertical would perforate the splint.

The "inventors" of the AP-System wanted me to recommend it in my presentations.

They copied the bad features of an NTI such as the wrong angle between the occluding surface and the labial flange, and the useless labial "nose"

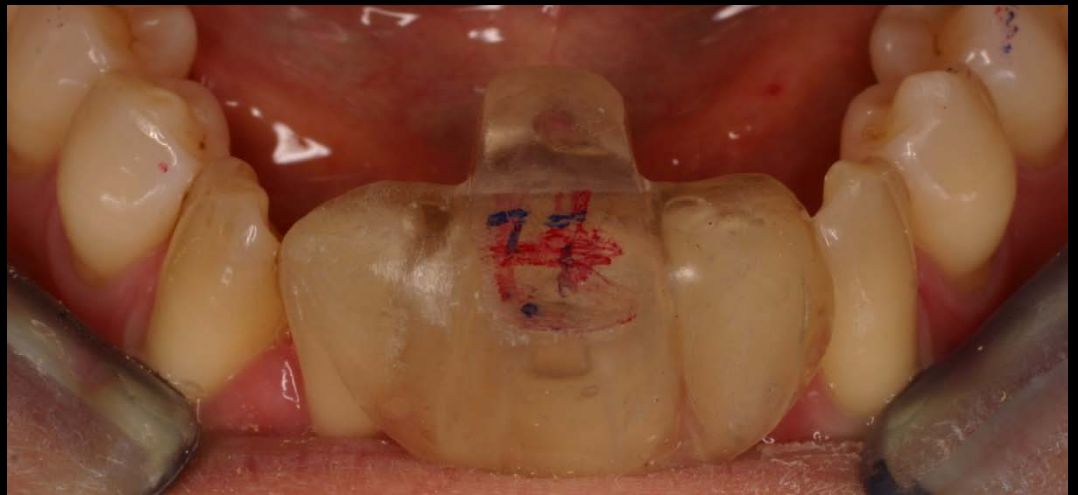
They made it worse than an NTI by eliminating the palatal extension (unsuitable for Class II's) and increasing the labial lateral curvature (reducing labial retention)

It is not a deprogrammer, it is not a classic anterior splint

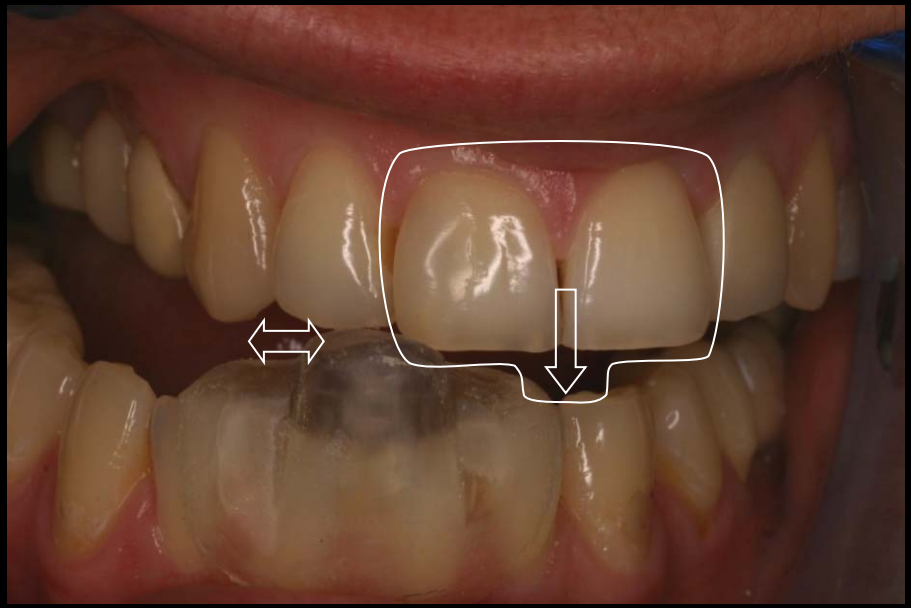
Relax Splint (PMMA)

Two sizes; the largest one is too small for 50% of patients
Does not cover the gingival 1/3 of the maxillary incisors: poor retention
Adjusting to contact with lower incisors usually perforates at the canines

About 50% of my deprogrammers are placed in the lower arch



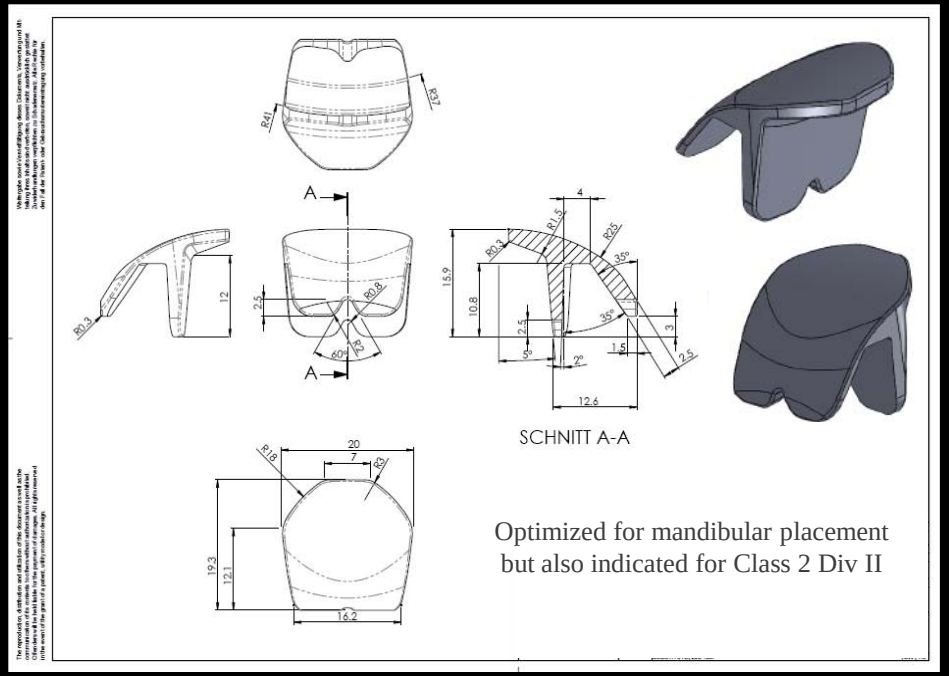
When a patient has signs of excentric bruxism
and headaches are one of the symptoms



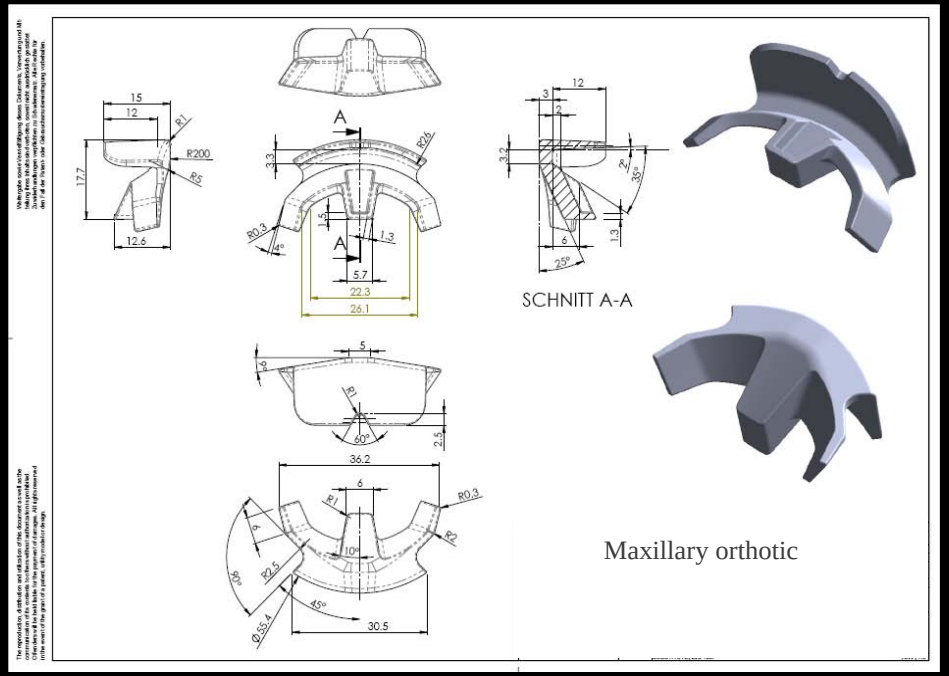
an equilibration splint will demonstrate a low success rate
and a maxillary deprogrammer won't work much better

Disclosure

I have designed new deprogrammers for maxillary and mandibular indications.
Patents are pending and market introduction is planned early in 2013.



Optimized for mandibular placement
but also indicated for Class 2 Div II



Maxillary orthotic

The thermoplast is not PMMA or PC or opaque PA; and you can bond any composite to it.

This patient also needed a mirror to find this position

How do you know she bruxes at night?

**Bilateral wear facets and balancing contacts, cervical lesions,
mild tension headaches, diffuse pain on left side (neck, mandible, TMJ).**

I recommended a splint
and promised to restore the cervicals one week before her wedding

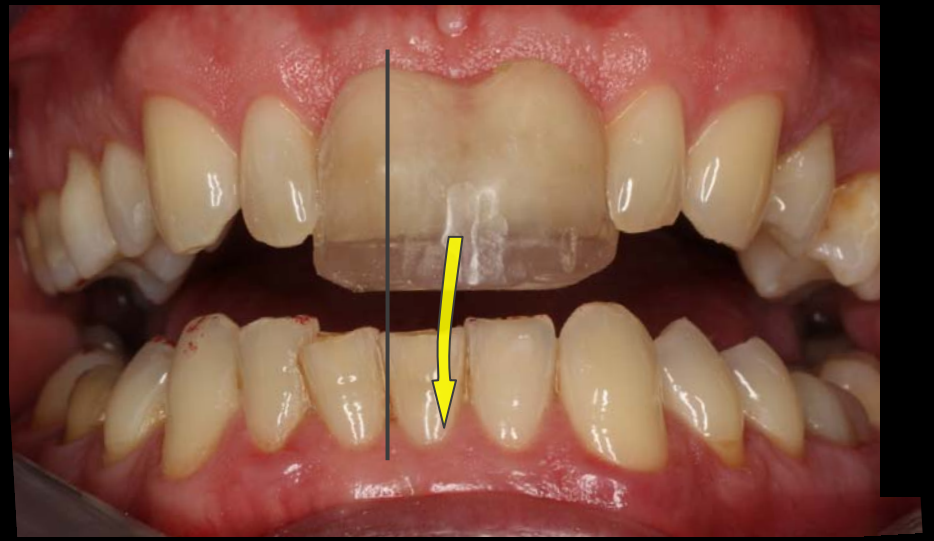
Communication with your patient is critical

Are the symptoms severe enough to justify treatment?

Can you predict the consequences of splint therapy?

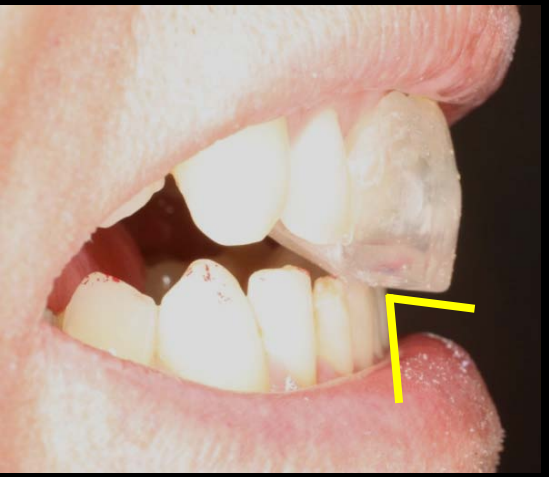
Patients with immediate deviation on opening

mandibular repositioning is probable – and desirable
(open bite, occlusal modifications, perhaps extensive restorative treatment, etc.)



Neck and back pain, tension headaches, diverse "wandering" dental problems.
Deviation to the right on opening, slight anterior shift of left condyle.
No retrusion with bilateral manipulation.
Always sleeps on his right side.

You should already see that this occlusion cannot be adjusted.
It is very unlikely that mandibular repositioning will result in a stable occlusion.



Axial load of antagonists in "centric" (i.e. at voluntary or guided retruded position)
Left canine out of contact (he sleeps on his right side so contact is unlikely)
More clearance of right lateral (contact is not a problem, but not alone)

Symptoms reduced? Stable "premature contact"?
Full arch splint, but if headaches return, convert it to a deprogrammer.

(probably for the rest of his life)

Remember: Stress is a primary factor!
Multidisciplinary approach

CMD: Programs with biofeedback and relaxation techniques have been more effective than splints in some clinical studies.

Crider A, et.al. 2005 **Medicott MS and Harris SR. 2007**

30-50% of all chronic headache patients need a dentist as a member of the interdisciplinary team

Brummkopp clinic

Neurologist

Head of physical therapy

Clinic director

Remember: Stress is a primary factor!
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Anything that relaxes the patient is good

physical therapy, massage, biofeedback, autogenic training, yoga, ayurveda, craniosacral therapy, acupuncture, leave your partner, buy new shoes, aroma therapy, homeopathy, bioresonance,

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Crider A, et.al. 2005 **Medicott MS and Harris SR. 2007**

Find out what your patient believes, what you believe is almost irrelevant.

physical therapy, massage, biofeedback, autogenic training, yoga, ayurveda, craniosacral therapy, acupuncture, leave your partner, buy new shoes, aroma therapy, homeopathy, bioresonance,

or any other placebo

Placebo Effect

"A psychological aspect causes a physiologic reaction."

Platon, ca. 360 b.c.

**"Words can heal,
and a medical lie can be justified."**

Palla, 2003

"At every opportunity; assure the patient that you understand the cause, and emphasize the positive prognosis."

Intelligent people have always used this advantage

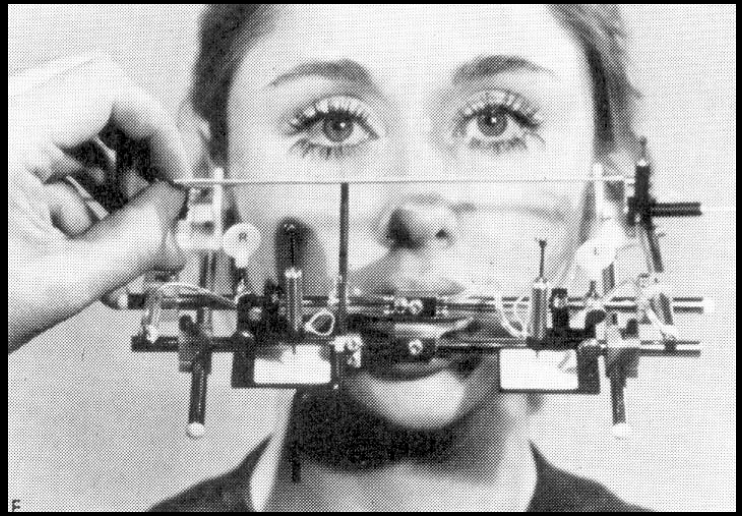
"Your surgeon likes to predict the result."

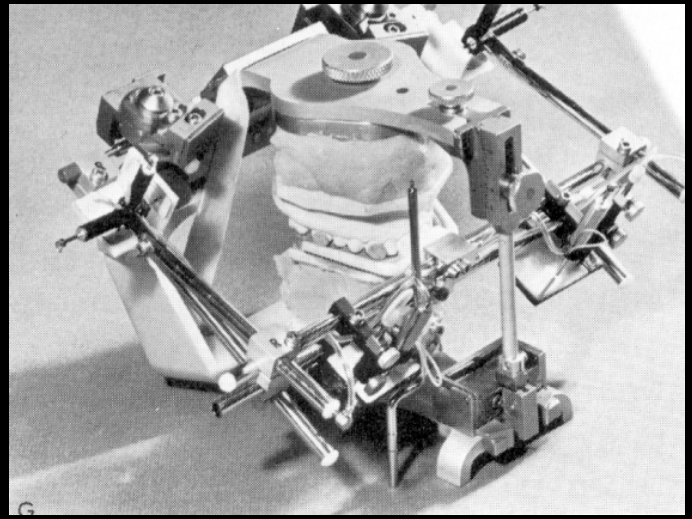
Splint therapy

The "mechanical" part is also important: every splint is different

Technology

is an inadequate substitute for lack of sufficient knowledge





Jaw tracking devices and complicated articulators can be useful for research.

The perfect articulator looks very complex,

and has only one moving part.

So many things we need to consider

psychological benefits of illness
neurological chronification
2nd axis of pain
etc.

So many things we need to consider

psychological benefits of illness
neurological chronification
2nd axis of pain
etc.

Red Flags

patients taking antidepressants

So many things we need to consider

psychological benefits of illness
neurological chronification
2nd axis of pain
etc.

Red Flags

patients taking antidepressants
fibromyalgia (muscle pain in multiple sites)

So many things we need to consider

psychological benefits of illness
neurological chronification
2nd axis of pain
etc.

Red Flags

patients taking antidepressants
fibromyalgia (muscle pain in multiple sites)
TMJ symptoms existing for >10 years

So many things we need to consider

psychological benefits of illness
neurological chronification
2nd axis of pain
etc.

Red Flags

patients taking antidepressants
fibromyalgia (muscle pain in multiple sites)
TMJ symptoms existing for >10 years
radiographic signs of joint degeneration → crepitus (MRI)

So many things we need to consider

psychological benefits of illness
neurological chronification
2nd axis of pain
etc.

Red Flags

patients taking antidepressants
fibromyalgia (muscle pain in multiple sites)
TMJ symptoms existing for >10 years
radiographic signs of joint degeneration → crepitus (MRI)
stupid people

"Some people are just too dumb to be unhappy"

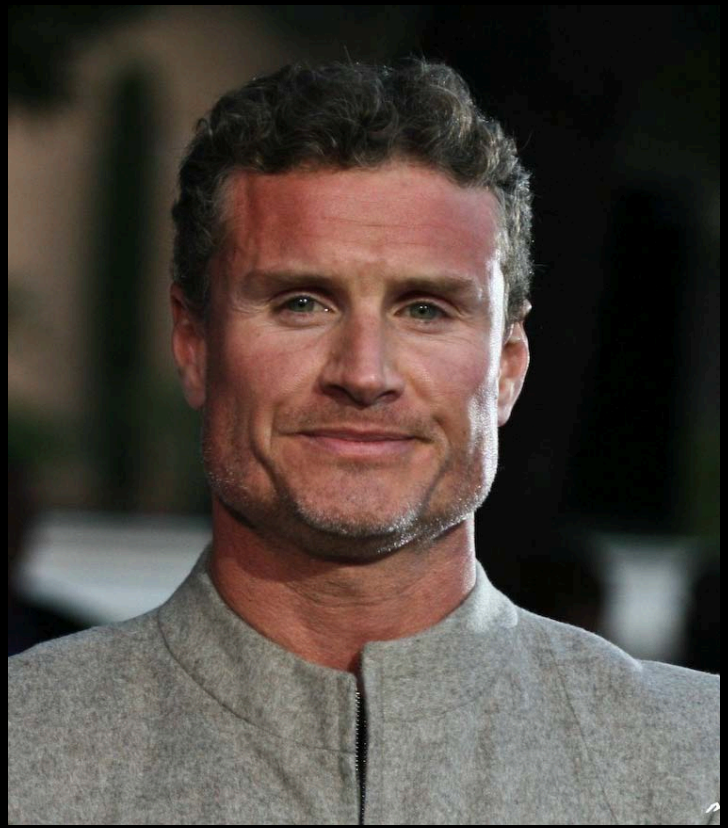
Garbage like this only contributes to conflusion!

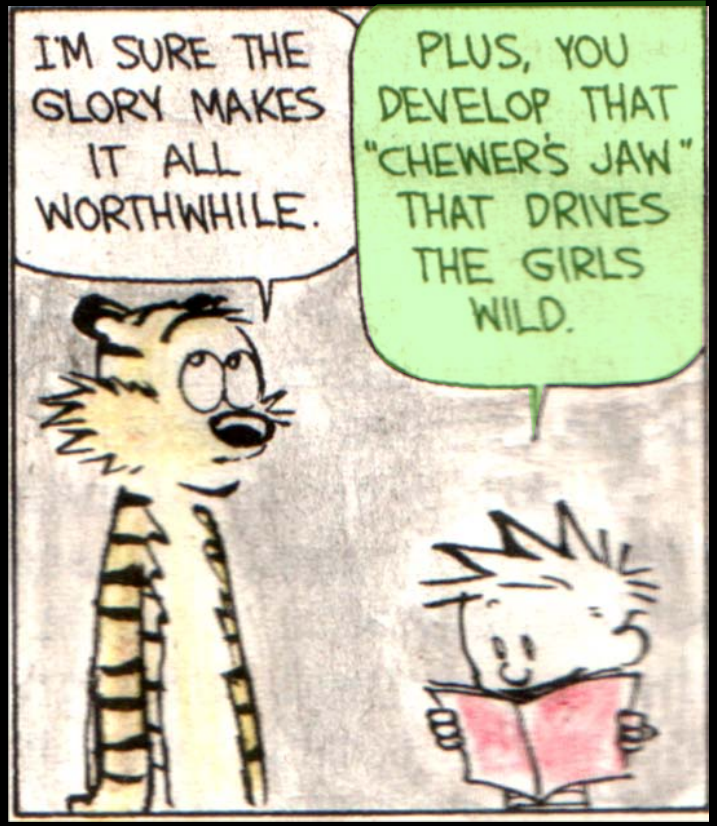
Muscle palpation +	masseter und temporalis
Joint noises	easily heard
Limited opening	IID three fingers
Deviation	> 2 mm
Occlusal "tone" on tapping	atonal instead of clear
Lateral movements	traumatic

They left out a few minor things:

SCM, trapezius and TMJ palpation, cervical defects, unilateral function, chronic headaches, sleep disorders, etc.

One advantage of clenching





but only for men

There is no logical reason to believe
that occlusal rehabilitation will provide
a higher success rate than an equilibration splint

CMD: ca. 50-80%
Headaches: ca. 20% (tension) to 35% (migraine)

Occlusal rehabilitation can be indicated, for example,
as a necessary requirement to meet aesthetic desires,

but it takes a strange combination of ignorance and arrogance
to claim it is indicated for treatment of symptoms!

CMD patients are a mix of reward and frustration. You must decide for yourself if you want to treat or refer, but…

When you do not recognize parafunction

restorative and prosthetic dentistry will be just as frustrating.

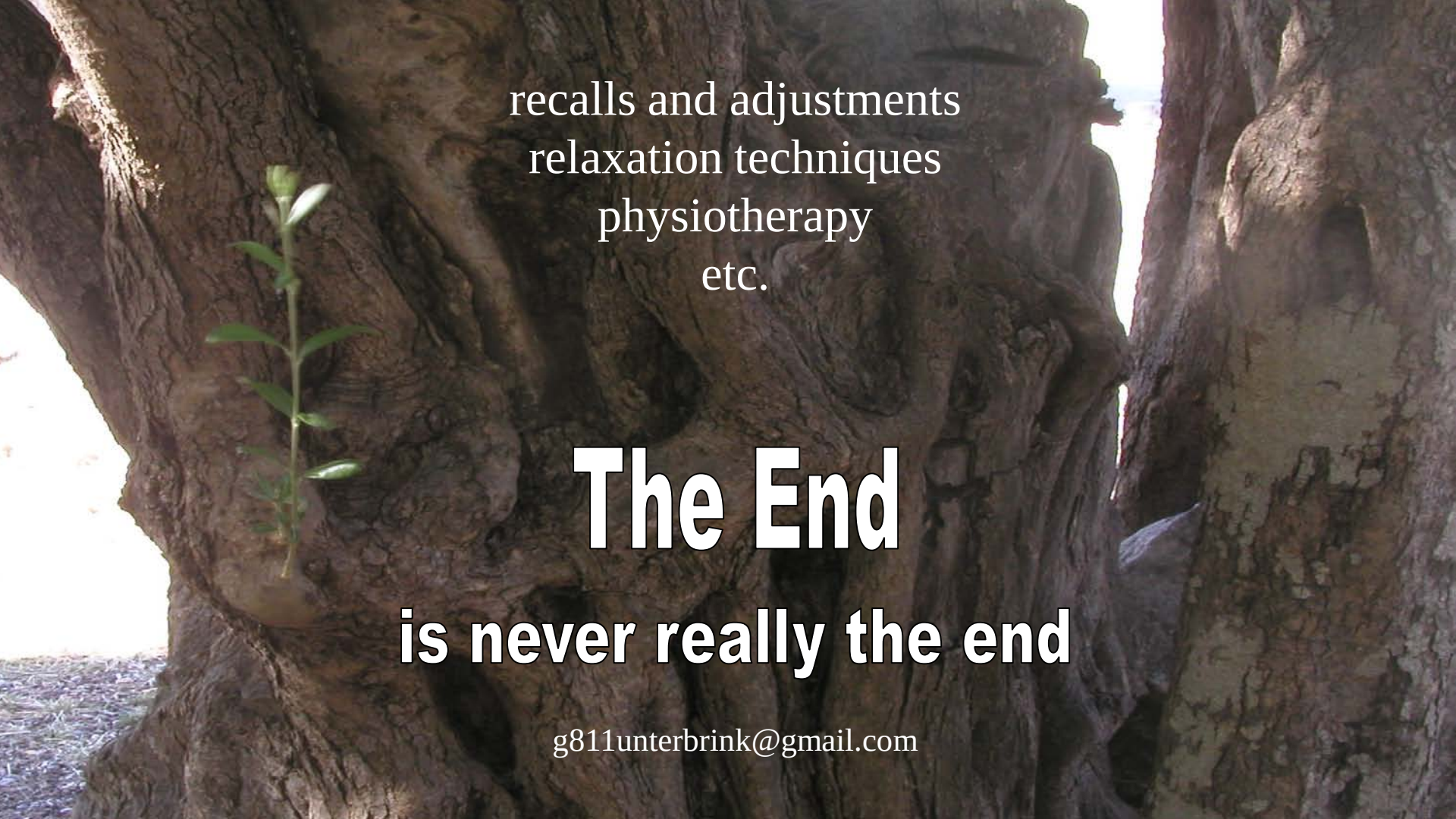
If my technician sees something on the model that I did not see clinically, I expect him/her to tell me!

Questions?

Finally we have
come to the end

One answer in advance

No, you cannot
get my assistant's
phone number.


recalls and adjustments
relaxation techniques
physiotherapy
etc.
The End
is never really the end
g811unterbrink@gmail.com