

Pankey TMD 2021

John R Droter DDS
Annapolis, Maryland

www.jrdroter.com

John R Droter, DDS

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go to www.APSleep.com

Seminar Download

Pankey TMD

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John R. Droter, DDS

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SEMINAR DOWNLOADS

Upcoming Seminars

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

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

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

Most Popular and Common Downloads

TMD Supersheet Download
[SuperTMDQx12.11](#)

Brux supersheet Download



Hello. I am:

**John R Droter DDS
Annapolis, Maryland**

*Annapolis, Maryland
John R Droter DDS*

Milestones



Visiting Faculty Spear Education 2013

Visiting Faculty LD Pankey Institute 2008

Visiting Faculty Orthodontic Program
Washington Hospital Center 2000

On staff AAMC: Orthopedic Rounds
In OR for TMJ Surgery

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

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

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



JAC 03

TMD Therapies: (60+ therapies)

Physical

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

Medicinal

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

Occlusal Orthopedic

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

Tongue Parafunction

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

Dental Orthotics

In Office Trial Anterior Stop
Palatal anterior stop
Lower posterior deprogrammer
Lower postured indexed
Lower CR Indexed
Lower TMJ Rehab flat plane
Lower full coverage CR
Lower Soft Sectional

Brux PAS with lower Essix
Myobrace
Clear Brux checker
Lateral Bruxing Device guided planes
Lateral Bruxing Device Elastomeric
Upper full coverage hard CR guard
Temporary home use anterior stop
Aqualizer

Sleep/ Fatigue

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

Surgical

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

Different Diagnoses have Different Therapies

Specific Diagnosis

TMDs- What are the choices? (190 Diagnoses, 7 Categories)

1. TMJ Damage

Arthritis (osteoarthritis or rheumatoid arthritis) seen
 Condylar hyperplasia/hypoplasia (trauma)
 Condylar hyperplasia/hypoplasia (trauma) (over)
 Condylar cysts (parathyroid hormone)
 Condylar cysts (parathyroid hormone) (over)
 Condylar cysts (parathyroid hormone) (over)
 Condylar cysts (parathyroid hormone) (over)
 Condylar cysts (parathyroid hormone) (over)
 Condylar cysts (parathyroid hormone) (over)
 Condylar cysts (parathyroid hormone) (over)
 Condylar cysts (parathyroid hormone) (over)

2. Muscles of the TMJ

Myofascial pain dysfunction
 Myofascial pain dysfunction (over)
 Myofascial pain dysfunction (over)
 Myofascial pain dysfunction (over)
 Myofascial pain dysfunction (over)
 Myofascial pain dysfunction (over)
 Myofascial pain dysfunction (over)
 Myofascial pain dysfunction (over)
 Myofascial pain dysfunction (over)
 Myofascial pain dysfunction (over)

3. Cranial Alignment/Occlusion

Malocclusion (Class I, II, III)
 Malocclusion (Class I, II, III) (over)
 Malocclusion (Class I, II, III) (over)
 Malocclusion (Class I, II, III) (over)
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 Condylar cysts (parathyroid hormone) (over)

4. Cervical Damage

Cervical spondylosis (degenerative)
 Cervical spondylosis (degenerative) (over)
 Cervical spondylosis (degenerative) (over)
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 Cervical spondylosis (degenerative) (over)
 Cervical spondylosis (degenerative) (over)

5. Parafunction

Bruxism (diurnal or nocturnal)
 Bruxism (diurnal or nocturnal) (over)
 Bruxism (diurnal or nocturnal) (over)
 Bruxism (diurnal or nocturnal) (over)
 Bruxism (diurnal or nocturnal) (over)
 Bruxism (diurnal or nocturnal) (over)
 Bruxism (diurnal or nocturnal) (over)

6. Whole Body / Systemic

Systemic sclerosis (scleroderma)
 Systemic sclerosis (scleroderma) (over)
 Systemic sclerosis (scleroderma) (over)
 Systemic sclerosis (scleroderma) (over)
 Systemic sclerosis (scleroderma) (over)
 Systemic sclerosis (scleroderma) (over)

7. Other

Other (trauma, infection, etc.)
 Other (trauma, infection, etc.) (over)
 Other (trauma, infection, etc.) (over)
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TMD Therapies: (60+ therapies)

Physical

Ice
 Hot/Cold/Hat
 Range of motion exercises
 Active Stretching: Manual, Tongue Blades, Dynasplint
 Cold Laser
 TENS in office
 TENS home use
 Refer to Physical Therapy: Rock/foam mobilization
 Refer to Physical Therapy: Postural Restoration Therapy
 Refer to Physical Therapy: Triggerpoints
 Refer to Chiropractic: Atlas Orthogonalist
 Refer to Osteopathic MD: Body alignment

Medicinal

Anti-inflammatory:
 NSAIDs
 Tetracycline low dose
 CBD oil/menthol
 Glucosamine/Chondroitin MSM
 Vitamins: Vitamin D, Vitamin B12
 Minerals: Magnesium
 Minerals: Iron
 Refer to MD for Lyme therapies
 Refer to MD Rheumatoid Arthritis therapies
 Botox Masseter injections
 Botox Lateral Pterygoid injections

Dental Orthotics

In Office Trial Anterior Stop
 Palatal anterior stop
 Lower posterior deprogrammer
 Lower posterior interad
 Lower CR interad
 Lower TMJ Rehab flat plane
 Lower full coverage CR
 Lower Soft Sectional

Brux PAS with lower Essix
 Myofascial
 Clear Brux checker
 Lateral Bracing Device guided planes
 Lateral Bracing Device Elastomeric
 Upper full coverage CR guard
 Temporary home use anterior stop
 Aquasizer

Occlusal Orthopedic

Lingual Light Wire
 Lower soft sectional orthotic
 Condylar distraction
 Sectional orthodontics
 Expansion orthopedic/orthodontics
 Occlusal Adjustment

Tongue Parafunction

Refer for Cervical Alignment/ Stabilization
 Myofascial
 Upper Lingual light wire
 Clear Brux Checker
 Fraxotomy
 Myofunctional therapy

Sleep/ Fatigue

Mouth taping
 Diet Modification
 Postural Therapy
 Vitamins: Vitamin D, Vitamin B12
 Minerals: Magnesium, Iron
 Lateral Bracing Device guided plane
 Lateral Bracing Device Elastomeric
 Mandibular Advancement Device
 CPAP

Specific Therapy

Dr Guy Haddix had been taking CT scans since 1990

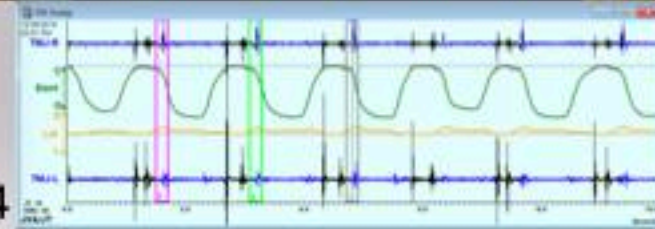


CT and MRI Scans in my practice since 1992.



Closet full of printed scans just as digital appeared!!

Compare CT, Mounted models, MRI, JVA before and after a case. What can I see now?



JVA since 2004

Lingual Light Wire- Crozat Arch Expansion

Age 29

Start



7 months LLW

Age 30



Anterior Openbite Non Surgical Treatment: Moving the Maxilla



Anterior Openbite with Active TMJ Bone Loss

Non Surgical Therapies



Condylar Distraction



Meloxicam and Doxycycline



Restorative Dentistry

Pathological Occlusion

??Airway Related Bruxing?



Restore Function

Composite Trial Occlusion

AHI + 26 CPAP



Anterior guidance
or group function?



Disclosures:

Atomic Skis- Sponsored.
I do benefit financially.

LD Pankey Institute- I am paid
a small honorarium for lectures

Spear Education- Paid
honorarium for lectures

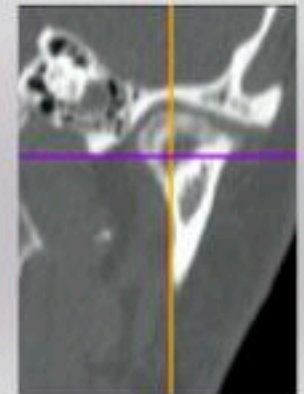
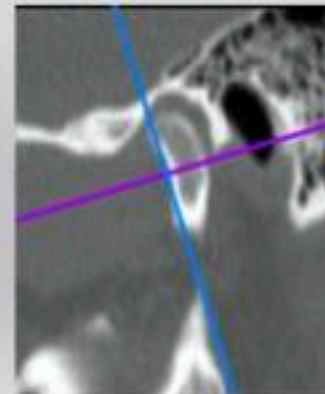
Patent on sleep device: LatBrux
Co-Owner of ArrowPath Sleep



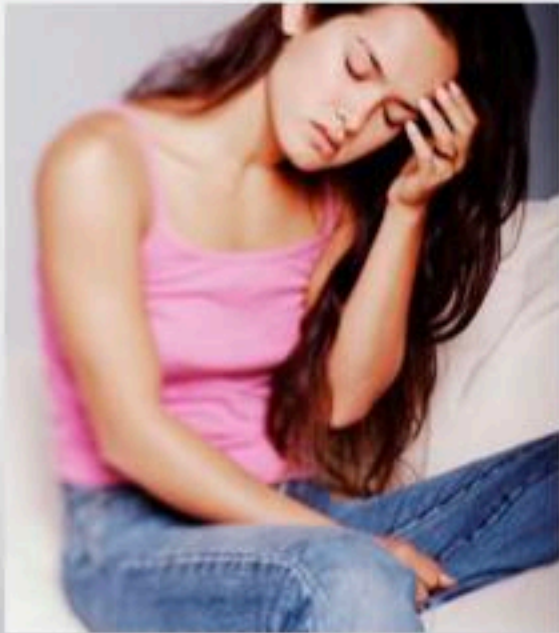
All of my slides have been altered with
respect to cropping and exposure.
None have been "photoshopped" to misrepresent reality

I have chosen the most representative slice of and MRI and CT
scans to best represent what you would see if viewing all images

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



You have TMD patients in your practice



Headaches



Fatigued

Parafunctional
Clenching



16 yo F

Parafunctional Grinding



Why is TMD So Confusing?

John R Droter DDS
Annapolis, Maryland

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John R Droter DDS

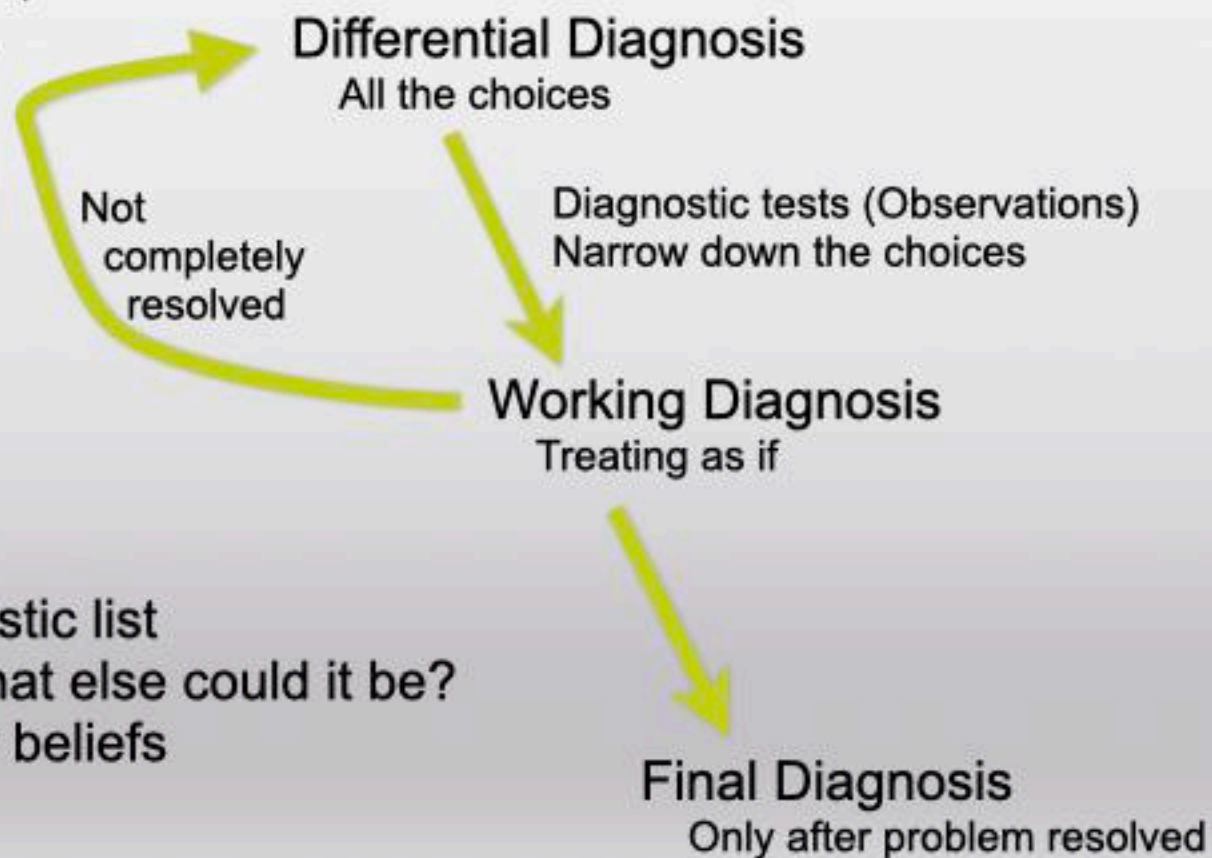
The Diagnostic Process

When diagnosing and treating facial pain, we have entered the world of medicine.



Think!!

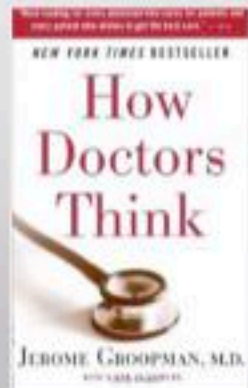
Always make a differential diagnostic list
Ask, "It appears to be this, but what else could it be?"
Be aware you are blinded by your beliefs



Differential Diagnosis

Diagnostic Boxes: Pattern Recognition

“My Tooth Hurts”



Differential Diagnosis

Diagnostic Boxes: Pattern Recognition

“My Tooth Hurts”

Reversible Pulpitis secondary to caries

Irreversible Pulpitis secondary to caries

Pulpitis secondary to split tooth

Pulpal necrosis

Referred Pain from Muscle
Trigger Point

Sinus Infection

Sympathetic Mediated Pain

Neuroma

Periodontal Infection

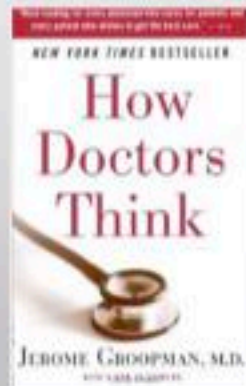
Inflamed Tissue secondary to
popcorn husk

Aphthous Ulcer

Periodontal ligament inflammation
secondary to Occlusal Trauma

Pulpitis secondary to Occlusal Trauma

Other

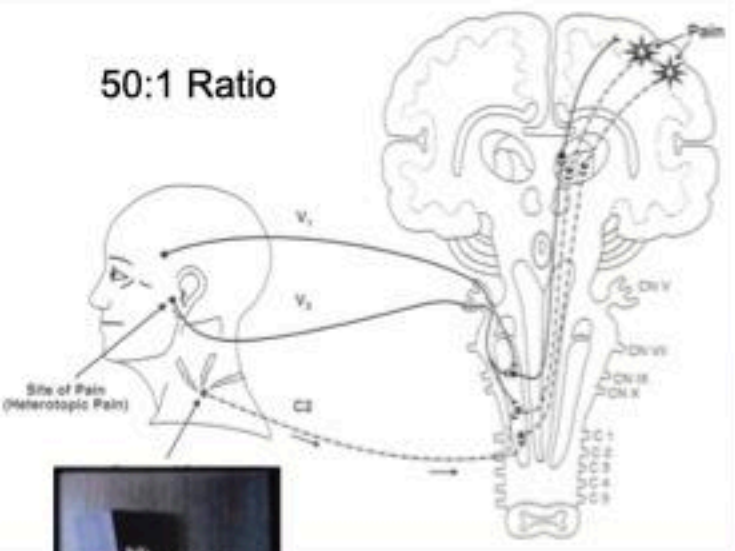


Referred Pain

Convergence

More primary sensory neurons than secondary neurons that travel to brain

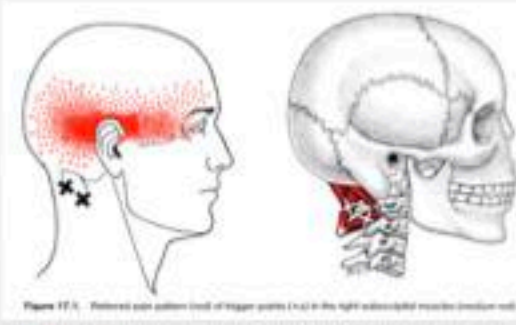
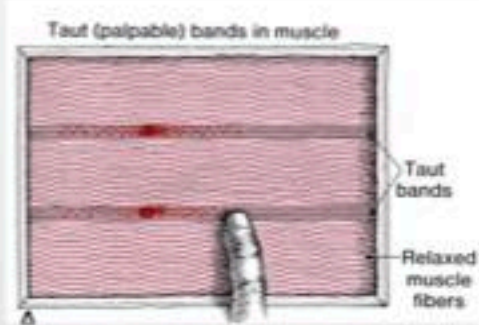
50:1 Ratio



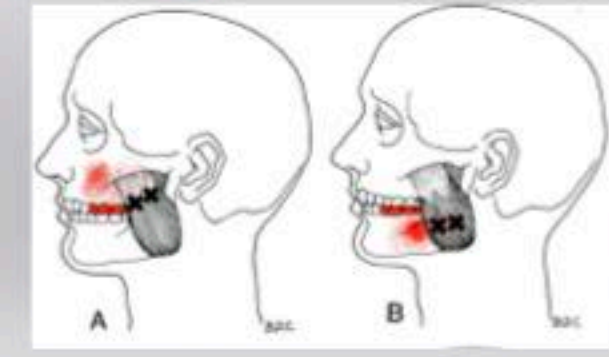
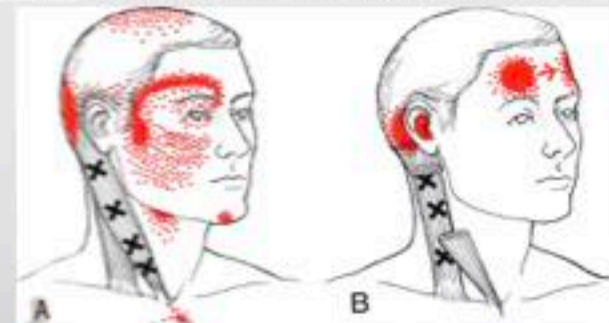
"Bell's Orofacial Pain"
Jeffery Okeson

Trigger Points

Contracted mass of actin, myosin and histamine



"The Trigger Point Manual"
Janet Travell, MD



Differential Diagnosis

Diagnostic Boxes: Pattern Recognition

“My Tooth Hurts”

Reversible Pulpitis secondary to caries

Irreversible Pulpitis secondary to caries

Pulpitis secondary to split tooth

Referred Pain from Muscle
Trigger Point

Periodontal Infection

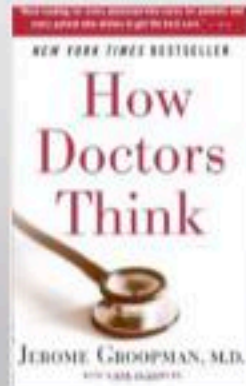
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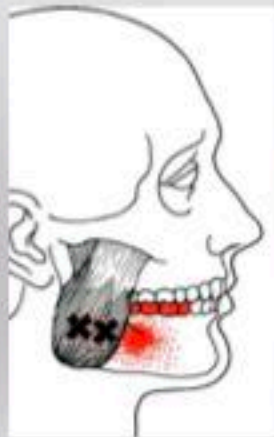
Other



“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



Differential Diagnosis

Diagnostic Boxes: Pattern Recognition

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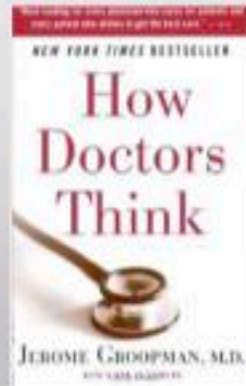
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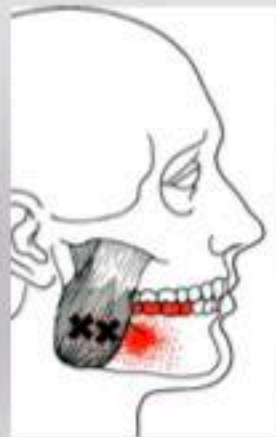
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Always make a differential diagnostic list

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TMJ/TMD Confusion



Dogmatic
Arguments



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).

TMDs- What are the choices? (190 Diagnoses, 7 Categories)

1. TMJ Damage

Adhesions and ankylosis of temporomandibular joint
Avascular Necrosis Mandibular Condyle
Cartilage Fibrillation, Mandibular Condyle, Fossa
Closed Lock, Jaw Cartilage, Acute
Closed Lock, Jaw Cartilage, Chronic
Closed Lock, Jaw Cartilage, Intermittent, Mechanically dysfunctional
Crush Injury Mandibular Condyle
Crystal arthropathy, unspecified, TMJ
Dislocation jaw cartilage due to injury, Sequela
Dislocation jaw cartilage with reduction, favorable adaptation, TMJ
Dislocation jaw cartilage without reduction, favorable adaptation, TMJ
Effusion, TMJ

Impingement Retrodiscal Tissue
Inflammatory Tissue Bone Resorption, TMJ Condyle
Loose Body (Joint Mice), TMJ
Malignant neoplasms of bones of skull and face
Open Lock TMJ, Recurring
Osteoarthritis TMJ, active degeneration
Osteoarthritis- inactive
Osteochondritis Dissecans TMJ
Osteolysis Mandibular Condyle, Active
Perforation Meniscus, TMJ
Perforation Pseudodisc, TMJ
Psoriatic Arthritis TMJ
Rheumatoid Arthritis Seronegative TMJ

2. Muscles of the TMJ

Dystonia
Habitual posture forward mandible
Hemifacial Muscle spasm
Inhibitory Reflex Dysfunction, Periodontal Ligament Masseter Muscle
Muscle Atrophy, TMJ
Muscle Bracing Neck Stabilization
Muscle Bracing Pain Avoidance
Muscle Bracing TMJ stabilization
Muscle Bracing Airway Patency (with Tongue)
Muscle Contracture Fibrosis Lateral Pterygoid
Muscle Contracture Fibrosis Masseter, Medial Pterygoid, Temporalis
Muscle Fatigue Overuse
Muscle Hypertrophy TMJ Muscles

3. Cranial Alignment/Occlusion

Cranial Distortion / Misalignment
Hemifacial Hypoplasia
Hyper Occlusal Awareness
Idiopathic Orthotic Damage
Malocclusion Anterior Open Bite
Malocclusion Centric occlusion MesioC discrepancy
Malocclusion Deep Bite
Malocclusion due to mouth breathing
Malocclusion due to TMJ bone loss
Malocclusion due to tongue, lip or finger habits
Malocclusion Insufficient anterior occlusal guidance
Malocclusion lack of posterior occlusal support
Malocclusion Posterior Openbite Bilateral
Malocclusion Posterior Openbite Unilateral
Malocclusion unspecified

Malposition/Misalignment: Maxilla, Temporal Bone, Mandible
Mandibular asymmetry
Mandibular hyperplasia
Mandibular hypoplasia
Mandibular Retrognathia
Maxillary asymmetry
Maxillary hyperplasia
Maxillary hypoplasia
Maxillary Retrognathia
Occlusal Adaptation, Favorable
Occlusal Dependency for Joint Stabilization/ Proprioception
Tooth Intrusion
Tooth Supereruption

4. Cervical Damage

Cervical Vertebrae Alignment Dysfunction
Cervicocranial Syndrome
Muscle Guarding (see Neck Instability)
Trigger Point Neck Muscle with Referred Pain
Trigger Point Neck Muscle, Localized Pain

5. Parafunction

Excessive Tooth Wear, Damage
Hypereruptive Occlusion
Parafunctional Clenching Teeth, Awake
Parafunctional Clenching Teeth, Sleep
Parafunctional Grinding Teeth, Awake
Parafunctional Grinding Teeth, Sleep
Parafunctional Clench/Grind Wiggle
Parafunctional Tongue Bracing avoiding uncomfortable tooth contact
Parafunctional Tongue Bracing Neck stabilization
Parafunctional Tongue Bracing to maintain Airway
Parafunctional Tongue Bracing unknown cause

6. Whole Body / Systemic

Lyme Disease Arthritis
Magnesium Deficiency
Obstructive Sleep Apnea
Osteoporosis without current pathological fracture
Pathological Habitual Movement Pattern
Postural Deformity Standing
Postural Deformity Walking
Postural Forward Head Position
Upper Airway Resistance, UARS

7. Other

Nerve Entrapment Masseteric Nerve due to Masseteric hypertonicity
Neurosensory Trigeminal Nerve
Obsessive-Compulsive Personality Disorder
Other
Otitis Ear Infection
Pain disorder exclusively related to psychological factors, Somatoform pain disorder
Pain disorder with related psychological factors
Peripheral Sensitization

1. TMD: TMJ Damage and Diseases

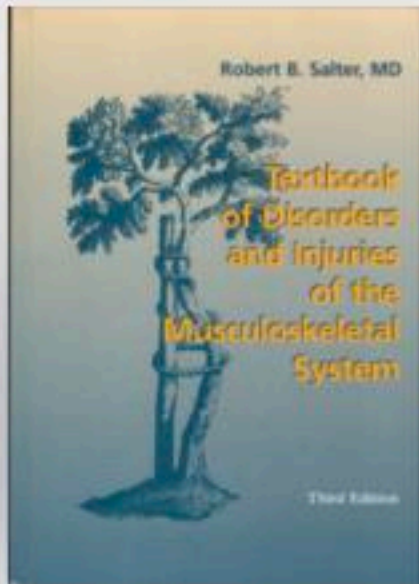
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Effusion, TMJ
Fracture of subcondylar process of mandible
Gout, TMJ
Growth Disturbance Prepuberty due to TMJ damage
Hemarthrosis TMJ, Traumatic
Hyperplasia Mandibular Condyle,
Hypoplasia Mandibular Condyle
Hypoxia Reperfusion Injury, TMJ Cartilage Damage
Hypoxic Progressive Condylar Resorption

Impingement Retrodiscal Tissue
Inflammatory Tissue Bone Resorption, TMJ Condyle
Loose Body (Joint Mice), TMJ
Malignant neoplasm of bones of skull and face
Open Lock TMJ, Recurring
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Perforation Meniscus, TMJ
Perforation Pseudodisc, TMJ
Psoriatic Arthritis TMJ
Rheumatoid Arthritis Sero Negative TMJ
Rheumatoid Arthritis TMJ
Sprain Discal Ligament TMJ, acute with joint edema
Subluxation on Loading, TMJ
Subluxation on Movement, TMJ
Synovial Cyst (Ganglion Cyst)
Synovial Hyperplasia
Synovitis

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

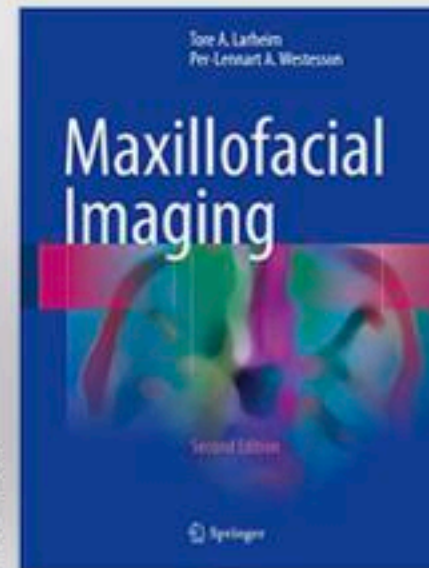
Understanding orthopedic medicine is the key to understanding joints, including the TMJ



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



Stomatognathic System Interrelationship

A change in any one area will affect the others

CNS/PNS

Skull

TMJ

Teeth

Mandible

Teeth

Neck

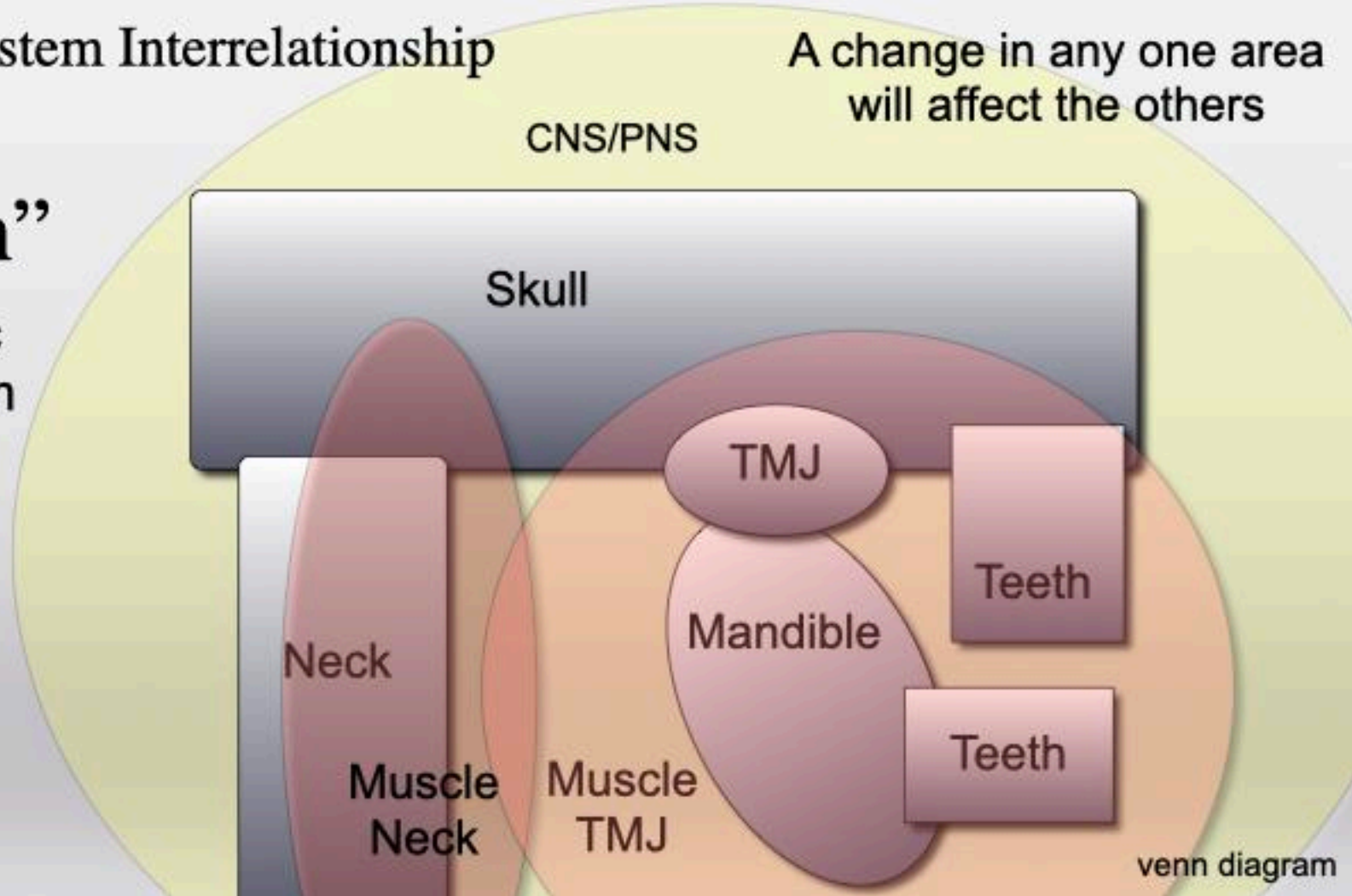
Muscle Neck

Muscle TMJ

venn diagram

“Adaptation”

This is a **dynamic** orthopedic System



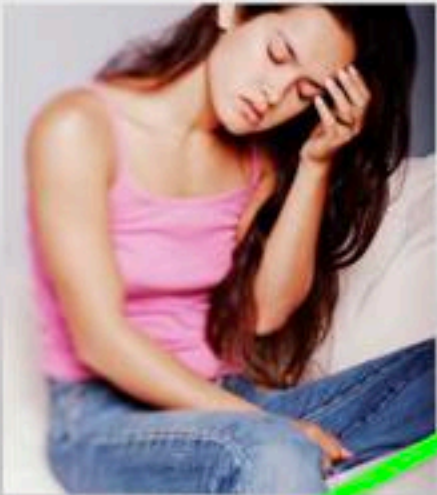
TMD Symptoms

- 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



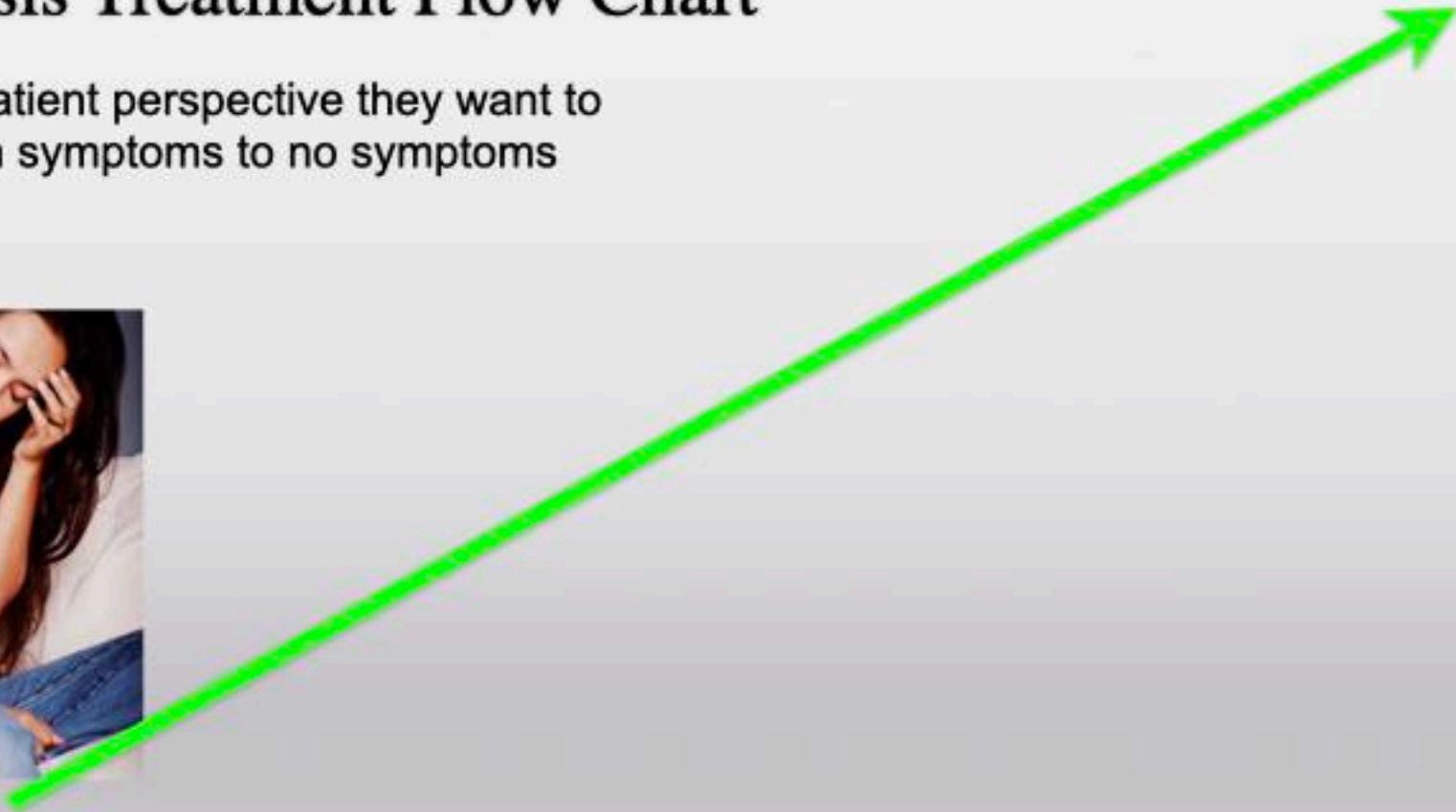
Diagnosis Treatment Flow Chart

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



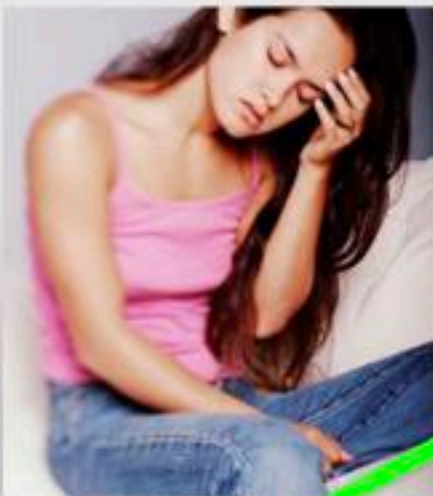
Symptoms

No Symptoms

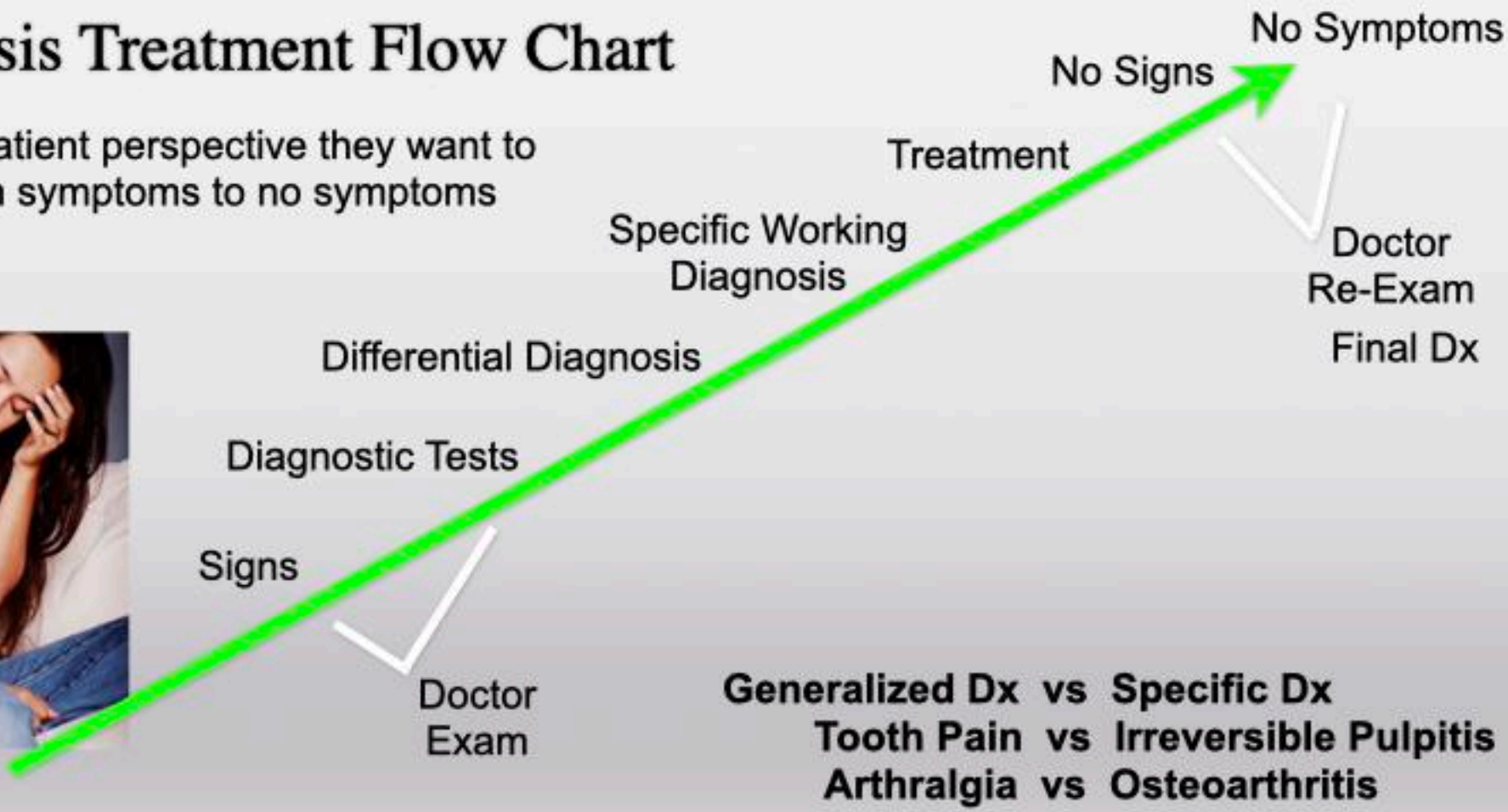


Diagnosis Treatment Flow Chart

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



Symptoms



Diagnosis Treatment Flow Chart

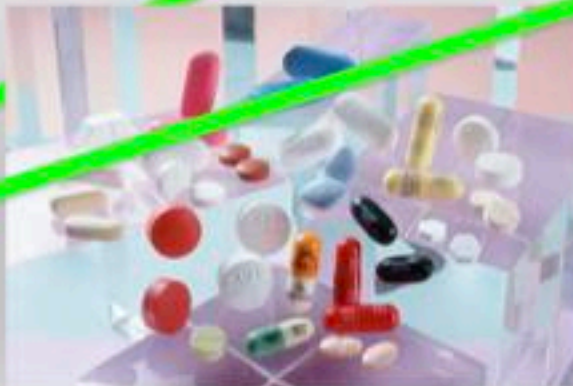
From a patient perspective they want to go from symptoms to no symptoms

No Symptoms

Less Symptoms



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.

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

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



TMD is a symptom based (generalized) diagnosis

TMD Symptoms

Difficulty chewing

Pattern:

Jaw gets tired when chewing
chewy foods

Diseases to consider and rule out:

Occlusal Muscle Dysfunction

Arthralgia- Painful TMJ

Temporal Arteritis

Other

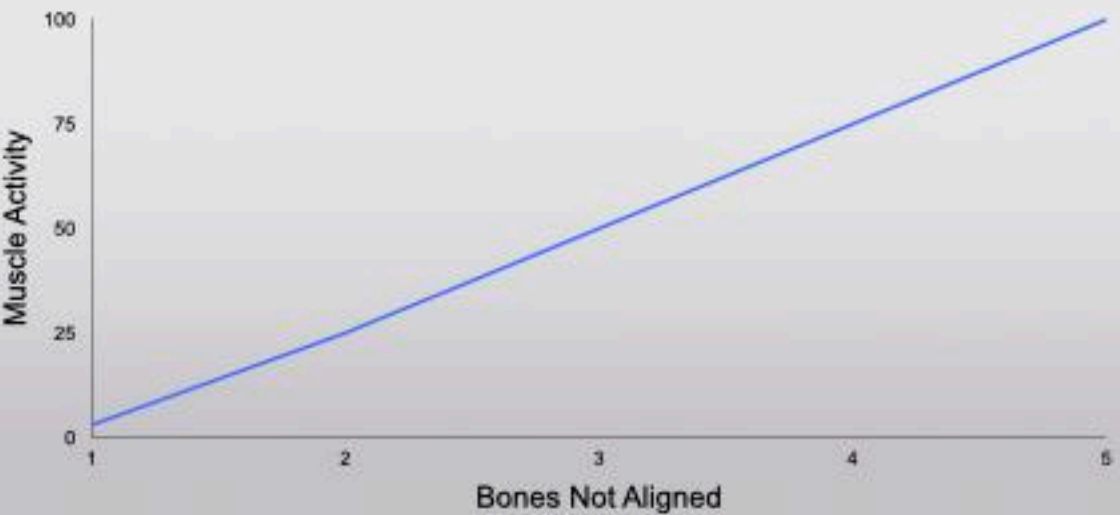


Acute vs Chronic

Orthopedic Medicine- Optimal Load Bearing Position

Every joint has an optimal load bearing position-
Most Bone Support/ Least Muscle Bracing when Loaded

Centric Relation- Optimal Load bearing position of the TMJ-
Most Bone Support/ Least Muscle Bracing when Loaded



Which position can you hold the longest?



Nemeth G, On hip and lumbar biomechanics. A study of joint load and muscular activity, Scand J Rehabil Med Suppl. 1984;10:1-35.

Occlusal Muscle Disharmony

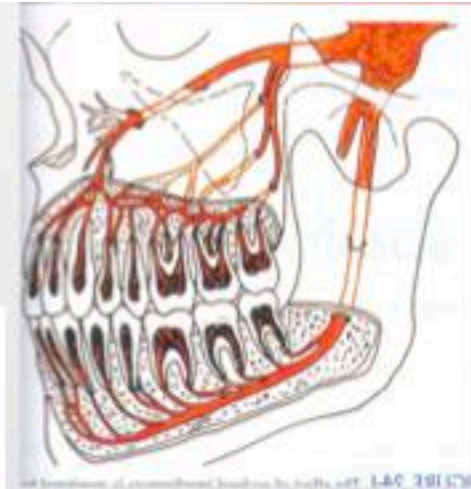
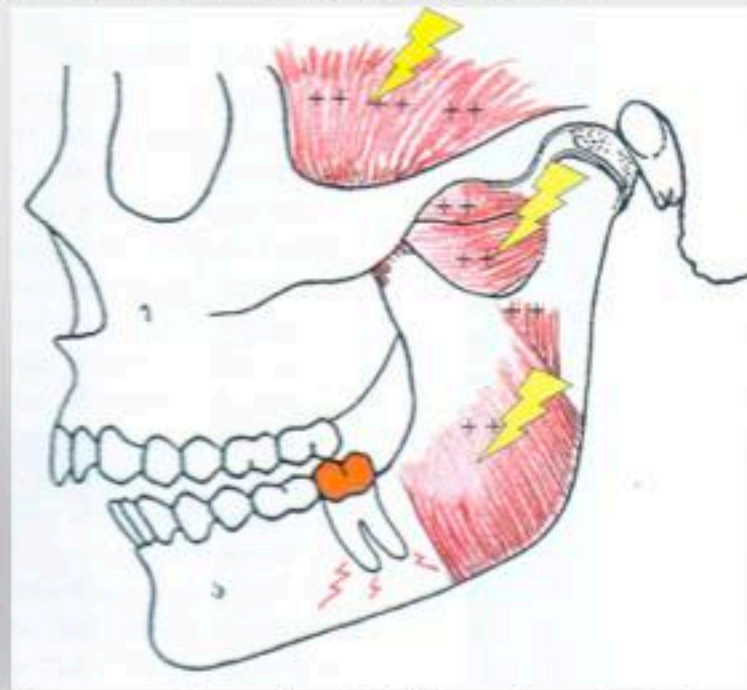
Uneven tooth contact with condyles fully seated triggers muscle activity

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

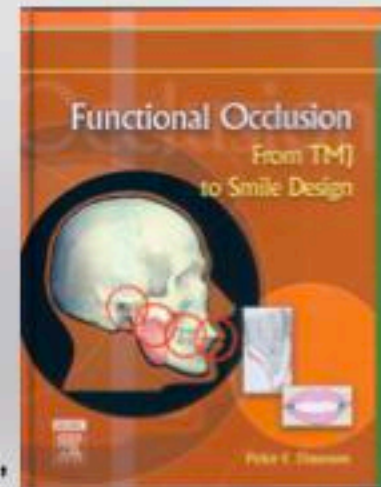
Disharmony in all muscles: Splinting/Bracing

Muscles sore from overuse

Muscles do not think- CNS input



from Dawson's Textbook, "Functional Occlusion"



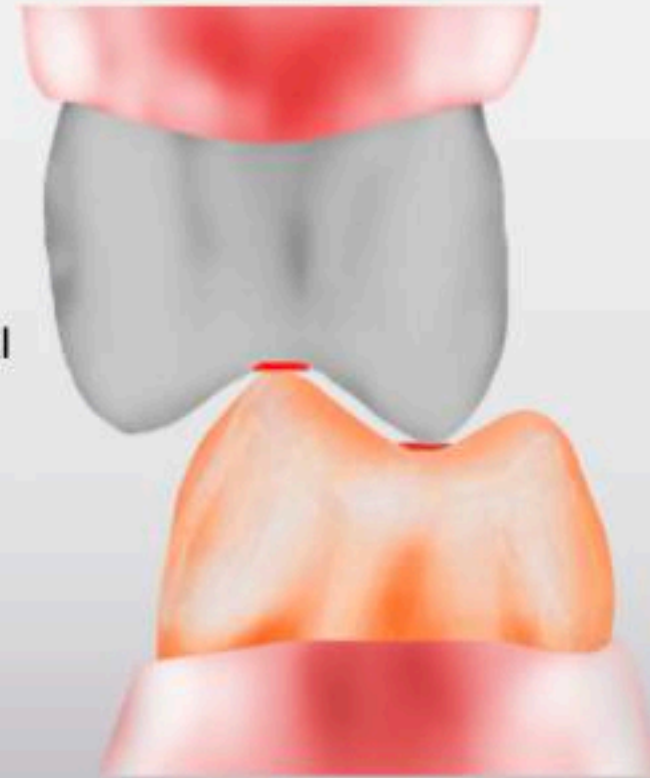
LD Pankey's 3 Rules of Occlusion

(Clyde Schuyler)

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

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

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



Drawing by Dr Jim Kessler



LD Pankey's 3 Rules of Occlusion Literature

(Clyde Schuyler)

Schuyler CH. J Florida Dent Soc, 1938.

Occlusal disharmony and its relation to oral discomfort.

Schuyler CH. J Am Dent Assoc. 1958 Aug;57(2):221-31.

Factors of occlusion to be observed in everyday practice.

Schuyler CH. J Pros Dent. 1963 Nov: 13(6): 1011-29.

The function and importance of incisal guidance in oral rehabilitation.

Kerstein, R. B., & Radke, J. (2012). Cranio 30(4), 243–254.

Masseter and temporalis excursive hyperactivity decreased by measured anterior guidance development.

Kerstein, R. B., & Radke, J. (2016). Cranio pp1–17.

Average chewing pattern improvements following Disclusion Time reduction.



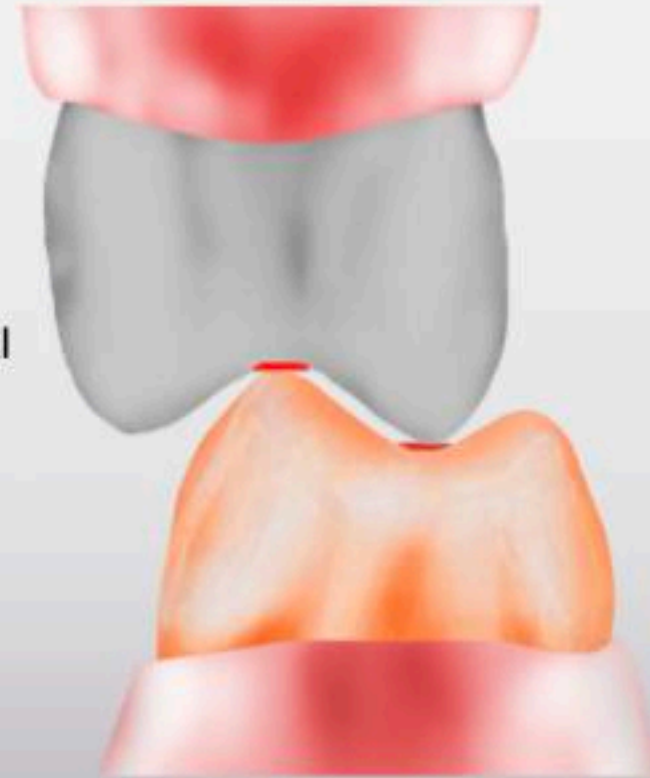
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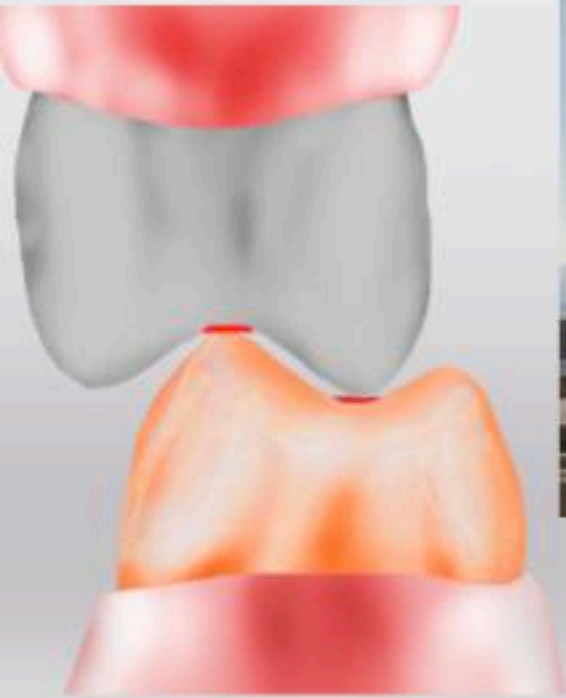
Bonus Observation- All the above work much better the closer the teeth are to being on the Curve of Spee and Curve of Wilson



Drawing by Dr Jim Kessler

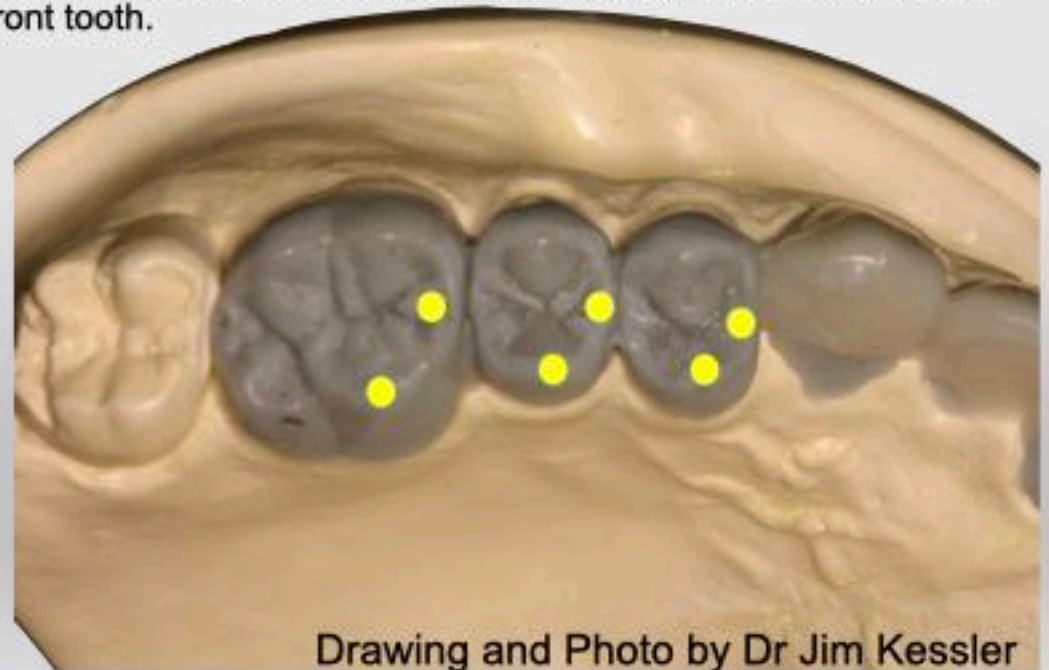
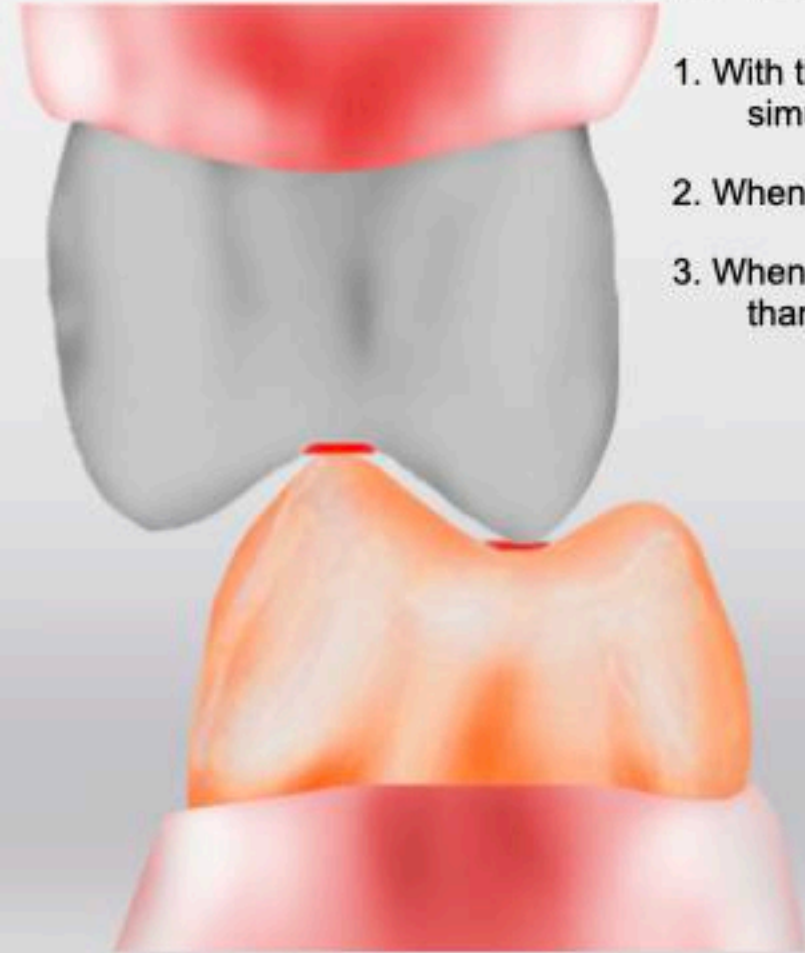
2. When you squeeze, neither a tooth nor the mandible moves (in a lateral direction).

Rule #2 = Flat Landing Area



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

1. With the condyles fully seated in the fossa, all the posterior teeth touch simultaneously and even, with the anterior teeth lightly touching.
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3. When you move the mandible in any excursion, no back tooth hits before, harder than, or after a front tooth.



Drawing and Photo by Dr Jim Kessler

Curve of Spee and Curve of Wilson

From Dawson Text Book "Functional Occlusion"



Fig. 7-1. The curve of Spee begins at the top of the condyle and touches the tips of the cusp tips of all the posterior teeth.

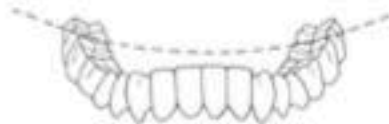


Fig. 7-2. The curve of Wilson is the mediobuccal curve that contacts the buccal and lingual cusp tips on each side of the arch.

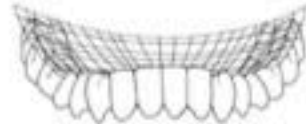
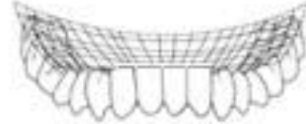
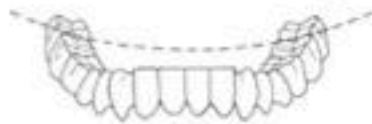
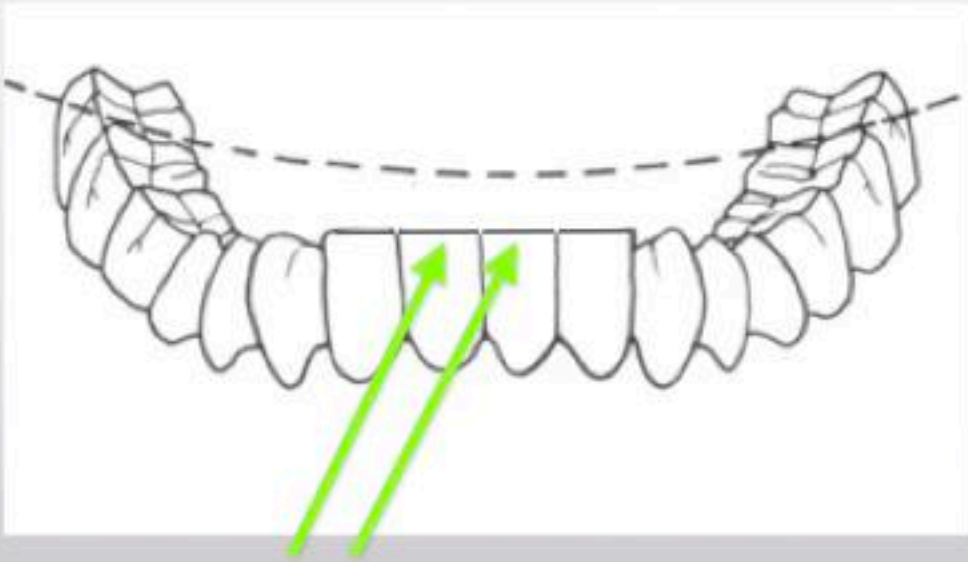


Fig. 7-3. The curve of occlusion contains a composite of the curve of Spee, the curve of Wilson, and the curve of the incisal edges. It is more often called the plane of occlusion when it is related to the cranium.

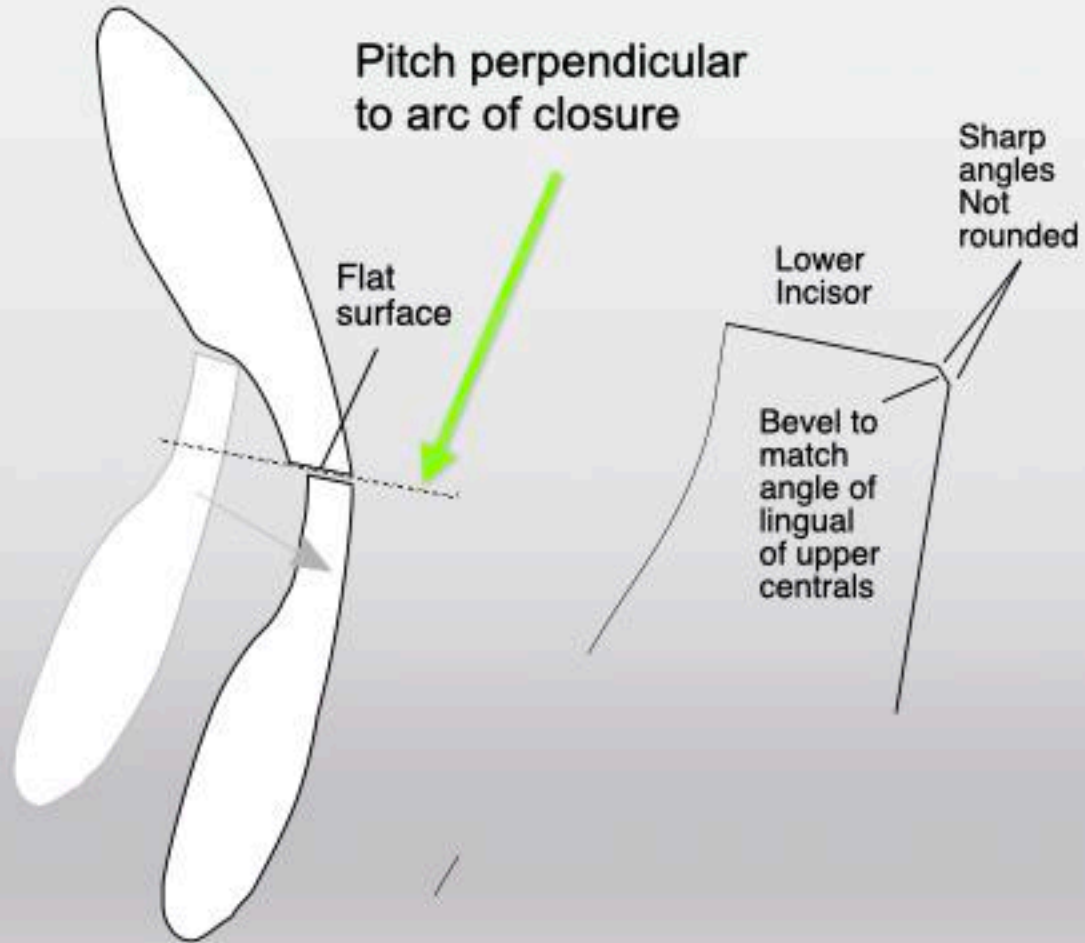
Modified by John R. Droter, DDS



Pitch and Bevel of Incisors



Flat Table Top Dance Floor on Central Incisors



I learned importance of this from Guy Haddix

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

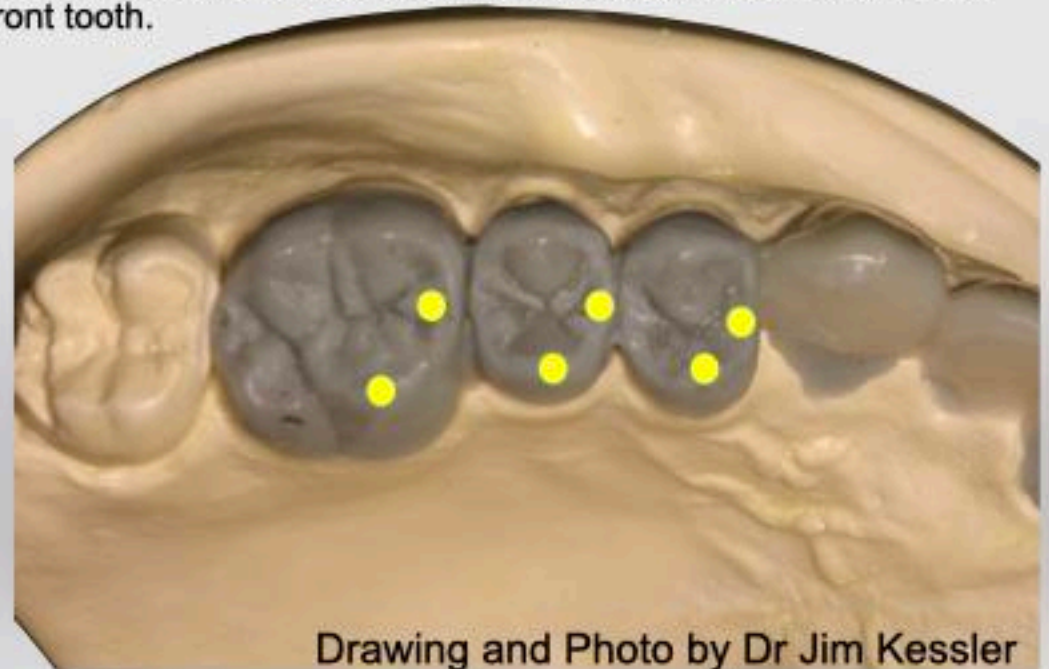
1. Swallowing

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. Chewing

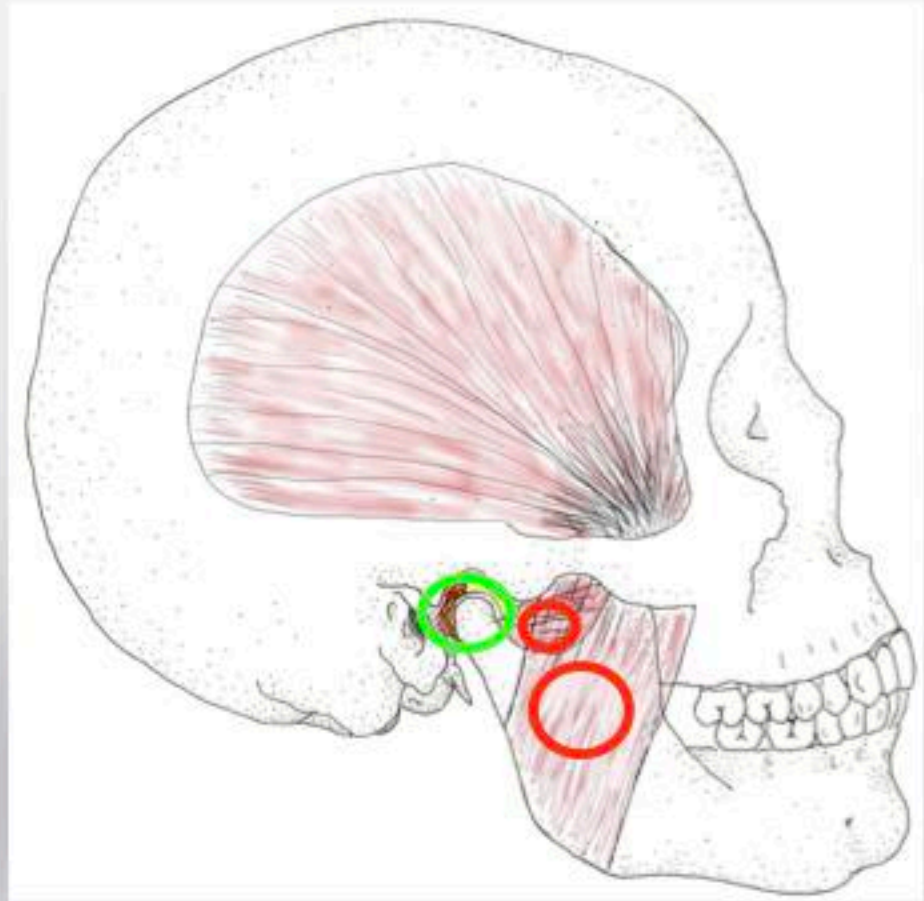
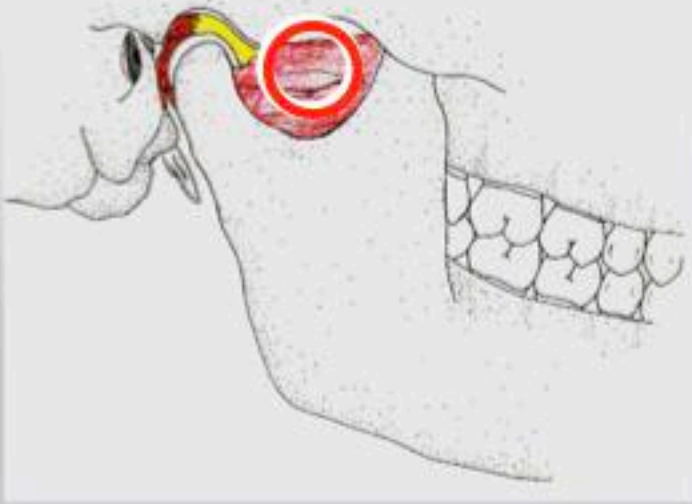
3. When you move the mandible in any excursion, no back tooth hits before, harder than, or after a front tooth.



Drawing and Photo by Dr Jim Kessler

Occlusal Muscle Dysfunction Pattern

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



Drawings by Gretta Tomb DDS and John Droter DDS

Anterior Stop Orthotic In Office Diagnostic Test



Reline with Parkell Blu-Mousse Super Fast

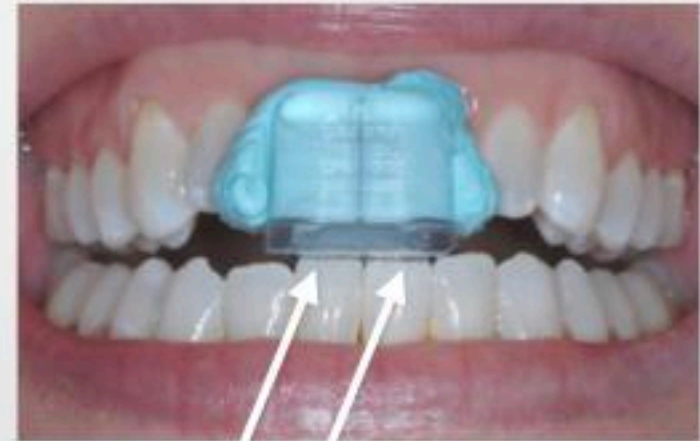


Can do 2nd reline over top of the first if needed

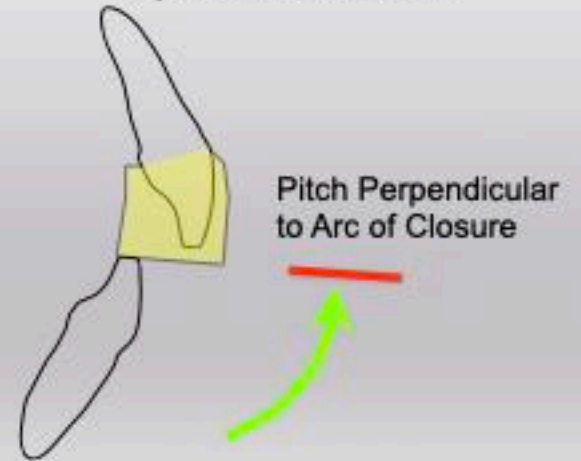


APS Anterior Stop 2.5mm

Easy to hold and align
Built in undercuts
Long enough for class 2 and class 3
Is bondable to composite



2 points of contact



Anterior Stop Orthotic In Office Diagnostic Test



ArrowPath Sleep
Anterior Stop



Deprogram Muscle Engrams

If pain reduces, Occlusion/ Cranial Alignment and/or Muscle Engrams are part of the problem

With anterior stop in place:

5-10x wide open solid tap, open tap far left, open tap far right

2nd round same except Dr unexpectedly accelerates closing a few times

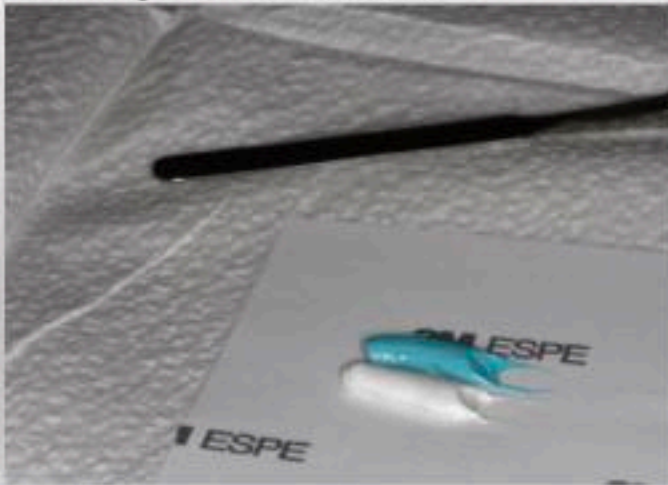
Occipital Lift with 3 deep breaths. Posterior neck opening muscle massage.

3rd round same as first except less taps each position

Office USE ONLY Do not send home with patient

Anterior Stop Orthotic In Office Diagnostic Test

Can do 2nd mix to
overlay 1st if needed



Anterior Stop Orthotic In Office Diagnostic Test

Does the occlusion, cranial alignment, and/or muscle bracing have anything to do with the dysfunction or pain?

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



ArrowPath Sleep
Anterior stop 2.5 mm

>30% of headaches have an occlusal component

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

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

Centric Relation Orthotic

Trial of Harmonious Occlusion 24/7

LD Pankey Rules of Occlusion

Condyles fully seated

Dots in the Back

Lines in the Front

OMD is a daytime problem. Wear 24/7.

Patient gets to experience a full, solid, harmonious bite 24/7.

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

See patient at week # 1, 2, 4. Done in 3- 6 weeks.



Must not rock or be squishy



Anatomic Orthotic by Dr. Buzz Raymond



Pankey Study Clubs
Tanner Study Clubs



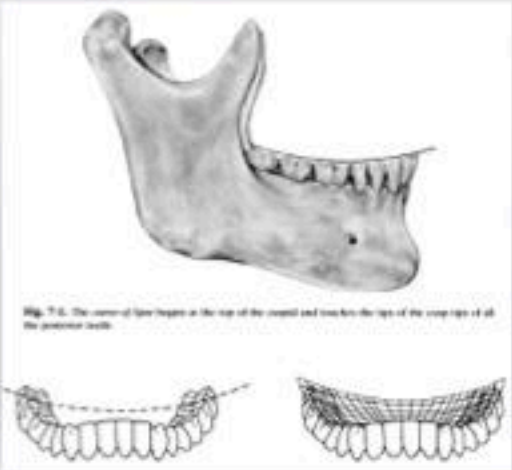
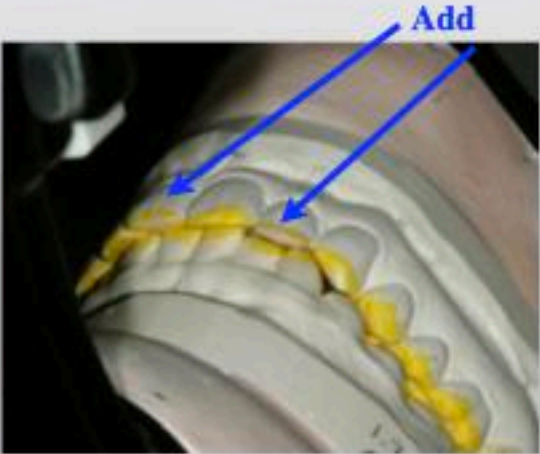
Lower Flat Plane
Centric Relation
Orthotic by
Glenn Kidder



Occlusal Adjusting is an Esthetic Procedure Form Follows Function



Before



After

Occlusal Sculpting Tools, including Zirconia



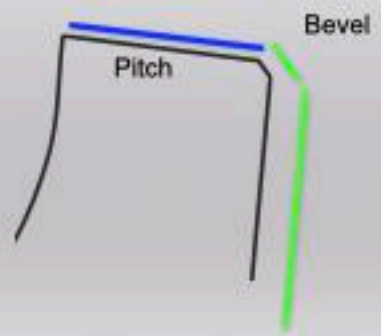
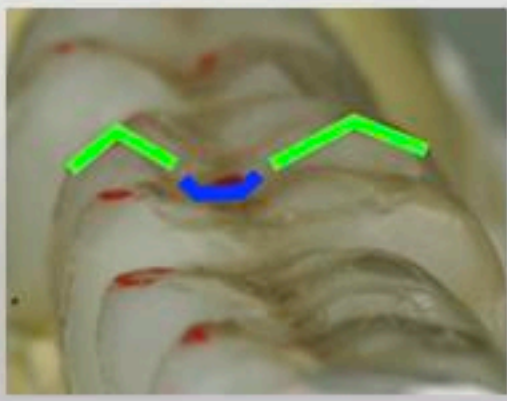
Wheel
 Create Cusp Landing Zone
 Flatten Incisal edges
 Bulk reduction of inclines



Move and Shape Cusps,
 Inclines, Facial Surfaces



Brassler Brio Shine
 FLBCER-1
 FLBF-2



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

Start Age 50



Lingual Light Wire w/ Sectional Ortho

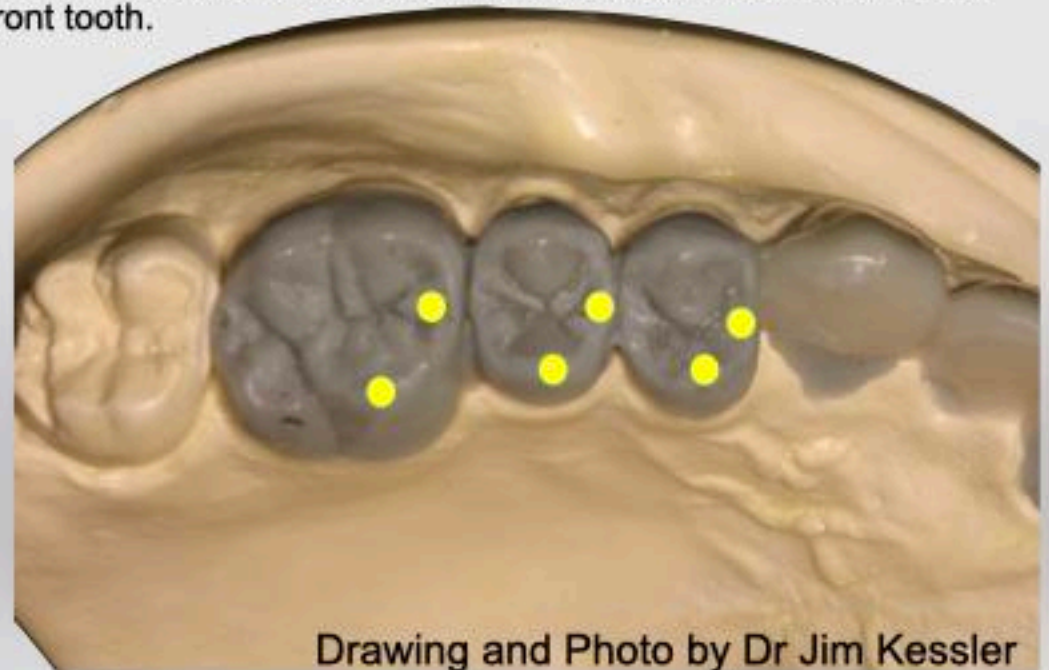
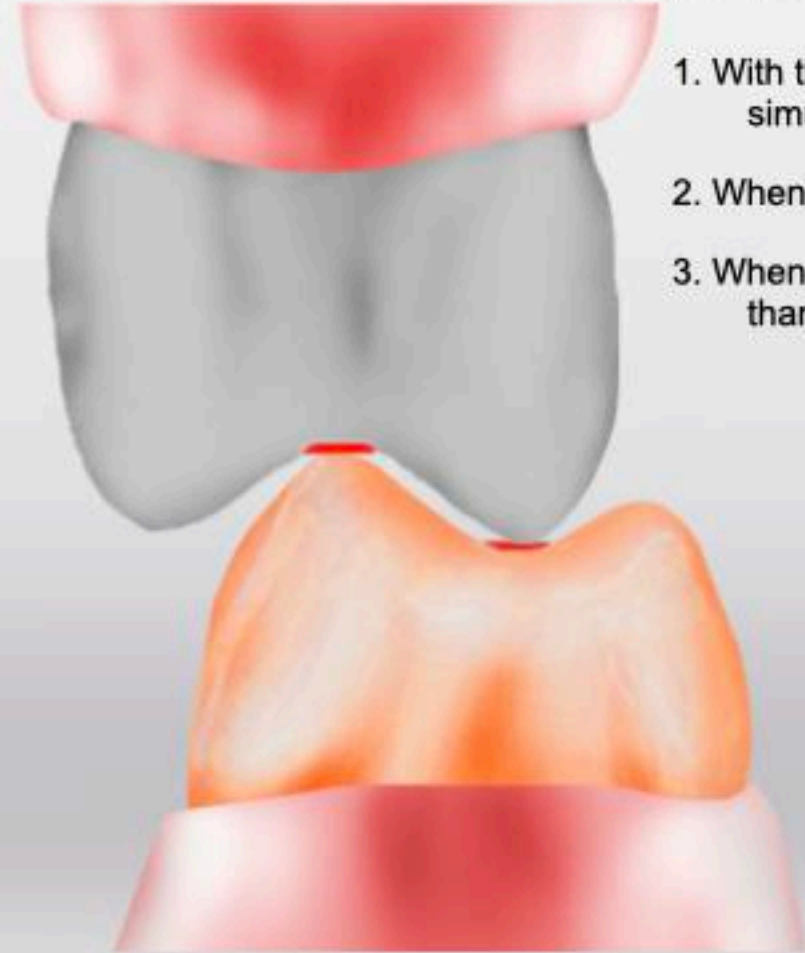


Post Occlusal Reshaping



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Drawing and Photo by Dr Jim Kessler

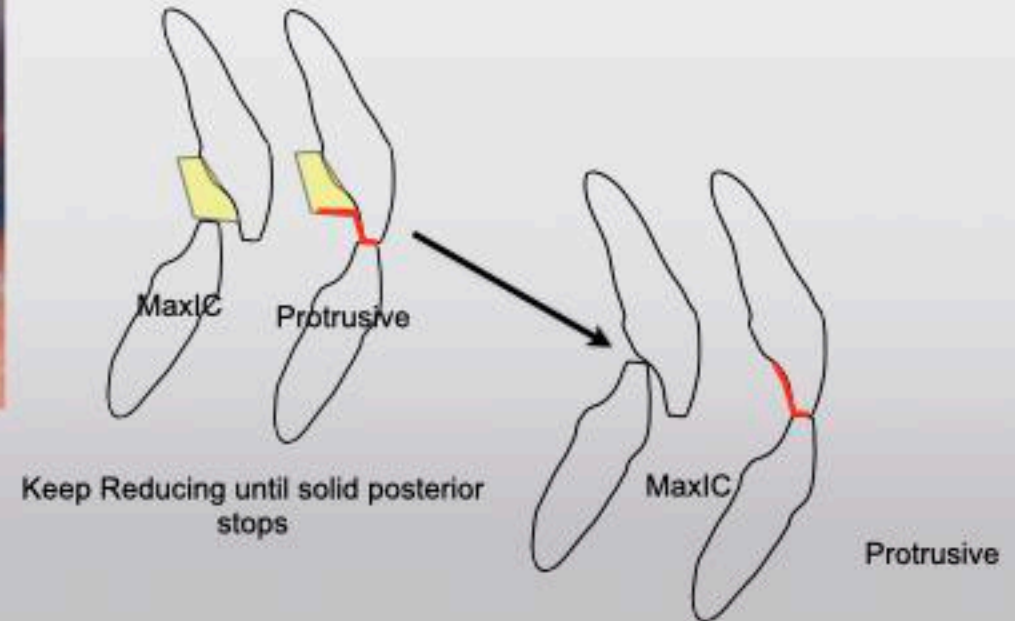
Occlusal Adjustment Treatment Assist Orthotic Deprograms throughout the occlusal adjustment



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



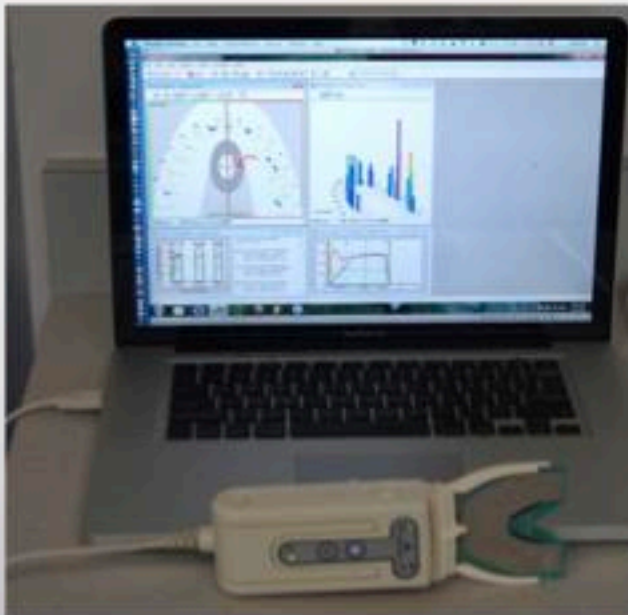
Learning the skill of occlusal adjusting to treat occlusal pathology is the doorway into a world of dentistry most do not even imagine. Creating a more harmonious occlusion is a wonderful service to provide for your patients.



More Harmonious Occlusion \neq Perfect

T-Scan Computerized Occlusion

Occlusion Live and in Slow Motion



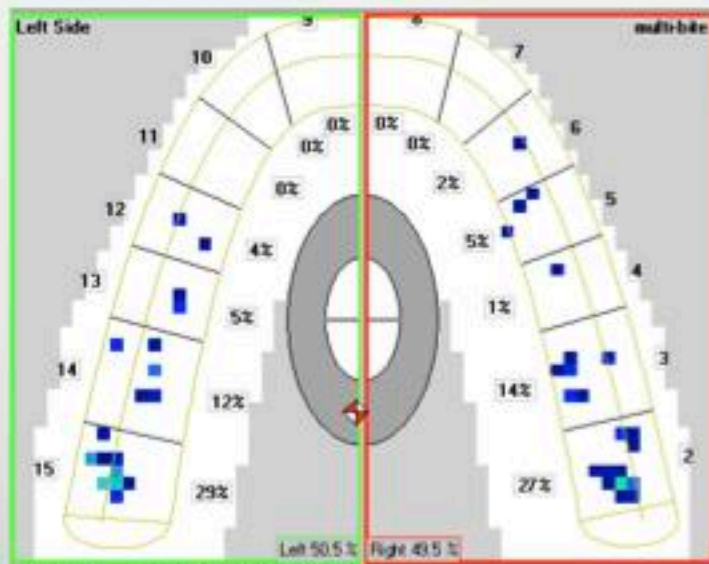
Articulating Paper leaves evidence after the events
Not Live
All events lumped together

Using Since 1999

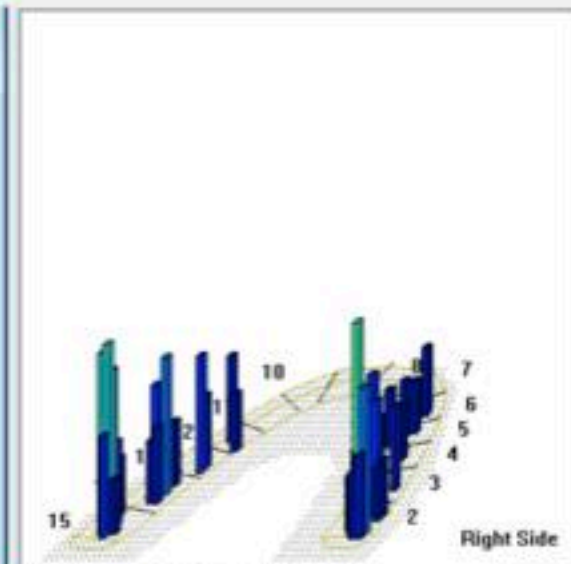


Time Force Graphic Representation of the Occlusion

T-Scan Gives you:
 Timing
 Intensity
 Location
 Distribution

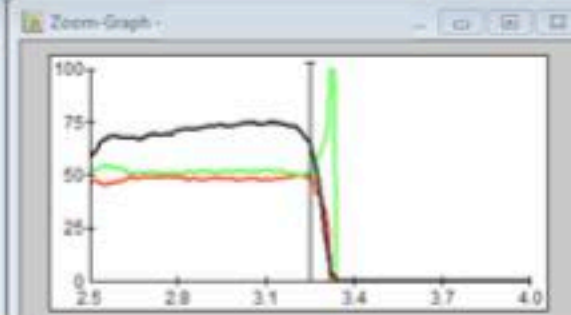
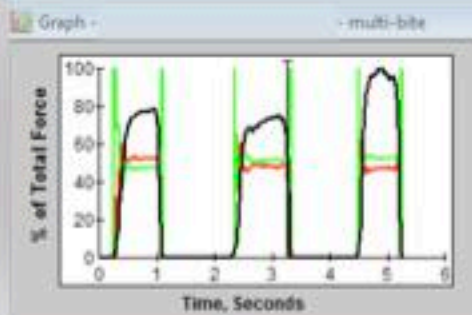


3.249 sec | Force: 64.8 % of MMF

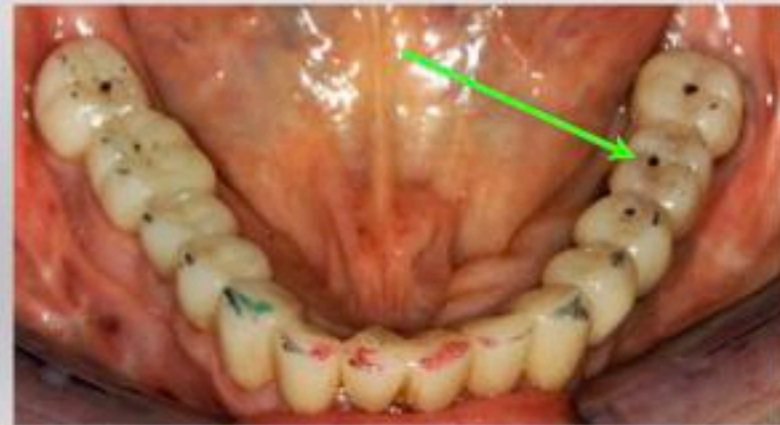
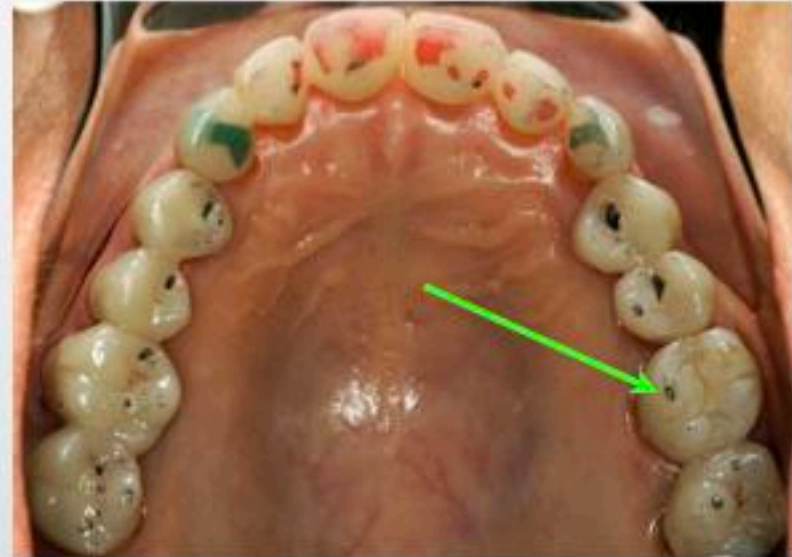
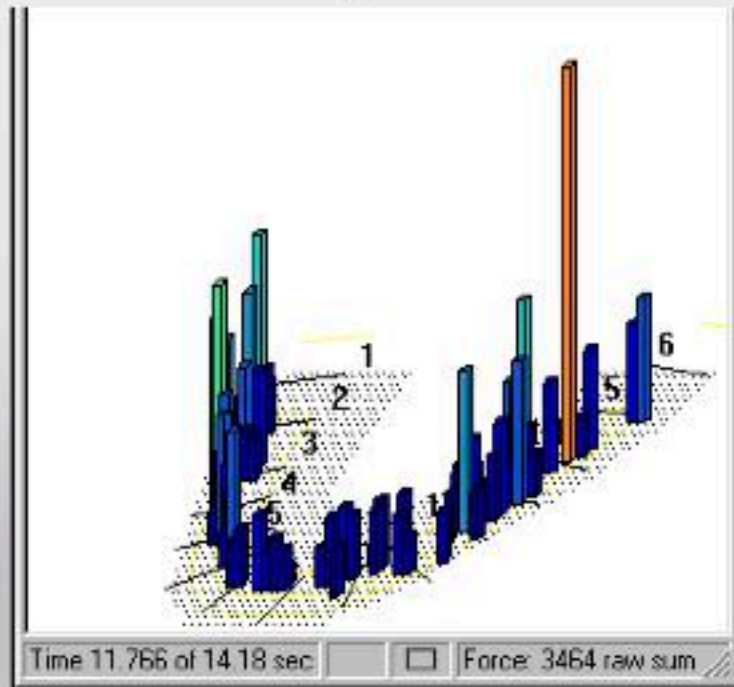


3.249 sec | Force: 64.8 % of MMF

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

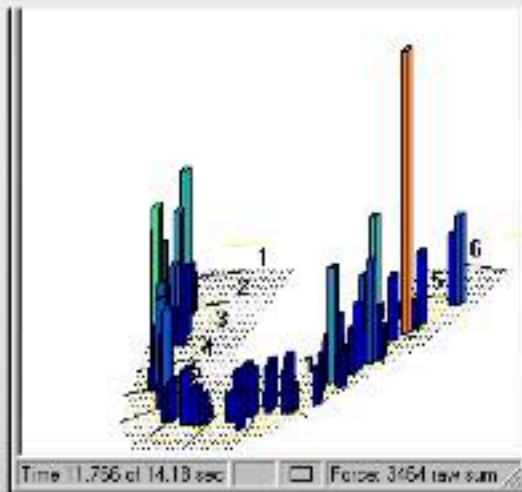


Which dot on temps is heavy?



Implant Occlusion

Implants not moving in occlusion is incorrect

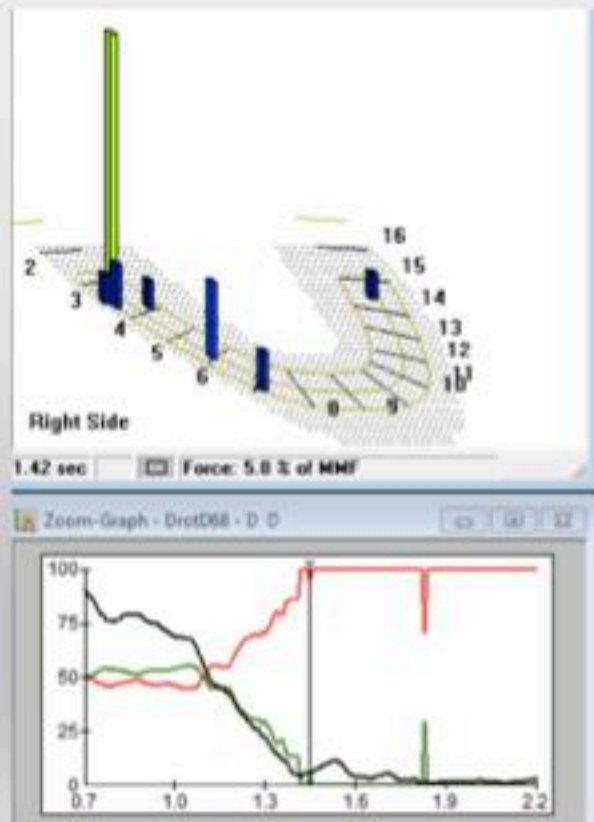


Implants and teeth will both compress bone.

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?

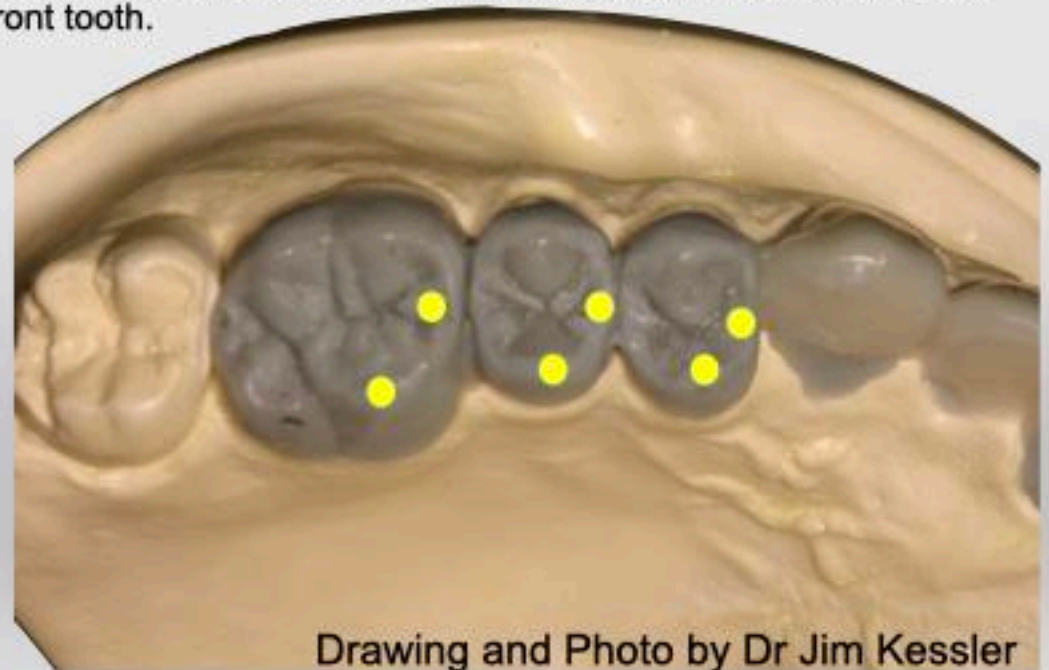


Remove too much and you decrease the ability to chew, especially lettuce. Chewing lettuce requires posterior inclines coming close enough to chew, but far enough apart to not touch and activate muscle.

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

Most Crowns are not made like this

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

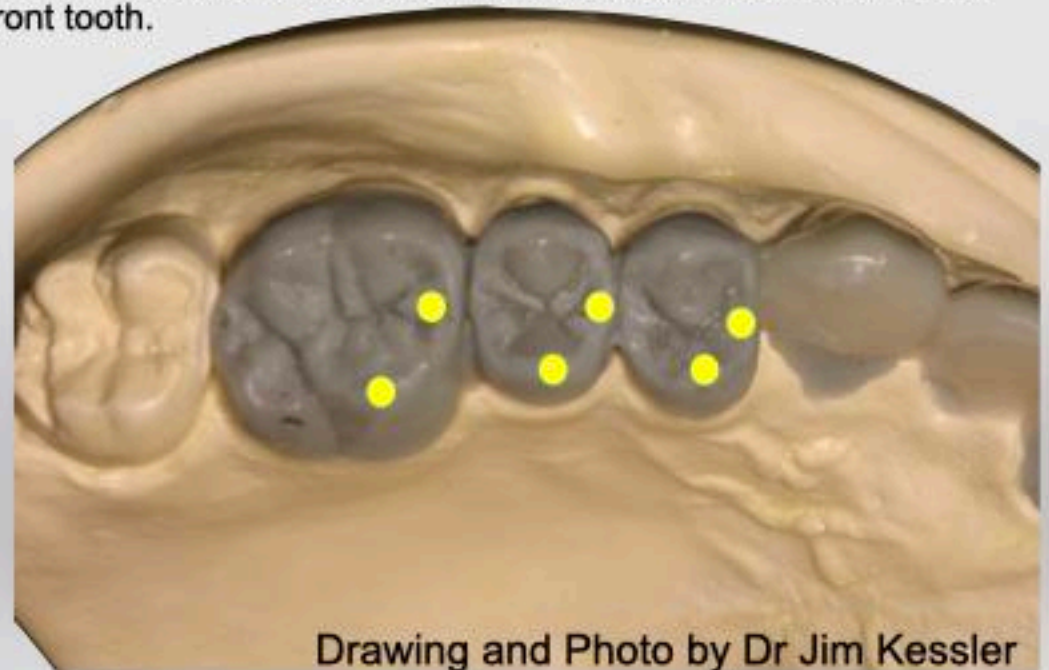


Drawing and Photo by Dr Jim Kessler

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Most Crowns are either like this

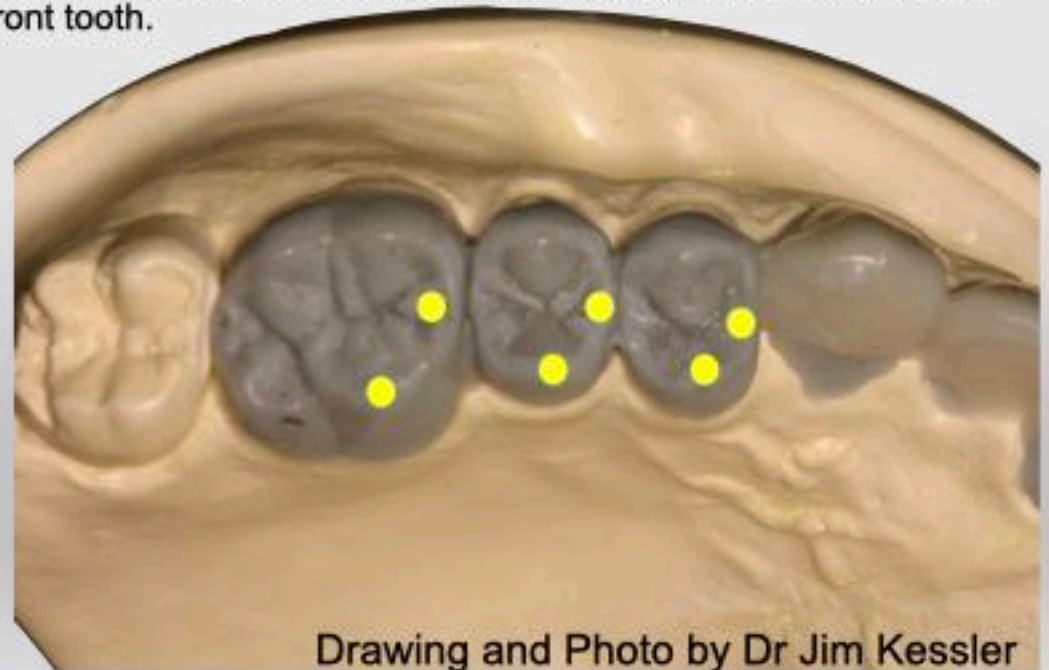


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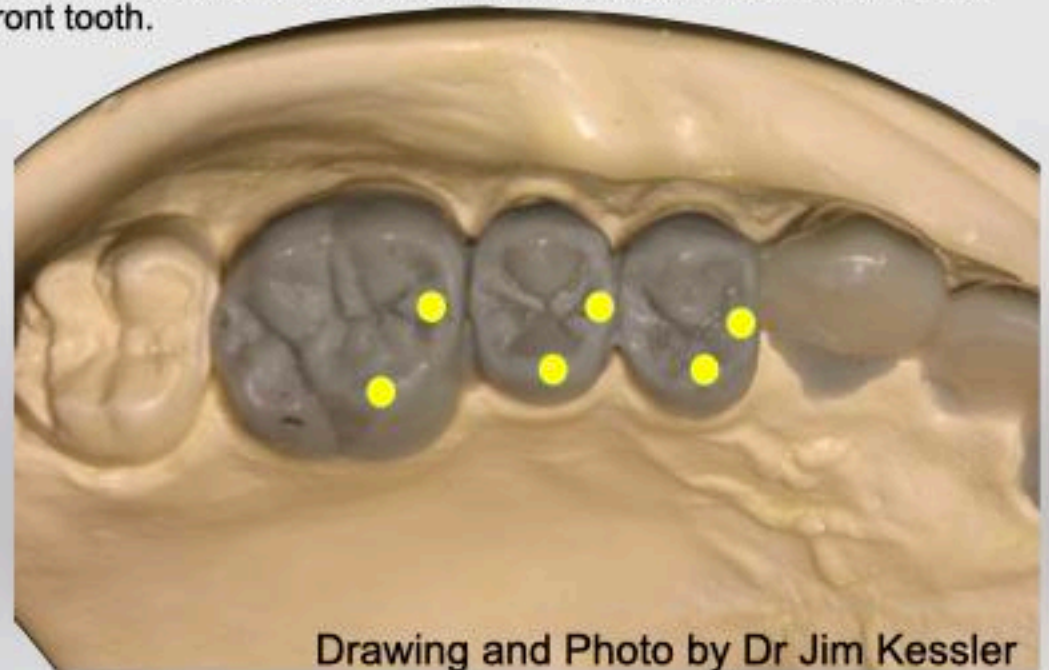
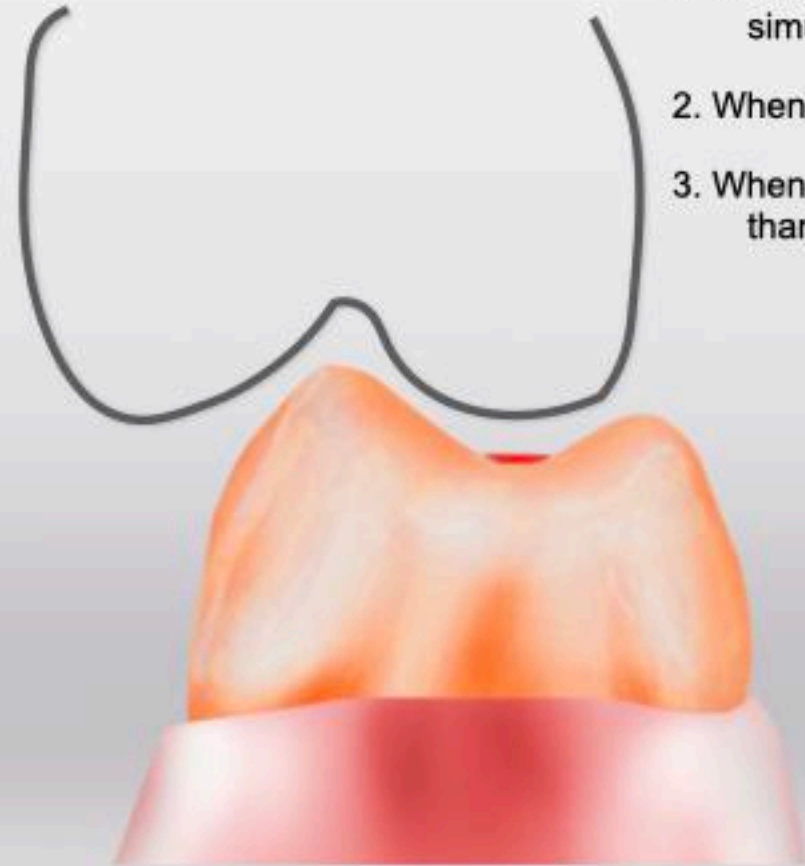
or this



Drawing and Photo by Dr Jim Kessler

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

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3. When you move the mandible in any excursion, no back tooth hits before, harder than, or after a front tooth.



Drawing and Photo by Dr Jim Kessler



www.Despair.com

MEDIOCRITY

IT TAKES A LOT LESS TIME
AND MOST PEOPLE WON'T NOTICE THE DIFFERENCE
UNTIL IT'S TOO LATE.



Dr. Glenn Kidder 2015

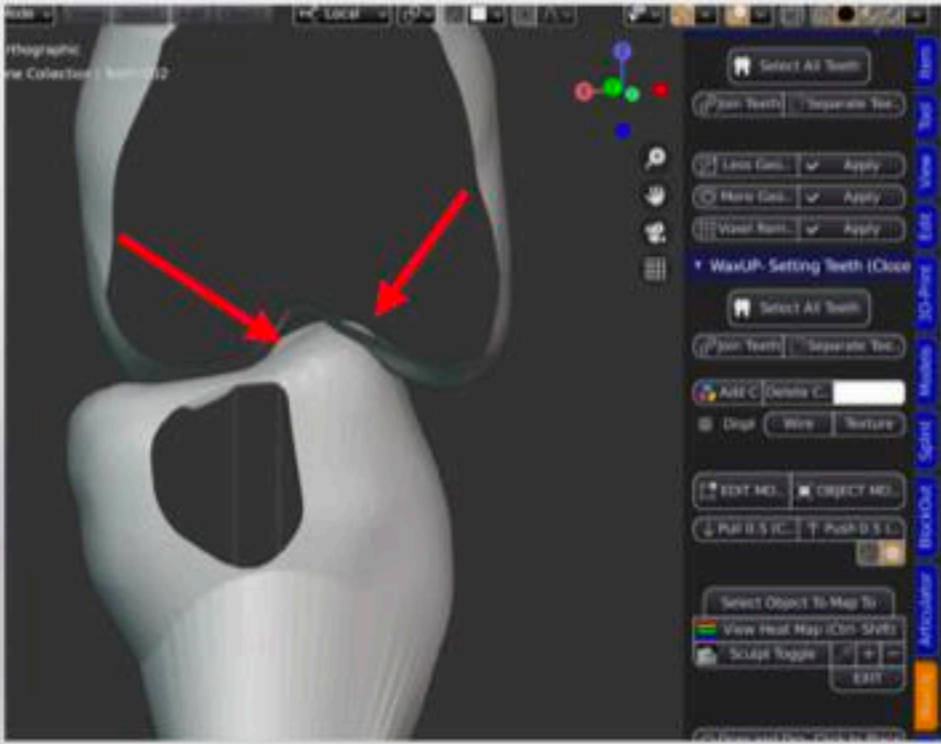
90 Consecutive New Patients

84 / 100 crowns done in past year
were out of occlusion, did not hold
12 μ shim stock



3D Design places contacts on inclines

Then moves it out of occlusion
There is a setting for how far out of occlusion



Diagnostic Design with flowable composite on 3D printed models



Which tooth is a crown?



Which tooth is a crown?

Challenge yourself to create perfect form and function on a single tooth.
Occlusal contact holds 12 μ m Almore shimstock.



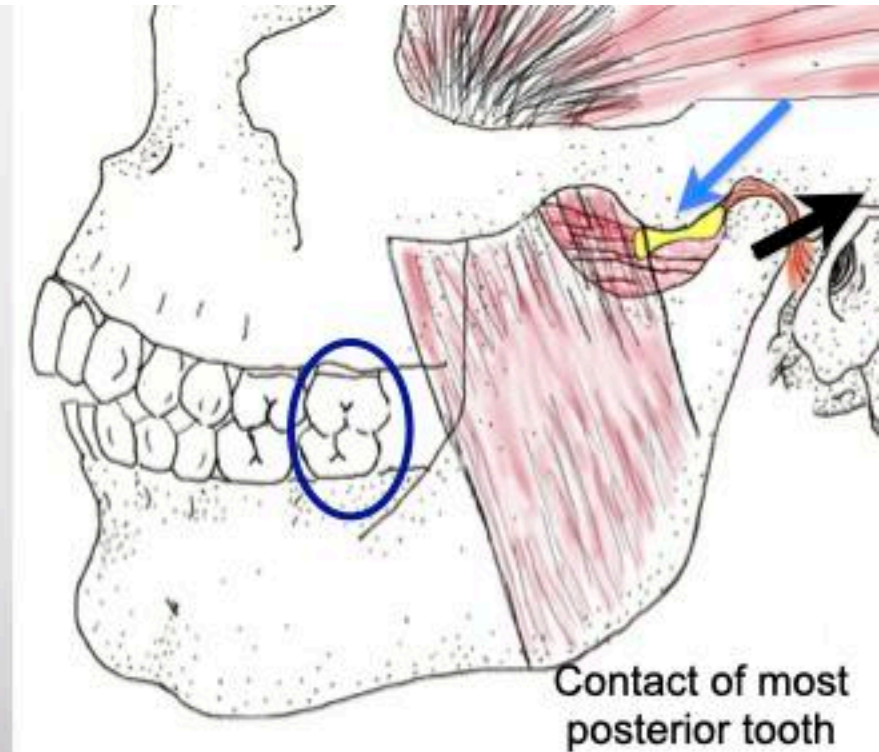
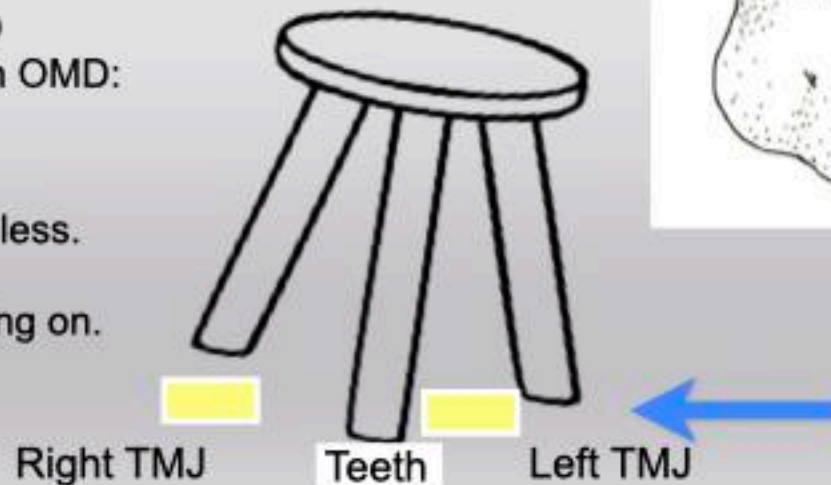
Damaged Joint with Malocclusion

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

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

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

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



Case CC

TMD Symptoms

Sore TMJ muscles

TMJ clicking

TMJ pain

Jaw locking

Limited opening

Difficulty open jaw

Difficulty closing jaw

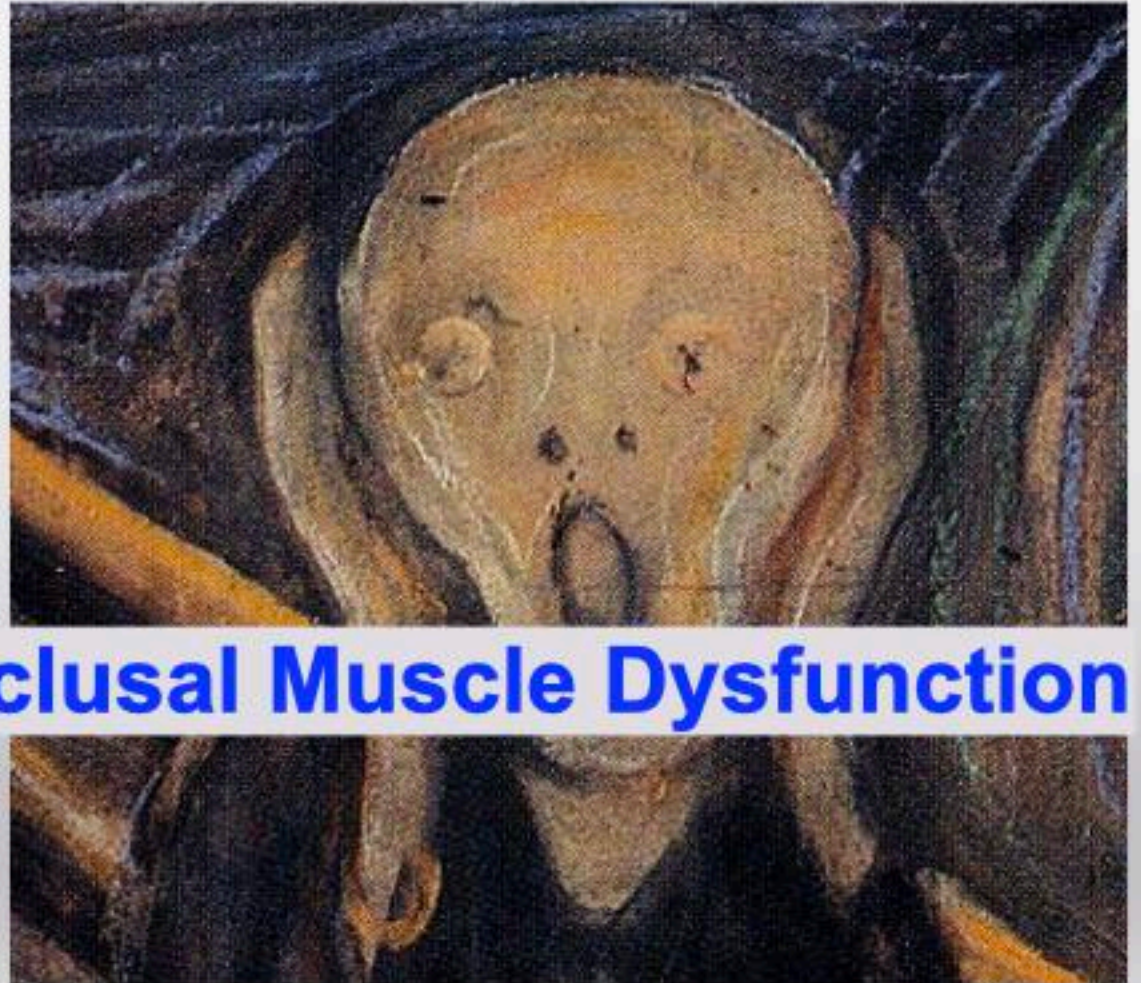
Difficulty chewing

Headaches

Eye pain

Ear pain

Facial Pain



Occlusal Muscle Dysfunction

Facial Pain: Not always OMD

CC: Sharp Shooting Nerve Pain Right Face

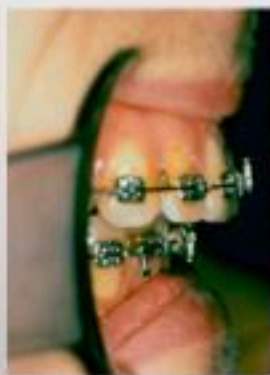
Dx: Class 2 Malocclusion

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.



Rule cancer out early, rule it out often.

TMDs- What are the choices? (190 Diagnoses, 7 Categories)

1. TMJ Damage

Adhesions and ankylosis of temporomandibular joint
Avascular Necrosis Mandibular Condyle
Cartilage Fibrillation, Mandibular Condyle, Fossa
Closed Lock, Jaw Cartilage, Acute
Closed Lock, Jaw Cartilage, Chronic
Closed Lock, Jaw Cartilage, Intermittent, Mechanically dysfunctional
Crush Injury Mandibular Condyle
Crystal arthropathy, unspecified, TMJ
Dislocation jaw cartilage due to injury, Sequela
Dislocation jaw cartilage with reduction, favorable adaptation, TMJ
Dislocation jaw cartilage without reduction, favorable adaptation, TMJ
Etiology: TMJ

Impingement Retrodiscal Tissue
Inflammatory Tissue Bone Resorption, TMJ Condyle
Loose Body (Joint Mice), TMJ
Malignant neoplasms of bones of skull and face
Open Lock TMJ, Recurring
Osteoarthritis TMJ, active degeneration
Osteoarthritis -inactive
Osteochondritis Dissecans TMJ
Osteolysis Mandibular Condyle, Active
Perforation Meniscus, TMJ
Perforation Pseudodisc, TMJ
Psoriatic Arthritis TMJ
Rheumatoid Arthritis Seronegative TMJ

4. Cervical Damage

Cervical Vertebrae Alignment Dysfunction
Cervicocranial Syndrome
Muscle Guarding (see Neck Instability)
Trigger Point Neck Muscle with Referred Pain
Trigger Point Neck Muscle, Localized Pain

5. Parafunction

Without ruling out occlusal problems and parafunction it is hard to figure out the rest.

Muscle Bracing Pain Avoidance
Muscle Bracing TMJ stabilization
Muscle Bracing Airway Patency (with Tongue)
Muscle Contracture Fibrosis Lateral Pterygoid
Muscle Contracture Fibrosis Masseter, Medial Pterygoid, Temporalis
Muscle Fatigue Overuse
Muscle Hypertrophy TMJ Muscles

3. Cranial Alignment/Occlusion

Cranial Distortion / Misalignment
Hemifacial Hypoplasia
Hyper Occlusal Awareness
Idiopathic Orthotic Damage
Malocclusion Anterior Open Bite
Malocclusion Centric occlusion Max/C discrepancy
Malocclusion Deep Bite
Malocclusion due to mouth breathing
Malocclusion due to TMJ bone loss
Malocclusion due to tongue, lip or finger habits
Malocclusion Insufficient anterior occlusal guidance
Malocclusion lack of posterior occlusal support
Malocclusion Posterior Openbite Bilateral
Malocclusion Posterior Openbite Unilateral
Malocclusion unspecified

Malposition/Misalignment: Maxilla, Temporal Bone, Mandible
Mandibular asymmetry
Mandibular hyperplasia
Mandibular hypoplasia
Mandibular Retrognathia
Maxillary asymmetry
Maxillary hyperplasia
Maxillary hypoplasia
Maxillary Retrognathia
Occlusal Adaptation, Favorable
Occlusal Dependency for Joint Stabilization/ Proprioception
Tooth Intrusion
Tooth Supereruption

6. Whole Body / Systemic

Lyme Disease Arthritis
Magnesium Deficiency
Obstructive Sleep Apnea
Osteoporosis without current pathological fracture
Pathological Habitual Movement Pattern
Postural Disharmony Standing
Postural Disharmony Walking
Postural Forward Head Position
Upper Airway Resistance, UARS

7. Other

Nerve Entrapment Masseteric Nerve due to Masseteric hypertonicity
Neurona Trigeminal Nerve
Obsessive-Compulsive Personality Disorder
Other
Otitis Ear Infection
Pain disorder exclusively related to psychological factors, Somatoform pain disorder
Pain disorder with related psychological factors
Sarcoidosis

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



TMD Symptoms

Limited Opening

Diseases to consider and rule out:

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

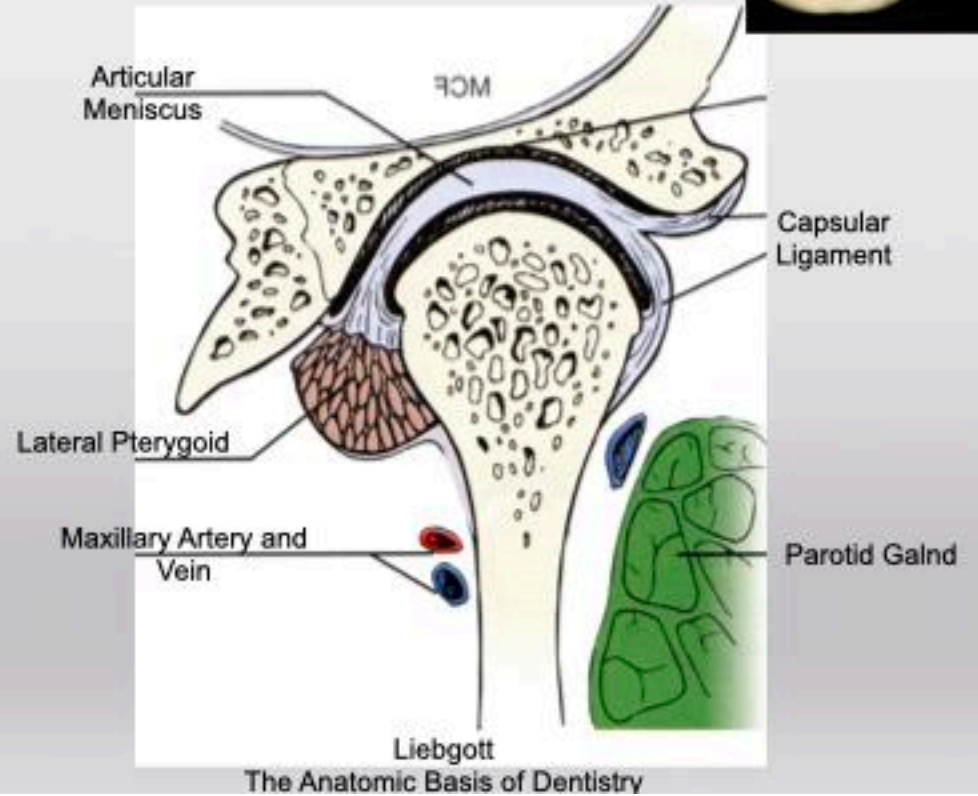
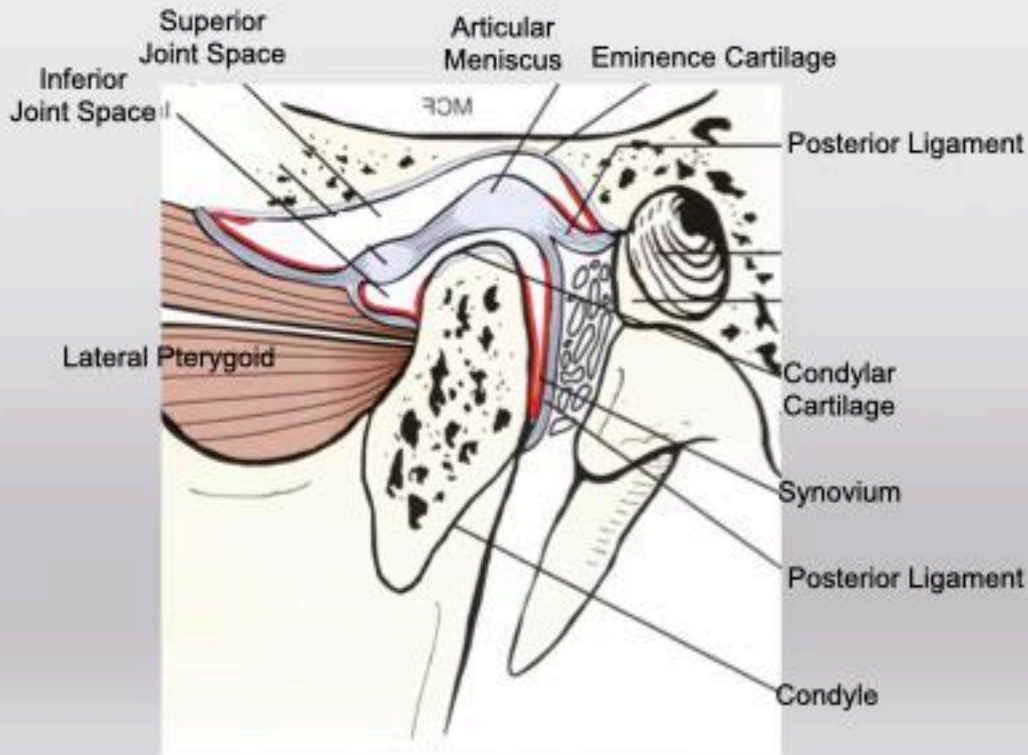




Left TMJ Sagittal View



Left TMJ Coronal View



The Anatomic Basis of Dentistry



Rotate
Slide
Pivot

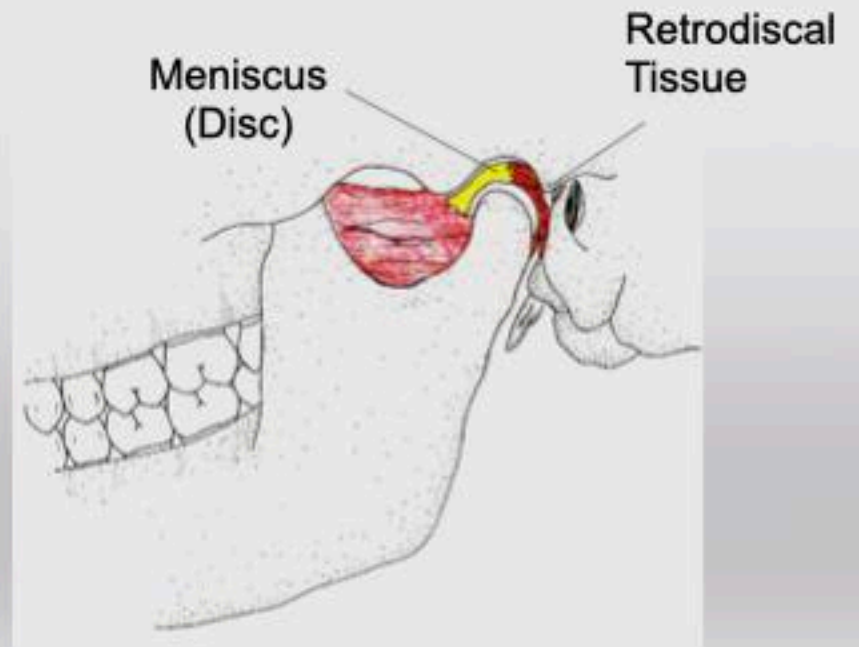
Solid end point closing
Ligamentous end point opening

A joint joins two bones that allows movement between the two bones

TMJ has 2 Joint Compartments:

Upper- Translation

Lower- Rotation

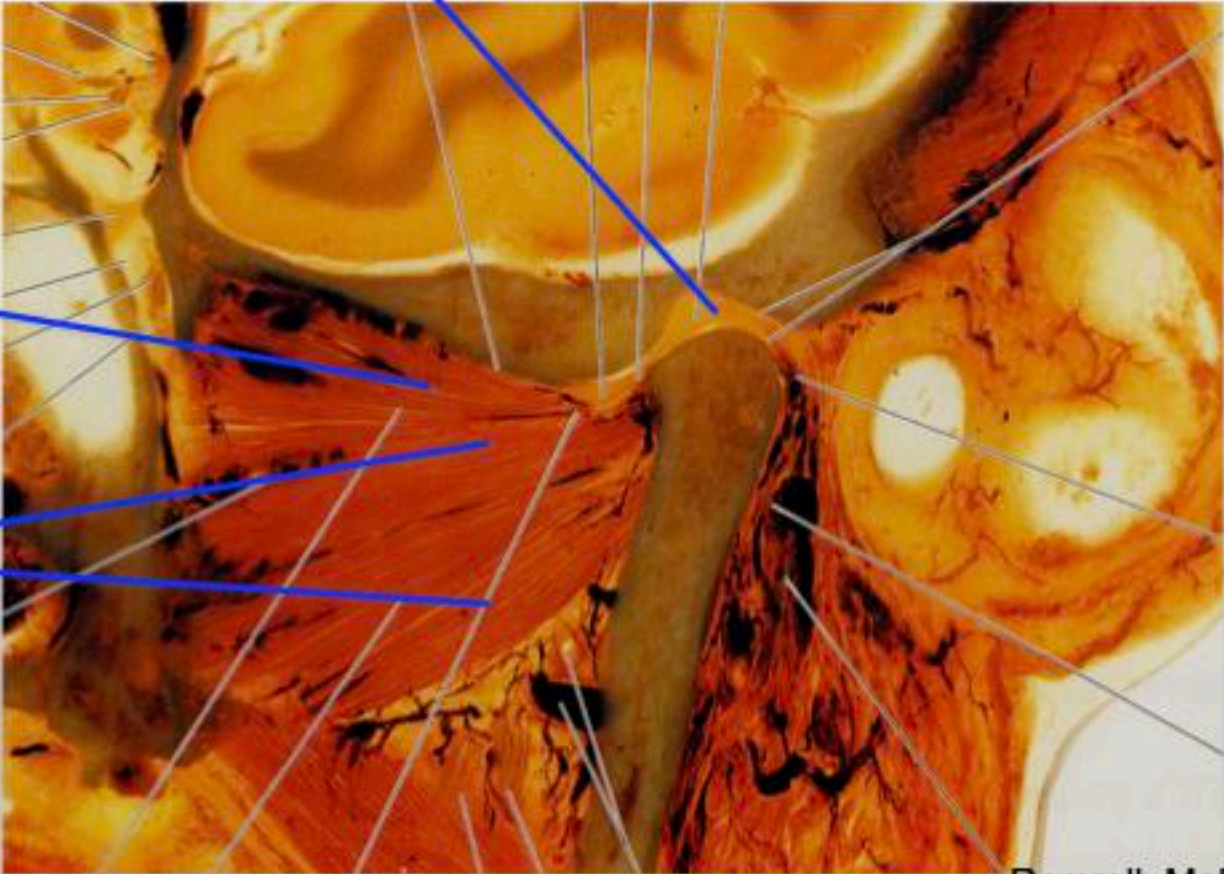


Disc: Thick-Thin-Thick

Oblique Sagittal View

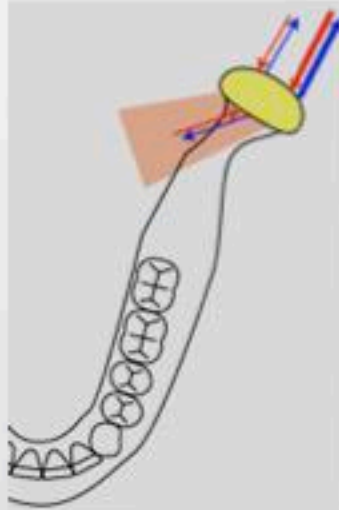
Lateral Pterygoid
Superior Head

Lateral Pterygoid
Inferior Head



Romrell, Mahan

Axial View



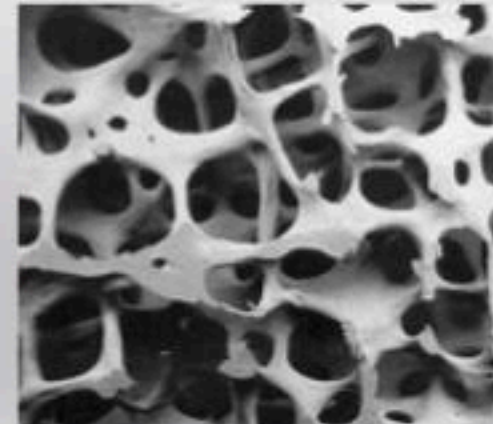
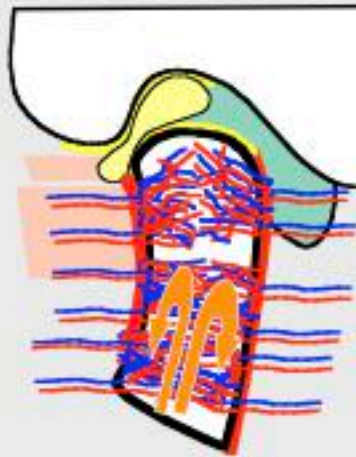
Normal TMJ Blood Flow, Marrow

Condylar head limited collateral circulation
Epiphyseal growth center

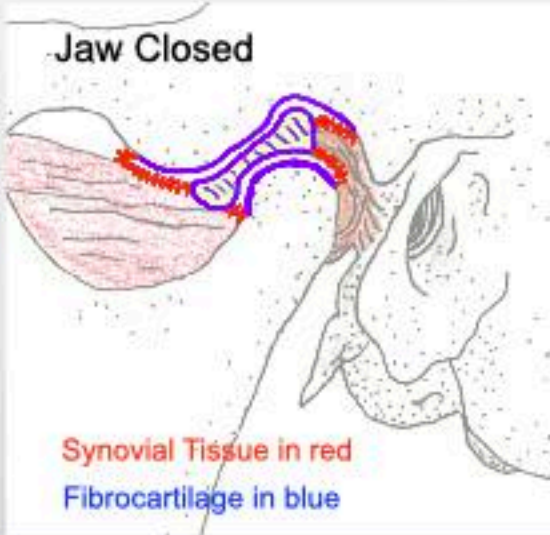
Marrow is fatty tissue with blood vessels, containing the precursor for blood cells

No Blood vessel inside joint

Closed
Sagittal

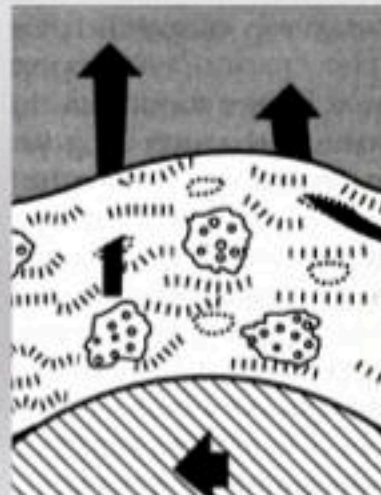
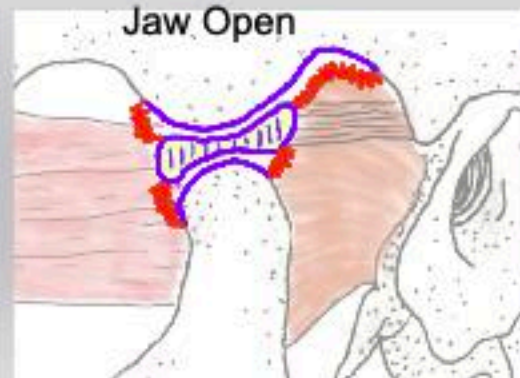
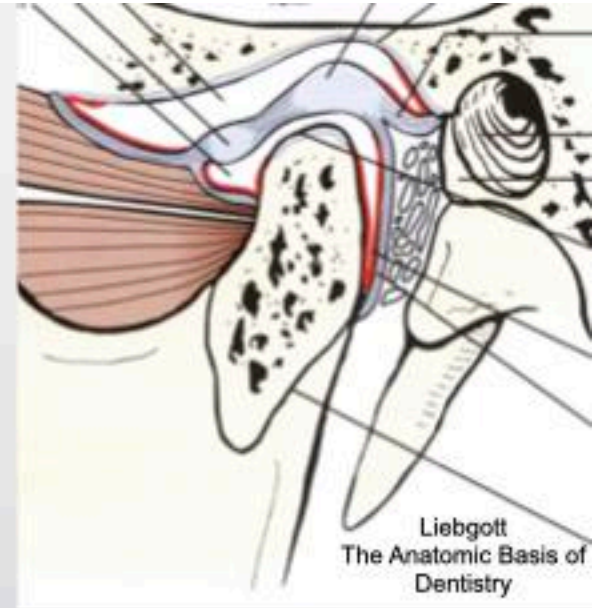


Normal TMJ- Synovium, Cartilage



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



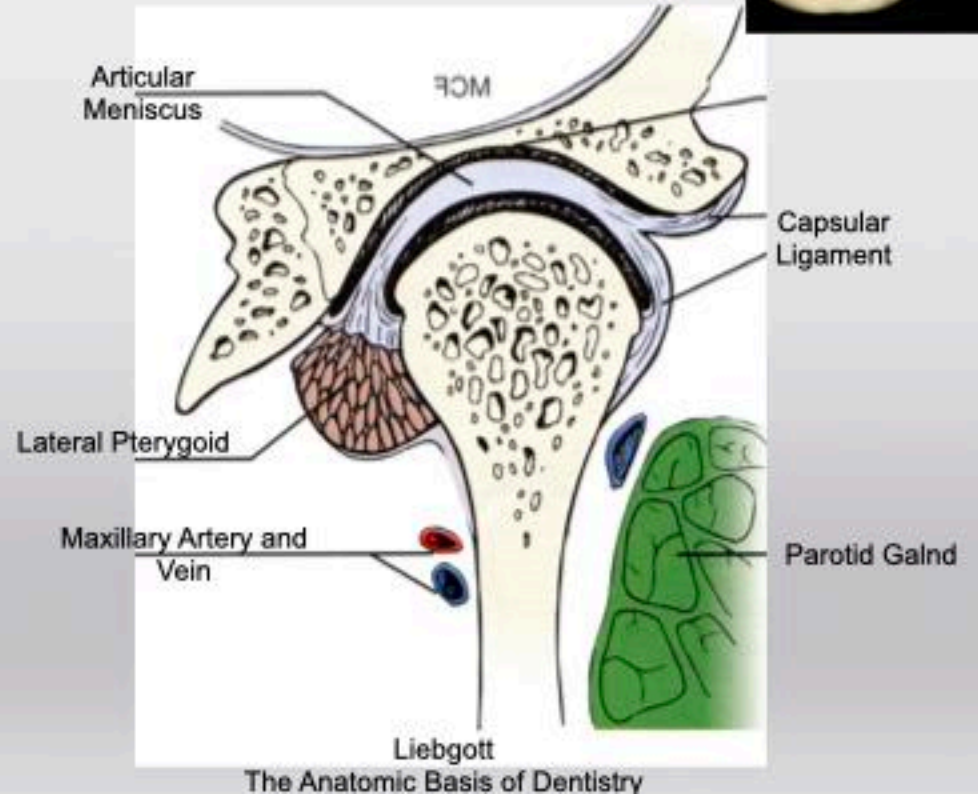
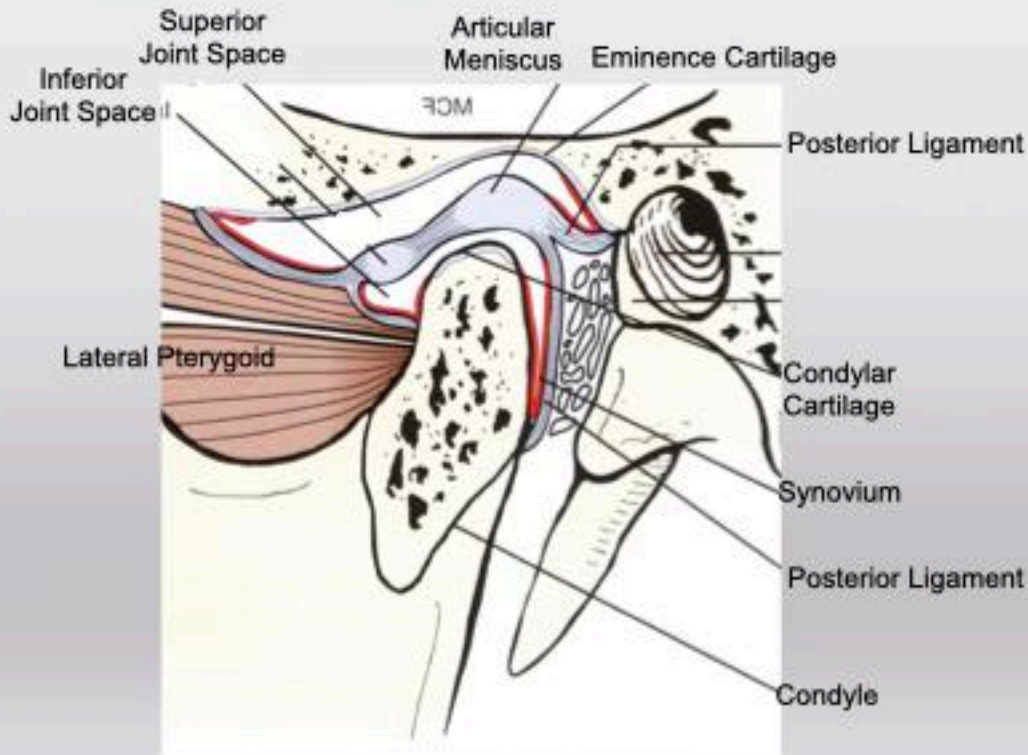
Fibrocartilage surface covered in fluid
Cartilage is hydrophilic
Proteoglycan negative charge
Surface Active Phospholipids
Fluid slides against fluid
5x slipperier than ice



Left TMJ Sagittal View

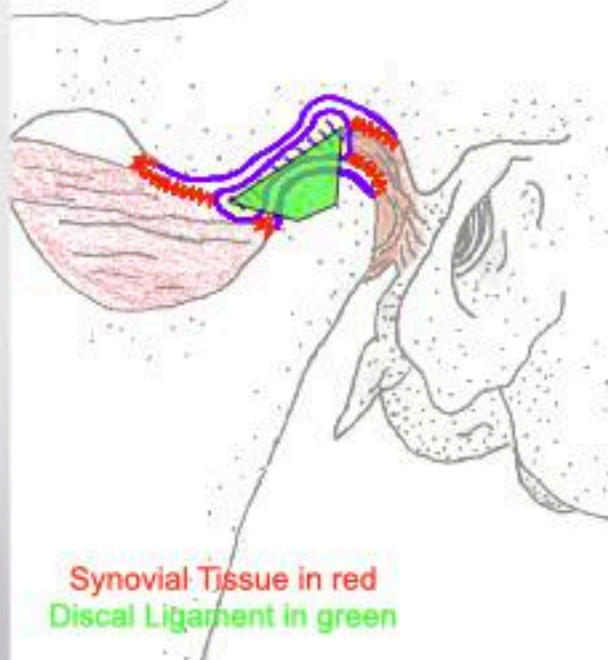


Left TMJ Coronal View



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

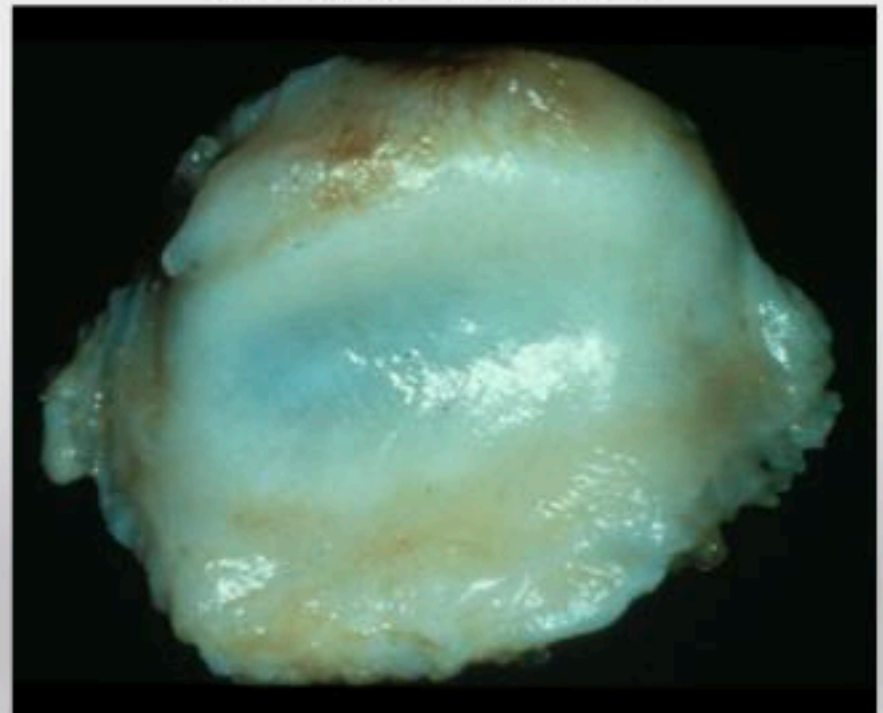
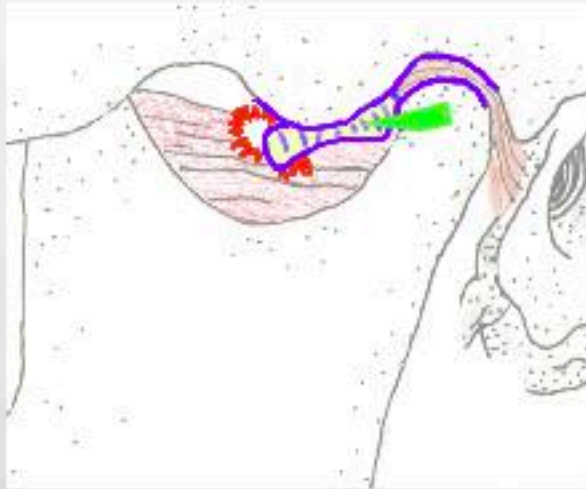


Photo Courtesy of Dr Henry Gremillion

Damaged TMJ- Anteriorly Dislocated Disc



Torn or stretched Meniscal ligaments

Anterior Dislocated Disc

Damaged Synovium

Retrodiscal Tissue pulled up and over the condyle

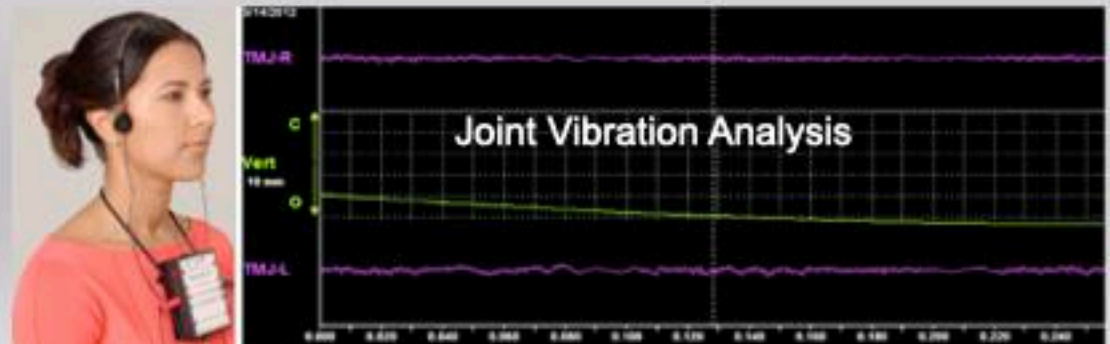
Retrodiscal tissue in direct contact with fibrocartilage

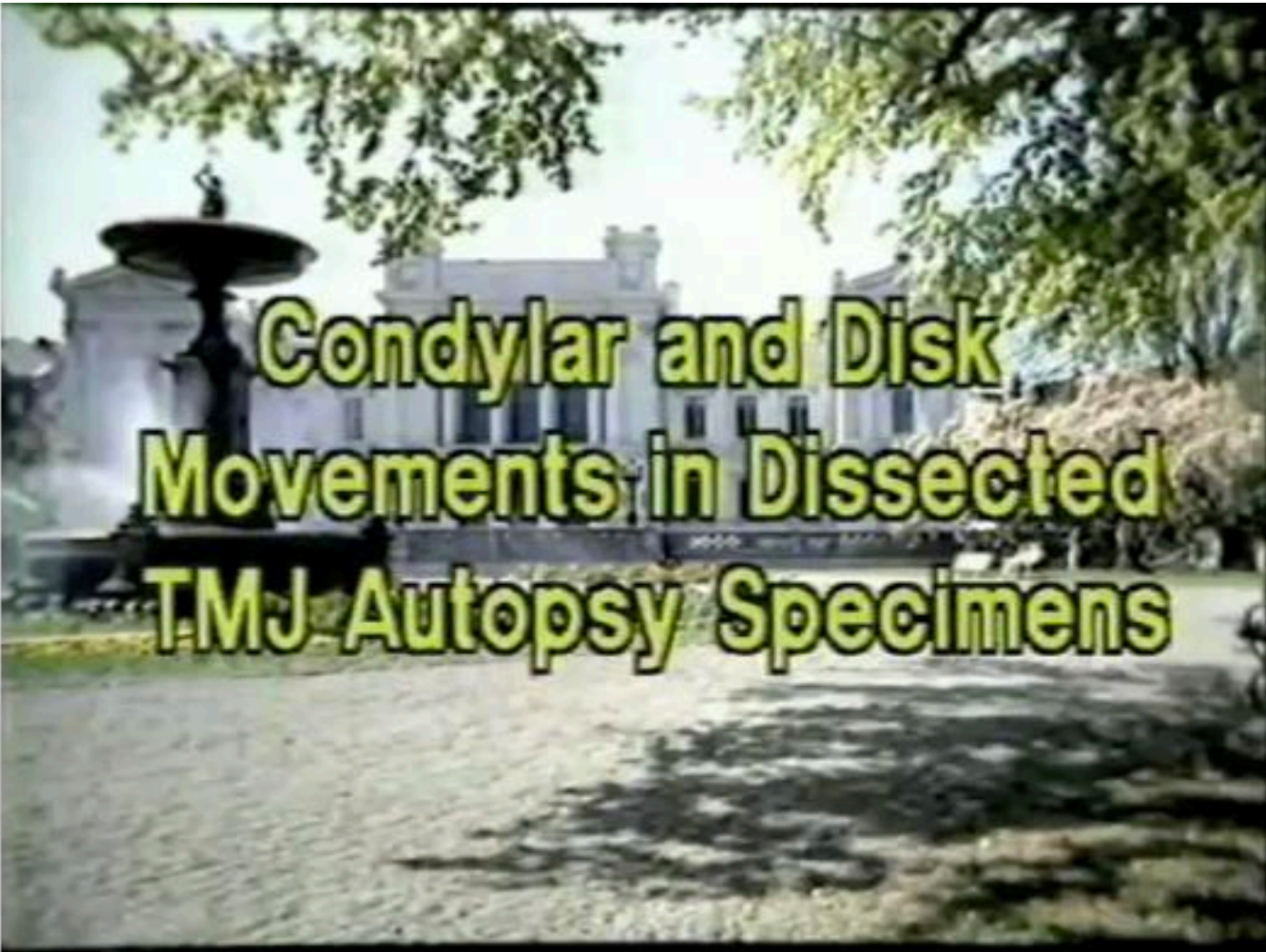
Major Increase in friction

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

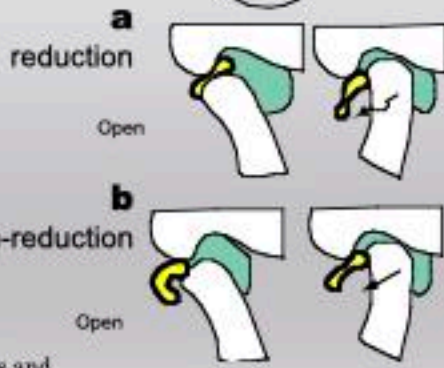
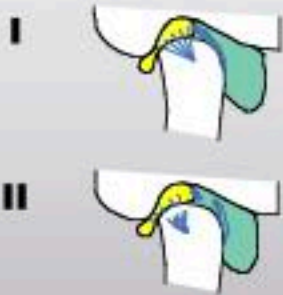
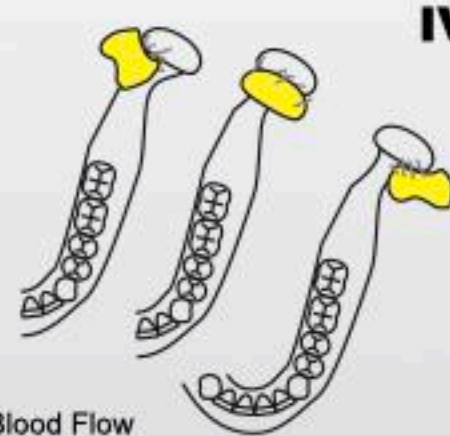
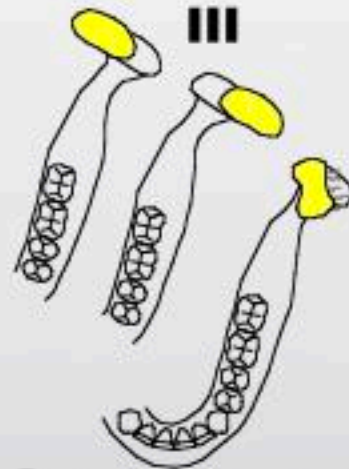
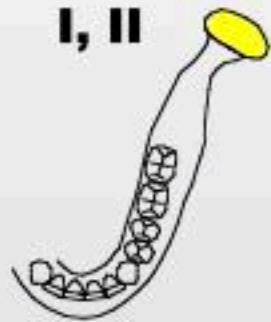




**Condylar and Disk
Movements in Dissected
TMJ Autopsy Specimens**

Dr. Mark Piper's Classification

Left TMJ



% Blood Flow Affected?



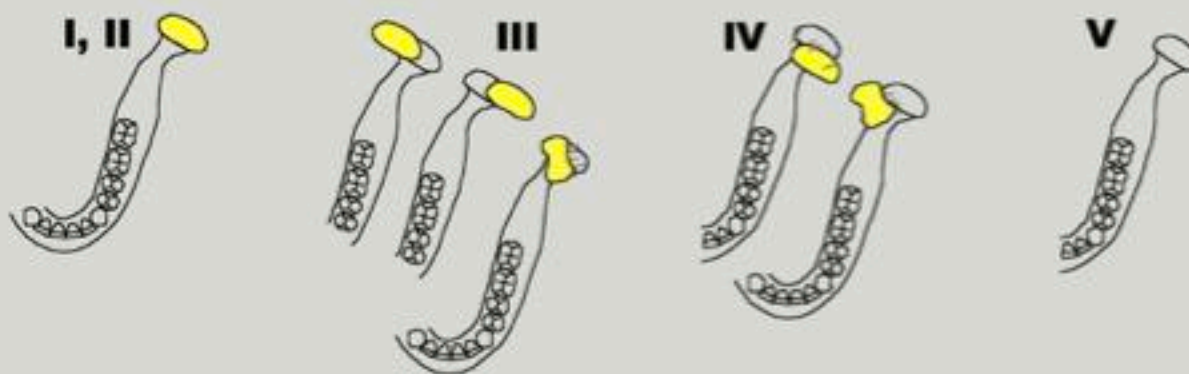
Bone to Bone
a Adapting
b Adapted

- I Normal
- 2 Ligaments or Cartilage damage
- 3a Partial disc subluxation, with reduction
- 3b Partial disc subluxation, non-reducing
- 4a Complete disc dislocation, with reduction
- 4b Complete disc dislocation, non-reducing
- 5a No Disc, Bone to bone- Adapting
- 5b No Disc, Bone to bone- Adapted

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

Distribution- 126 MRIs- 252 TMJs

- Patients presenting to my Restorative/Pain practice
- All patients with any indication of TMJ damage had scans



I&II-	32%
IIIa-	12%
IIIb-	3%
IVa-	18%
IVb-	30%
V-	5%

I&II- 32%

IIIa- 12%

IVa- 18%

V- 5%

IIIb- 3%

IVb- 30%

**Both joints normal
14%**

15%

48%

****III due mesial and III due lateral are new categories and not included in this study. Data thru 6/2003**

Basic Orthopedics

Joints are either
Healthy or
Damaged

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



Healthy

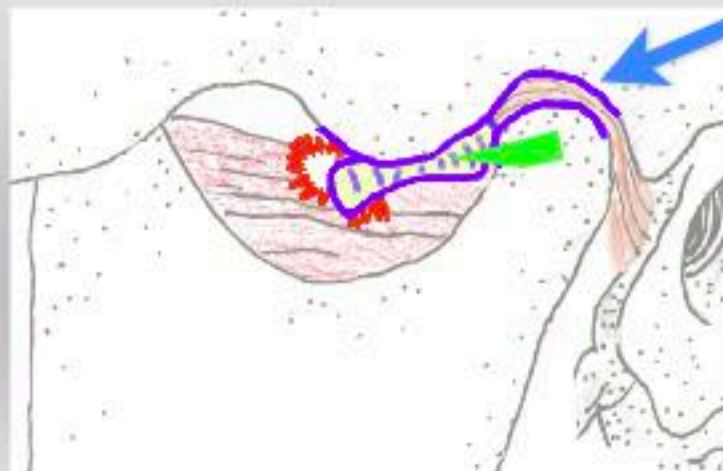


Damaged



Actively Breaking Down

Majority of damaged
TMJs adapt favorably



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

Tissue Fibrosis

Differential Diagnosis: Limited Joint Motion

Muscle Spasm

Painful to Move
Joint Pain
Muscle Pain

Mechanically Blocked
4b Acute
Adhesion

Masseteric Space
Infection
Hematoma

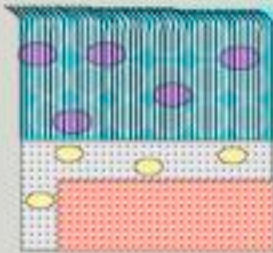
Lose 50% height of cartilage
Proteoglycans not being produced by Chondrocytes
Loss of 50% proteoglycans and water
Collagen still intact
Process is reversible

Move joint with light force/repetitive motion next 30 days

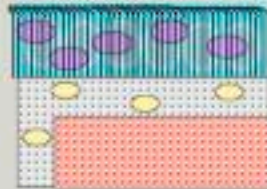
You have 6-8 weeks to get jaw moving
before cartilage is irreversibly damaged,
independent of the cause of the
immobilization



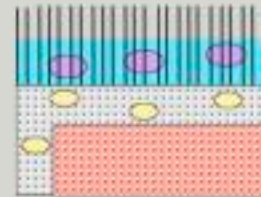
Healthy Cartilage



4 Weeks

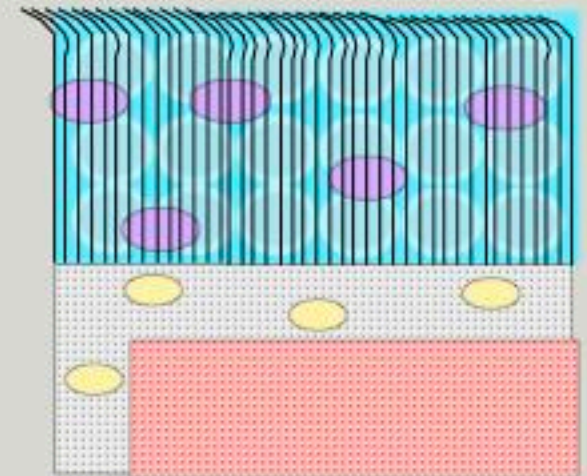
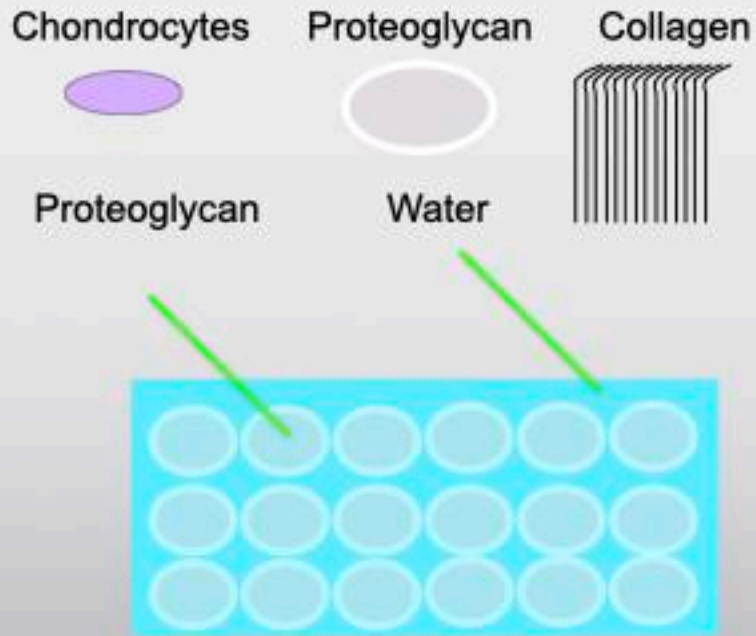


8 Weeks



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

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

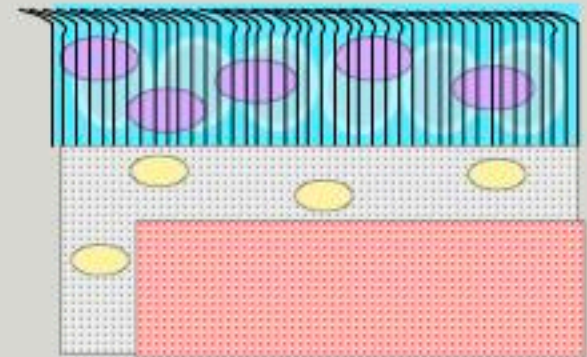
Immobilization 4 weeks

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 irreversible damaged

Collagen is irreversible damaged.

The proteoglycans have no way to attach in the cartilage matrix

Adhesions form between the joint surfaces

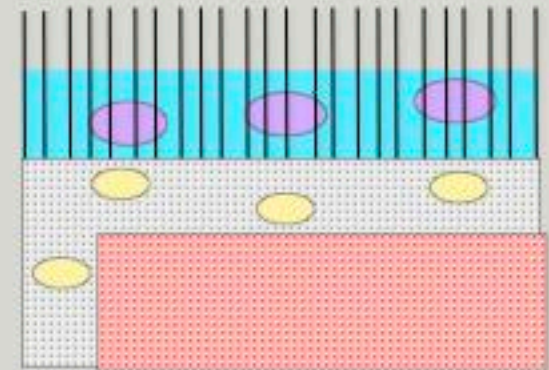
Connective tissue proliferates into the joint

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

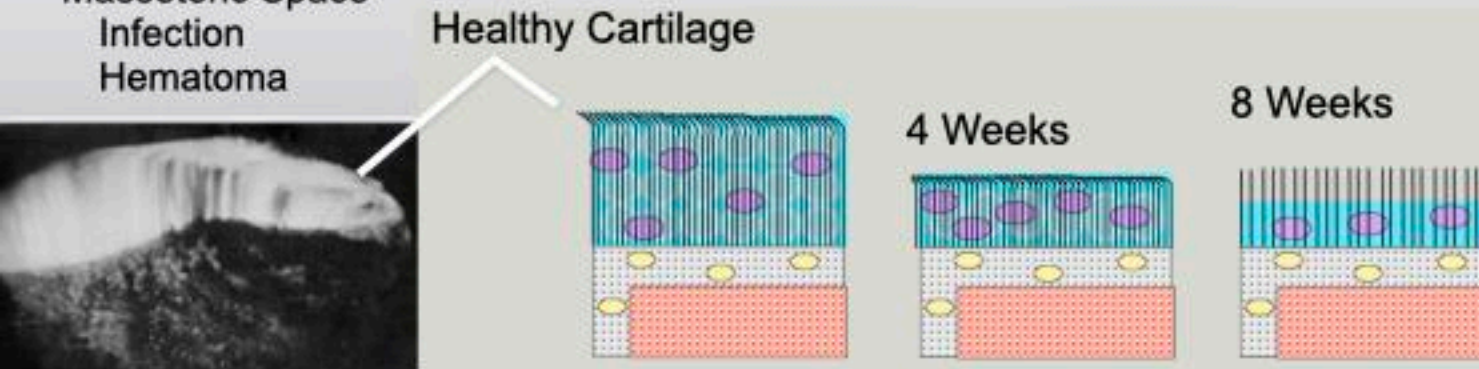
Mechanically Blocked
4b Acute
Adhesion

Masseteric Space
Infection
Hematoma

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

Move joint with light force/repetitive motion next 30 days

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

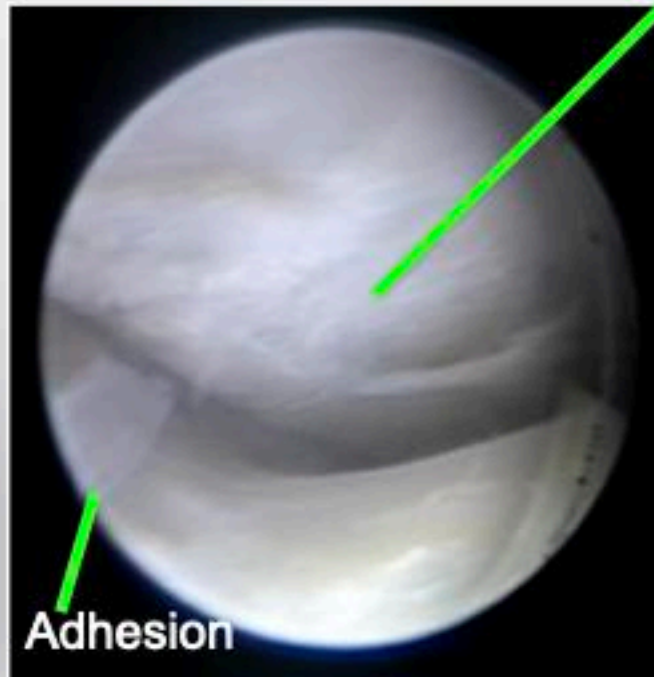
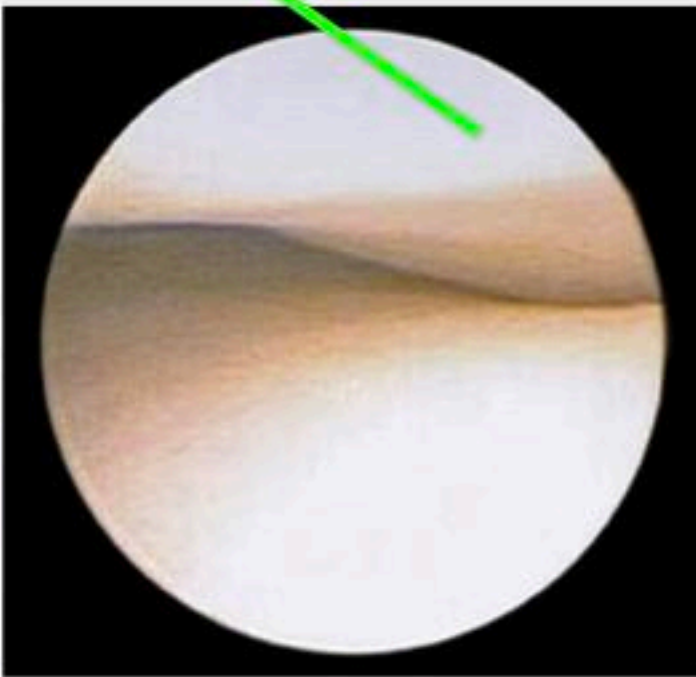


E.B. Evans, GWN Eggers, J.K. Butler, and J. Blumel, Experimental immobilization and remobilization of rat knee joints, J Bone Joint Surg Am, 1960 vol. 42 (5) pp. 737-758
Enneking WF, Horowitz M. The intra-articular effects of immobilization on the human knee. J Bone Joint Surg Am. 1972 Jul;54(5):973-85.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

Arthroscopic View Left TMJ

Eminence Healthy Cartilage

Eminence Necrotic Cartilage



Not Same Patient

Right TMJ Open Joint Surgery



Cartilage
Damage
Movie

Subjective:

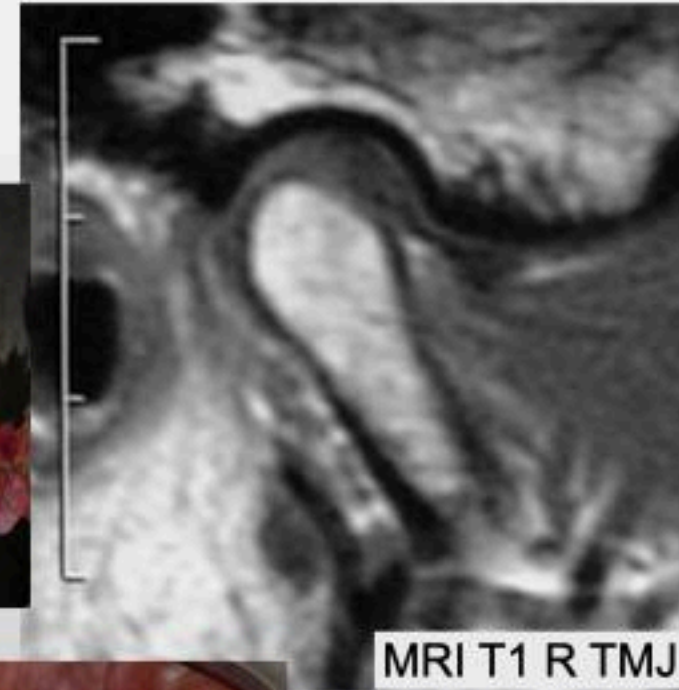
Dentist doing crown prep #30 1 week ago
Severe pain Right TMJ after moving jaw at end of appt
Constant deep pain Right TMJ
Limited opening

Objective:

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

Assessment:

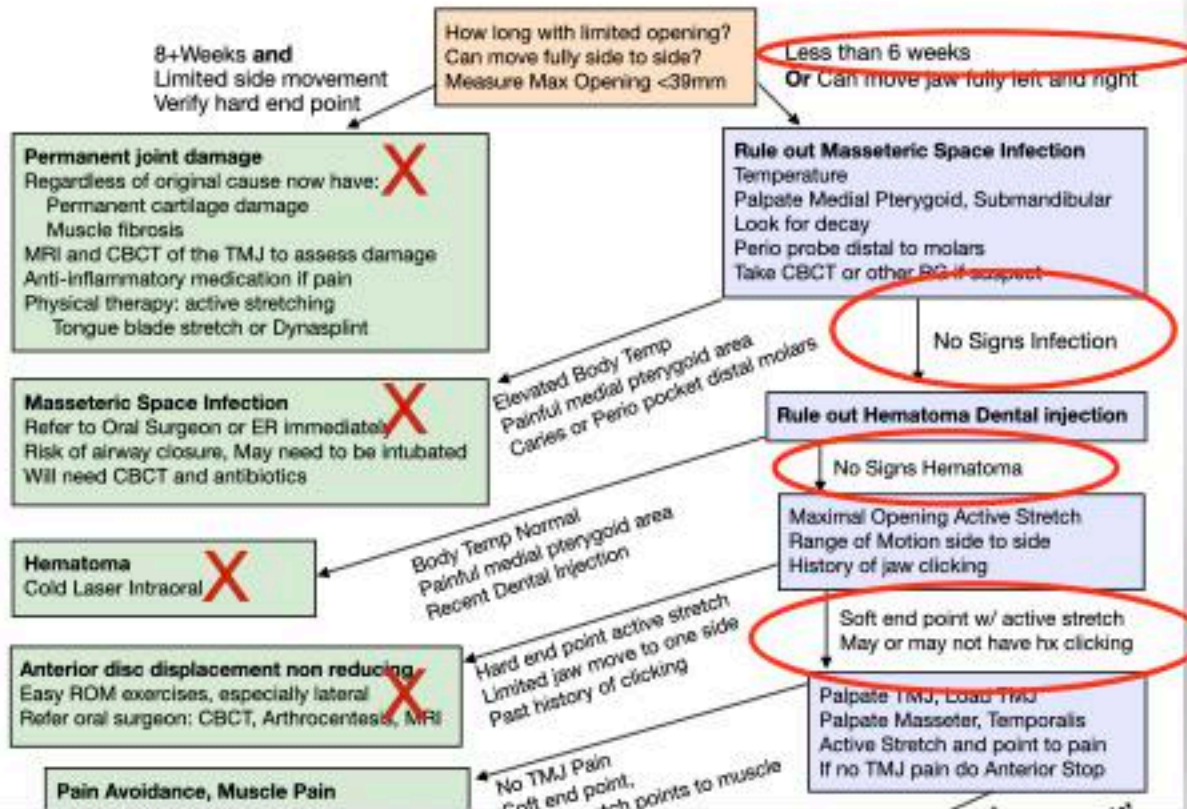
Limited opening due to Right TMJ pain avoidance
Acute Sprain Right TMJ Ligaments



Dr Droter's Limited Opening Algorithm

19.5

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



Objective:

Limited opening 32mm, Mandible shifts Left

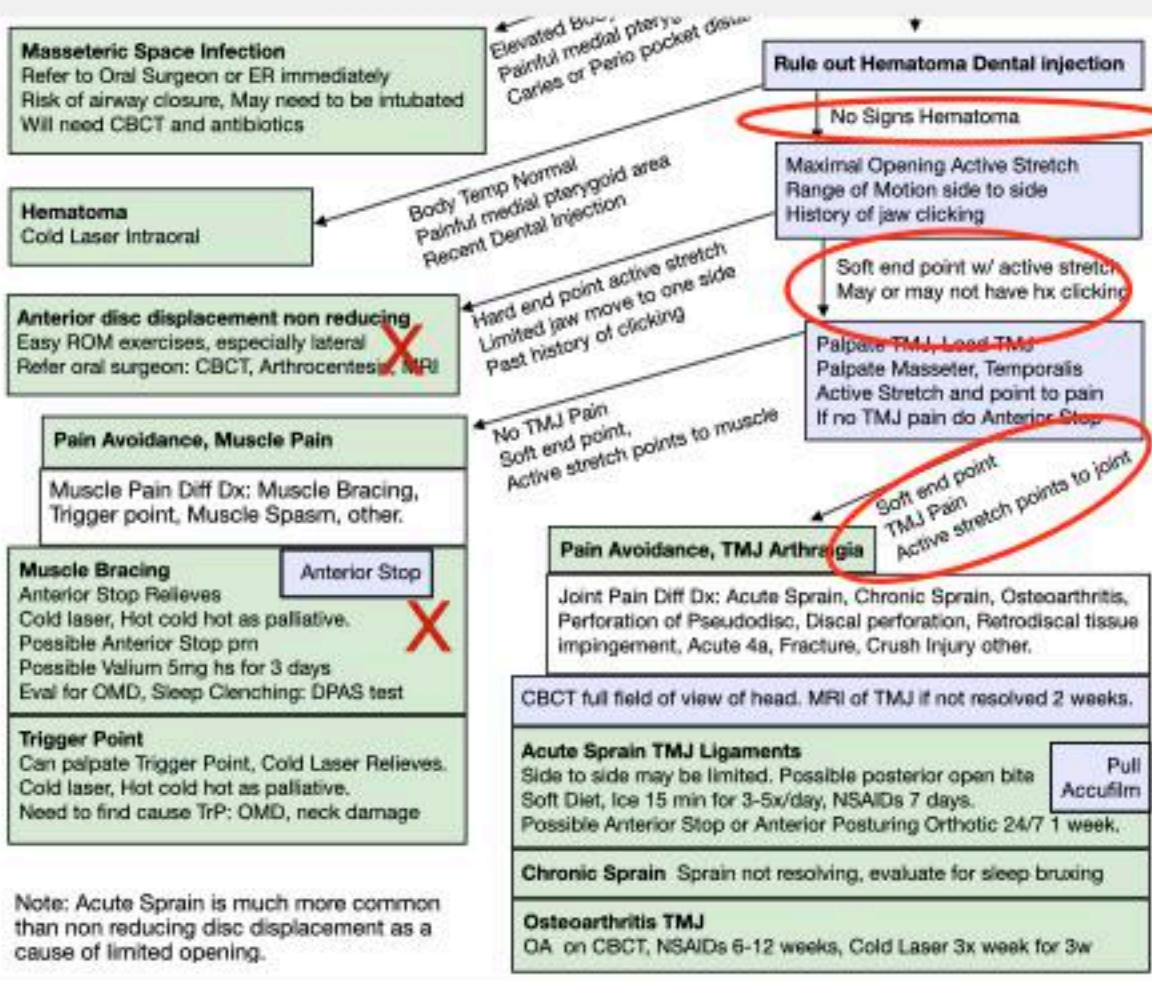
Normal side to side motion
98 temp, normal perio probe 2nd molars, no caries

No pain palpation RL Medial Pterygoid

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

Right TMJ pain to palpation, Left TMJ normal

Posterior openbite Right, does not hold Accufilm



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

Objective:

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

Pain Avoidance, TMJ Arthralgia

TMJ +
Active stre...

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

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

Acute Sprain TMJ Ligaments

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

Pull
Accufilm

Chronic Sprain Sprain not resolving, evaluate for sleep bruxing

Osteoarthritis TMJ

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

Objective:

Limited opening 32mm, Mandible shifts Left

Normal side to side motion

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

No pain palpation RL Medial

Pterygoid

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

Right TMJ pain to palpation, Left TMJ normal

Posterior openbite Right, does not hold Accufilm

Treatment:

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

Anterior repositioning orthotic 24/7 one week

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

Sleep with head elevated first week

Soft chew diet

At 1 week Anterior repositioning orthotic sleep only for second week

Week 3, no orthotic, reintroduce harder foods



Verify Orthotic does not rub
lingual tissue of mandible

At 4 weeks patient had full ROM
No clicking

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



MLS Laser

Multiwave Locked System Laser

808 nm Continuous, 905 nm Pulsed

Stimulates metabolic processes in cells
Decrease inflammation
Pain Reduction
Faster Healing



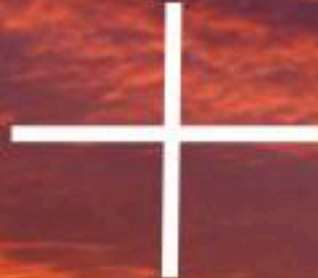
Diode Laser

Ms MY



Know Yourself

Know Your Work



Know Your Patient

Apply Your Knowledge

LD Pankey Institute

Write your Dream

CBCT

John R Droter DDS
Annapolis, Maryland

Annapolis, Maryland
John R Droter DDS

www.jrdroter.com

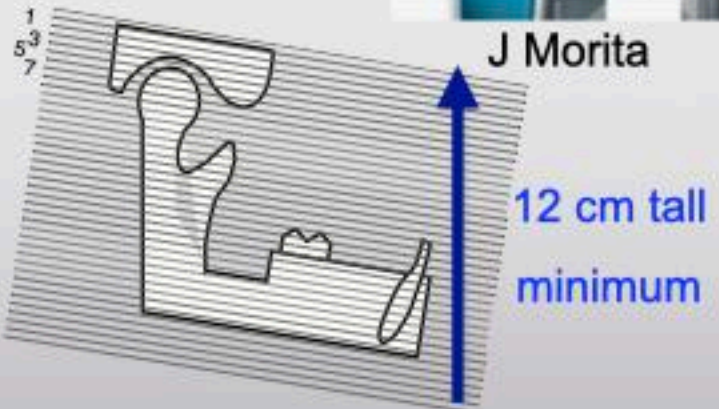
Key Features for TMJ Images

**Large Field of View 15cm Tall (12cm is minimum)
Excellent raw image quality**



Recommend Best Raw Image Quality:
3D Accutomo 170 J Morita 12cm
VaTech i3D Premium 19cm

Most important is service behind the product
Benco vs others



VaTech

Not recommend:
Any Sirona including Galileos: Marginal raw image quality, motion artifact

Green = LOW Contrast

Making a Great TMJ Scan

Rx for CBCT

Adding a chair vastly improves image quality



Can get from JRDroter.com

1. Large Field of View

15cm tall field of view or greater

At 12cm tall you will miss some joints. 15cm and up is better

Note: 17cm x 12 cm is 12 cm tall. The smaller # is the height, and is listed last

2. Scan Area

Scan Area to include 1 cm above condylar head,

1 cm behind condylar head and 1 cm below chin.

3. KVP and AMP

Use highest KVP and Amperage the machine allows to get best contrast.

4. Voxel Size

Lesser scan time minimizes movement artifact. 0.3 voxel will give a better image than

0.1 voxel

5. No Metal-

No hair ties/clips, facial piercings, partials, glasses, etc.

6. Natural Neck Posture

Side view: Neck in natural postural alignment, and Frankfurt horizontal plane parallel to the floor. Avoid reaching for chin-rest with head forward posture.

Align head frontal view: Laser aligner down middle of face, can see both ears equally

7. Hold Still

Goal: Patient to hold very, very still for 20 seconds while scan is being taken

Sitting is more stable than standing. A hard chair works well.

Practice swallowing, back teeth touching, tongue lightly resting back of front teeth.

Practice lightly breathing.

Give patient a 7 second warning before you take the scan so they can swallow, get back teeth touching, and have tongue lightly resting back of front teeth.



Normal TMJ- Bone

Bone Density

Intact Cortex

Even pattern Trabecular bone

Normal Size/Shape Condyle/Fossa

Ovoid Condylar Shape

Non-Congruent Condyle/Fossa

Condyle 70% Size Fossa

Condyle Centered in Fossa

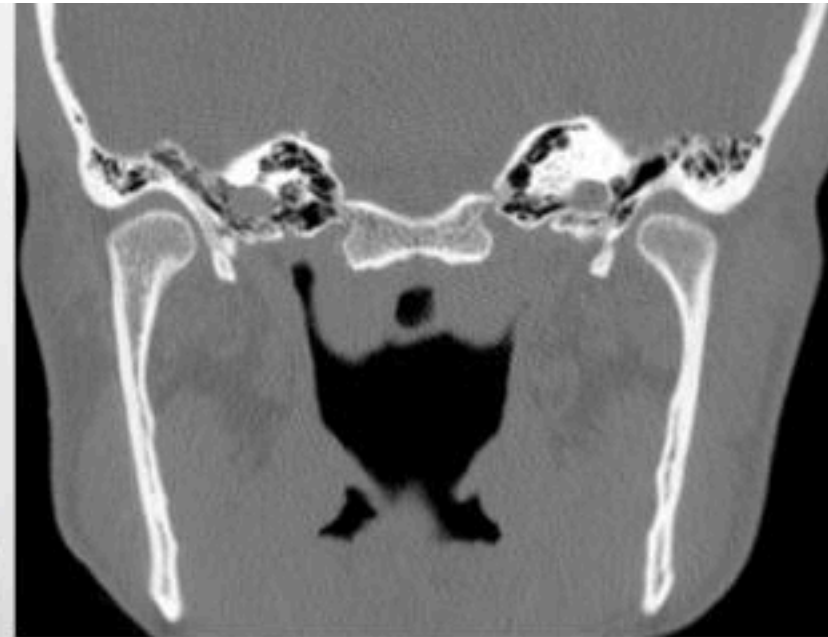
Coronal and Sagittal

Room for Disc

Stable CR load Zone

Condyle closest to fossa

CT Scan
Coronal View



CT Scan
Sagittal View

Interpreting CBCT

www.jrdroter.com

Review of Scan: CBCT

John R Droter, DDS

Name _____ Scan Date _____

Review Date: _____
Scan Quality: Good Fair Marginal

How to quickly scroll through axial, coronal, and sagittal for global impressions:

Right TMJ *Small Coronal Sagittal and Coronal Coronal*

Condyle: Normal Size Small condyle size
 Normal Shape Abnormal condyle shape
 Cortex Intact Cortex not intact
 Cortex Even Hypertrophia

Fossa: Normal Size Small fossa size
 Normal Shape Flattened fossa shape
 Cortex Intact Cortex not intact

Condyle Position: Centered in fossa Condyle distalized
 Joint spacing: Room for disc No room for disc
 CR Load Zone: Superior medial Superior Lateral

Estimate Piper: R1 R2 R3a R3b R4a R4b R5a R5b

Right TMJ Health: Healthy Damaged Active Degeneration Adapting Adapted

Left TMJ *Small Coronal Sagittal and Coronal Coronal*

Condyle: Normal Size Small condyle size
 Normal Shape Abnormal condyle shape
 Cortex Intact Cortex not intact
 Cortex Even Hypertrophia

Fossa: Normal Size Small fossa size
 Normal Shape Flattened fossa shape
 Cortex Intact Cortex not intact

Condyle Position: Centered in fossa Condyle distalized
 Joint spacing: Room for disc No room for disc
 CR Load Zone: Superior medial Superior Lateral

Estimate Piper: L1 L2 L3a L3b L4a L4b L5a L5b

Left TMJ Health: Healthy Damaged Active Degeneration Adapting Adapted

Swelling *Coronal View, Sagittal View, Axial View*

All Tissues: Right = Left = Except _____
 Look for cancer Brain, Muscle, Parotid Submand. Gland, Hypertrophy

All Bones: Right = Left = Except _____
 Look for hypercalcified or radiolucent areas, cysts

Mand *(Sagittal, Cor)*: Open Restricted Divided Segments
 Sinuses: Clear Thickened Lining Dense Polyps
 Airway: Adequate Restricted
 Teeth *(Sagittal, Cor)*: No PNP PNP # _____
(Axial): No Gross Caries

Perio *(Thick Sagittal)*: No Gross Perio Bone Loss

Axis: Aligned Misaligned Non Level with Skull Base
 C2, C3, C4: Aligned Misaligned
 Max Mand Relation: Normal Sagittal Retrognathia Maxilla Mandible
 Max Mand Casting: Normal Coronal Asymmetric Cast Maxilla Mandible

Impression: _____

Signature: _____

Review of Scan: CT/CBCT Guide

TMJ

Condyle

Fossa

Normal Size, Normal Shape, Cortex Intact
 Condyle is 30% size of the fossa with an oval shape. The condyle and fossa are congruent concave surfaces. The outer cortex of bone is a solid continuous line with no breaks. Look for areas of hypertrophia which are indicative of excess load in that area or damage and repair. The right and left TMJ should be the same size.

Condylar Position

Centered in fossa

The condyle should be centered in the fossa. A distalized condyle is indicative of either joint damage and disc dislocation anteriorly or heavy anterior tooth contact. An anteriorly positioned condyle is indicative of a large CR/CO discrepancy usually associated with an adapted mandibular retractor.

Joint Spacing

Centered in fossa

There should be room to "draw" a disc between the condyle and fossa.

CR Load Zone (Centric Relation Load Zone)

Superior medial

Ideally the condyle in its optimal load bearing position (Centric Relation) should load on the superior medial surface. In the coronal view the area where the condyle is closest to the fossa is the Centric Relation Load Zone. A series of normal TMJ's have both condyles load on the superior lateral surface. If the load zones of the right and left do not match (i.e. one is medial the other lateral) this is indicative of joint damage and disc dislocation. Need to evaluate for joint mechanical stability (joint wobble) with a D-PM. Clinically these patients may have a hypertrophia "bite".

Estimate Piper

This estimation combines clinical data from the clinical history, exam, joint palpation, microscope visualization, Doppler (JA) (Joint Vibration Analysis) and the CT scan. If the joint has a left distalized condyle and no clicking in either a Piper 4b or a health joint distalized due to heavy anterior contact (usually isotropic), in the case of the 4b, JA would show some slight "scratch vibrations", whereas a health TMJ distalized due to occlusion would show "smooth vibrations", and clinically have fremitus on the anterior teeth.

1. Normal joint: **PMJ** and **CT** are normal (See all above). No joint sounds, full range of motion, JA no vibrations, quiet Doppler.

2. The TMJ is damaged but disc is still in place so **PMJ** and **CT** are normal. Usually the cartilage is damaged, roughened from parafunctional bruxing. Doppler and JA will both indicate slight vibrations. A well adapted 4b will also have the same vibratory signals as a Piper 2, but the 4b will show changes in condylar position on the CBCT, and the PMJ will show the disc dislocation.

3. This is a partial dislocation of the disc, usually in an anterior medial direction with the lateral ligament being taut or stretched. The joint reduces on opening and will make a vibration, either a click or wobble on JA. If a JA is opposite a health joint there is not a change in occlusion so **CT** is normal. A Piper 3a is often contralateral to a 4b. With loss of the opposing disc, the mandible shifts coronally, the CR load zone changes in both joints leading to 3a.

3a. Same as above except nonloading and therefore no clicking vibration. **CT** is normal.

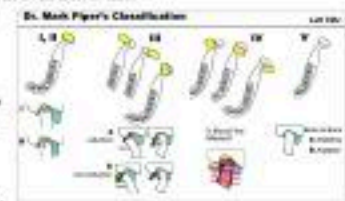
4. The disc is fully displaced off the head of the condyle and reduces on opening. There will be a shifting of the mandible which can be seen on the CBCT. **Condyle not centered in fossa.** Clinically there will "click or wobble" vibration as the disc returns and subluxates. While most vibrations are in the audible range some may not be. These will be detected with JA.

4b. The disc is fully displaced off the head of the condyle and does not reduce on opening. This will look the same on CBCT as a 4a. **Condyle not centered in fossa.** While limited opening may occur, many can have a full range of motion. Range of motion should not be a sole determining factor on whether a joint is 4b.

5a. Osteoarthritis. There will be changes to the **condylar shape and cortex** seen on the CBCT. Osteoarthritis is the inflammatory phase of Osteoarthrosis. Look for missing cortex indicative of active degeneration. The joint will be tender to palpation. An PMJ is helpful in detecting extent of inflammation.

5b. Osteoarthrosis. There will be changes to the **condylar shape and cortex** seen on the CBCT. The Cortex however will be intact and the joint will not be tender to palpation. Hypertrophia will be seen having reinforced the damaged area. There is a loss of congruency as the condyle and fossa wear down and become flattened. Parafunctional tooth grinding increases CA bone wear.

John R Droter DDS



First do quick scroll through axial, coronal, and sagittal for global impression.

Right TMJ

Scroll Corrected Sagittal and Corrected Coronal

Condyle:

- Normal Size
- Normal Shape
- Cortex Intact
- Cortex Even
- Small condylar size
- Altered condylar shape
- Cortex not intact
- Hypercalcification

Fossa:

- Normal Size
- Normal Shape
- Cortex Intact
- Small fossa size
- Flattened fossa shape
- Cortex not intact

Condyle Position

- Centered in fossa
- Condyle distalized

Joint spacing

- Room for disc
- No room for disc

CR Load Zone

- Superior medial
- Superior Lateral

Estimate Piper:

- R1
- R2
- R3a
- R3b
- R4a
- R4b
- R5a
- R5b

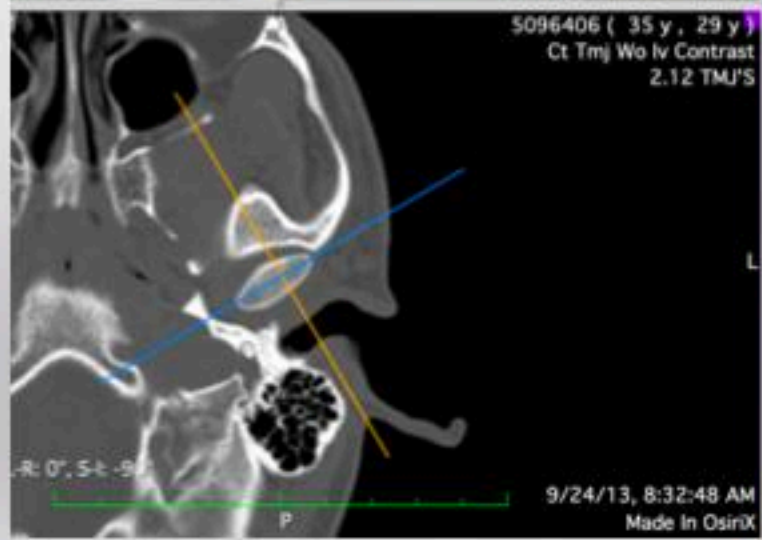
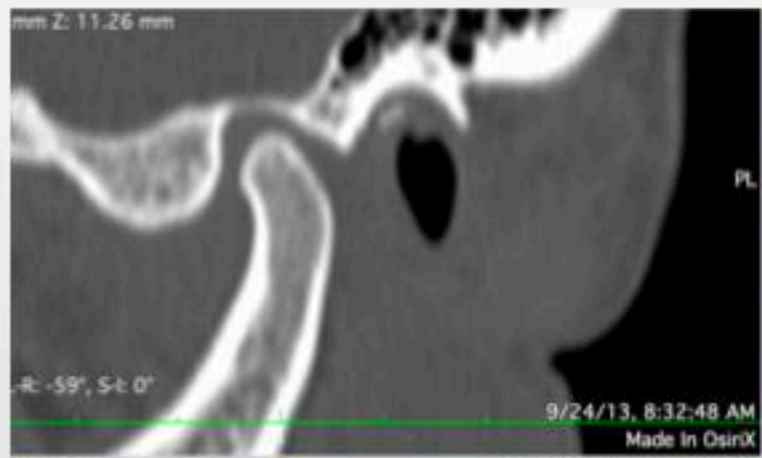
Right TMJ Health:

- Healthy
- Damaged
- Active Degeneration
- Adapting
- Adapted

CT Left Piper 2 from MRI

- Condyle:
 - Normal Size
 - Normal Shape
 - Cortex Intact
 - Cortex Even
- Fossa:
 - Normal Size
 - Normal Shape
 - Cortex Intact
- Condyle Position
 - Centered in fossa
- Joint spacing
 - Room for disc
- CR Load Zone
 - Superior medial

- Hypercalcification
- Condyle distalized
- Superior Lateral



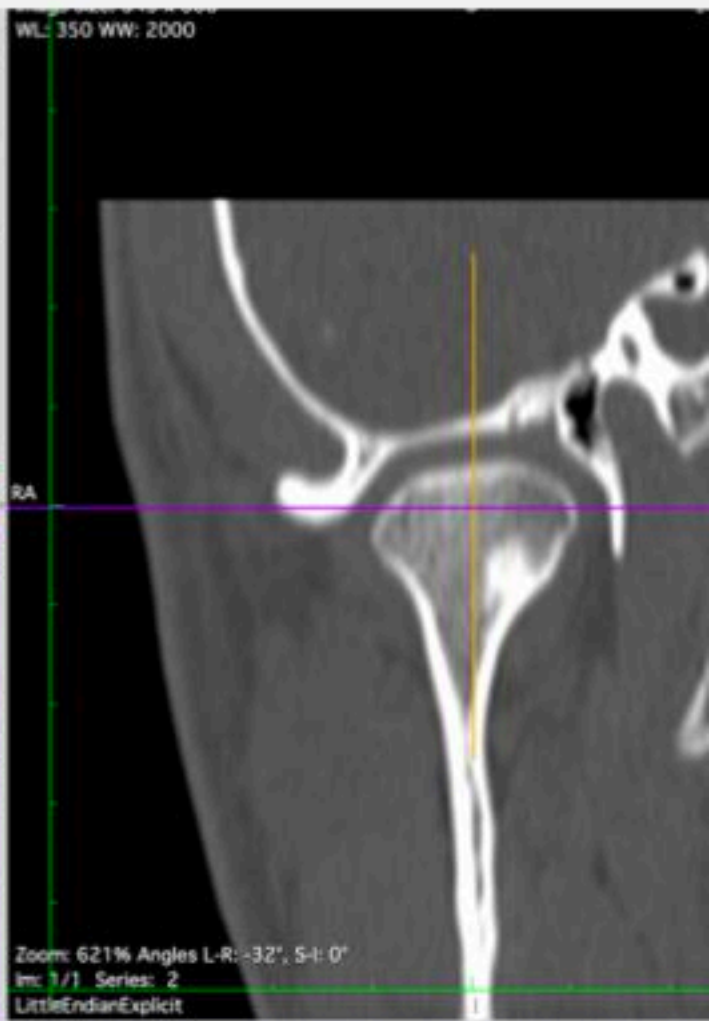
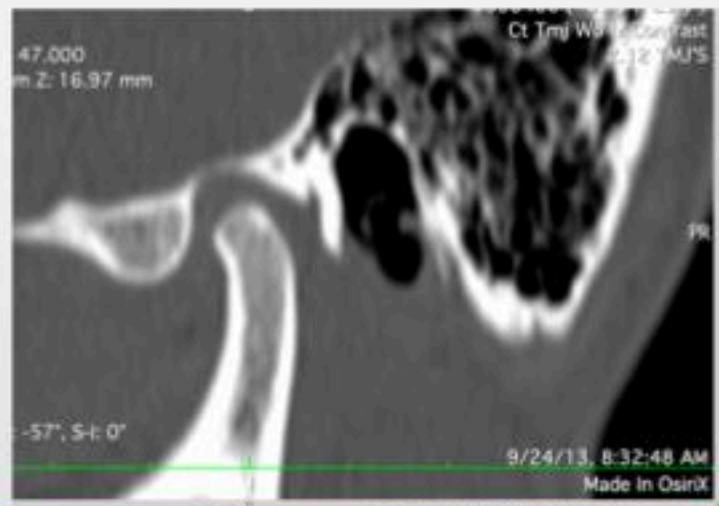
CT Right Piper 4a-e from MRI

- Condyle:
 - Normal Size
 - Normal Shape
 - Cortex Intact
 - Cortex Even
- Fossa:
 - Normal Size
 - Normal Shape
 - Cortex Intact
- Condyle Position Centered in fossa
- Joint spacing Room for disc
- CR Load Zone Superior medial

Hypercalcification

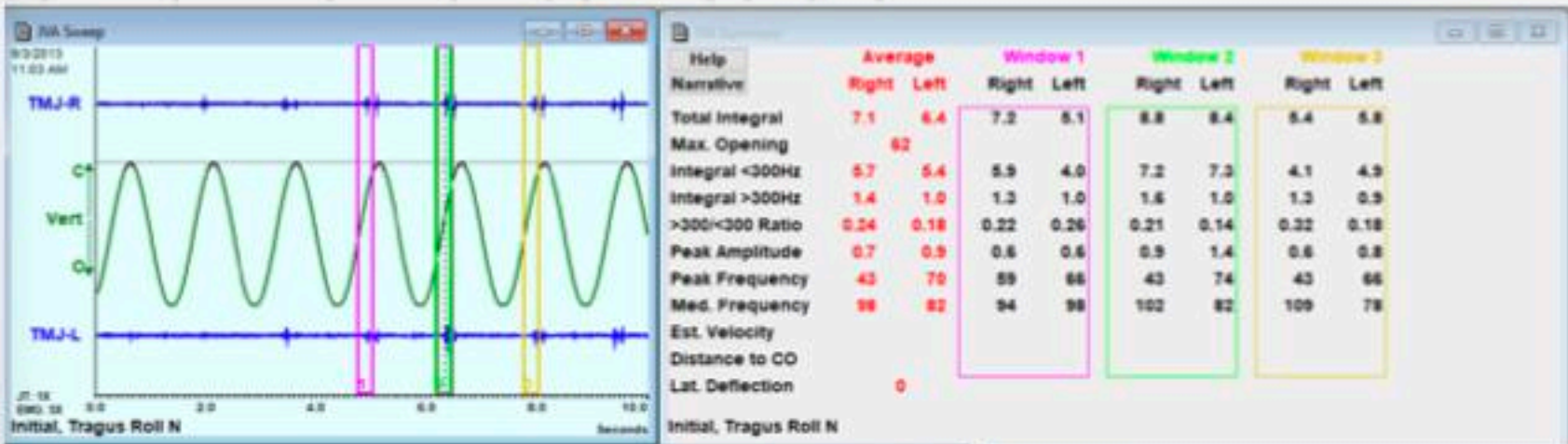
Superior Lateral

Note: Large joint space



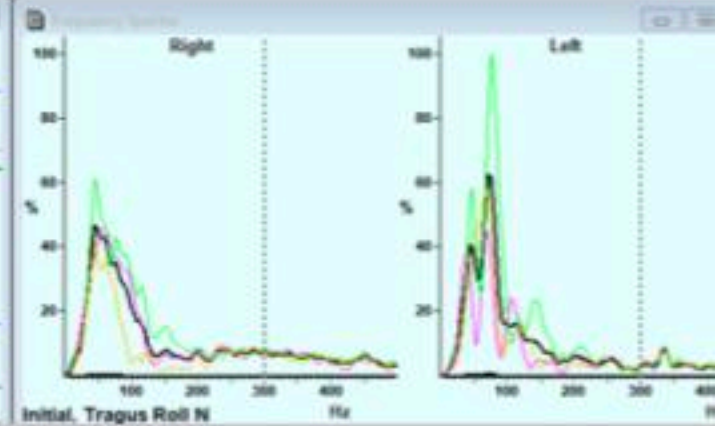
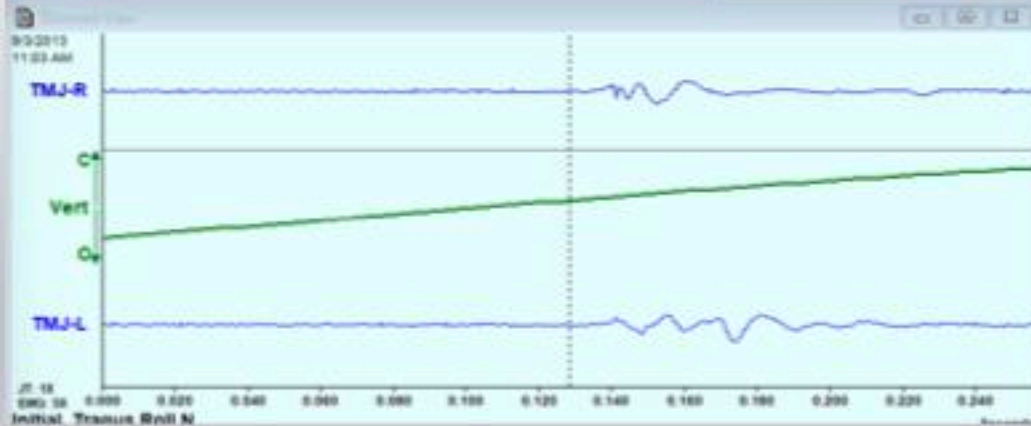
Slight Wobble
before tooth
contact

Joint
subluxation
on movement



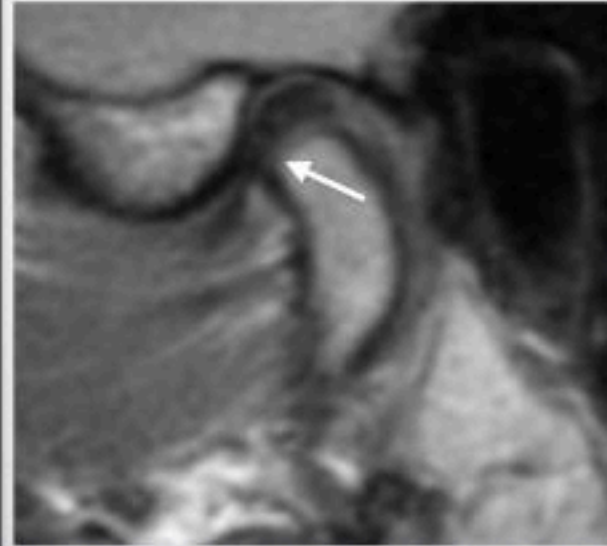
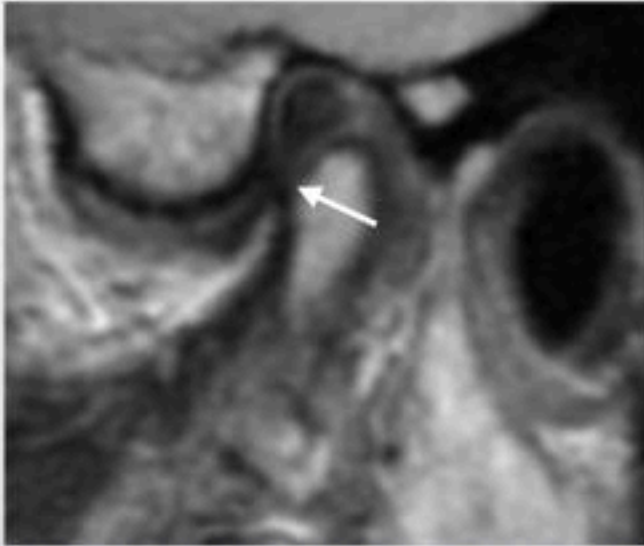
Clinical
Relevance?

Early damage
from
parafunction



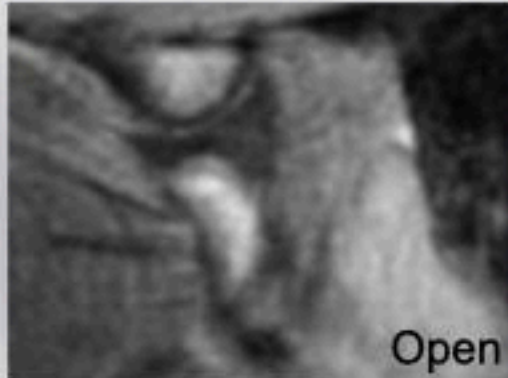
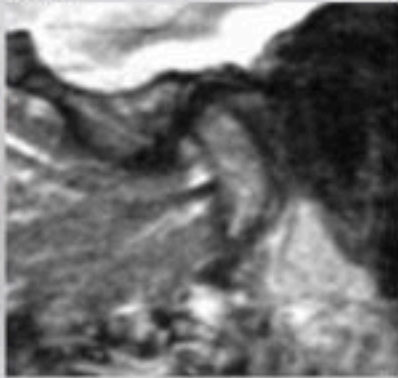
MRI
R4a-e, L2

Right
PD Closed

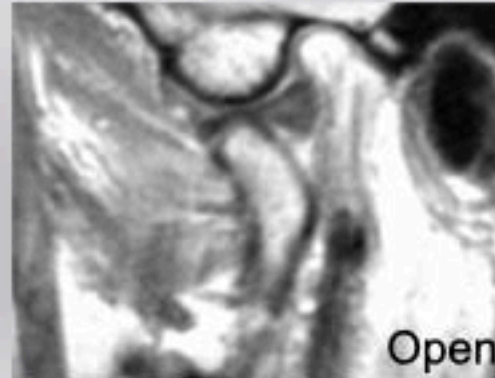


Left
PD Closed

Stir



Stir

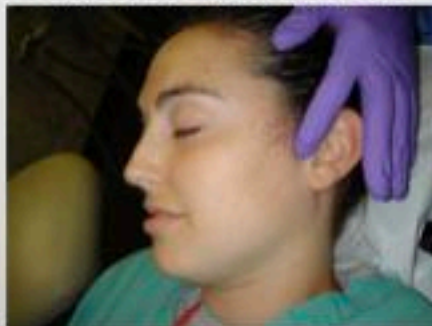


Facial Pain Diagnosis

Diagnostic Tools

- 1 Written and Oral History
 - 2 Observation
 - 3 Physical Exam
 - Muscle Palpation
 - Joint Palpation**
 - Joint Auscultation
 - Joint Motion
 - 4 Anterior Stop Test
 - 5 Sleep Airway Screening
 - 6 CT Scan
- MRI
Blood Tests

Anterior Lateral Pole



Key Question: What is sore?
Is it the joint, or is it muscle,
or both, or neither?

Palpation and Load

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



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

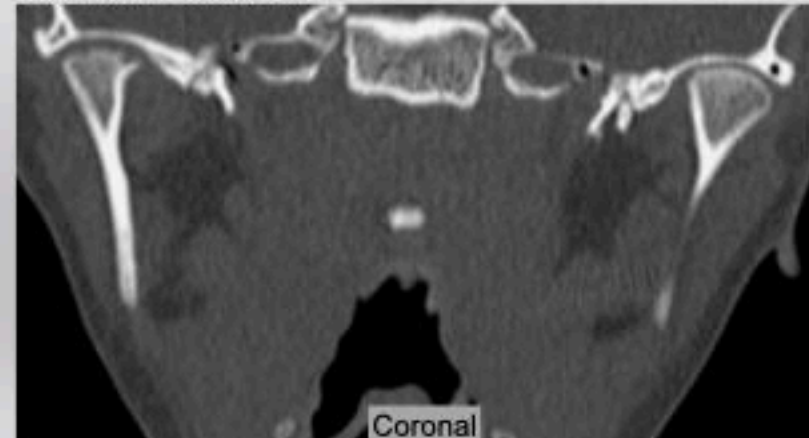
46yo F
CR Load Normal
Excursion Load Normal



40yo F
CR Load Normal
Excursion Load Slight



12yo F- CR Load Normal
Excursion Load Slight



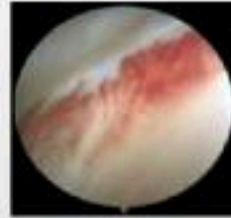
Differential Diagnosis: Painful TMJ

Inflamed Tissue

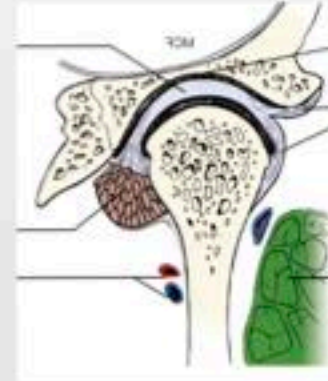
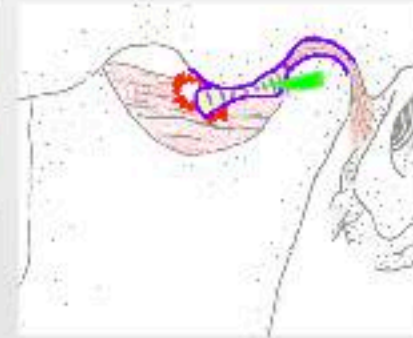
- Acute Ligament Sprain
- Synovitis/Capsulitis
- Pannus
- Retrodiscal Tissue Impingement
- Retrodiscal Tissue Inflammation
- Inflammatory Tissue Bone Resorption
- Deep Masseter inflammation
- Ear Inflammation



Synovitis

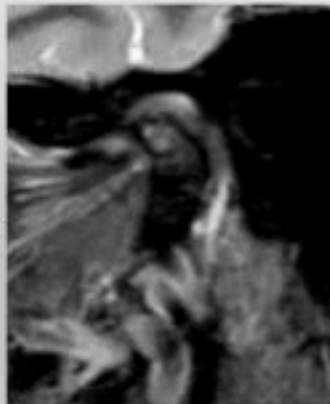


Retrodiscal impingement

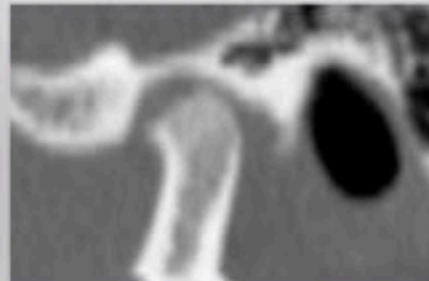


Inflamed Bone

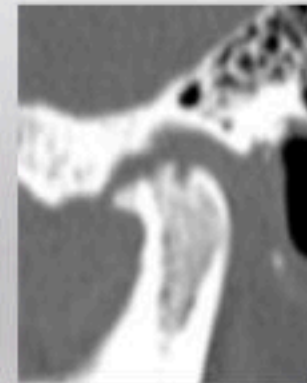
- Osteoarthritis
- RhA
- Hypoxic Progressive Condylar Resorption
- Lyme Arthritis
- Psoriatic Arthritis
- AVN



Inflamed tissue in joint



Missing cortex



OA cyst



CBCT Rx

Patient _____

Date _____

Dx Code:
Reason for Scan:

1. Large Field of View

15cm tall field of view or greater

At 12cm tall you will miss some joints. 15cm and up is better

Note: 17cm x12 cm is 12 cm tall. The smaller # is the height, and is listed last

2. Scan Area

Scan Area to include 1cm above condylar head,
1 cm behind condylar head and 1 cm below chin.



3. KVP and AMP

Use highest KVP and Amperage the machine allows to get best contrast.

4. Voxel Size

Lesser scan time minimizes movement artifact. 0.3 voxel will give a better image than 0.1 voxel

5. No Metal-

No hair ties/clips, facial piercings, partials, glasses, etc.

6. Natural Neck Posture

Side view: Neck in natural postural alignment, and Frankfurt horizontal plane parallel to the floor. Avoid reaching for chin-rest with head forward posture.

Align head frontal view: Laser aligner down middle of face, can see both ears equally

7. Hold Still, Back teeth together

Goal: Patient to hold very, very still for 20 seconds while scan is being taken

Sitting is more stable than standing. A hard chair works well.

Practice swallowing, back teeth touching, tongue lightly resting back of front teeth.

Practice lightly breathing.

Give patient a 7 second warning before you take the scan so they can swallow, get

back teeth touching, and have tongue lightly resting back of front teeth.

8. Take Scan

Ten seconds before scan have patient swallowing, back teeth touching, tongue lightly resting back of front teeth, lightly breathing.

9. Burn Raw DICOM

Burn as Raw Dicom files, not locked into a viewer program

19.2

MRI Scan of the Temporomandibular Joint 1.5 Tesla Magnet

date _____

Please evaluate _____

- Facial Pain 784.8
- Arterial Necrosis 326.4
- Osteoarthritis 715.2

Significant History: See Exam Form

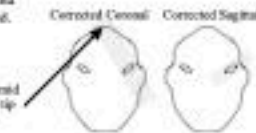
- Use TMJ coils. Use 1.5 Tesla magnet. Do not use an open MRI. Do not use a short flip angle.
- Show orientation views.
- Closed views are with back teeth together.
- Use a roll of tape (3M Transpon Tape 1 inch wide) for the open view. The roll is two inches in diameter. Have patient open as wide as they can comfortably and place the tape roll as far back as possible with the flat side toward the teeth. They should be biting into the tape with their back molars on both sides.
- Copy DICOM images to a CD and give to patient.
- If at Anne Arundel Medical Center, Radiologist Kerry Thompson, MD is to read the scan.
 - Patient has wax index to wear on both to stabilize jaw for closed views.
 - Patient is to wear Dr. Drotter's appliance for all closed views.
 - Give Rx for _____ They will take it 1 hour before scan.
 - Patient to get braces off molars before scan. No orthodontic wire in place.

1. T1, mouth closed, corrected sagittal projection, right and left TMJ.
8 or more views: lateral, medial, 4 cuts through condylar head.
2. T2 scan mouth closed, corrected sagittal projection, right and left TMJ.
8 or more views: lateral, medial, 4 cuts through condylar head.
3. STIR (T1 inversion recovery) corrected sagittal projection, right and left TMJ.
8 or more views: lateral, medial, 4 cuts through condylar head.
4. Proton Density, mouth closed, corrected sagittal projection, right and left TMJ.
8 or more views: lateral, medial, 4 cuts through condylar head.
5. Proton Density, mouth closed, corrected coronal projection, right and left TMJ.
8 or more views: in front of condylar head, through condylar head, behind condylar head.
Be sure to go at least one slice distal, and one slice anterior to condylar head.
6. Proton Density, mouth open fully, corrected sagittal projection, right and left TMJ. 8 or more views: lateral, medial, 4 cuts through condylar head.
Use roll of tape for open view as described above.
Take this view last.

Thank You

18.18

Aim from mid
condyle to tip
of nose



TMD Therapies

John R Droter DDS
Annapolis, Maryland

Annapolis, Maryland
John R Droter DDS

TMDs- What are the choices? (190 Diagnoses, 7 Categories)

1. TMJ Damage

Adhesions and ankylosis of temporomandibular joint
Avascular Necrosis Mandibular Condyle
Cartilage Fibrillation, Mandibular Condyle, Fossa
Closed Lock, Jaw Cartilage, Acute
Closed Lock, Jaw Cartilage, Chronic
Closed Lock, Jaw Cartilage, Intermittent, Mechanically dysfunctional
Crush Injury Mandibular Condyle
Crystal arthropathy, unspecified, TMJ
Dislocation jaw cartilage due to injury, Sequela
Dislocation jaw cartilage with reduction, favorable adaptation, TMJ
Dislocation jaw cartilage without reduction, favorable adaptation, TMJ
Effusion, TMJ

Impingement Retrodiscal Tissue
Inflammatory Tissue Bone Resorption, TMJ Condyle
Loose Body (Joint Mice), TMJ
Malignant neoplasms of bones of skull and face
Open Lock TMJ, Recurring
Osteoarthritis TMJ, active degeneration
Osteoarthritis- inactive
Osteochondritis Dissecans TMJ
Osteolysis Mandibular Condyle, Active
Perforation Meniscus, TMJ
Perforation Pseudodic, TMJ
Psoriatic Arthritis TMJ
Rheumatoid Arthritis Seronegative TMJ

2. Muscles of the TMJ

Dystonia
Habitual posture forward mandible
Hemifacial Muscle spasm
Inhibitory Reflex Dysfunction, Periodontal Ligament Masseter Muscle
Muscle Atrophy, TMJ
Muscle Bracing Neck Stabilization
Muscle Bracing Pain Avoidance
Muscle Bracing TMJ stabilization
Muscle Bracing Airway Patency (with Tongue)
Muscle Contracture Fibrosis Lateral Pterygoid
Muscle Contracture Fibrosis Masseter, Medial Pterygoid, Temporalis
Muscle Fatigue Overuse
Muscle Hypertrophy TMJ Muscles

3. Cranial Alignment/Occlusion

Cranial Distortion / Misalignment
Hemifacial Hypoplasia
Hyper Occlusal Awareness
Idiopathic Orthotic Damage
Malocclusion Anterior Open Bite
Malocclusion Centric occlusion MesioC discrepancy
Malocclusion Deep Bite
Malocclusion due to mouth breathing
Malocclusion due to TMJ bone loss
Malocclusion due to tongue, lip or finger habits
Malocclusion Insufficient anterior occlusal guidance
Malocclusion lack of posterior occlusal support
Malocclusion Posterior Openbite Bilateral
Malocclusion Posterior Openbite Unilateral
Malocclusion unspecified

Malposition/Misalignment: Maxilla, Temporal Bone, Mandible
Mandibular asymmetry
Mandibular hyperplasia
Mandibular hypoplasia
Mandibular Retrognathia
Maxillary asymmetry
Maxillary hyperplasia
Maxillary hypoplasia
Maxillary Retrognathia
Occlusal Adaptation, Favorable
Occlusal Dependency for Joint Stabilization/ Proprioception
Tooth Intrusion
Tooth Supereruption

4. Cervical Damage

Cervical Vertebrae Alignment Dysfunction
Cervicocranial Syndrome
Muscle Guarding (see Neck Instability)
Trigger Point Neck Muscle with Referred Pain
Trigger Point Neck Muscle, Localized Pain

5. Parafunction

Excessive Tooth Wear, Damage
Hypereruptive Occlusion
Parafunctional Clenching Teeth, Awake
Parafunctional Clenching Teeth, Sleep
Parafunctional Grinding Teeth, Awake
Parafunctional Grinding Teeth, Sleep
Parafunctional Clench/Grind Wiggle
Parafunctional Tongue Bracing avoiding uncomfortable tooth contact
Parafunctional Tongue Bracing Neck stabilization
Parafunctional Tongue Bracing to maintain Airway
Parafunctional Tongue Bracing unknown cause

6. Whole Body / Systemic

Lyme Disease Arthritis
Magnesium Deficiency
Obstructive Sleep Apnea
Osteoporosis without current pathological fracture
Pathological Habitual Movement Pattern
Postural Deformity Standing
Postural Deformity Walking
Postural Forward Head Position
Upper Airway Resistance, UARS

7. Other

Nerve Entrapment Masseteric Nerve due to Masseteric hypertonicity
Neurosensory Trigeminal Nerve
Obsessive-Compulsive Personality Disorder
Other
Otitis Ear Infection
Pain disorder exclusively related to psychological factors, Somatoform pain disorder
Pain disorder with related psychological factors
Peripheral Sensitization

TMD Therapies: (70 therapies)

Physical

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

Dental Orthotics

In Office Trial Anterior Stop
Temporary home use anterior stop
Myobrace
Aqualizer
Diagnostic Palatal Anterior Stop
Lower full coverage CR
Lower posterior deprogrammer
Lower TMJ Rehab flat plane
Lower Indexed

Brux Checker
Upper full coverage hard CR guard
BiArch Posterior Deprogrammer
Mandibular Advancement Device
Lateral Bruxing Device

Medicinal

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

Sleep/ Fatigue

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

Occlusal Orthopedic

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

Tongue Parafunction

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

Surgical

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

Different Diagnoses have Different Therapies

Specific Diagnosis

TMDs- What are the choices? (190 Diagnoses, 7 Categories)

1. TMJ Damage

Acute/chronic inflammation of the temporomandibular joint
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2. Muscles of the TMJ

Acute/chronic inflammation of the temporomandibular joint
 Acute/chronic inflammation of the temporomandibular joint
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3. Cranial Alignment/Occlusion

Acute/chronic inflammation of the temporomandibular joint
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 Acute/chronic inflammation of the temporomandibular joint

4. Cervical Damage

Acute/chronic inflammation of the temporomandibular joint
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5. Parafunction

Acute/chronic inflammation of the temporomandibular joint
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6. Whole Body / Systemic

Acute/chronic inflammation of the temporomandibular joint
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7. Other

Acute/chronic inflammation of the temporomandibular joint
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TMD Therapies: (70 therapies)

Physical

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

Medicinal

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

Dental Orthotics

In Office Trial Anterior Stop
 Diagnostic Palatal Anterior Stop
 Brux Checker
 Lower full coverage CR
 Bilateral Posterior Degrammer
 Upper full coverage hard CR guard
 Temporary home use anterior stop
 Myofascial

Aqualizer
 Lower Soft Sectional
 Lower posterior degrogrammer
 Lower TMJ Rehab flat plane
 Lower postured indexed
 Lower CR Indexed
 Mandibular Advancement Device
 Lateral Bracing Device

Sleep/ Fatigue

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

Surgical

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

Occlusal Orthopedic

Lingual Light Wire
 Lower soft sectional orthotic
 Condylar distraction
 Sectional orthodontics
 Expansion orthopedics/ orthodontics
 Restorative Dentistry
 Occlusal Adjustment with OTR, TestBite

Tongue Parafunction

Refer for Cervical Alignment Stabilization
 Myofascial
 Upper Lingual light wire
 Clear Brux Checker
 Freerctory
 Myofunctional therapy

Specific Therapy

TMD Therapies: (70 therapies)

Physical

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

Dental Orthotics

In Office Trial Anterior Stop
Temporary home use anterior stop
Myobrace
Aqualizer
Diagnostic Palatal Anterior Stop
Lower full coverage CR
Lower posterior deprogrammer
Lower TMJ Rehab flat plane
Lower Indexed

Brux Checker
Upper full coverage hard CR guard
BiArch Posterior Deprogrammer
Mandibular Advancement Device
Lateral Bruxing Device

Medicinal

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

Sleep/ Fatigue

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

Occlusal Orthopedic

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

Tongue Parafunction

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

Surgical

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

TMD Therapies

Physical

Ice
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Refer to Physical Therapy: Various Muscle Therapies
Refer to Chiropractic: Atlas Orthogonist
Refer to Osteopathic MD: Body alignment
Breathe, Walk , Exercise

TMD Therapies

Physical

Ice Hot Cold Hot

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

Wet Towel in Microwave
3 Min Hot
3 Min Hot



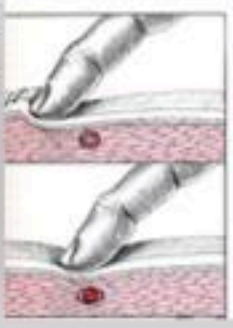
3 Min Cold

Ice Pack
 15 min 3-5x a day



ThermoSafe
 U-Tek Cold Pack
 -23° C

Triggerpoint
 in muscle



TMD Therapies

Physical

Ice
Hot Cold Hot

Cold Laser
TENS in office
TENS home use

Range of motion exercises
Active Stretching: Manual, Tongue Blades, Dynasplint
Refer to Physical Therapy: Rocabado mobilization
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Refer to Physical Therapy: Various Muscle Therapies
Refer to Chiropractic: Atlas Orthogonist
Breathe, Walk, Exercise

Cold laser for sore joints, inflammation,
muscle triggerpoints

3x week for 3 weeks



BioResearch MLS Laser 808, 905 pulsed Diode



Past Dry Needling and ischemic Pressure

Handheld TENS
Acupuncture Pen

BioResearch
QuadraTENS



MLS Laser

Multiwave Locked System Laser

808 nm Continuous, 905 nm Pulsed

Stimulates metabolic processes in cells
Decrease inflammation
Pain Reduction
Faster Healing



Diode Laser

Treatment OA

Osteoarthritis

Minimize parafunction:

If sleep grinding due to airway:

CPAP or Dental Airway Device

Glucosamine 1500mg /Chondroitin 600 mg



Shea Brand CBD

Osteoarthritis

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

NSAIDs

Cold Laser

If still inflamed arthrocentesis with
Platelet Rich Plasma (PRP)



No Shellfish allergy



MLS Laser
3x week for 3 weeks

TMD Therapies

Physical

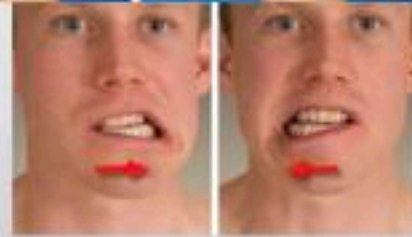
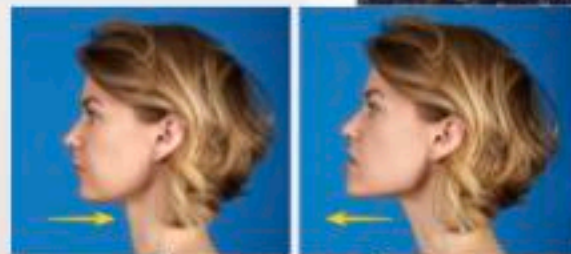
- Ice
- Hot Cold Hot
- Cold Laser
- TENS in office
- TENS home use

Range of motion exercises

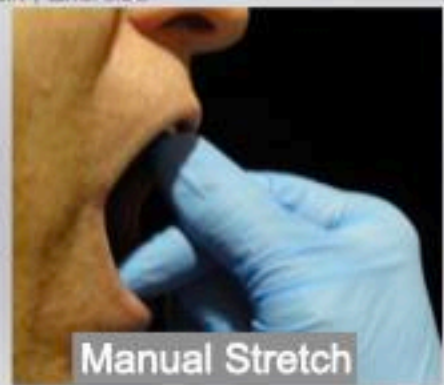
Active Stretching: Manual, Tongue Blades, Dynasplint

- Refer to Physical Therapy: Rocabado mobilization
- Refer to Physical Therapy: Postural Restoration Therapy
- Refer to Physical Therapy: Various Muscle Therapies
- Refer to Chiropractic: Atlas Orthogonist
- Refer to Osteopathic MD: Body alignment
- Breathe, Walk, Exercise

20 reps, 5x a day, non painful
Open close, side to side, front to back



Danger,
Danger,
Danger.



Manual Stretch



Tongue Blade



DynaSplint

Must have MRI for all active stretches. You will be irreversibly tearing/stretching ligaments.

TMD Therapies

Physical

- Ice
- Hot Cold Hot
- Cold Laser
- TENS in office
- TENS home use
- Range of motion exercises
- Active Stretching: Manual, Tongue Blades, Dynasplint

Refer to Physical Therapy: Postural Restoration Therapy
Refer to Physical Therapy: Various Muscle Therapies
Refer to Physical Therapy: Rocabado mobilization

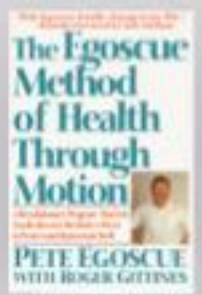
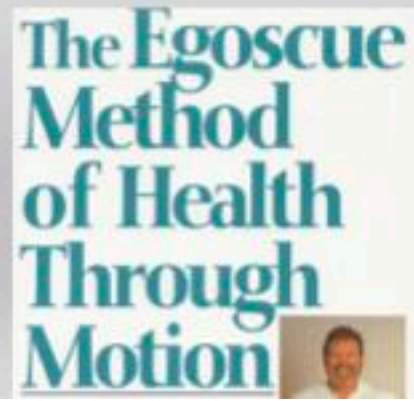
Refer to Chiropractic: Atlas Orthogonist
 Refer to Osteopathic MD: Body alignment
 Breathe, Walk, Exercise

Postural
Restoration
Therapy



Dr Mariano Rocabado

If no access to professionals.
 Do it yourself PT.
 Strengthen weak opposing muscles



TMD Therapies

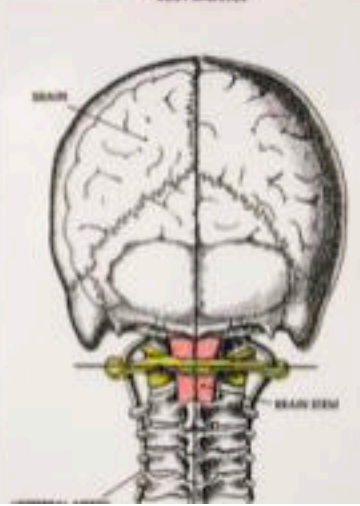
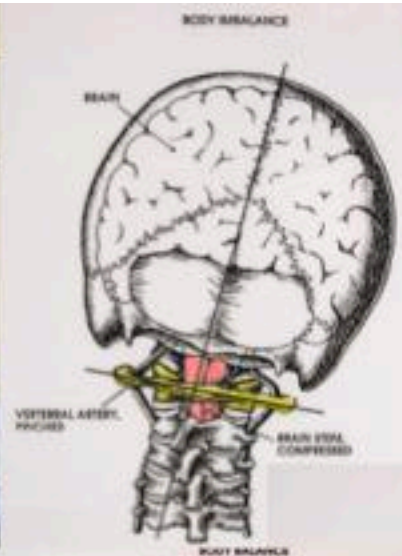
Physical

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- Hot Cold Hot
- Cold Laser
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- TENS home use
- Range of motion exercises
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Refer to Chiropractic: Atlas Orthogonist
Refer to Osteopathic DO: Body alignment

Breathe, Walk, Exercise

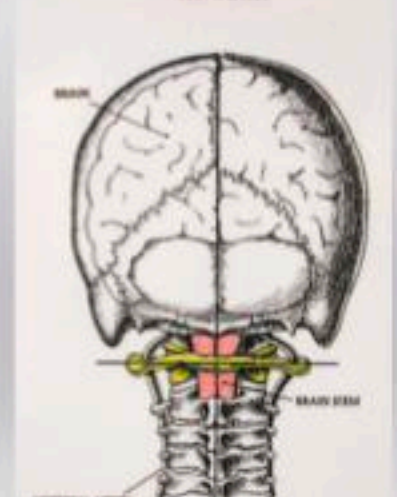
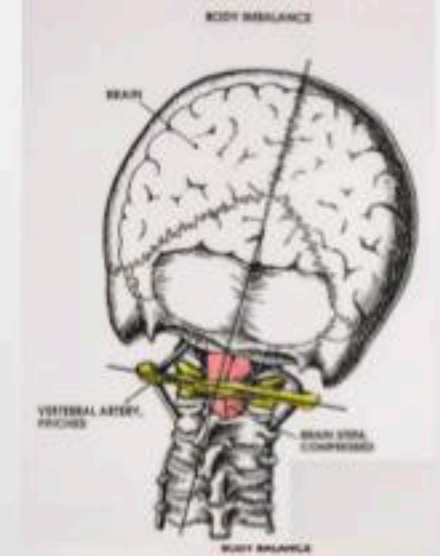
Atlas Alignment



Atlas Orthogonist
Branch of Chiropractic Medicine



Uses sound wave to move atlas,
disrupts muscle bracing



TMD Therapies

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Cold Laser
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Active Stretching: Manual, Tongue Blades, Dynasplint
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Refer to Chiropractic: Atlas Orthogonist
Refer to Osteopathic MD: Body alignment

Breathe, Walk , Exercise

Postural Restoration PT addresses these



Which famous doctor published this?

A desire to take medicine separates man from animals. Why this appetite should have developed, how it could have grown to its present dimension, what it will ultimately reach, are interesting problems in psychology. We of the profession.....routinely administer nauseous mixtures on every possible occasion.

.....when we are able to say without fear of dismissal, that a little more exercise, a little less food, and a little less tobacco and alcohol may possible meet the indications of the case.

Sir William Osler, 1891



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“Recent Advances in Medicine,” Science, March **1891**

Founding father of Johns Hopkins Medical School

Father of modern medicine

“Greatest diagnostician ever to wield a stethoscope”

from book: William Osler, A life in Medicine. Michael Bliss



TMD Therapies: (70 therapies)

Physical

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TENS home use
Range of motion exercises
Active Stretching: Manual, Tongue Blades, Dynasplint
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Refer to Physical Therapy: Various Muscle Therapies
Refer to Chiropractic: Atlas Orthogonist
Refer to Osteopathic MD: Body alignment
Breathe, Walk , Exercise

Dental Orthotics

In Office Trial Anterior Stop
Temporary home use anterior stop
Myobrace
Aqualizer
Diagnostic Palatal Anterior Stop
Lower full coverage CR
Lower posterior deprogrammer
Lower TMJ Rehab flat plane
Lower Indexed

Brux Checker
Upper full coverage hard CR guard
BiArch Posterior Deprogrammer
Mandibular Advancement Device
Lateral Bruxing Device

Medicinal

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

Sleep/ Fatigue

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

Occlusal Orthopedic

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

Tongue Parafunction

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

Surgical

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

TMD Therapies

Medicinal

Anti Inflammatory:

NSAIDs,

Doxycycline low dose

CBD Topical

Glucosamine/Chondroitin MSM

Vitamins: Vit C, Vit D, Vit B12

Minerals: Magnesium, Electrolytes

Minerals: Iron

Refer to MD for Lyme therapies

Refer to MD Rheumatoid Arthritis therapies

Refer Botox Masseter injections

Refer Botox Lateral Pterygoid Injections

Food

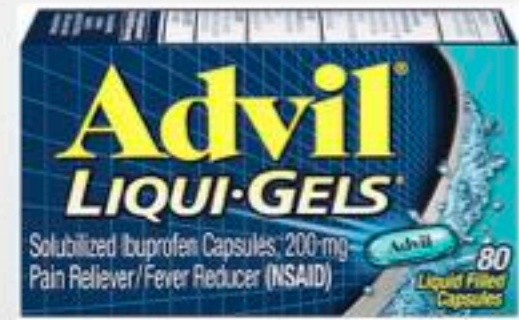
TMD Therapies

Medicinal

Anti Inflammatory: NSAIDs, Doxycycline low dose

- CBD Topical
- Glucosamine/Chondroitin MSM
- Vitamins: Vit C, Vit D, Vit B12
- Minerals: Magnesium, Electrolytes
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- Food

Meloxicam 15mg qd
 Doxycycline 20mg bid
 Need Blood work CMP



No Sulfur
Allergy



No women pre-menopause

TMD Therapies

Medicinal

Anti Inflammatory:
NSAIDs,
Doxycycline low dose

CBD Topical Glucosamine/Chondroitin MSM

Vitamins: Vit C, Vit D, Vit B12
Minerals: Magnesium, Electrolytes
Minerals: Iron
Refer to MD for Lyme therapies
Refer to MD Rheumatoid Arthritis therapies
Refer Botox Masseter injections
Refer Botox Lateral Pterygoid Injections
Food

Shea Brand CBD



No Shellfish allergy



Vegan

TMD Therapies

Medicinal

- Anti Inflammatory:
 - NSAIDs,
 - Doxycycline low dose
- CBD Topical
- Glucosamine/Chondroitin MSM

Vitamins: Vit C, Vit D, Vit B12

Minerals: Magnesium, Electrolytes

Minerals: Iron

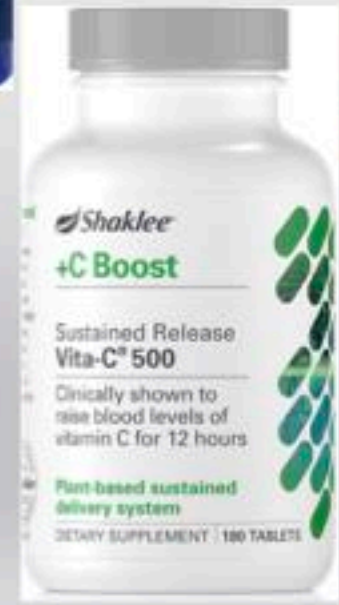
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- Refer Botox Lateral Pterygoid Injections
- Food

Mother Earth Ionic Angstrom
Magnesium 2 oz bottle
0.5 teaspoon sublingual



Women
add iron

Vit C 1,500 mg
before exercise



TMD Therapies

Medicinal

- Anti Inflammatory:
 - NSAIDs,
 - Doxycycline low dose
- CBD Topical
- Glucosamine/Chondroitin MSM
- Vitamins: Vit C, Vit D, Vit B12
- Minerals: Magnesium, Electrolytes
- Minerals: Iron

Refer to MD for Lyme therapies
Refer to MD Rheumatoid Arthritis therapies

- Refer Botox Masseter injections
- Refer Botox Lateral Pterygoid Injections
- Food



MRI STIR
Disc Lysis
Joint infection

Spikey = Rheumatoid Arthritis

TMD Therapies

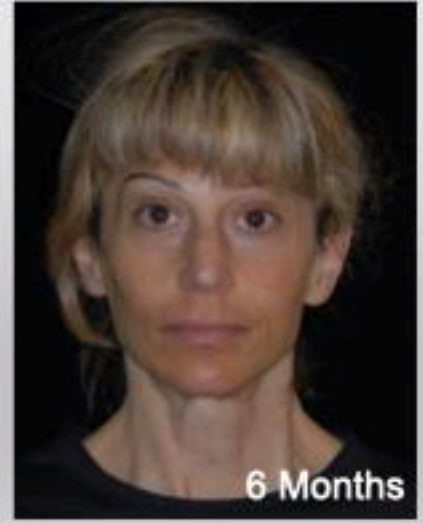
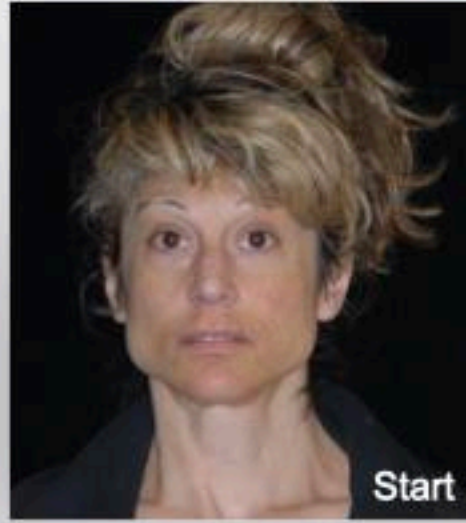
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- Minerals: Iron
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- Refer to MD Rheumatoid Arthritis therapies

Refer Botox Masseter injections

- Refer Botox Lateral Pterygoid Injections
- Food

Botox for Hypertrophic Masseters from chronic clenching



TMD Therapies

Medicinal

- Anti Inflammatory:
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 - Doxycycline low dose
- CBD Topical
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Food

Anti- Inflammatory Diet



TMD Therapies: (70 therapies)

Physical

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

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Lateral Bruxing Device Elastomeric
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CPAP

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Lingual Light Wire
Lower soft sectional orthotic
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Frenectomy
Myofunctional therapy

Surgical

Refer: Arthrocentesis w/ PRP
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Refer: Total Joint Replacement
Refer: Orthognathic Surgery



Choosing the Correct Night Guard

www.APSleep.com

My #1 Choice: Best Night Guard

My #1 Choice: Best Night Guard

- Neck alignment
- Mechanically Stable TMJs
- Physiological Harmonious Occlusion

Occlusal Adjustment with DTR, TekScan

Disclusion Time Reduction with TekScan is more precise and more objective than occlusal adjusting with articulating paper/ribbon/film alone.





Choosing the Correct Night Guard

www.APSleep.com

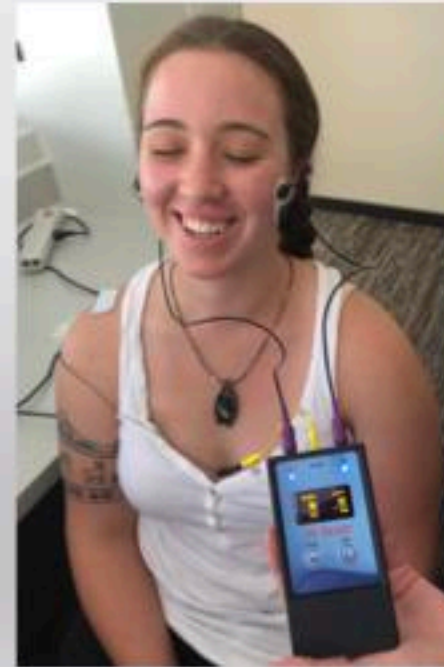
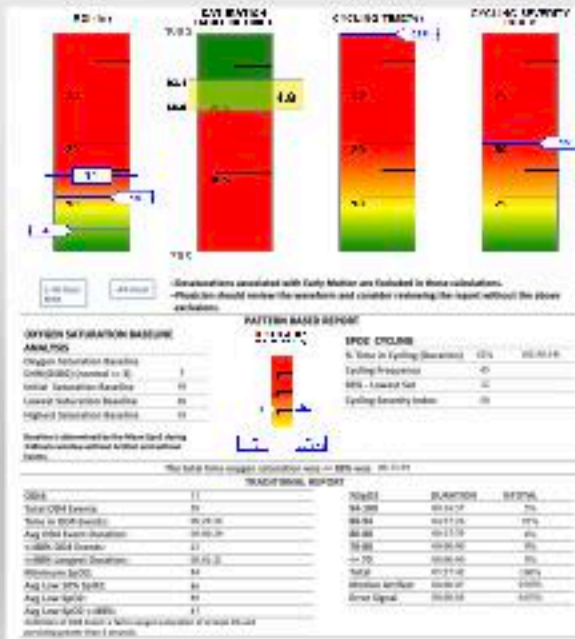
EMG Muscle Test: Forces on Front Teeth

Sleep Heart Rate and Oxygen

EMG Muscle Test: Forces on Front Teeth

Sleep Heart Rate and Oxygen

SleepSAT
Patient Safety Inc.



M-Scan
BioResearch



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

"Sleep Airway Screening"



High Resolution
Pulse Oximetry

Data every 1
second average
over 3 seconds

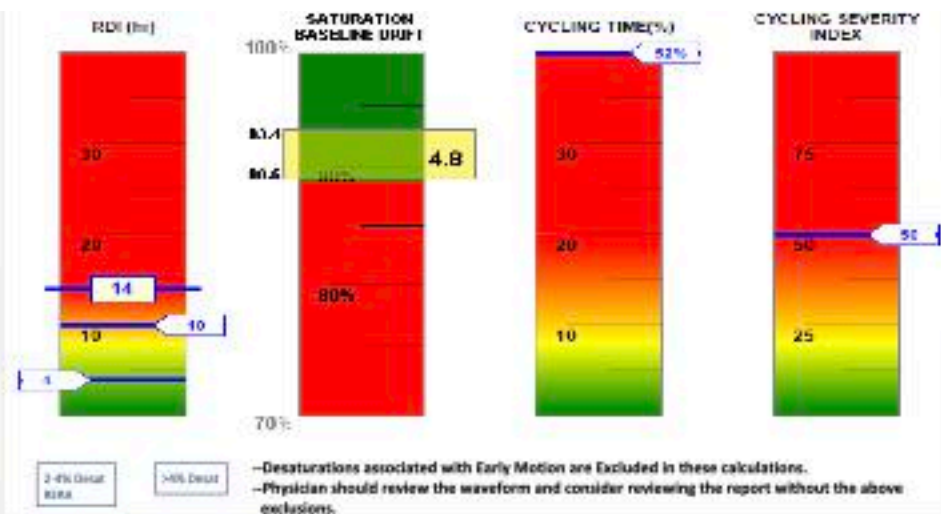


Patient Safety Inc.



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

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



OXYGEN SATURATION BASELINE ANALYSIS

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

Baseline is determined by the Mean SpO2 during 2 Minute window without Artifact and without Events.

PATTERN BASED REPORT

SpO2 Cycling

% Time in Cycling (Duration)	52%	(02:50:14)
Cycling Frequency	45	
96% - Lowest Sat	13	
Cycling Severity Index	58	

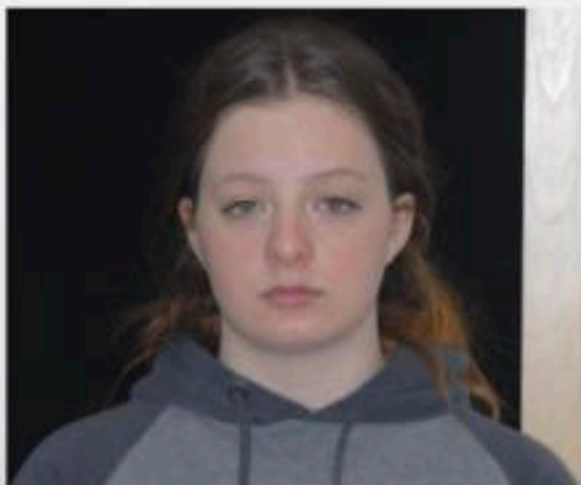
The total time oxygen saturation was <= 88% was: 00:13:39

TRADITIONAL REPORT

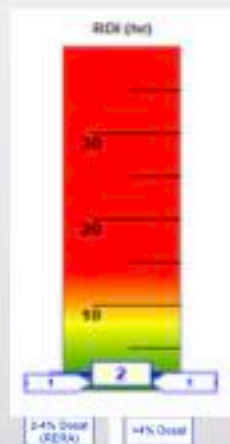
OD4:		SpO2	DURATION	%TOTAL
Total OD4 Events:	11	94-100	00:16:37	5%
Time in OD4 Events:	58	88-94	04:57:26	91%
Avg OD4 Event Duration:	06:29:26	80-88	00:13:39	4%
<=88% OD4 Events:	00:00:28	70-80	00:00:00	0%
<=88% Longest Duration:	23	<= 70	00:00:00	0%
Minimum SpO2:	00:01:21	Total	05:27:42	99%
Avg Low 10% SpO2:	84	Motion Artifact	00:00:07	0.04%
Avg Low SpO2:	86	Error Signal	00:00:05	0.03%
Avg Low SpO2 <=88%:	89			
	87			

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

Age 16F
 cc: Facial Pain, Excessive Daytime Fatigue



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



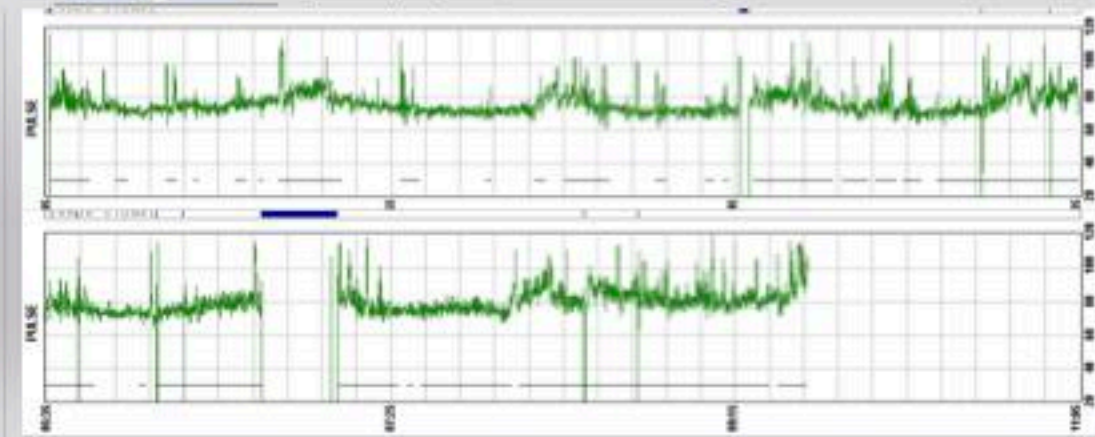
PULSE RATE DATA	
Autonomic Arousal	
Index (#/hr):	31
Pulse Rate Range	
Mean:	78
Min:	34
Max:	122
Tachycardia - Sleep (>90 bpm)	
Duration:	00:34:56
% (VRT):	6%
Bradycardia - Sleep (<50 bpm)	
Duration:	00:00:35
% (VRT):	0%



Heart Rate
 >90 bpm
 for 35 min

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

Sleep Latency Test
 Dx: Narcolepsy
 Recommend daytime medication

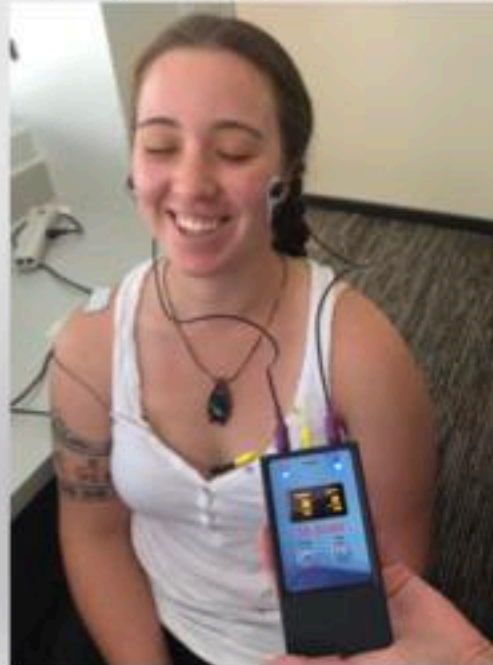


Choosing the Correct Night Guard

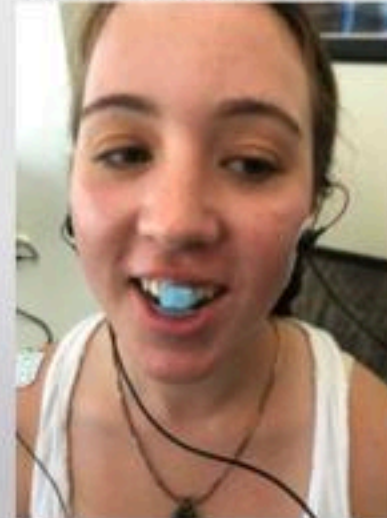
M-Scan EMG Electromyography



Clench back teeth



Clench
anterior stop



Can place moderate force
on front teeth

Clench
Back teeth +250 μv
Front teeth +121 μv



EMG Muscle Test: Forces on Front Teeth

Sleep Heart Rate and Oxygen

Low Sympathetic Arousals
Good Blood Oxygenation

Low Forces

Moderate Forces

Severe Forces

D-PAS

Posterior
Deprogrammer

Upper Hard
Night Guard

Moderate Sympathetic Arousals
AHI less than 5

D-PAS
or Lat Brux
Anterior Stop

Post Deprogram
or Lat Brux
Posterior Stop

Lat Brux
Posterior Stop

Obstructive Sleep Apnea
AHI 5 - 20

MAD
Anterior Stop

MAD
Posterior Stop

CPAP +
Upper Hard
Night Guard

D-PAS = Diagnostic Palatal Anterior Stop

Lat Brux = Lateral Bruxing Device

MAD = Mandibular Advancement Device

EMG Muscle Test: Forces on Front Teeth

Sleep Heart Rate and Oxygen

**Low Sympathetic Arousals
Good Blood Oxygenation**

Low Forces

Moderate Forces

Severe Forces

D-PAS

Posterior
Deprogrammer

Upper Hard
Night Guard

**Moderate Sympathetic Arousals
AHI less than 5**

D-PAS
or Lat Brux
Anterior Stop

Post Deprogram
or Lat Brux
Posterior Stop

Lat Brux
Posterior Stop

**Obstructive Sleep Apnea
AHI 5 - 20**

MAD
Anterior Stop

MAD
Posterior Stop

CPAP +
Upper Hard
Night Guard

D-PAS = Diagnostic Palatal Anterior Stop

Lat Brux = Lateral Bruxing Device

MAD = Mandibular Advancement Device

Choosing the Correct Night Guard

Low Forces on Front Teeth

Sleep Heart Rate/Oxygen

Low Sympathetic Arousals
Good Blood Oxygenation

Moderate Sympathetic Arousals
AHI less than 5

Obstructive Sleep Apnea
AHI 5 - 20

Low Forces

D-PAS

D-PAS
or Lat Brux
Anterior Stop

MAD
Anterior Stop



D-Pas



Lat-Brux

Choosing the Correct Night Guard

Moderate Forces on Front Teeth

Sleep Heart Rate/Oxygen

Low Sympathetic Arousals
Good Blood Oxygenation

Moderate Sympathetic Arousals
AHI less than 5

Obstructive Sleep Apnea
AHI 5 - 20

Moderate Forces

Posterior
Deprogrammer

Post Deprogram
or Lat Brux
Posterior Stop

MAD
Posterior Stop



Bi Arch Posterior Deprogrammer



D-SAD sleep
Panthera Dental

Choosing the Correct Night Guard

Severe Forces on Front Teeth

Sleep Heart Rate/Oxygen

Low Sympathetic Arousals
Good Blood Oxygenation

Moderate Sympathetic Arousals
AHI less than 5

Obstructive Sleep Apnea
AHI 5 - 20

Severe Forces

Upper Hard
Night Guard

Lat Brux
Posterior Stop

CPAP +
Upper Hard
Night Guard





APS

ArrowPath Sleep

www.APSleep.com
info@apsleep.com



APS In Office Anterior Stop 2.5mm



APS Airway Bite 4mm



APS Home Trial Anterior Stop



APS D-PAS

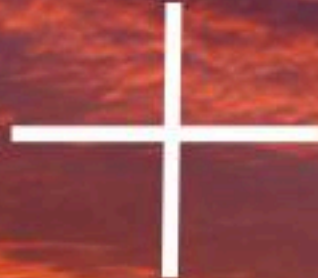


APS Lat-BruX



Know Yourself

Know Your Work



Know Your Patient

Apply Your Knowledge

LD Pankey Institute

Write your Dream