

Pankey TM Disorders 2017

John R Droter DDS
Annapolis, Maryland

Annapolis, Maryland
John R Droter DDS

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John R Droter, DDS

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Pankey TMD
2017

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Upcoming Seminars

- July 20, 2016 D-PAS Hand on- In Office, Annapolis MD
- July 21-23 2016 Droter Hands on- In office, Annapolis MD
Call Kim 301-805-9400
- Pankey TMD Week, Key Biscayne FL
October 23-27, 2016
October 22-26, 2017
Call [LD Pankey Institute](http://LD.Pankey.Institute) 305.428.5500
- Spear TMD Course 1 with Dr Herb Blumenthal
Aug 11-13, 2016, Scottsdale Arizona
Call [Spear Education](http://Spear.Education) (866) 781-0072

Most Popular and Common Downloads

- TMD Supersheet Download
[SuperTMDdx13.11](#)
- Brux supersheet Download

In studying conditions of pain in the temporomandibular joint, I have been impressed by the lack of consideration given to them by the dental profession. The dentist must familiarize himself with this field of responsibility and incorporate in his every day practice, procedures which will adequately safeguard against or relieve abnormalities of the temporomandibular articulation.



Clyde Schuyler

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Clyde Schuyler, DDS 1938



Clyde Schuyler
of Pankey, Mann, Schuyler fame

Schuyler CH. J Florida Dent Soc, 1938. Occlusal disharmony and its relation to oral discomfort.



Hello. I am:

John R Droter DDS
Annapolis, Maryland

Annapolis, Maryland
John R Droter DDS

Milestones



Visiting Faculty Spear Education 2013

Need to publish.....

Visiting Faculty LD Pankey Institute 2008

Visiting Faculty Orthodontic Program
Washington Hospital Center 2000

On staff AAMC: Orthopedic Rounds
In OR for TMJ Surgery

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

CT and MRI Imaging Joints 1992
Guy Haddix, DDS: Mentor
(3,100 images and rising)

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



Specific Diagnosis Specific Treatment 8 Key Questions

John R Droter DDS
Annapolis, Maryland

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John R Droter DDS

Why Confusion?

TMD/TMJ
Symptoms based

Not One Disease



Temporomandibular Disorders (TMD) is an umbrella term covering any condition causing pain or dysfunction in the temporomandibular joint, muscles of mastication, trigeminal nerve, facial nerve, and associated head and neck musculoskeletal and neural structures. Craniomandibular Disorders would be a better term (CMD).

Facial Pain- What are the choices?

TMD Myalgia as primary source of pain

Occlusal Muscle Dysfunction (OMD)

Parafuction- Grinding of Teeth

Parafuction- Clenching Teeth

Muscle Splinting, Stabilizing, Tonic Contracture

Mechanically UnstableTMJ: Deep Temporalis, Deep Masseter

Pain Avoidance: Painful TMJ, Muscle or Teeth: Temporalis, Digastric

Tongue: Stabilize Neck, Stabilize TMJ, Occlusal Cushion

Mastication Dysfunction (Chewing)

Muscle Weakness

Muscle Hypertrophy

Overuse Myalgia

Triggerpoints/Myofascial Pain

Muscle Spasm

Dystonia

TMD other

Cervical Damage- Atlas Misalignment

Referred pain from neck muscles

Migraine Headaches- cervical/trigeminal mediated

CRPS/RSD

Trigeminal Neuralgia

Neuroma, Phantom Tooth Pain

Bell's Palsy

TMD Arthralgia as primary source of pain

Physical Damage to Disc & Ligaments

Osteoarthritis

Avascular Necrosis

Osteochondritis Dissecans

Hypoxic Progressive Condylar Resorption

Inflammatory Tissue Bone Resorption

Rheumatoid Arthritis

Lyme Disease

Joint Infection- Staph, Strep, Syphilis

Fracture/Crush condylar head and fossa

Psoriatic Arthritis

Crystalline Deposition Diseases

Cancer TM Joint/ TM Bones

Synovial Cyst (Ganglion)

Non TMD Facial Pain

Cancer; Head, Neck, Central

Coronary Artery Disease

Centrally Mediated Pain

Migraine Headaches histamine mediated

Infection: Sinuses, Ear, Teeth, Periodontal

Pulpitis

Temporal Arteritis

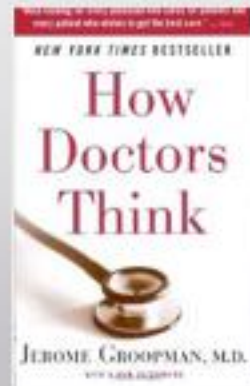
Other

* This is not a complete listing of all the possibilities

Differential Diagnosis

Diagnostic Boxes: Pattern Recognition

“My Tooth Hurts”



Differential Diagnosis

Diagnostic Boxes: Pattern Recognition

Reversible Pulpitis secondary to caries

Irreversible Pulpitis secondary to caries

Pulpitis secondary to split tooth

Pulpal necrosis

Sinus Infection

Sympathetic Mediated Pain

Referred Pain from Muscle
Trigger Point

Neuroma

Periodontal Infection

Inflamed Tissue secondary to
popcorn husk

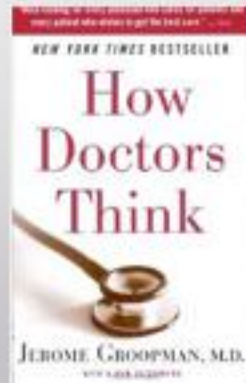
Aphthous Ulcer

“My Tooth Hurts”

Periodontal ligament inflammation
secondary to Occlusal Trauma

Pulpitis secondary to Occlusal Trauma

Other

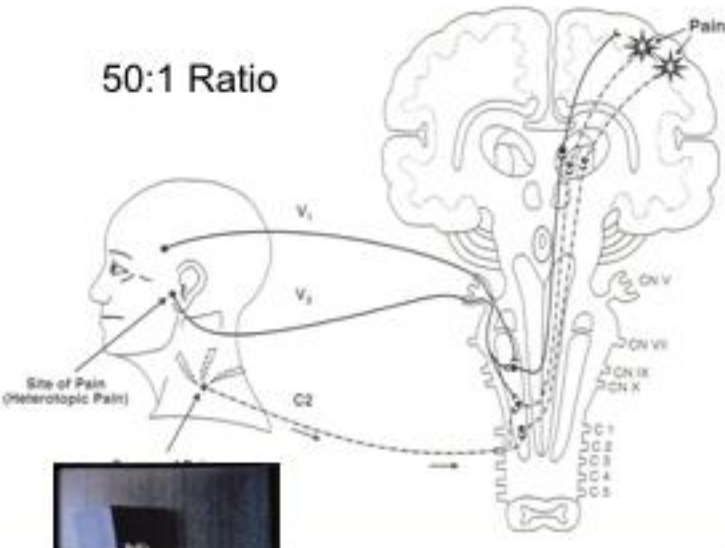


Referred Pain

Convergence

More primary sensory neurons than secondary neurons that travel to brain

50:1 Ratio



"Bell's Orofacial Pain"
Jeffery Okeson

Trigger Points

Contracted mass of actin, myosin and histamine

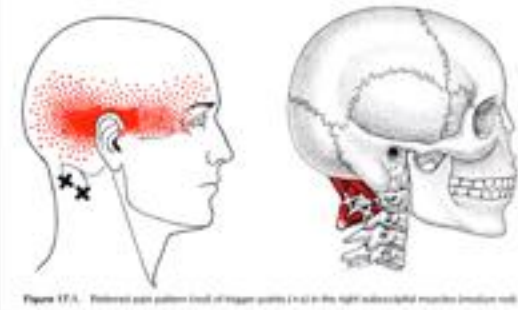
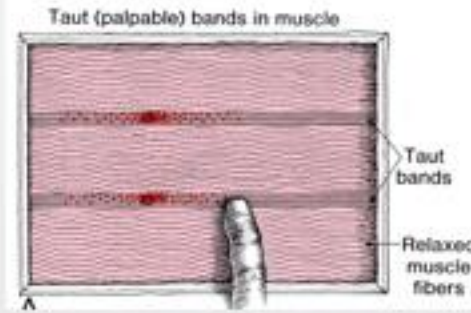
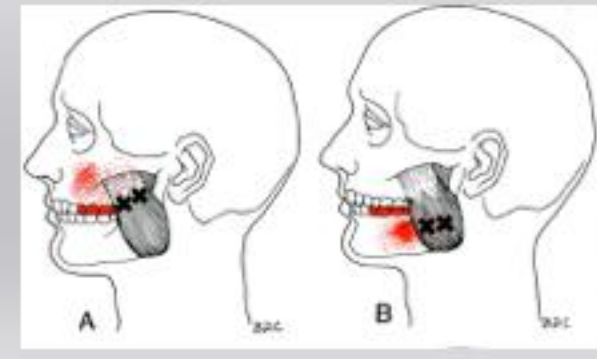
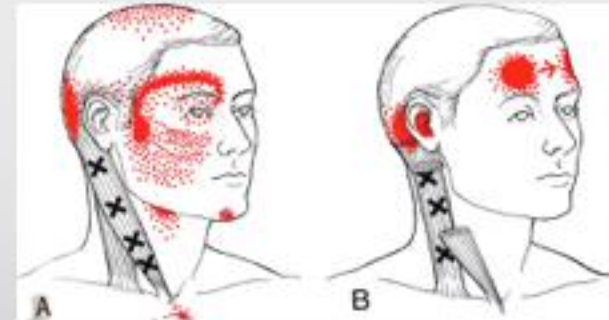


Figure 17.1. Referred pain pattern (red) of trigger points (x) in the right suboccipital muscles (medial neck).

"The Trigger Point Manual"
Janet Travell, MD



Differential Diagnosis

Diagnostic Boxes: Pattern Recognition

“My Tooth Hurts”

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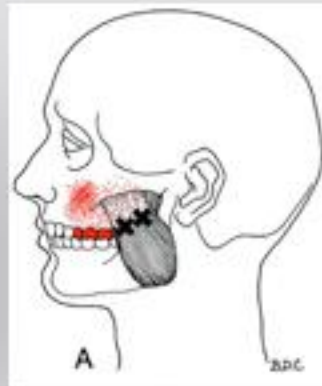
Inflamed Tissue secondary to
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Aphthous Ulcer

Periodontal ligament inflammation
secondary to Occlusal Trauma

Pulpitis secondary to Occlusal Trauma

Other



“How Doctors Think”, by Jerome E. Groopman

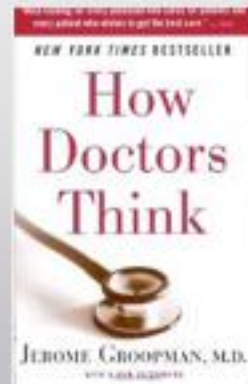
Diagnose by Pattern Recognition

Tendency to make patients fit what we know
Ignore signs and symptoms that do not fit

Always make a differential diagnostic list

Ask, “ It appears to be this, but what else could it be?”

Be aware you are blinded by your beliefs



Observations- Accurate

Observation with Explanation

Observation with no Explanation

Not Observed

Explanations (beliefs)

Best at the time

Not always accurate

Do not become attached to explanations

We carve out order by leaving the disorderly parts out.*

William James, MD, 1890

*How Doctors Think, by Jerome E. Groopman
Pattern Recognition



We have beliefs in our minds of how we think the TMJ behaves in health and in disease. We also have voids.

Become a good observer

Have an open mind but not an empty head

Facial Pain- What are the choices?

TMD Myalgia as primary source of pain

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Pulpitis

Temporal Arteritis

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* This is not a complete listing of all the possibilities

TMD Treatment- What are the choices?

TMD Myalgia as primary source of pain

Occlusal therapies
Orthodontics
Protective full coverage night guard
Anterior Stop night guard
TMJ re-adaptive appliance, 24/7 wear
Pain medication
Muscle relaxants
Triggerpoint injections
Botox
Cold Laser
Thermal Therapy
Jaw Exercises
Active Stretching
Massage

TMD other

Cervical Re-alignment
Trigger point therapies- Injections, Cold Laser
Migraine medications
Stellate ganglion block
Surgical excision nerve ending
Trigeminal Neuralgia medications
Botox block lateral pterygoid

TMD Arthralgia as primary source of pain

TMJ re-adaptive appliance, 24/7 wear
NSAIDs
Doxycycline
Condylar distraction
Methotrexate
Antibiotics
Arthrocentesis
TMJ surgery

* This is not a complete listing of all the possibilities

Need to know which specific diagnosis goes to which specific treatments

TMD Tx- What are the choices?

TMD Arthralgia as primary source of pain
 TMJ re-adaptive appliance, 24/7 wear
 NSAIDs
 Doxycycline
 Condylar distraction
 Methotrexate
 Antibiotics
 TMJ surgery

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Specific Treatment

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TMD other

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Physical Damage to Disc & Ligaments
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 Avascular Necrosis
 Inflammatory Tissue Bone Resorption
 Rheumatoid Arthritis
 Lyme Disease
 Joint Infection- Staph, Strep, Syphilis
 Compromised Condylar Perfusion
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 Psoriatic Arthritis
 Crystalline Deposition Diseases
 Cancer TM Joint/ TM Bones
 Scleroderma
 Synovial Cyst

Specific Diagnosis

in TMD Facial Pain
 Ischemic; Head, Neck, Central Nervous System
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 Centrally Mediated Pain
 Migraine Headaches histamine mediated
 Infection: Sinuses, Ear, Teeth, Periodontal
 Pulpitis
 Fibromyalgia
 Temporal Arteritis
 Other

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TMD Symptoms

- Sore TMJ muscles
- TMJ clicking
- TMJ pain
- Jaw locking
- Limited opening
- Difficulty open jaw
- Difficulty closing jaw
- Difficulty chewing
- Headaches
- Eye pain
- Ear pain
- Facial Pain



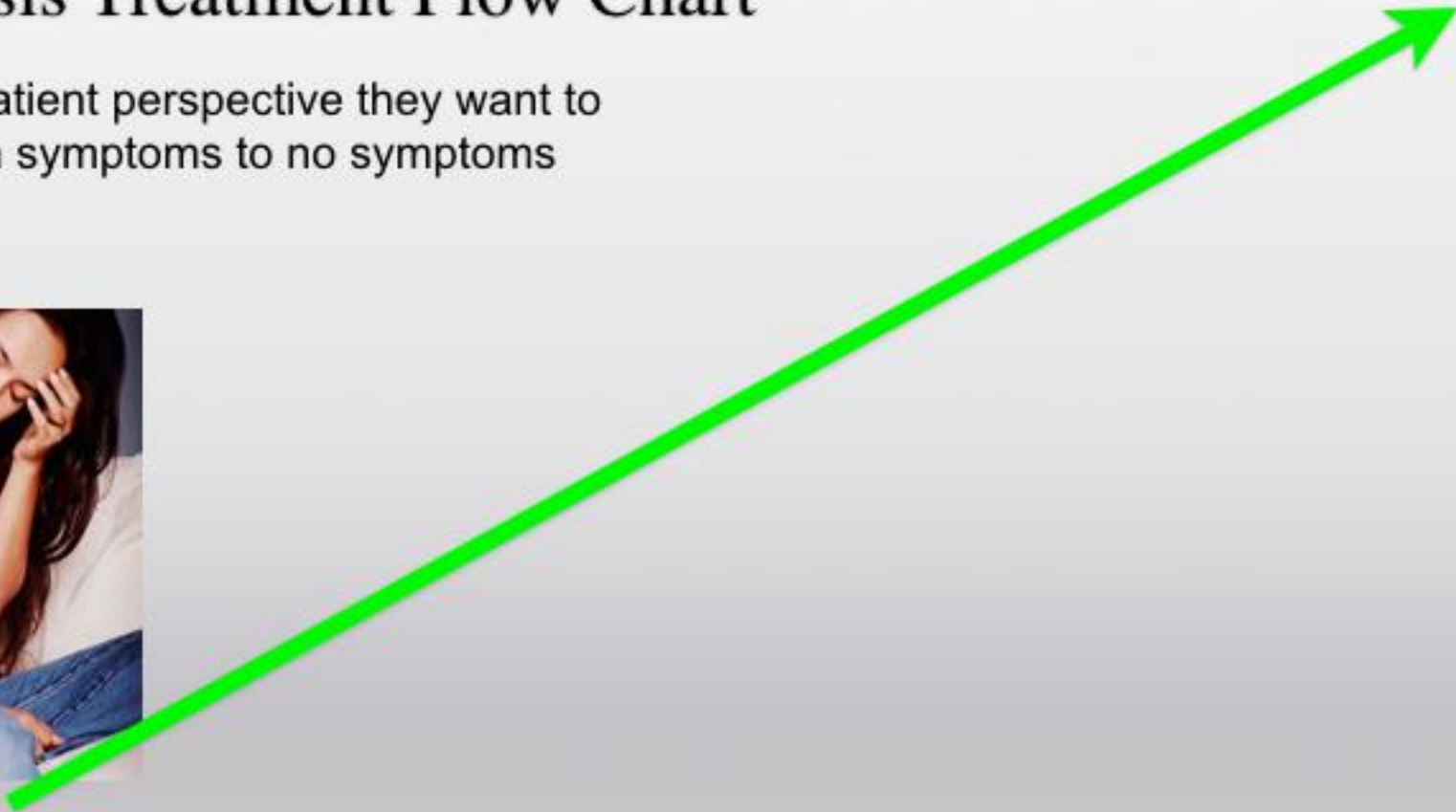
Diagnosis Treatment Flow Chart

From a patient perspective they want to go from symptoms to no symptoms



Symptoms

No Symptoms

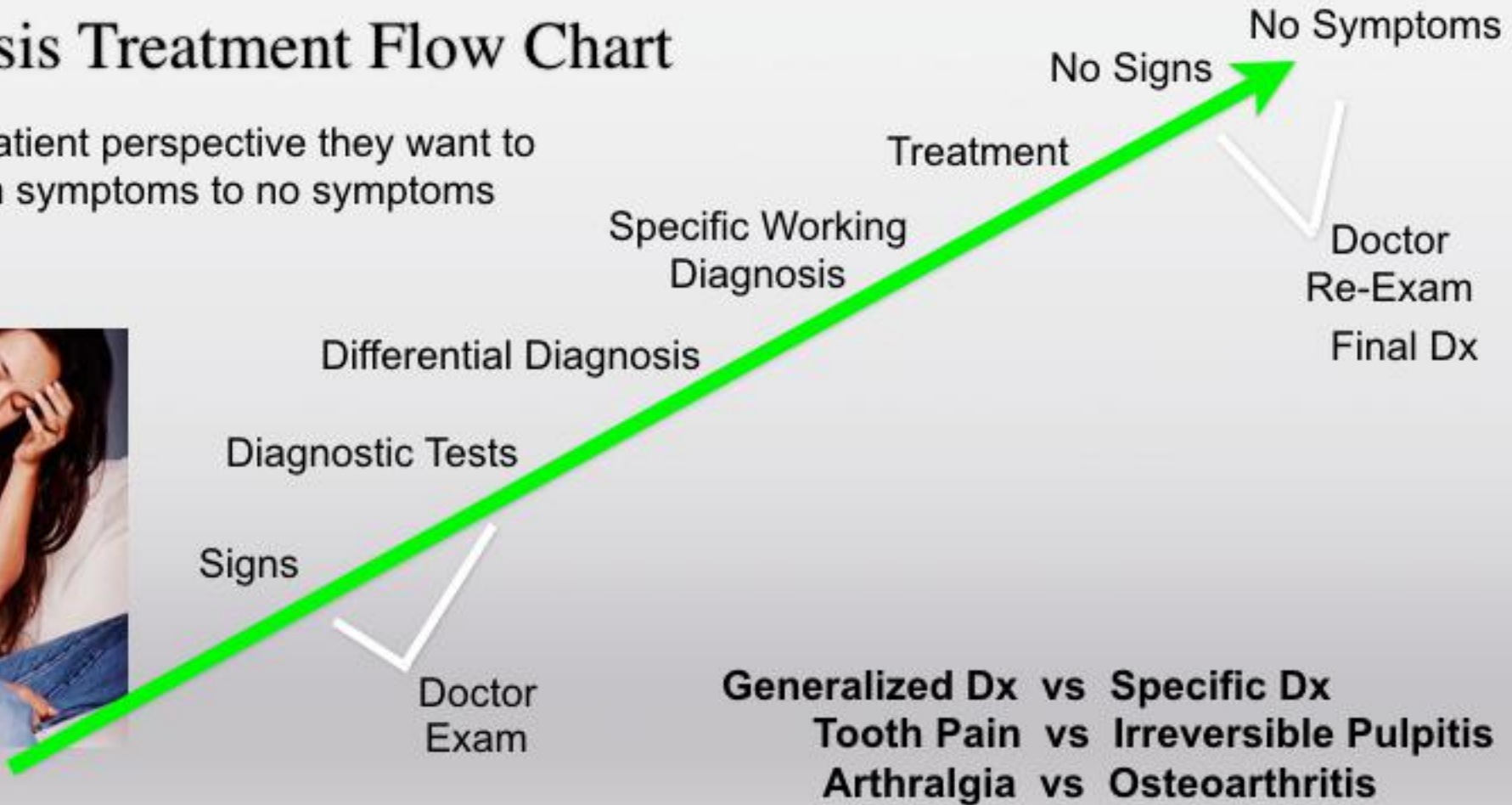


Diagnosis Treatment Flow Chart

From a patient perspective they want to go from symptoms to no symptoms



Symptoms



Diagnosis Treatment Flow Chart

From a patient perspective they want to go from symptoms to no symptoms

No Symptoms

Less Symptoms

If you skip the exam, diagnostic tests, and diagnosis, you can give a therapy directed at symptoms. If you dull the symptoms the patient will perceive a benefit.



Symptoms



**TMD: If only one Diagnosis,
only need one Treatment**

**If only one Treatment,
only need one Diagnosis**



Shotgun approach: Combine many therapies

TMD is a symptom based (generalized) diagnosis

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Neuroma, Phantom Tooth Pain

Bell's Palsy

The Big 3:
OMD

Grinding

Clenching

TMD Arthralgia as primary source of pain

Physical Damage to Disc & Ligaments

Osteoarthritis

Avascular Necrosis

Osteochondritis Dissecans

Hypoxic Progressive Condylar Resorption

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- Muscle Bracing, Stabilizing, Tonic Contracture
- Clenching Teeth
- Mechanically Unstable TMJ: Deep Temporalis, Deep Masseter

The Big 3+1: OMD

Grinding

Clenching

Joint Subluxation (Wobbly Joint)

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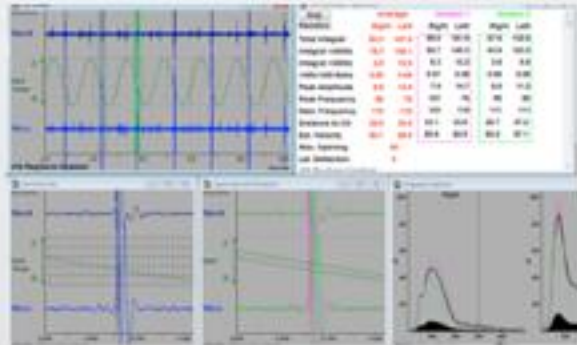
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Specific Diagnosis

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Degrees of Sophistication of the Diagnosis of TMJ Damage



JVA use

Orthopedic Diagnosis
 Working knowledge of orthopedic medicine
 Imaging will be part of diagnostic process
 Treatment will cause adaptation

Advanced

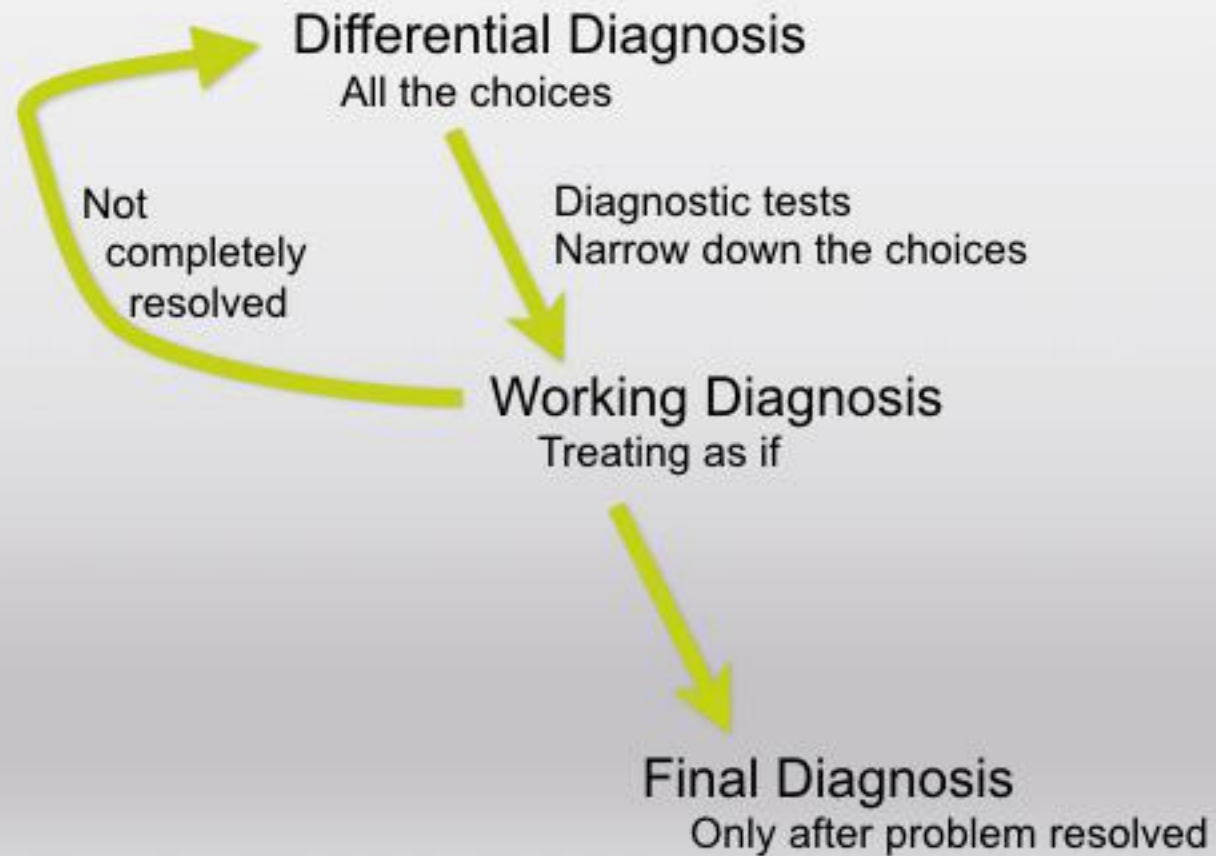
Sophisticated Confusion Applied

Disc Centered Diagnosis
 One or two treatments, put in an appliance
 Help some, over-treat many, hurt a few

Joint Healthy or Damaged
 JVA as a screening tool, monitoring tool
 Continue Regular Dental Care on
 Favorably Adapted TMJ Damage
 Refer out joints needing joint therapy

Basic

The Diagnostic Process



Facial Pain: Not always OMD

CC: Sharp Shooting Nerve Pain Right Face

Dx: Class 2 Malocclusion

Tx: Orthognathic Surgery. Still Facial Pain.

Dx: OMD

Tx: Multiple Occlusal Adjustment over a year
Still Pain

Dx: CT scan reveals Parotid Cancer, Stage 4.



7 Rules for Dx Facial Pain:

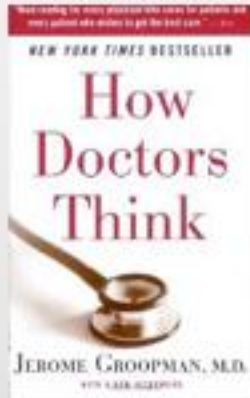
1. Listen to the patient, oral and written
2. Patients can have more than one disease
3. Develop a Differential Diagnosis
4. Run tests that increase or decrease the pain
5. Develop a Working Diagnosis
6. Diagnosis Confirmed after Tx
7. Do not chase a diagnosis too long before you rule out cancer.



Rule cancer out early, rule it out often.

Blinded by the Click

There is no rule that says you only get one disease



Always make a differential diagnostic list
Ask, " It appears to be this, but what else could it be?
Be aware you are blinded by your beliefs

Jaw is clicking, ear pain

Jaw is clicking, sudden onset headache, 53 year old

Jaw is clicking, temple pain, pain increases with chewing, 62 year old

Jaw use to click, Jaw stopped clicking and can not open wide

History is key, physical exam is next most important, palpate the muscles and joint.

Notice the Age group does not fit OMD for the second and third patient.

None of the above patients will pass the D-PAS test.

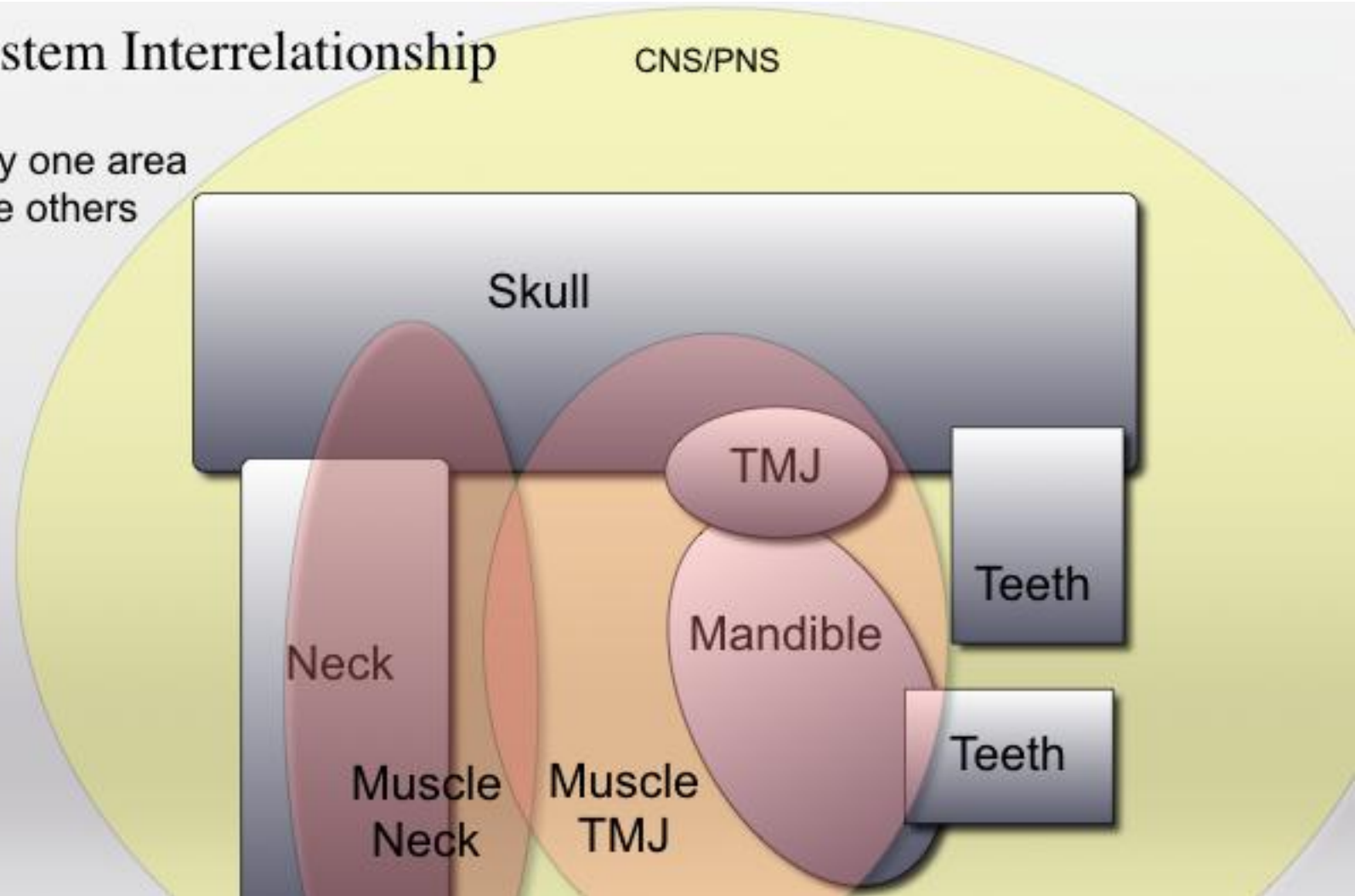
The third patient does not have time for the D-PAS test

Stomatognathic System Interrelationship

CNS/PNS

A change in any one area
will affect the others

“Adaptation”
This is a **dynamic**
orthopedic System



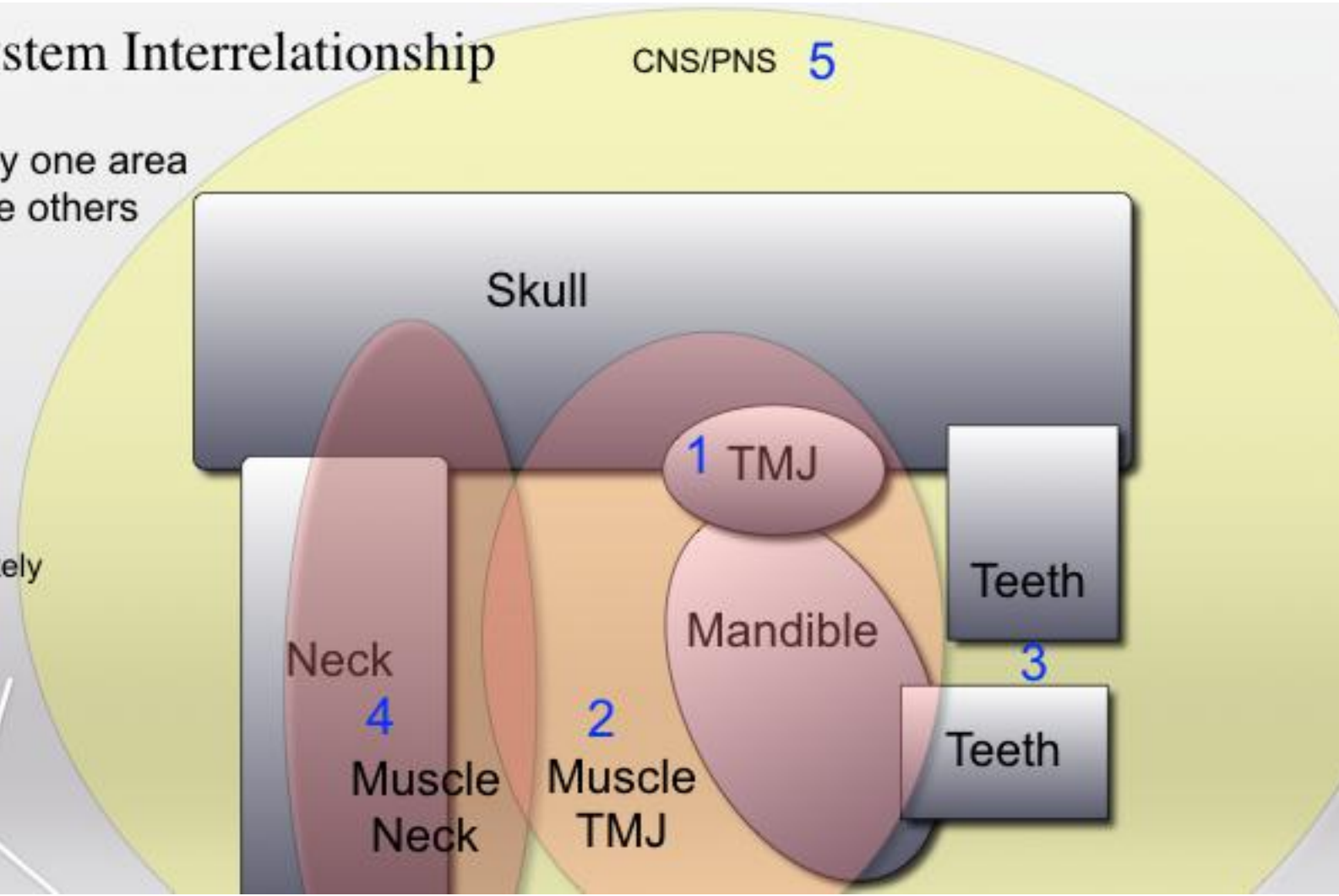
venn diagram

Stomatognathic System Interrelationship

CNS/PNS 5

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Diagnosis each area separately

- 1. TMJ
- 2. TMJ Muscles
- 3. Occlusion
- 4. Neck and Neck Muscles
- 5. Parafunction
- 6. Whole Body

6

8 Key Questions Leading to a Specific TMD Diagnosis and Treatment

1. Is there temporomandibular joint damage that needs to be treated?
2. Are the muscles associated with the TMJ sore and or dysfunctional?
3. Is there Occlusal Disharmony with the Maxilla, Temporal bone, Mandible and muscles?
4. Is there cervical damage or misalignment that needs treated (including muscles)?
5. Is there parafunction that needs to be managed?
6. Are there any whole body, systemic issues affecting health, comfort, or the ability to heal?
7. Are there any other sources of pain or dysfunction?
8. Are any of the above affecting Quality of Life?

8 Questions

I can figure out a case and at the same time generate a report for other doctors or insurance companies.

8 Key Questions for Specific TMD Diagnosis and Treatment

Patient's Chief Concern (CC):

1. Is there temporomandibular joint damage that needs to be treated?
2. Are the muscles associated with the TMJ sore and/or dysfunctional?
3. Is there Occlusal Disharmony with the Maxilla, Temporal bone, Mandible and muscles?
4. Is there cervical damage or misalignment that needs treated (including muscles)?
5. Is there parafunction that needs to be managed?
6. Are there any whole body, systemic issues affecting health, comfort, or the ability to heal?
7. Are there any other sources of pain or dysfunction?
8. Are any of the above affecting quality of life? (Symptoms)

Past Treatments:

«Today's Date» **Diagnosis/Appointment Schedule**
John R. Driskel, DDS
207-805-8400
djr@mac.com

«Pat_FirstName» «Pat_LastName»

Age
Referred By
P- Patient's Chief Concern (CC):

Summary:

Health Status of the Key Regions

1. Is there temporomandibular joint damage that needs to be treated?
TMJ Piger Disc Classification:
TMJ is Damaged: Actively breaking down...Adapting, Favorably Adapted, Unfavorably Adapted
TMJ is Healthy

Comfort: Good Fairly
TMJ Palpation: Slight/Moderate/Severe Soreness: Comfortable
TMJ Load: Slight/Moderate/Severe Soreness: Comfortable
Chewing Ability: Good Compromised due to TMJ damage, TMJ pain, and Malocclusion
Difficulty chewing hard foods

Movement: Good Limited, Dysfunctional
ROM:
TMJ Motion: Smooth, Good Velocity, Quietest/softest opening/closing Dysfunctional

Jaw: No Wonders Simple Click Complex Click Scratch Wobble Slight Moderate
Severe

10-30-15 **Diagnosis/Appointment Schedule**
John R. Driskel, DDS
207-805-8400

PT Name: JT
Referred By: DDS
P- 2010 severe atypical pain after worse prep, has not resolved.
Dx with Trigeminal neuralgia, on medications
Patient's Chief Concern (CC): Decrease Clenching

Goal of Treatment: manage severe clenching
Pain Reduction

Limitations/Obstacles: Atypical facial pain
Current dx is trigeminal neuralgia, may not be accurate.

Health Status of the Key Regions

1. Is there temporomandibular joint damage that needs to be treated? Possible, but probably not primary source of pain. Occlusal/TMJ stabilization needed to help with neck stabilization.
No increase in pain with previous anterior stop appliances. Currently uses E splint

TMJ Piger Disc Classification: L3a/R3a
ROM: S1+T
TMJ Motion: Smooth
TMJ Palpation: Slight
TMJ Load: Slight
Difficulty chewing hard foods
TMJ is Damaged/ Appears well adapted
Structural Stability: Stable
Mechanical Stability: Stable. No increase in pain with anterior stop appliances.

Are the muscles associated with the TMJ sore and/or dysfunctional? **YES**
TMJ Muscles: Severe Soreness, Lateral Pterygoid Severe Soreness
Good Harmony in motion

Is there Occlusal Disharmony with the Maxilla, Temporal bone, Mandible and muscles?
NO
Dysfunctional Malocclusion
Severe malocclusion open bite #6-10, minimal tooth stabilizing contacts in MaxC or CR
Low posterior contact and 3mm to occlude teeth.
Chewing Ability: Compromised due to Malocclusion
Difficulty chewing hard foods

Is there cervical damage or misalignment that needs treated (including muscles)? **YES**

In MacPractice (Practice Software) I made a template I can chose, cut and paste to generate a report answering the 8 questions.



1. Is there TMJ Damage that needs to be treated?

TMJ Piper Disc Classification:

TMJ is Damaged: Actively breaking down, Adapting, Favorably Adapted, Unfavorably Adapted

TMJ is Healthy

Comfort: Good Painful

TMJ Palpation: Slight/ Moderate/ Severe Soreness Comfortable

TMJ Load: Slight/ Moderate/ Severe Soreness Comfortable

Chewing Ability: Good Compromised due to TMJ damage, TMJ pain, and Malocclusion

Difficulty chewing hard foods

Movement: Good Limited, Dysfunctional

ROM:

TMJ Motion: Smooth, Good Velocity, Guarded motion opening/closing Dysfunctional

Sounds Stethoscope:

Sounds Doppler:

JVA: No Vibrations Simple Click Complex Click Scratch Wobble Slight Moderate Severe

Chewing Ability: Good Compromised due to TMJ damage and Malocclusion

Difficulty chewing hard foods

Mechanical Stability: Stable/ Unstable/ Probably Stable/ Not sure

D-PAS Test: No increase in pain, No difference in pain, Pain increased

Deep Temporalis: Slight/ Moderate/ Severe Soreness Comfortable

JVA: No Vibrations Simple Click Complex Click Scratch Wobble Slight Moderate Severe

Structural Stability: Stable/ Unstable/ Probably Stable/ Not sure

CT Scan Cortex Intact not intact hypercalcified cystic degeneration

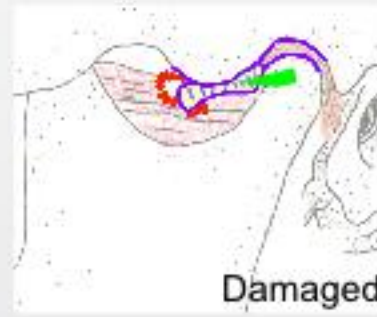
MRI Scan T2/STIR: No edema of retrodiscal tissue or bone marrow

Inflamed Retrodiscal Tissue Bone Marrow Edema Intracapsular edema

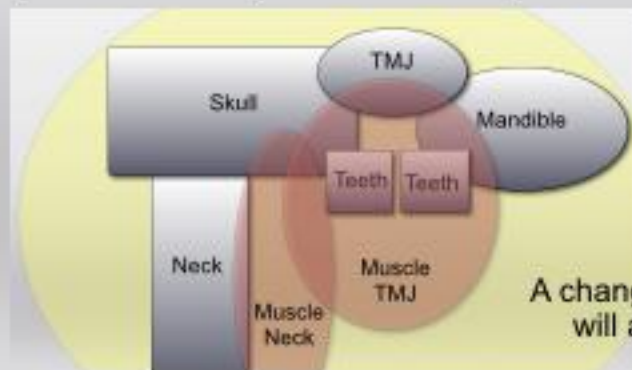
Basic Orthopedics

Joints are either
Healthy or
Damaged

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



Does the joint damage have anything to do with the pain and/or dysfunction the patient is experiencing?



A change in any one area will affect the others

If the TMJ Adapted Unfavorably:
Mechanically unstable joint motion
Mechanically unstable loading



TMJ Neuromuscular Disharmony pain avoidance
TMJ Neuromuscular Disharmony occlusal avoidance

Descending neck neuromuscular disharmony
Ascending neck neuromuscular disharmony

The TMJ: What You need to Know

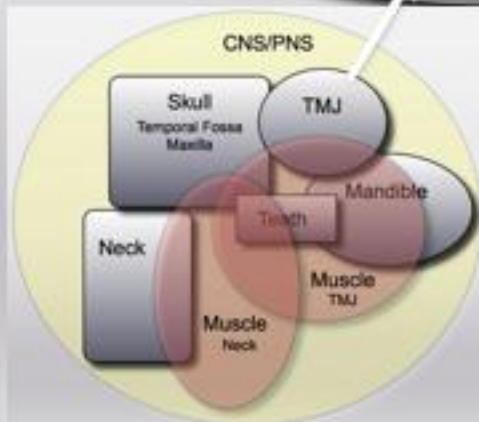
TMJ

Does it Hurt?
Does it Move?
Does it Wobble?
Is it Structurally Stable?

Evaluate every TM joint for:

1. Comfort
2. Movement
3. Mechanical stability- Does the joint wobble on loading?
4. Structural stability- Will the joint lose bone with a resulting occlusal shift?

If there is a TMJ problem it will be in one of these four areas.



The Bottom Line:

To Minimize Risk and Maximize Benefit before you change an Occlusion:

Palpate and Load the TMJ.

Measure Smoothness and Range of Motion (Quality and Quantity), Record JVA

Put in Anterior Stop Orthotic 24/7 for 2 days- Not Painful

Take CT scan- see intact cortex of condylar bone and fossa

History: Chews well, no pain. No change joint sounds, ROM, or occlusion in past year.

2. Are the muscles associated with the TMJ sore and or dysfunctional?

TMJ Muscles: Slight/ Moderate/ Severe Soreness Comfortable
 Slight/ Moderate/ Severe Disharmony in motion Good Harmony in motion
 Chewing Ability: Good Compromised due to Muscle pain and Malocclusion

My "Monitor Muscles"

- Temporalis
- Masseter
- Digastric
- Superior Oblique Capitus
- Deep Temporalis
- Lateral Pterygoid

Worse Function Push			
Muscle Palpation		R	L
		N SL MO SV	N SL MO SV
Masseter sup deep			
mid	●		
inferior		●	
Intermediate	●		
Temporalis insert		●	
Lateral Pterygoid	●		
Digastric		●	
Medial Pterygoid			●
Temporalis post		●	
mid	●		
ant	●		
Teeth		Qccl	Slide Direction
CR ± Max I	3mm		Anterior
Lacks Stable/Solid Max/C			
Anterior open bite		Delayed Occlusion	SL Wear
Dental Health		Good	
Perio Health		Fair	No attached tissue
Neck		R	L
		SCM Scalenes	
Sup Oblique Capitus			
Post Neck			
Trapezius			
TMJ Palpation			
	R	L	
	N SL MO SV	N SL MO SV	
ant lat pole	●		
post lat pole	●		
indirect		●	
Load CR	●		
Load Lateral	●		
Bite			
Skeletal Alignment			
Eyes	---	Max Plane	---
Incisal Edge/Lip	5mm	Max Midline	+
CEJ Alignment	Aligned	Mand Midline	+
		Mand Plane	-
		Chin	+
Sounds			
R	max open	55+1	mm
smooth	deviate	I	smooth
	Protrusion	Normal	
	deviate	I	
	Lateral Exc	Normal	
	none	Click	none
Skin Health			
Good			
Doppler Piper Classify			
R	rot	trans	L
crep	---	+	crep
	+	++	
Vasc	+	click	Vasc
	2	2	

3. Is there Occlusal Disharmony with the Maxilla, Temporal bone, Mandible and muscles?

Occlusal Harmony with joint, bone and muscles

Functional Malocclusion, well adapted

Slight / Moderate / Severe Dysfunctional Malocclusion

Pathological Malocclusion

Slight / Moderate / Severe Worn/Damaged Teeth

Chewing Ability: Good Compromised due to TMJ damage and Malocclusion

Difficulty chewing hard foods

Malocclusion caused by TMJ damage

CR≠MaxIC mm (Centric Relation does not equal Maximal Intercuspatation)

4. Is there cervical damage or misalignment that needs treated (including muscles)?

Neck Muscles: Slight/ Moderate/ Severe Soreness Comfortable
Need to evaluate cervical alignment

5. Is there parafunction that needs to be managed?

Parafunction: none/ slight/ moderate/ severe

No clinical signs of parafunctional grinding or clenching

Sleep Grinding, Awake Grinding

Sleep Clenching, Awake Clenching

Tongue bracing

Clenching may be from neck instability

6. Are there any whole body, systemic issues affecting health, comfort, or the ability to heal?

Whole Body Health good/ fair/ questionable/ poor/ questionable

Energy Level: good/ fair/ questionable/ poor/ questionable

Sleep: good/ fair/ poor

Airway: good/ fair/ questionable/ poor

Dental health: Teeth good/ fair/ poor

Perio good/ fair/ poor

Nutrition: good/ fair/ poor/ Not able to chew hard foods , Soft foods only

Systemic diseases: none/ RhA/ connective tissue disease/ fibromyalgia/ Lyme

Standing Posture: good/ fair/ poor Marginal, could be improved, may be neck related

Walking posture: good/ fair/ poor Marginal, could be improved

Pain tolerance: good/ fair/ poor Worry, Stress management: good/ fair/ poor

Heart Rate Variability: Good Parasympathetic Control Poor, Sympathetic Dominance

Skin Health: good fair marginal fragile frail stressed

7. Are there any other sources of pain or dysfunction?

Other possible sources of pain do not appear present: Sinus, Dental, Ear, Neuralgia, CRPS, Dystonia are all wnl

8. Are any of the above affecting Quality of Life?

Inability to effectively chew.

Avoiding healthier foods due to lack of chewing ability.

Mental clarity affected due to pain.

Brain fog, decrease in ability to concentrate.

Daily fatigue due to pain.

Daily fatigue due to lack of quality sleep.

Previous Treatments Attempted

Medications:

Doctors seen: Neurologist, DDS, Oral surgeons, Medical Primary, ER

Physical Therapy

TMJ Surgery

Splint therapy

Orthodontics

Occlusal adjustments

Conservative treatment: Soft Diet, Muscle relaxants

From JRD Dx Handout Treatments Handout

JRD Dx with Closest ICD10	Category
Adhesions and ankylosis of temporomandibular joint M25.01	1 TMJ Disorder
Adhesions and ankylosis of upper joint compartment temporomandibular joint M29.81	1 TMJ Disorder
Angiogenesis Cartilage TMJ M93.81	1 TMJ Disorder
Avascular Necrosis Mandibular Condyle M87.29	1 TMJ Disorder
Bilal Condyle Q27.4	1 TMJ Disorder
Cartilage Fibrillation, Mandibular Condyle, Foresh M19.05	1 TMJ Disorder
Closed Lock, Jaw Cartilage, Acute	1 TMJ Disorder
Closed Lock, Jaw Cartilage, Chronic M24.32	1 TMJ Disorder
Closed Lock, Jaw Cartilage, Intermittent, Mechanically dysfunctional M24.33	1 TMJ Disorder
Crush Injury Mandibular Condyle M87.4	1 TMJ Disorder
Crystal arthropathy, unspecified, TMJ M11.9	1 TMJ Disorder
Dislocation jaw cartilage due to injury, Initial S22.0x4	1 TMJ Disorder
Dislocation jaw cartilage due to injury, Sequela S22.0x2	1 TMJ Disorder
Dislocation jaw cartilage with reduction, favorable adaptation, TMJ S22.0x49	1 TMJ Disorder
Dislocation jaw cartilage without reduction, favorable adaptation, TMJ S22.0x48	1 TMJ Disorder
Effusion, TMJ M25.47	1 TMJ Disorder
Fibrosis Retrodiscal Tissue M27.2	1 TMJ Disorder
Fracture of subcondylar process of mandible S22.05	1 TMJ Disorder
Gout, TMJ M10.00	1 TMJ Disorder
Hemarthrosis TMJ, Traumatic M25.39	1 TMJ Disorder
Hydroxyapatite deposition disease, TMJ M11.22	1 TMJ Disorder
Hypertrophy Mandibular Condyle, Bilateral, Active M26.03	1 TMJ Disorder
Hypertrophy Mandibular Condyle, Unilateral, Active M27.3	1 TMJ Disorder
Hypoplasia Mandibular Condyle, Bilateral, Growth Disturbance due to TMJ damage prepuberty M94.84	1 TMJ Disorder
Hypoplasia Mandibular Condyle, Unilateral, Growth Disturbance, due to TMJ damage prepuberty M27.3	1 TMJ Disorder
Hypoxic Reperfusion Injury, TMJ Cartilage Damage M8.9	1 TMJ Disorder
Hypoxic Progressive Condylar Resorption M83.8	1 TMJ Disorder
Impingement Retrodiscal Tissue M19.2	1 TMJ Disorder
Inflammatory Tissue Bone Resorption, TMJ Condyle M94.04	1 TMJ Disorder
Loose Body (Joint Mice), TMJ M24.28	1 TMJ Disorder
Malignant neoplasm of bones of skull and face C41.8	1 TMJ Disorder
Open Lock TMJ, Recurring S22.0x41	1 TMJ Disorder

Treatments	Category
2nd Biluspid Orthotic	1 TMJ
Active teachstetch posterior discal ligaments	1 TMJ
Anterior Repositioning Orthotic Short Term	1 TMJ
Condylar Distraction Orthotic	1 TMJ
Dynasplint	1 TMJ
Indexed Orthotic	1 TMJ
Jaw Exercises- active stretching	1 TMJ
Jaw Exercises- passive motion	1 TMJ
Jaw Exercises- Tongue Blade Stretch	1 TMJ
NSAID	1 TMJ
NSAID and Doxycycline	1 TMJ
NSAID and Tylenol	1 TMJ
Refer for Arthrocentesis	1 TMJ
Refer for Autogenous Blood Joint Injection	1 TMJ
Refer for Discotomy, Fat graft, Condylar Distraction	1 TMJ
Refer for Prolo Therapy	1 TMJ
Refer for Total Joint Replacement	1 TMJ
Cold Laser	2,4,6 Neck, Muscles, Body
Hot, Cold, Hot Muscle Therapy	2,4,6 Neck, Muscles, Body
Iron Supplement	2,4,6 Neck, Muscles, Body
Magnesium Supplement	2,4,6 Neck, Muscles, Body
Mandibular Advancement Appliance (OSA)	2,4,6 Neck, Muscles, Body

From JRD DxTx Handout

JRD Dx with Closest ICD10	Treatment	Differential Diagnosis to Include	Signs/Symptoms
Adhesions and ankylosis of temporomandibular joint M26.61	1 TMJ Damage Jaw Exercises- active stretching Jaw Exercises- passive motion Physical Therapy active stretching Dynamaprint Arthrocentesis	Muscle Spasm Pain Avoidance Muscle splinting: Joint Pain Pain Avoidance Muscle splinting: Muscle Pain Closed Lock TMJ Disc Masseteric space infection Adhesions TMJ	Limited opening Myalgia
Adhesions and ankylosis of upper joint compartment temporomandibular joint M26.61	1 TMJ Damage Jaw Exercises- active stretching Jaw Exercises- passive motion Physical Therapy active stretching Dynamaprint Arthrocentesis	Muscle Spasm Pain Avoidance Muscle splinting: Joint Pain Pain Avoidance Muscle splinting: Muscle Pain Closed Lock TMJ Disc Masseteric space infection Adhesions TMJ	Limited opening Myalgia
Angiogenesis Cartilage TMJ M93.90	1 TMJ Damage Decrease load NSAID. See OA	Angiogenesis Cartilage TMJ Osteoarthritis Rheumatoid Arthritis Impingement Retrodiscal Tissue Perforation Disc or pseudodisc	Pain on loading
Avascular Necrosis Mandibular Condyle M87.26	1 TMJ Damage Wait one year for definitive Tx of malocclusion. Need to rule out progressive condylar resorption and allow adaptation of condylar bone	Avascular Necrosis, Hypoxia Progressive Condylar Resorption, Rheumatoid Arthritis, Lyme Disease, Osteoarthritis, Osteochondritis Dissecans, Other.	Condylar decortication + T2 Marrow MRI Uneven Marrow Signal MRI Changing MRI Marrow Signal Condylar Bone Loss
Bifid Condyle Q67.4	1 TMJ Damage Only tx if need to improve function; orthotic therapy, Occlusal Adjust		
Cartilage Fibrillation, Mandibular Condyle, Fossa M19.93	1 TMJ Damage Decrease Parafunction. See Clenching.		Clenching

From Treatments Handout

Therapies	Category
2nd Bicuspid Orthotic	1 TMJ
Active tear/stretch posterior discal ligaments	1 TMJ
Anterior Repositioning Orthotic Short Term	1 TMJ
Condylar Distraction Orthotic	1 TMJ
Dynasplint	1 TMJ
Indexed Orthotic	1 TMJ
Jaw Exercises- active stretching	1 TMJ
Jaw Exercises- passive motion	1 TMJ

TMD Thinker

Show Filemaker Program

TMD Thinker

180 / 181 Found (Sorted)

Layout: Raw Data View As: Preview

56 of 56

Diagnosis	ICD-10	Category	Treatment	Dr Notes	Differential Diagnosis to Include
Adhesions and ankylosis of temporomandibular joint	Adhesions and ankylosis of temporomandibular joint M68.81	TMJ Damage	<ul style="list-style-type: none"> Joint Exercises active stretching Joint Exercises passive motion Physical Therapy active stretching Dysplasia Arthrocentesis 	Fibrosis Ankylosis	<ul style="list-style-type: none"> Muscle Spasm Pain Avoidance Muscle spitting Joint Pain Pain Avoidance Muscle spitting Muscle Pain Closed Lock TMJ Disc Masseter's space infection
Adhesions and ankylosis of upper joint compartment temporomandibular joint	Adhesions and ankylosis of upper joint compartment temporomandibular joint M68.81	TMJ Damage	<ul style="list-style-type: none"> Joint Exercises active stretching Joint Exercises passive motion Physical Therapy active stretching Dysplasia Arthrocentesis 	Fibrosis Ankylosis upper joint space Adhesed disc	<ul style="list-style-type: none"> Muscle Spasm Pain Avoidance Muscle spitting Joint Pain Pain Avoidance Muscle spitting Muscle Pain Closed Lock TMJ Disc Masseter's space infection
Angiogenesis Cartilage TMJ	Angiogenesis Cartilage TMJ M68.25	TMJ Damage	<ul style="list-style-type: none"> Excessive load TMJ See CR 	Pain on loading	<ul style="list-style-type: none"> Angiogenesis Cartilage TMJ Dysarthrosis Rheumatoid Arthritis Injury/Trauma Retroligament Tissue Perforation Disc or pseudotumor
Avascular Necrosis Mandibular Condyle	Avascular Necrosis Mandibular Condyle M67.25	TMJ Damage	Wait one year for definitive Tx of malocclusion Need to rule out progressive condyle resorption and allow adaptation of condyle bone		<ul style="list-style-type: none"> Avascular Necrosis, Hypoxia Progressive Cond Resorption, Rheumatoid Arthritis, Lyme Disease Chondrolysis, Osteochondritis Dissectans, Dis
Bifid Condyle	Bifid Condyle M67.4	TMJ Damage	Only if it need to improve function, arthralg therapy, Occlusal Adjust		
Cartilage Fibrosis, Mandibular Condyle, Fossa	Cartilage Fibrosis, Mandibular Condyle, Fossa M68.25	TMJ Damage	Decrease Pain/Function, See Clenching	Cartilage Damage Early Osteoarthritis Clenching damage to cartilage	
Closed Lock, Jaw Cartilage, Acute	Closed Lock, Jaw Cartilage, Acute M68.20	TMJ Damage	<ul style="list-style-type: none"> Civil Laser, Manual Distraction Autocollapsing nerve block, Manual Distraction Arthrocentesis attempt reduction, Pain is an Spontaneous Locking Disc If not reducing, PT, active stretch posterior ligaments TMJ surgery (biomechanics let graft condyle distraction) 	Less than 8 weeks	<ul style="list-style-type: none"> Muscle Spasm Pain Avoidance Muscle spitting Joint Pain Pain Avoidance Muscle spitting Muscle Pain Closed Lock TMJ Disc Masseter's space infection
Closed Lock, Jaw Cartilage, Chronic	Closed Lock, Jaw Cartilage, Chronic M68.20	TMJ Damage	<ul style="list-style-type: none"> Home Active Stretching Physical Therapy Dysplasia 	More than 8 weeks, Disc Dislocation without reduction Favorable no pain, good ROM Unfavorable, pain, Limited ROM	<ul style="list-style-type: none"> Pain Avoidance Muscle spitting Joint Pain Pain Avoidance Muscle spitting Muscle Pain Closed Lock TMJ Disc Masseter's space infection
Closed Lock, Jaw Cartilage, Intermittent, Mechanically dysfunctional	Closed Lock, Jaw Cartilage, Intermittent, Mechanically dysfunctional M68.20	TMJ Damage	<ul style="list-style-type: none"> 2nd B arthralg (correct occlusal plane), then CR arthralg, then Occlusal adjust Alternative would be TMJ surgery (biomechanics let graft condyle distraction), or physical therapy active stretch posterior ligaments 	Wiggle jaw to open	
Crush Injury Mandibular Condyle	Crush Injury Mandibular Condyle M67.2	TMJ Damage	Decrease load TMJ, non CR arthralg		
Crystal arthropathy, unspecified, TMJ	Crystal arthropathy, unspecified, TMJ M11.10	TMJ Damage	Peter is MD		<ul style="list-style-type: none"> Disc, Pseudogout, Hydroxyapatite deposition
Dislocation jaw cartilage due to injury, initial	Dislocation jaw cartilage due to injury, initial S03.2x4A	TMJ Damage	Anterior repositioning splint (RT for 8 weeks, CR arthralg 2 weeks)	Less than 4 week post injury	
Dislocation jaw cartilage due to injury, Sequela	Dislocation jaw cartilage due to injury, Sequela S03.2x5A	TMJ Damage	See Occlusal Muscle Dysfunction, Subluxation TMJ, Avascular Necrosis, Hypoxia Progressive Condyle Resorption, other	Sequela of TMJ damage	

75 Browse

Centric Relation Load Zone Mechanical Stability

John R Droter DDS
Annapolis, Maryland

Annapolis, Maryland
John R Droter DDS

The TMJ: What You need to Know

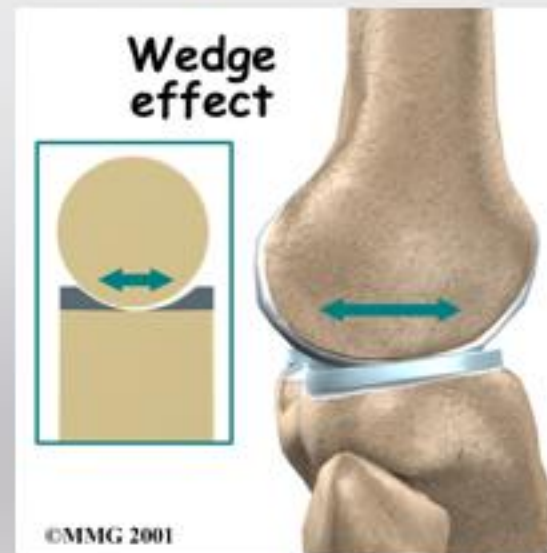
Mechanical Stability ● + - ●

Mechanical Joint Stability

Shape condyle/disc/fossa provides stability when loaded

Capsular Ligaments provide stability when not loaded so pieces will be aligned and ready for loading.

Capsular Ligaments other roles are to provide end point of joint movement and proprioception



Mechanical Joint Stability

Shape condyle/disc/fossa provides stability when loaded

Ligaments provide stability when not loaded so pieces will be aligned and ready for loading.

Ligaments other role is to provide end point of joint movement

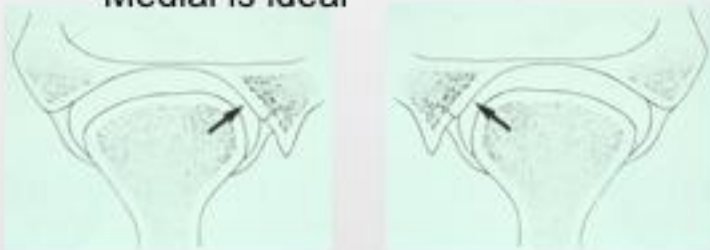


Key word is shape- which you can see on scans

CR Load Zone

When the masseter fires and seats the joint, where do the condyles load?

Medial is ideal

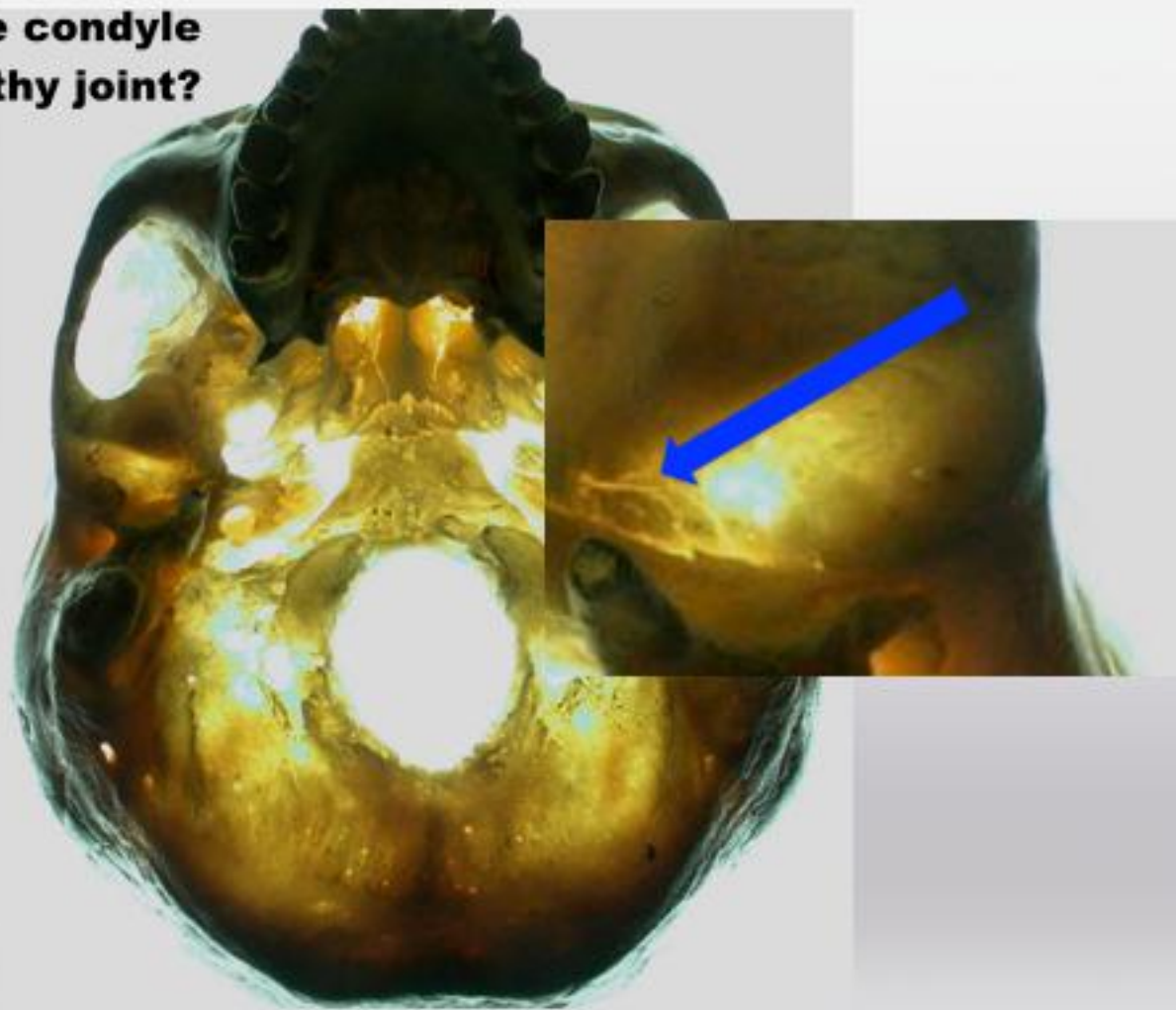


Find Closest Bone to Bone

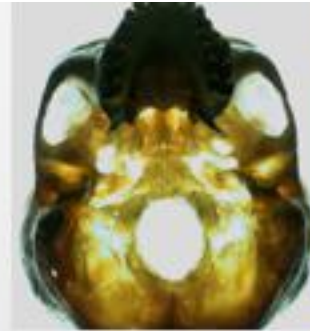
Unstable Mechanically
Hypersensitive Occlusion



**Where does the condyle
load in a healthy joint?**



Centric Relation (CR) Load Zone



Protrusive Movement

Condyle moves out of fossa

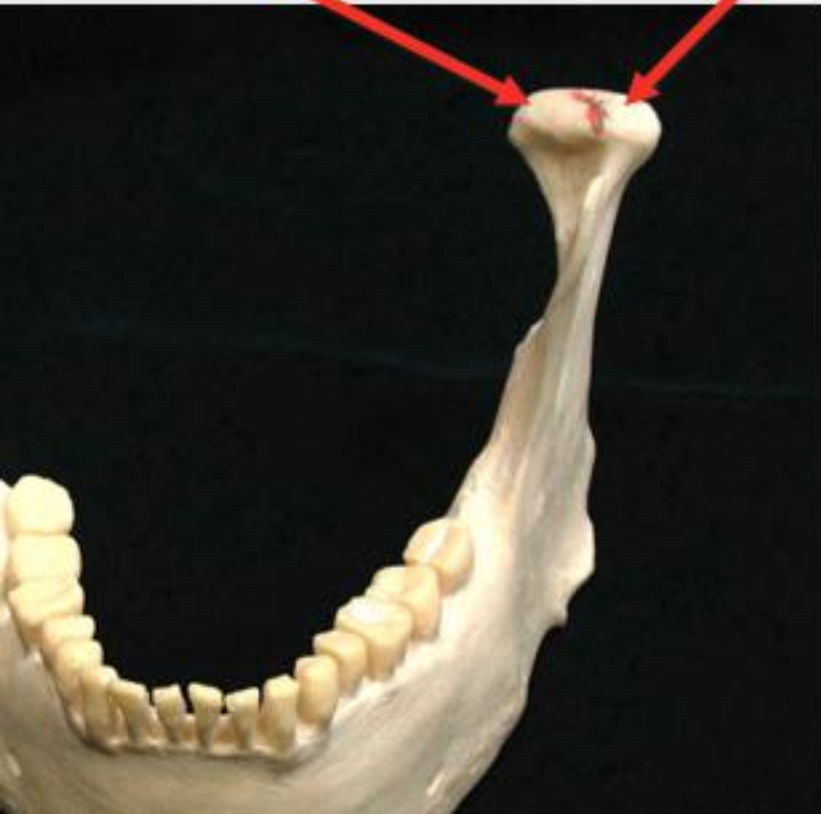
Translatory Load Zone



CR and Translatory Load Zones

CR Load Zone

Translatory Load Zone



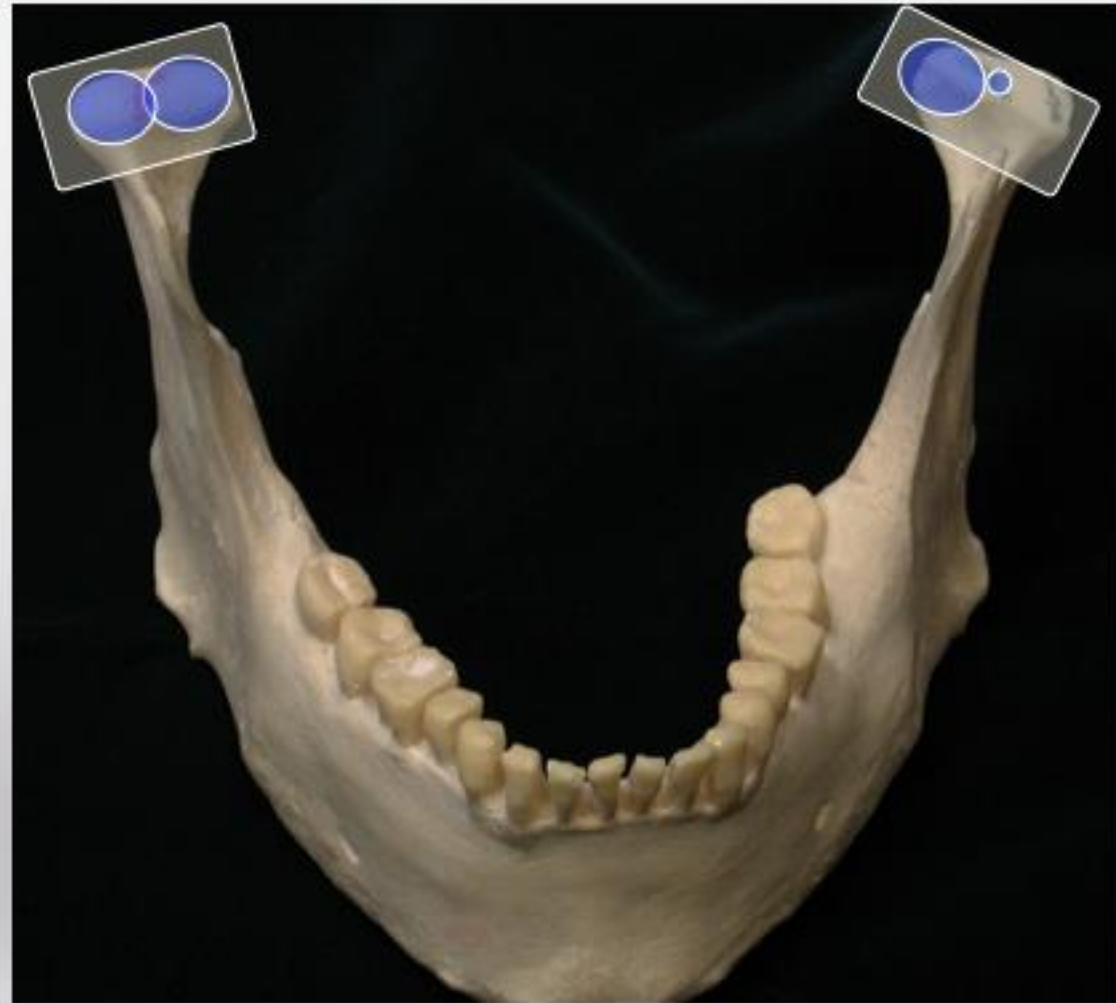
Load zones on opening





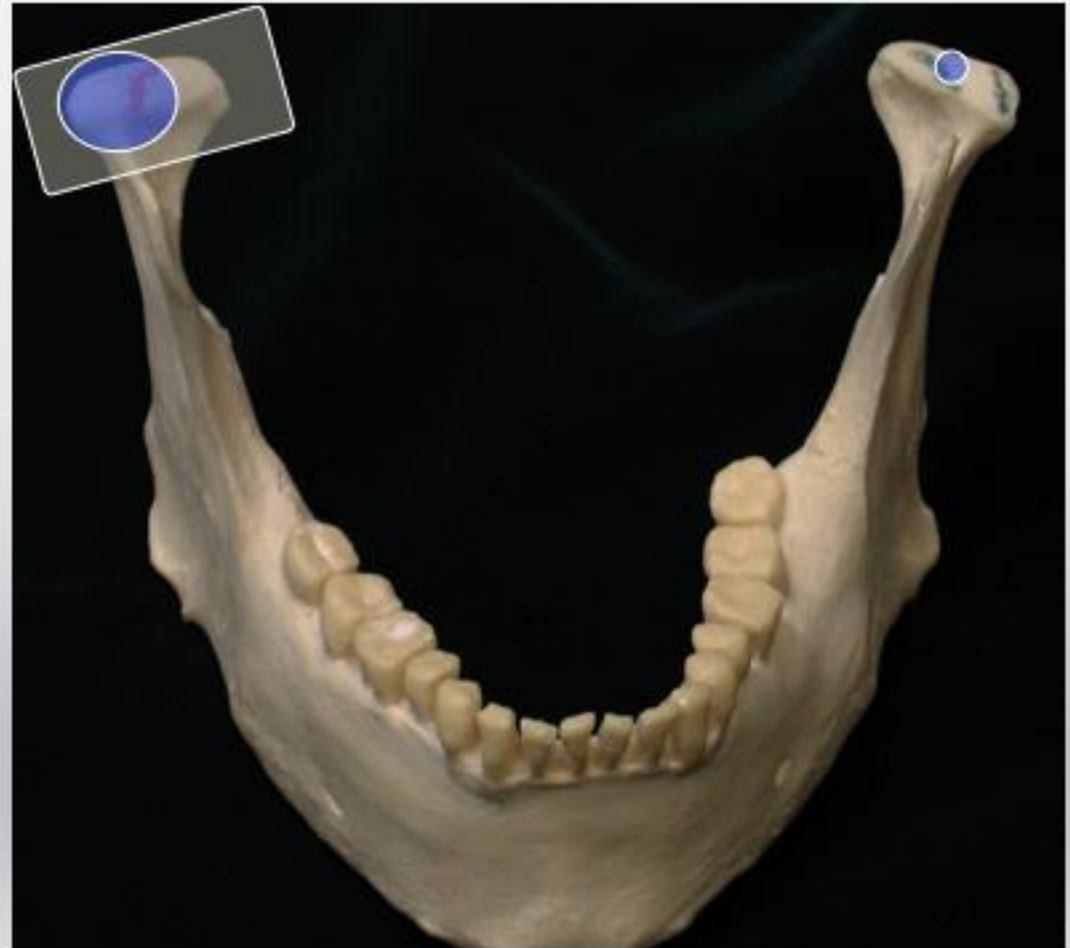
CR zone in damaged joints may not be on the medial pole

Condylar Loading in Disc Displacement



Mechanically Unstable TMJs “Wobbly Joint”

Joint Subluxates under Load



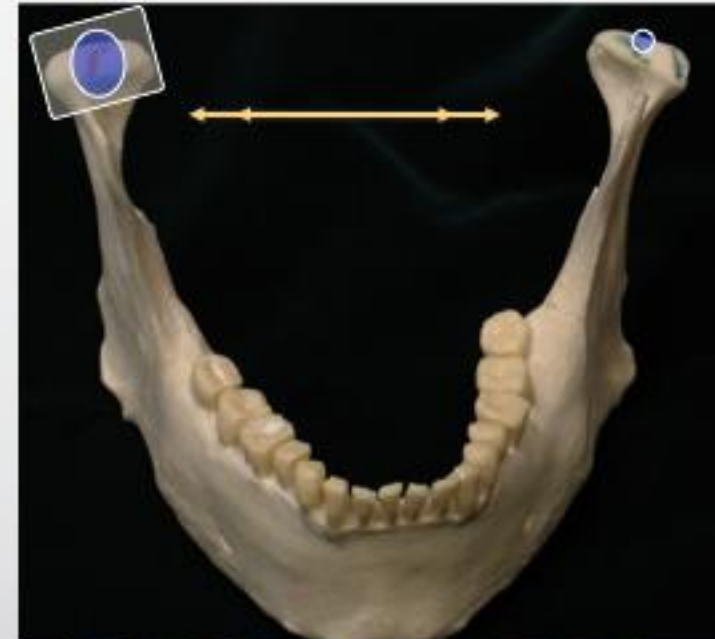
Non-Linear Joint Deformity- Mechanically Unstable TMJs- “Wobbly Joint”

TM Joint subluxates under load
Adapted CR “wobbles”

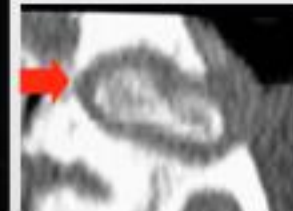
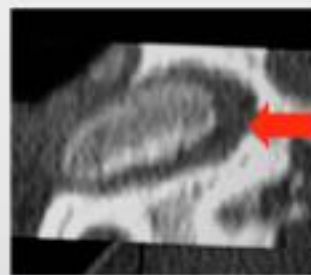
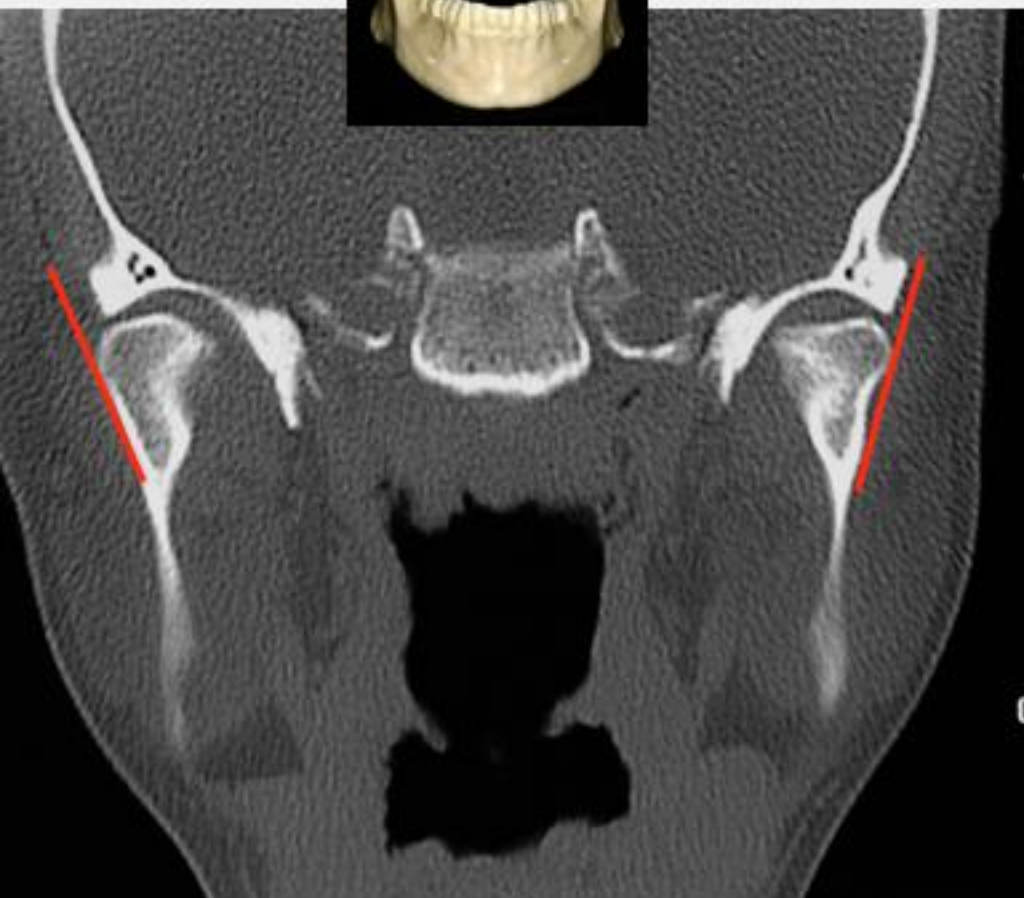
TMJ Muscle hyperactivity
Looks similar to OMD
Muscles must stabilize the joint
Deep temporalis especially sore

Clinically:

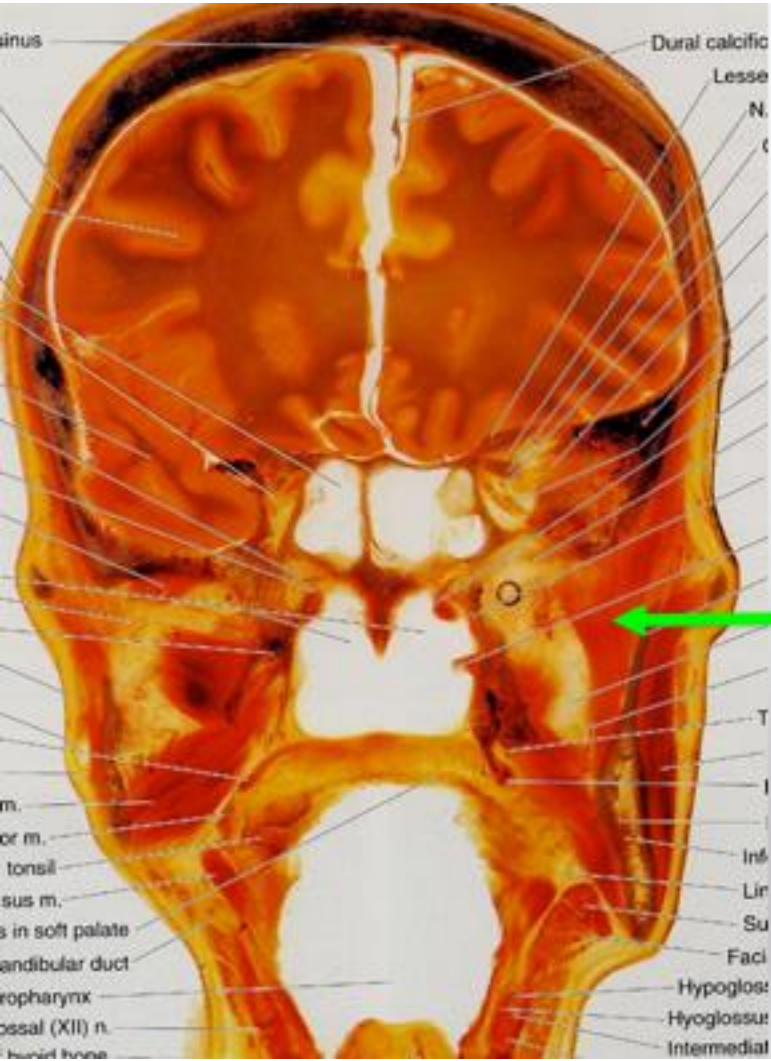
Hypersensitive bite
Increase muscle pain with anterior deprogrammer
Continued muscle disharmony with flat plane orthotics
CT Scan- CR load zone not medial
JVA- after tooth tap see “wobble- 50hz vibration



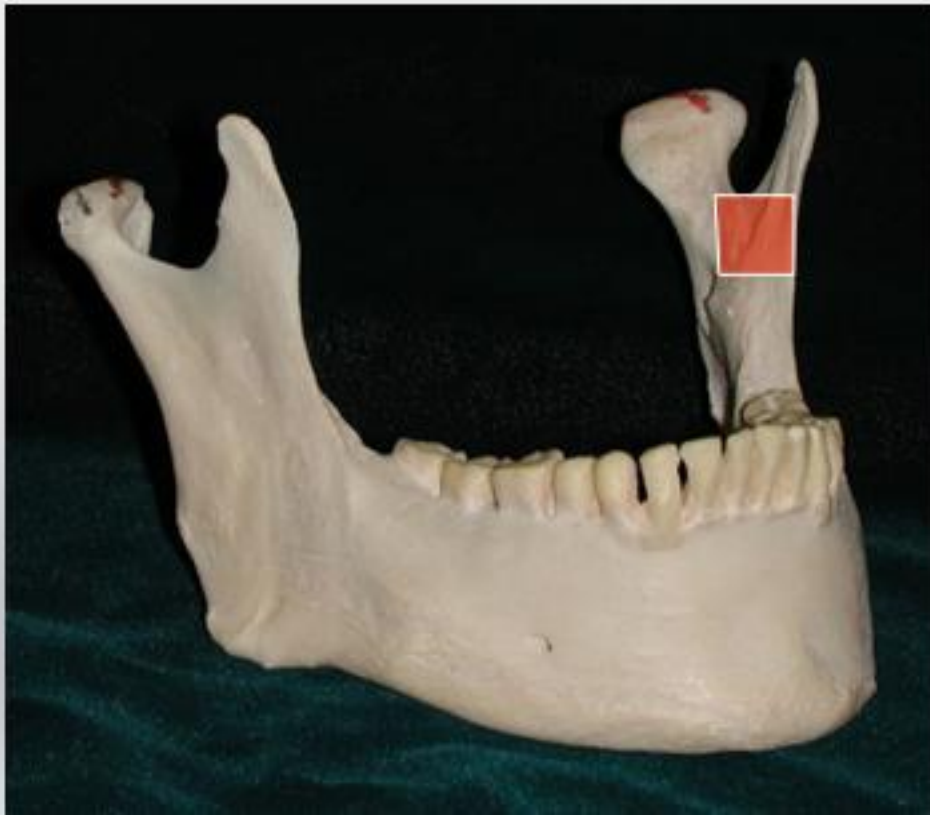
CT Coronal View



CT Axial View



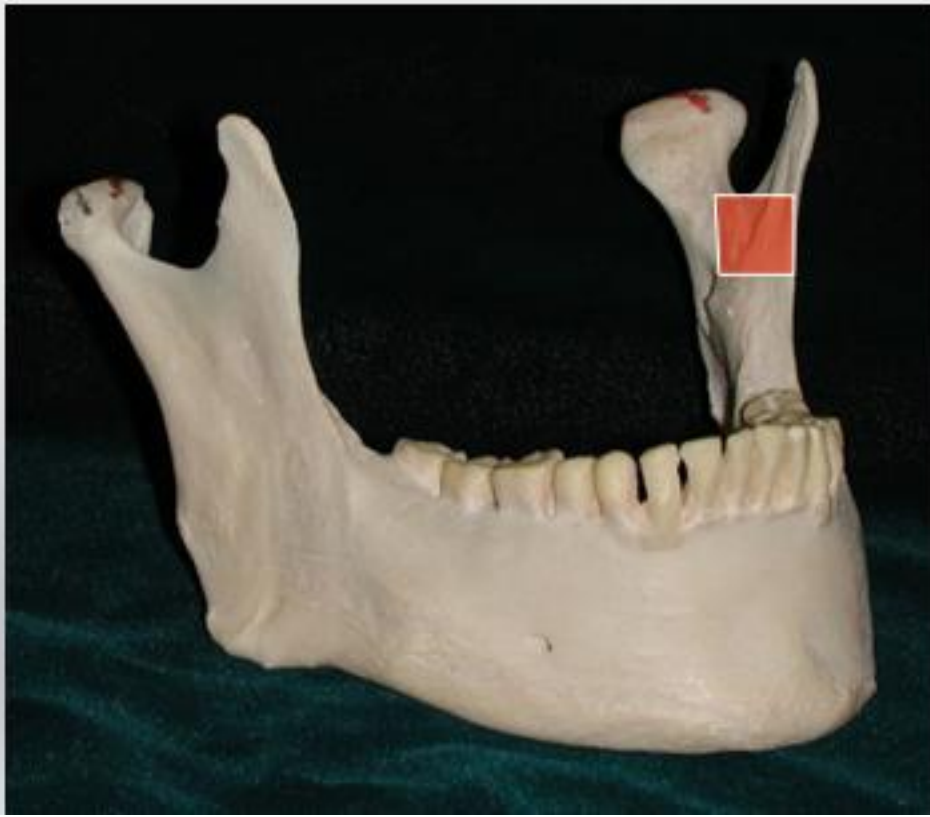
What Muscles is this and what does it do?



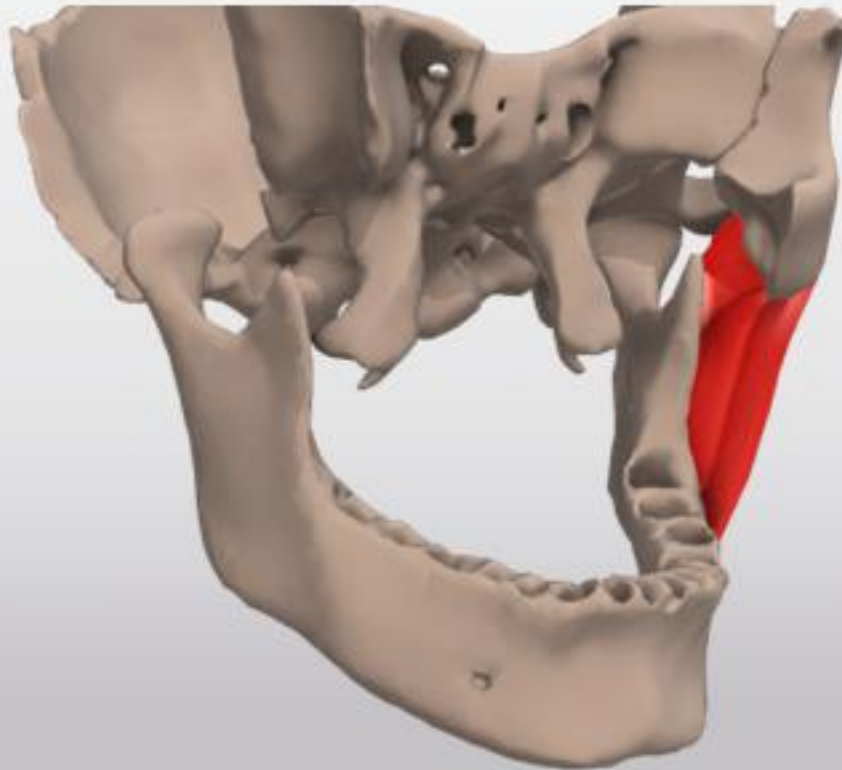
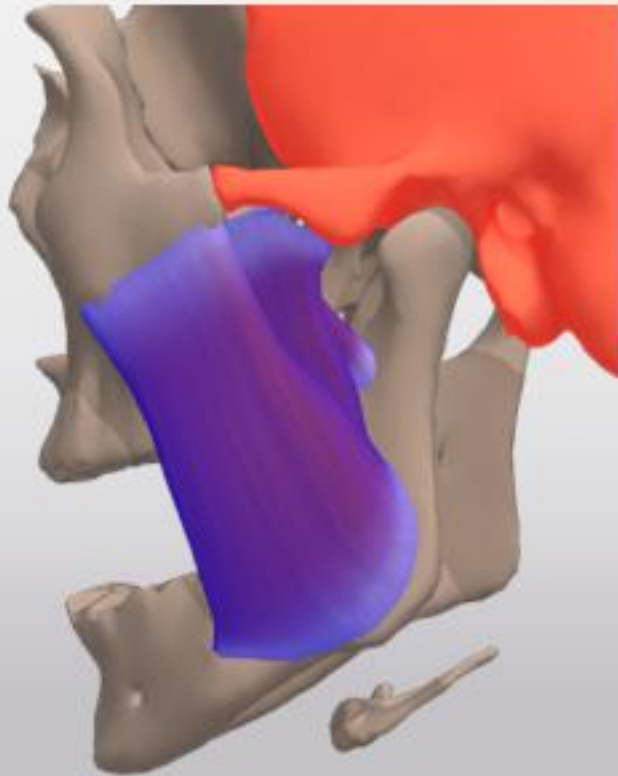


Deep Temporalis
 Stabilizes TM joint side to side
 Always sore in "Wobbly Joints"

What Muscles is
 this and what does
 it do?



Masseter Muscle is Complex



Complex Muscle
3 Different Portions
3 Different Functions

Can you palpate a muscle and determine whether it is healthy by feel alone?

Drawings by Anatomy.TV
and Dr Herb Blumenthal

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

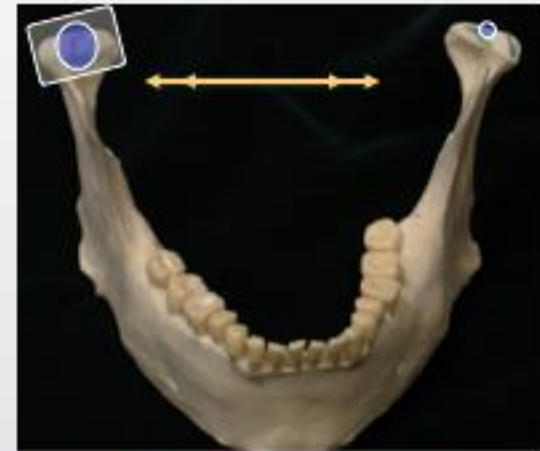
TM Joint subluxates under load
Adapted CR “wobbles”

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

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

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

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





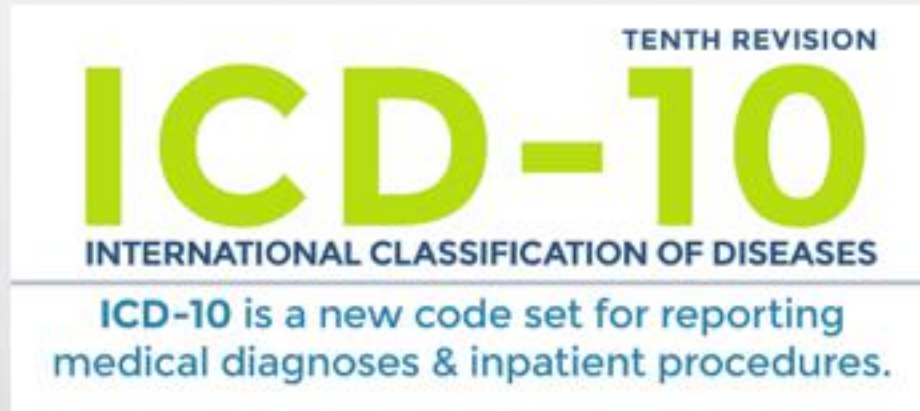
Medical Insurance

John R Droter DDS
Annapolis, Maryland

Annapolis, Maryland
John R Droter DDS

www.jrdroter.com

On October 1st, 2015, new medical diagnostic codes were activated



Many more new diagnostic codes

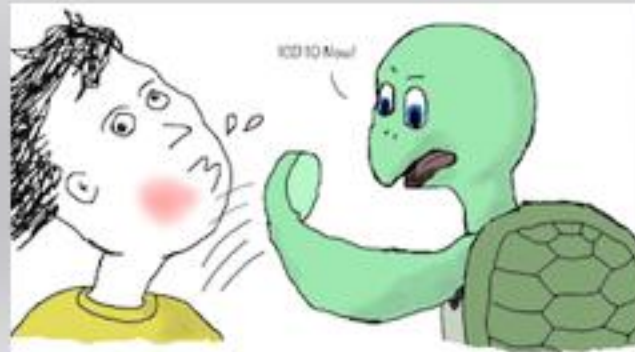
ICD-9 had 13,000

ICD-10 has 68,000

That is an increase in 45,000 new codes

Yes, now there is a code for that:

- W6112XA Struck by macaw
- Y92146 Hurt at swimming pool of prison
- Y93D1 Stabbed while crocheting
- W55.21 Bitten by cow
- W59.22 Struck by Turtle
- V97.33 Sucked into jet engine
- W56.22xA Struck by an orca



V95.41 Spacecraft crash injuring occupant



Yes, now there is a code for that:

V9107XA Burn due to water-skis on fire



Yes, now there is a code for that:

S30.867A Insect bite of anus, initial encounter

S30.867D Insect bite of anus, subsequent encounter



After years of neglect here is how the
TMJ made out.....

Secondary Osteoarthritis

M19.221 Secondary osteoarthritis, right elbow

M19.222 Secondary osteoarthritis, left elbow

M19.229 Secondary osteoarthritis, unspecified elbow

There is not a code for Osteoarthritis of the TMJ. Must use **unspecified site**

M19.93 Secondary osteoarthritis, **unspecified site**

Avascular Necrosis

M87.277 Osteonecrosis due to previous trauma, right toe

M87.278 Osteonecrosis due to previous trauma, left toe

M87.279 Osteonecrosis due to previous trauma, unspecified toe

There is not a code for Avascular Necrosis of the TMJ. Must use **other**.

M87.28 Osteonecrosis due to previous trauma, **other** site

There is still not a code for not being able to chew.
All other parts of the alimentary system have codes

Dysfunctional chewing)	No code
Dysphagia (Swallow)	R13.1
Functional dyspepsia (Digestion)	K30
Functional intestinal disorder	K59.9
Fecal incontinence	R15

Can't walk and chew gum

Dysfunctional walking	R26	Abnormalities of gait and mobility
Dysfunctional chewing-	no code	

Closest code M26.50 Dentofacial functional abnormalities, unspecified

The cause of many TMD issues:

Z63.1 Problems with the in-laws



There is a code for Temporomandibular joint disorders:

M26.60 Temporomandibular joint disorder, unspecified

There are no codes for Knee, Toe, Hip or Elbow disorders

M26.6 codes only get insurance coverage for surgery.

All non surgical therapies are automatically denied.

M26.6 Temporomandibular joint disorders

Excludes: current temporomandibular joint dislocation (S03.0)
current temporomandibular joint sprain (S03.4)

M26.60 Temporomandibular joint disorder, unspecified

M26.61 Adhesions and ankylosis of temporomandibular joint

M26.62 Arthralgia of temporomandibular joint

M26.63 Articular disc disorder of temporomandibular joint

M26.69 Other specified disorders of temporomandibular joint

TMD Diagnostic Codes 2015

 10/31/2015
Version

	ICD 10	Short Description	Description
Symptoms	M26.02		Arthralgia of temporomandibular joint
Symptoms	M77.4	Capsulitis TMJ	Other arthropathies, not elsewhere classified
Symptoms	M70.1		Myalgia, myofascial pain syndrome
Symptoms	R51	Facial Pain	Headache, Facial pain
Symptoms	R53.81	Malaise	Other malaise
Symptoms	R53.83	Fatigue	Other fatigue
Symptoms	R68.84	Jaw Pain	Jaw pain
TMJ Damage	M05.7	Rheumatoid Arthritis	Rheumatoid arthritis with rheumatoid factor without organ or systems involvement
TMJ Damage	M06.0		Rheumatoid arthritis without rheumatoid factor
TMJ Damage	M12.20		Villosular synovitis (pigmented), unspecified site
TMJ Damage	M19.91		Primary osteoarthritis, unspecified site
TMJ Damage	M19.93	Osteoarthritis, secondary	Secondary osteoarthritis, unspecified site
TMJ Damage	M24.10		Other articular cartilage disorders, unspecified site
TMJ Damage	M24.20		Ligament Laxity, unspecified site
TMJ Damage	M24.30	Closed Lock	Pathological dislocation of unspecified joint, not elsewhere classified
TMJ Damage	M25.40	Effusion	Effusion, unspecified joint
TMJ Damage	M26.60	x	Temporomandibular joint disorder, unspecified
TMJ Damage	M26.61	x	Adhesions and ankylosis of temporomandibular joint
TMJ Damage	M26.63	x	Articular disc disorder of temporomandibular joint
TMJ Damage	M26.69	x	Other specified disorders of temporomandibular joint
TMJ Damage	M27.9		Disease of jaws, unspecified
TMJ Damage	M86.80	Synovitis	Other synovitis and tenosynovitis, unspecified site
TMJ Damage	M87.20		Synovial hypertrophy, not elsewhere classified, unspecified site

TMD Diagnostic Codes 2015

10/31/2015 Version

ICD 9	ICD 10	Short Description	Description
	M70.31		Primary osteoarthritis, unspecified site
	M87.4		Disease of jaws, unspecified
	M87.20		Synovial hypertrophy, not elsewhere classified, unspecified site NCS Not otherwise specified. Use other specified instead of
	M26.53		Deviation in opening and closing of the mandible
	M26.54		Insufficient anterior guidance
	Y79.1		Therapeutic (nonsurgical) and rehabilitative orthopedic devices
688.81	A69.23	Lyme Arthritis	Arthritis due to Lyme disease
395.8	F45.8		Other somatoform disorders (includes teeth grinding, bruxing)
327.39	G47.30	Obstructive sleep	Obstructive sleep apnea (adult) (pediatric)
327.55	G47.05	Bruxing, Sleep	Sleep related bruxism
323.82	G24.4		Idiopathic orofacial dystonia
337.29	G90.5	CRPS	Complex regional pain syndrome I (CRPS I)
346.0	G43.1	Migraine no Aura	Migraine with aura
346.1	G43.0	Migraine with Aura	Migraine without aura
350.1	G50.0	Trigeminal neuralgia	Trigeminal neuralgia
350.2	G50.1	Atypical facial pain	Atypical facial pain
447.8	J7.8	Temporal Arteritis	Arteritis, unspecified (Temporal)
510.8	J98.8	Upper Airway	Other specified respiratory disorders
521.12	K23.8		Excessive attrition of teeth (Occlusal wear of teeth) excludes dentures
521.32	K23.2		Erosion of teeth (Acid)
524.01	M26.01	Maxillary hyperplasia	Maxillary hyperplasia
524.02	M26.03	Mandibular hyperplasia	Mandibular hyperplasia
524.03	M26.02	Maxillary hypoplasia	Maxillary hypoplasia
524.04	M26.04	Mandibular hypoplasia	Mandibular hypoplasia
524.11	M26.11	Maxillary asymmetry	Maxillary asymmetry
524.24	M26.22	Anterior Open Bite	Open anterior occlusal relationship
524.25	M26.23	Posterior Open Bite	Open posterior occlusal relationship
524.4	M26.4		Malocclusion, unspecified
524.50	M26.50		Dentofacial functional abnormalities, unspecified
524.51	M26.51		Abnormal jaw closure
524.52	M26.52		Limited mandibular range of motion

Strategies

Purpose is to get patent \$ from ins company for treatment, not dx list of all ds they have

Write out all your dx, but only code a few

Less codes the better

Reviewer's job is to find a reason to deny claim- if give them 10 codes just have to find one to deny whole claim

The less said the better: Lawyers, angry people, Insurance companies.

Fallacy to think the more codes will make them sympathize

Will not deny claim by your written summary- they will not read it. It supports your one code claim
If they say need more information, they already have it

Avoid the crowd- no TMD, no Disc, no 26.6 codes

Even if you have opted out, need Opt out letter for each patient or else you have to accept medicare fees +20% as payment in full and refund the patient.

**MEDICARE
PRIVATE CONTRACT**

By signing this contract I understand and agree that I will not submit (or request that my general dentist submit) a claim to Medicare or its agents for services provided by John R. Droter, DDS, even if such services would otherwise be covered.

I agree to be fully responsible, through insurance or otherwise, for payment of services rendered by John R. Droter, DDS, and I understand that no claims will be submitted to Medicare and no Medicare reimbursement will be provided for these services.

I understand that there are no limits specified by Medicare as to the amounts that may be charged by my general dentist for services provided.

I understand that Medigap plans do not, and other health and medical care insurance plans may elect not to, make payments for such services.

I understand that I have the right to have services provided by other general dentists or other practitioners for whom Medicare payment would be made, and that I am not compelled to enter into private contracts that apply to covered care furnished by other health care professionals who have not opted-out.

I understand that John R. Droter, DDS is not excluded from participation in the Medicare program under Section 1128 of the Social Security Act or pursuant to any other legal authority.

This contract is effective on _____, and it will not expire until the patient is released from Treatment with John R. Droter, DDS.

Patient Name: _____

Patient's Signature: _____

General Dentist's Signature: _____

Download ICD 10 Codes pdf

CMS.Gov

The screenshot shows the CMS.gov website interface. At the top, there is a navigation bar with the CMS.gov logo and the text "Centers for Medicare & Medicaid Services". Below the logo is a search bar with the text "Learn about your health care options" and a "Search" button. A horizontal menu contains several categories: Medicare, Medicaid/CMP, Medicare-Medicaid Coordination, Private Insurance, Innovation Center, Regulations & Guidance, Research, Statistics, Data & Systems, and Outreach & Education. The main content area is titled "2017 ICD-10-CM and GEMs". It includes a "Latest News" section with links to "ICD-10 Implementation and ICD-10 Coordination Letter (JG)", "CMS ICD-10 Industry Email Updates", "CMS Regional Offices", "Provider Resources", "Medicare Fee-For-Service Provider Resources", "State Medicaid ICD-10 Readiness", "Plan Resources", "Webinar Resources", "Notice and Regulations", and "ICD-10 OASIS Frequently Asked Questions". Below this is a "Downloads" section with a list of links: "2017 Code Descriptors in Tabular Order (ZIP, 2MB)", "2017 Check, Tables and Index (ZIP, 20MB)", "2017 ICD-10-CM Duplicate Code Numbers (ZIP, 64KB)", "2017 Addendum (ZIP, 1MB)", "2017 ICD-10-CM Conversion Tables (ZIP, 3MB)", "2017 ICD-10-CM Guidelines (PDF, 973KB)", "2017 ICD-10-CM Conversion Tables (ZIP, 3MB)", and "2017 ICD-10-CM Conversion Tables (ZIP, 3MB)". At the bottom, it says "Page last Modified: 06/22/2018 12:04 PM" and "Help with File Formats and Plug-ins".

Osteoarthrosis

Osteoarthritis

John R Droter DDS
Annapolis, Maryland

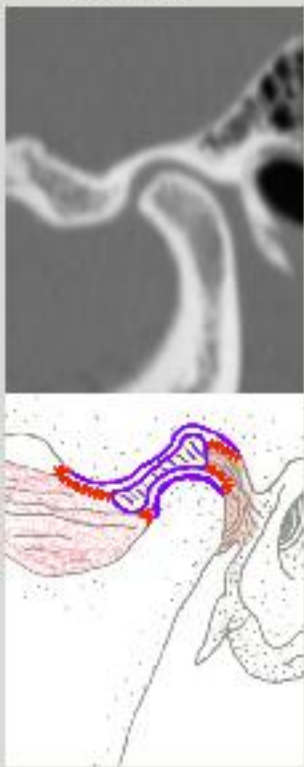
Annapolis, Maryland
John R Droter DDS

www.jrdroter.com

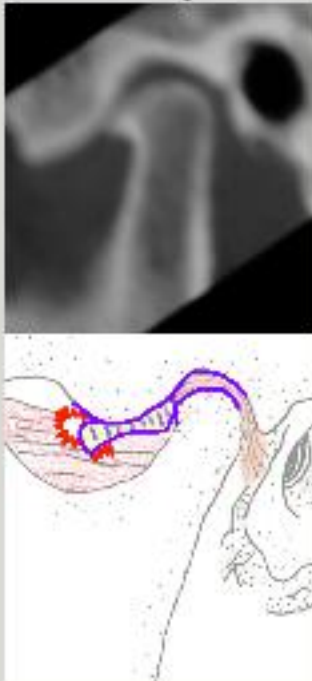
Osteoarthrosis/Osteoarthritis

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

Normal



Early



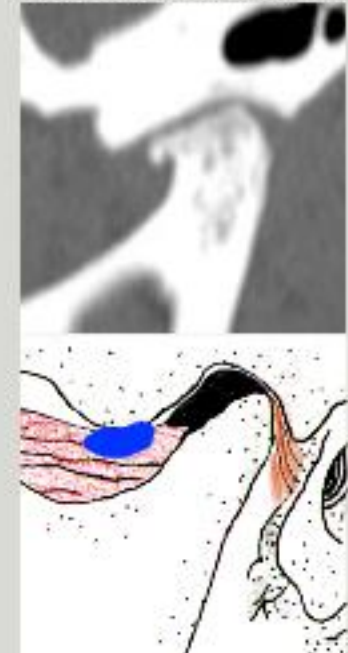
Early/ Moderate



Moderate



Severe OA, Eburnation



Representative examples of OA
in different patients

.....osis = disease process

.....itis = inflammation

Osteoarthosis is a disease of cartilage, leading to progressive cartilage degeneration and changes in the bone.

Osteoarthritis is an inflammatory phase of osteoarthritis.

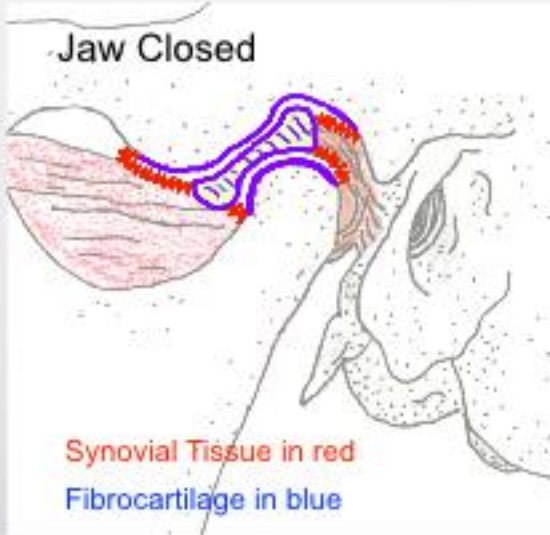
If it is not inflamed it is not **ITIS**.

Unfortunately the terms are mistakenly used interchangeably by doctors and in the literature.

If you effectively treat osteoarthritis with NSAIDs, you are now back to osteoarthritis, which is not inflamed and will at a much slower rate.

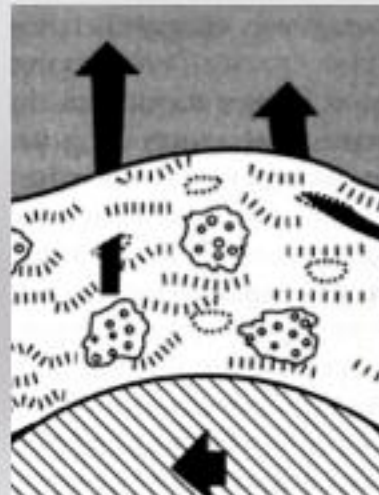
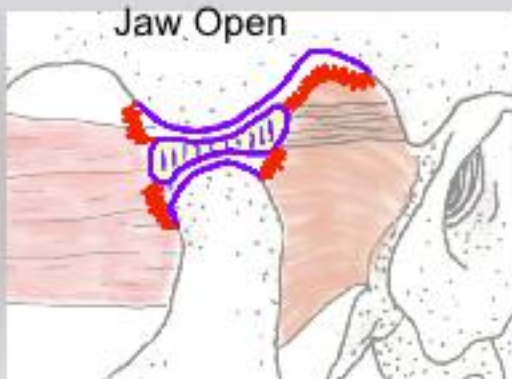
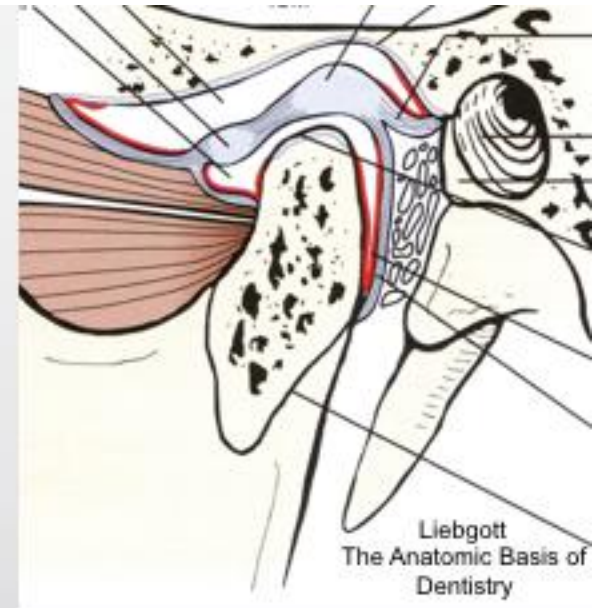


Normal TMJ- Synovium, Cartilage



Fibrocartilage-
Slope of Eminence
Disc
Top of Condyle

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



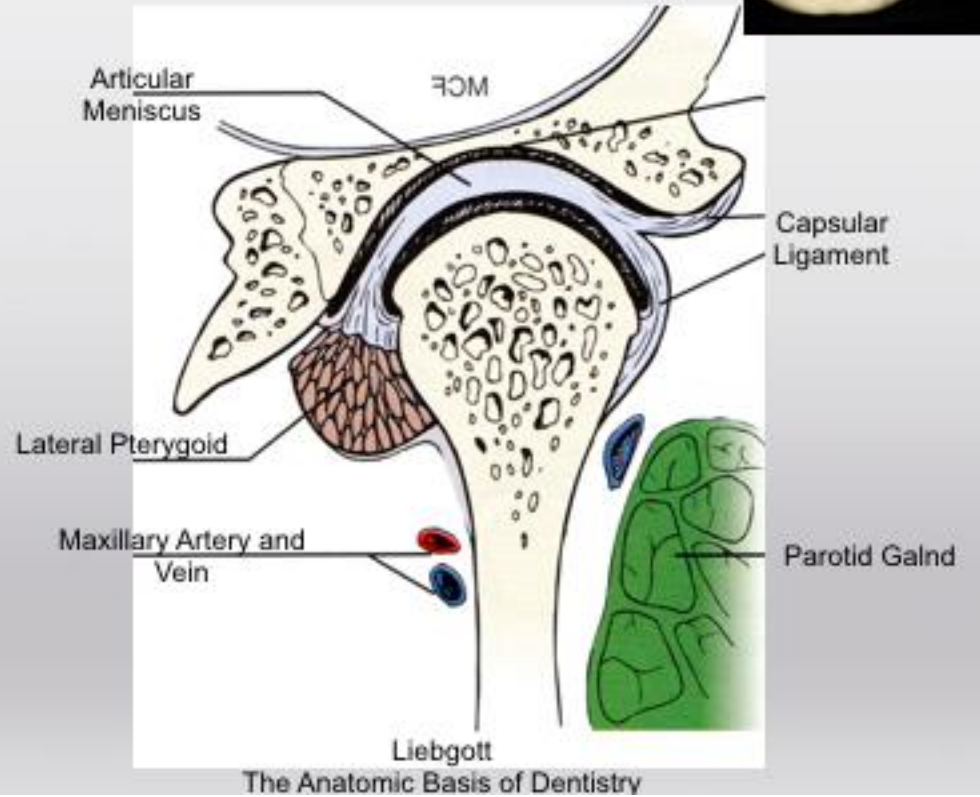
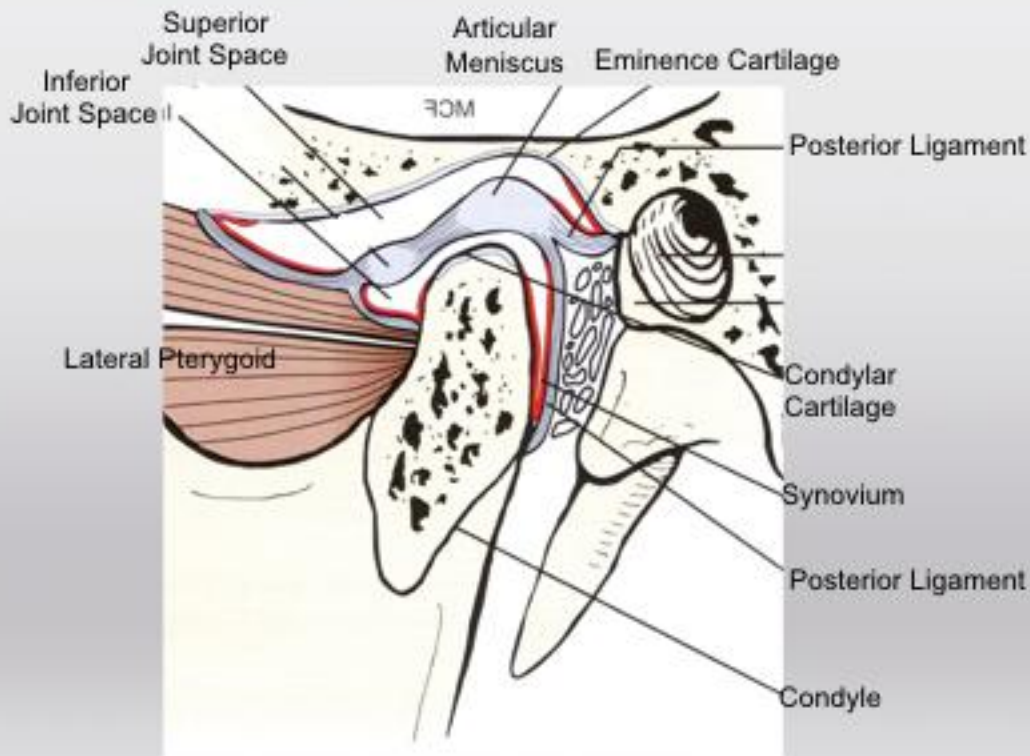
Fibrocartilage surface covered in fluid
Cartilage is hydrophilic
Proteoglycan negative charge
Surface Active Phospholipids
Fluid slides against fluid
5x slipperier than ice



Left TMJ Sagittal View

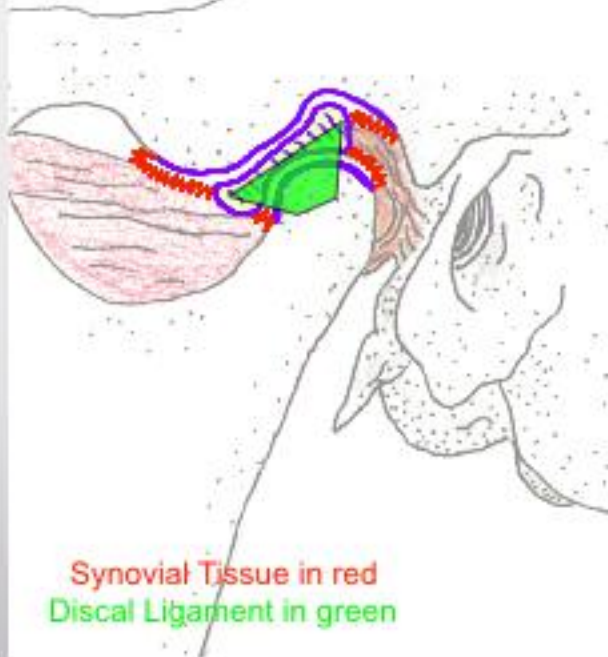


Left TMJ Coronal View



Normal TMJ

Jaw Closed



Discal Ligaments attach Disc to Condyle

Synovial Tissue

- Covers Front , Back and Sides
- Collapsed due to negative joint pressure

Disc viewed from above

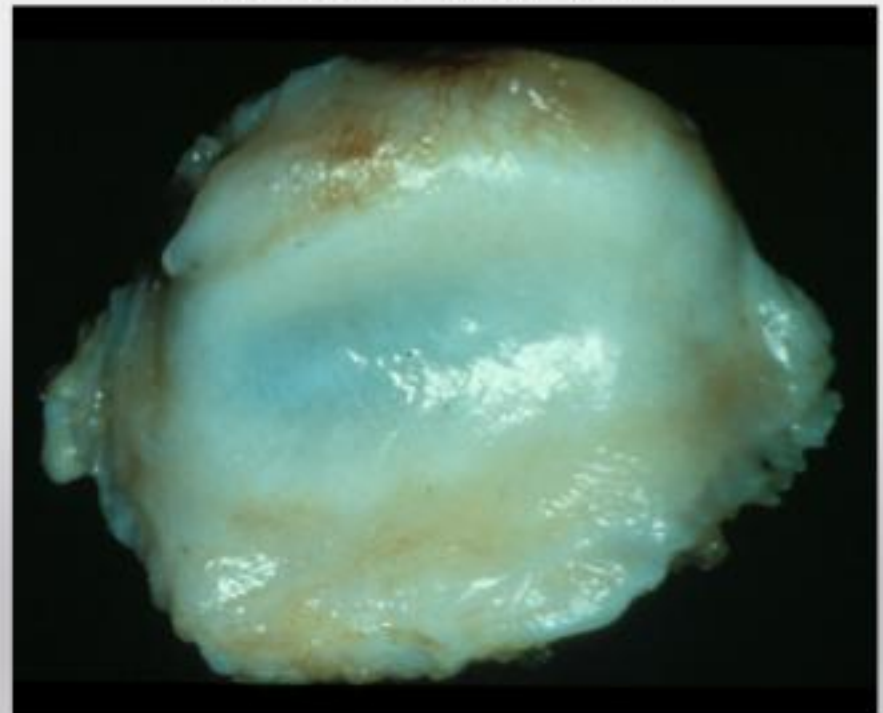
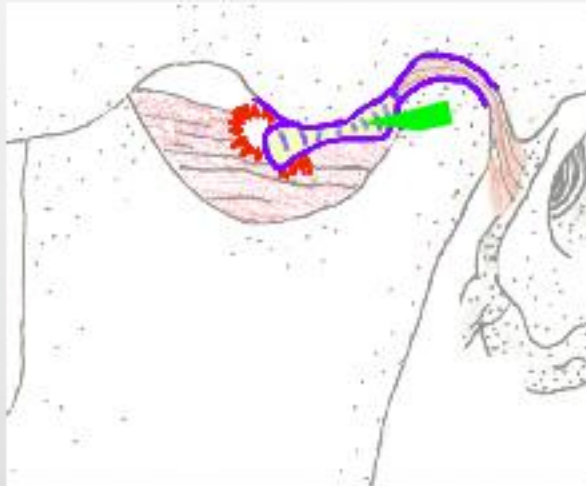


Photo Courtesy of Dr Henry Gremillion

Damaged TMJ- Anteriorly Dislocated Disc



Torn or stretched Meniscal ligaments

Anterior Dislocated Disc

Damaged Synovium

Retrodiscal Tissue pulled up and over the condyle

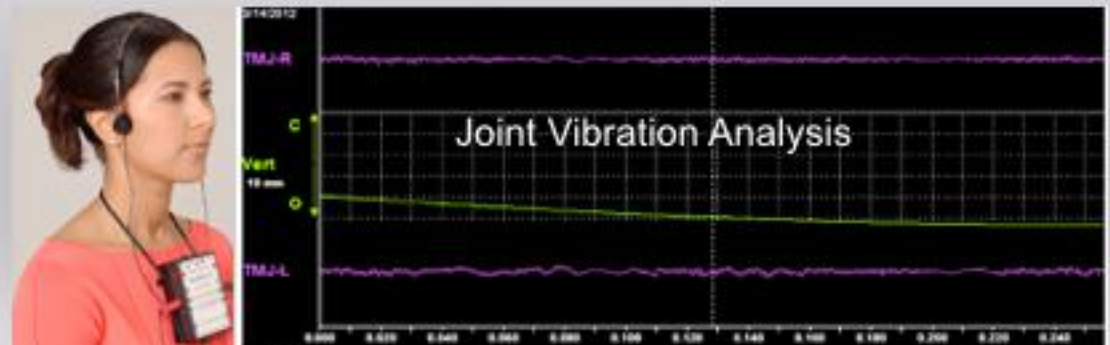
Retrodiscal tissue in direct contact with fibrocartilage

Major Increase in friction

Retrodiscal tissue adapts into fibrous "pseudodisc"

85% of all damaged joints adapt favorably without treatment

Cartilage sliding on tissue creates vibrations that can be detected



Basic Orthopedics

Joints are either
Healthy or
Damaged

If damaged, joints will be either:

Actively Breaking Down

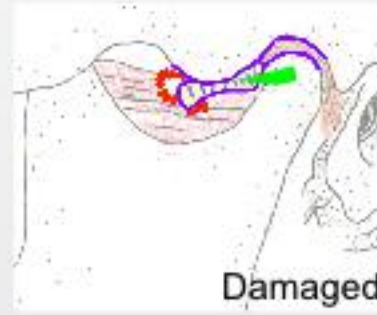
Adapting

Adapted Favorably Structurally and Mechanically

Adapted Unfavorably



Healthy

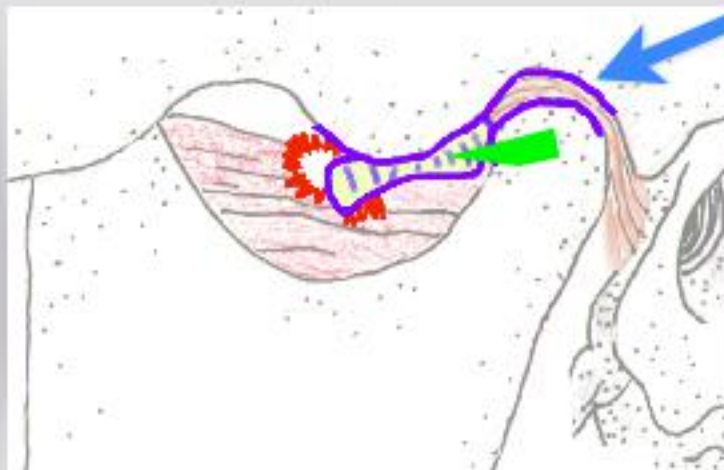


Damaged



Actively Breaking Down

Majority of damaged
TMJs adapt favorably



Posterior ligament, synovium,
and retrodiscal tissue adapt to
form a

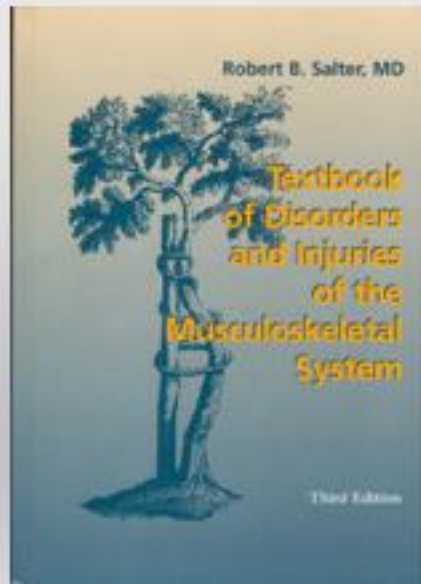
Pseudo-disc

Tissue Fibrosis

My Core Belief

The TMJ is a synovial joint of the human body and will undergo the same disease processes as any other synovial joint

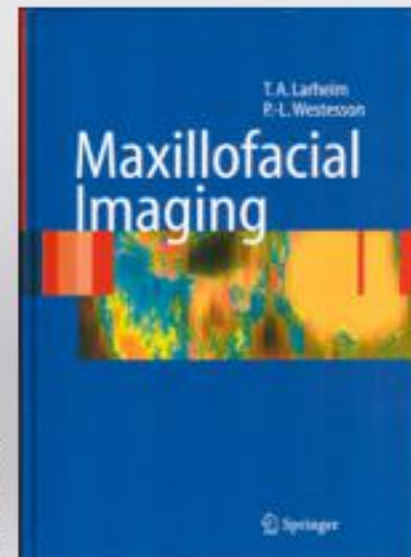
Understanding orthopedic medicine is the key to understanding joints, including the TMJ



Textbook of Disorders and Injuries of the Musculoskeletal System
Robert Salter MD

Buy Salter's Orthopedic Textbook.
When you have a patient with specific disease (i.e. osteoarthritis), read that chapter.

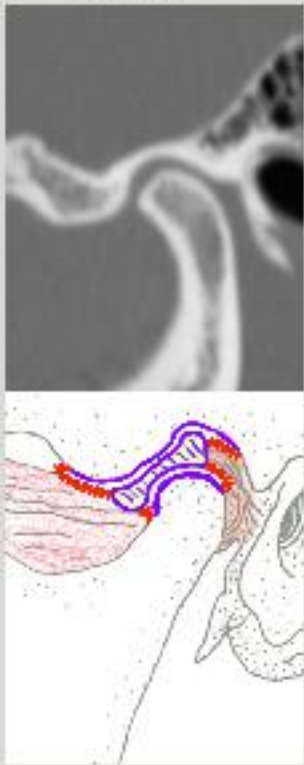
Maxillofacial Imaging
Larheim
Westesson



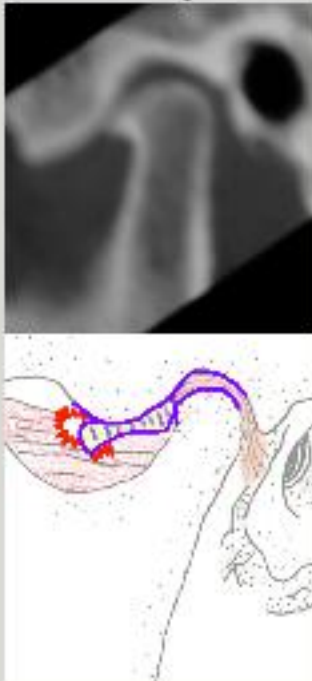
Osteoarthrosis/Osteoarthritis

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Early



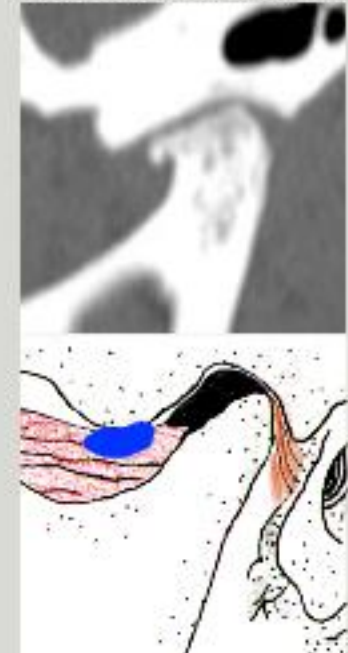
Early/ Moderate



Moderate



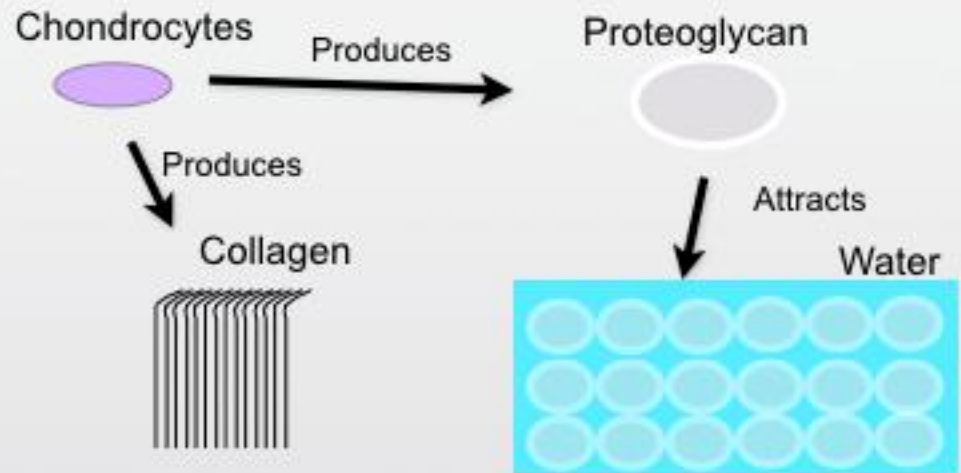
Severe OA, Eburnation



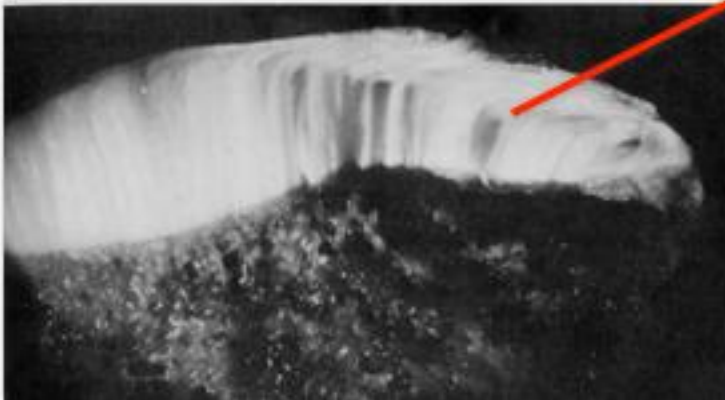
Representative examples of OA
in different patients

Cartilage

Chondrocytes
Collagen 10%
Proteoglycans 10%
Water 80%



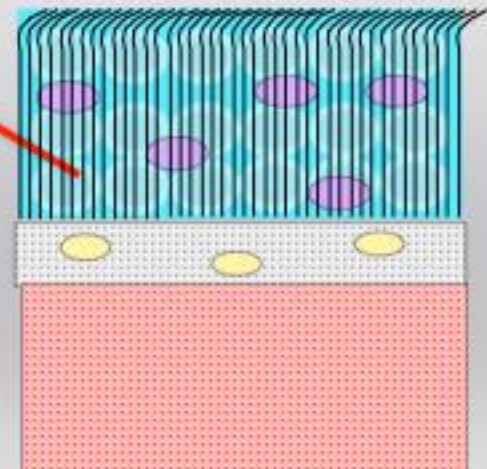
Cartilage top of femur
(Salter's orthopaedic textbook)



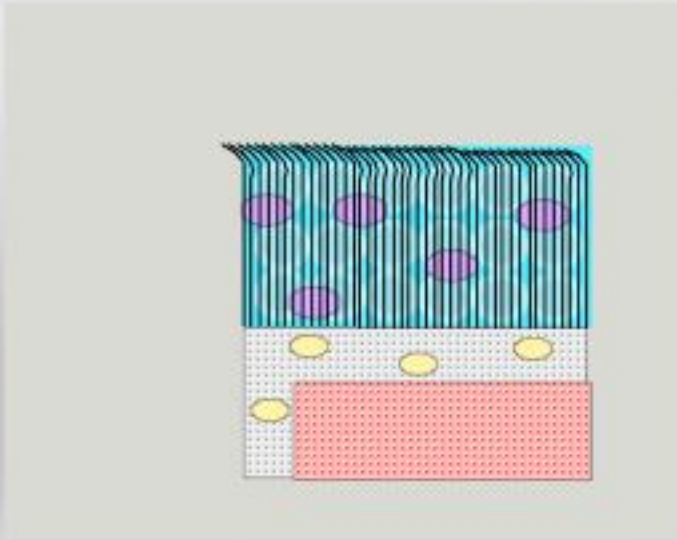
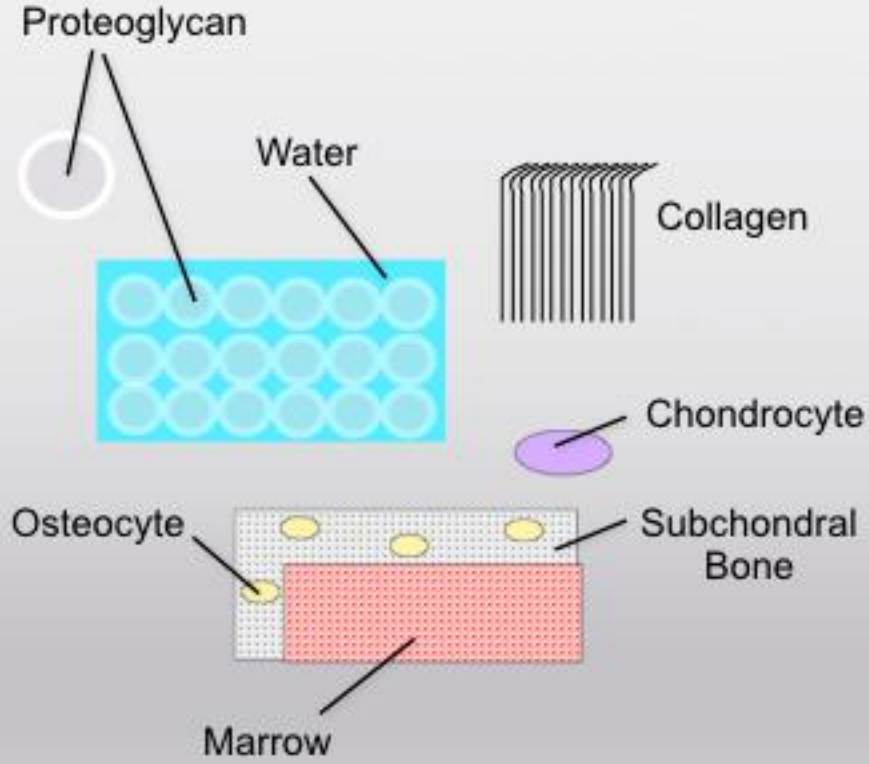
Cartilage

Subchondral
Bone

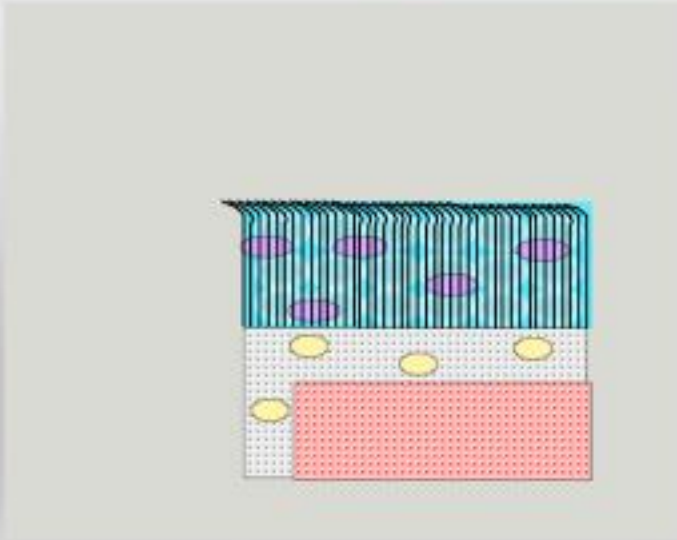
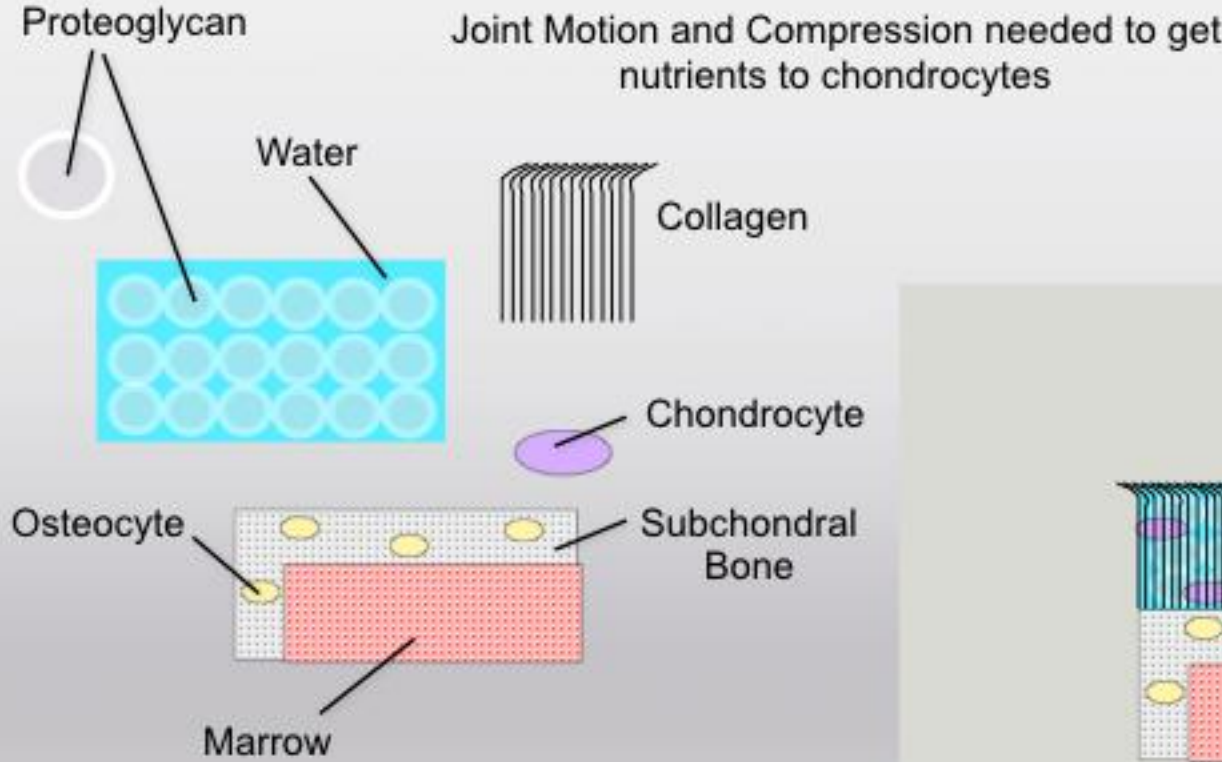
Marrow



Healthy Cartilage



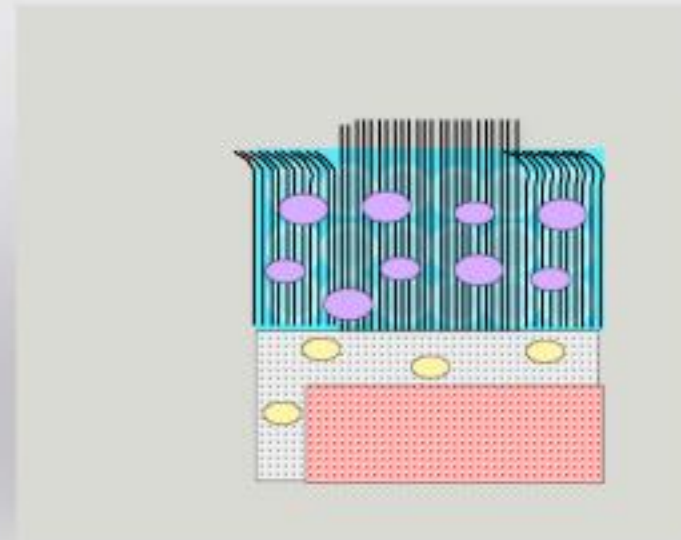
Healthy Cartilage



Osteoarthrosis/ Osteoarthritis Early

Collagen Fibrillation
Increase # Chondrocytes
Loss Cartilage in area of stress
Overgrowth Cartilage on periphery

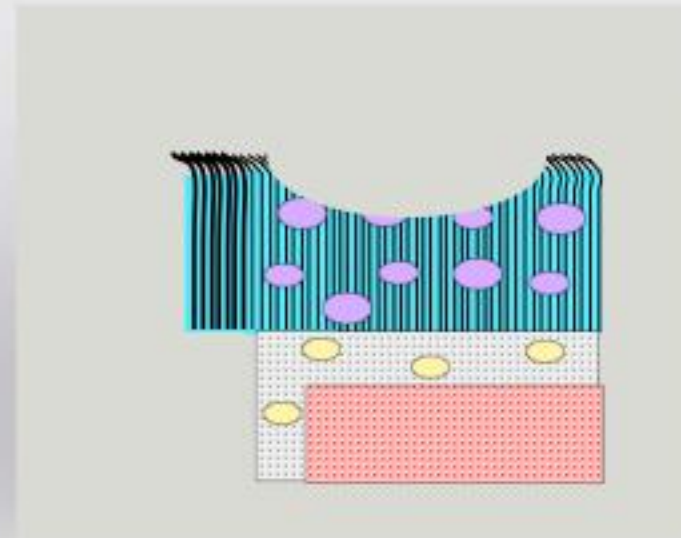
Causes:
Excessive Force
Decrease Nutrients (movement)
Decrease Synovial Fluid Perfusion



Osteoarthrosis/ Osteoarthritis Early

- Collagen Fibrillation
- Increase # Chondrocytes
- Loss Cartilage in area of stress
- Overgrowth Cartilage on periphery

Causes:
Excessive Force
Decrease Nutrients (movement)
Decrease Synovial Fluid Perfusion



Osteoarthritis Moderate

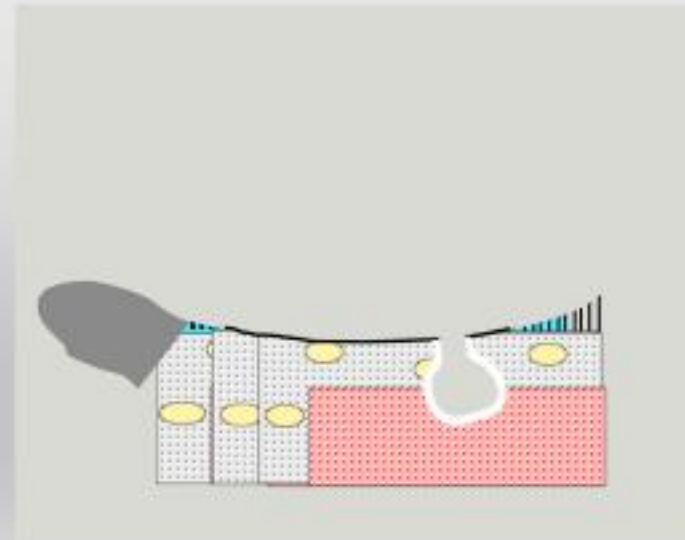
Continued loss of cartilage down to subchondral bone

Subchondral Bone Cysts

Hypercalcification

Ossification of excessive cartilage

Cystic degeneration is "ITIS"

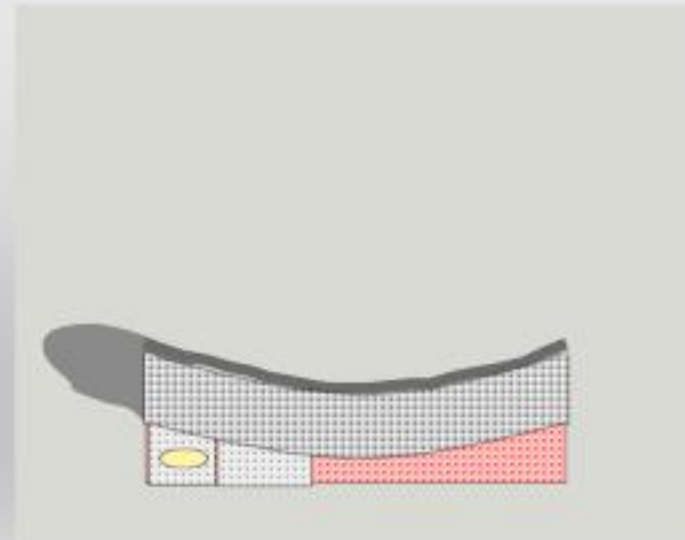


Osteoarthrosis/ Osteoarthritis Late

Sclerotic Bone

Eburnated Bone- Marble like

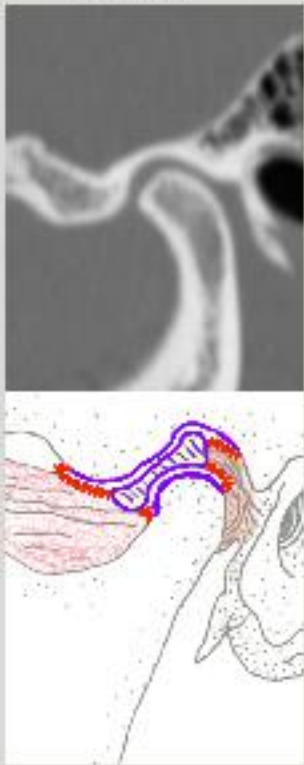
Calcification of surrounding structure



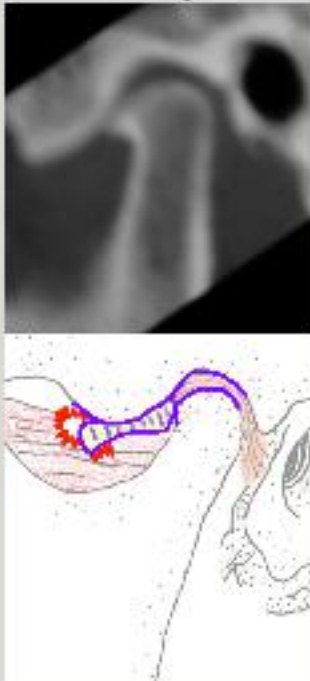
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Early



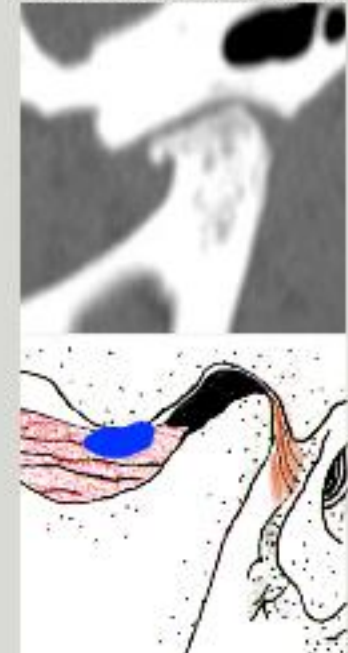
Early/ Moderate



Moderate



Severe OA, Eburnation



Representative examples of OA
in different patients

Light force

Repetitive motion

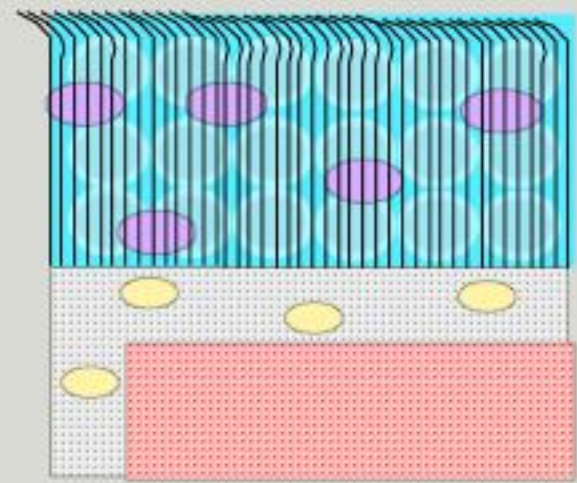
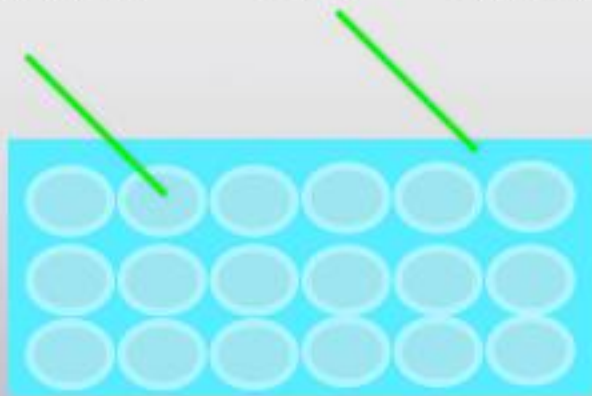
*Keeps joints
healthy*

Excessive force

No motion

Causes damage

Healthy Cartilage



Enneking WF, Horowitz M. The intra-articular effects of immobilization on the human knee. J Bone Joint Surg Am. 1972 Jul;54(5):973-85. PMID: 5068717

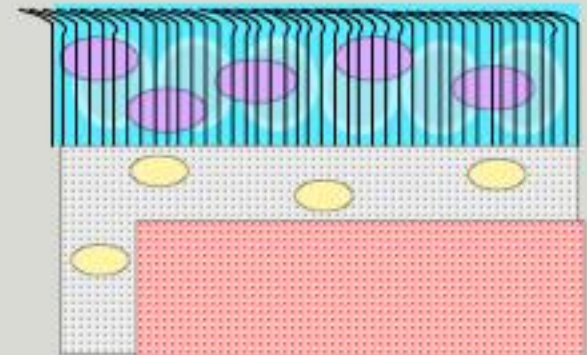
Immobilization 4 weeks

Proteoglycans not being produced by Chondrocytes
Collagen still intact
Process is reversible at 4 weeks

Move joint with light force/repetitive motion next 30 days

Half as many "Balloons"
Still have "Ropes"

Half as many proteoglycans so
half as much water so
half as much cartilage height



Enneking WF, Horowitz M. The intra-articular effects of immobilization on the human knee. J Bone Joint Surg Am. 1972 Jul;54(5):973-85. PMID: 5068717

Immobilization 8 weeks

“Ropes” Degenerate

Permanent joint damage in previous healthy joints

The cartilage is irreversibly damaged

Collagen is irreversibly damaged.

The proteoglycans have no way to attach in the cartilage matrix

Adhesions form between the joint surfaces

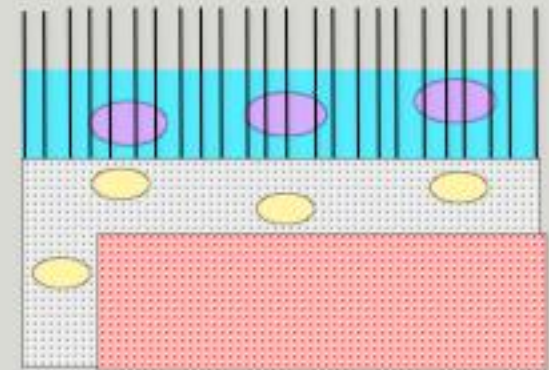
Connective tissue proliferates into the joint

Fibrous contracture of the muscles and joint capsule

Key Point:

In a patient with limited opening, you have
4 weeks to get the jaw moving.

At 8 weeks, there is permanent damage to
the TMJ, even if it was not the original
cause of the limited opening



Differential Diagnosis: Limited Joint Motion

Muscle Spasm

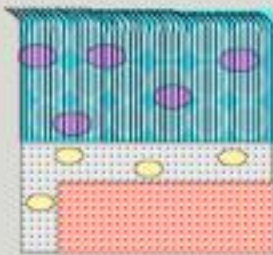
Painful to Move
Joint Pain
Muscle Pain

Mechanically Blocked
4b Acute
Adhesion

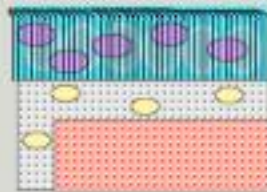
Masseteric Space
Infection
Hematoma



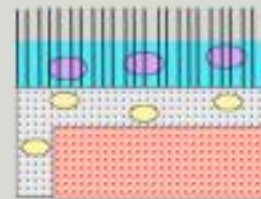
Healthy Cartilage



4 Weeks



8 Weeks



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

Move joint with light force/repetitive motion next 30 days

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



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

Basic Orthopedics

Joints are either
Healthy or
Damaged

If damaged, joints will be either:

Actively Breaking Down

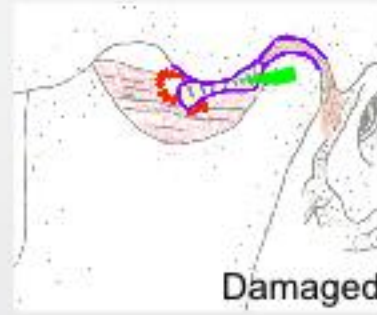
Adapting

Adapted Favorably Structurally and Mechanically

Adapted Unfavorably



Healthy

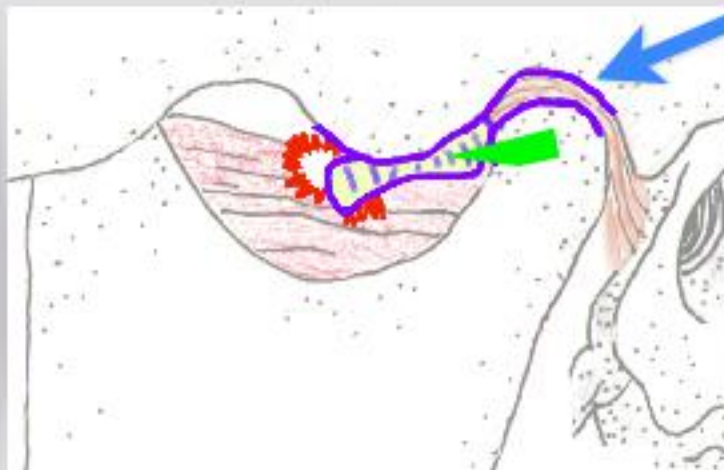


Damaged



Actively Breaking Down

Majority of damaged
TMJs adapt favorably



Posterior ligament, synovium,
and retrodiscal tissue adapt to
form a

Pseudo-disc

Tissue Fibrosis

My Core Belief

11 Degenerative Disorders of Joints and Related Tissues

The terms "degenerative diseases" discussed in the preceding chapter are predominantly in-
 flammatory in nature, the rheumatic dis-
 eases discussed in this chapter are predomi-
 nantly degenerative. You will appreciate,
 however, that the disease is somewhat ab-
 sence because some inflammatory reaction is
 needed to set things in motion. The degenerative
 types of disorders of joints and related tissues.
 This chapter includes a discussion of the
 degenerative types of arthritis (degenerative
 and disease in chronic articular rheumatism)
 and the related rheumatic diseases of extra-
 articular, or mesoarticular, structures such as
 tendons, muscles, and ligaments (osteoarthritis
 tenosynovitis). Many aspects of these diseases
 are related to normal aging, a process that
 merits separate consideration.

NORMAL AGING OF ARTICULAR CARTILAGE

Although most joints are to be expected to last
 a lifetime, at least as far as reasonable function
 is concerned, the normal aging process, which
 begins in early adulthood and slowly progresses
 throughout the remainder of life, gradually
 erodes the smooth, gliding surface of
 articular cartilage to a granular, dull
 surface in old age. Furthermore, because of
 the very limited ability of articular cartilage to
 regenerate, the degenerative changes tend to
 be irreversible and progressive.

Mechanically, there is a gradual loss of
 proteoglycan, a firm component of the carti-
 lage matrix, as the matrix deteriorates, the cell
 layer thins and their support, and the carti-
 lage tends to become atrophic (thinned).
 Thus, with advancing years, articular cartilage
 becomes less effective, not only as a "shock
 absorber" but also as a lubricated surface over
 which, it becomes more vulnerable as the
 movement load-bearing and repeated dis-
 torsion of normal function.

These changes of age in articular cartilage
 are present to some degree in all adults, how-
 ever, because these changes do not usually
 cause significant symptoms, they may be con-
 sidered variations of normal. When these
 changes in a given joint are either pronounced
 or excessive and cause pain, however, the con-
 dition becomes clinically significant, and is
 known as degenerative joint disease.

DEGENERATIVE JOINT DISEASE (OSTEOARTHRITIS)

Degenerative joint disease, a common disor-
 der of one or more joints, is caused by a local
 deterioration of articular cartilage and is char-
 acterized by progressive degeneration of the
 cartilage, hypertrophy, remodeling of the sub-
 chondral bone, and secondary inflammation
 of the synovial membrane. It is a localized disor-
 der with no systemic effects.

The currently accepted term degenerative
 joint disease is synonymous with the terms os-
 teoarthritis, osteoarthrosis, degenerative arthri-
 tis, senescent arthritis, and hypertrophic arthri-
 tis. Nevertheless, many clinicians prefer the
 term osteoarthrosis to the term degenerative
 joint disease.

Incidence

Degenerative joint disease is by far the most
 common type of arthritis, such that more com-
 mon than the acute rheumatic conditions of
 rheumatoid arthritis and occurring 10 times
 greater frequency in North America.
 Indeed, it has been estimated that after the
 age of 40 years, 25% of women and 15% of
 men have symptoms related to degenerative
 joint disease. After the age of 70 years, more
 than 80% of women and men are affected.

The primary, or idiopathic, type, which is
 somewhat more common in adult women, de-
 velops spontaneously in middle age and pro-
 gresses slowly as an exaggeration of the nor-



Figure 11.7. Right hip of a 60-year-old woman with degenerative arthritis. Note the large cystic lesion under the weight-bearing area of the femoral head. At operation this cyst was found to communicate with the joint cavity; it contained synovial fluid.

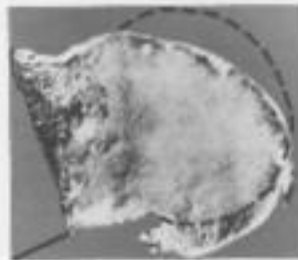
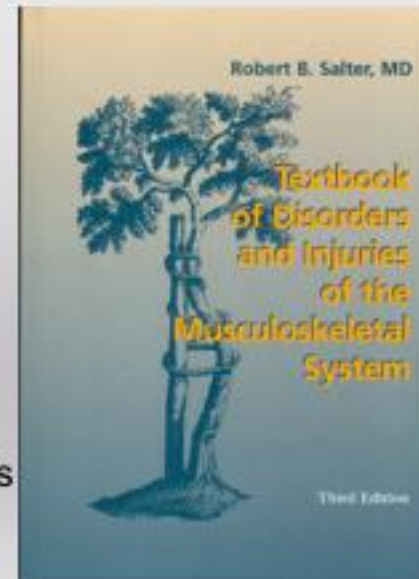


Figure 11.8. Coronal section of the femoral head from the anterior leg of a 74-year-old man. The present shape of the femoral head is the result of gradual remodeling from the original shape (dotted line). Such remodeling accentuates irregularity of the joint and contributes to the vicious cycle of degeneration.

Understanding orthopedic medicine is the key to understanding joints, including the TMJ

Buy Salter's Orthopedic Textbook.
 When you have a patient with specific disease
 (i.e. osteoarthritis), read that chapter.

Textbook of Disorders and Injuries of the Musculoskeletal System
 Robert Salter MD



Diagnostic Misadventure

47yo Female

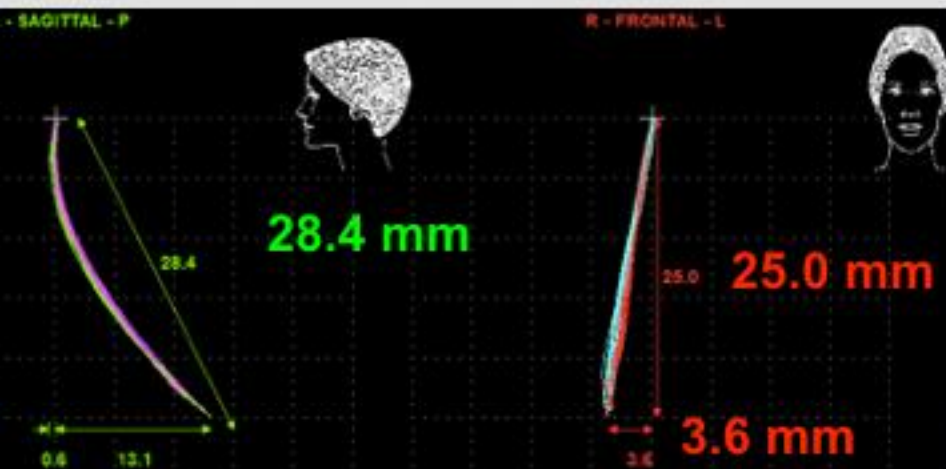
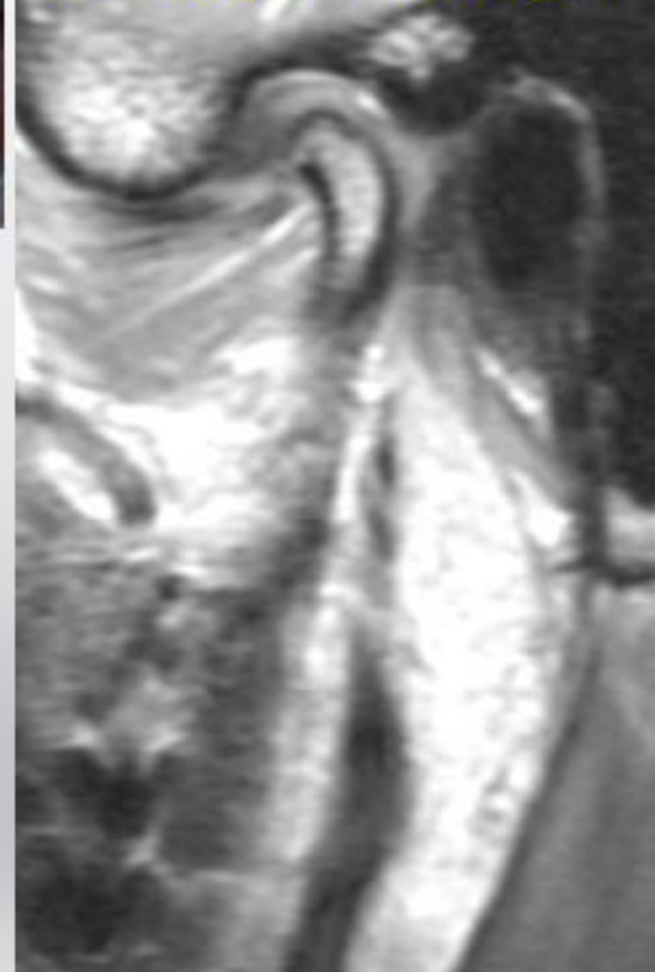
Limited opening past 15 months
since orthognathic surgery

Pain on chewing, eating is challenging
On soft diet

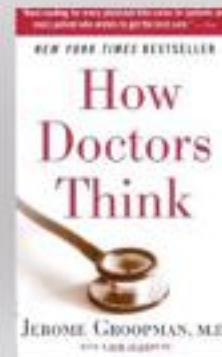
Treatments: Physical Therapy,
Chiropractic, Occlusal Splint



MRI Right TMJ Open



What we
perceive is
influenced
by our
beliefs.



Final Diagnosis

Limited opening due to 4 screws into right medial pterygoid and lateral pterygoid muscles restricting movement. Fibrous ankylosis right TMJ. Fibrosis right masseter, medial pterygoid, and temporalis muscle.



Treatment:

Surgical Removal of Screws

Dynasplint- 2x/day 30-45 min for 6 weeks

Home stretching with fingers to maintain

Results:

Final opening 43mm

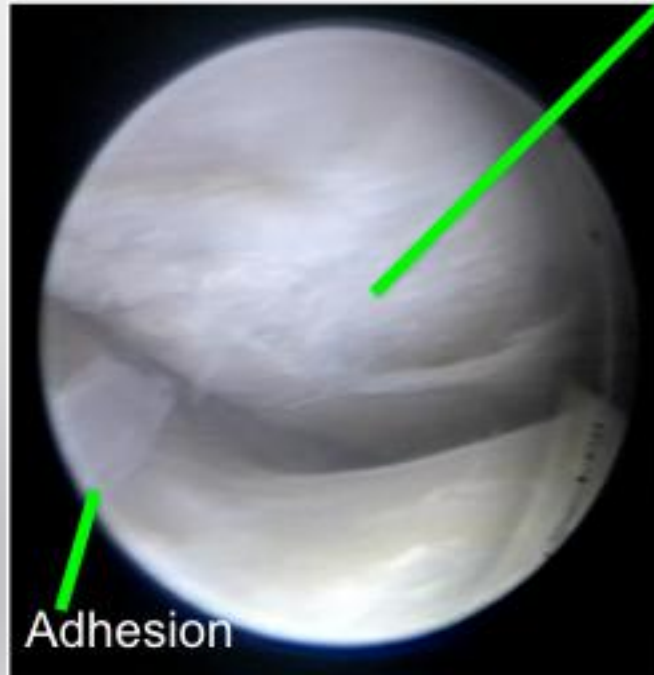
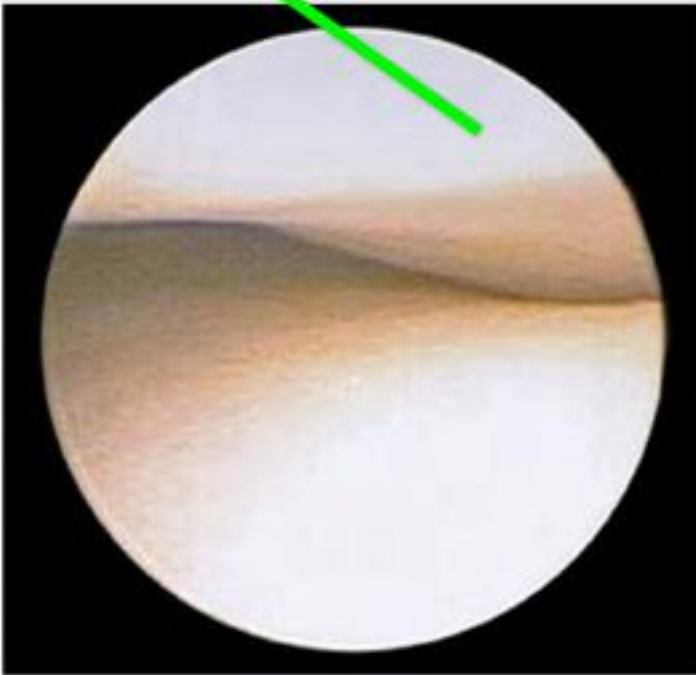
She can now eat hard pretzels without pain



Arthroscopic View Left TMJ

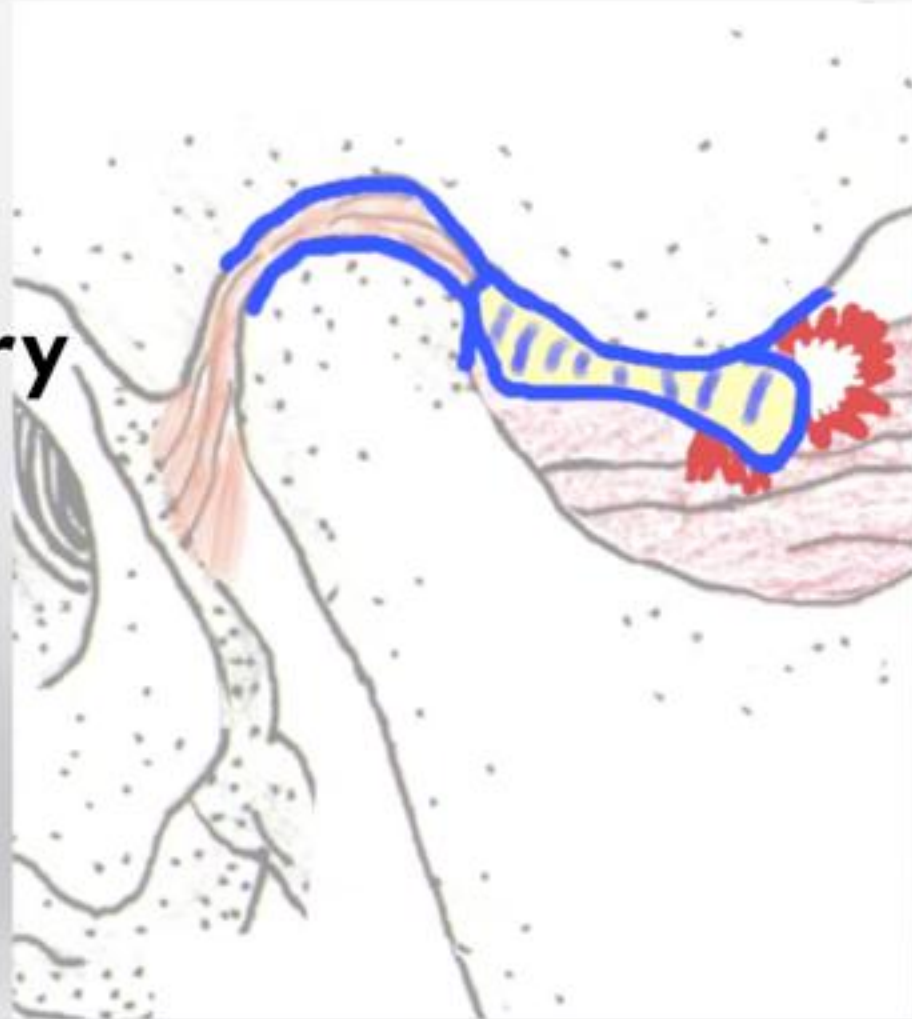
Eminence Healthy Cartilage

Eminence Necrotic Cartilage



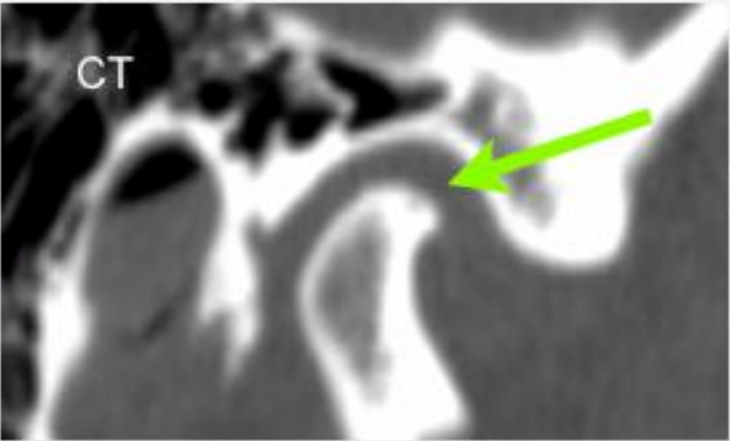
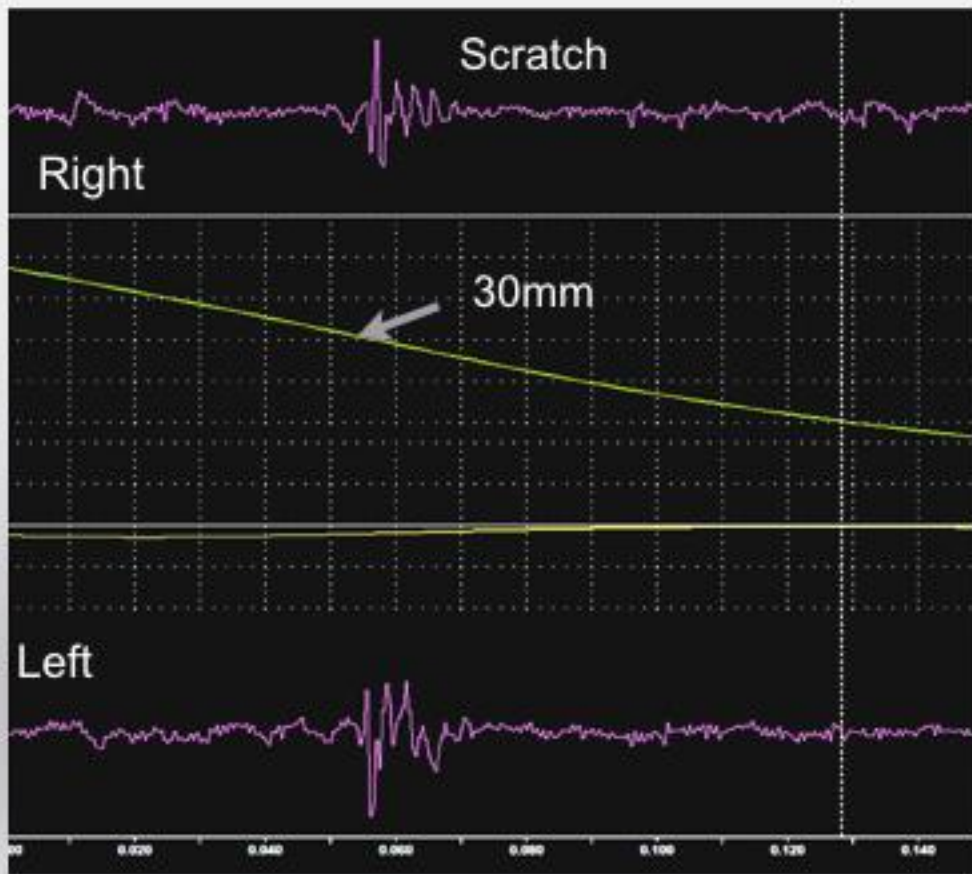
Not Same Patient

Right TMJ Open Joint Surgery

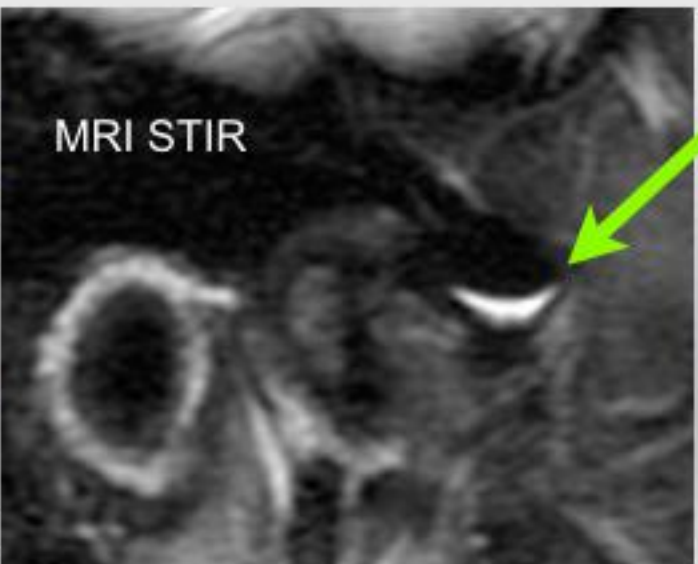


Cartilage
Damage
Movie

48 yo female
JVA/JT Opening Scratch



Right TMJ
Hypercalcification
Small cyst



Effusion or pooling?
No arthralgia

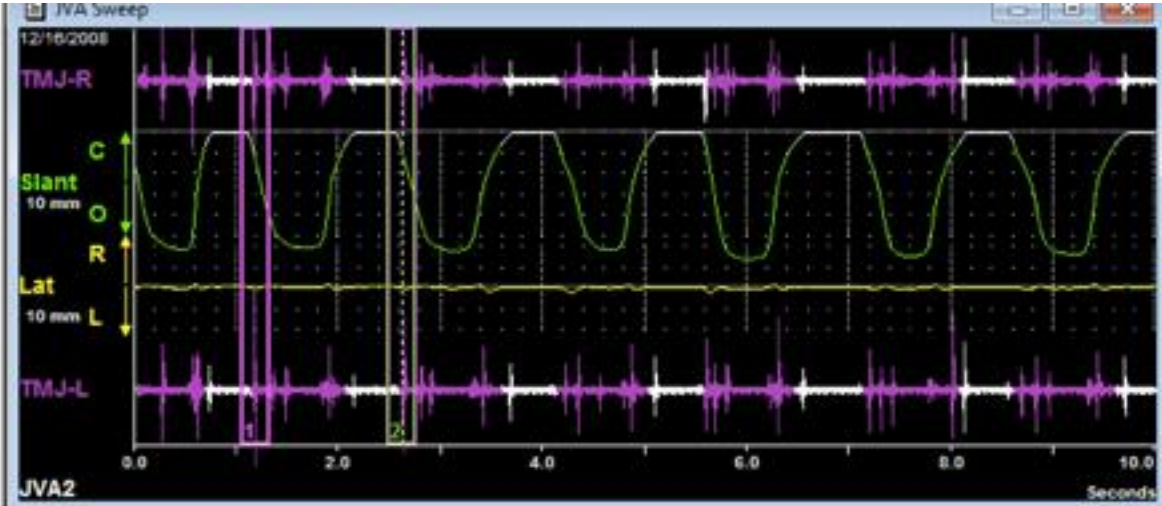
This is
Osteoarthritis
No NSAID tx

48 yo female

Left Click 36 pascals
Consistent timing
Variable Intensity

Right Severe Scratch

Start



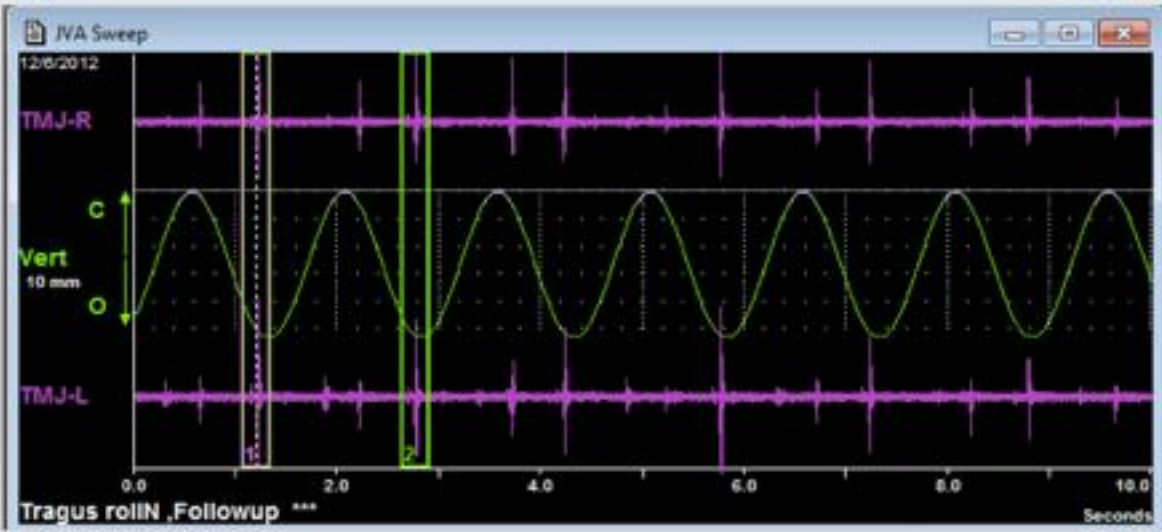
Dx: TMJ damage R4a,L4a adapted unfavorably, osteoarthritis, cranial misalignment, malocclusion.

Treatment: Altered forces through the TMJ by changing occlusion: Orthotic, Orthodontics, Occlusal equilibration.

Left Click 28 pascals
Consistent Timing
Consistent Intensity

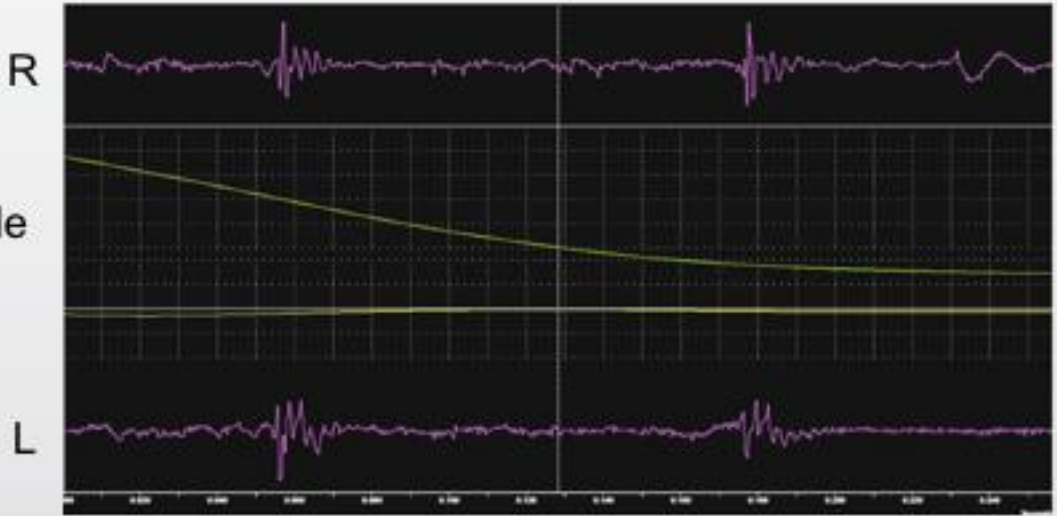
3 years
Post Tx

Right slight wobble on
No scratch

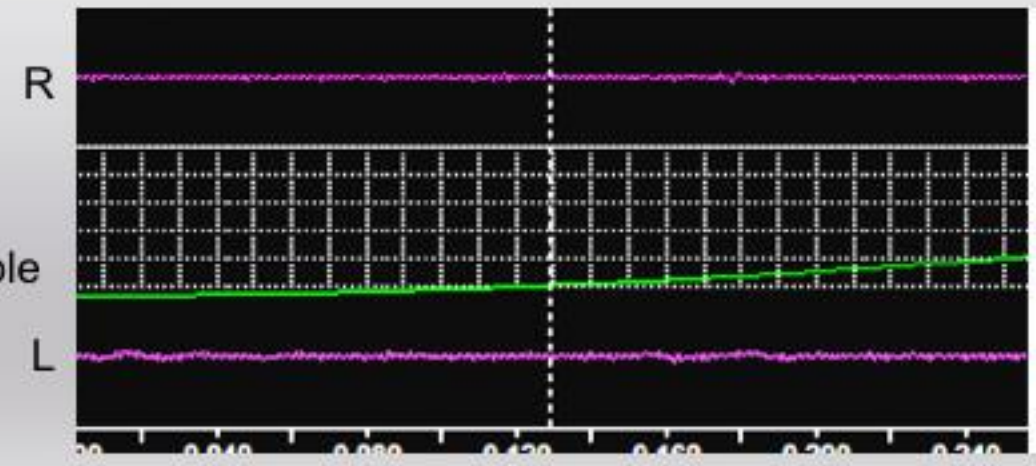


48 yo female

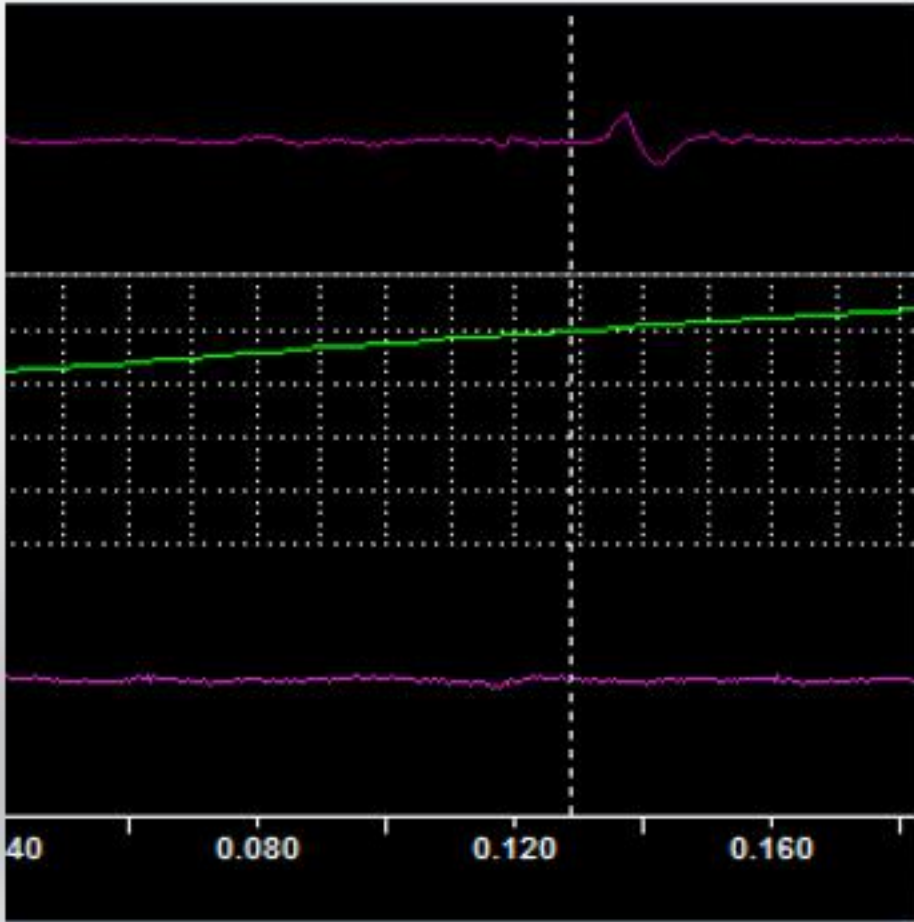
Start
Mid Opening
Right Scratch, Wobble
Left Scratch



3 years
Post Tx
No Scratch, No wobble



32 yo female
JVA closing wobble



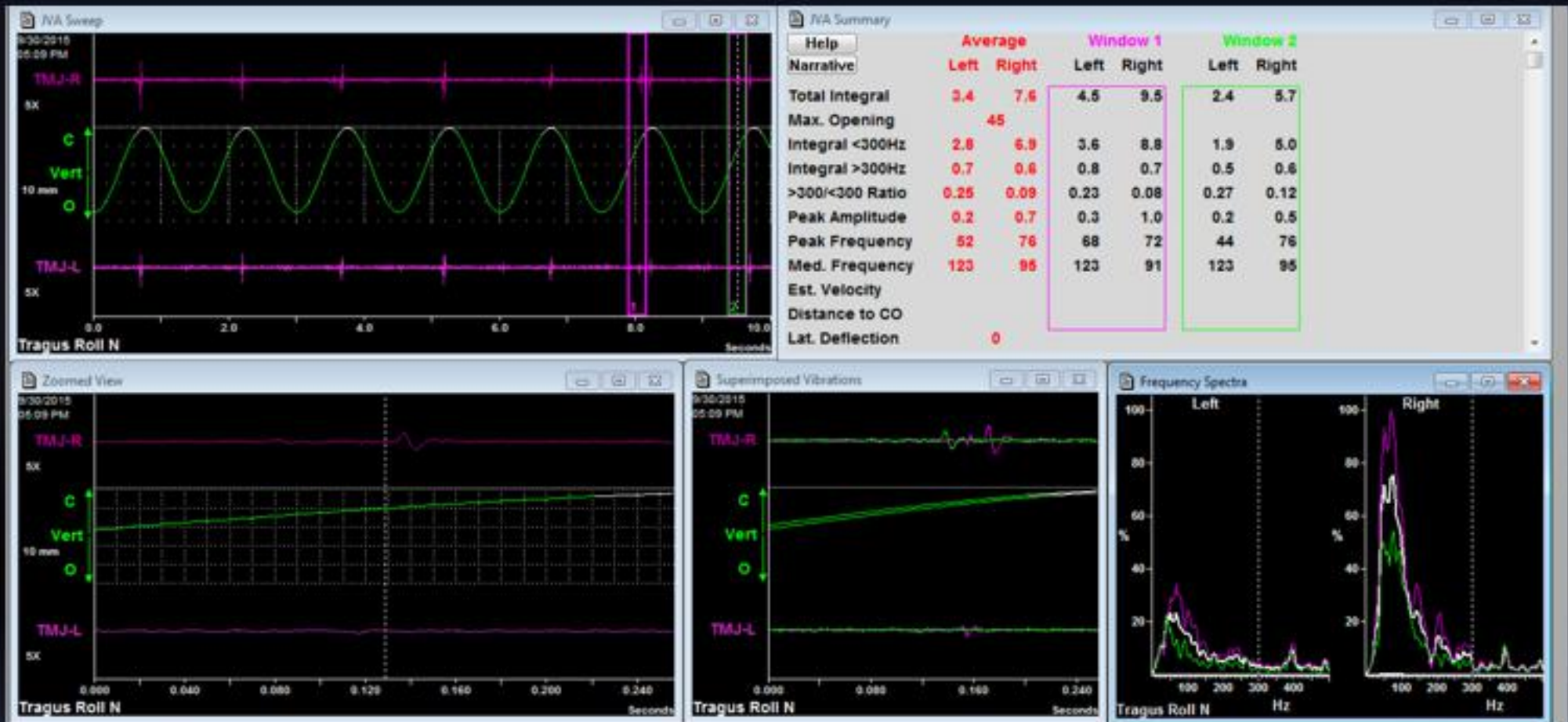
Right TMJ
Hypercalcification
Irregular Surface Condyle
and fossa



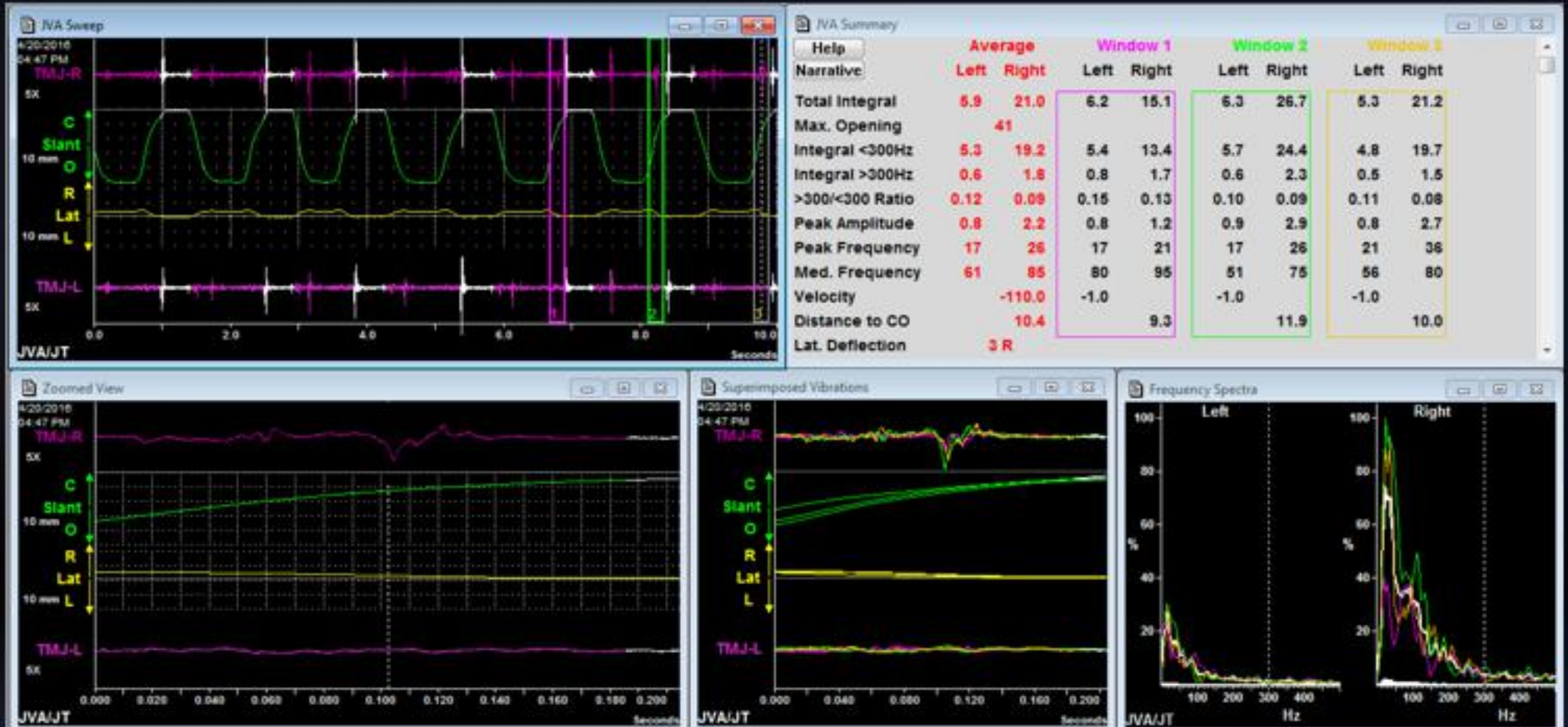
Severe Joint edema
Arthralgia, pain on load

This is
Osteoarthritis
NSAID tx

Age 32 Start: Before NSAID 8 weeks

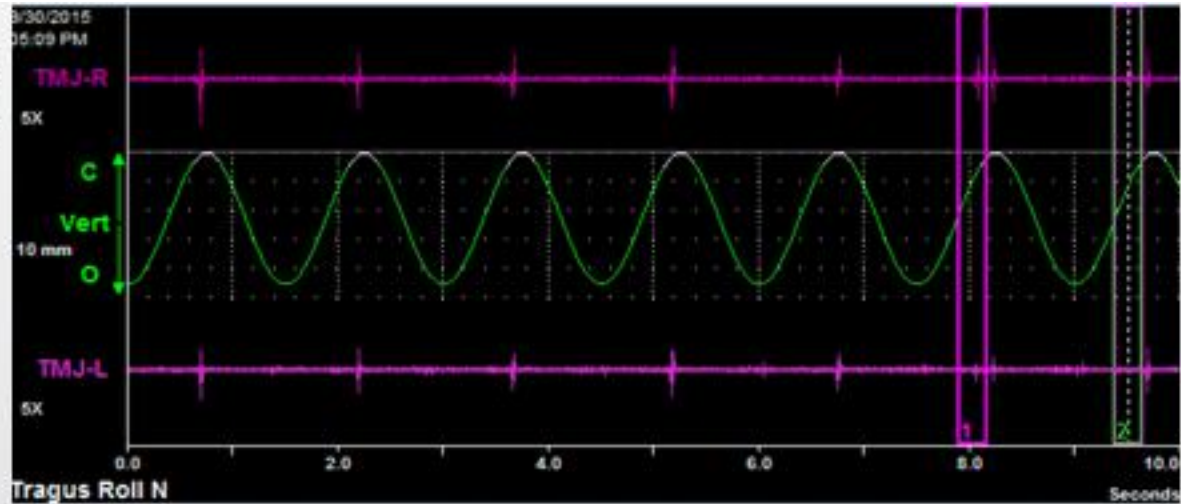
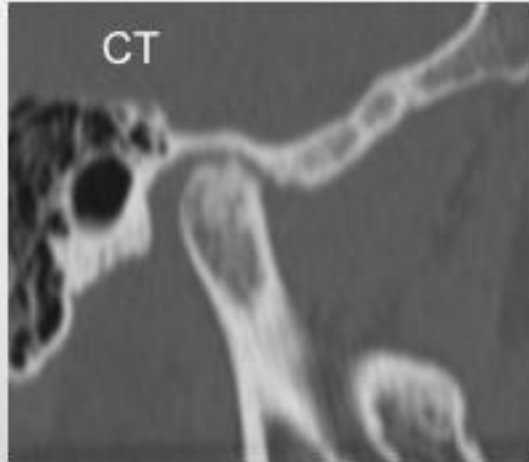


7 months later

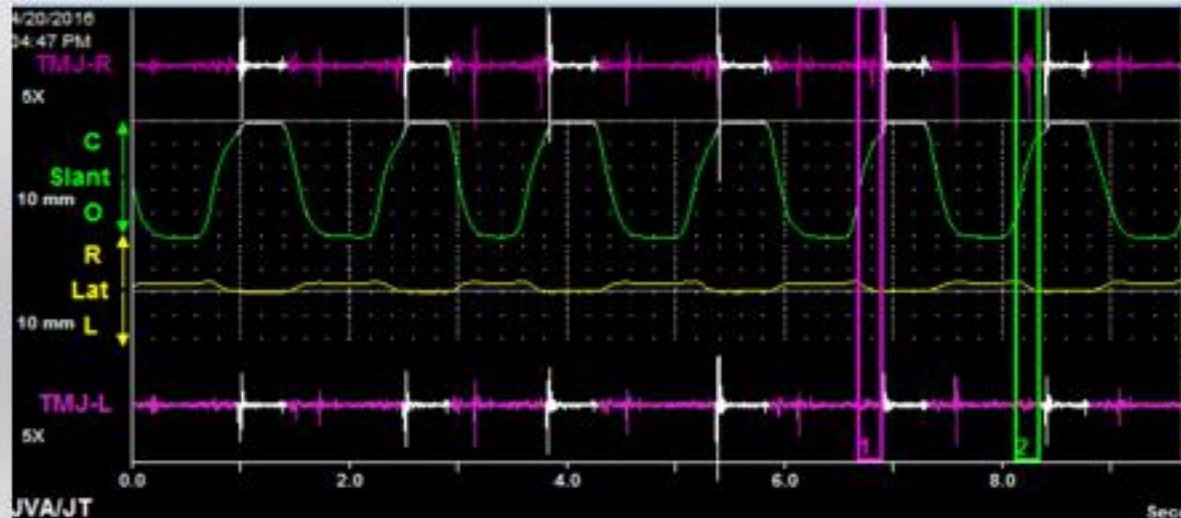
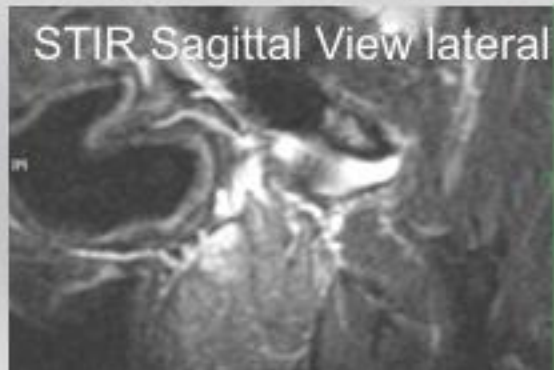


Age 32 Start:
Before NSAID 8 weeks

Why no scratch vibrations?



7 months later



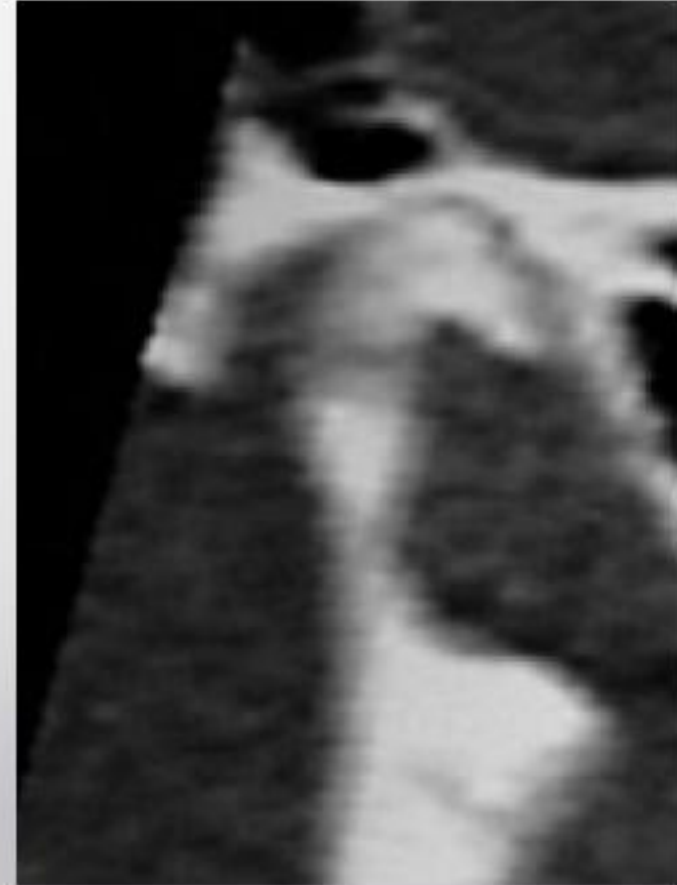
Diagnose OA

Osteoarthrosis

After early phase, CT scan shows bone alteration
Joint sounds, vibrations (roughness)- JVA is best
Non painful to joint palpation, loading
Friction in the joint causing wear

Osteoarthritis

CT shows bone alteration
Inflammation present
Arthralgia
Need to palpate and load test the joint
Joint sounds roughness may be diminished by joint effusion
MRI STIR or T2 show inflammation



Osteoarthrosis / Osteoarthritis Treatments

John R Droter DDS
Annapolis, Maryland

Annapolis, Maryland
John R Droter DDS

www.jdroter.com

Treatment OA

Osteoarthrosis

Minimize parafunction:

If sleep clenching: D-PAS

If sleep grinding due to airway: Airway device that allows jaw motion

Light Force, Repetitive Motion: Promote synovial fluid flow

Jaw exercise: 20 reps, 5x a day jaw wiggle, open close

Glucosamine 1500mg /Chondroitin 600 mg per day

Osteoarthritis

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

NSAIDs

Cold Laser

Turmeric, Anti-Inflammation Diet

If still inflamed arthrocentesis with Platelet Rich Plasma (PRP)

Treatment OA

Osteoarthrosis

Minimize parafunction:

If sleep clenching: D-PAS

If sleep grinding due to airway: Airway device that allows jaw motion

Light Force, Repetitive Motion: Promote synovial fluid flow

Jaw exercise: 20 reps, 5x a day jaw wiggle, open close

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D-PAS



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Cold Laser

Turmeric, Anti-Inflammation Diet

If still inflamed arthrocentesis with Platelet Rich Plasma (PRP)

EMA



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

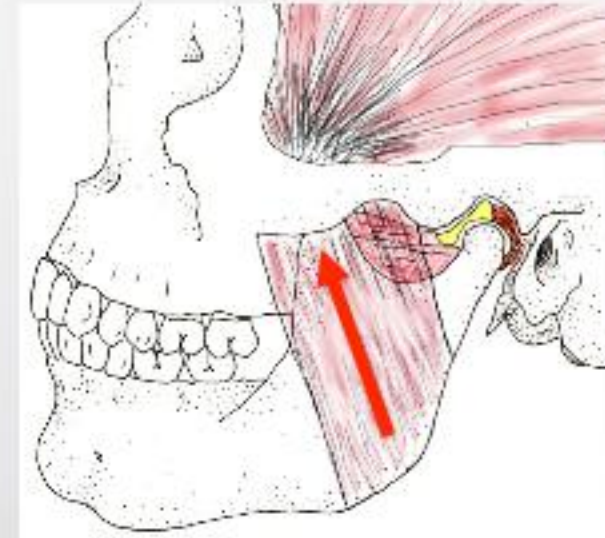
If antioxidants (Vitamin A, C, E) around:

Protects tissue from damage

Vitamin C 1500mg

Shaklee Vitamin C Sustained Release 500mg

3 tablets right before sleep



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



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.

Treatment (Management) Uses

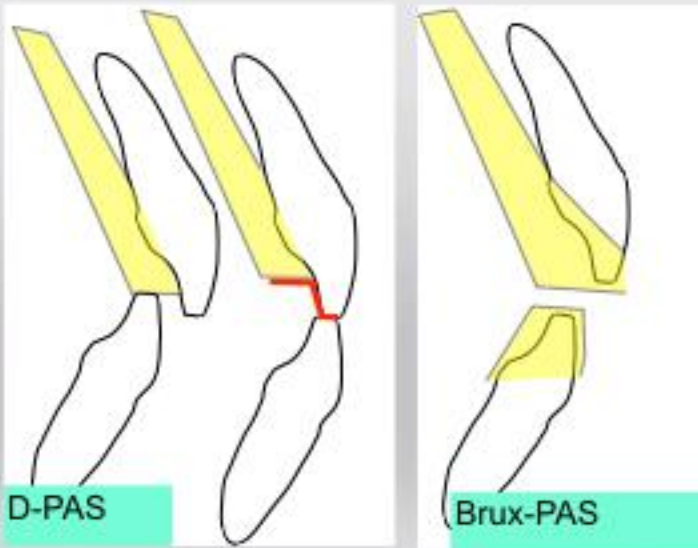
D-PAS
Diagnostic Palatal Anterior Stop Orthotic

Educational: Patient awareness of problem

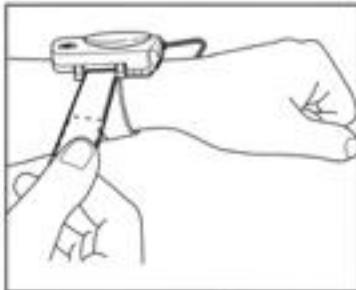
Sleep Clenching with muscle inhibition:
D-PAS wear during sleep

Sleep Grinding with muscle inhibition:
Brux-PAS wear during sleep.
Increase vertical of D-PAS,
Add lower essex

Assist in cranial bone alignment

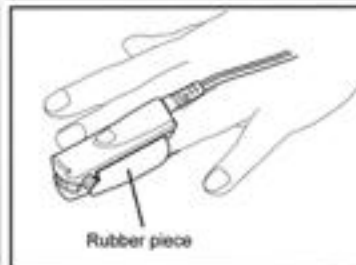


If sleep grinding, is there an airway issue?
 (Upper Airway Resistance or Obstructive Sleep Apnea)



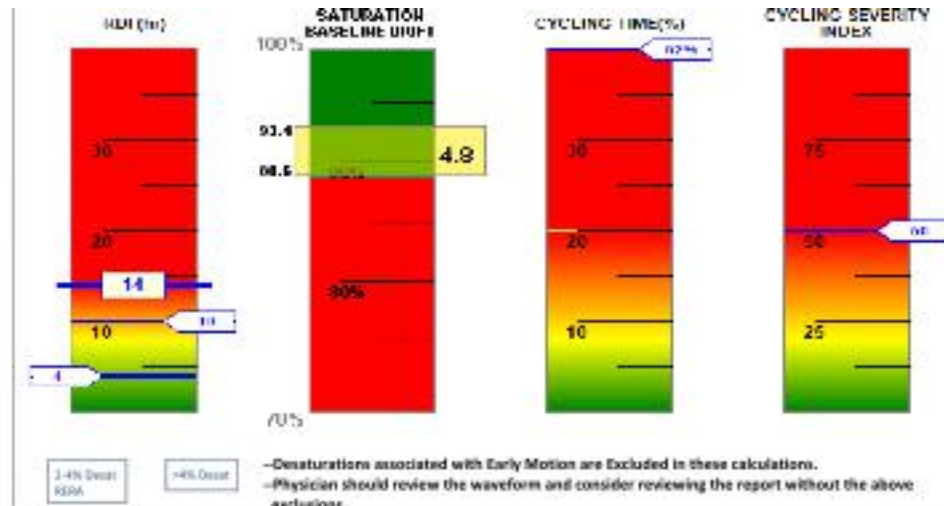
High Resolution
Pulse Oximetry

Data every 3
seconds



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

Order from Jeffery Rouse DDS
 Michael Boatner
 (210) 828-3334



OXYGEN SATURATION BASELINE ANALYSIS

Oxygen Saturation Baseline	
Drift(OSBG) (normal <= 3)	3
Initial Saturation Baseline	95
Lowest Saturation Baseline	89
Highest Saturation Baseline	95

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

PATTERN BASED REPORT

SPO2 CYCLING

% Time in Cycling (Duration)	32%	00:50:14
Cycling Frequency	45	
96% - Lowest Sat	12	
Cycling Severity Index	50	

The total time oxygen saturation was <= 88% was 00:13:34

TRADITIONAL REPORT

SpO2	DURATION	%TOTAL
96-100	00:16:37	5%
88-94	04:57:26	91%
80-88	00:15:39	4%
70-80	00:00:00	0%
<= 70	00:00:00	0%
Total	05:27:42	100%
Notion Artifact	00:00:07	0.04%
Error Signal	00:00:05	0.03%

Definition of OD4 Event: a fall in oxygen saturation of at least 4% and persisting greater than 3 seconds.

Want sleep device that allows full jaw motion.

None are great but EMA is better for OA than others. Allows for more movement of the TMJ. Problem with device longevity.



Somnodent



Dream TAP



Herbst



TAP



Worst device for OA

Treatment OA

Osteoarthrosis

Minimize parafunction:

If sleep clenching: D-PAS

If sleep grinding due to airway: Airway device

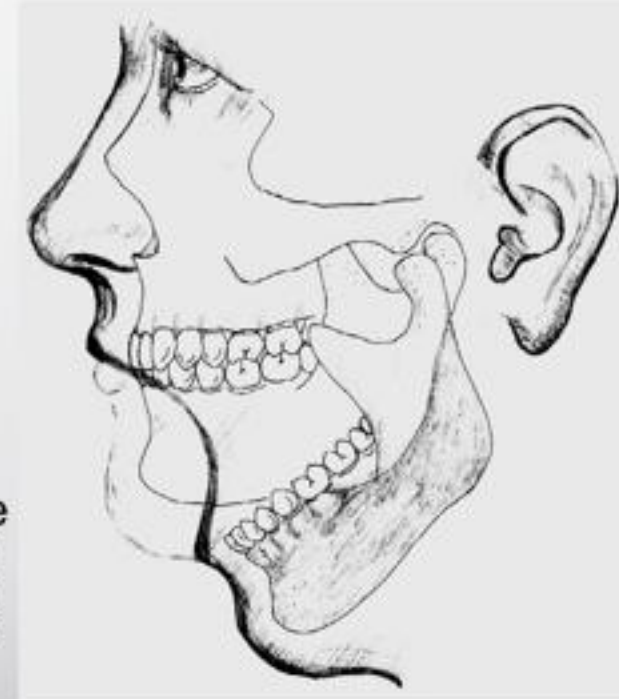
Light Force, Repetitive Motion: Promote synovial fluid flow

Jaw exercise: 20 reps, 5x a day jaw wiggle, open close

Glucosamine 1500mg /Chondroitin 1200 mg per day



Avoid if shellfish or sulfate allergy
Use Glucosamine Sulfate
Glucosamine HCl is not effective



Rotate
Slide
Pivot

Jaw exercises

Open Close
Front Back
Side to side

Treatment OA

Osteoarthrosis

Minimize parafunction:

If sleep clenching: D-PAS

If sleep grinding due to airway: Airway device that allow
Light Force, Repetitive Motion: Promote synovial fluid flow

Jaw exercise: 20 reps, 5x a day jaw wiggle, open close

Glucosamine 1500mg /Chondroitin 600 mg per day

Osteoarthritis

All of the above plus eliminate inflammation....

NSAIDs

Cold Laser

Turmeric, Anti-Inflammation Diet

Will be on NSAID 6-12 weeks

Best to have MD prescribe and manage

CMP- Complete Metabolic Panel

Creatinine Clearance Rate

Monitor BP- early kidney failure see rise in BP

NSAIDs I like:

Meloxicam 15mg qd

Celebrex 200mg qd

Aleve 440mg bid

Advil Liquid Gel Caps 800mg tid

Limbrel 500 bid

Can add Doxycycline 20mg bid
to meloxicam 15mg qd if needed



Treatment OA

Osteoarthrosis

Minimize parafunction:

If sleep clenching: D-PAS

If sleep grinding due to airway: Airway device

Light Force, Repetitive Motion: Promote synovial fluid flow

Jaw exercise: 20 reps, 5x a day jaw wiggle, open close

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Osteoarthritis

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

NSAIDs

Cold Laser

Turmeric, Anti-Inflammation Diet

If still inflamed arthrocentesis with Platelet Rich Plasma (PRP)



MLS Laser

350 hz, 50 % intensity

30 sec open 30 sec closed

17.33 Joules

3x week for 3 weeks

Treatment OA

Eat food, not too much, mostly plants.

Osteoarthrosis

Minimize parafunction:

If sleep clenching: D-PAS

If sleep grinding due to airway: Airway device

Light Force, Repetitive Motion: Promote synovial fluid flow

Jaw exercise: 20 reps, 5x a day jaw wiggle, open close

Glucosamine 1500mg /Chondroitin 600 mg per day

Michael Pollan..... Author, food and diet

Osteoarthritis

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

NSAIDs

Cold Laser

Turmeric, Anti-Inflammation Diet

If still inflamed arthrocentesis with Platelet Rich Plasma (PRP)

Treatment OA

Osteoarthrosis

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Osteoarthritis

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

NSAIDs

Cold Laser

Turmeric, Anti-Inflammation Diet

If still inflamed arthrocentesis with Platelet Rich Plasma (PRP)

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



Treatment OA

Osteoarthosis

Minimize parafunction:

If sleep clenching: D-PAS

If sleep grinding due to airway: Airway device that allows jaw motion

Light Force, Repetitive Motion: Promote synovial fluid flow

Jaw exercise: 20 reps, 5x a day jaw wiggle, open close

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Osteoarthritis

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

NSAIDs

Cold Laser

Turmeric, Anti-Inflammation Diet

If still inflamed arthrocentesis with Platelet Rich Plasma (PRP)

OA a few more things

John R Droter DDS
Annapolis, Maryland

Annapolis, Maryland
John R Droter DDS

www.jrdroter.com

Osteoarthritis Bone Loss

CR Load zone is now on zygoma

Condylar guidance has become shallower



Age 54 male

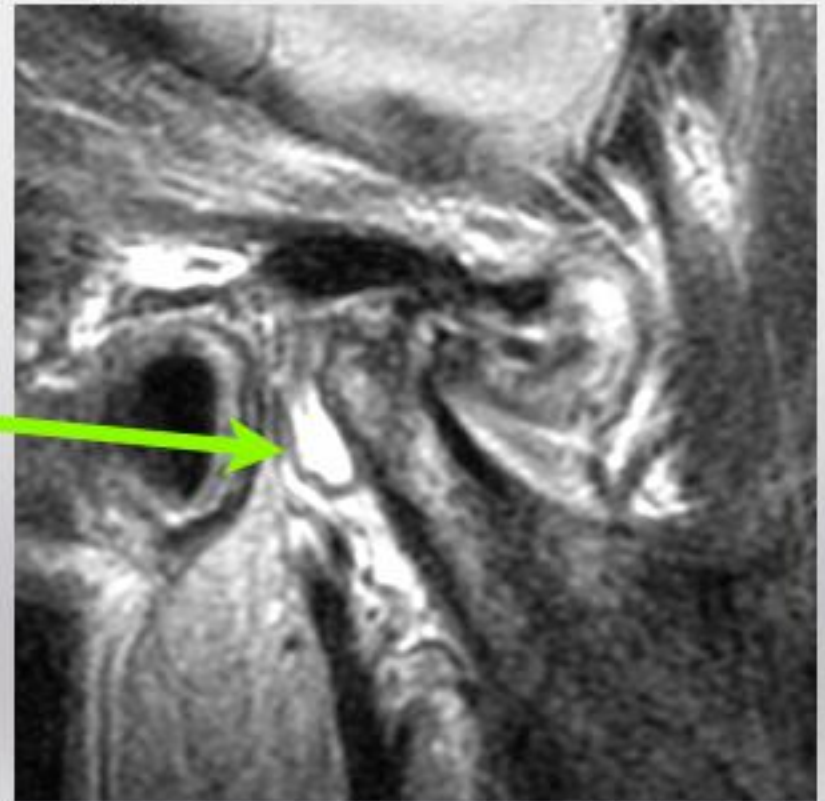
Osteoarthritis with Synovial Cysts (Ganglion Cyst)

MRI Right TMJ

PD



T2



OA CT sample images

John R Droter DDS
Annapolis, Maryland

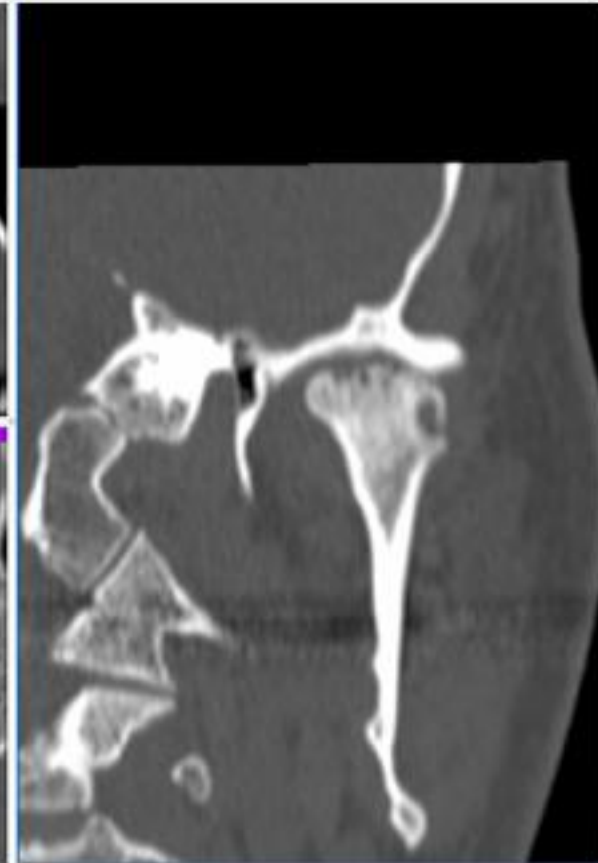
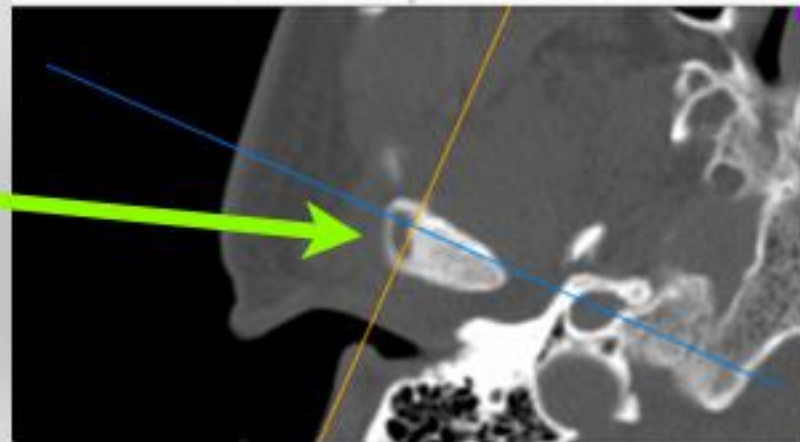
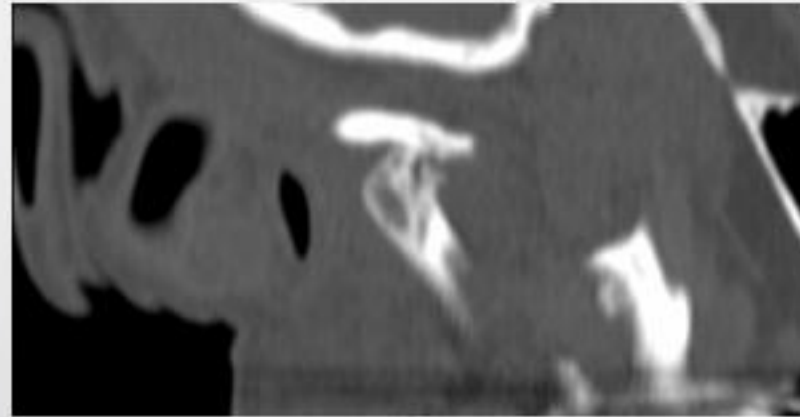
Annapolis, Maryland
John R Droter DDS

www.jrdroter.com

Age 54 male

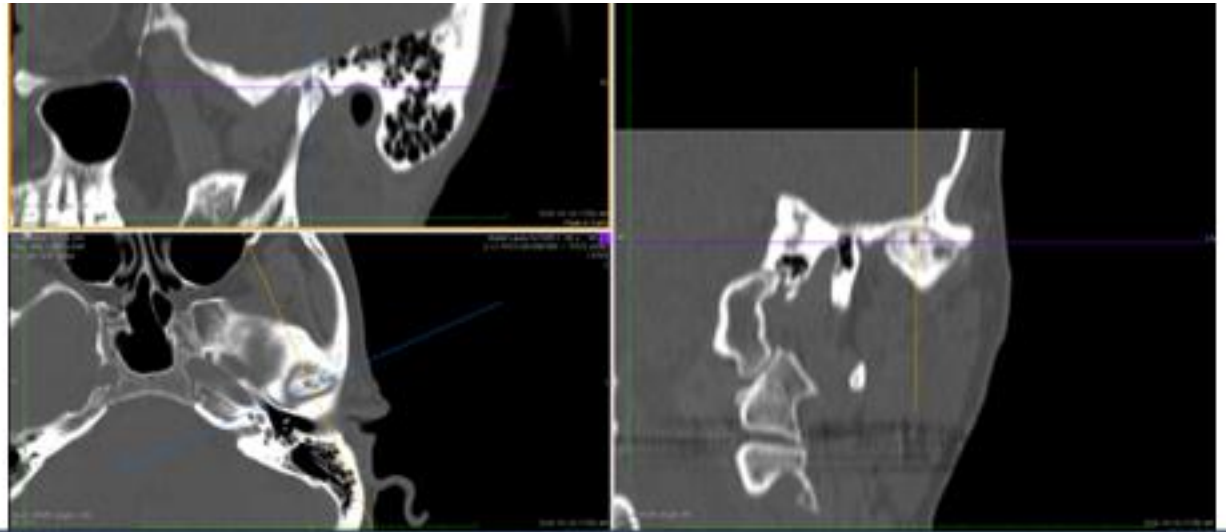
Osteoarthritis with intra-osseous Synovial Cysts (Ganglion Cyst)

CT Right TMJ

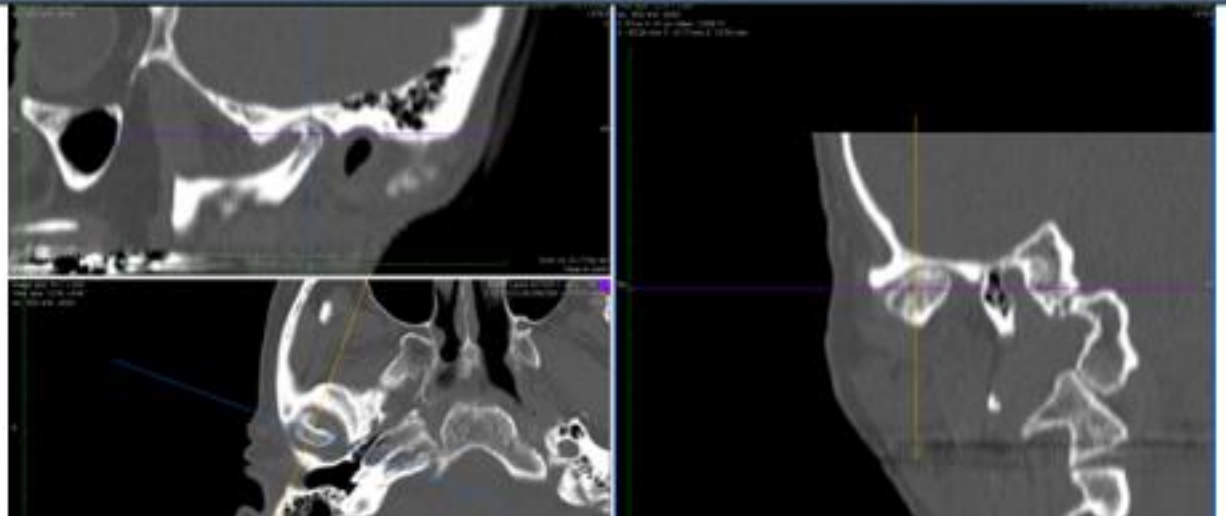


LS 66yo F
5-6-14
OA

CT
Left

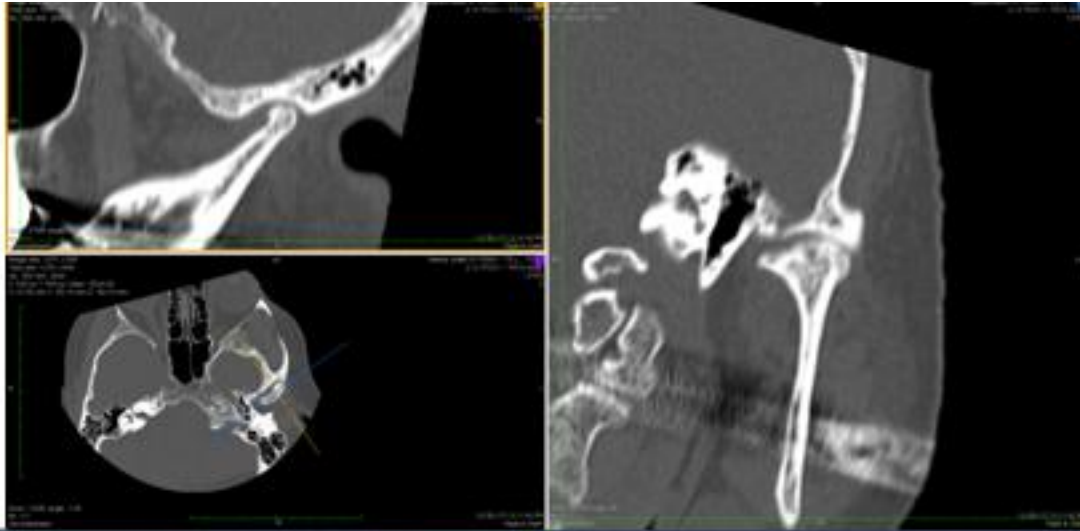


CT
Right

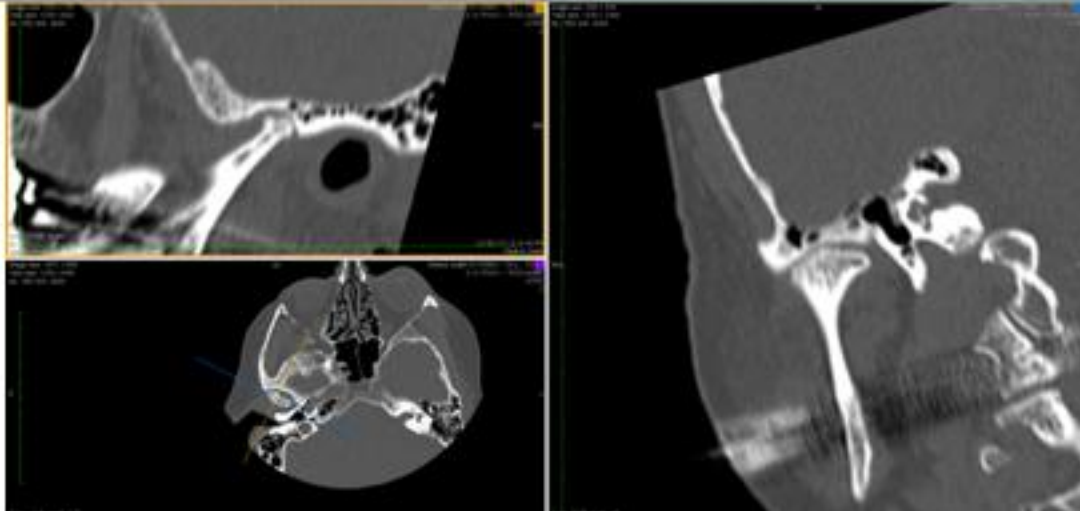


JG 73yo F
12-30-13

CT
Left

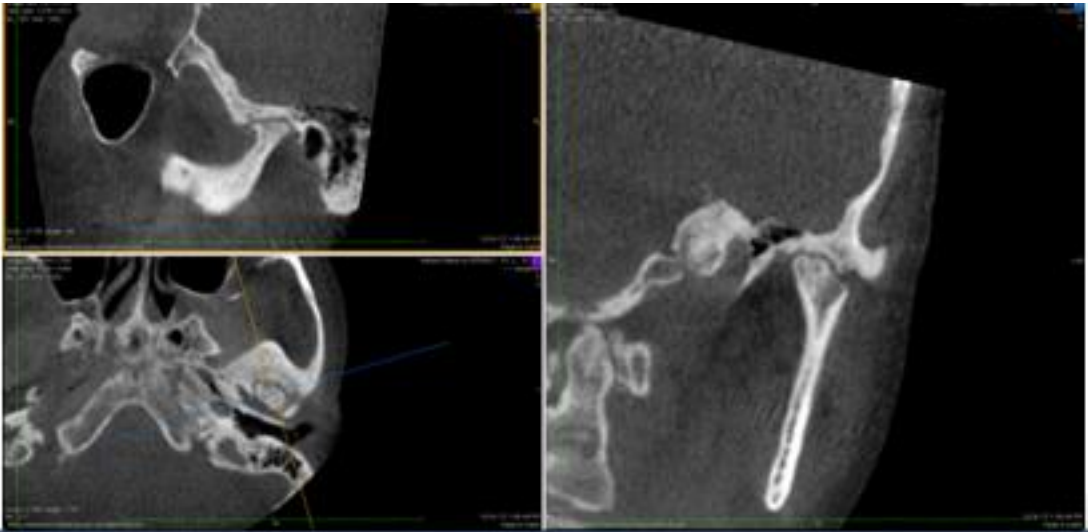


CT
Right

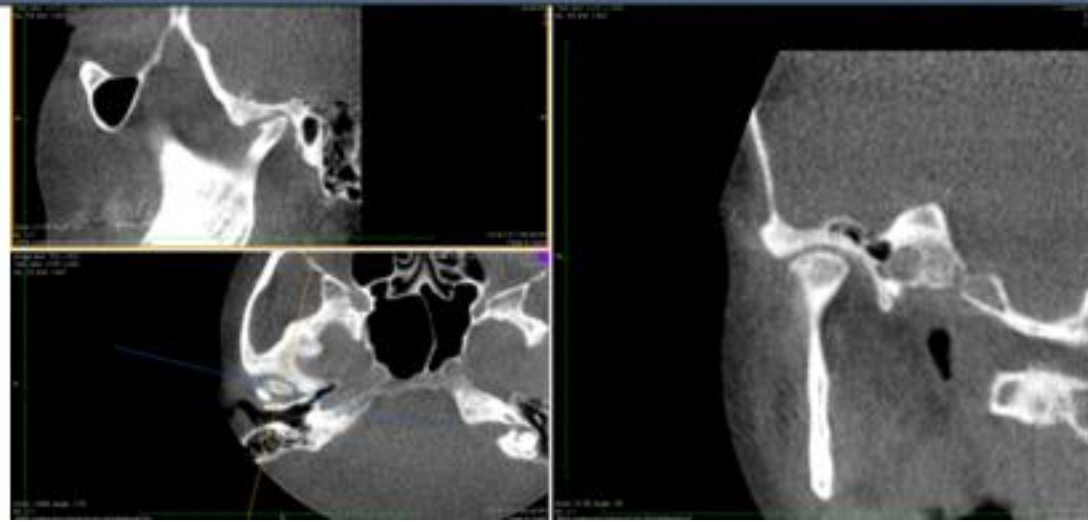


RW 61yo F
10-9-13

CT
Left



CT
Right



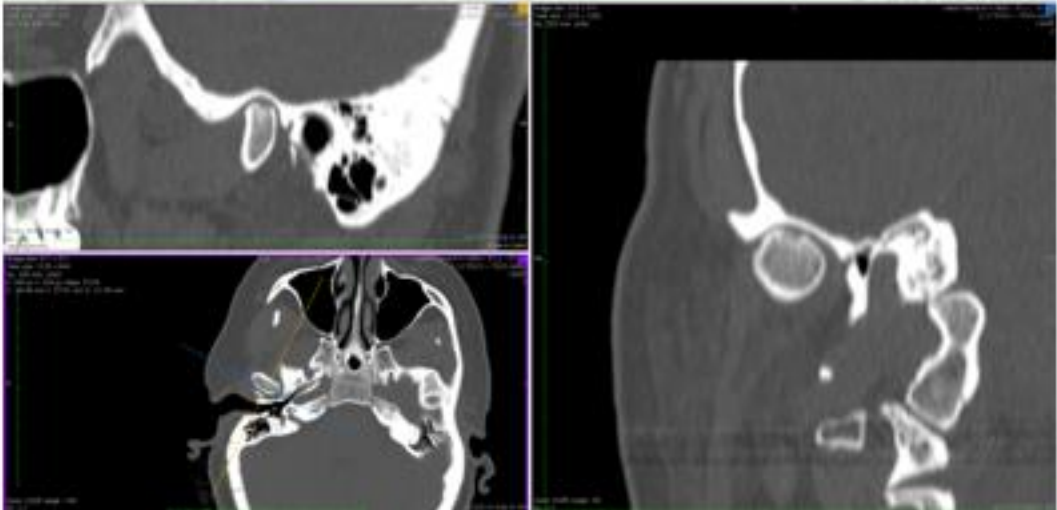
ML 51yo F
12-30-13

OA

CT
Left



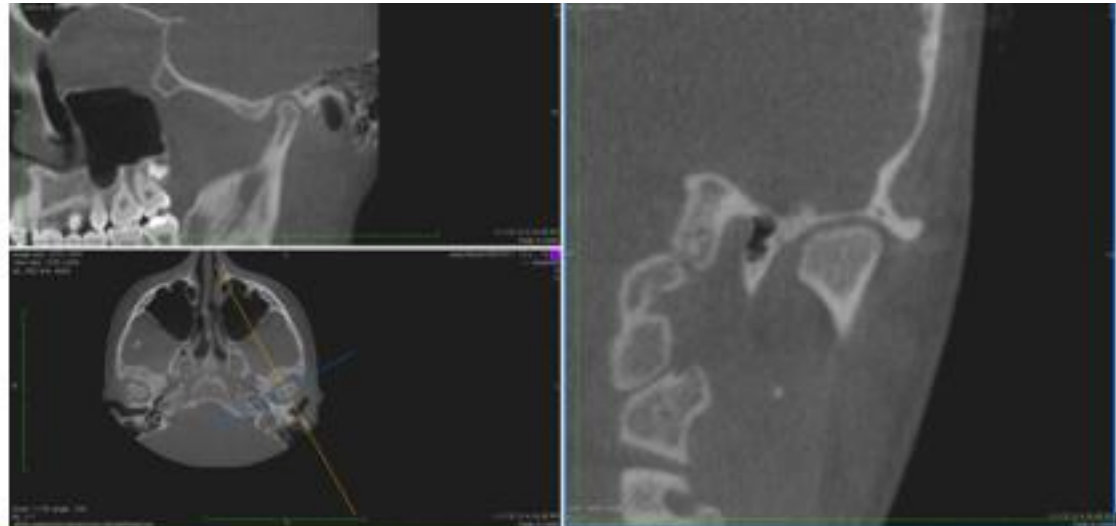
CT
Right



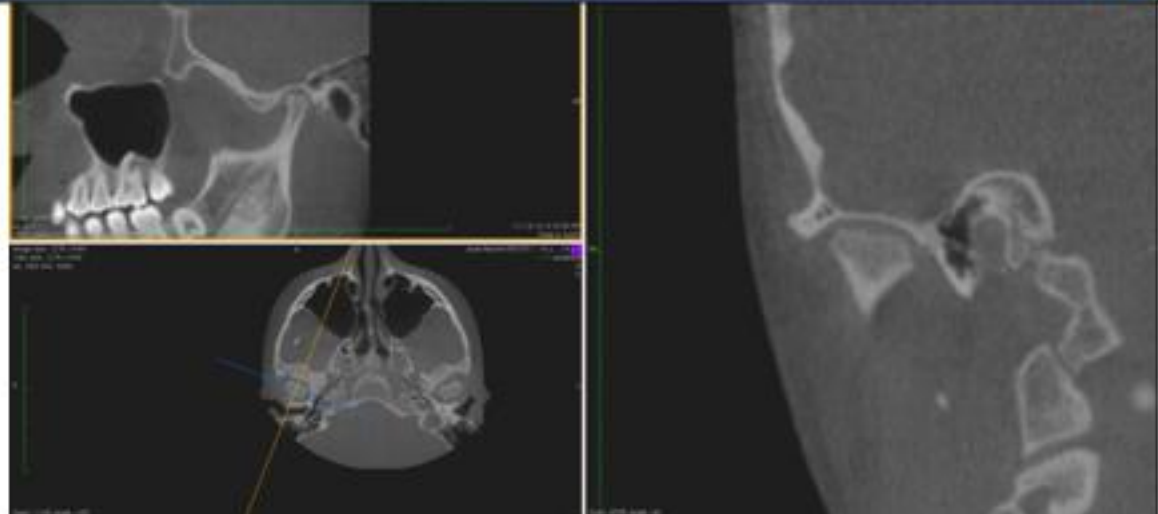
RJ 18yo F
11-13-12

Bone Loss still active. Was
schedule for orthognathic surgery
Dx; HiPCR

CT
Left



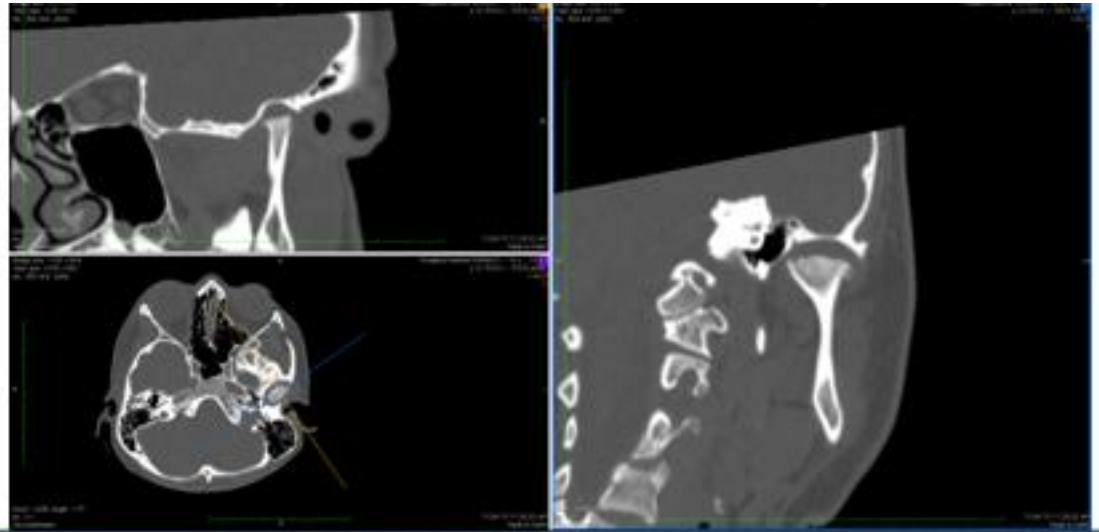
CT
Right



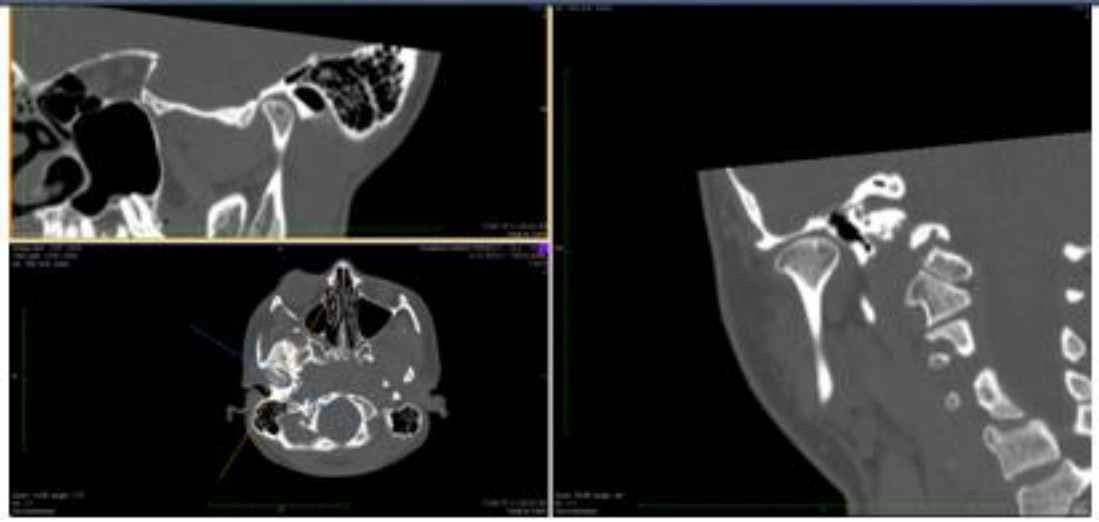
HM 18yo F
7.24.13

Diff Dx; Hi-PCR, AVN,
Not primary OA

CT
Left



CT
Right



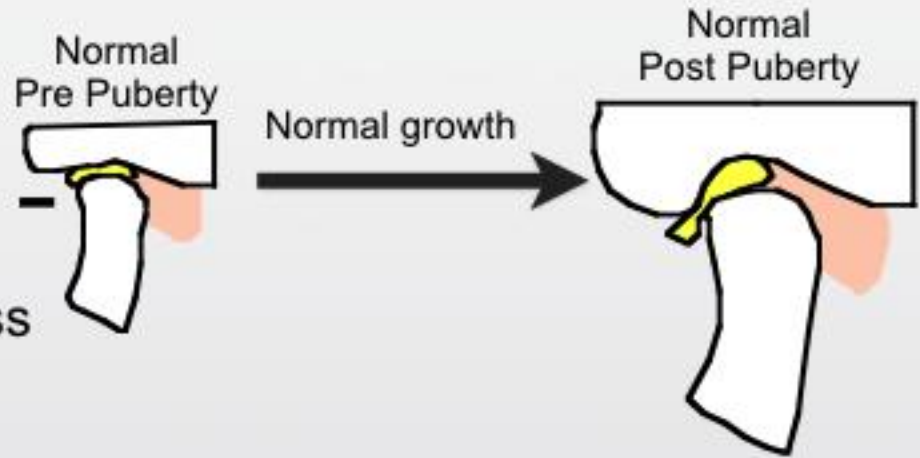
Case AK

What is the Clinical Relevance of TMJ Damage Pre-Puberty?

John R Droter DDS
Annapolis, Maryland

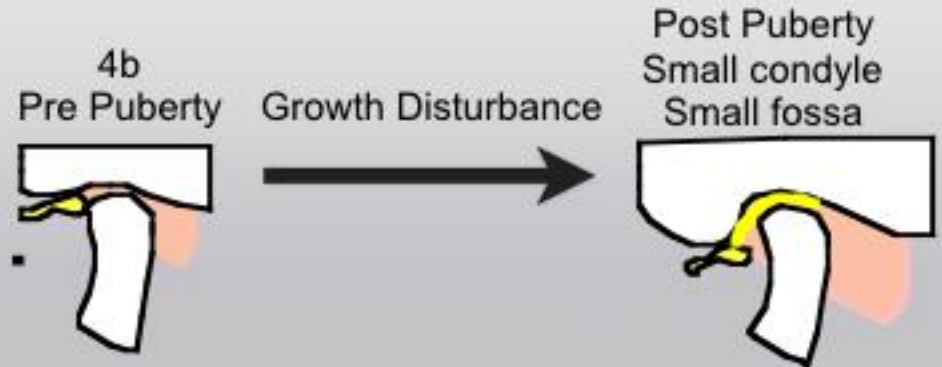
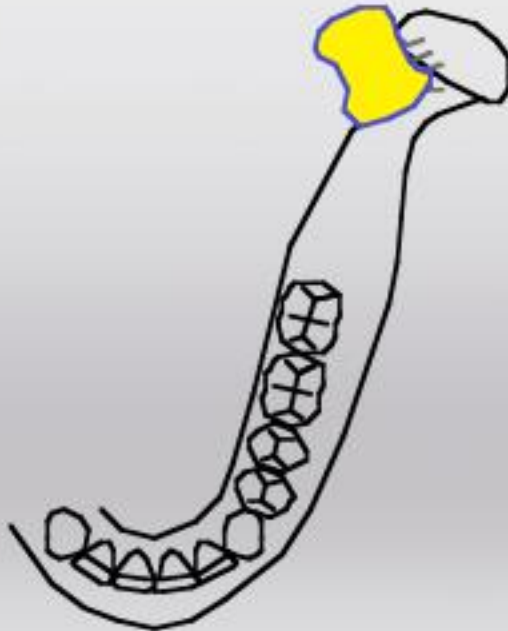
Annapolis, Maryland
John R Droter DDS

TMJ Damage Prepuberty

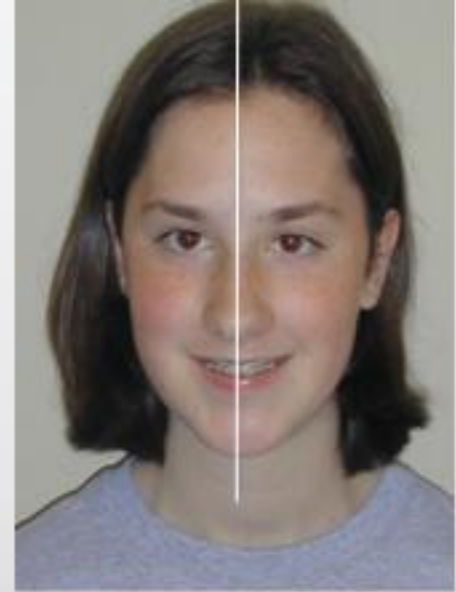
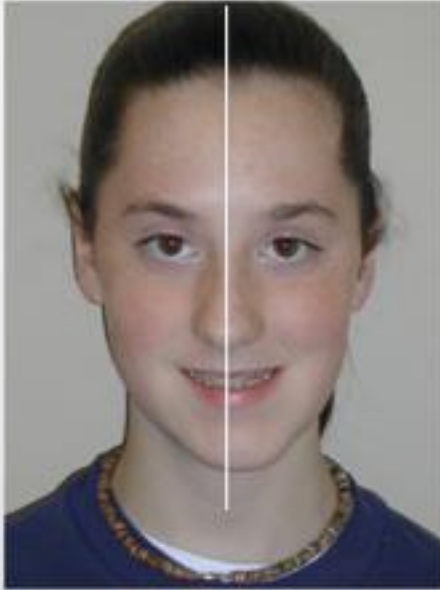


4b Pre-puberty is not a degenerative process

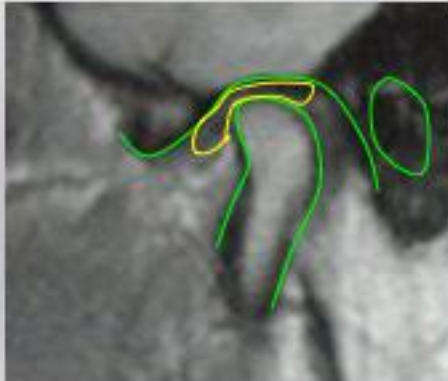
Can affect growth



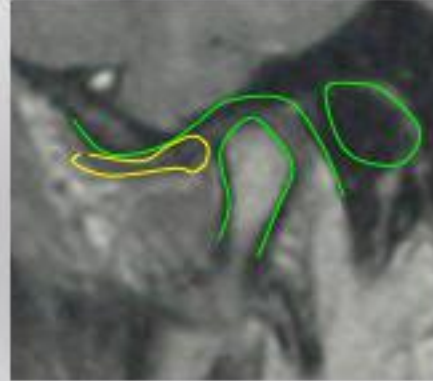
Age 17



R TMJ



L TMJ



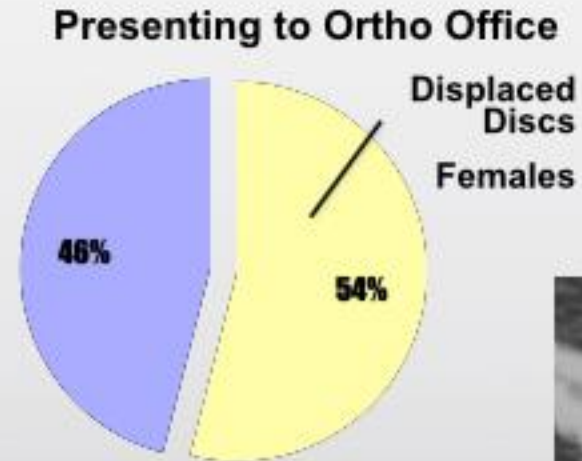
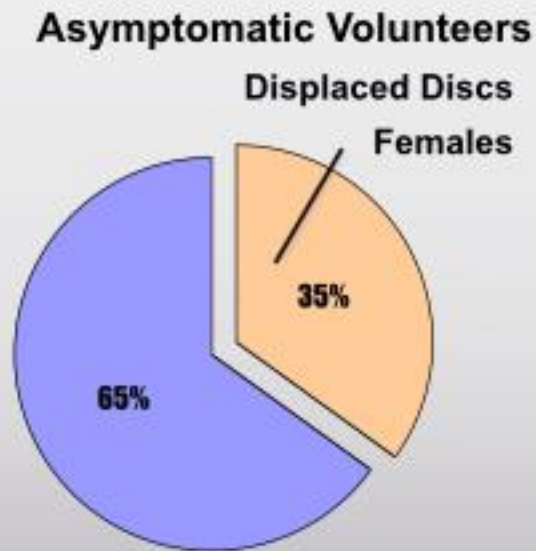
**Identical Twin
Sister Age 17**

Pt of Ed Zebovitz, DDS

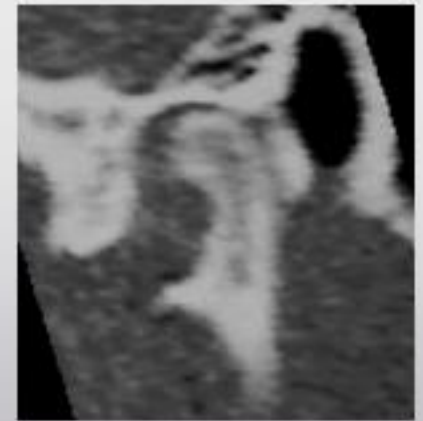
Şakar, O., Çalışır, F. (2013). Evaluation of the Effects of Temporomandibular Joint Disc Displacement and Its Progression on Dentocraniofacial Morphology in Symptomatic Patients Using Posteroanterior Cephalometric Analysis. *Cranio*, 31(1), 23–31.

TMJ Damage Prepuberty

Prevalence Displaced Discs



In patients with Displaced Discs
Condyles of Females Distalized
Significantly more than Males



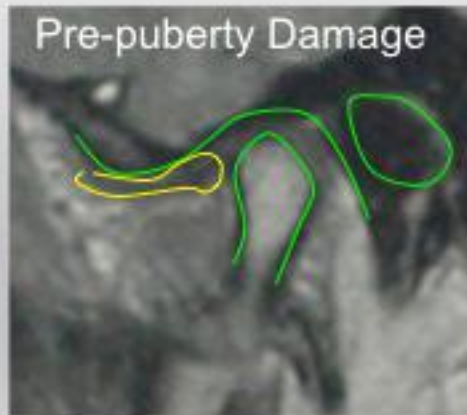
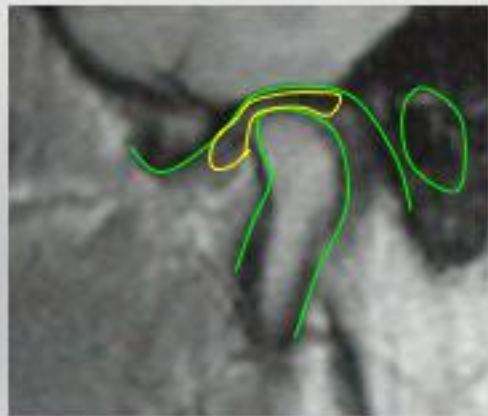
The Prevalence of Disc Displacement in Symptomatic and Asymptomatic Volunteers
Ribeiro R, Tallents R, Katzberg R, J Oral Facial Pain 1997 ;11:37-47

Osseous Morphology and Spatial Relationships of the TMJ Comparisons of Normal and
Anterior Disc Positions, Kinniburgh R, Major P, Nebbe B, Angle Orthod 2000;70:70-80

Basic Orthopedics

Joints are either
Healthy or
Damaged

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



Small condyles due to TMJ damage:

Pre-puberty TMJ damage, the joints adapted, but did not grow.

Post-puberty TMJ damage will be a degenerative process.

Note ratio condyle size
to fossa size



What is the Clinical Relevance of TMJ Damage Post-Puberty?

John R Droter DDS
Annapolis, Maryland

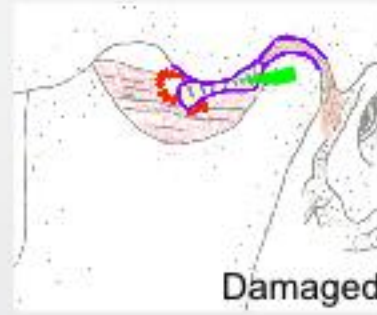
Annapolis, Maryland
John R Droter DDS

Basic Orthopedics

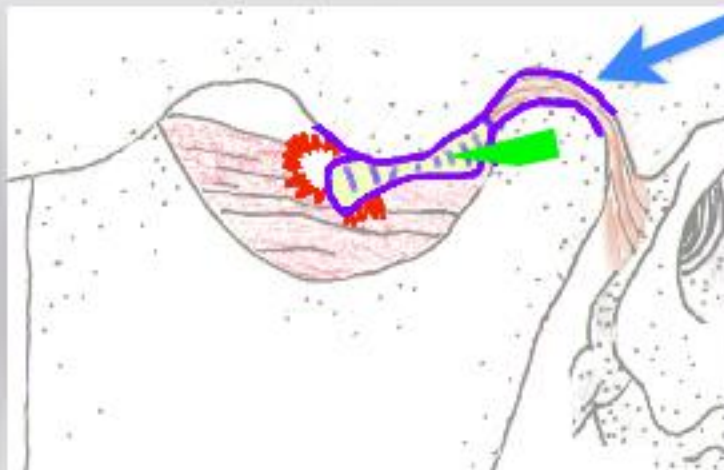
Joints are either
Healthy or
Damaged

If damaged, joints will be either:

- Actively Breaking Down
- Adapting
- Adapted Favorably Structurally and Mechanically
- Adapted Unfavorably



Majority of damaged
TMJs adapt favorably



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

Tissue Fibrosis

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

Leeuw, Boering, Stegenga, Bont,

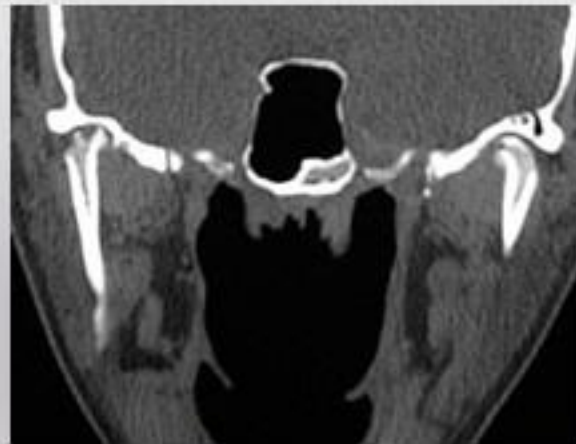
Journal of Craniomandibular Practice, April 1995, vol. 13, No. 2

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

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

There is no love sincerer than the love of food.

G. B. Shaw





Damaged TMJs



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



Occlusal Muscle Dysfunction
Osteoarthritis



Avascular Necrosis
Progressive Condylar Resorption

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

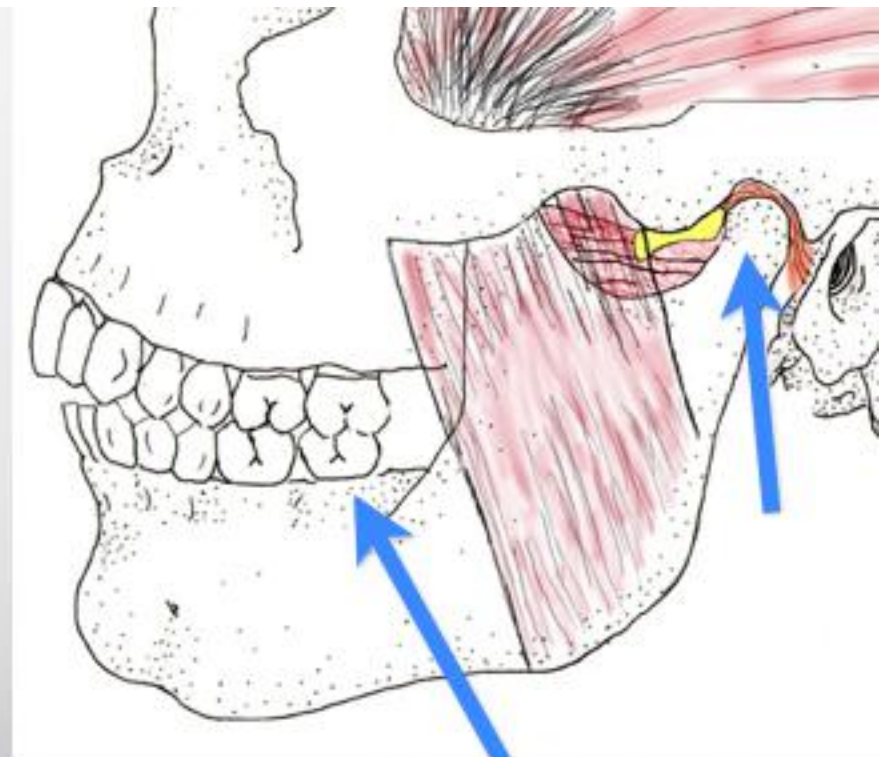
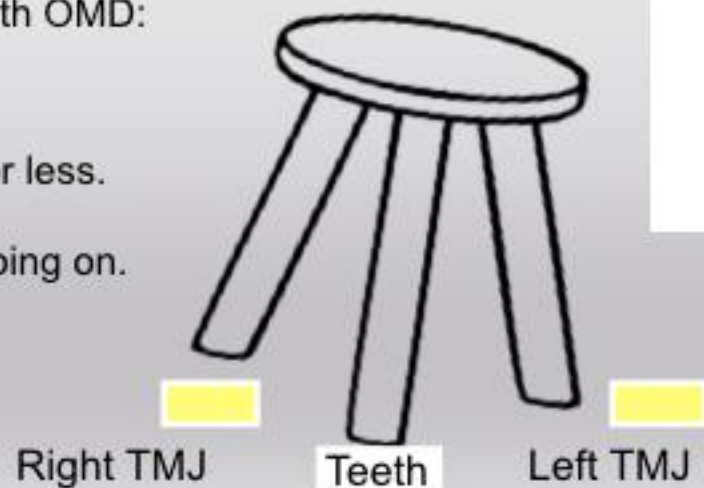
Damaged Joint w/ OMD

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

Anteriorly Dislocated Disc changes occlusion.
Occlusal muscle dysfunction develops.

Treat favorably adapted joints with OMD
the same as healthy joints with OMD:
Occlusal Adjustment

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



Contact of most
posterior tooth

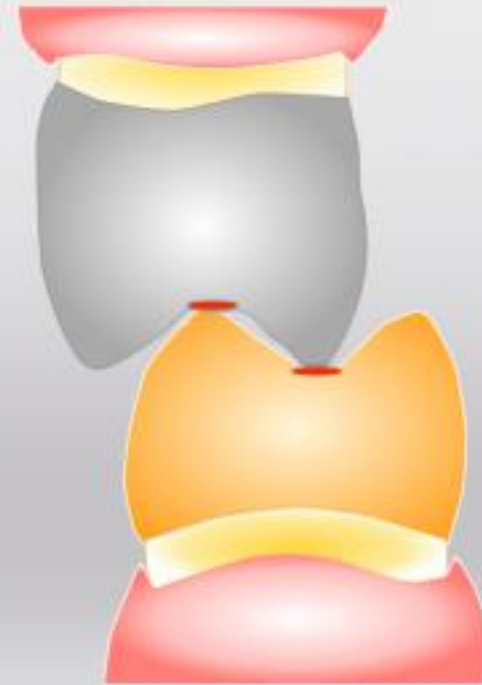
Treat Occlusal Muscle Dysfunction- Adjust the Occlusion

Step 1: Trial ideal occlusion on hard orthotic



Step 2: Reshape teeth

Add: Composite
Subtract: Burs



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



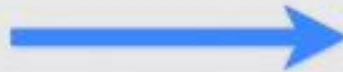
Why LD Never wrote a text book

Treat Occlusal Muscle Dysfunction- Adjust the Occlusion



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

Before



After



Diseases that cause bone loss in Joints

Osteoarthrosis/Osteoarthritis
Avascular Necrosis
Hypoxia Induced- Progressive Condylar Resorption

Rheumatoid Arthritis
Infection- Lyme Ds, Syphilis, Staph
Crystalline Deposition Disease
Various other Autoimmune Arthritis
Autoimmune Rheumatic Fever
Cancer

Diseases that cause bone loss in Joints

Osteoarthrosis/Osteoarthritis
Avascular Necrosis
Hypoxia Induced- Progressive Condylar Resorption

Systemic Disease of Synovium
Overgrowth of Synovium into joint space
Pannus- Inflammatory tissue in joint
Cartilage dies lack of synovial fluid flow

Rheumatoid Arthritis
Infection- Lyme Ds, Syphilis, Staph
Crystalline Deposition Disease
Various other Autoimmune Arthritis
Autoimmune Rheumatic Fever
Cancer

Weird = Lyme Disease
Lyme Test has many false negatives

Gout
Uric Acid crystallizes in joint

Psoriatic Arthritis: Look for dry skin patches

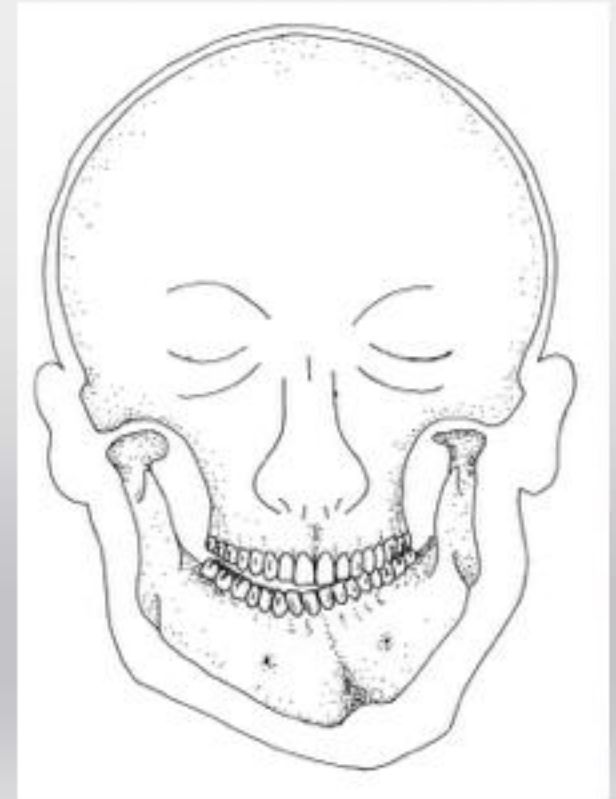
Rule cancer out early, rule it out often.
Any sudden onset pain after 50 is suspect

Diseases that cause bone loss in Joints

3 diseases are associated with TMJ disc dislocation

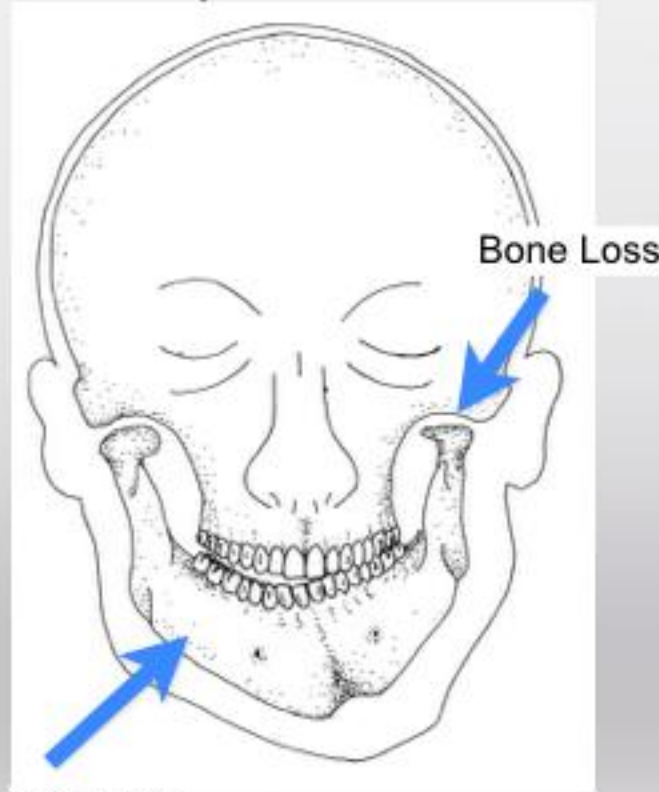
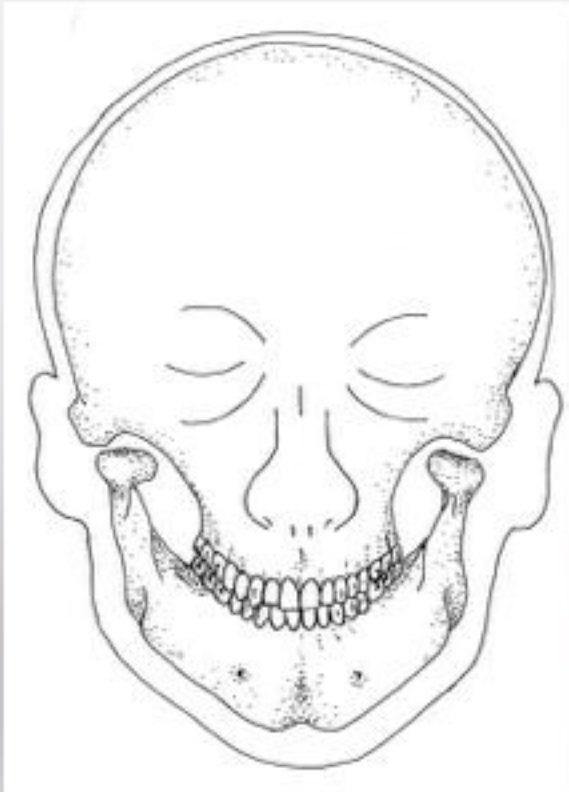
Osteoarthrosis/Osteoarthritis
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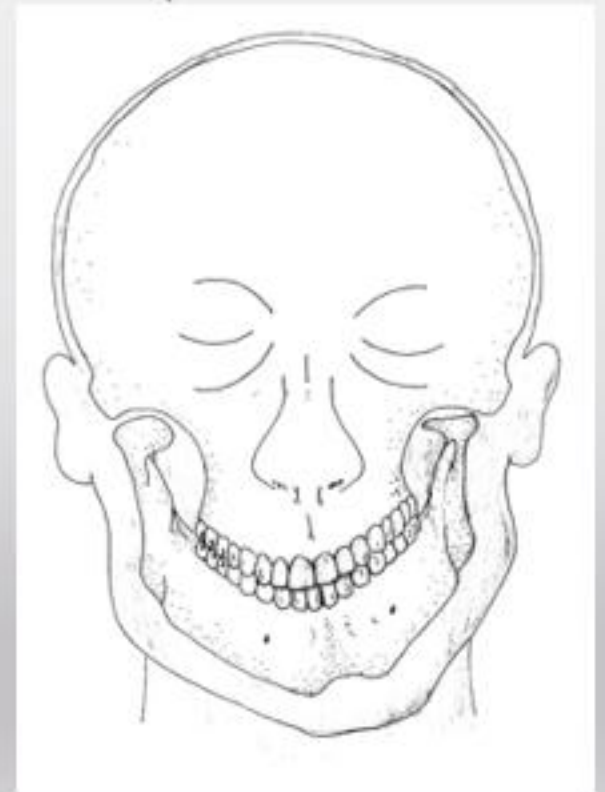


Diseases that cause bone loss in the TMJ alter the Occlusion

Condylar Bone Loss



Adaptation Over Time



What happens if you lose 2mm joint height in both Right and Left TMJ?

Can lose joint height with bone loss or disc displacement



Minus 2mm TMJ RL joint height

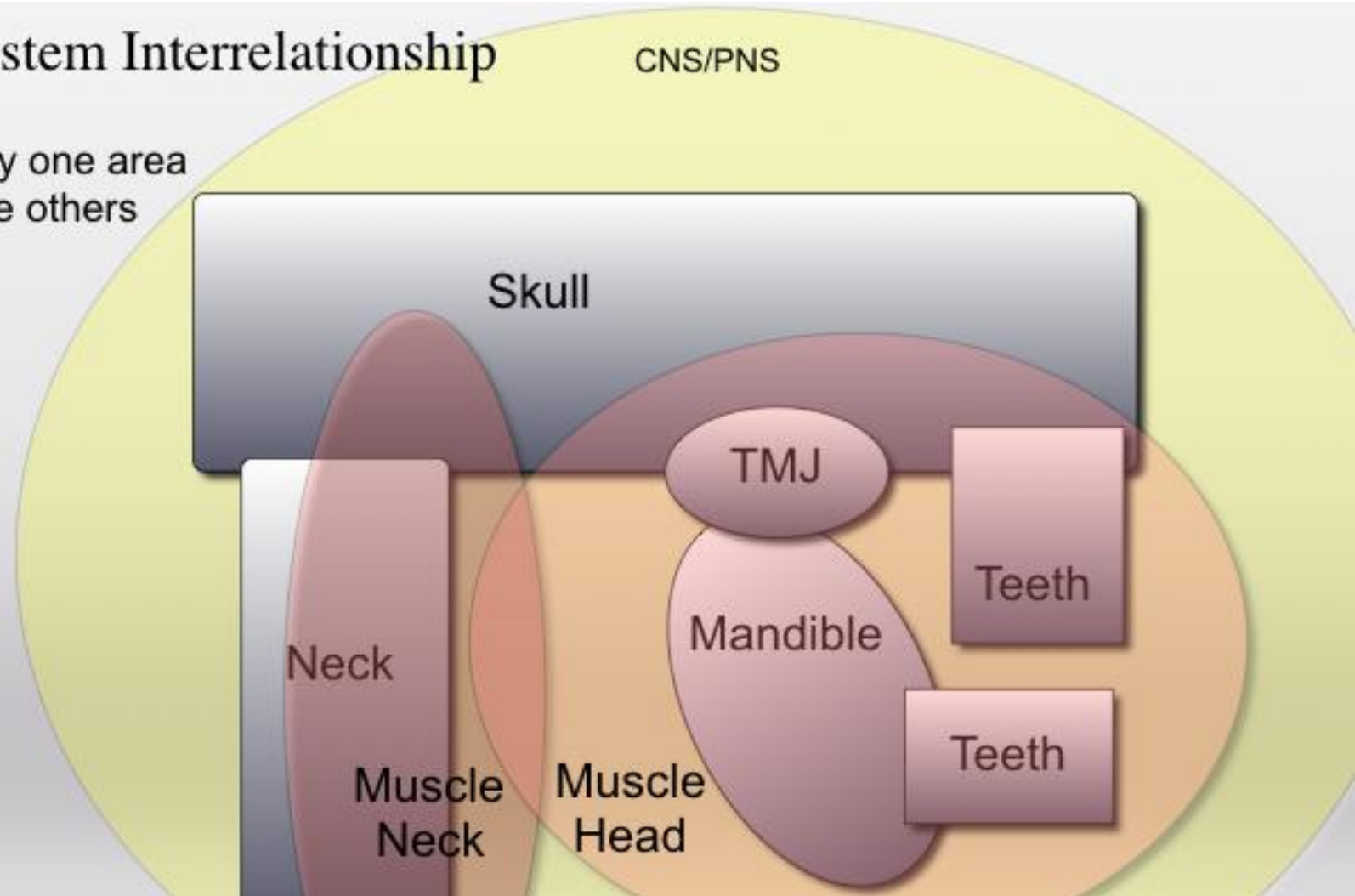


Stomatognathic System Interrelationship

CNS/PNS

A change in any one area
will affect the others

“Adaptation”
This is a **dynamic**
orthopedic System



venn diagram

Diseases that cause bone loss in Joints

Osteoarthrosis/Osteoarthritis

Avascular Necrosis

Hypoxia Induced- Progressive Condylar Resorption

Rheumatoid Arthritis

Infection- Lyme Ds, Syphilis, Staph

Crystalline Deposition Disease

Various other Autoimmune Arthritis

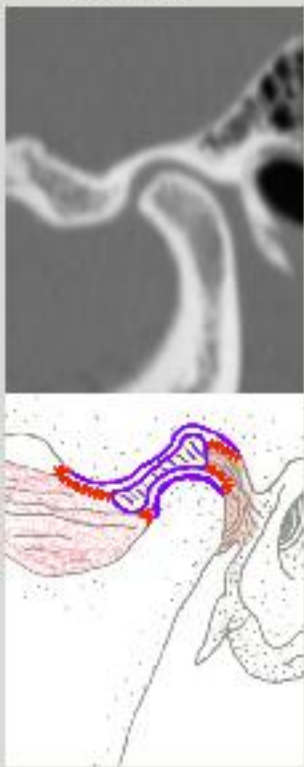
Autoimmune Rheumatic Fever

Cancer

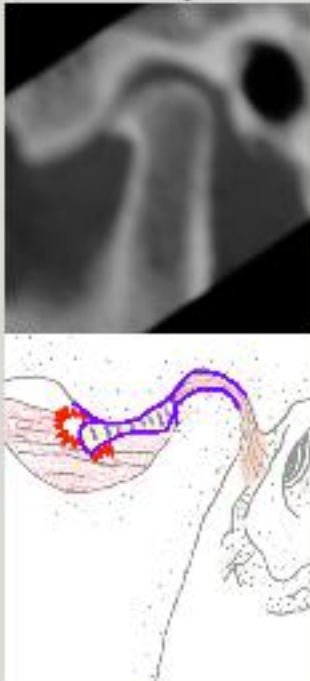
Osteoarthosis/Osteoarthritis

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

Normal



Early



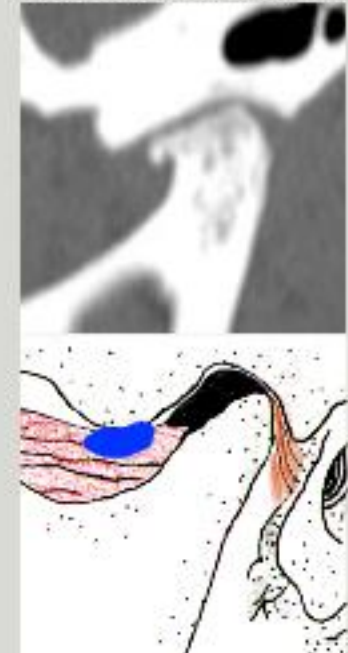
Early/ Moderate



Moderate



Severe OA, Eburnation

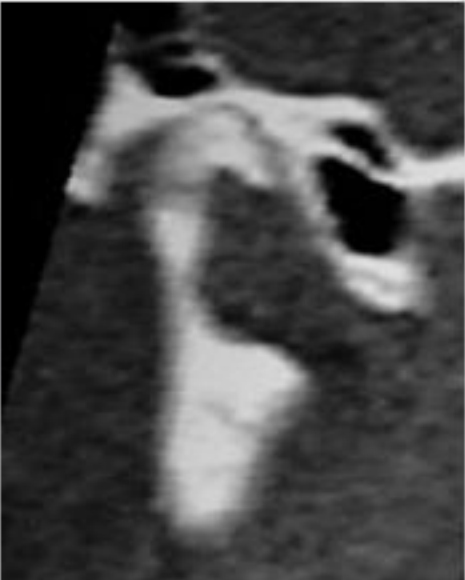


Representative examples of OA
in different patients

Adaptation Chronic Bilateral Osteoarthritis

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

OA Right and Left Bone Loss
#8 Ankylosed



Diseases that cause bone loss in Joints

Osteoarthrosis/Osteoarthritis

Avascular Necrosis

Hypoxia Induced- Progressive Condylar Resorption

Rheumatoid Arthritis

Infection- Lyme Ds, Syphilis, Staph

Crystalline Deposition Disease

Various other Autoimmune Arthritis

Autoimmune Rheumatic Fever

Cancer

Disease of Cartilage.

Slow Bone loss over 10+ years.

Death of Subchondral Bone.

Single event bone collapse.

May lead to Inflamed Tissue.

Disease of Subchondral Bone

Progressive bone loss over several months/years

Diseases that cause bone loss in Joints

Osteoarthrosis/Osteoarthritis

Avascular Necrosis

Hypoxia Induced- Progressive Condylar Resorption

Death of Subchondral Bone.
Single event bone collapse.
May lead to Inflamed Tissue.

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Infection- Lyme Ds, Syphilis, Staph

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Autoimmune Rheumatic Fever

Cancer

Disease of Subchondral Bone

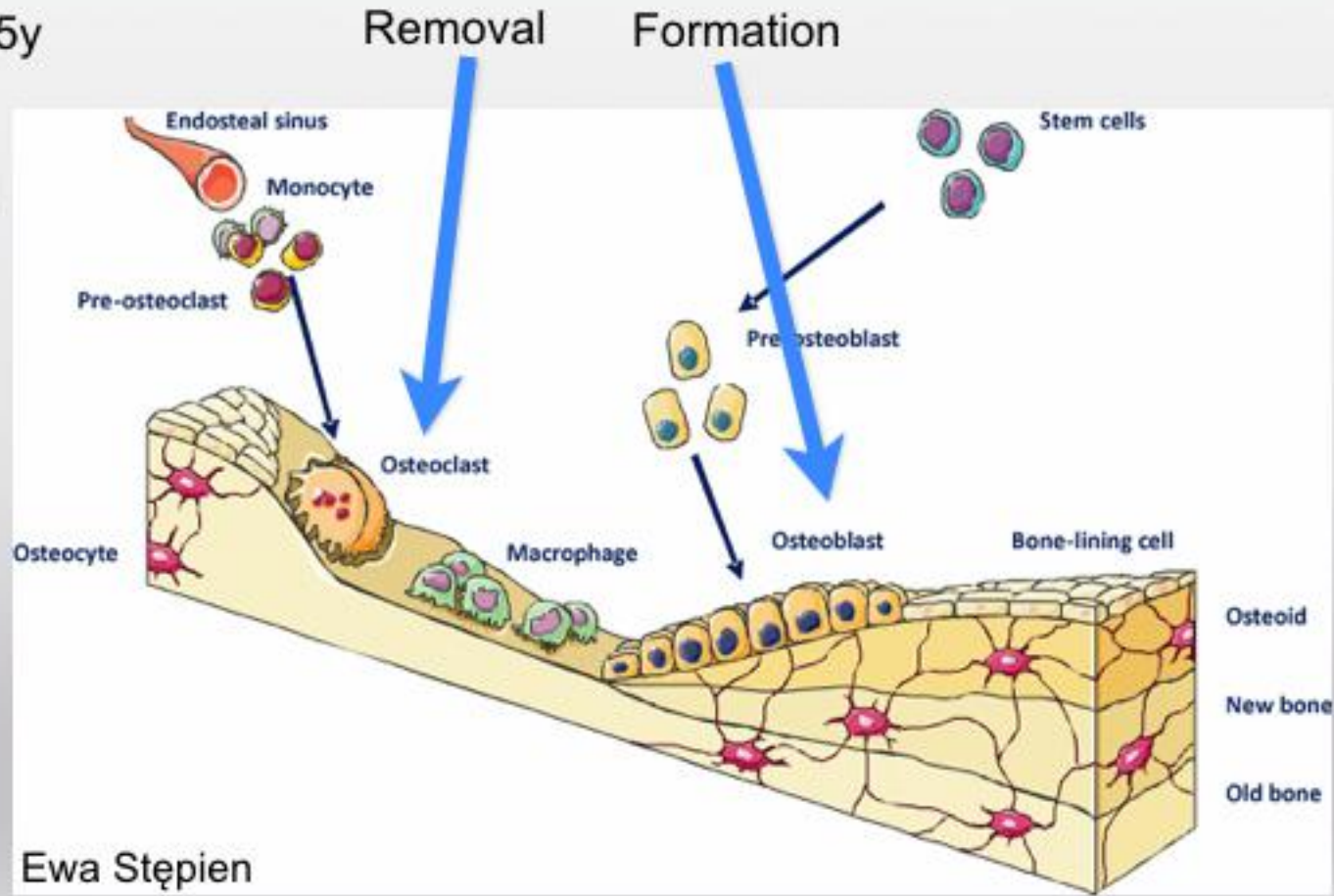
Progressive bone lose over several months/years

Bone is not a static tissue

Constant turnover- 6 months to 1.5y

There is a delicate balance of cell activation/deactivation between the osteoclast and osteoblast.

- Osteoclasts
Resorption- Bone removal
- Osteoblasts
Bone Formation



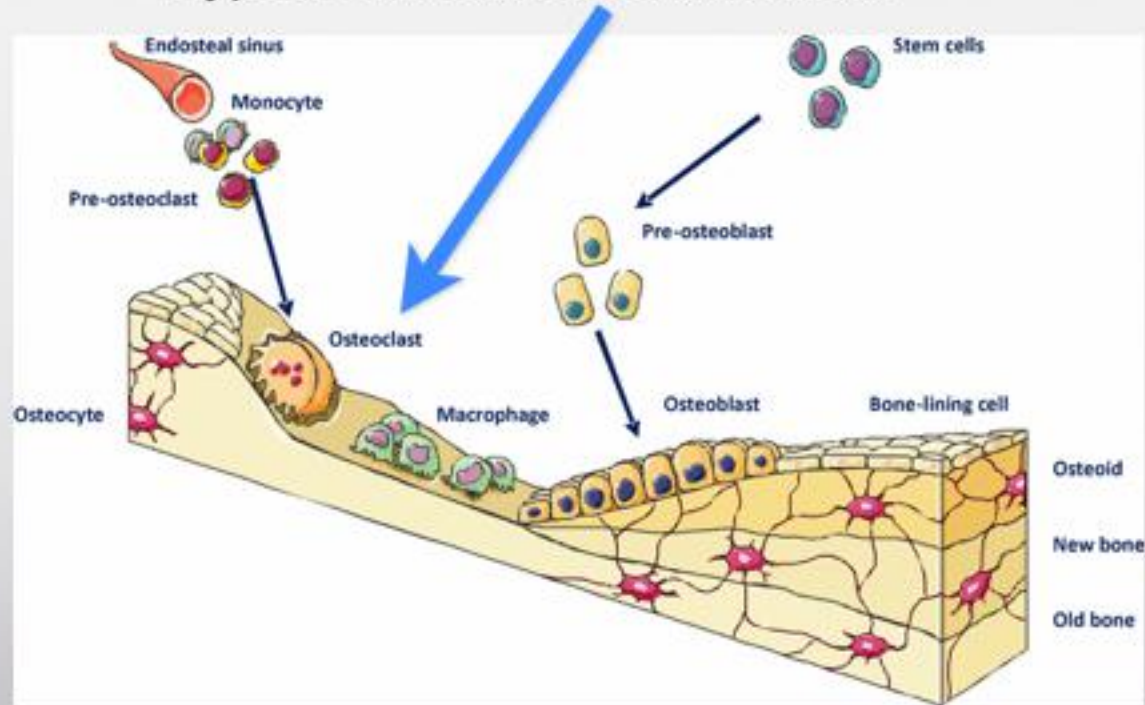
Low Oxygen: Hypoxia

Hypoxia induces pathological bone resorption by activating osteoclast, inhibiting osteoblast

Hypoxia and reperfusion maintains osteoclast activation

Progressive Resorption

Hypoxia increases Osteoclasts

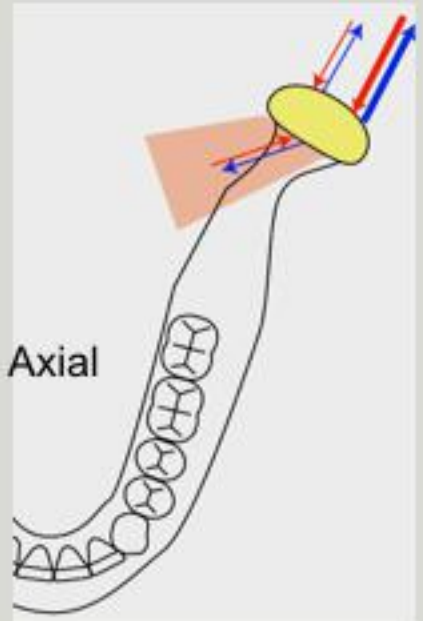


Knowles, H.J. & Athanasou, N.A., 2009. Acute hypoxia and osteoclast activity: a balance between enhanced resorption and increased apoptosis. *The Journal of Pathology*, 218(2), pp.256–264.

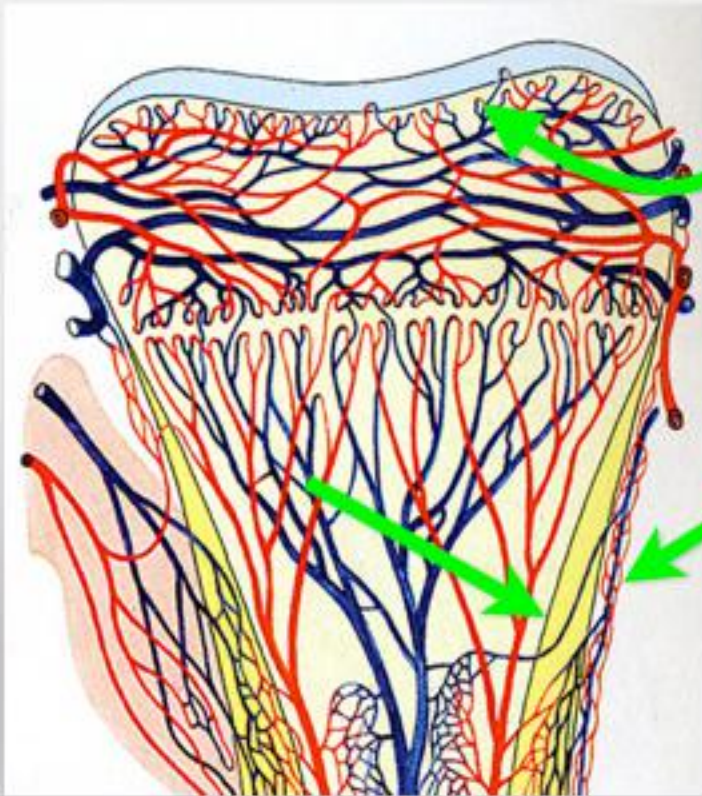
Knowles, H.J. et al., 2010. Hypoxia-inducible factor regulates osteoclast-mediated bone resorption: role of angiopoietin-like 4. *FASEB journal : official publication of the Federation of American Societies for Experimental Biology*, 24(12), pp.4648–4659.

Condylar Perfusion

Blood flows in and out of the condylar head through vessels that pierce the cortex



Subchondral Bone only has blood vessels from intramedullary



Cortical bone gets blood vessels from both intramedullary and periosteum

Abundant collateral circulation



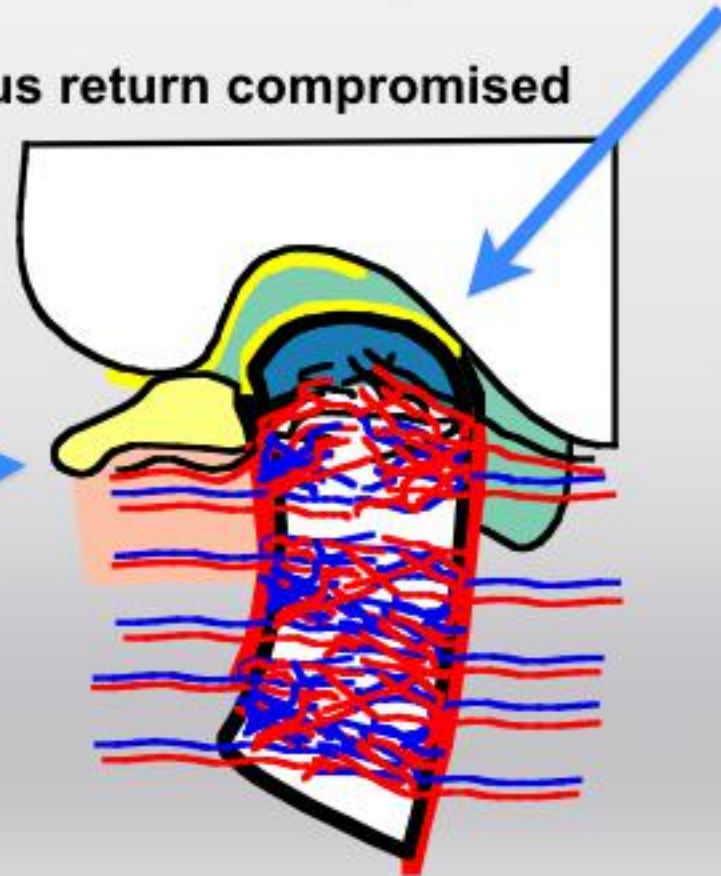
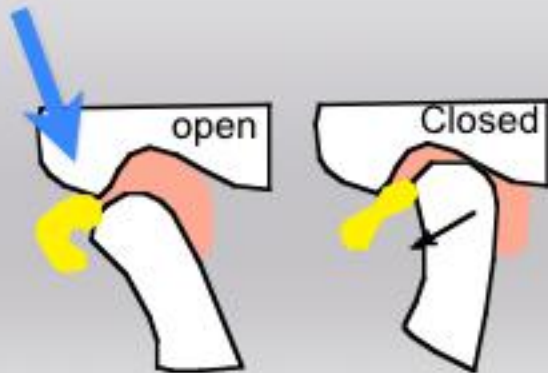
When the clicking stops (4a to 4b):

Condyle Distalized

Venous return compromised

Compromised Condylar Perfusion
Blood flow through condyle is decreased

Disc Anterior

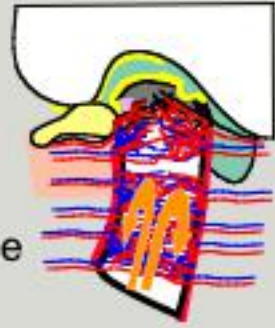


4 Outcomes of Compromised Condylar Perfusion



Avascular Necrosis

Bone cells die



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



Inflammatory Tissue Bone Resorption

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



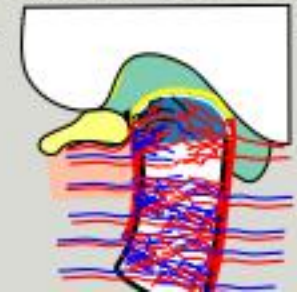
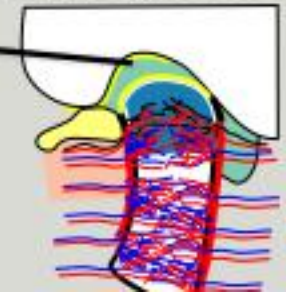
Repeated Hypoxia and Reperfusion

Nothing

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

Hypoxic Progressive Condylar Resorption

Missing Cortex



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

AVN TMJ Controversy

AVN does exist, only rare if you don't look for it

AVN affects all joints of the human body, including the TMJ

The only disease process that occurs underneath intact cartilage

Larhein/Westesson Core Biopsy Study

Competing Theories: Estrogen, Venereal Disease, OA, Idiopathic

15 y/o Male
Piper 4b



16 y/o Female
Piper 4b

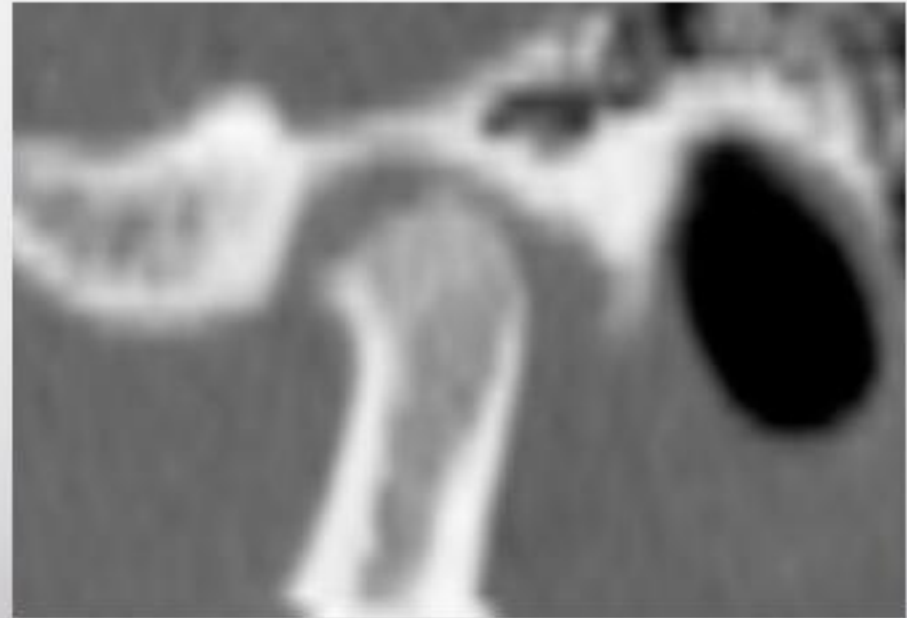


Larhein TA, Westesson PL, Osteonecrosis of the Temporomandibular Joint: Correlation of Magnetic Resonance Imaging and History, Jour OMS, 1999

Hypoxia Induced Progressive Condylar Resorption HI-PCR

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

Occlusion will constantly be changing

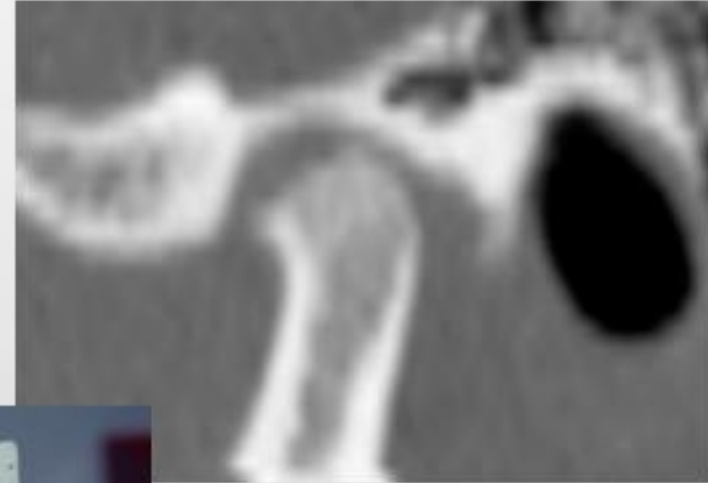


1 year after the clicking stops is the “Danger Zone”

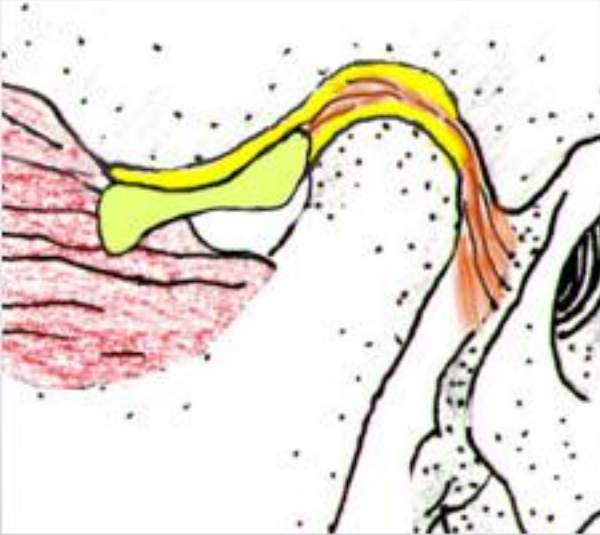
Look for TMJ bone loss, anterior open bite developing
Avascular Necrosis
Hypoxia Induced Progressive Condylar Resorption

After clicking stops:

Get CT or CBCT scan of the TMJ
Maintain jaw motion: PT, exercises
Get photos
Mounted models
Monitor occlusion over the next year
Follow up CBCT scan 1 year later
After 1 year “Adapted Favorably”



All Clicking Joints are Damaged



Not so Dangerous Clicks

- Unchanging click for 2+ years
- Consistent, easy reduction of Disc
- Good range of motion with clicking
- Stable occlusion with clicking

Clicks that need further Evaluation/ Scans

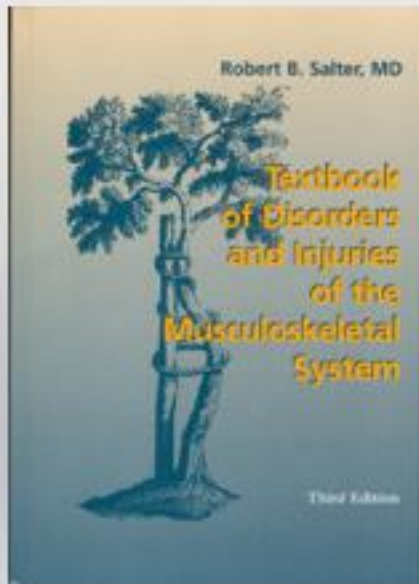
- Clicking that has stopped in the past year
- Clicking has changed in the last 2 years
- Wiggling jaw to open. Locking.
- Chronic Painful click
- Unstable Occlusion

Many Dangerous things do not Click

My Core Belief

The TMJ is a synovial joint of the human body and will undergo the same disease processes as any other synovial joint

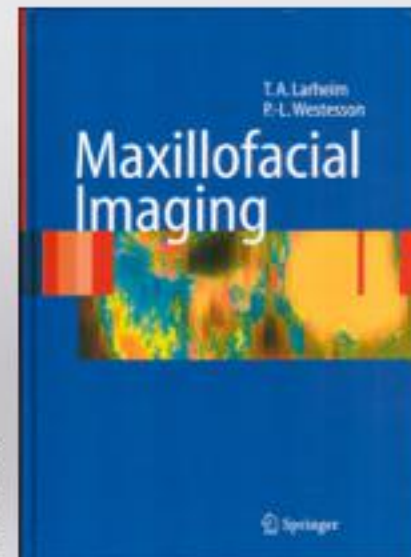
Understanding orthopedic medicine is the key to understanding joints, including the TMJ



Textbook of Disorders and Injuries of the Musculoskeletal System
Robert Salter MD

Buy Salter's Orthopedic Textbook.
When you have a patient with specific disease (i.e. osteoarthritis), read that chapter.

Maxillofacial Imaging
Larheim
Westesson



Basic Orthopedics

Joints are either
Healthy or
Damaged

If damaged, joints will be either:

Actively Breaking Down

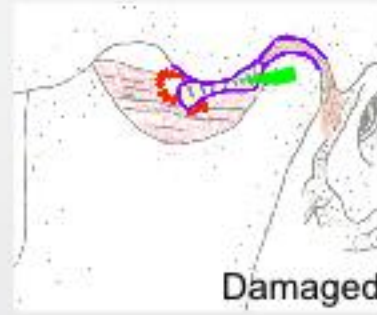
Adapting

Adapted Favorably Structurally and Mechanically

Adapted Unfavorably



Healthy

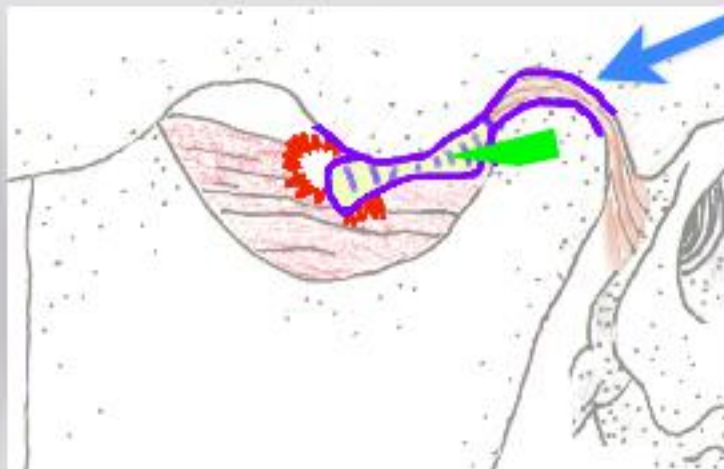


Damaged



Actively Breaking Down

Majority of damaged
TMJs adapt favorably



Posterior ligament, synovium,
and retrodiscal tissue adapt to
form a

Pseudo-disc

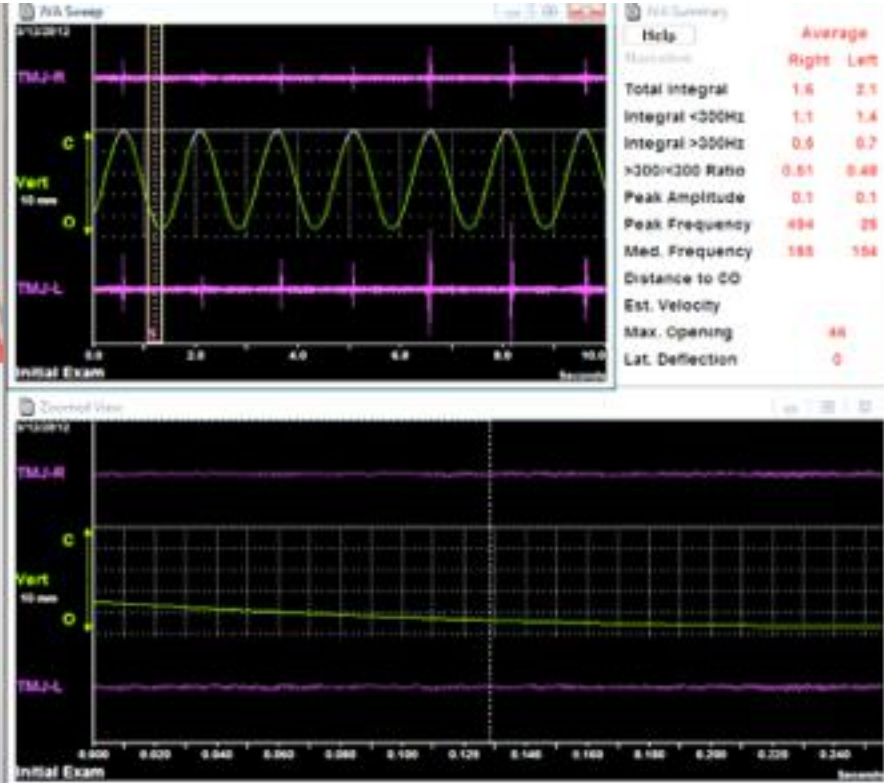
Tissue Fibrosis



How do I Examine the TMJ? The 4 Question TMJ Evaluation

John R Droter DDS
Annapolis, Maryland

Annapolis, Maryland
John R Droter DDS



If you have a stable joint
you can get away with a lot of stupid stuff

Ray Becker, DDS

Friend, Colleague, Fellow Biopak User

8 Key Questions Leading to a Specific TMD Diagnosis and Treatment

1. Is there temporomandibular joint damage that needs to be treated?
2. Are the muscles associated with the TMJ sore and or dysfunctional?
3. Is there Occlusal Disharmony with the Maxilla, Temporal bone, Mandible and muscles?
4. Is there cervical damage or misalignment that needs treated (including muscles)?
5. Is there parafunction that needs to be managed?
6. Are there any whole body, systemic issues affecting health, comfort, or the ability to heal?
7. Are there any other sources of pain or dysfunction?
8. Are any of the above affecting Quality of Life?

8 Key Questions for Specific TMD Diagnosis and Treatment

Patient's Chief Concern (CC):

1. Is there temporomandibular joint damage that needs to be treated?
2. Are the muscles associated with the TMJ sore and or dysfunctional?
3. Is there Occlusal Disharmony with the Maxilla, Temporal bone, Mandible and muscles?
4. Is there cervical damage or misalignment that needs treated (including muscles)?
5. Is there parafunction that needs to be managed?
6. Are there any whole body, systemic issues affecting health, comfort, or the ability to heal?
7. Are there any other sources of pain or dysfunction?
8. Are any of the above affecting quality of life? (Symptoms)

8 Key Questions

Question #1

Is there temporomandibular joint damage that needs to be treated?

Facial Pain Diagnosis

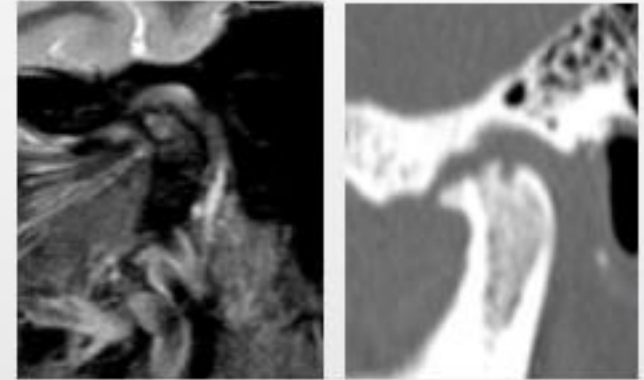
Diagnostic Tools

- 1 Written and Oral History
- 2 Observation
- 3 Physical Exam
 - Muscle Palpation
 - Joint Palpation
 - Joint Auscultation
 - Joint Motion
- 4 CT Scan
- 5 Dx Orthotic- D-PAS
- 6 Sleep Airway Screening
- 7 MRI

Biometrics

- Joint Vibration
- Jaw Tracker
- Electromyography
- T-Scan

- Occlusion: CR Mounted Study Models
- Complete Dental Exam
- Clinical Photographs
- Dx Blocks
- Blood test
- Dx Orthotics- Brux Checker, CR Orthotic



8 Key Questions for Specific TMD Diagnosis and Treatment

Patient's Chief Concern (CC):

1. Is there temporomandibular joint damage that needs to be treated?
2. Are the muscles associated with the TMJ sore and/or dysfunctional?
3. Is there Occlusal Harmony or Disharmony with the TMJ and muscles?
4. Is there neck damage that needs to be treated (including the associated muscles)?
5. Is there parafunction that needs to be managed?
6. Are there any whole body, systemic issues affecting health, comfort, or the ability to heal?
7. Any other sources of pain or dysfunction?
8. Any Past Treatments?

Develop Working Diagnosis
Relationship of the above to the CC:
(Primary, secondary contributory, unrelated)



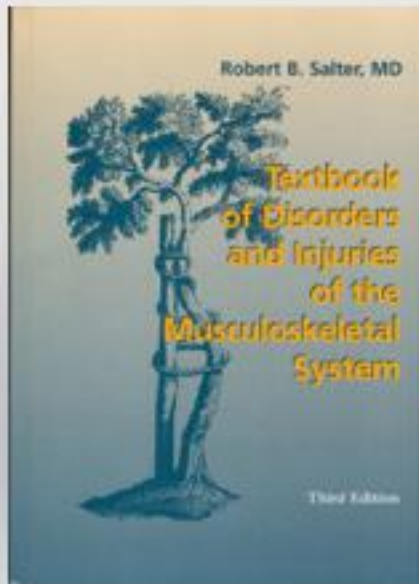
Question #1

Is there temporomandibular joint damage that needs to be treated?

My Core Belief

The TMJ is a synovial joint of the human body and will undergo the same disease processes as any other synovial joint

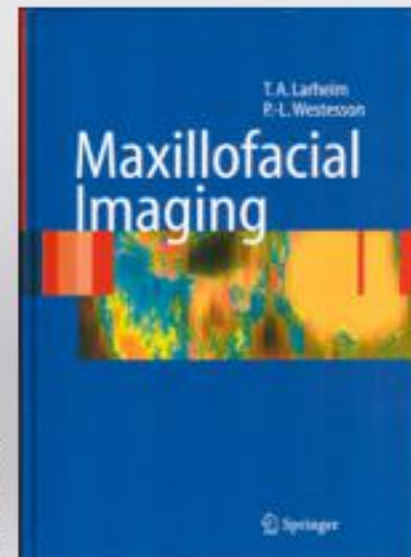
Understanding orthopedic medicine is the key to understanding joints, including the TMJ



Textbook of Disorders and Injuries of the Musculoskeletal System
Robert Salter MD

Buy Salter's Orthopedic Textbook.
When you have a patient with specific disease (i.e. osteoarthritis), read that chapter.

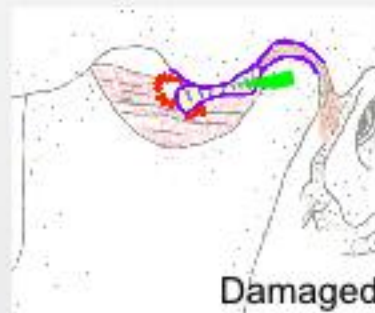
Maxillofacial Imaging
Larheim
Westesson



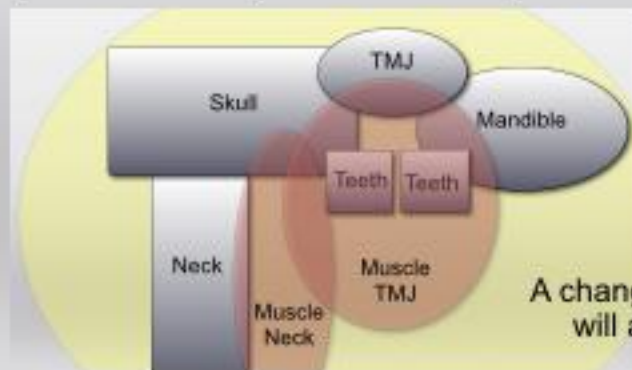
Basic Orthopedics

Joints are either
Healthy or
Damaged

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



Does the joint damage have anything to do with the pain and/or dysfunction the patient is experiencing?



A change in any one area will affect the others

If the TMJ Adapted Unfavorably:
Mechanically unstable joint motion
Mechanically unstable loading



TMJ Neuromuscular Disharmony pain avoidance
TMJ Neuromuscular Disharmony occlusal avoidance

Descending neck neuromuscular disharmony
Ascending neck neuromuscular disharmony

The TMJ: What You need to Know

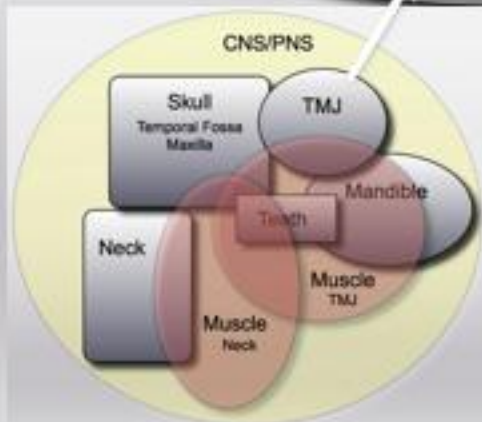
TMJ

Does it Hurt?
Does it Move?
Does it Wobble?
Is it Structurally Stable?

Evaluate every TM joint for:

1. Comfort
2. Movement
3. Mechanical stability- Does the joint wobble on loading?
4. Structural stability- Will the joint lose bone with a resulting occlusal shift?

If there is a TMJ problem it will be in one of these four areas.



Correct Answer: No, Yes, No, Yes

The TMJ: What You need to Know

TMJ

Does it Hurt?

Does it Move?

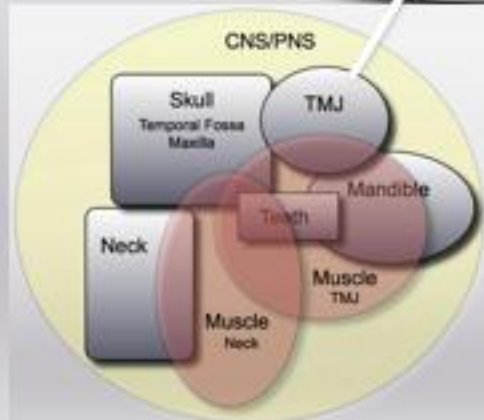
Does it Wobble?

Is it Structurally Stable?

Evaluate every TM joint for:

1. Comfort
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3. Mechanical stability- Does the joint wobble on loading?
4. Structural stability- Will the joint lose bone with a resulting occlusal shift?

Palpate Joint
Load Test



Palpation and Load



Load in CR- gradual increase pressure
Load In Excursions if negative in CR
No pain does not mean stable

Anterior Lateral Pole



Posterior Lateral Pole



Indirect through Ear



Load Testing

No pain does not mean stable

Reviewed 600 cases (MRI and CT Scans) at my practice of facial pain:

6.5% cases had structurally unstable TM joints. 39/600
(A general practice will have less % structurally unstable TM joints)

CR Load test on these 39 joints:

CR Load Positive Soreness 22/39 (56%)

Missed 17/39 structurally unstable joints (44%)

CR and Lateral Load test on these 39 joints:

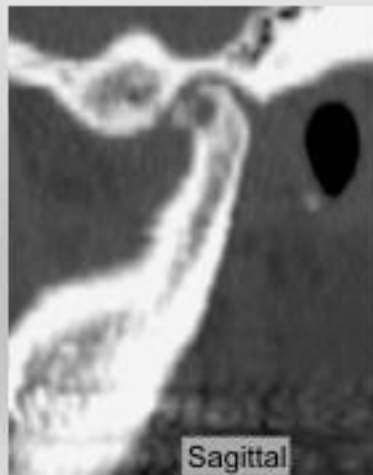
Positive Soreness of one or both test 33/39 (85%)

Missed 6/39 structurally unstable joints (15%)



Load Test Bimanual Manipulation

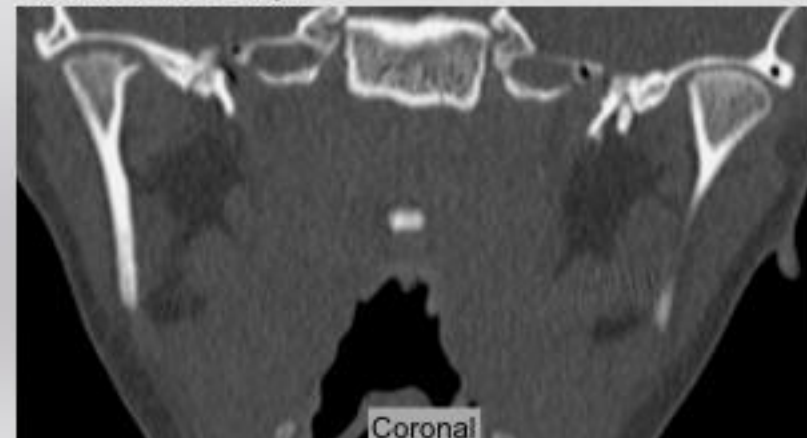
46yo F
CR Load Normal
Excursion Load Normal



40yo F
CR Load Normal
Excursion Load Slight



12yo F- CR Load Normal
Excursion Load Slight



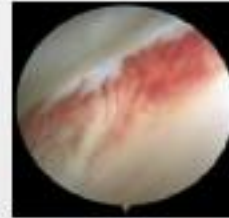
Differential Diagnosis: Painful TMJ

Inflamed Tissue

- Acute Ligament Sprain
- Synovitis/Capsulitis
- Pannus
- Retrodiscal Tissue Impingement
- Retrodiscal Tissue Inflammation
- Inflammatory Tissue Bone Resorption
- Deep Masseter inflammation
- Ear Inflammation



Synovitis

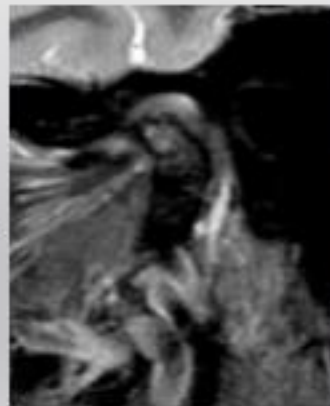


Retrodiscal impingement



Inflamed Bone

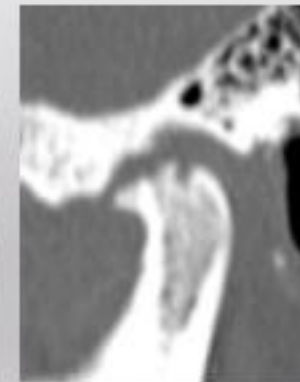
- Osteoarthritis
- RhA
- Hypoxic Progressive Condylar Resorption
- Lyme Arthritis
- Psoriatic Arthritis
- AVN



Inflamed tissue in joint



Missing cortex



OA cyst



The TMJ: What You need to Know

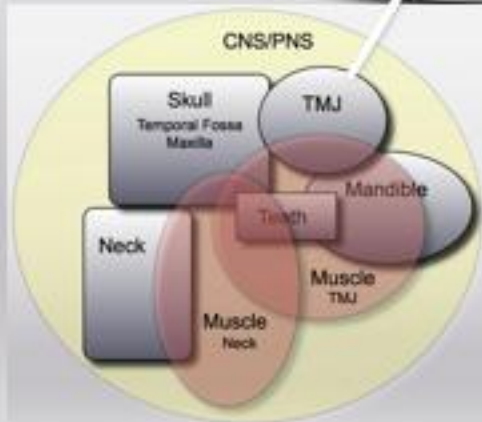
TMJ

Does it Hurt?
Does it Move?
Does it Wobble?
Is it Structurally Stable?

Evaluate every TM joint for:

1. Comfort
2. Movement
3. Mechanical stability- Does the joint wobble on loading?
4. Structural stability- Will the joint lose bone with a resulting occlusal shift?

Take History
Measure Movement
Listen for Vibration



TMJ Movement/Function History

No Clicking, no Pain,
no Limited opening, no Trauma

Can They Chew?

Has the clicking changed?

Download Facial Problem Questionnaire
www.jrdroter.com

6.	Does it hurt to move your jaw?	Y	N	
	Does it hurt to chew?	Y	N	
	Any discomfort upon chewing hard foods like carrots?	Y	N	
	Do your jaw muscles get tired from chewing?	Y	N	
	Does it hurt to open wide?	Y	N	
	Which side of your jaw makes a clicking/popping noise?	R	L	
	Which side of your jaw makes other noises?	R	L	
	What Noises? _____			
	When did you first notice the noises or clicking? _____			
	Have you noticed any changes in noises or clicking?	Y	N	
7.	Have you ever not been able to open your jaw all the way?	Y	N	
	Have you ever had to wiggle your jaw to get it open?	Y	N	
	Has your jaw ever been stuck open and you could not close it?	Y	N	
	When did this first happen? _____			
	When did this last happen? _____			
12.	Have you ever injured or sustained any form of trauma or whiplash to your (circle all that apply)	Jaw	Head	Neck
		None of the above		
	(If any past trauma, please complete the trauma questionnaire)			
	Have you ever had stitches to your chin?	Y	N	
	Do you feel there is any connection between the trauma you have had and the problems you are having?	Y	N	

Evaluate for Full, Smooth Range of Motion

40-55 mm, 300mm/sec velocity, straight path, consistent arc

Take 4 Measurements:

Maximum Opening	40-55mm
Right Lateral	10-12mm
Left Lateral	10-12mm
Protrusive	10-12mm

Normal excursion are 25% of the max open

Evaluate Smoothness:
Light hold on chin as patient
moves jaw



38+4 indicates 38mm edge to edge
plus 4mm overbite for a total of 42mm



Therabite, 1-800-217-0025
www.therabite.com
Quick, Disposable, Inexpensive

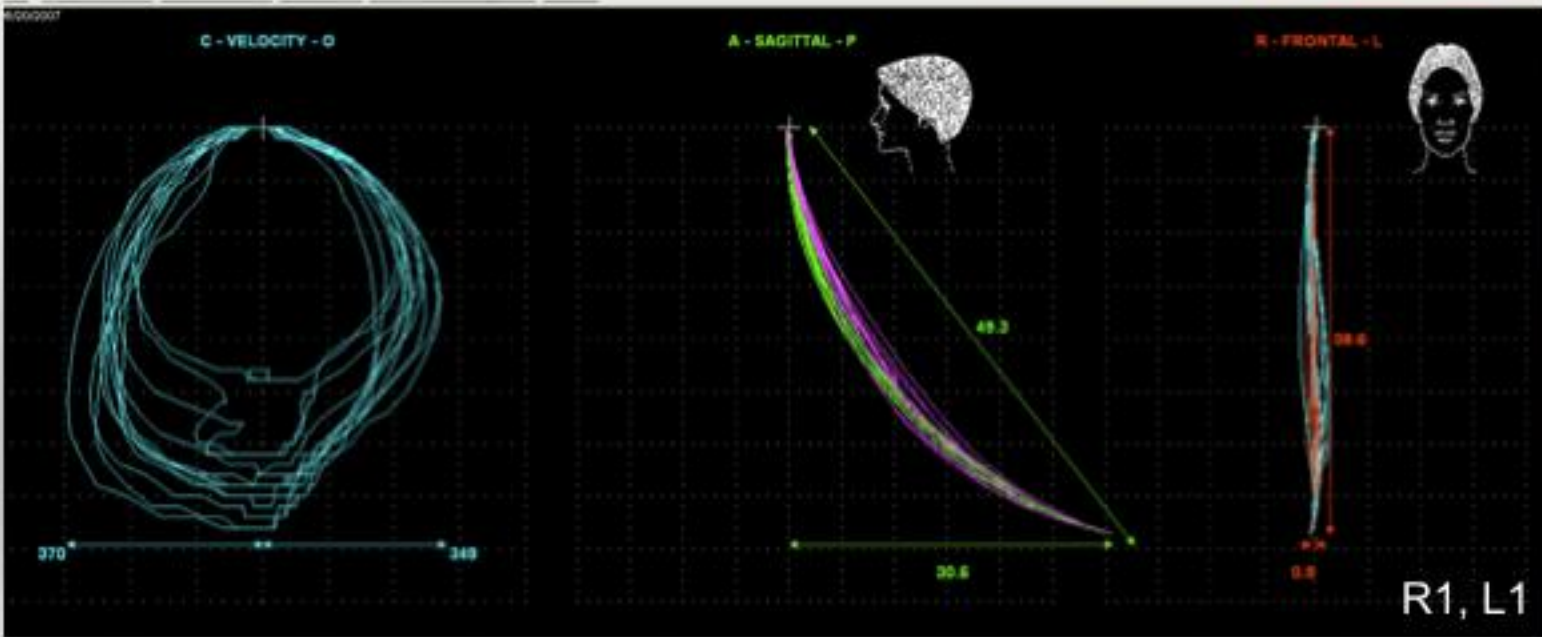
Jaw Tracker- Normal TMJ Motion

Analysis of the jaw in motion
Testing the function of the
CNS, muscles, TMJ

Velocity:
Open and Close fast



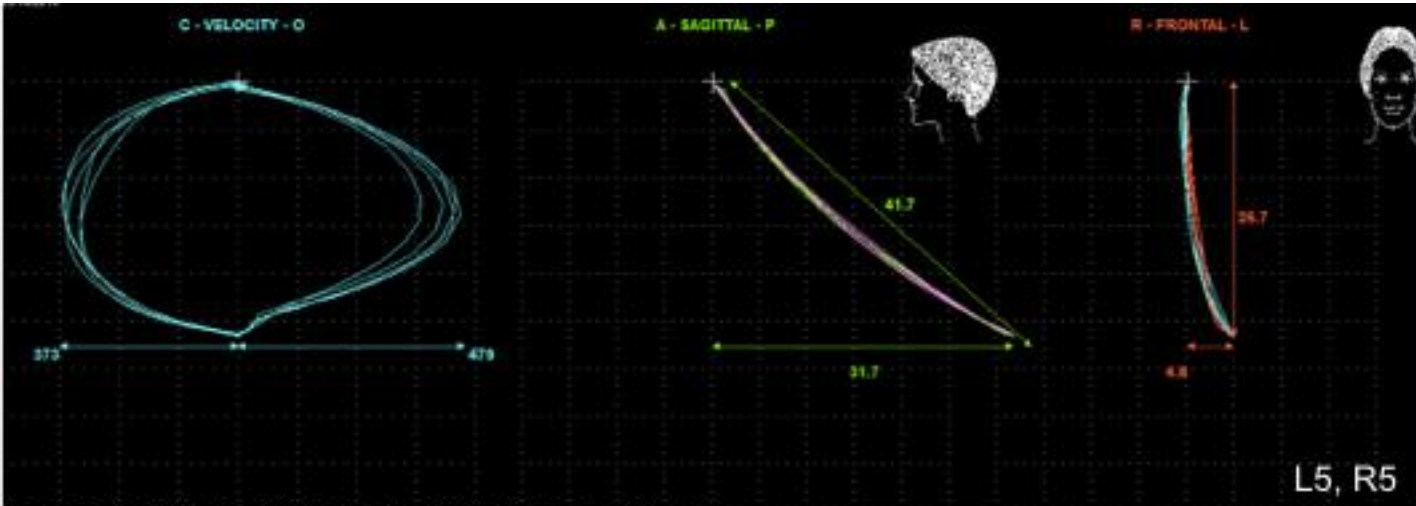
ROM- 40-55mm
Velocity 300+mm/sec
Consistent arc open/close
sagittal path
Straight frontal path



Jaw Tracker

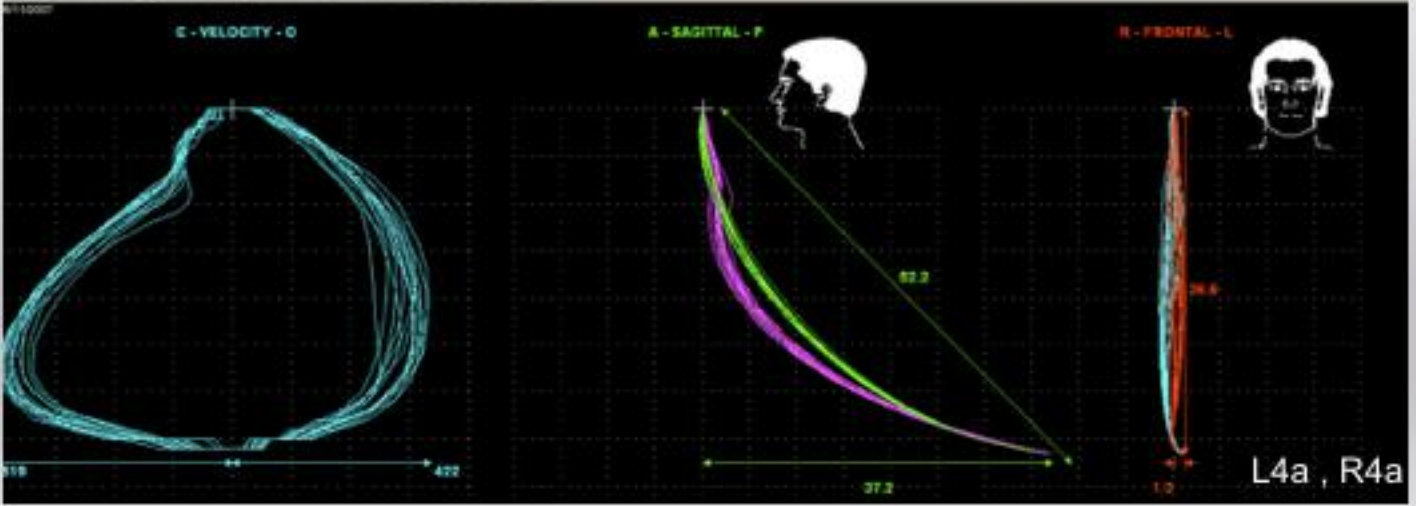
What are the muscles having to do to create this motion?

TMJ Damage
L5a , R5a
Normal Velocity



L5, R5

TMJ Damage
L4a, R4a
Good ROM
Abnormal Arc of Closure
Abnormal Velocity



L4a , R4a

Sounds/ Vibrations Stethoscope



Use Bell side, not Diaphragm side,
over the TMJ

3M Littmann Classic II S.E. Stethoscope

My Subjective Description of Joint Sounds

smooth
paper
sand
pebbles
rocks
glass

fine
med
coarse

crackle
crunchy
squeaky
scratch

Click
soft
crisp
squishy
early
late
100%
75%
50%
25%
sporadic
??

negative joint movement
minimal joint movement

Sounds/ Vibrations Doppler

Doppler measures motion toward or away from the source



A Health Joint is Quiet



Find Superficial Temporal Artery
Listen for Retrodiscal Expansion
Cavernous Vein Expansion
Pin back Tragus, Aim for eye
Rapid velocity to find best location
Diagnostic velocity jaw movement

Skin Movement causes errors

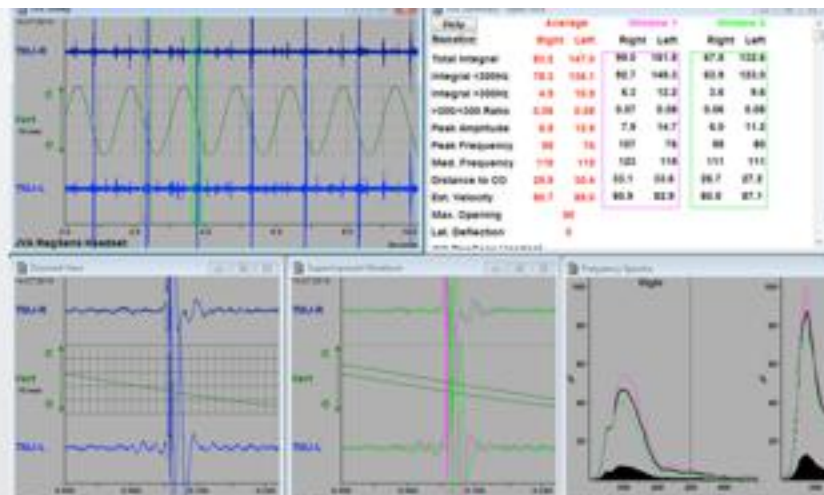
Doppler only hears what occurs at lateral portion of condyle.
Small degenerated condyles are quiet.

All dopplers generate different sounds for different motions

Landmark Medical, Inc. 800-334-5618
Huntleigh Mini Dopplex 5hz
Great Lakes Orthodontics 800-828-7626

Joint Vibration Analysis

Objectively measures and quantifies joint vibrations during motion which is an indication of cartilage health



Three main types of sounds



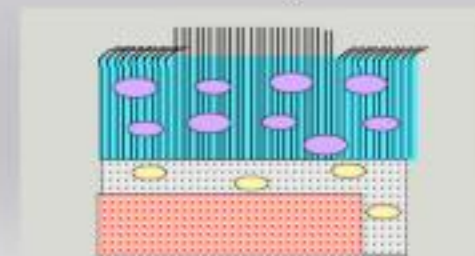
Disc Reduction
Disc Dislocation
Adhesion crackle
tooth tap

Osteoarthritis
Osteoarthritis
Pseudo Disc
Damaged Cartilage

Disc Subluxation
Joint Subluxation
Disc Reduction
Disc Dislocation

Based on Sonar.
It is not a microphone

JVA measures the health of the cartilage



Magnetic Resonance Imaging

MRI gives you the start and finish
You have to infer what happened in between



Joint Vibration Analysis

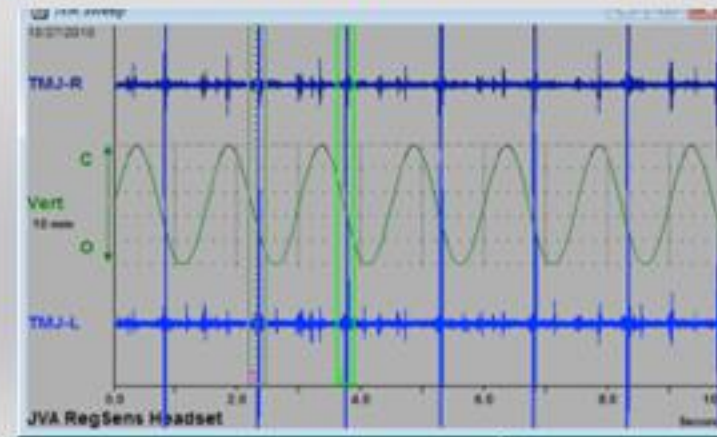
JVA gives you what happens in between
open and closed.

You then infer the start and finish



JVA records Objectively the vibrations of
the TMJ as you open and close.
Ability to compare from year to year.

JVA allows you to view
the joint in function



Evaluating TMJ Movement

History

No Click, No Limited opening, no pain, no trauma

Can They Chew?

Download Facial Problem Questionnaire, www.jrdroter.com

Motion- Full, Smooth Range of Motion

40-55 mm, 300mm/sec velocity, straight path, consistent arc

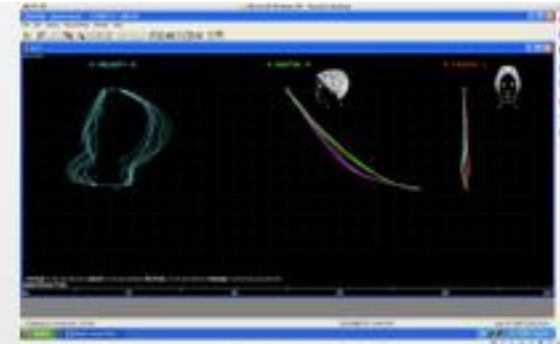
Sounds/ Vibrations

Stethoscope - No Sounds

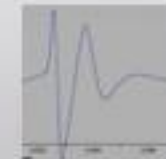
No abnormal subtle sounds- paper, sand, pebbles, rocks, crackle

Doppler Auscultation- No joint vibrations

Joint Vibration Analysis- No joint vibrations



Click
Scratch
Wobble



Differential Diagnosis: Limited Joint Motion

Muscle Spasm

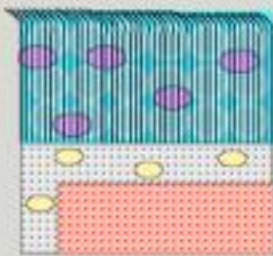
Painful to Move
Joint Pain
Muscle Pain

Mechanically Blocked
4b Acute
Adhesion

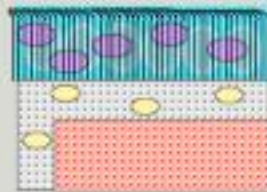
Masseteric Space
Infection
Hematoma



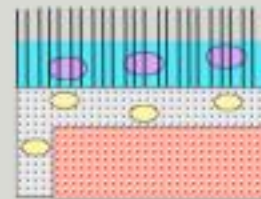
Healthy Cartilage



4 Weeks



8 Weeks



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

Move joint with light force/repetitive motion next 30 days

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



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

Diagnostic Misadventure

47yo Female

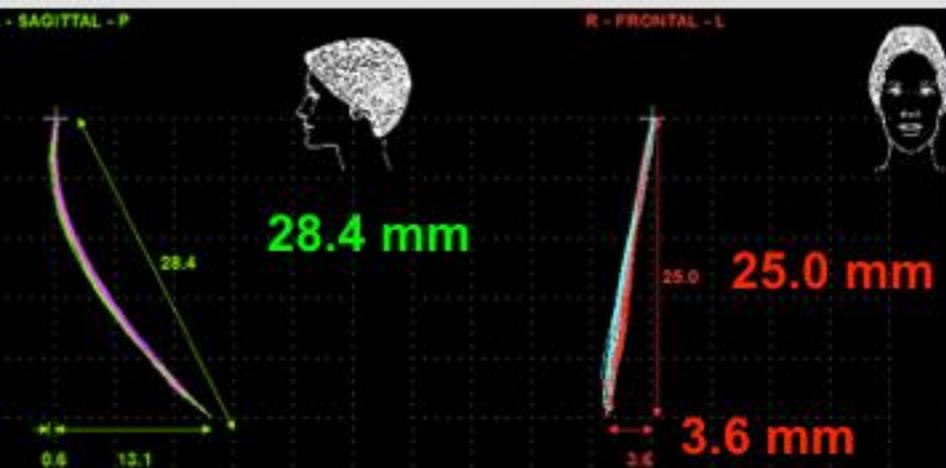
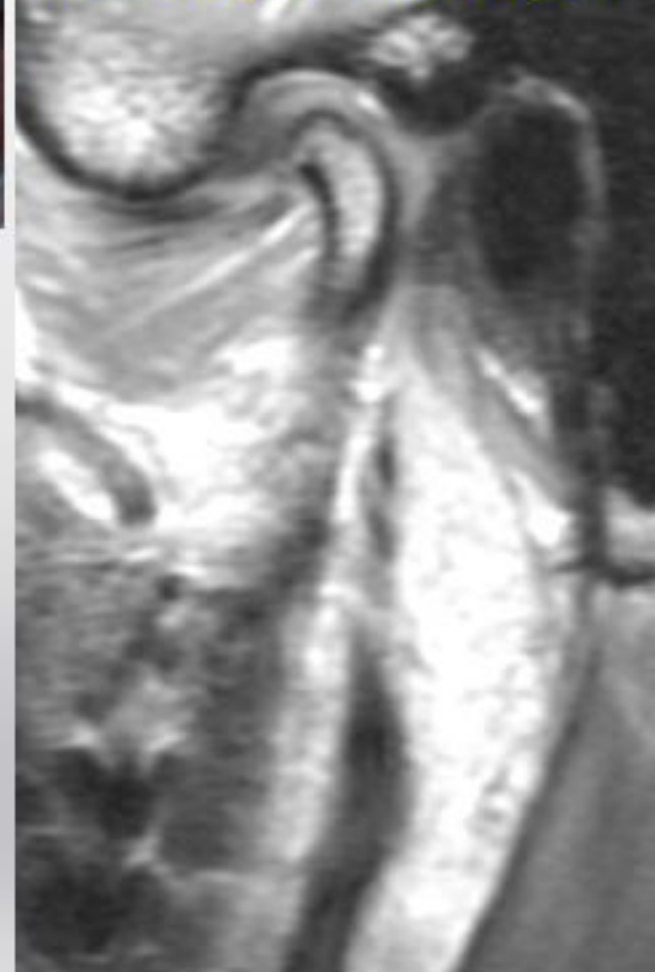
Limited opening past 15 months
since orthognathic surgery

Pain on chewing, eating is challenging
On soft diet

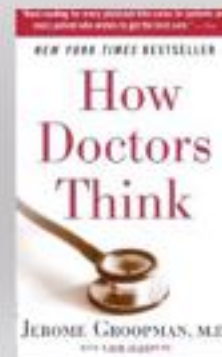
Treatments: Physical Therapy,
Chiropractic, Occlusal Splint



MRI Right TMJ Open



What we
perceive is
influenced
by our
beliefs.



Facial Pain Diagnosis

Diagnostic Tools

1 Written and Oral History

2 Observation

3 Physical Exam

Muscle Palpation

Joint Palpation

Joint Auscultation

Joint Motion

4 CT Scan

5 Dx Orthotic- D-PAS

6 Sleep Airway Screening

7 MRI

Biometrics

Joint Vibration

Jaw Tracker

Electromyography

T-Scan

Occlusion: CR Mounted Study Models

Complete Dental Exam

Clinical Photographs

Dx Blocks

Blood test

Dx Orthotics- Brux Checker, CR Orthotic

8+ doctors have seen her

What Diagnostic Test did they not do?

Show KO MRI and CT

See Geese

Final Diagnosis

Limited opening due to 4 screws into right medial pterygoid and lateral pterygoid muscles restricting movement. Fibrous ankylosis right TMJ. Fibrosis right masseter, medial pterygoid, and temporalis muscle.



Treatment:

Surgical Removal of Screws

Dynasplint- 2x/day 30-45 min for 6 weeks

Home stretching with fingers to maintain

Results:

Final opening 43mm

She can now eat hard pretzels without pain



The TMJ: What You need to Know

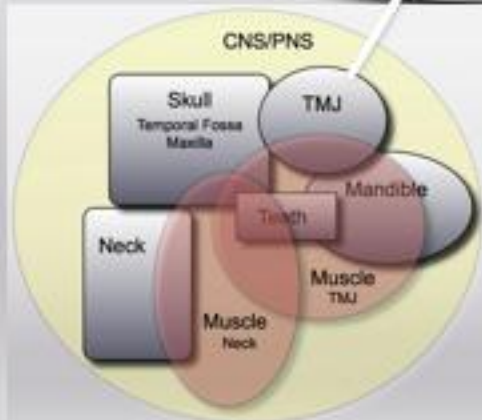
TMJ

Does it Hurt?
Does it Move?
Does it Wobble?
Is it Structurally Stable?

Evaluate every TM joint for:

1. Comfort
2. Movement
3. Mechanical stability- Does the joint wobble on loading?
4. Structural stability- Will the joint lose bone with a resulting occlusal shift?

D-PAS 24/7 for 1-2 days



The TMJ: What You need to Know

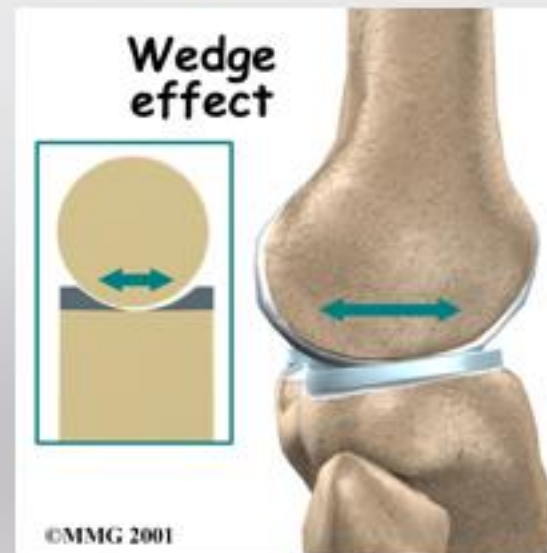
Mechanical Stability ● + - ●

Mechanical Joint Stability

Shape condyle/disc/fossa provides stability when loaded

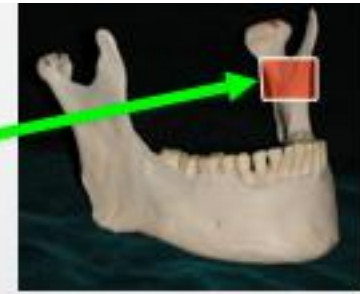
Capsular Ligaments provide stability when not loaded so pieces will be aligned and ready for loading.

Capsular Ligaments other roles are to provide end point of joint movement and proprioception



CR Load Zone

When the masseter fires and seats the joint, where do the condyles load?



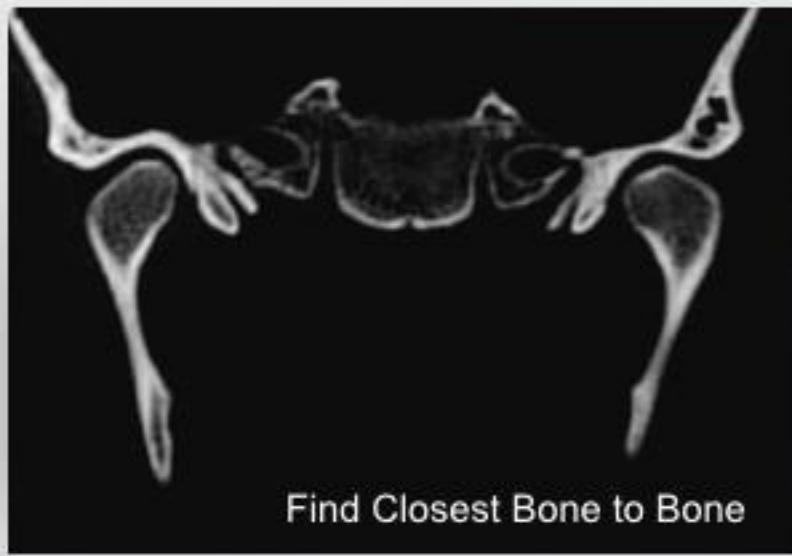
Sore Muscle



Medial Bracing is ideal

Lateral Load right TMJ
This joint can "wobble" side to side
Non-Linear Joint Deformity

Deep Temporalis runs horizontally
Sphenoid to Inferior Coronoid



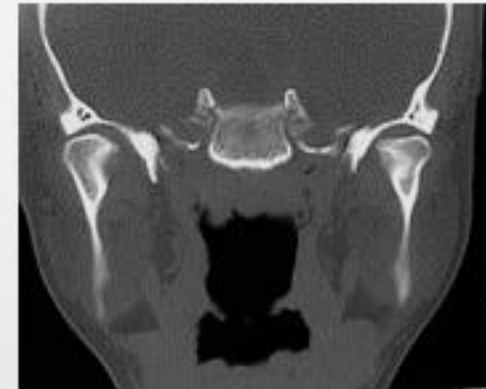
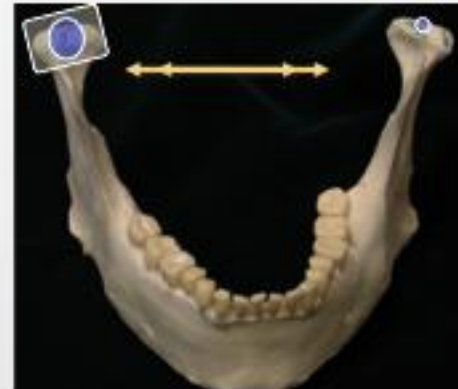
Find Closest Bone to Bone



Diagnosis: Hypersensitive Bite

Non-Linear Joint Subluxation

There is not a mechanically stable CR load zone.
The joint deforms when loaded



Clinical Presentation:

The deep temporalis will be sore.

Their muscles will not relax with a CR splint.

They will not like an anterior deprogrammer like the D-PAS.

Muscles are braced to stabilize the joint, not to protect from occlusal interferences.

Coronal CT images will show CR load zones that allow side to side movement.

On JVA you will see "wobble" near the tooth tap.

They are dependent on their working and nonworking interferences for some stability.

Do not remove the working and nonworking interferences.

How to Avoid Missing the Diagnosis of Non-Linear Joint Subluxation:

Clinical History- Changes of microns to the teeth affect patients comfort level

Identify CR load zone on CBCT

Anterior deprogrammer test 24/7 for 2 days

Palatal Anterior
Stop Orthotic



Lock in Orthotic



Dentists can inadvertently remove a critical bracing tooth contact with a crown prep or occlusal adjustment

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

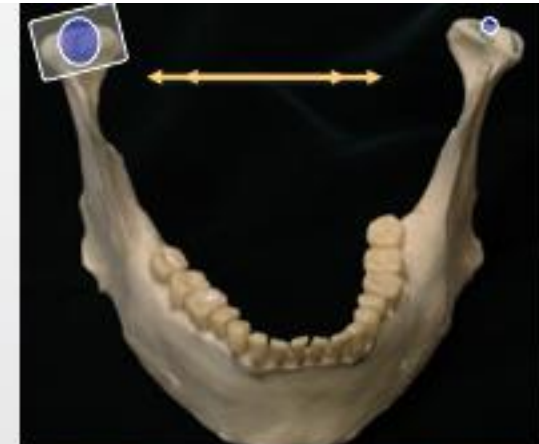
TM Joint subluxates under load
Adapted CR “wobbles”

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

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

How to Avoid Missing Dx-
Clinical History, Identify CR load zone on CBCT, Anterior deprogrammer test 24/7 for 2 days

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



Test Translatory Mechanical Stability with Medial/Lateral Deformation

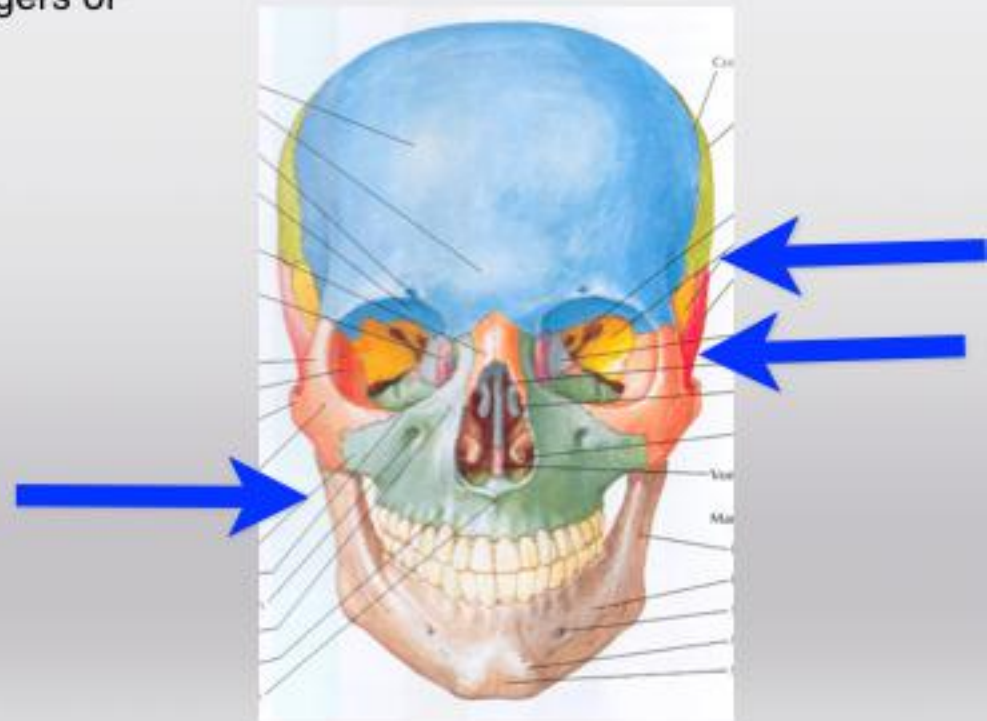
Support the temporal and zygomatic bones with the palm of one hand, and push medially on the mid masseter with the fingers of the other hand.

Have the patient open and close.

Rate the function of the TMJ as:

- No Change
- Improved
- Worse

Mechanically stable joints do not change when deformed medial/laterally



The TMJ: What You need to Know

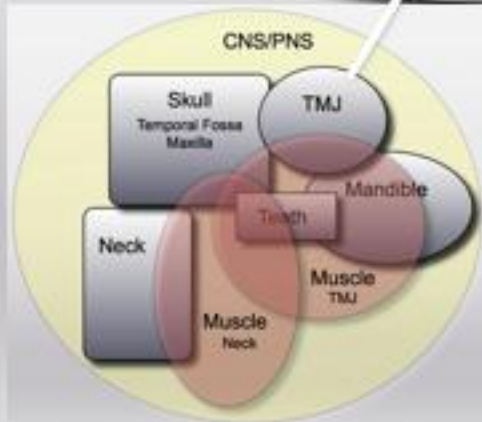
TMJ

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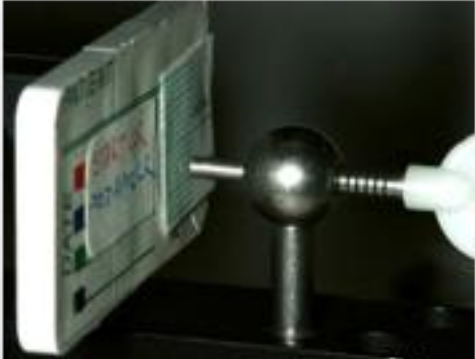
Evaluate every TM joint for:

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Monitor for Occlusal Changes over 1 year
CT scan- look for missing cortex

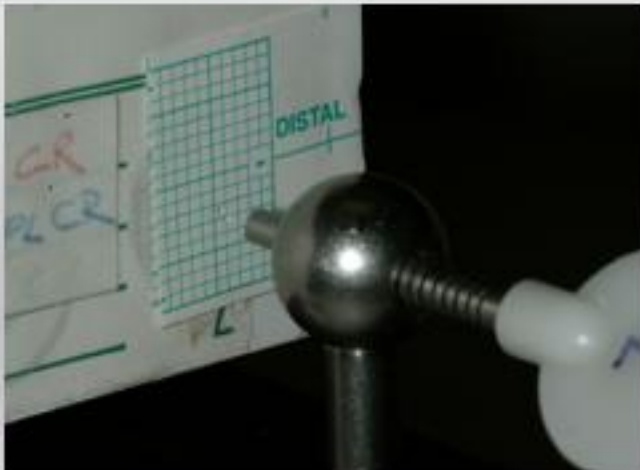
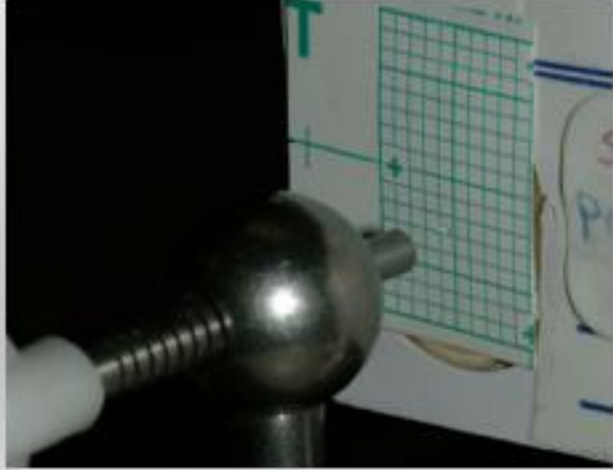


Vari-check- SAM or Denar- can compare serial bite records



Monitor occlusion over time
Any changes in occlusion needs Imaging
If no changes over 1 year, joints are structurally stable
Orthodontics make it hard to monitor occlusion.

- Differential Diagnoses: Anterior open bite post puberty
1. The teeth have moved
 2. The joints have lost structure (bone or disc)

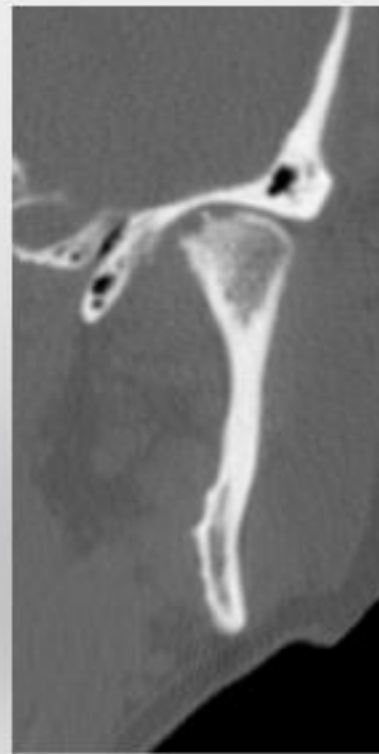


***All anterior open bites are assumed to be structurally unstable until proven otherwise

Which is most structurally Stable?

To Do: Take CBCT before starting any major occlusal changes

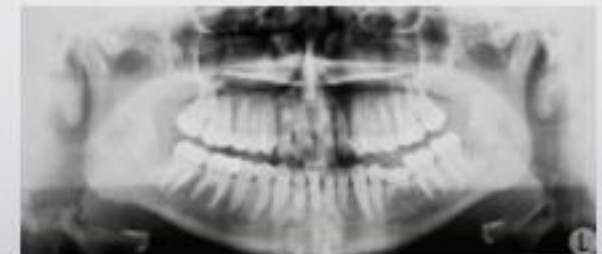
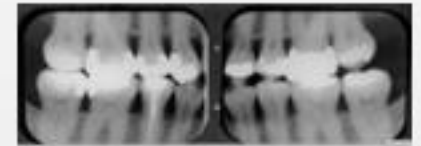
Coronal Views
CT



CBCT
7 Vert BW

Would you do full mouth rehabilitation with only a set of bitewing radiographs?

If you need to see all of the tooth surfaces, why would you not want to see all of the TMJ surfaces?



FMX, PanX

FMX, CBCT

CBCT, 7 vertical BW

2.5x more PAP found With CBCT

Patel S, Wilson R, Dawood A, Mannocci F., Detection of periapical pathology using intraoral radiography and cone beam computed tomography - a clinical study. Int Endod J. 2011 Dec 21

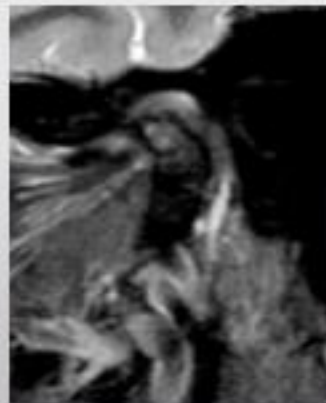
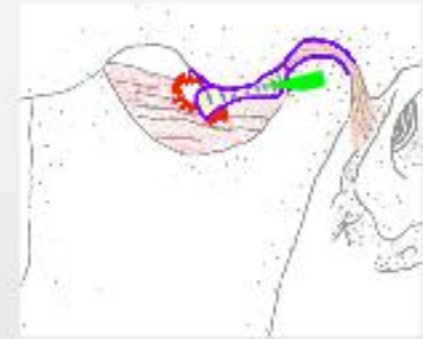
Differential Diagnosis: Changes in Joint Height

- Loss of Bone****
 Osteoarthritis
 AVN
 TIBR
 RhA
 Lyme Arthritis
 Psoriatic Arthritis

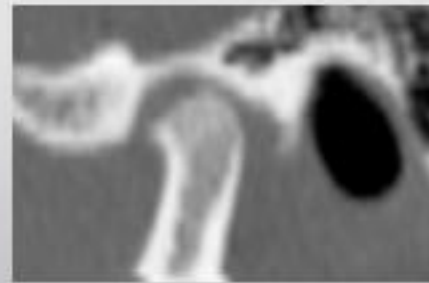
- Decrease Tissue Thickness**
 Acute PIPER 4

- Bone Growth**
 Condylar Hyperplasia

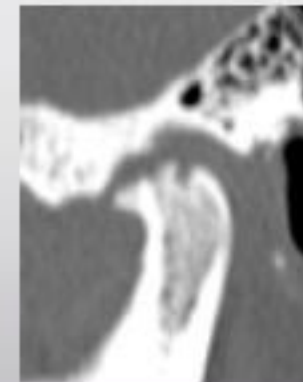
- Tissue Growth**
 Synovial Hyperplasia



Inflamed tissue in joint



Missing cortex

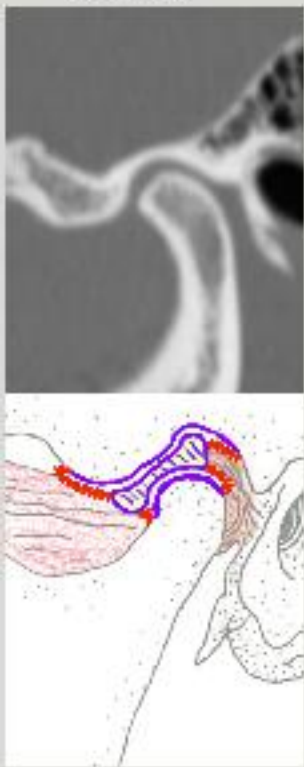


OA cyst



**Notice that loss of bone and sore TMJs have similar diseases

Normal



Osteoarthosis/Osteoarthritis

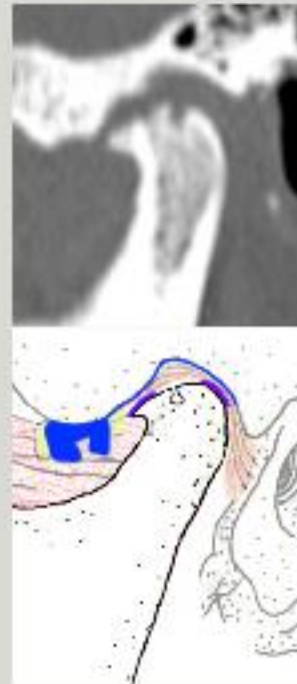
Early



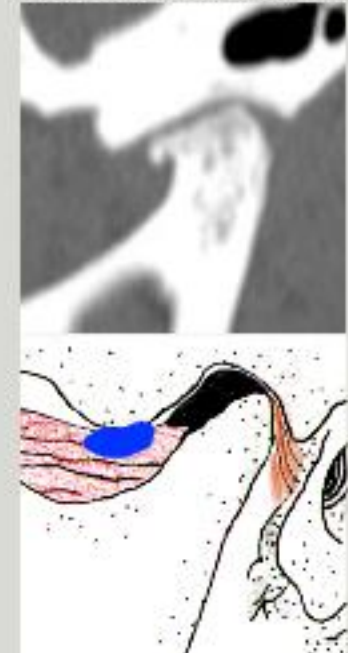
Early/ Moderate



Moderate

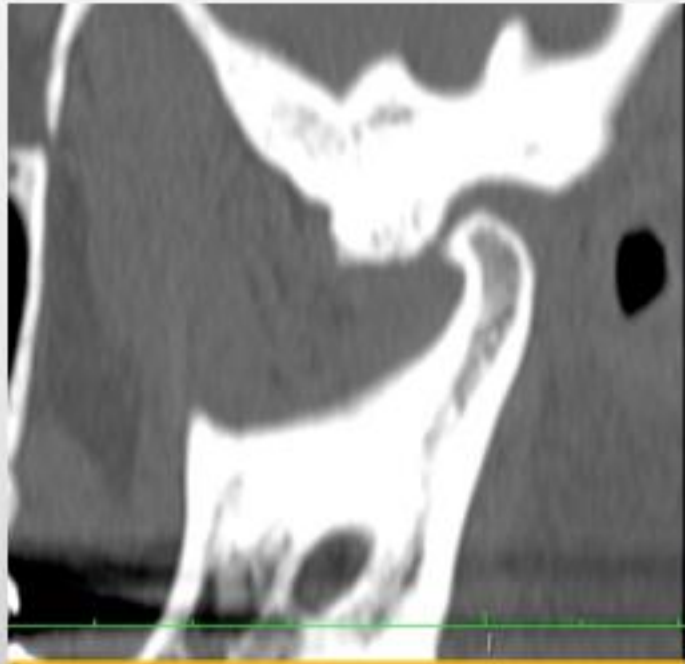


Severe OA, Eburnation



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

Representative examples of OA in different patients



Active OA



6 Months later, pt on Aleve
Lipping from calcification of cartilage overgrowth

Adaptation Chronic Bilateral Osteoarthritis

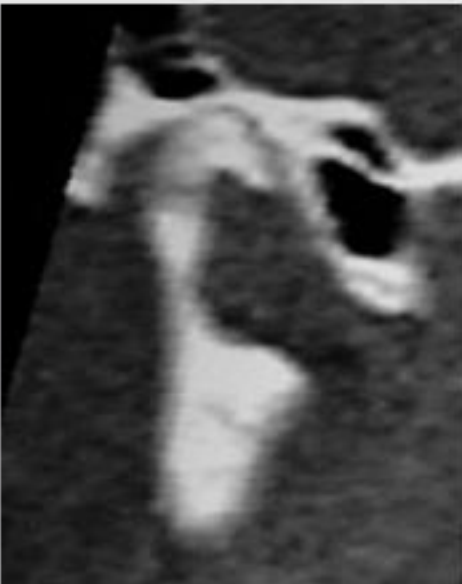
Mandible recedes Slowly

Teeth Move/ Adapt

Anterior Guidance gets steeper as Condylar Guidance get shallower

OA Right and Left Bone Loss

#8 Ankylosed



The TMJ: What You need to Know

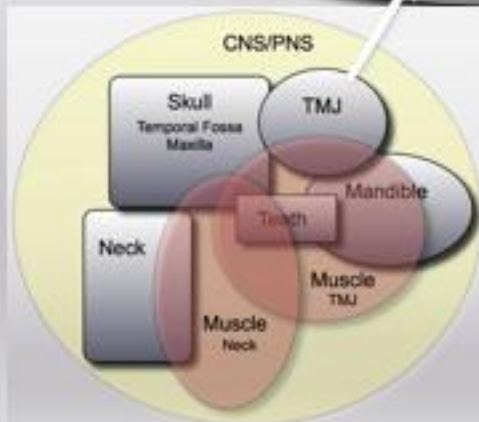
TMJ

Does it Hurt?
Does it Move?
Does it Wobble?
Is it Structurally Stable?

Evaluate every TM joint for:

1. Comfort
2. Movement
3. Mechanical stability- Does the joint wobble on loading?
4. Structural stability- Will the joint lose bone with a resulting occlusal shift?

If there is a TMJ problem it will be in one of these four areas.



The Bottom Line:

To Minimize Risk and Maximize Benefit before you change an Occlusion:

Palpate and Load the TMJ.

Measure Smoothness and Range of Motion (Quality and Quantity), Record JVA

Put in Anterior Stop Orthotic 24/7 for 2 days- Not Painful

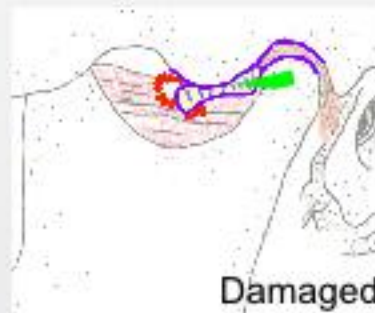
Take CT scan- see intact cortex of condylar bone and fossa

History: Chews well, no pain. No change joint sounds, ROM, or occlusion in past year.

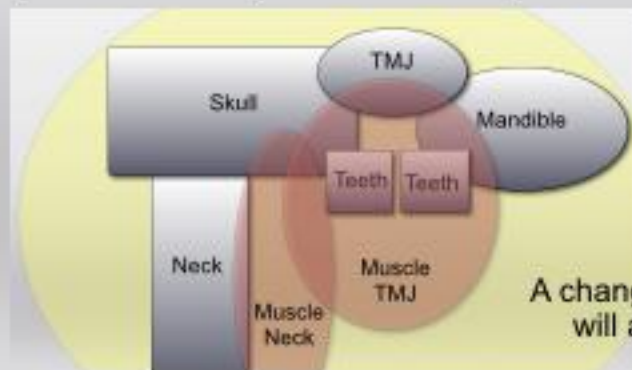
Basic Orthopedics

Joints are either
Healthy or
Damaged

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



Does the joint damage have anything to do with the pain and/or dysfunction the patient is experiencing?



A change in any one area will affect the others

If the TMJ Adapted Unfavorably:
Mechanically unstable joint motion
Mechanically unstable loading



TMJ Neuromuscular Disharmony pain avoidance
TMJ Neuromuscular Disharmony occlusal avoidance

Descending neck neuromuscular disharmony
Ascending neck neuromuscular disharmony

Appliance Therapy

John R Droter DDS
Annapolis, Maryland

Annapolis, Maryland
John R Droter DDS

5 Levels of Appliance Therapy

Level 1
Protective Therapy for Sleep Bruxing
or Clenching



Store bought \$20

Level 1
Protective therapy for Bruxing or clenching
Joint status- healthy or favorable adaptation
Occlusal status- Non pathologic
Protective guard

Level 2
Clenching Inhibition



Palatal Anterior Stop

Level 2
Tx Clenching
Joint status- healthy or favorable adaptation
Occlusal status- Non pathologic
Anterior Stop Appliance

Level 3
Diagnose and Treat Occlusal Muscle
Disorder

CR



Lock in

Level 3
Tx OMD
Joint status- healthy or favorable adaptation
Occlusal status- Pathologic
CR Appliance
Occlusal Equilibration

Level 4
Treat Damaged Joints that have
Adapted Unfavorably



Level 4
Tx unfavorably adapted damaged joint
Orthopedic Appliance

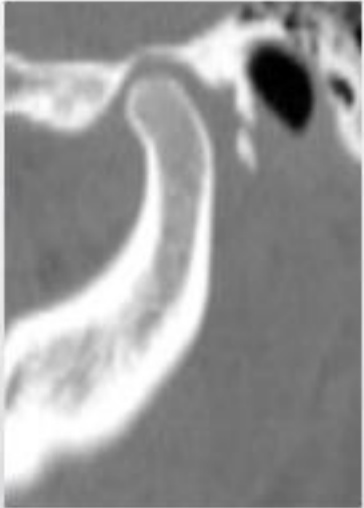
Level 5
Treat Actively Degenerating
Temporomandibular Joints

Condylar Distraction



Level 5
Tx actively degenerating joints
Orthopedic and Medical Management

I use both Centric Relation and Non-Centric Relation Orthotics



Treatment Position vs Final Position: Do Not Confuse the Two

Treatment Position Creates Change (Adaptation)

Treat: Painful CR Load Zone

Mechanically Unstable Centric Relation Loading
Cranial bones misaligned

Final Position Creates Stability (Centric Relation)

When the forces are balanced, Adaptation Stops



Different Appliances



Lower Full Coverage Posterior Deprogrammer



Upper Palatal anterior deprogrammer



Upper Sectional Anterior Directive



Lower Full Coverage Posterior Indexed



Lower Full Coverage Centric Relation with immediate anterior guidance

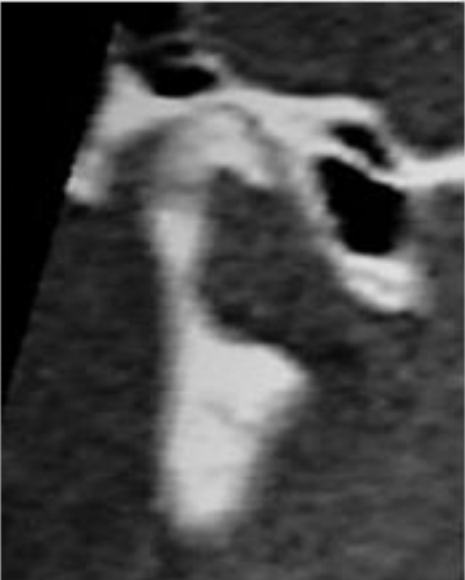


Lower Soft Sectional

Adaptation Chronic Bilateral Osteoarthritis

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

OA Right and Left Bone Loss
#8 Ankylosed



Osteoarthritis Bone Loss

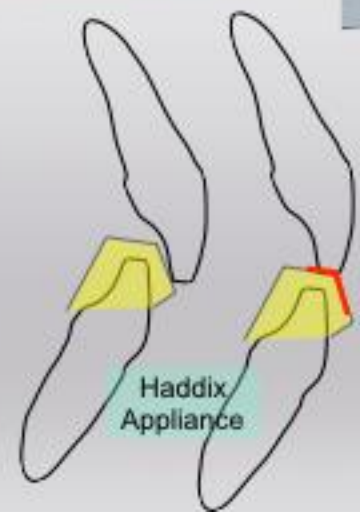
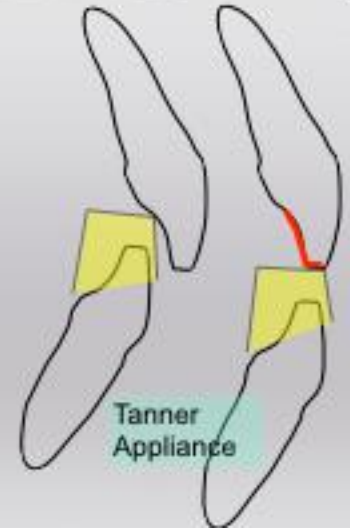
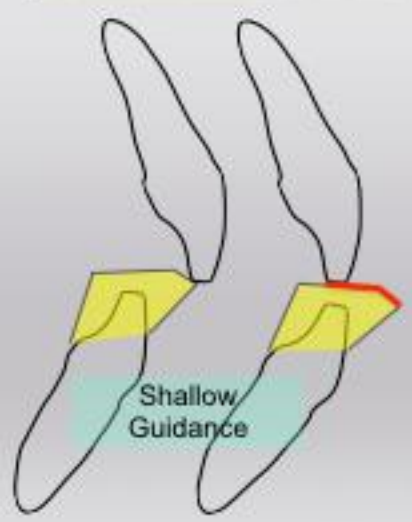
CR Load zone is now on zygoma

Condylar guidance has become shallower



Which Appliance to use for OA?

Need to discover the new anterior guidance that will work with the new condylar guidance



How do you Diagnose and Treat Occlusal Muscle Dysfunction?

John R Droter DDS
Annapolis, Maryland

Annapolis, Maryland
John R Droter DDS

Treating Common TMDs in a General Practice

Diagnosis	Pattern	Treatment
Sleep Clenching with anterior tooth contact inhibition	Sore masseters on waking Morning TMJ clicking that resolves Sleep D-PAS Relieves Symptoms	D-PAS Night Guard
Sleep Grinding (not airway related)	Worn Teeth Apnea Hypoxia Index less than 5	Full Coverage Night Guard
Sleep Grinding , Airway Related	Worn Teeth Apnea Hypoxia Index 5+	Mandibular Advancement Appliance (after MD approves)
Occlusal Muscle Dysfunction	Sore muscles on chewing Sore Lateral Pterygoid Day D-PAS Relieves Symptoms	Occlusal Adjustment
OMD secondary to TMJ Damage, Favorably Adapted Joint	Same as above	Occlusal Adjustment
Other	Pain does not resolve with D-PAS	Refer

Treating Common TMDs in a General Practice

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Occlusal Muscle Dysfunction	Sore muscles on chewing Sore Lateral Pterygoid Altered chewing pattern Day D-PAS Relieves Symptoms	Occlusal Adjustment
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5 Levels of Occlusal Orthotic Therapy

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Store bought \$20

Level 1
Protective therapy for Grinding or clenching
Joint status- healthy or fav adapt
Occlusal status- Non pathologic
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Palatal Anterior Stop

Level 2
Tx Clenching
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Anterior Stop Orthotic

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Diagnose and Treat Occlusal Muscle Dysfunction



CR Orthotic

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Occlusal status- Pathologic
CR Orthotic
Occlusal Equilibration

Level 4
Treat Damaged Joints that have Adapted Unfavorably



Lock in Orthotic

Level 4
Tx unfavorably adapted damaged joint
Orthopedic Orthotic

Level 5
Treat Actively Degenerating Temporomandibular Joints

Condylar Distraction



Level 5
Tx actively degenerating joints
Orthopedic and Medical Management

Occlusal Muscle Dysfunction Diagnostic Flow sheet for a General Dentists

Finding Occlusal Muscle Dysfunction (OMD)

1. Exam/Differential Diagnosis:

What is sore- Is it joint, muscle or neck?

Take History, Palpate TM Joints, Palpate TM muscles, Palpate Neck

Rule out dental causes. What are the choices?

Sore TMJ muscles, no TMJ pain, suspect Occlusal Muscle Dysfunction

2. Diagnostic Tests:

D-PAS Orthotic for 1 week, Night wear only. Test for Clenching.

D-PAS Orthotic for 2 days, 24 hr wear except to eat. Test for OMD

Rules out other.....

or Full Coverage Centric Relation Orthotic 3-6 weeks, 24/7 wear

Test for OMD. Testing benefit of a fully functioning occlusion

3. Repeat Step 1. If all the pain has gone away then step 4.

4. Occlusal Analysis. Alter Occlusion- See LD Pankey 3 Rules of Occlusion

Two days before adjust occlusion, use D-PAS 24/7 to verify joint stability.

At any point if pain increases, or if the pain has not fully resolved after 6 weeks of therapy, a full facial pain diagnostic work up is needed including TMJ imaging.



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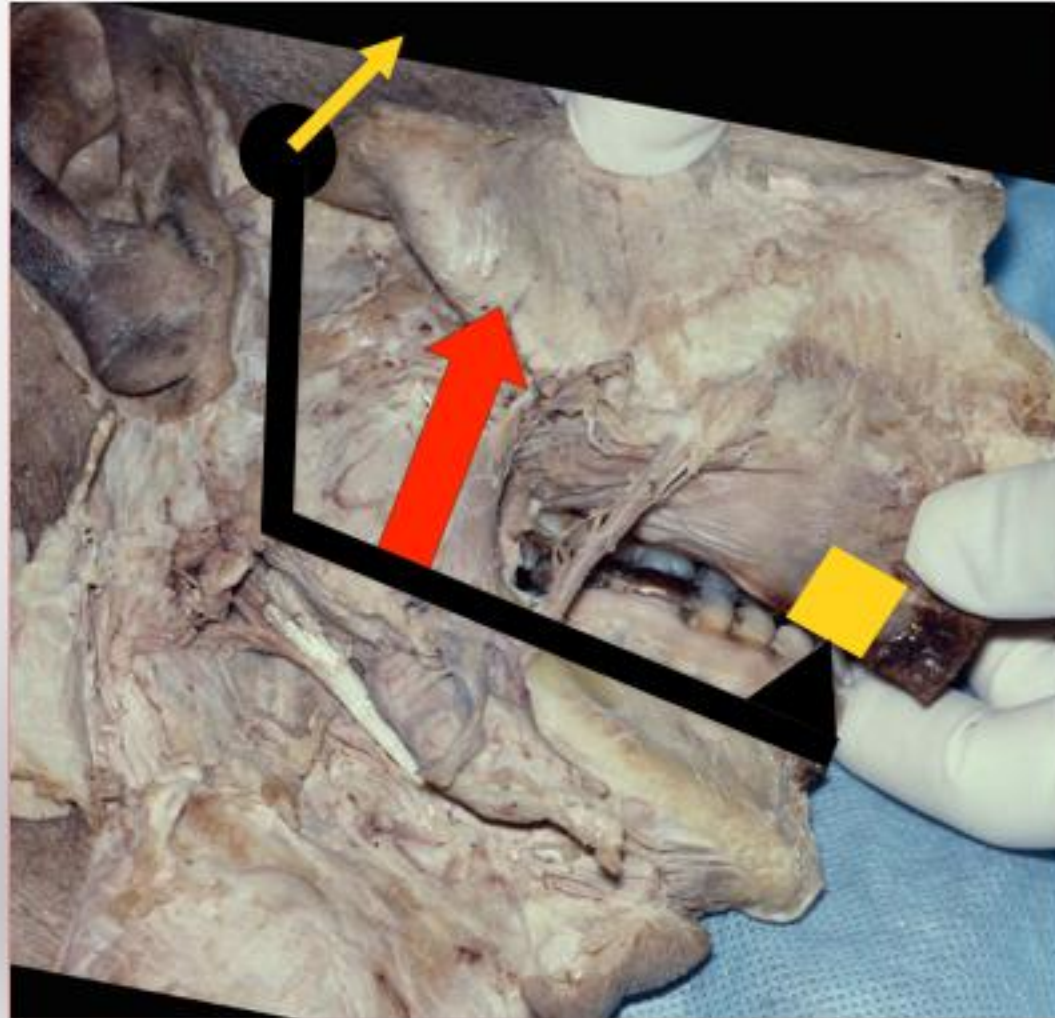
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Biomechanics of Anterior Stop Orthotic



Anterior Deprogrammer Anterior Stop Orthotic

Common Actions to all Anterior Deprogrammers:
 Only anterior teeth contact in MaxIC
 Load/seat condyles
 Eliminate immediate posterior interferences



Wear 10- 15 min in Office

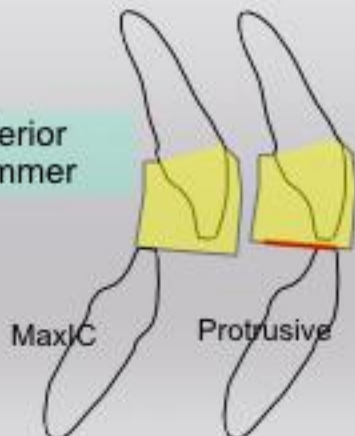


Wear Nighttime

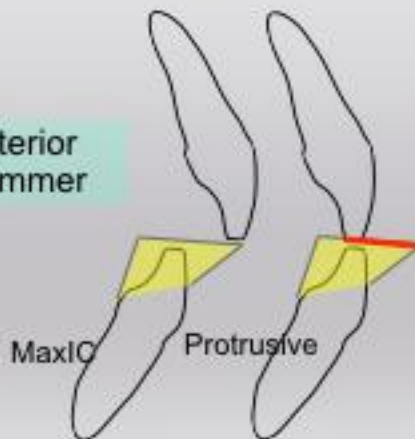


Can wear Nighttime and Daytime
 24 hour wear no longer than 1 week

Upper Anterior
Deprogrammer

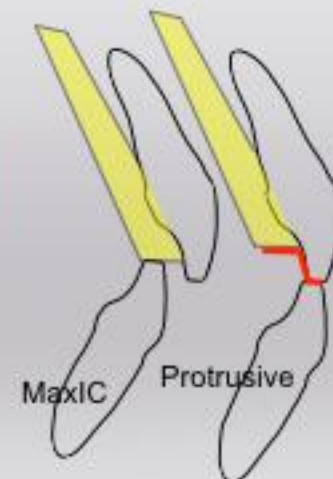


Lower Anterior
Deprogrammer



My Top Choice
"D-PAS"

Palatal Anterior
Stop Orthotic



This is a diagnostic test first and foremost

D-PAS: Diagnostic Palatal Anterior Stop Orthotic

Decrease Muscle Pain

- Sleep Clenching: Wear during sleep for 1 week
- Occlusal Muscle Dysfunction: Wear 24/7 for 2 days

Increase Muscle Pain

Mechanically Unstable TMJ

Increase Joint Pain

Intracapsular Problem TMJ

No Change in Pain

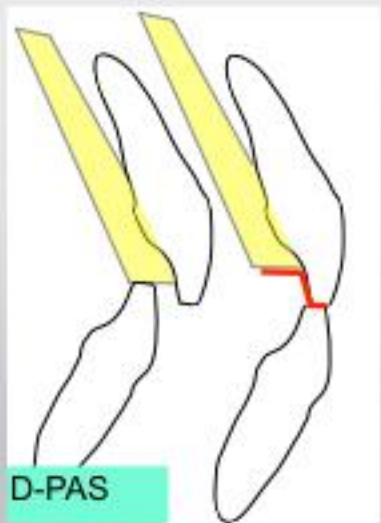
- Damaged TMJ are mechanically stable
- Pain not related to occlusion

Masseter Muscle/ tooth contact Inhibition:

- Has Inhibition: Can use anterior disclusion
- Lacks Inhibition: Full power on clenching

Quick to make, no mounted models.

Very Esthetic. Not Visible. Good Compliance



Treatment (Management) Uses

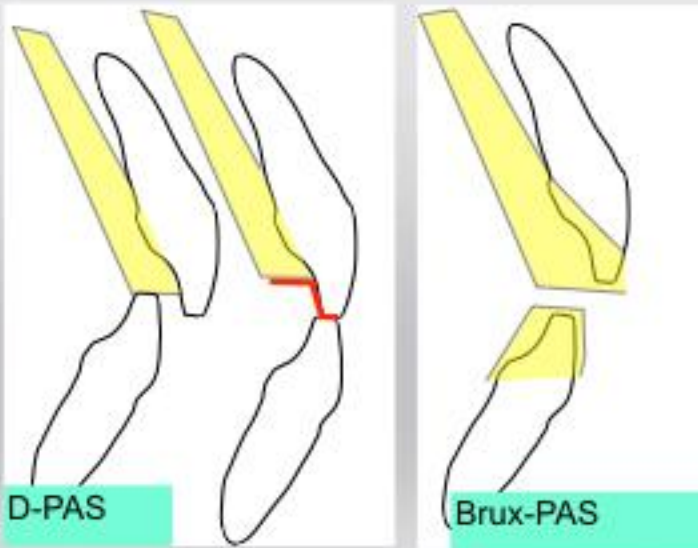
D-PAS
Diagnostic Palatal Anterior Stop Orthotic

Educational: Patient awareness of problem

Sleep Clenching with muscle inhibition:
D-PAS wear during sleep

Sleep Grinding with muscle inhibition:
Brux-PAS wear during sleep.
Increase vertical of D-PAS,
Add lower essex

Assist in cranial bone alignment



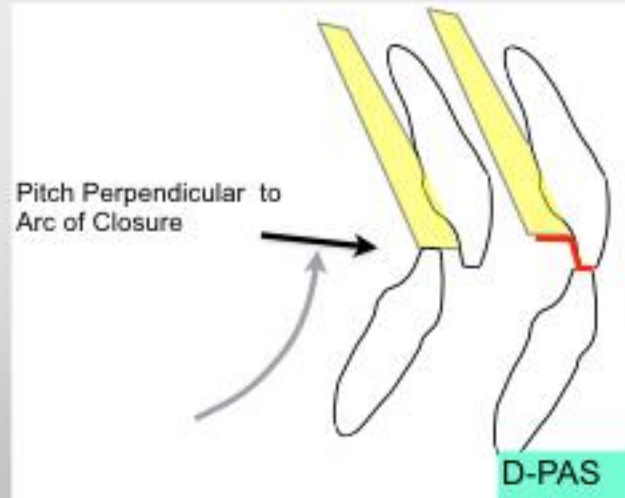
Key Features of D-PAS

To Optimize Results:

- Relined so forces go into whole maxilla
- Pitch is perpendicular to arc of closure
- Minimal change in vertical
- Nothing wraps around the buccal
(Every tooth is free to move buccally)

Must Reline

- Most cases you will reline whole D-PAS
- Can just reline anterior if good retention.
- Must reline at least cuspid to cuspid.



Basically it is a relined upper Hawley Orthotic with no buccal restrictions, with an anterior stop added.
Similar Orthotics- Hawley with anterior stop, Kois, Cranham, Hegyi DATA



Apply bonding agent, cure.

For acrylic D-PAS use Triad bond

For Eclipse D-PAS use any composite bonding agent

Apply even layer of Triad clear gel, 2mm thick on tissue side in either front section only, cuspid to cuspid, or the whole orthotic depending on retention desired.

Seat in mouth



Wipe away Excess





Carefully Cure.

Triad gel will get very hot if cured too fast. I use Valo light in high power mode and keep the light moving so no one area has light for more than 0.25 seconds at a time. All surfaces are exposed including the palate and distal to the molars.



Thayer Dental Lab

D-PAS Orthotic as recommended by Dr Droter
Made out of Eclipse

800.382.1240

717.697.6324

131 Old Schoolhouse Lane
Mechanicsburg, Pennsylvania 17055



Cost estimate \$110

Ask for Denise

Occlusal Muscle Dysfunction Diagnostic Flow sheet for a General Dentists

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3. Repeat Step 1. If all the pain has gone away then step 4.

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At any point if pain increases, or if the pain has not fully resolved after 6 weeks of therapy, a full facial pain diagnostic work up is needed including TMJ imaging.



CR Orthotic

Condyles fully seated

Dots in the Back

Lines in the Front



Must not rock or be squishy

Patient gets to experience a full, solid, harmonious bite.

Doctor gains experience in setting up a harmonious bite in this particular patient

Can wear 24/7 for longer than 3 weeks

See patient at week 1, 2, 4. Then every 2-4 weeks. No longer than 6 weeks between appt.



CR Orthotic

Condyles fully seated

Dots in the Back

Lines in the Front



Orthotic Adjustment Burs



Round

Flat



Brassler H351.11.070 Carbide, 1-800-841-4522
Preat F-8 Silicon Polisher, 1-800-232-7732, www.preat.com
Keystone Industries Miniature Scotch Brite Brushes 1", fine, (856) 663-4700
Brasseler Abbot Robinson Bristle Brush #12 Soft, 1-800-841-4522



Lower Flat Plane
Centric Relation Orthotic
by
Dr Herb Blumenthal

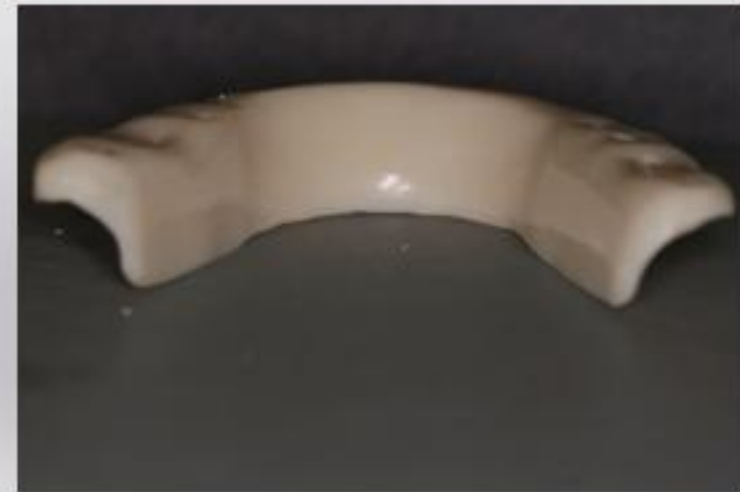


Lower Flat Plane
Centric Relation
Orthotic by
Glenn Kidder





Anatomic Orthotic by Dr. Buzz Raymond



Pankey Study Clubs
Tanner Study Clubs

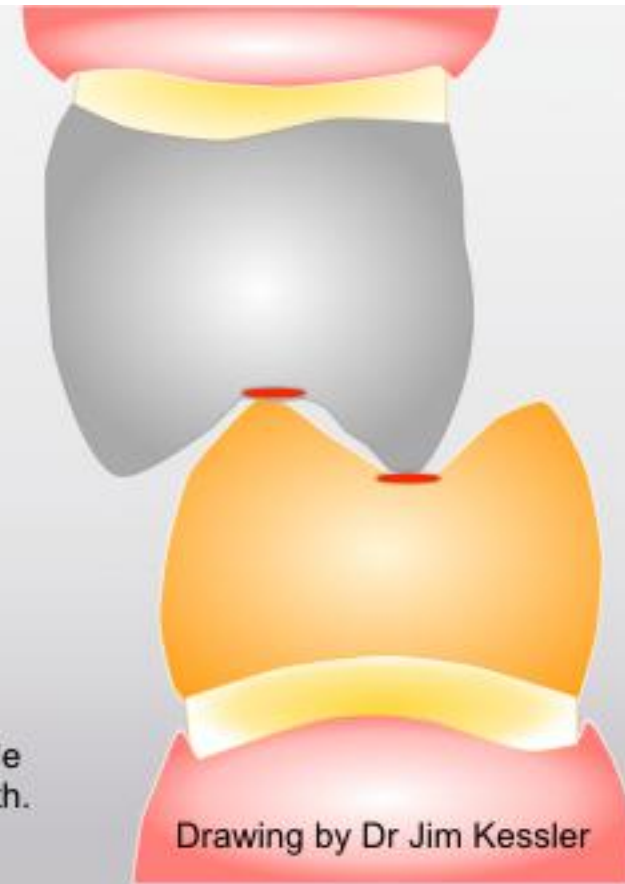
LD Pankey's 3 Rules of Occlusion

(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



Why LD Never wrote a text book

D-PAS Variations

Diagnostic Palatal Anterior Stop

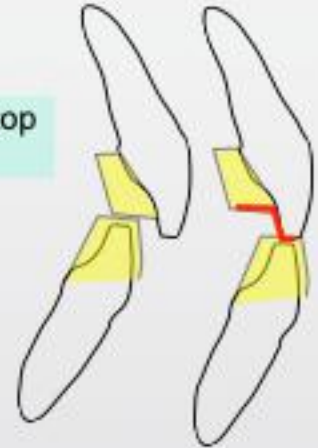


Palatal Anterior Stop for anterior open bite

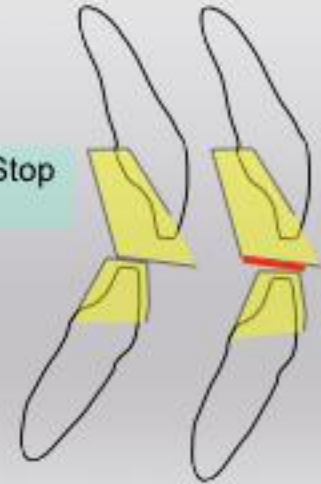
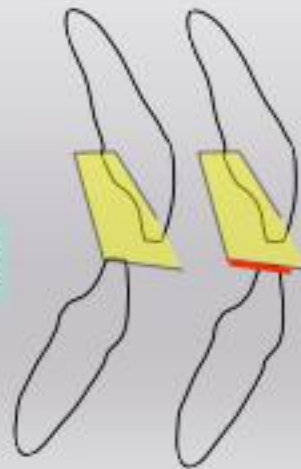
Palatal Anterior Stop



Palatal Anterior Stop with lower Essex



Brux-Palatal Anterior Stop Protective



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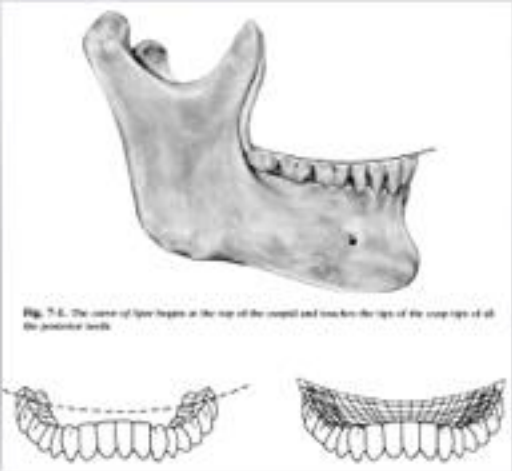
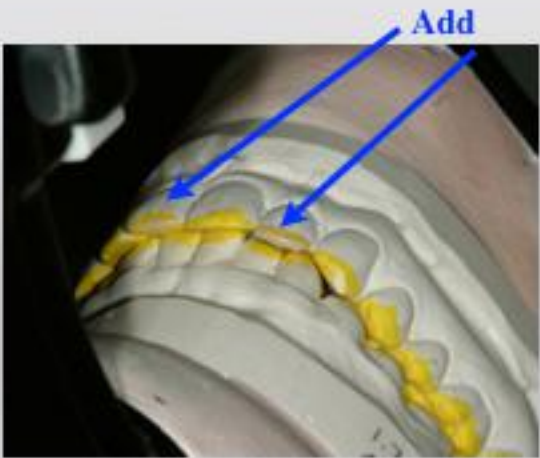
At any point if pain increases, or if the pain has not fully resolved after 6 weeks of therapy, a full facial pain diagnostic work up is needed including TMJ imaging.



Occlusal Adjusting is an Esthetic Procedure Form Follows Function



Before



After

Occlusal Sculpting Tools

Wheel

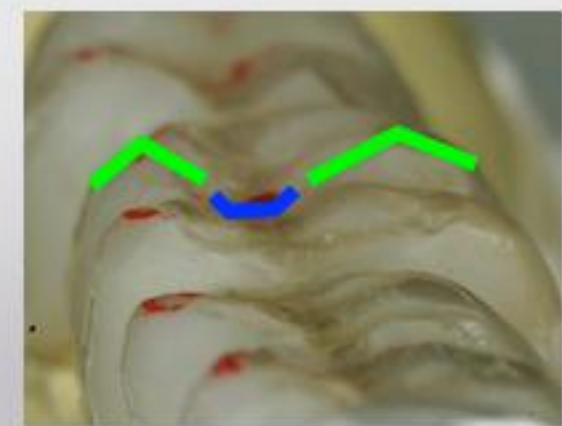
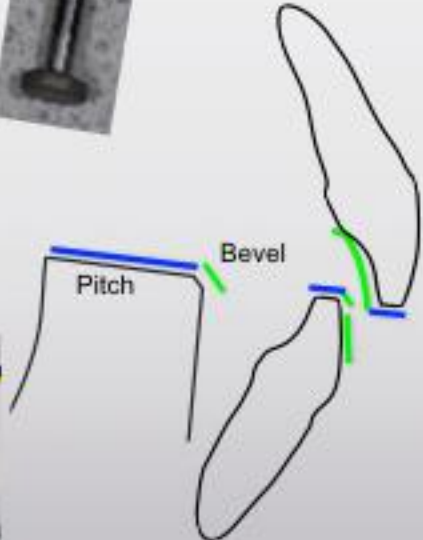
- Create Cusp Landing Zone
- Flatten Incisal edges
- Bulk reduction of inclines

Green Stone Bullet

- Move and Shape Cusps
- Inclines

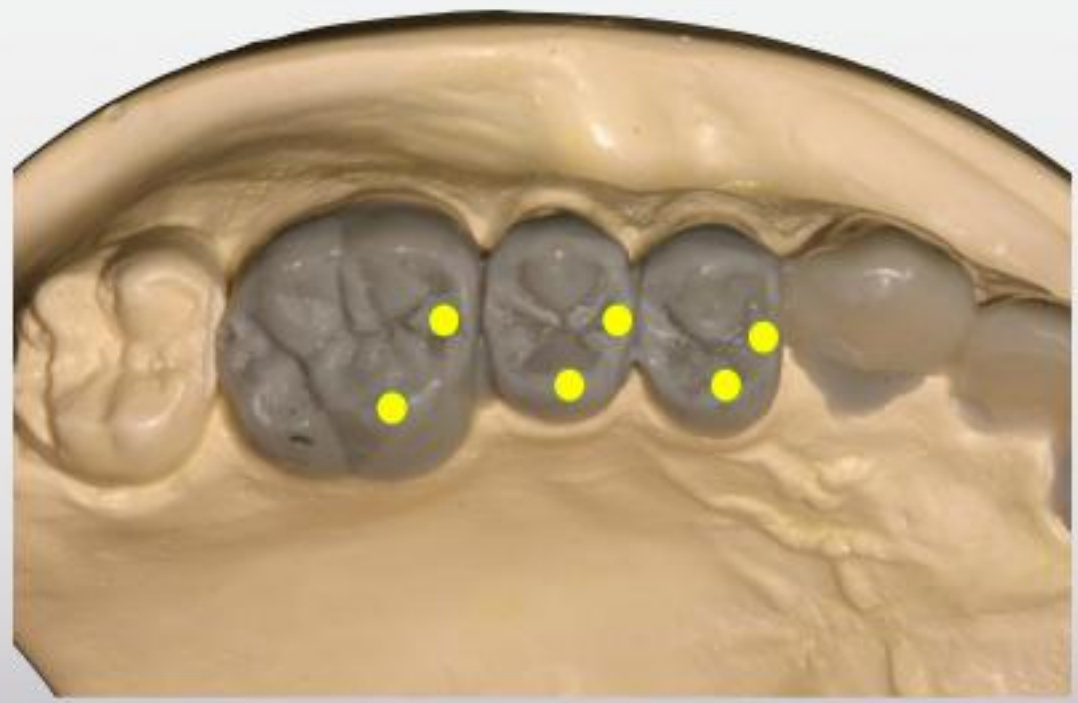
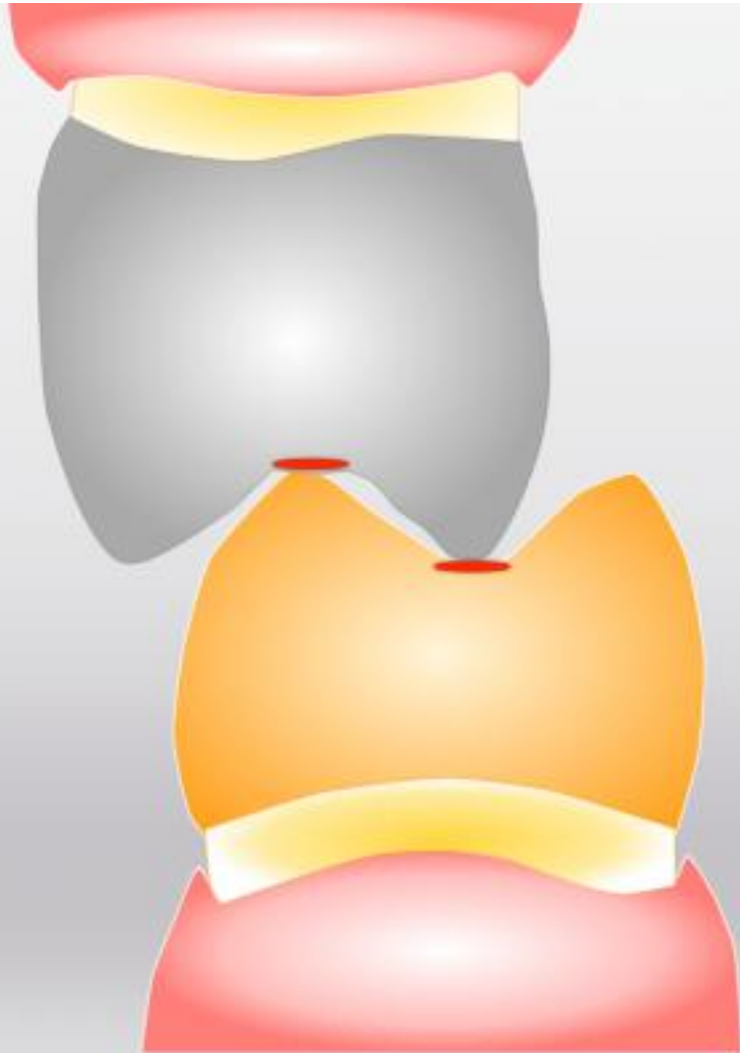
White Stone Bullet

- Uses same as Green stone
- Use toward end



Pogo Disc- Dentsply
Polish all surfaces
Tooth and Porcelain

Premier 860.9 Wheel Fine Diamond
Dedco Green Stone
White Arkansas stone



Slide by Dr Jim Kessler
Drawing by Dr Jim Kessler

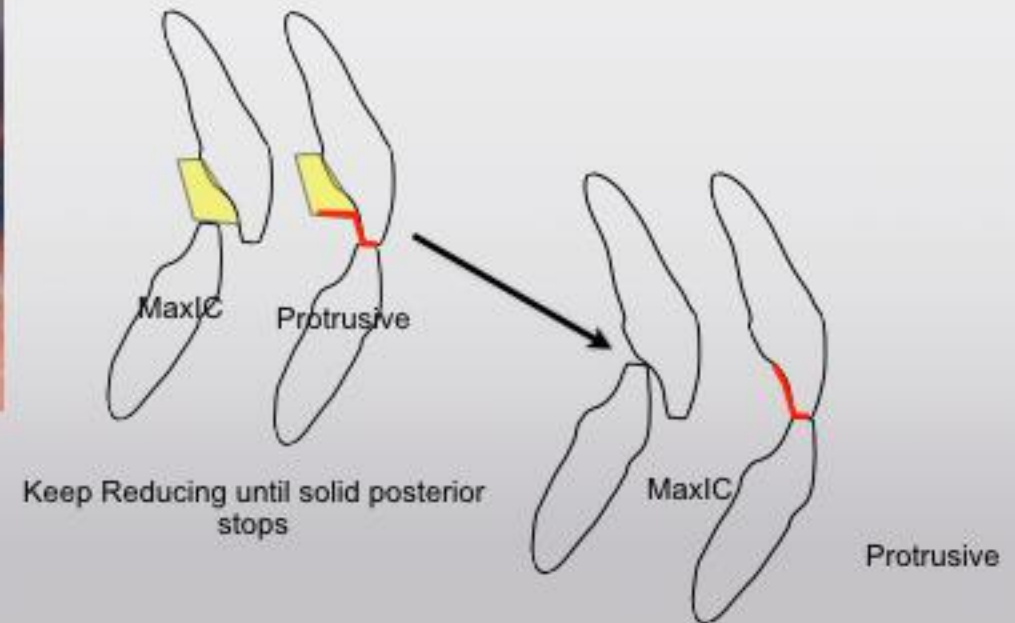
Occlusal Adjustment Treatment Assist Orthotic Deprograms throughout the occlusal adjustment



Triad Light Shade
Remove and refine
Solid flat anterior stop
Glue in with Triad clear gel
Adjust in with teeth
Remove once solid posterior stops



Learning the skill of occlusal adjusting to treat occlusal pathology is the doorway into a world of dentistry most do not even imagine. Creating a more harmonious occlusion is a wonderful service to provide for your patients.



More Harmonious Occlusion \neq Perfect

Dr. Angela Moss
GP Occlusion

If does filling:

Asks patient if OK to remove the tooth cracking forces on the tooth we are doing the filling on.

Also adjusts the adjacent tooth if class 2 and tooth was wedged apart.

Removes W and NW contact.

Does full equilibration big cases no charge prior to start.

If Jaw hinges freely will adjust, If not puts in anterior deprogrammer.

Staying out of trouble- Do not equilibrate if:

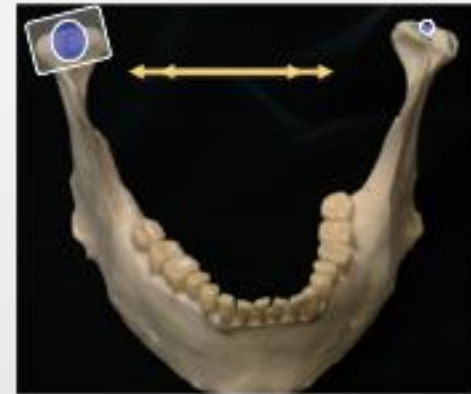
Painful CR

Fail the D-PAS test

Not able to have patient comfortable with full orthotic 24/7 for 3 weeks.

You will have to remove an excessive amount of tooth structure.

CR slide is greater than 2mm anterior or 1mm lateral. (vertical is less critical)

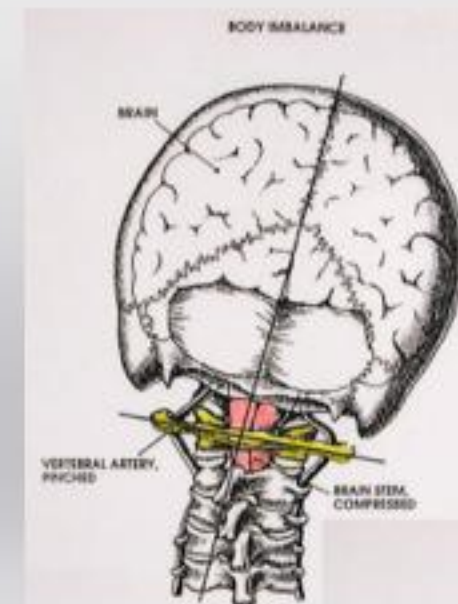


You can equilibrate with confidence if:

Pass D-PAS 24 hour/day for 3 days

Pass 24/7 full coverage orthotic wear

Conservative equilibration on CR mounted models



T-Scan Computerized Occlusion

Occlusion Live and in Slow Motion



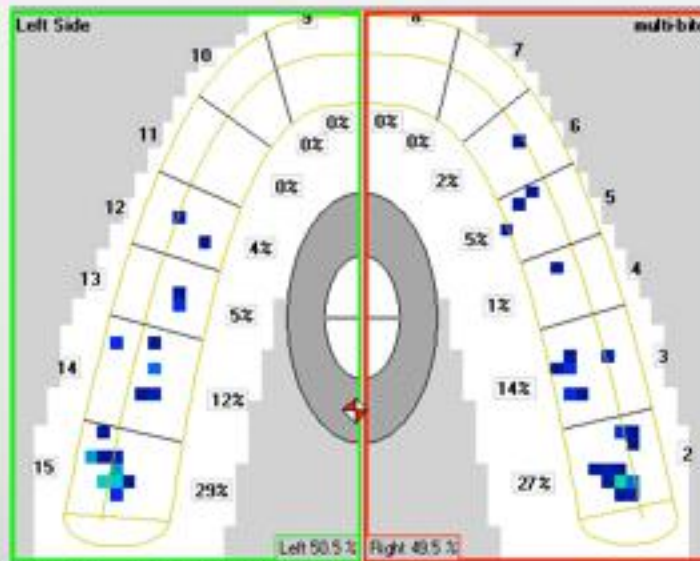
Articulating Paper leaves evidence after the events
Not Live
All events lumped together

Using Since 1999

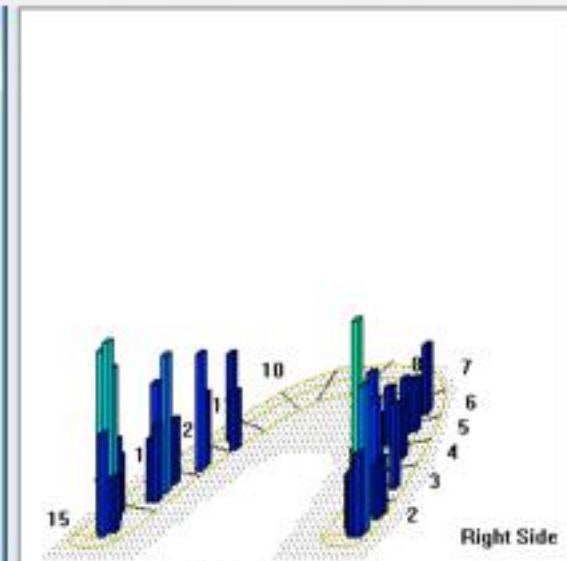


Time Force Graphic Representation of the Occlusion

T-Scan Gives you:
 Timing
 Intensity
 Location
 Distribution

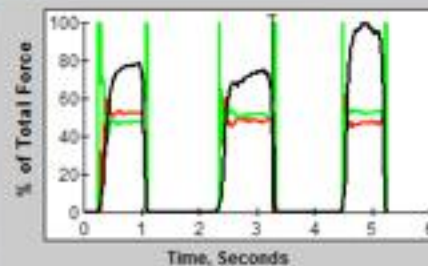


3.249 sec | Force: 64.8 % of MMF



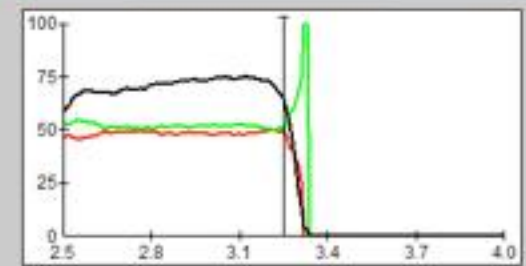
3.249 sec | Force: 64.8 % of MMF

Graph - multi-bite



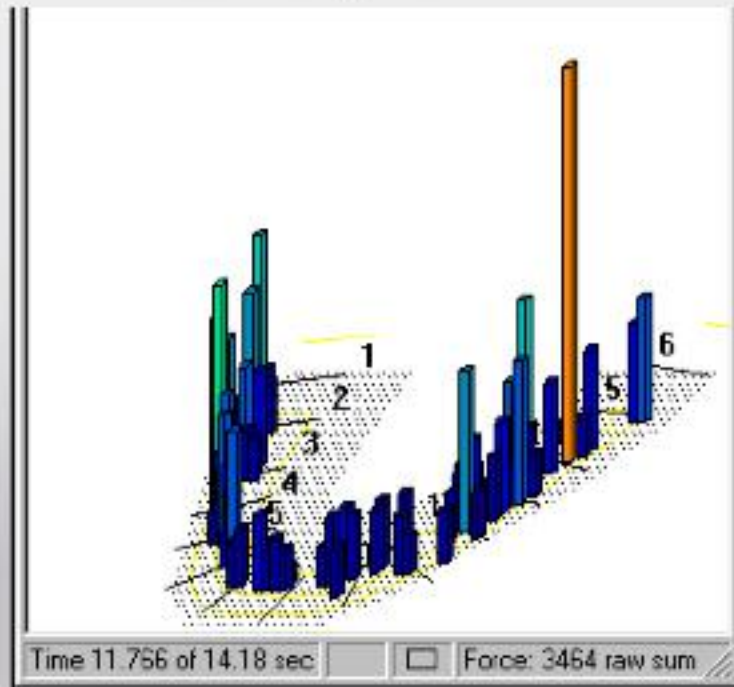
% of Max Movie Force (MMF)
 — F = 64.8 %
 3.249 sec (Time)
 — Left = 50.5 %
 — Right = 49.5 %

Zoom-Graph -



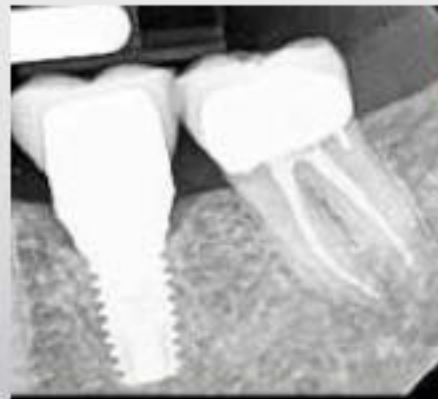
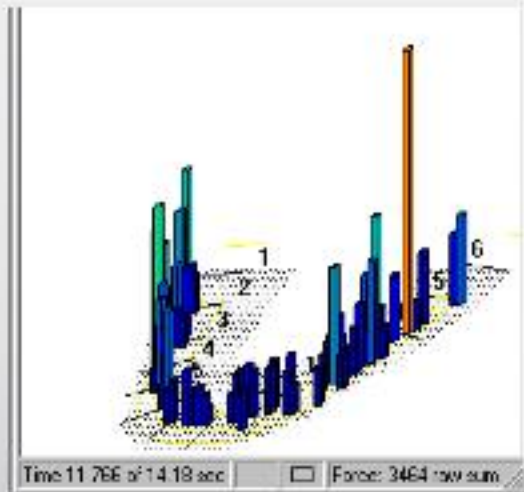
“Occlusion in Slow Motion”
 Regular 10 msec intervals
 Turbo 2.5 msec

Which dot on temps is heavy?



Implant Occlusion

Implants not moving in occlusion is incorrect

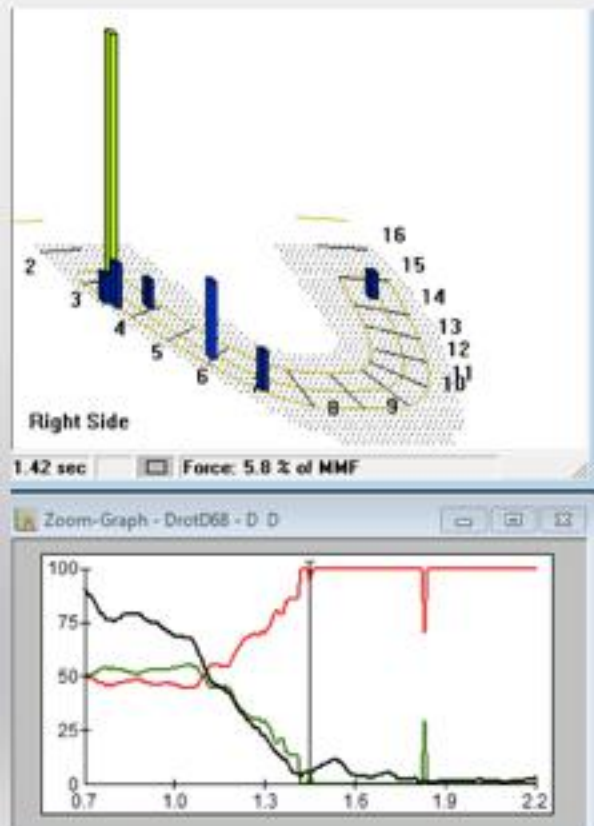


Implants and teeth will both compress bone.

Implants need to come into contact after the PDL compression phase and then they will behave the same as teeth in the bone compression phase.

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

Is that a smudge or a muscle activating interference?



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

Chapter 15

T-Scan as a Patient Education Tool

John R. Droter, DDS
The Pankey Institute, USA

ABSTRACT

The T-Scan is an effective patient education tool for illustrating existing occlusal pathology. It presents complex occlusal information in a visual format that is easily understood. The T-Scan applies to all stages of the teaching/learning process because its recorded data forms the framework upon which a doctor/patient discussion can begin regarding the patient's occlusal disease manifestations, the potential benefit of treatments, and the risks of not undergoing corrective treatment. When used as part of an educational strategy, the T-Scan can lead the patient to accept procedures that would benefit their long-term dental health. This chapter outlines the four stages of creating optimum dental health, the steps required to perform effective teaching and learning, the differing styles of teaching and learning utilized in educational forums, and how to best employ the technique of Feature, Function, and Benefit. A case study illustrates how T-Scan data can educate a patient about their own occlusal problems.

INTRODUCTION

One of a doctor's many roles is to educate patients with regards to their health (ADA, 2010). The three most prevalent diseases dentists regularly treat are caries, periodontal disease and occlusal disease (Christensen, 2001). Occlusal disease is under treated by many practitioners (Christensen, 1995), which is partially due to the difficulty of having a patient understand the benefits that occlusal therapies offer in the treatment of occlusal pathologies. Utilizing the T-Scan Computerized Occlusal Analysis System (T-Scan 8, Tekscan,

Inc. S. Boston, MA, USA) in combination with a well-planned strategy for patient education, can improve the number of patients who accept occlusal therapies that likely would benefit them.

The Four Stages of Health Creation

There are four stages the patient and the clinician must go through, to create health from a diseased state:

Stage I: Identifying the etiologic factors that cause the disease.

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IGI Global Website

Chapter 15 T-Scan as a Patient Education Tool

Can buy my chapter individually

The screenshot shows the IGI Global website interface. At the top, there is a navigation bar with links for 'Shopping Cart', 'Login', 'Register', 'Language: English', and a search bar. Below the navigation bar, there are several menu items: 'HOME', 'ABOUT IGI', 'FEATURES', 'TEACHING AIDS', 'SPEAKERS', 'TOPIC COLLECTIONS', 'ACQUISITION', and 'MEDIA'. The main content area displays the product 'Handbook of Research on Computerized Occlusal Analysis Technology Applications in Dental Medicine (2 Volumes)' by Robert B. Karsten, DMD. The product image shows a book cover with a dental model. The price is listed as \$380.00. Below the price, there are four purchase options: 'Hardcover + Free E-Access' for \$390.00, 'E-Access Only' for \$360.00, '1 Year Online Subscription' for \$175.00, and '2 Year Online Subscription' for \$300.00. To the right of the product information, there is a 'Buy Hardcover + Free E-Access' section with a quantity selector set to 1, a list price of \$479.00, and a price of \$380.00. There are also checkboxes for '20% Online Discounts Discount*' and 'Free Lifetime E-Access*'. Below this, there is a section for 'I will be using e-access as my preferred' with a dropdown menu. At the bottom right, there is a 'Quick Add' button with a price of \$30.00 and a list price of \$37.50. The bottom of the page shows the chapter title 'Chapter 15 T-Scan as a Patient Education Tool (pages 672-704)' by John R. Droter, DDS, and a 'Sample PDF' link.

Not Sick, Not Healthy

Concept from Bob Walker, DC
Graphics by John Droter, DDS



D-PAS Construction with Eclipse

John R Droter DDS
Annapolis, Maryland

Annapolis, Maryland
John R Droter DDS

D-PAS Construction

1. Make sure model is dry
2. Place a thin coat of Pledge/Future premium floor finish on upper model, using a long handle paint brush.
3. Allow model to dry under blow dryer for 3 minutes



Grumbacher long handle art brush size 6.

D-PAS Construction

6. Check the temperature of model with Ryobi Infrared Thermometer. Let the model cool until it is 100°F. Eclipse works best at this temperature. Too hot and you will have a goeey mess, too cold and the material is too rigid to mold.
7. Smooth a very thin layer of Eclipse Model Release Agent on model



D-PAS Construction

8. Open one Eclipse Clear Prosthetic Resin Upper Baseplate Material. Score the eclipse in the middle with a buffalo knife. A rapid quick snap will break the eclipse into two pieces while still in the plastic. Too slow a snap only bends the eclipse. Use a rapid quick separation of the plastic from the eclipse section you want to remove. Leftover material can be stored in an Air Techniques X-ray Plate Transfer Box



9. Take the eclipse half and roll it to about 12mm thickness, (about the thickness of a sharpie fine point marker).

10. Form it into a horse shoe shape. Have slightly more thickness in the anterior portion where the anterior stop will be. Place the eclipse on the lingual of the model



D-PAS Construction

11. Use your fingers to work the resin around each tooth, and form a small wing behind each of the last teeth, sculpt an anterior stop the width of the central incisors



D-PAS Construction

12. Smooth a thin layer of Eclipse Air Barrier Coating on orthotic



13. Place the model in the Enterra VLC Curing Unit, on the Eclipse night guard setting for 10 minutes



14. Take model out as soon as the cycle is finished, and while holding it under running cool water scrub off the air barrier coating, and gently start to work the appliance off of the model with a buffalo knife



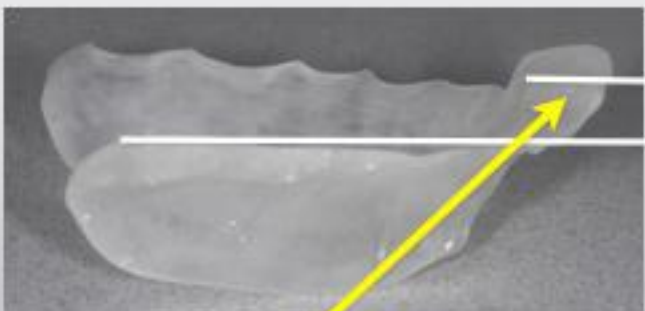
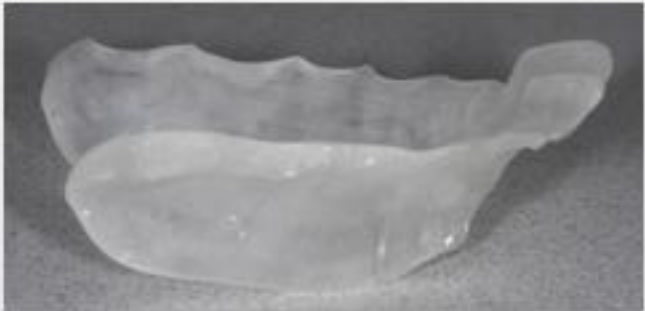
15. After the appliance & model are separated make sure you scrub off all of the remaining air barrier coating



16. Trim the appliance with a carbide cutter, and polish with a fine scotch brite brush and #12 soft bristle brush



D-PAS Orthotic
Diagnostic Palatal Anterior Stop Orthotic



The anterior stop is parallel to the occlusal plane, which will be roughly perpendicular to the arc of closure



Wing is off the tissue



Wing does not wrap around the tooth

D-PAS Variation: No Room for Wing

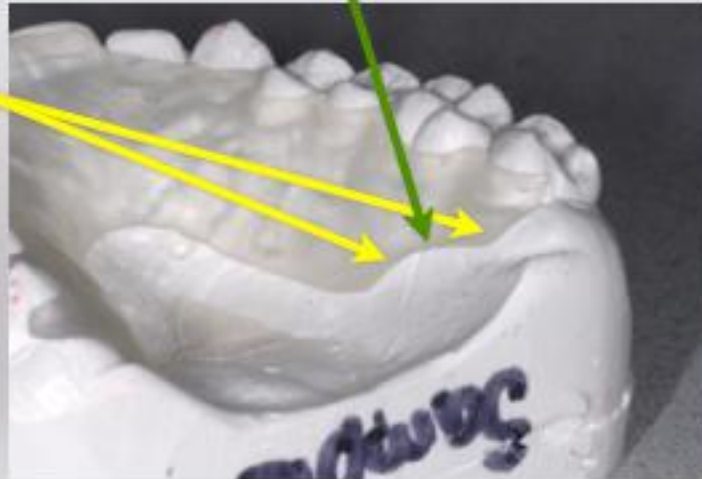
If there is not enough room behind the 2nd molar for a wing, make a flat area on the lingual flange to lift the appliance out.

Be sure the appliance is tapered enough to not rub a sore on the tongue.



Smooth into tissue

Lift area



D-PAS Supplies

Impression

Reflection Firm Putty Patterson item # 085-4729

Reflection Monophase Fast Set Patterson item # 085-4489

Model Prep

Pledge Future Premium Floor Finish Walmart 27 fl oz

Air Barrier Coating Eclipse Dentsply Patterson item # 274-2260

Model Release Agent Eclipse Dentsply Patterson item # 274-2278

Ryobi Tek4 Professional 4-Volt Infrared Thermometer Home Depot

Appliance Material

Enterra VLC Curing Unit Dentsply Patterson item # 173-4300

Eclipse Dentsply, 12-Upper Baseplate Shade-Clear, Patterson item # 274-1353

Finishing Supplies

F8 Silicone Polishers pack of 6 Preat Corporation item # 06000F8

1-800-232-7732/ 805-693-8666

Scotch Brite Brush 1", fine, 5,000 RPM Patterson item # 534-3579 12 brushes

Abbot Robinson Bristle Brush #12 Soft KOMET item #: AR9464.HP.190

Carbide Cutter KOMET item #: H351.HP.070

Delivery

Clearfil Photo Bond Universal Liquid Patterson item # 521-7567

Clearfil Photo Bond Catalyst Liquid Patterson item # 521-7559

Triad Gel Clear Colorless/Transparent, 4-22g tube,s Dentsply Patterson item # 276-7176

Pure Glycerin USP (99.5% Anhydrous) CVS 6 FL oz



Thayer Dental Lab

D-PAS Orthotic as recommended by Dr Droter
Made out of Eclipse

800.382.1240

717.697.6324

131 Old Schoolhouse Lane
Mechanicsburg, Pennsylvania 17055



Cost estimate \$110

Ask for Denise

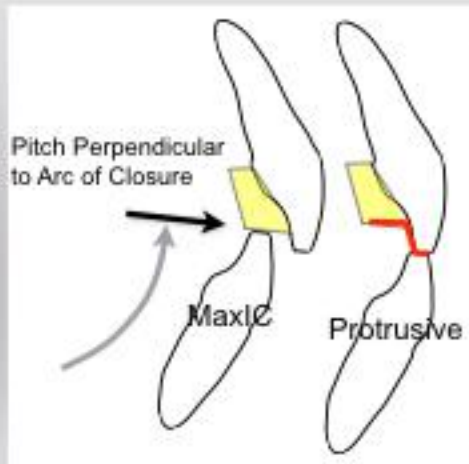
Delivering the D-PAS Orthotic

Try in Shell.
Determine if loose fit or tight fit.
If too loose reline first, otherwise
reline after.

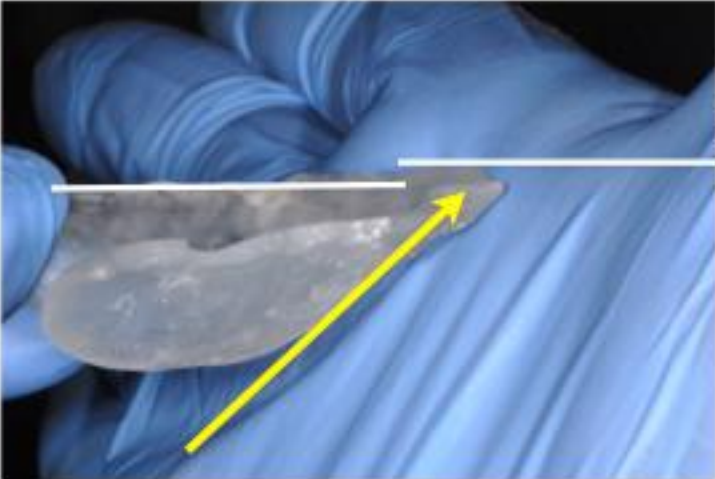


Mark with Black Accufilm

Adjust so occlusal table is perpendicular
with arc of closure and two or three
incisors are in even contact



Some Hints



The anterior stop is roughly parallel to the occlusal plane, which will be roughly perpendicular to the arc of closure

Use a new Preat Polisher, move it back to front so it will leave fine striations. All polishing is done back to front leaving a matt finish with fine striations. Any side to side parafunction movements by the patient will leave track marks going across the striations



Constantly check to make sure posterior teeth are not in contact. With a strong clench, articulating ribbon should freely be able to be pulled through the back teeth.



Once orthotic is adjusted it is now ready to reline. If loose fit, reline the whole orthotic. If good retention already, only reline the front



Wipe with Ethyl Alcohol

Apply Photo Bond to tissue side



Cure 4 Seconds
Valo Curing Light
High Power Setting





Apply even layer of Triad clear gel, 2mm thick on tissue side in either front section only, cuspid to cuspid, or the whole orthotic depending on retention desired

Seat in mouth



Wipe away Excess





Carefully Cure.

Triad gel will get very hot if cured too fast. I use Valo light in high power mode and keep the light moving so no one area has light for more than 0.25 seconds at a time. All surfaces are exposed including the palate and distal to the molars.

Using a PFI Woodson get under the edge of the orthotic distal to the molars and lift. If it comes off remove the orthotic. If it partially lifts off, use your finger in the same manner as the PFI to partially lift the orthotic and slip the PFI Woodson between the orthotic and the first molar. This will give you a good purchase point to leverage the orthotic off the teeth.



Finger Pressure



Cover all new Triad surfaces with Glycerin to cure the air inhibited layer

Cure 4 seconds each surface



Scrub 15 seconds with Chlorhexadine soap.
Rinse with water





Cover entire orthotic with Air Barrier Coating and cure in Enterra Curing Unit, Triad TransSheet setting for 4 minutes



Enterra VLC Curing Unit
DentsPly

Finish and polish



Carbide Cutter KOMET item #: H351.HP.070



F8 Silicone Polishers, pack of 6
Preat Corporation item # 06000F8
1-800-232-7732/ 805-693-8666



Scotch Brite Brush 1", fine, 5.000 RPM
Patterson item # 534-3579 12 brushes

Final Shine:
Abbot Robinson Bristle Brush #12 Soft
KOMET item #: AR9464.HP.190



