Hinman 2023

The Click

John R Droter DDS
Annapolis, Maryland

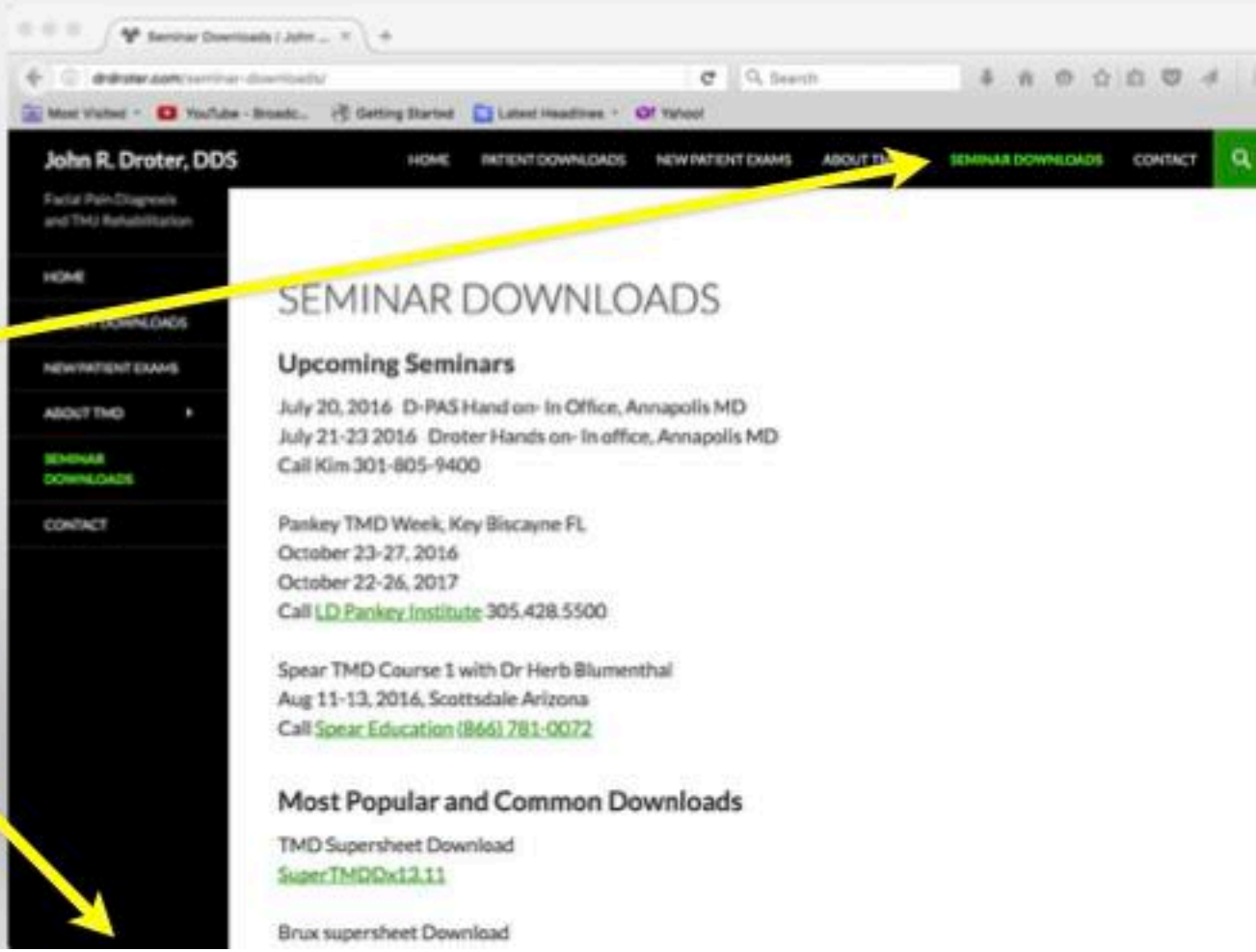
www.drdroter.com

John R Droter, DDS

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

Seminar Download

Hinman 2023



Hello. I am:

John R Droter DDS
Annapolis, Maryland

Milestones

Visiting Faculty Spear Education 2013

Visiting Faculty LD Pankey Institute 2008

Visiting Faculty Orthodontic Program
Washington Hospital Center 2000

On staff AAMC: Orthopedic Rounds
In OR for TMJ Surgery

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

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

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

TMD Therapies: (70 therapies)

Physical

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

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

Medicinal

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

Occlusal Orthopedic

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

Tongue Parafunction

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

Dental Orthotics

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

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

Athletic Mouthguard
Anterior Repositioning
Occlusal Adjust Assist
Aqualizer
Myobrace

Sleep/ Fatigue

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

Surgical

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

Different Diagnoses have Different Therapies

Specific Diagnosis

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

1. TMJ Damage
2. Muscles of the TMJ
3. Cranial Alignment/Occlusion
4. Cervical Damage
5. Parafunction
6. Whole Body / Systemic
7. Other

Specific Therapy

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Surgical

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Refer: Total Joint Replacement
Refer: Orthognathic Surgery

70

Lingual Light Wire- Crozat Arch Expansion

Age 29 Start

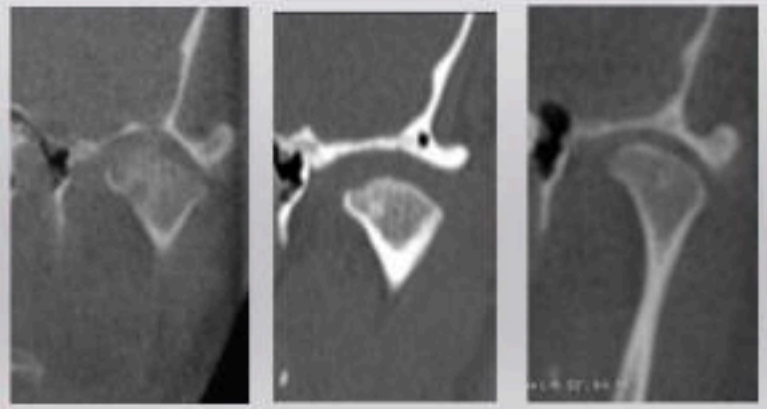
7 months LLW Age 30

Anterior Openbite with Active Osteolysis due to Inflammatory Tissue Bone Resorption

Non Surgical Therapies

Condylar Distraction

Anti Inflammatory Therapies



Restorative Dentistry

Pathological Occlusion

??Airway Related Bruxing?

Restore Function

Composite Trial Occlusion

AHI + 26 CPAP

Anterior guidance

or group function?

Disclosures:

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

Atomic Skis- Sponsored.
I got stuff.

TMD Course
LD Pankey Institute
A small honorarium for lectures

TMD Course
Spear Education
Honorarium for lectures

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

APS
ArrowPath Sleep

APS
ArrowPath Sleep

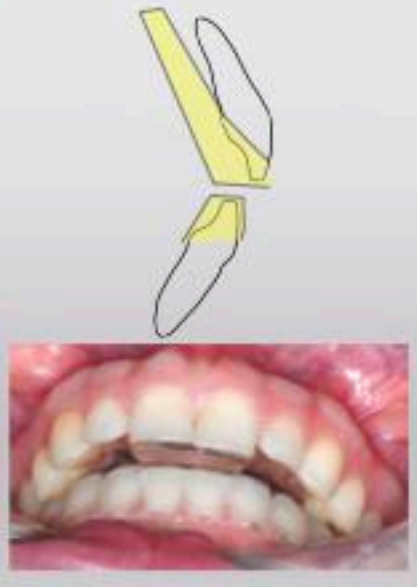
LIVING TREE DENTAL LAB

Nate Brock, CDT
(865) 509-4509
connect@livingtreelab.com

3D Printed Orthotics

D-PAS
Diagnostic-
Palatal Anterior Stop

Brux-PAS
with lower Essix



Hard Lower Posterior Stop
with upper essix

Hard Lower Full Coverage
Centric Relation Orthotic

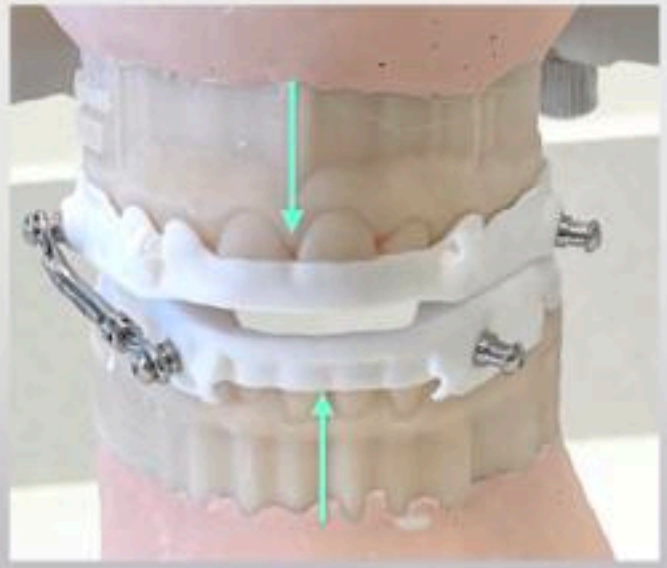
APS
ArrowPath Sleep

Great Lakes
DENTAL TECHNOLOGIES

greatlakesdentaltech.com
716.871.1161

Available May 1, 2023

ArrowPath Sleep
Lat Brux
Lateral Bruxing Guard



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

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

6 Common TMDs

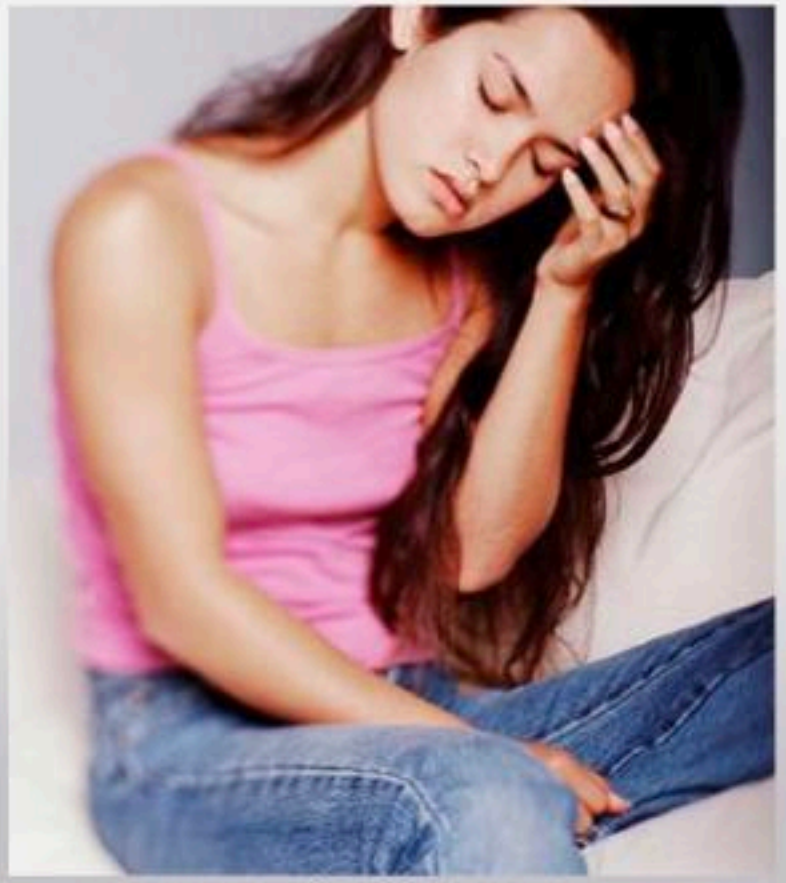
Parafunctional Clenching
Parafunctional Grinding
Occlusal Muscle Dysfunction
Osteoarthritis
Acute Sprain
Acute Closed lock of TMJ disc

5 Common Obstacles

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

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

TMJ Clicking



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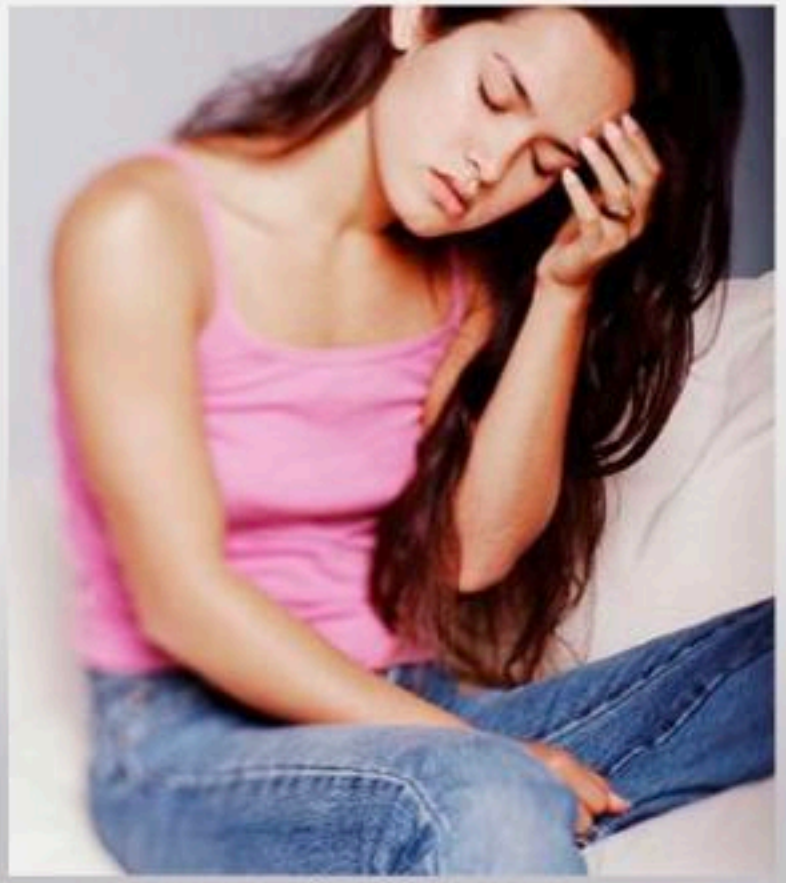


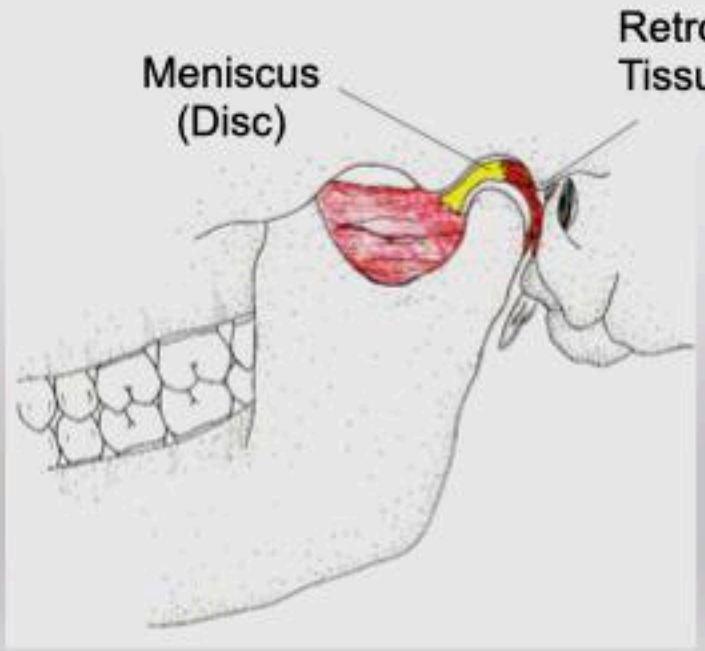
A joint joins two bones that allows movement between the two bones

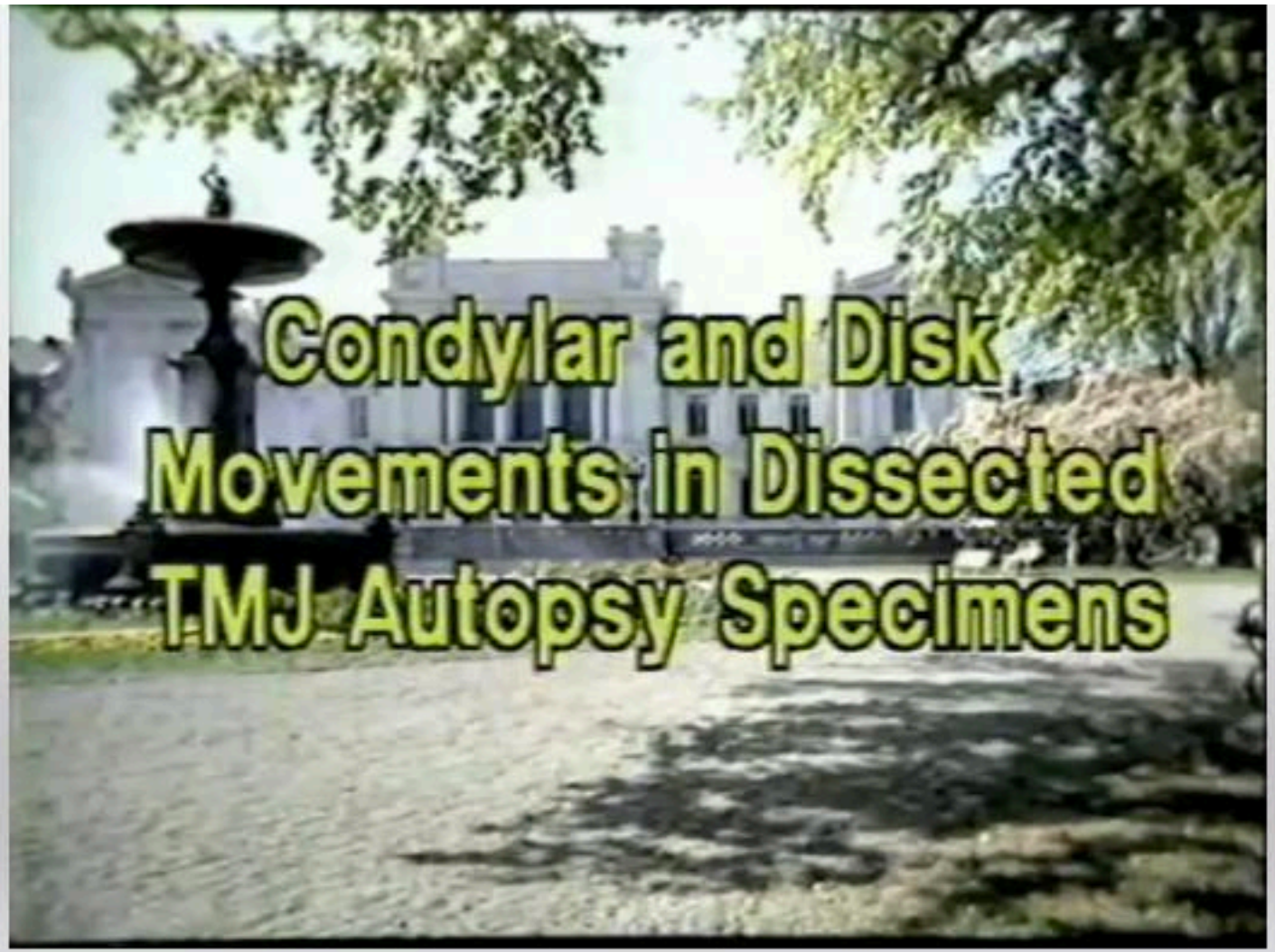
TMJ has 2 Joint Compartments:

Upper- Translation
Lower- Rotation

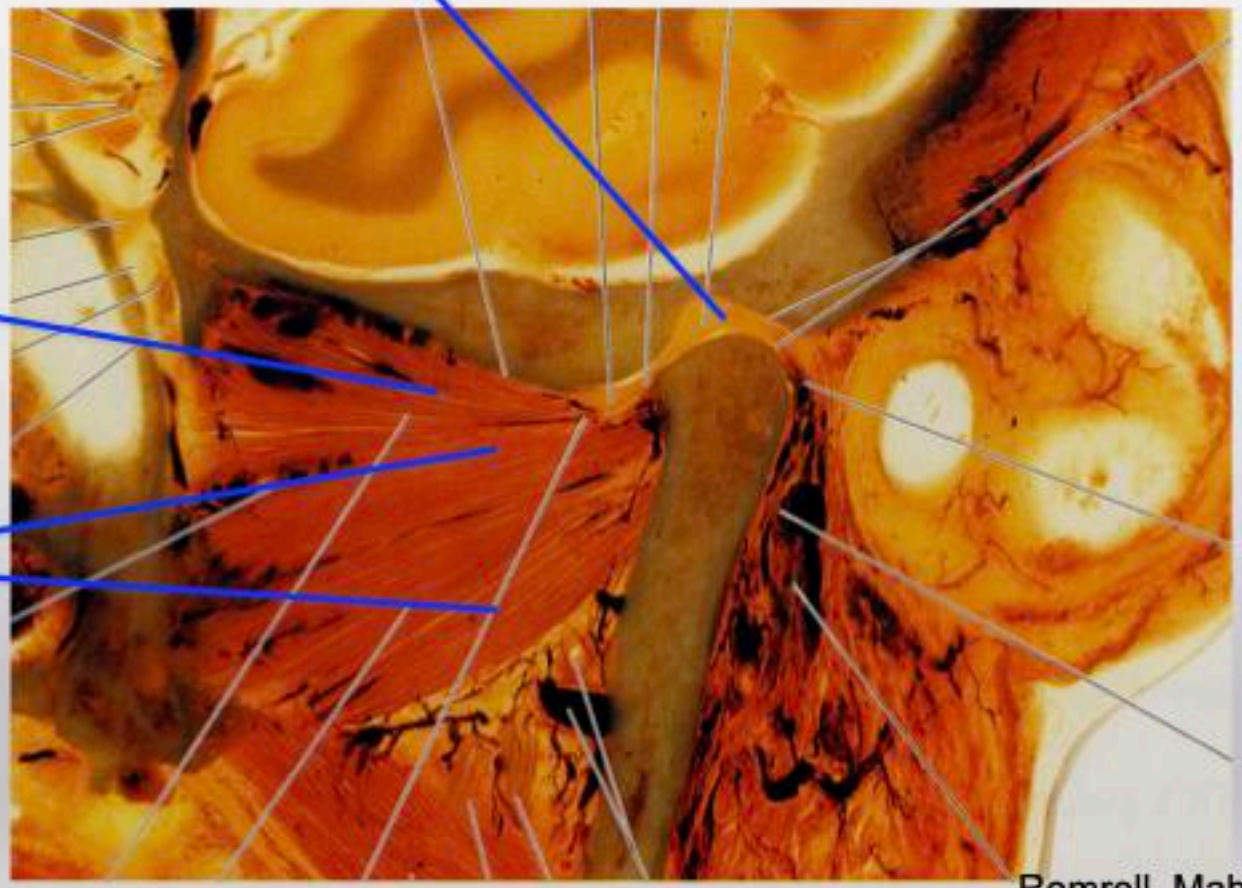
Rotate
Slide
Pivot

Solid end point closing
Ligamentous end point opening

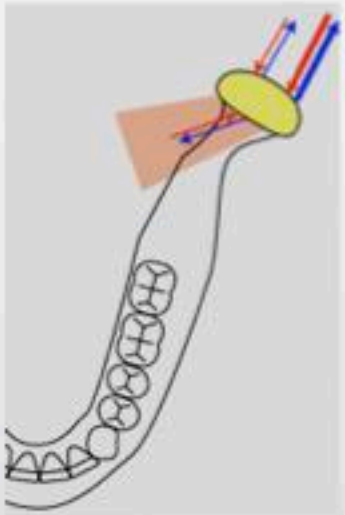



Condylar and Disk
Movements in Dissected
TMJ Autopsy Specimens

Oblique Sagittal View



Axial View



Normal TMJ Blood Flow, Marrow

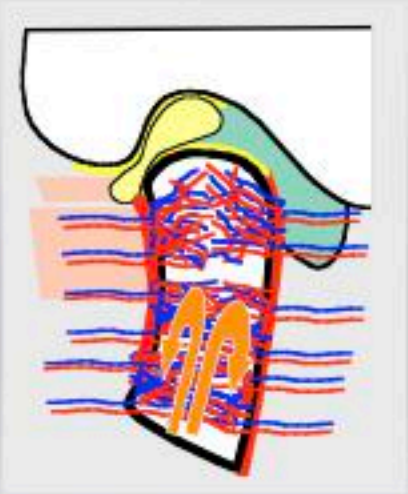
Condylar head limited collateral circulation

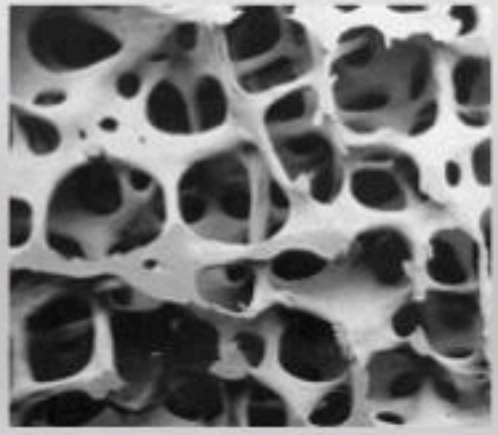
Epiphyseal growth center

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

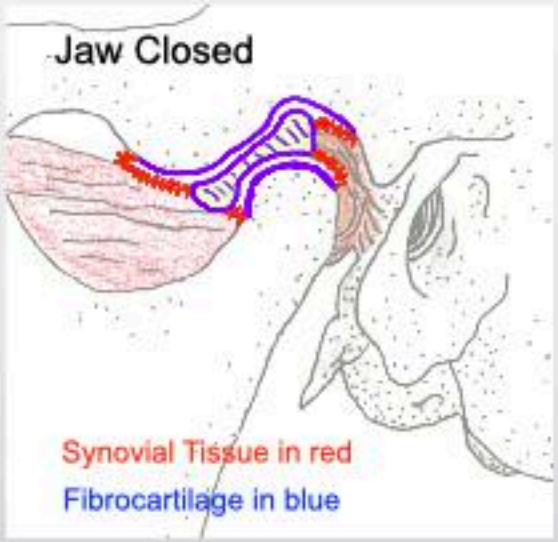
No Blood vessel inside joint

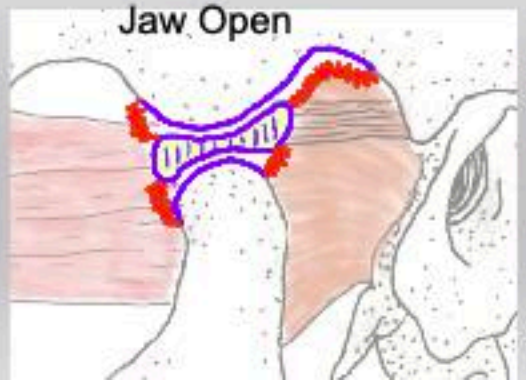
Closed Sagittal





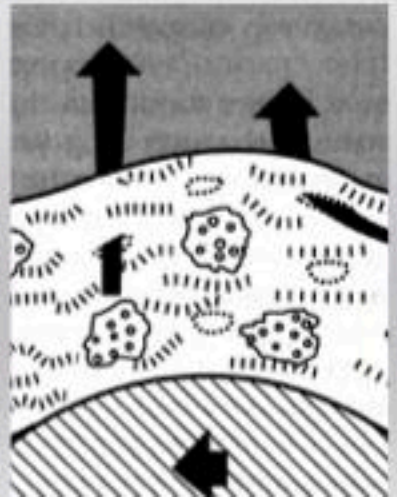
Normal TMJ- Synovium, Cartilage



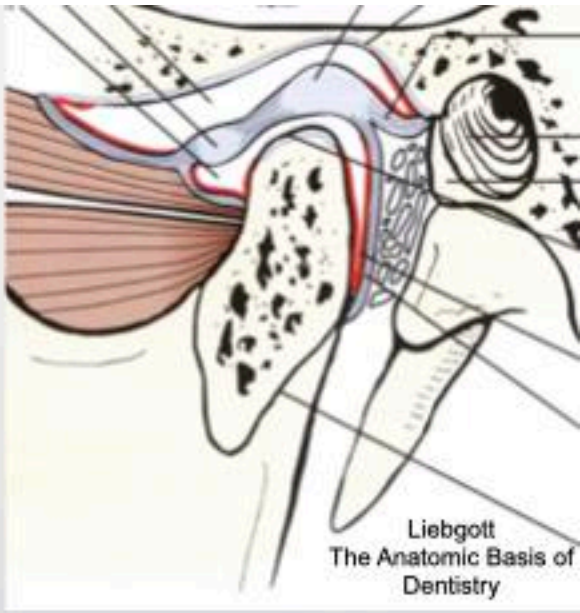


Fibrocartilage-
- Slope of Eminence
- Disc
- Top of Condyle

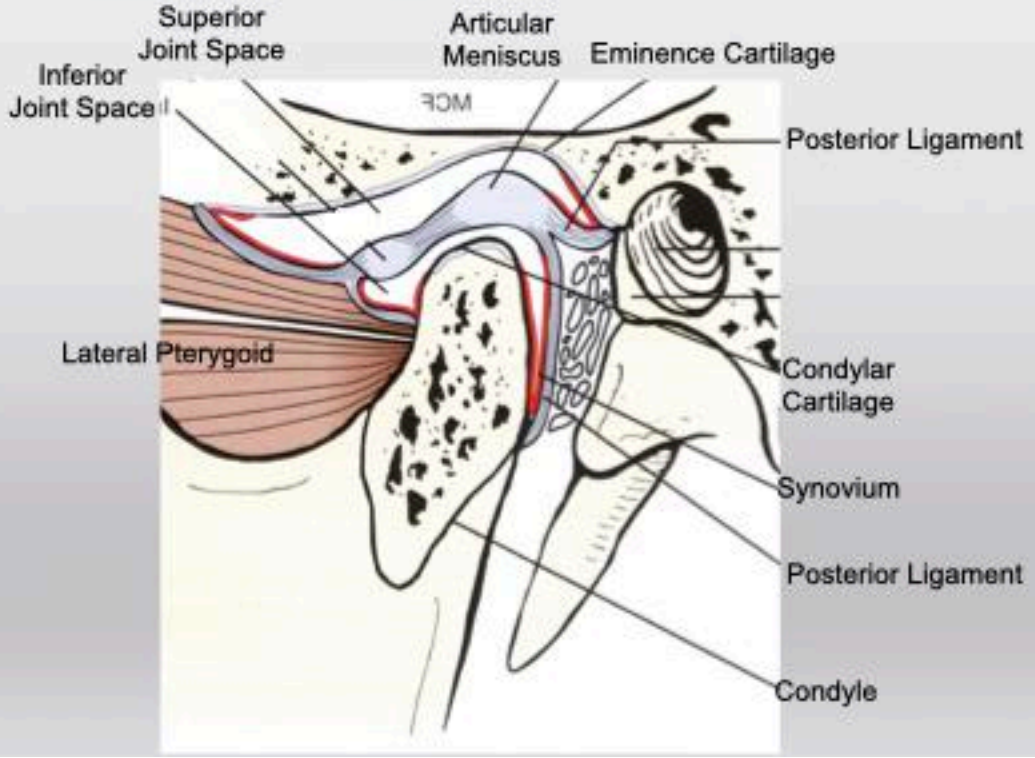
Synovial Tissue makes Synovial Fluid
- No blood vessels in a health joint
- Nutrition to the cartilage cells
- Lubrication- Hyaluronic Acid and Lubricin



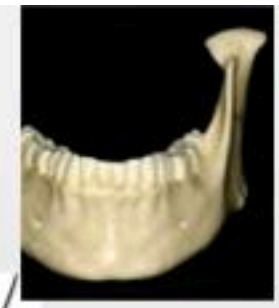
Fibrocartilage surface covered in fluid
- Cartilage is hydrophilic
- Proteoglycan negative charge
- Surface Active Phospholipids
- Fluid slides against fluid
- 5x slipperier than ice

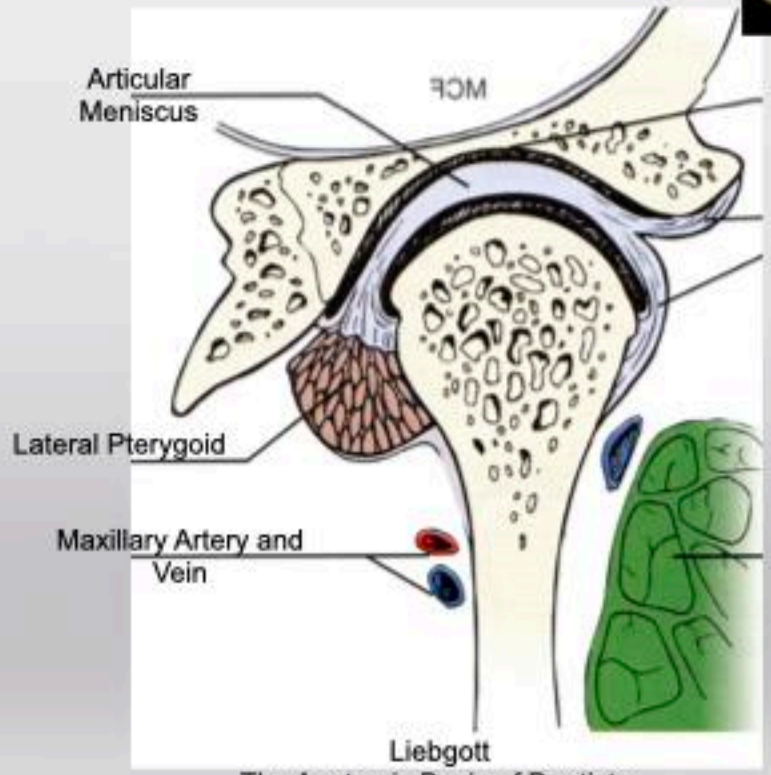


Left TMJ Sagittal View

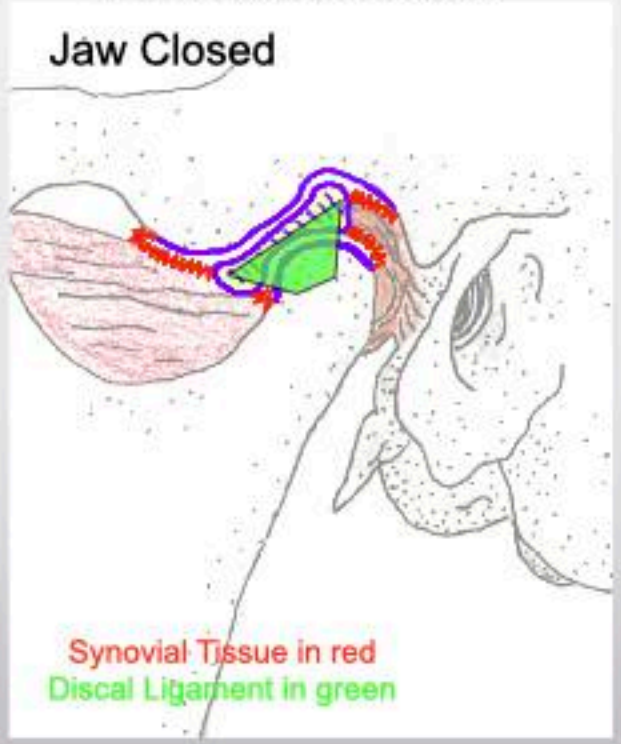


Left TMJ Coronal View





Normal TMJ



Discal Ligaments attach Disc to Condyle

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

Disc viewed from above

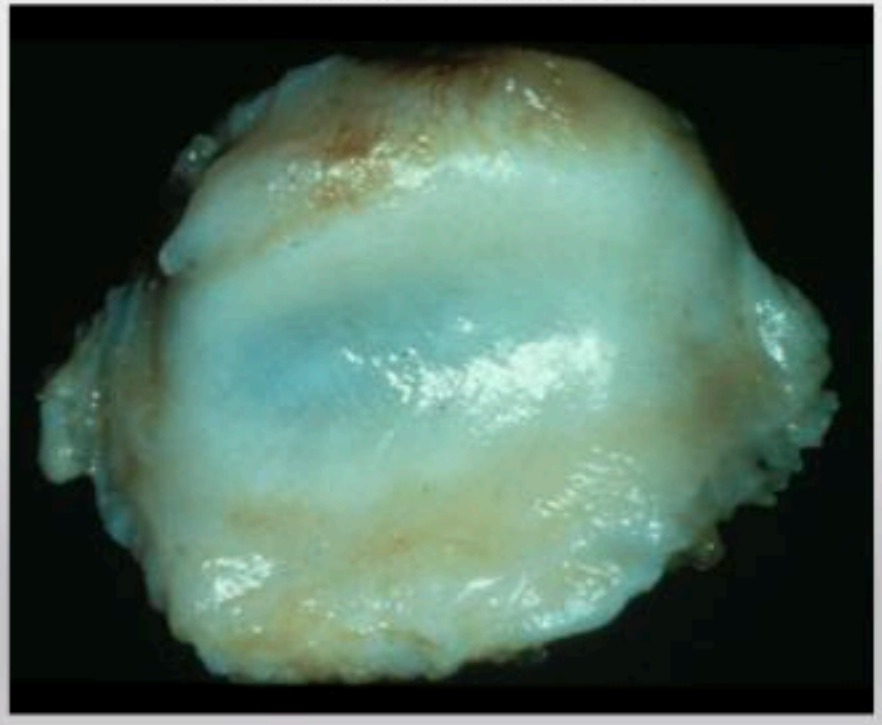
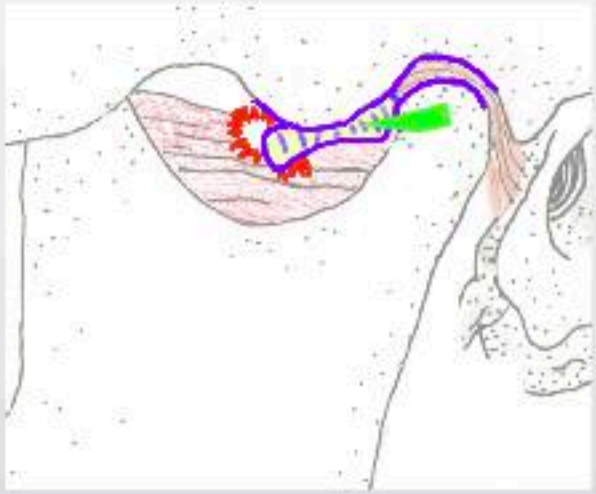


Photo Courtesy of Dr Henry Gremillion

Damaged TMJ- Anteriorly Dislocated Disc



Torn or stretched Meniscal ligaments

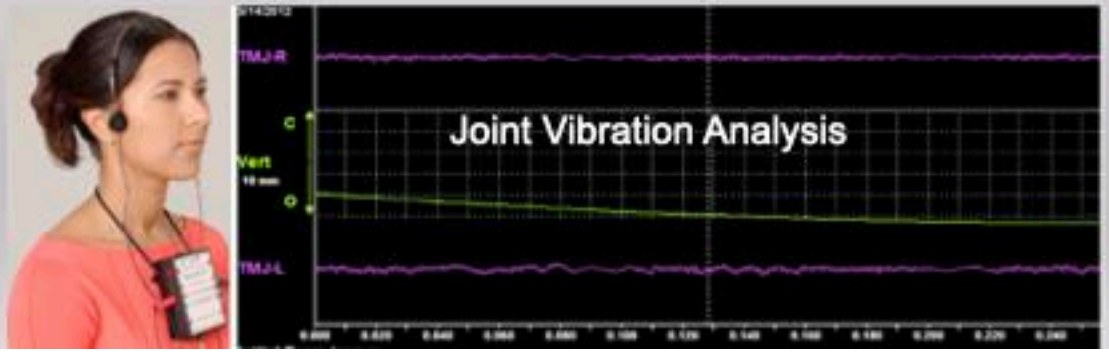
Anterior Dislocated Disc

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"

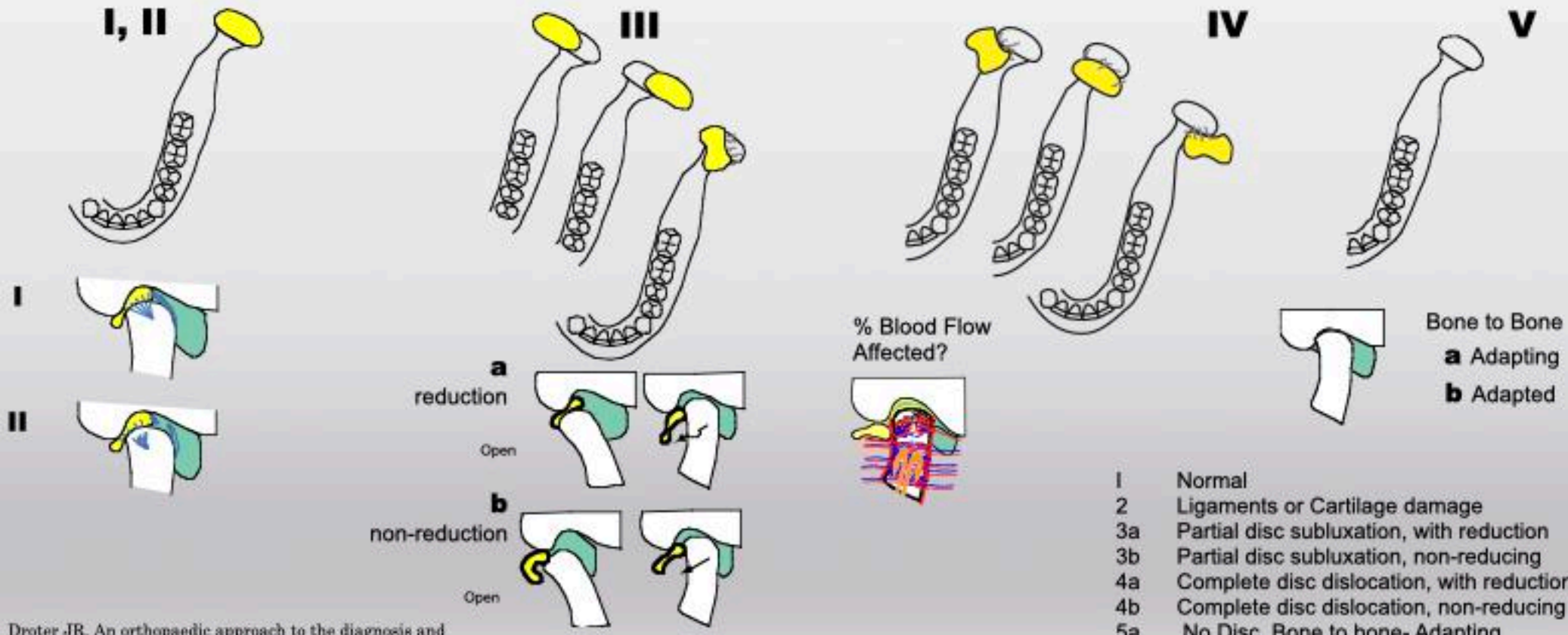
85% of all damaged joints adapt favorably without treatment

Cartilage sliding on tissue creates vibrations that can be detected



Dr. Mark Piper's Classification

Left TMJ

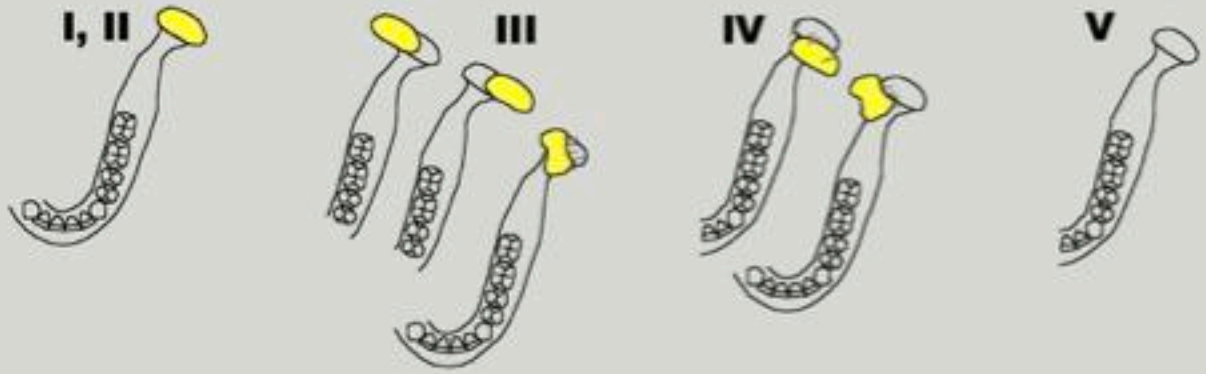


I	Normal
2	Ligaments or Cartilage damage
3a	Partial disc subluxation, with reduction
3b	Partial disc subluxation, non-reducing
4a	Complete disc dislocation, with reduction
4b	Complete disc dislocation, non-reducing
5a	No Disc, Bone to bone- Adapting
5b	No Disc, Bone to bone- Adapted

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 Facial Pain practice
- All patients with <u>any</u> indication of TMJ damage had scans



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

I&II- 32%

Both joints normal 14%

IIIa- 12%
IIIb- <u>3%</u>
15%

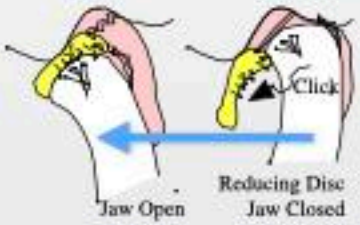
IVa- 18%
IVb- <u>30%</u>
48%

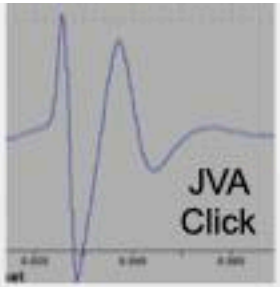
V- 5%

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

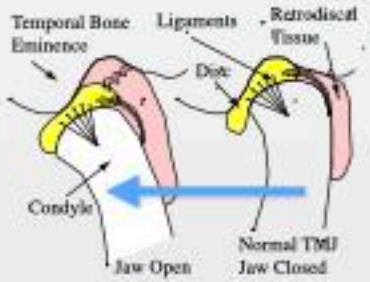
Differential Diagnosis of TMJ Clicking

Disc Reduction

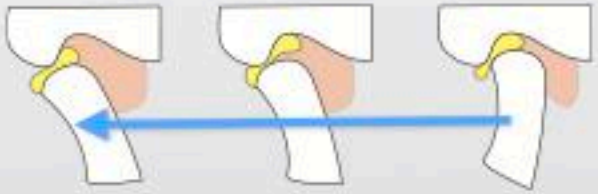




Normal

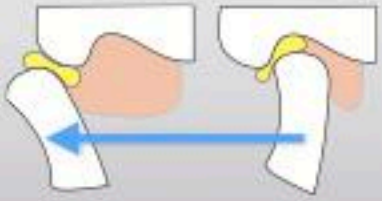


Adhesive Click



"Sticky Disc" - Disc sticks after prolonged clenching, then releases

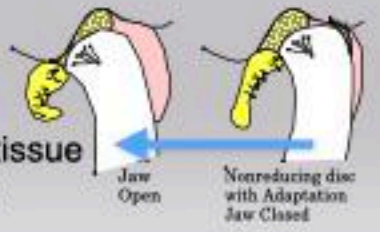
Eminence Thud



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

3a Condyle Distalized, Disc is in proper location, Lateral pole click on translation

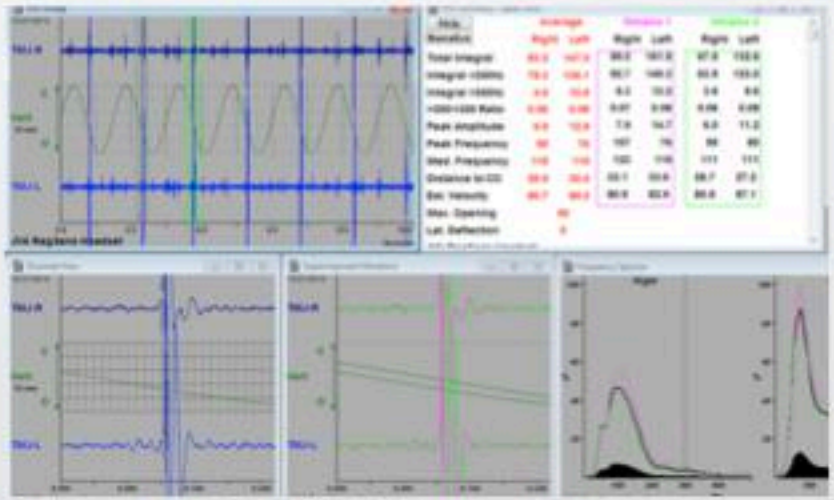
Adhesion Crackle



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

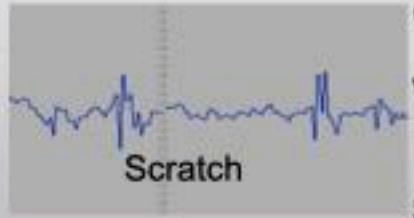
Joint Vibration Analysis

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



Based on Sonar.
It is not a microphone

Three main types of sounds

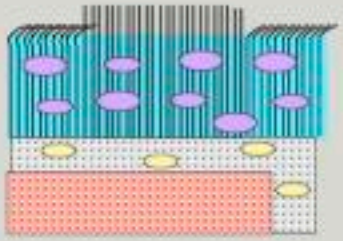


Click
- Disc Reduction

Wobble
- Disc subluxation
- Joint subluxation

Scratch
- Oseoarthritis
- Tissue against cartilage (Piper 4b)
- Rough cartilage- clenching

JVA measures the health of the cartilage

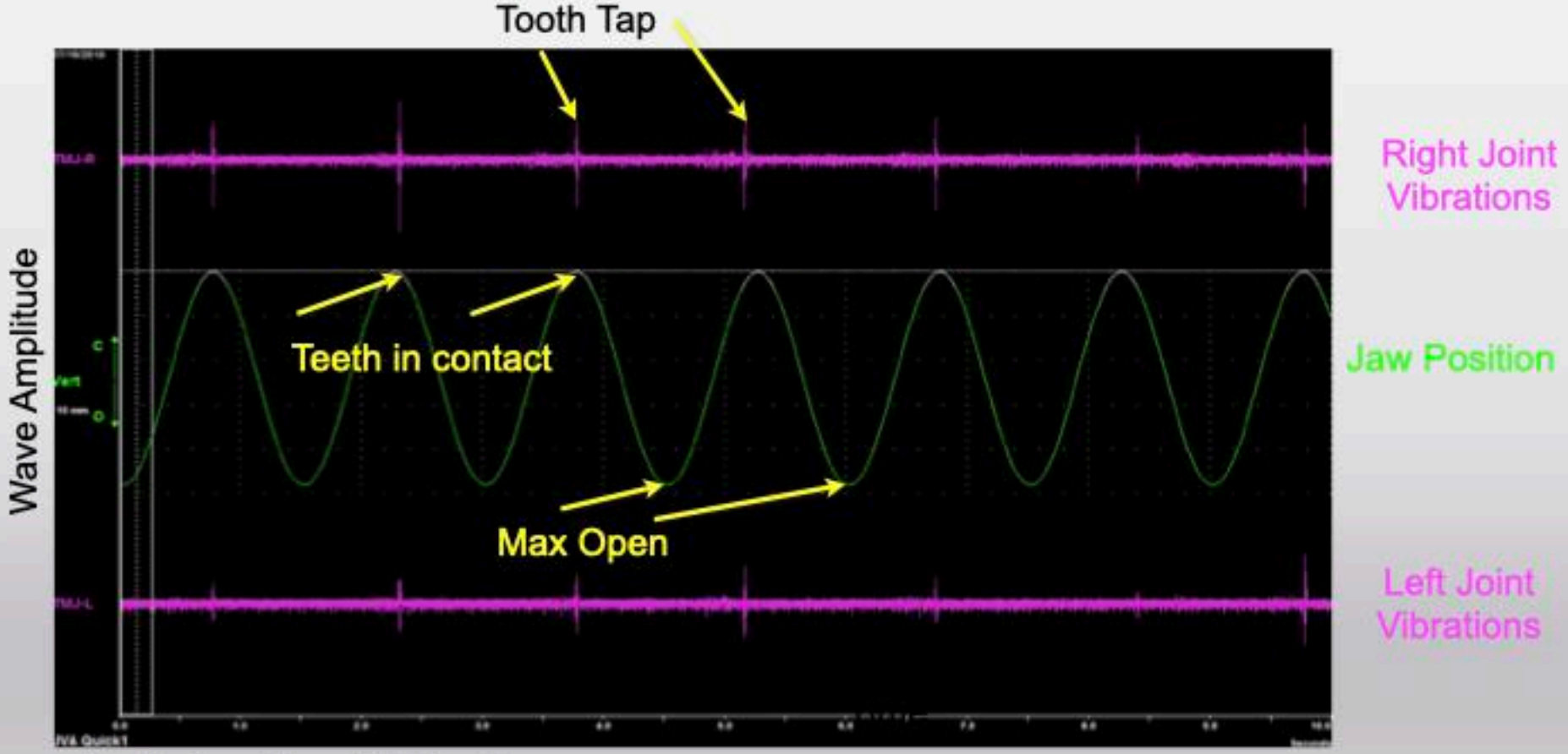


Recording JVA

Joint Vibration Analysis Software

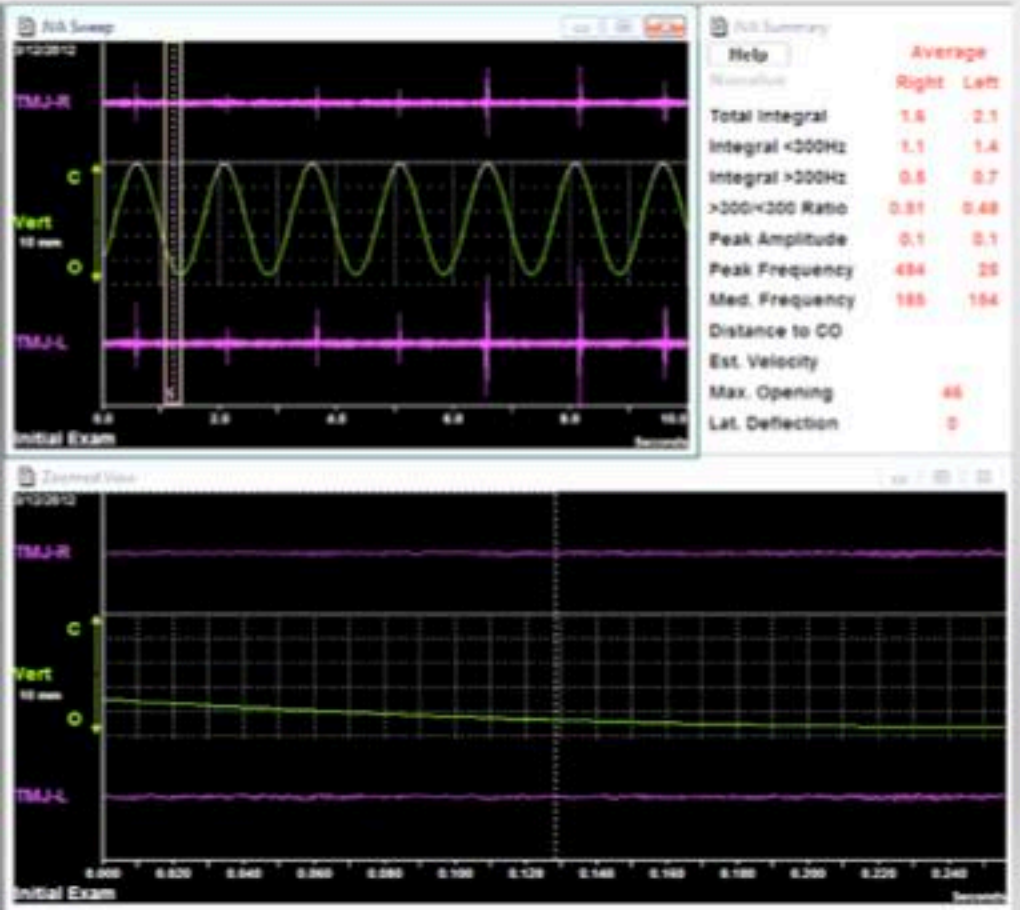
Normal JVA Quick

No other Vibrations than tooth contact

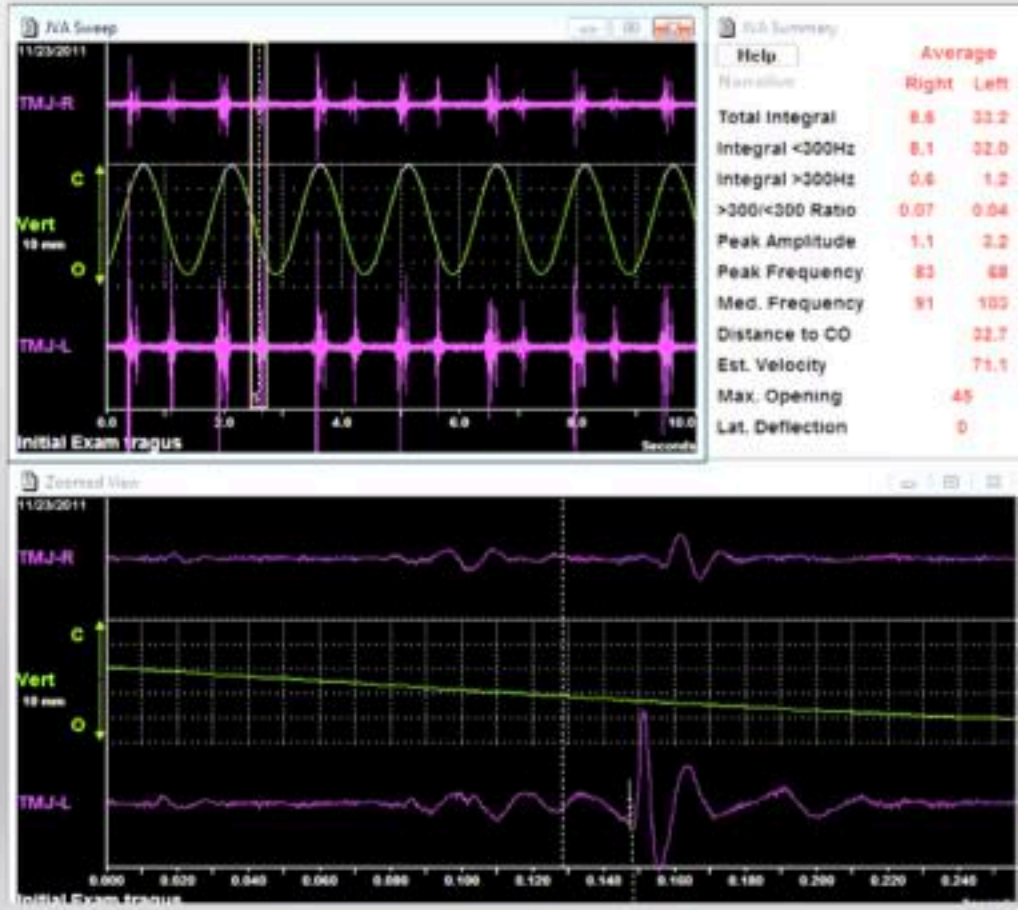


Amplitude = Wave Height = Energy

Healthy or Damaged?



Healthy or Damaged?



Vibration Types

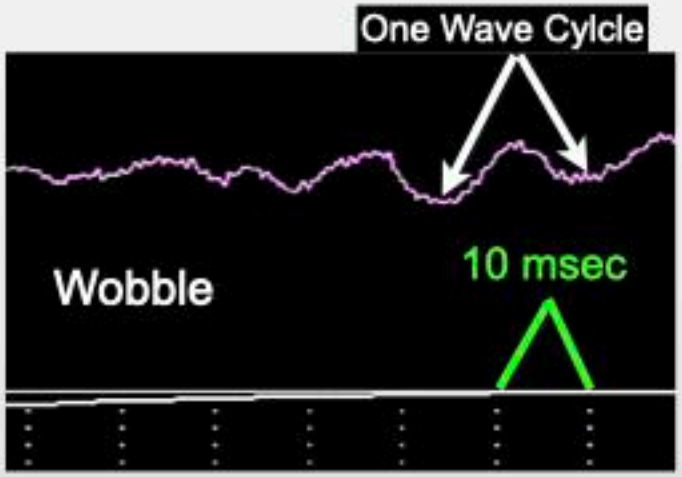
Good Vibrations

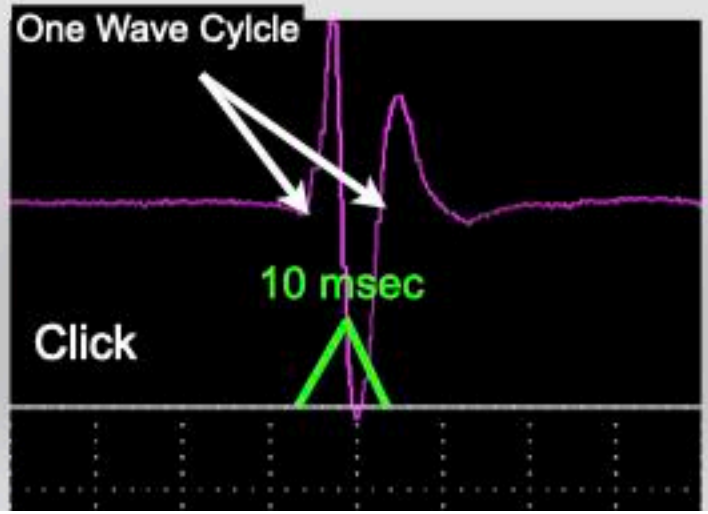
Hertz = cycles/sec

Wobble/Bump
- 50 Hz (range of 20-100)
- 0.5 cycle in 10 msec
- Rolling wave

Click/Tap/Crackle
- 100 Hz (range of 60-150)
- 1 cycles in 10 msec
- Double Cycle-
  - less hz in 2nd cycle

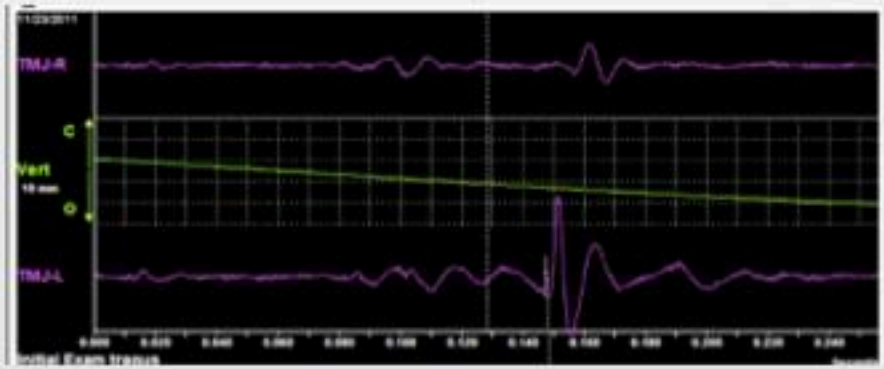
Scratch
- All Hz 500 to 50
- Disorganized Choppy
- Random full spectrum Hz





3 most important uses JVA in my practice:

JVA TMJ Damage screening
- Healthy, Damaged,
- Simple Click, Complex click,
- Scratch, Wobble



JVA helping with MRI interpretation
- Adds motion to MRI
- Favorable adaptation- few vibration

JVA showing changes over time****
- Measure disease progression
- Measure treatment progression

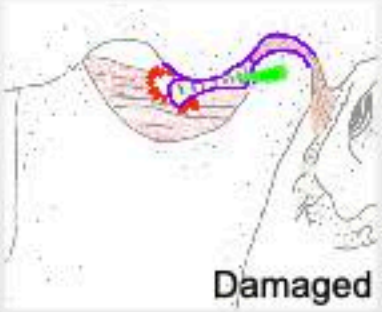
****JVA before all Orthodontics and Sleep apnea appliances

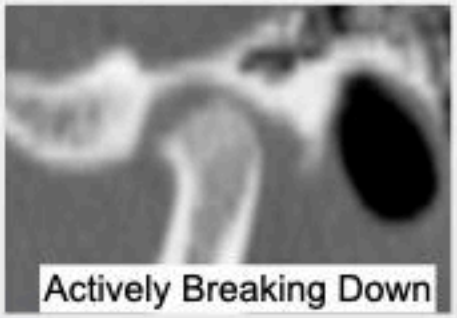
Basic Orthopedics

Joints are either
- Healthy or
- Damaged

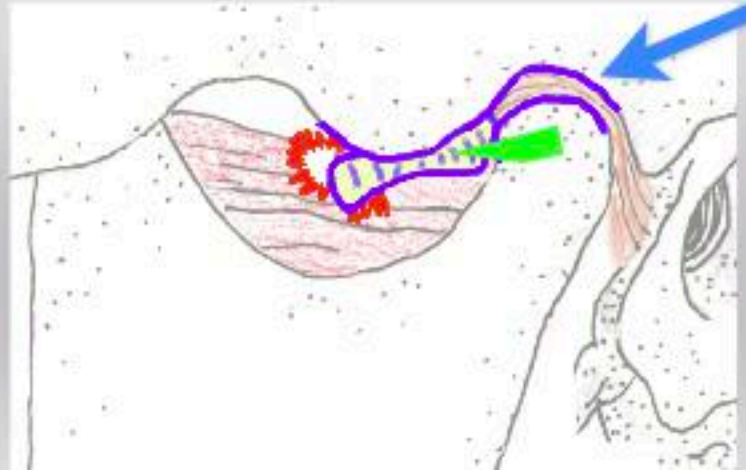
If damaged, joints will be either:
- Actively Breaking Down
- Adapting
- Adapted
  - Structurally, Mechanically
  - Favorably, Unfavorably


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

Magnetic Resonance Imaging

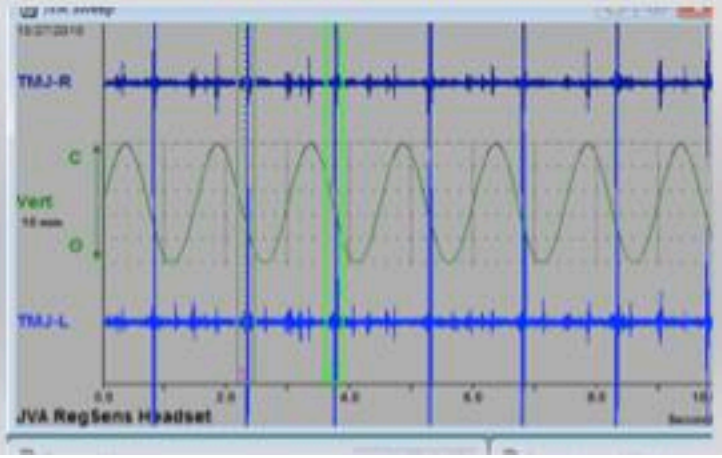
MRI gives you the start and finish
You have to infer what happened in between

Joint Vibration Analysis

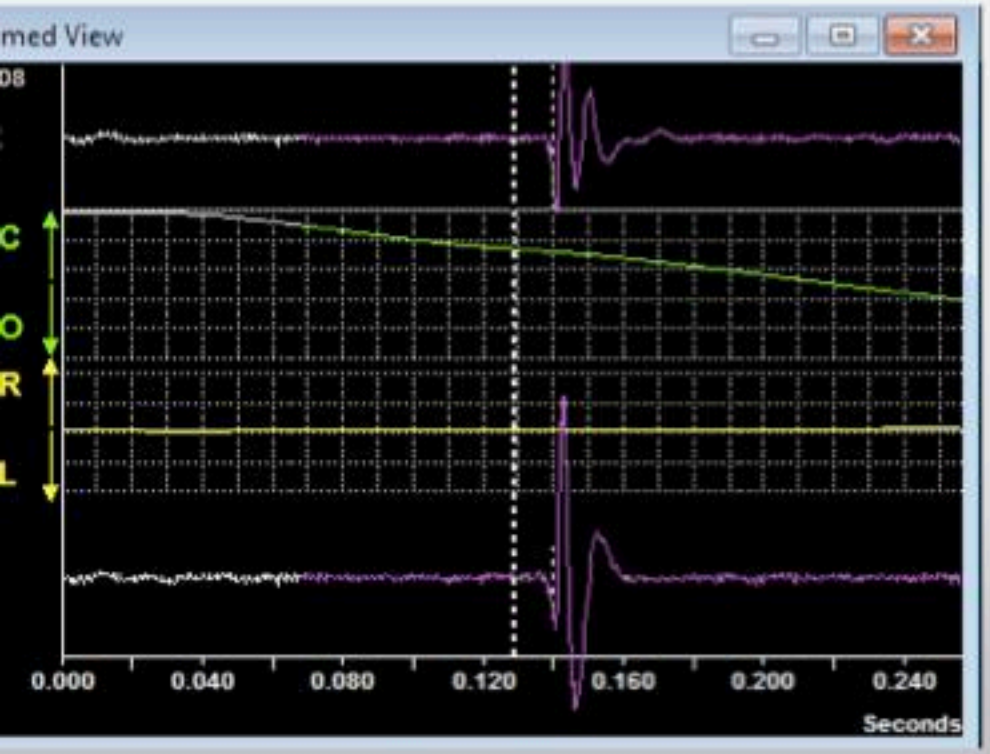
JVA gives you what happens in between
open and closed.
You then infer the start and finish

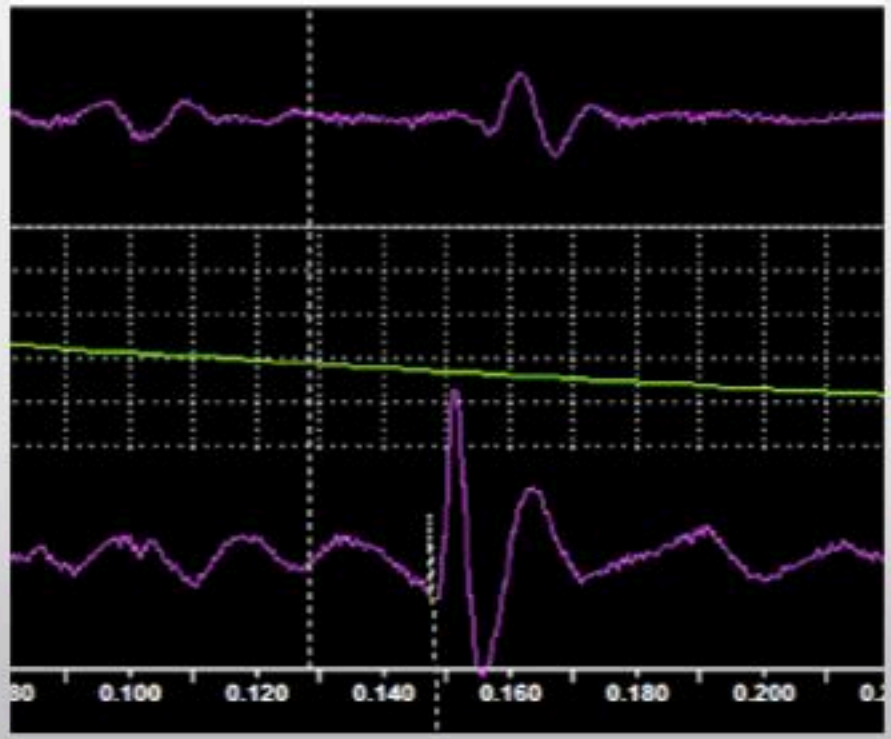
JVA records *Objectively* the vibrations of the TMJ as you open and close.
Ability to compare from year to year.

JVA allows you to view
the joint in function



Simple or Complex



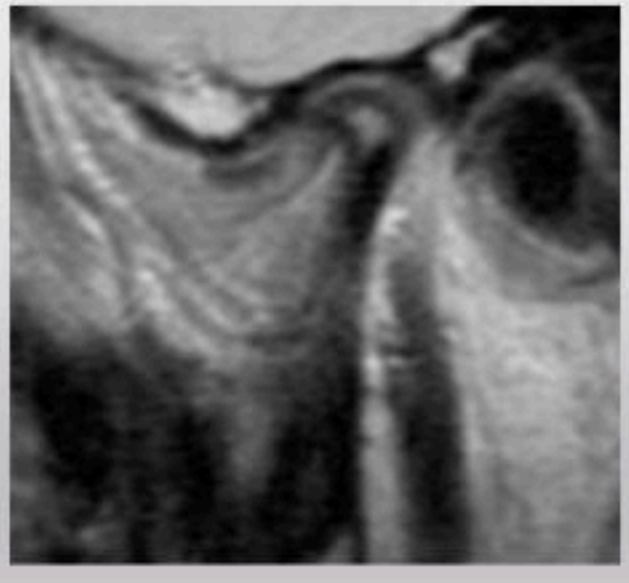


Simple left click with transference vibration to right
L4a

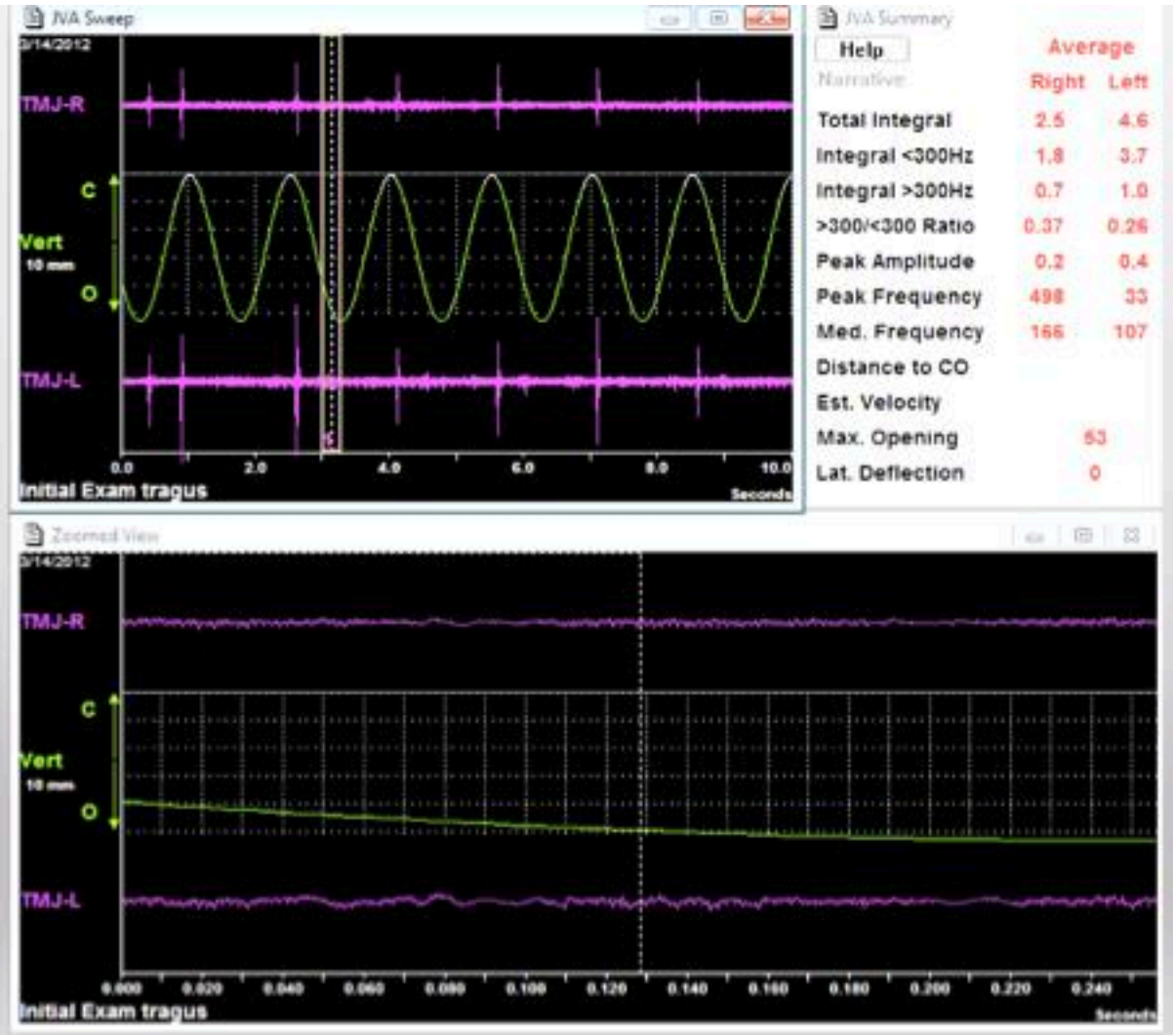
Complex Click
L3a, R4b

Well adapted bilateral anteriorly dislocated discs nonreducing

Max Open is 53mm
Total integral 4.6 Pascals



4b,4b



Why is Joint making this vibration?

Good Vibrations
Healthy Cartilage
No Movement

Wobble
Disc Dislocation
Disc Reduction
Disc subluxation
Joint subluxation
Condyle bumps Disc
Sensor roll on face

Click
Disc Reduction
Disc Dislocation
Adhesion Crackle
Tooth Tap
Contralateral Transference

Scratch
Cartilage Fibrillation
Cartilage against tissue
Bone against bone
Velcro Noise

Differential Diagnosis
All the choices

Diagnostic tests
Narrow down the choices

Working Diagnosis
Treating as if

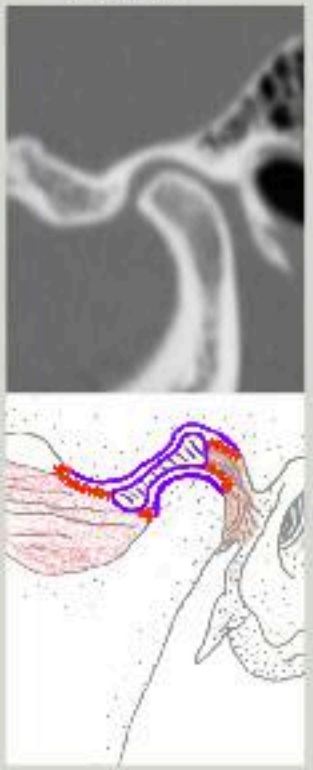
Not completely resolved

Final Diagnosis
Only after problem resolved

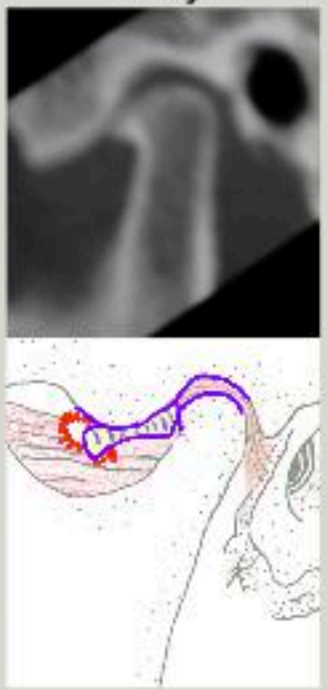
Osteoarthosis/Osteoarthritis

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

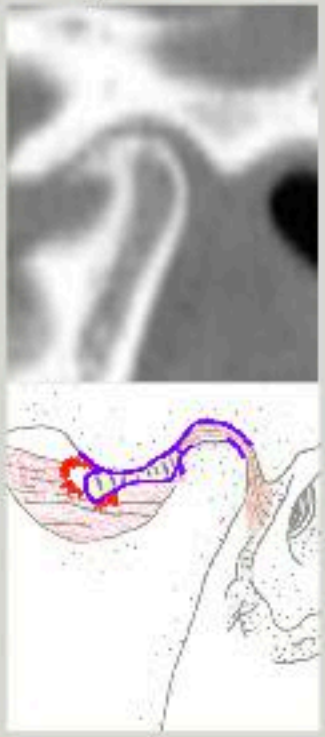
Normal



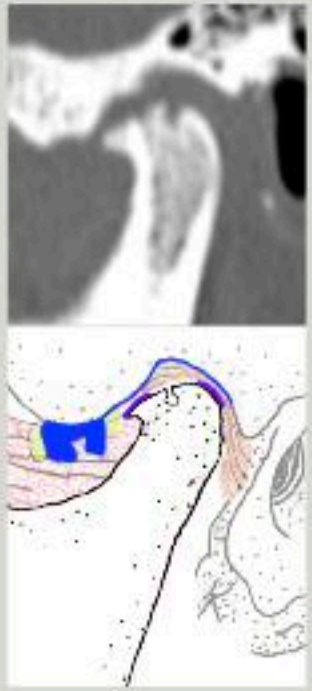
Early



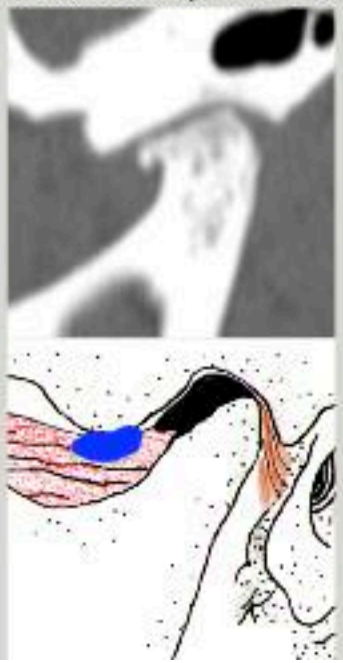
Early/ Moderate



Moderate



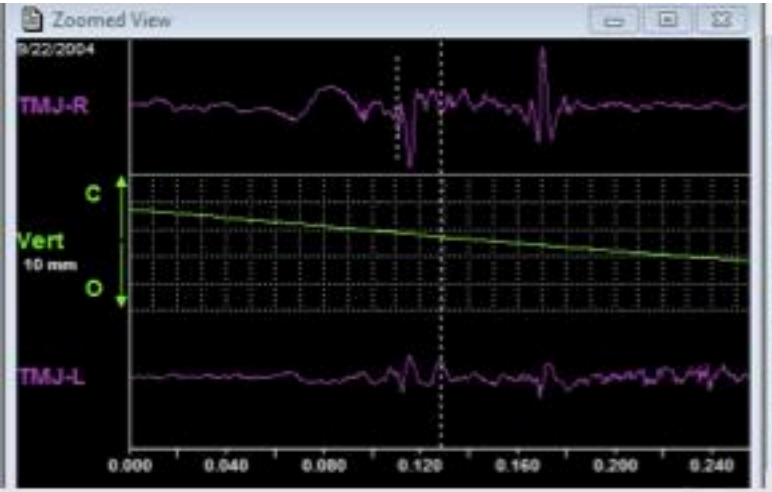
Severe OA, Eburnation



Representative examples of OA
in different patients

Joint Vibration Analysis

Osteoarthritis pre Treatment with NSAIDs



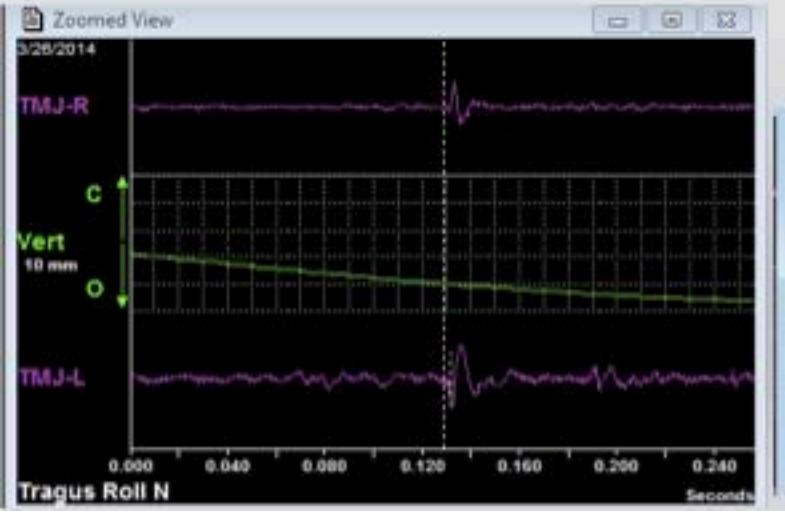
JVA Summary

Help

Narrative

	Average Left	Right
Total Integral	11.3	24.6
Integral <300Hz	9.7	21.3
Integral >300Hz	1.7	3.4
>300/<300 Ratio	0.17	0.16
Peak Amplitude	0.8	2.3
Peak Frequency	21	29
Med. Frequency	107	119

2004



2014

Help

Narrative

	Average Left	Right
Total Integral	19.2	10.4
Integral <300Hz	17.4	8.8
Integral >300Hz	1.8	1.6
>300/<300 Ratio	0.11	0.18
Peak Amplitude	1.6	0.7
Peak Frequency	91	91
Med. Frequency	115	150

Osteoarthrosis
eburnation over time

Basic Orthopedics

Joints are either
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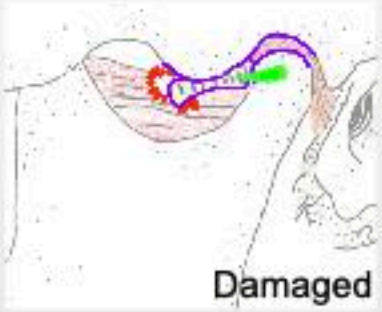
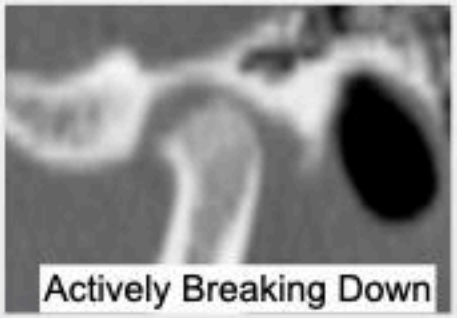
- Damaged

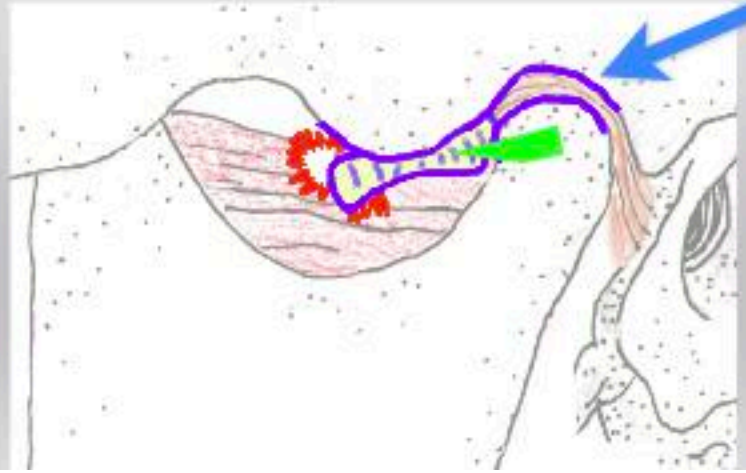
If damaged, joints will be either:
- Actively Breaking Down
- Adapting
- Adapted
  - Structurally, Mechanically
  - Favorably, Unfavorably


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

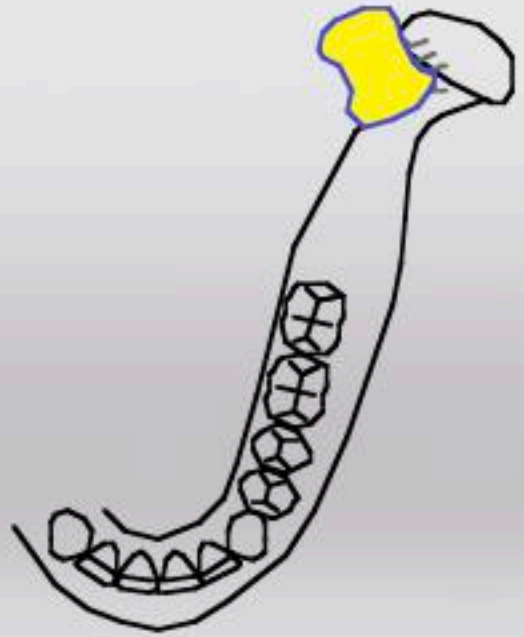
What is the Clinical Relevance of TMJ Damage Pre-Puberty?

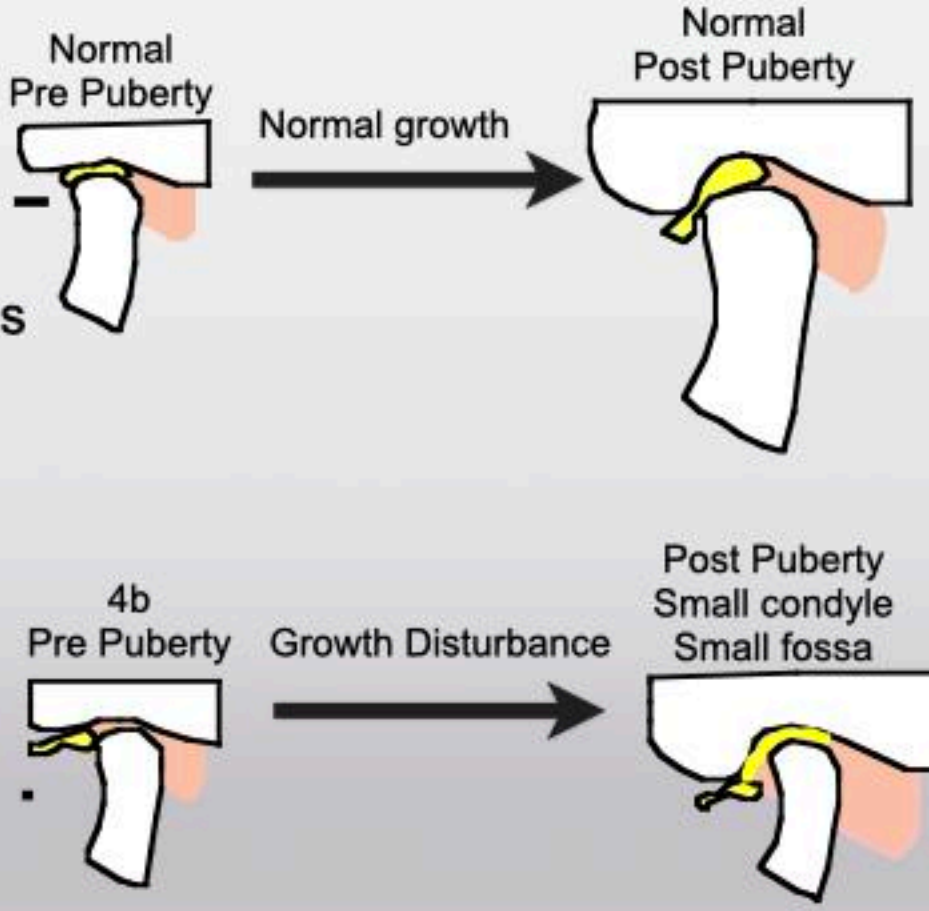
John R Droter DDS
Annapolis, Maryland

TMJ Damage Prepuberty

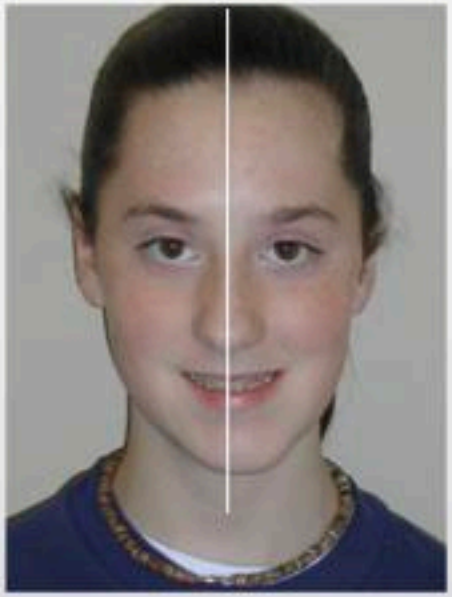
4b Pre-puberty is not a degenerative process

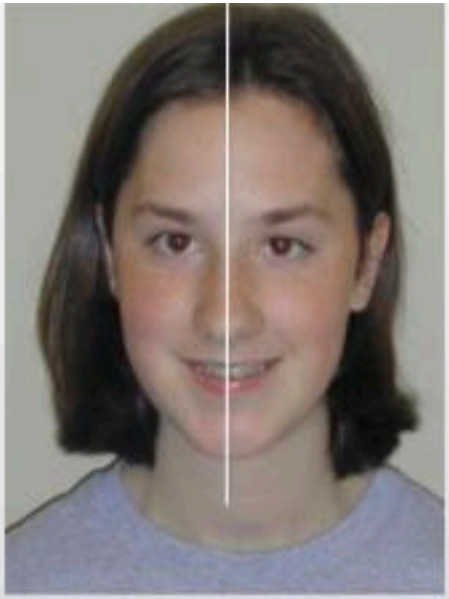
Can affect growth



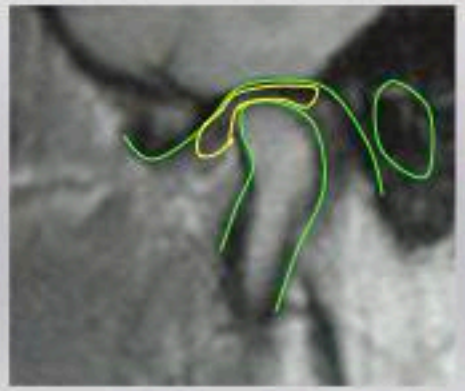


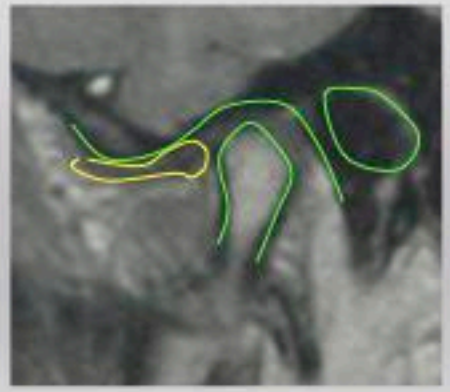
Age 17





R TMJ





L TMJ

Identical Twin Sister Age 17

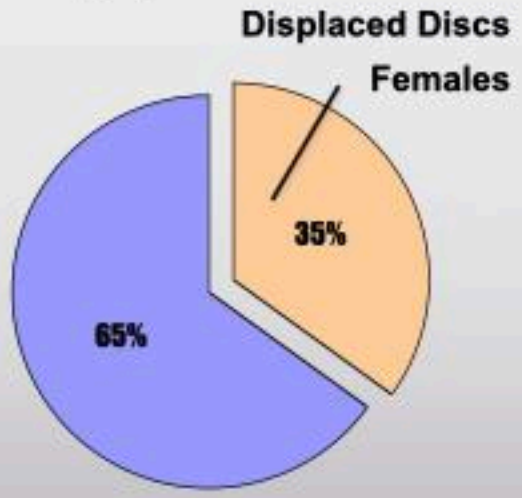
Pt of Ed Zebovitz, DDS

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

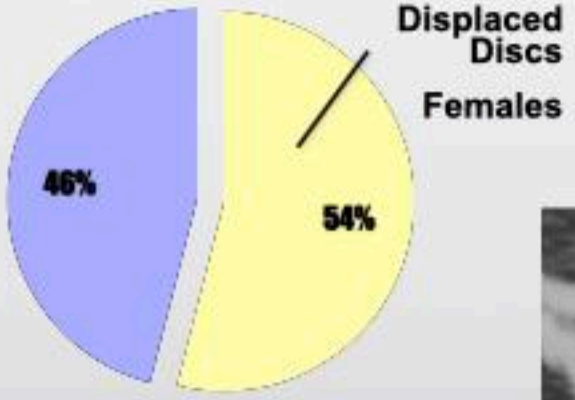
TMJ Damage Prepuberty

Prevalence Displaced Discs

Asymptomatic Volunteers



Presenting to Ortho Office



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

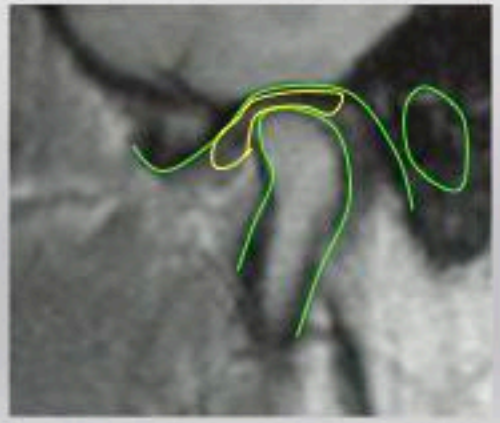
The Prevalence of Disc Displacement in Symptomatic and Asymptomatic Volunteers
Ribeiro R, Tallents R, Katzberg R, J Oral Facial Pain 1997 ;11:37-47

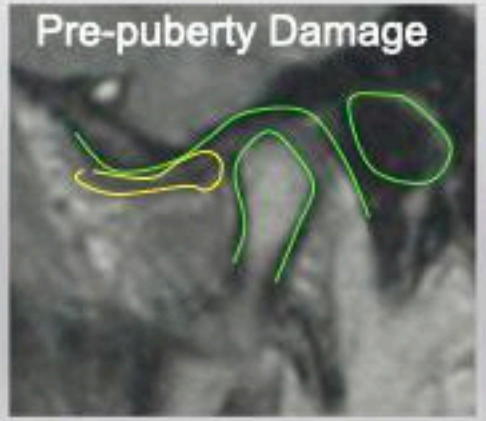
Osseous Morphology and Spatial Relationships of the TMJ Comparisons of Normal and Anterior Disc Positions, Kinniburgh R, Major P, Nebbe B, Angle Orthod 2000;70:70-80

Basic Orthopedics

Joints are either
- Healthy or
- Damaged

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





Small condyles due to TMJ damage:

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

Post-puberty TMJ damage will be a degenerative process.

Note ratio condyle size to fossa size

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

John R Droter DDS
Annapolis, Maryland

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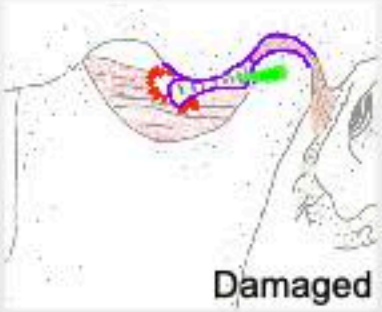
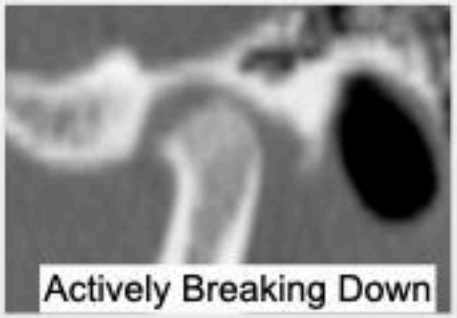
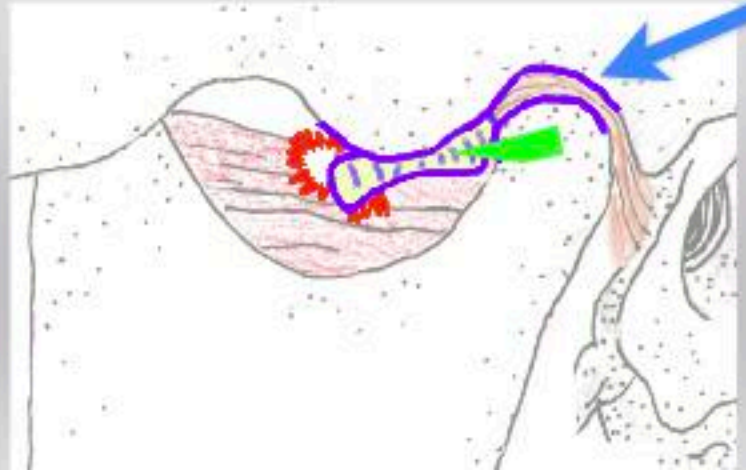

Damaged


Actively Breaking Down

Majority of damaged TMJs adapt favorably



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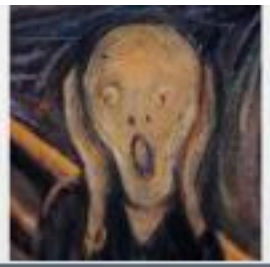
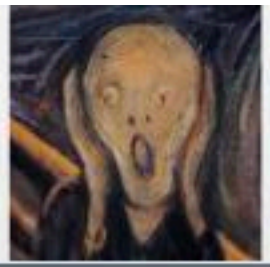


Damaged TMJs

Adapt Favorably **85%**
Adapt Fairly **14%** → Occlusal Muscle Dysfunction, Osteoarthritis
Adapt Poorly **<1%** → Avascular Necrosis, Progressive Condylar Resorption

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



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

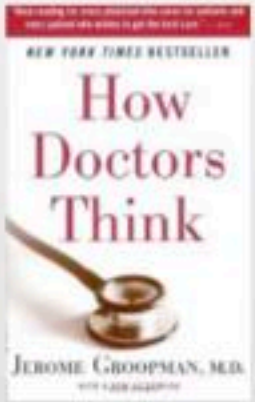
Leeuw, Boering, Stegenga, Bont,
Journal of Craniomandibular Practice, April 1995, vol. 13, No. 2

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

www.jrdroter.com

Blinded by the Click

There is no rule that says you only get one disease



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

Jaw is clicking, ear pain

Jaw is clicking, sudden onset headache, 53 year old

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

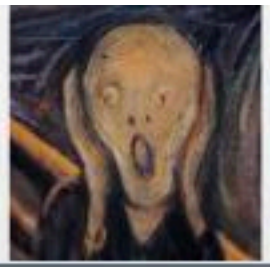
Jaw use to click, Jaw stopped clicking and can not open wide

History is key, physical exam is next most important, palpate the muscles and joint.
Notice the age group does not fit OMD for the second and third patient.

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

There is no love sincerer than the love of food.

G. B. Shaw



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→ Osteoarthritis

→ Avascular Necrosis

→ Progressive Condylar Resorption

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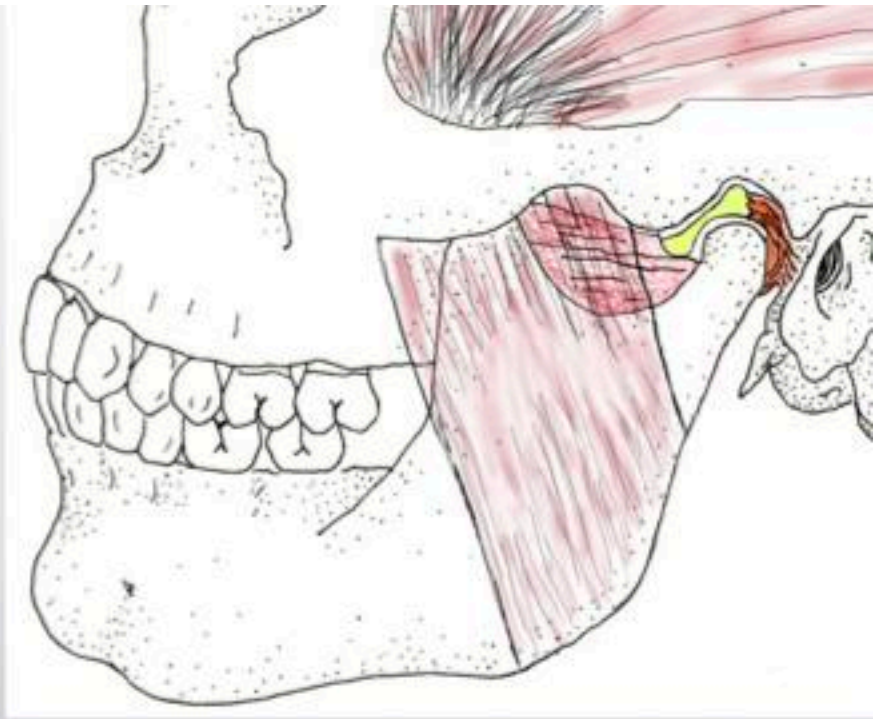
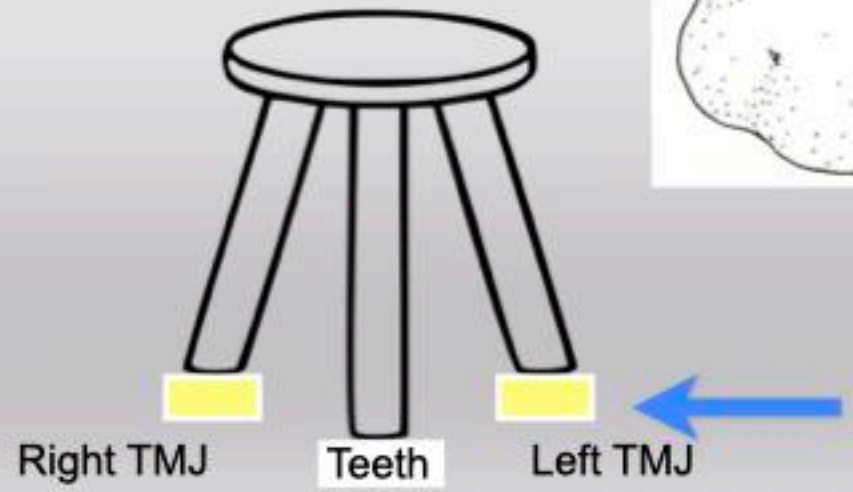
Normal Joint with Normal Occlusion

All teeth touch evenly with condyles seated in fossa



What happens to the occlusion if the disc is dislocated?



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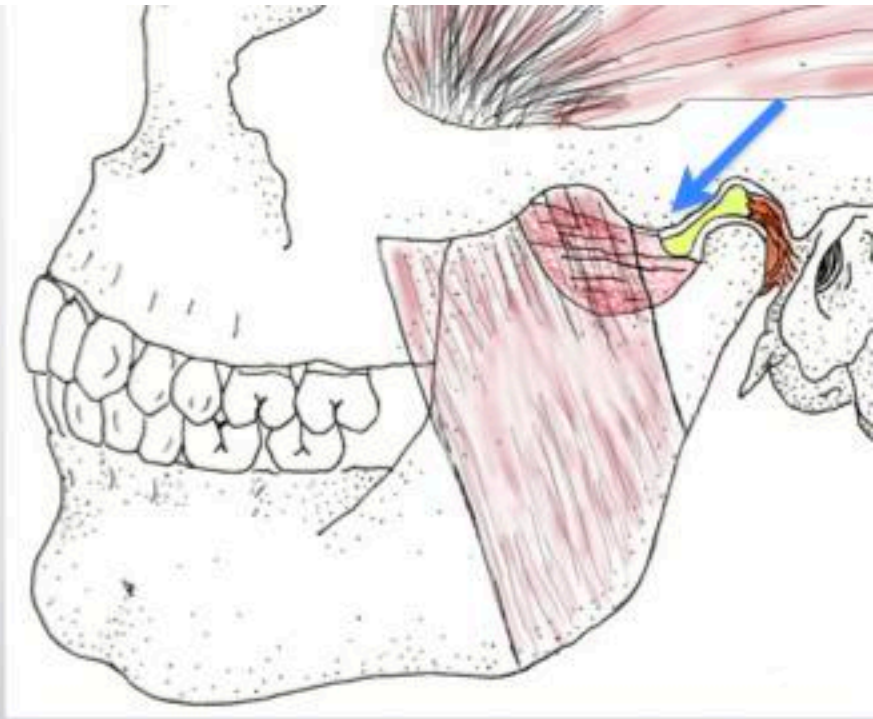
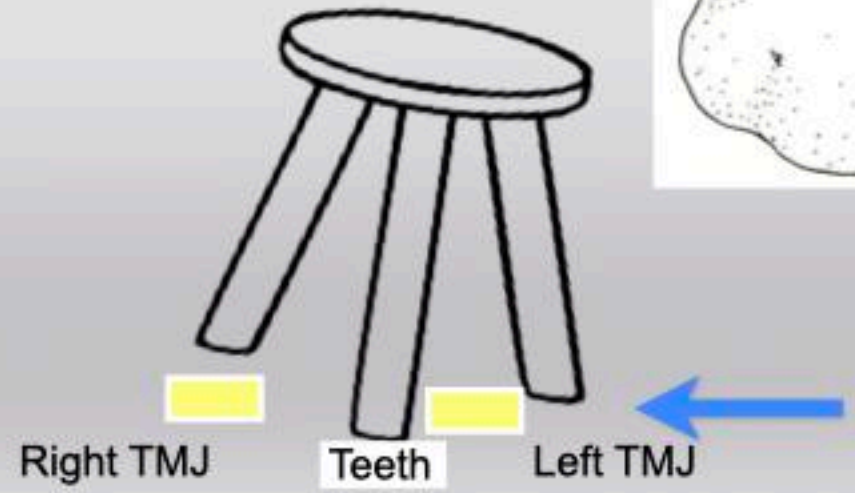




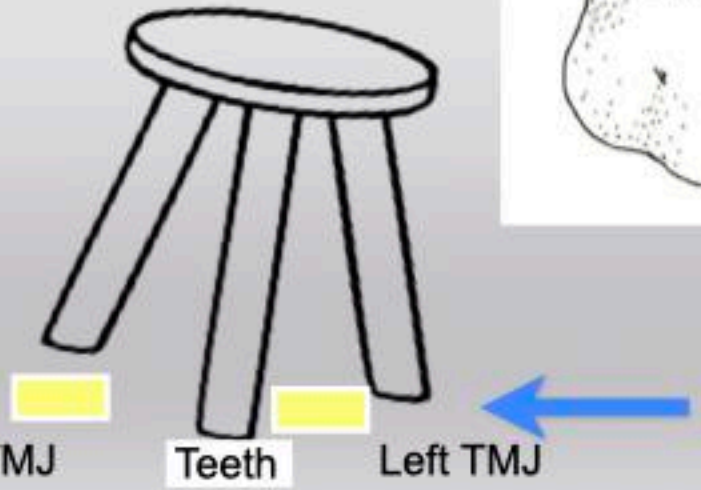
Damaged Joint with Malocclusion

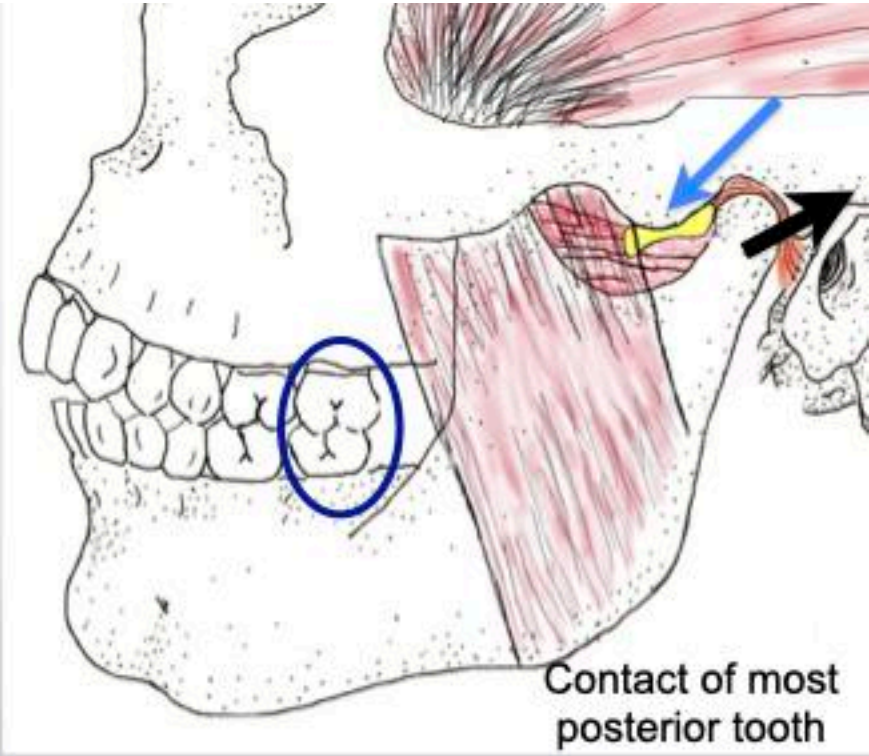
85% damaged joints adapt favorably with respect to the TMJ.

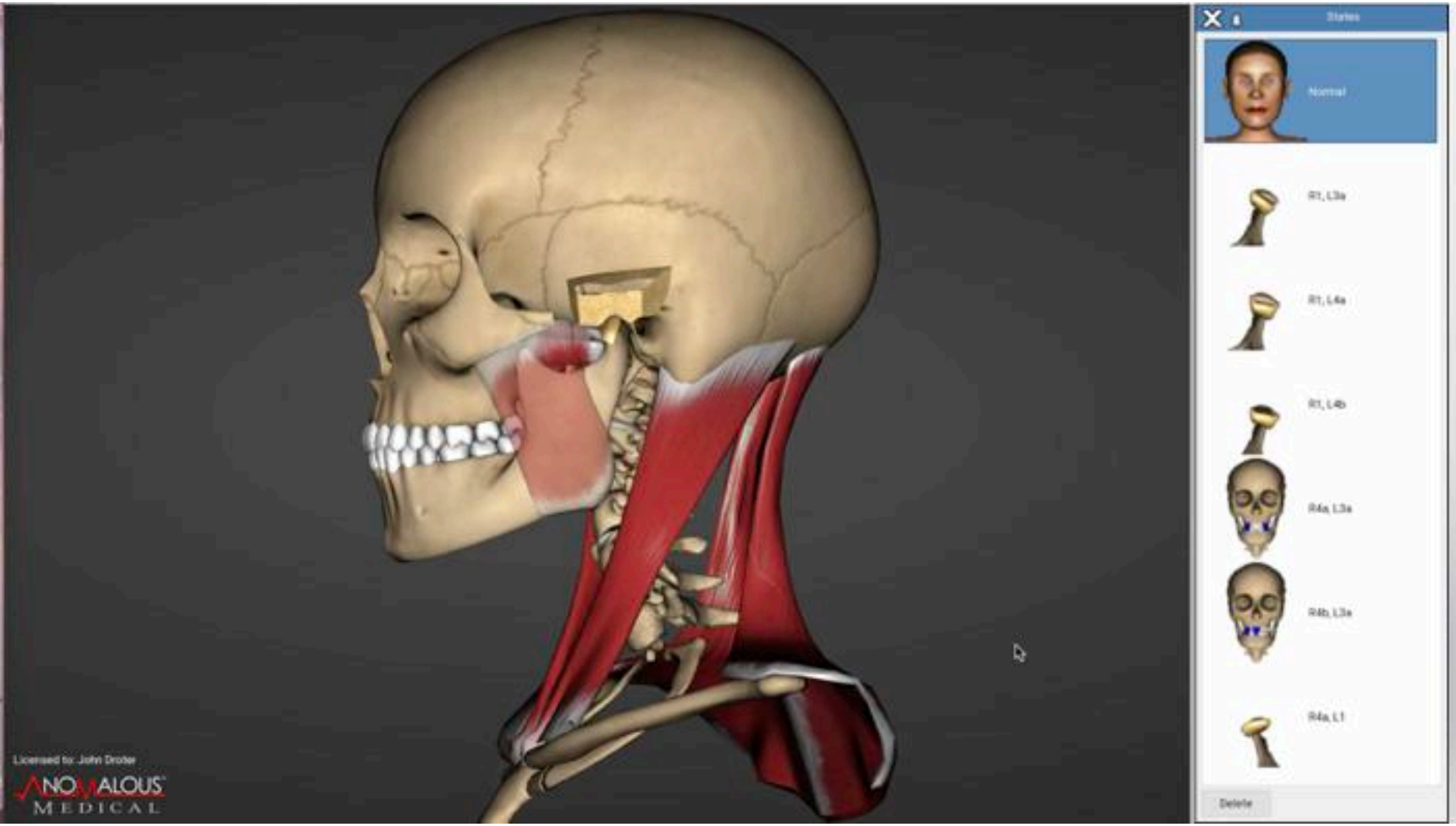
Anteriorly Dislocated Disc, Mandible shifts:
- Inadequate Anterior Guidance, Posterior Disclusion
- Uneven Occlusion,
- CR≠MaxIC
- Occlusal Muscle Disharmony develops.

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

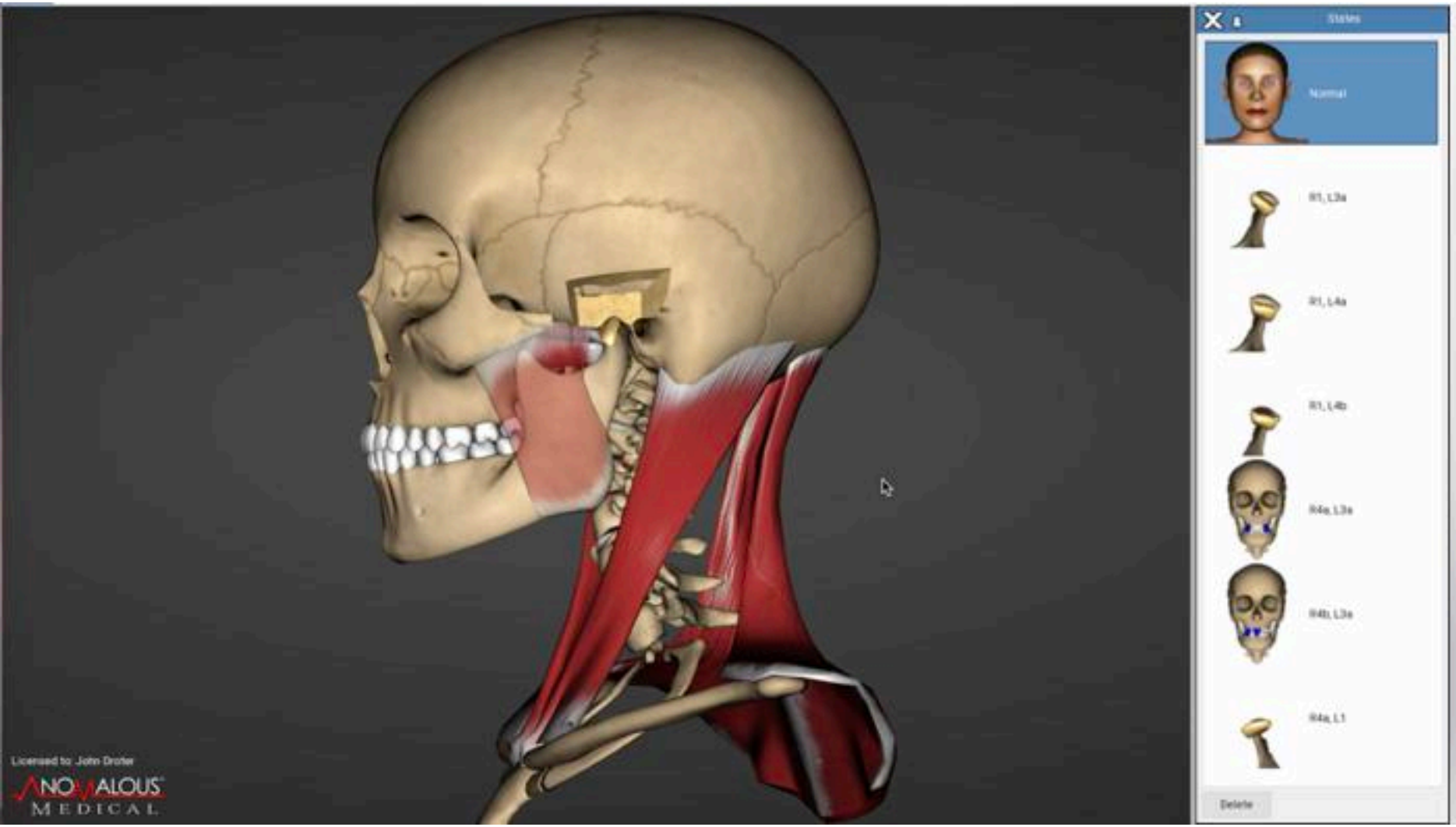
CR≠MaxIC should be 2mm or less.
(Anterior Posterior 2mm)
If >2mm something else is going on.





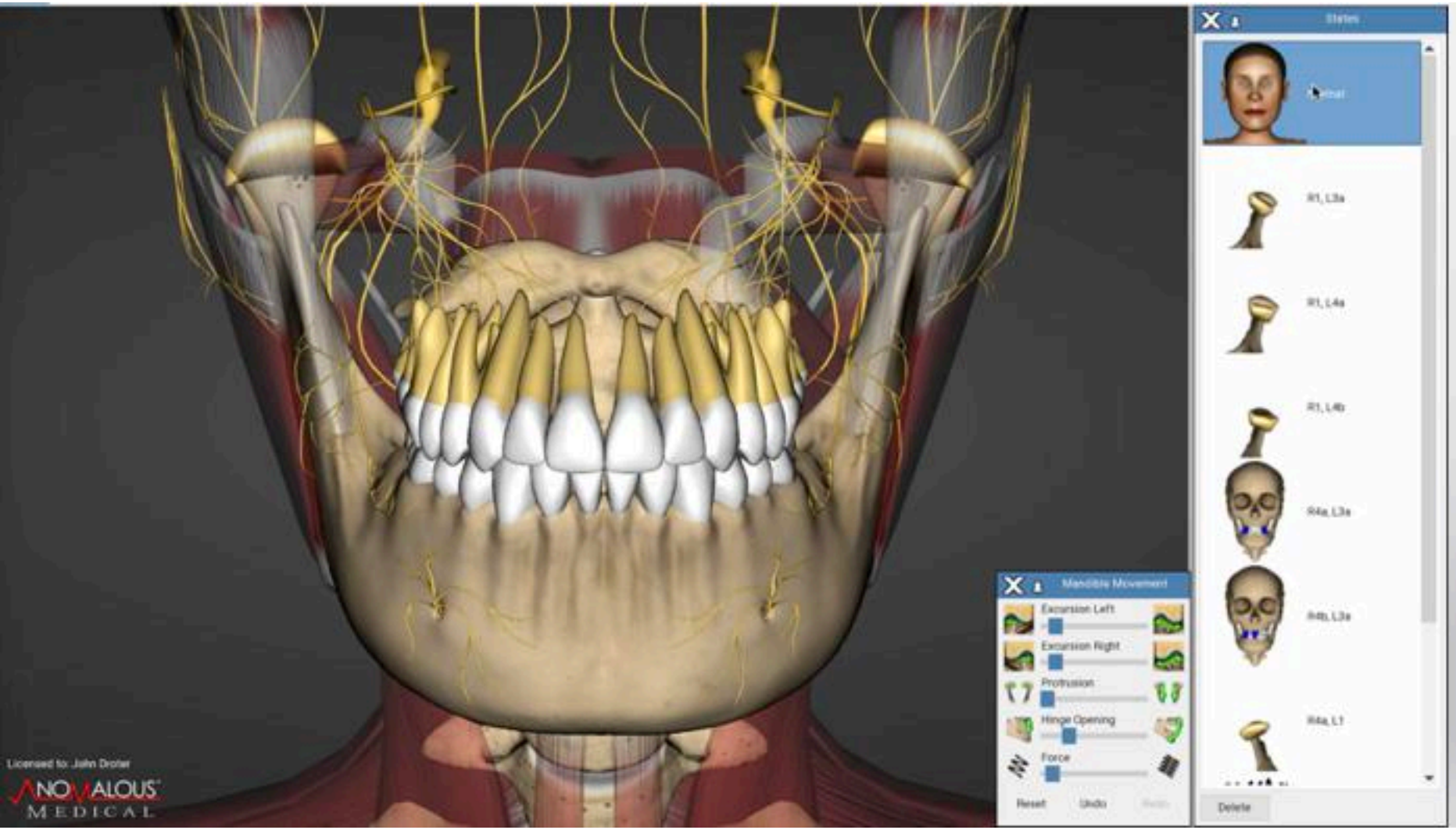


Skull Anatomy 4a


States
Normal
R1, L3a
R1, L4a
R1, L4b
R4a, L3a
R4b, L3a
R4a, L1
Delete
Licensed to: John Drotar
ANOMALOUS MEDICAL

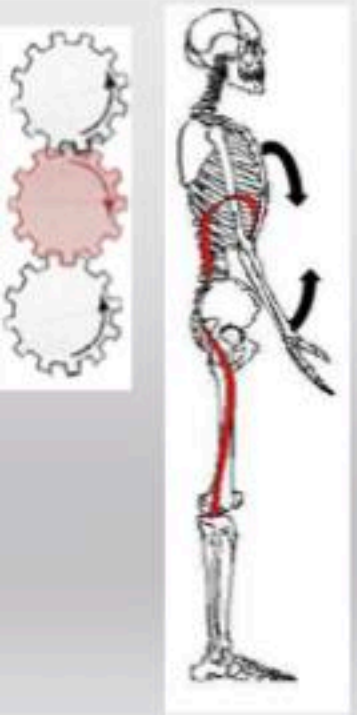
4a, 3a

Occlusal Shift



Neck and Postural Instability

This is a **dynamic** orthopedic System



A change in any one area will affect the others

CNS/PNS

Skull

TMJ

Teeth

Mandible

Neck

Teeth

Muscle Neck

Muscle TMJ

venn diagram

Occlusal Muscle Disharmony

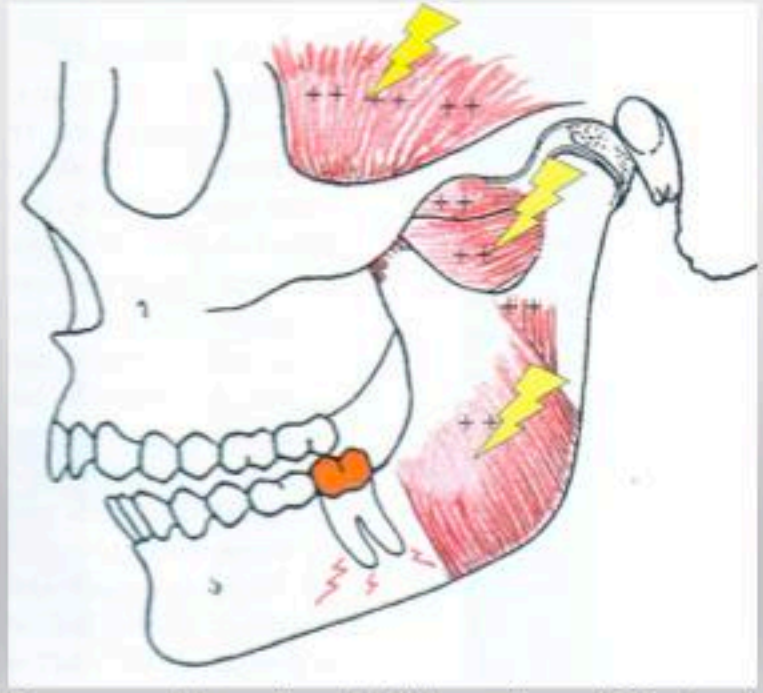
Uneven tooth contact with condyles fully seated triggers muscle activity

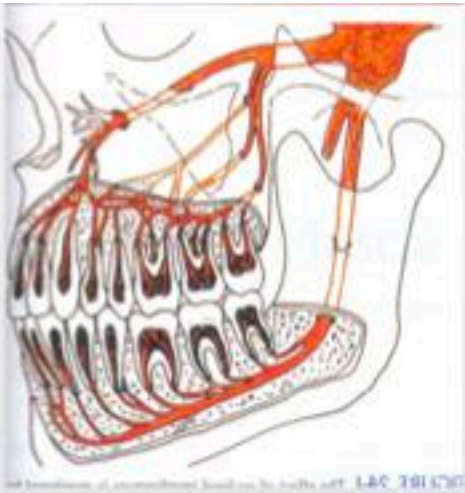
Lateral pterygoid fires out of sequence to create even tooth contact on closure

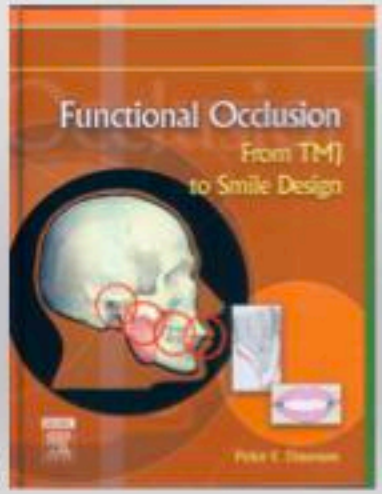
Disharmony in all muscles: Splinting/Bracing

Muscles sore from overuse

Muscles do not think- CNS input

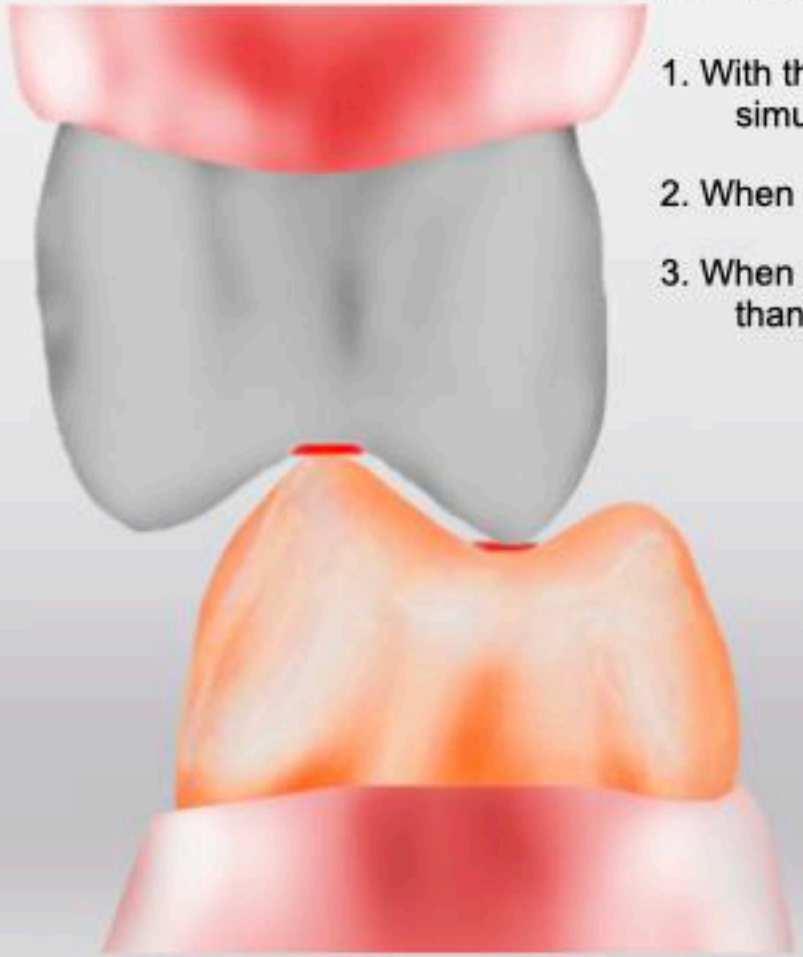






from Dawson's Textbook, "Functional Occlusion"

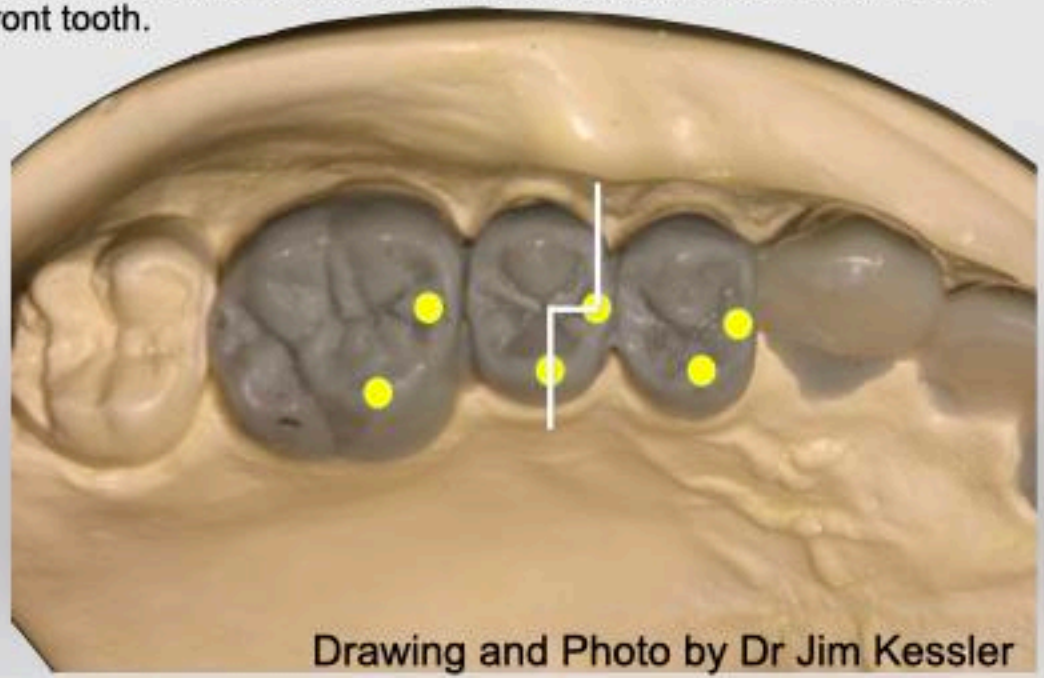
LD Pankey's 3 Rules of Occlusion (Clyde Schuyler)



1. With the condyles fully seated in the fossa, all the posterior teeth touch simultaneously and even, with the anterior teeth lightly touching.

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

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



Drawing and Photo by Dr Jim Kessler

Treat Occlusal Muscle Dysfunction- Adjust the Occlusion

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

Before

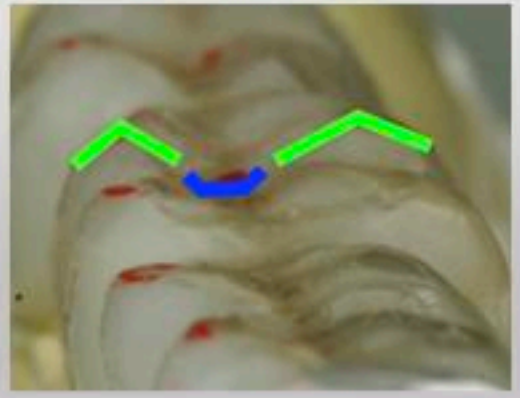
After

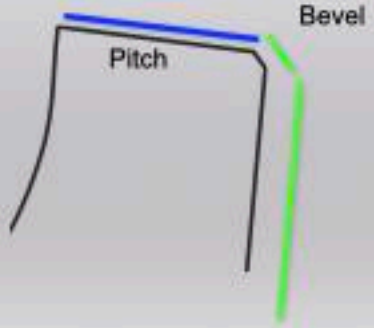
Occlusal Sculpting Tools, including Zirconia

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

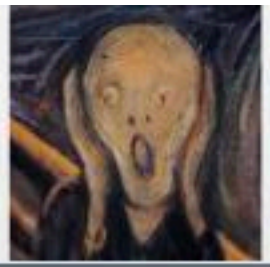
Move and Shape Cusps, Inclines, Facial Surfaces

Brassler Brio Shine
FLBCER-1
FLBF-2





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



Damaged TMJs

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

→ Occlusal Muscle Dysfunction

→ Osteoarthritis

→ Avascular Necrosis

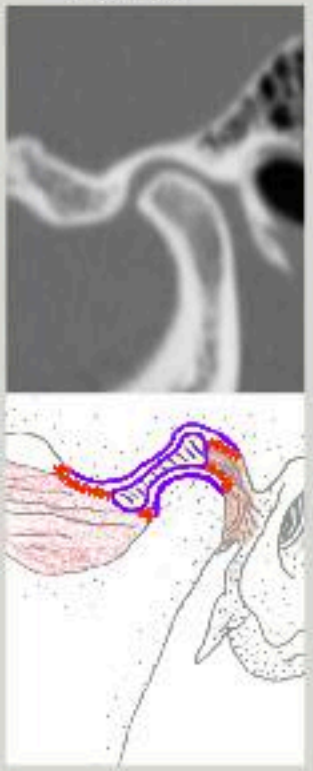
→ Progressive Condylar Resorption

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

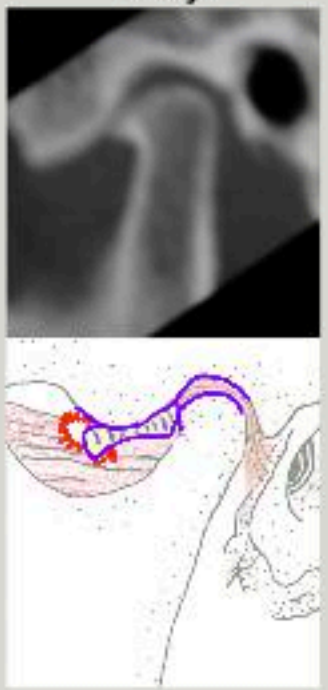
Osteoarthrosis/Osteoarthritis

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

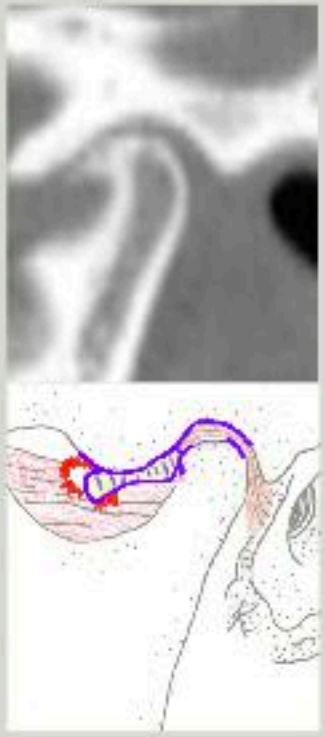
Normal



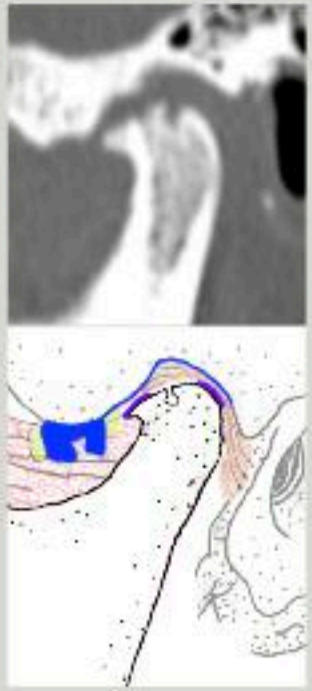
Early



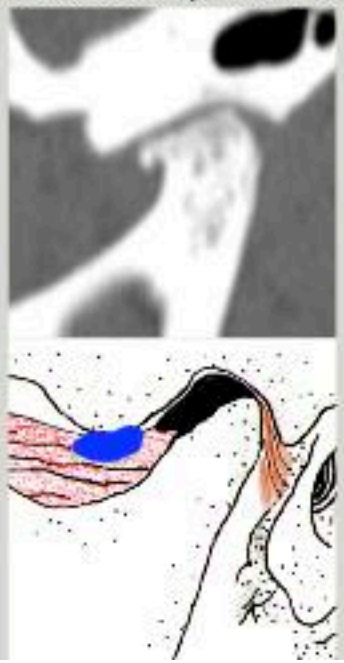
Early/ Moderate



Moderate



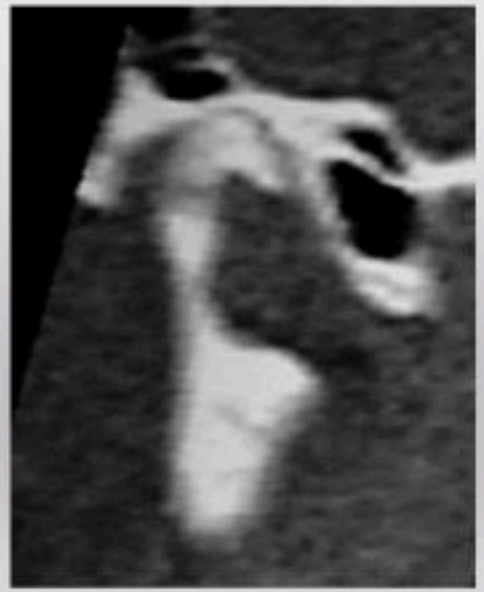
Severe OA, Eburnation



Representative examples of OA
in different patients

Adaptation Chronic Bilateral Osteoarthrosis

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



OA Right and Left Bone Loss
#8 Ankylosed

Treatment OA

Osteoarthr**osis**

Minimize parafunction:

If sleep grinding due to airway:

CPAP or Dental Airway Device

Glucosamine 1500mg /Chondroitin 600 mg

Shea Brand CBD

Osteoarthr**itis**

All of the above plus eliminate inflammation……

NSAIDs

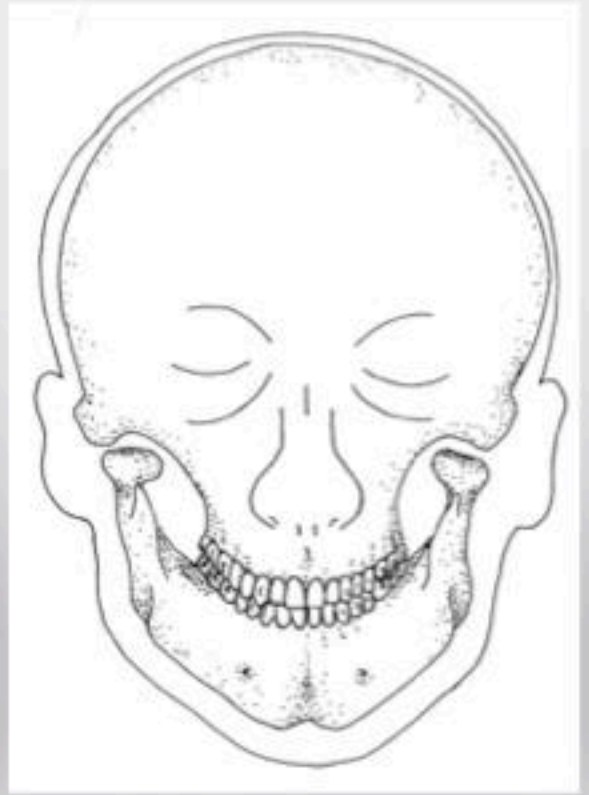
Cold Laser

If still inflamed arthrocentesis with Platelet Rich Plasma (PRP)

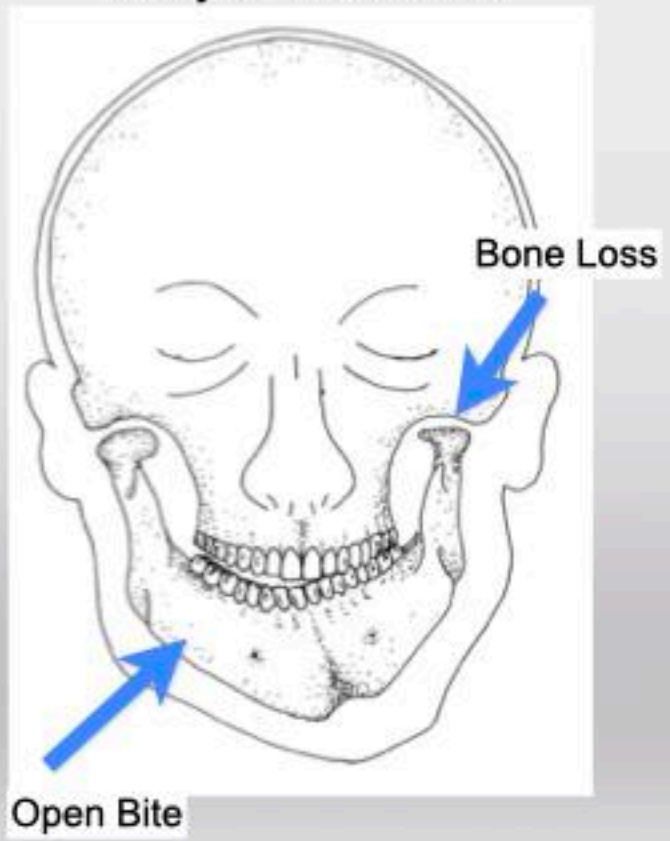
MLS Laser

3x week for 3 weeks

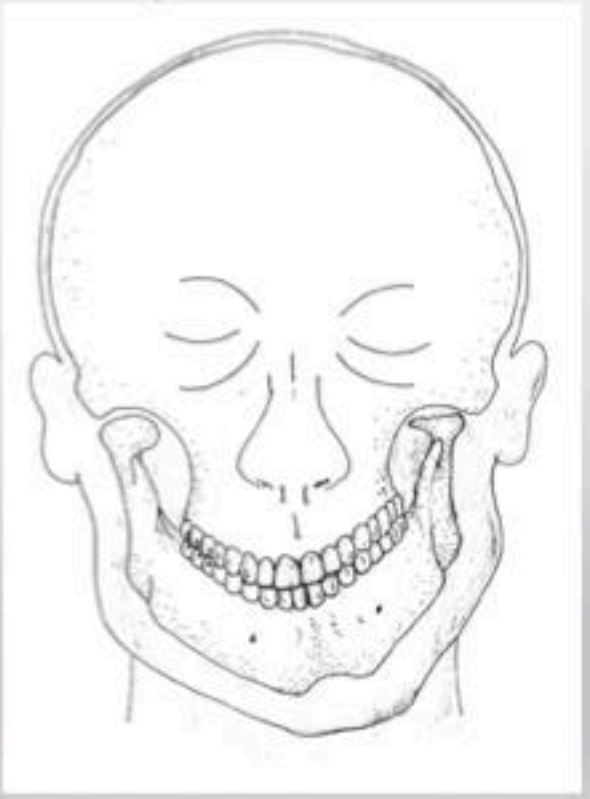
Diseases that cause bone loss in the TMJ alter the Occlusion



Condylar Bone Loss



Adaptation Over Time



Drawings by Gretta Tomb, DDS

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

Can lose joint height with bone loss or disc displacement

Minus 2mm TMJ RL joint height

Diseases that cause bone loss in Joints

Osteoarthrosis/Osteoarthrits
Avascular Necrosis
Inflammatory Tissue Bone Resorption

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

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Various other Autoimmune Arthritis
Autoimmune Rheumatic Fever
Cancer

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

Weird = Lyme Disease
Lyme Test has many false negatives

Gout
Uric Acid crystallizes in joint

Psoriatic Arthritis: Look for dry skin patches

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

Diseases that cause bone loss in Joints

3 diseases are associated with TMJ disc dislocation

Osteoarthrosis/Osteoarthrits
Avascular Necrosis
Inflammatory Tissue Bone Resorption

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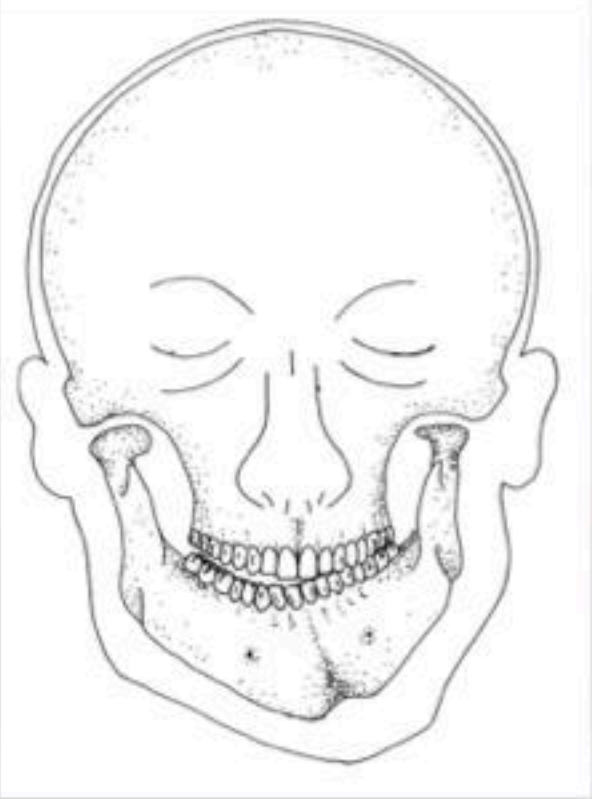
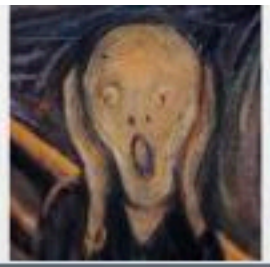




Damaged TMJs

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

→ Occlusal Muscle Dysfunction

→ Osteoarthritis

→ Avascular Necrosis

→ Progressive Condylar Resorption

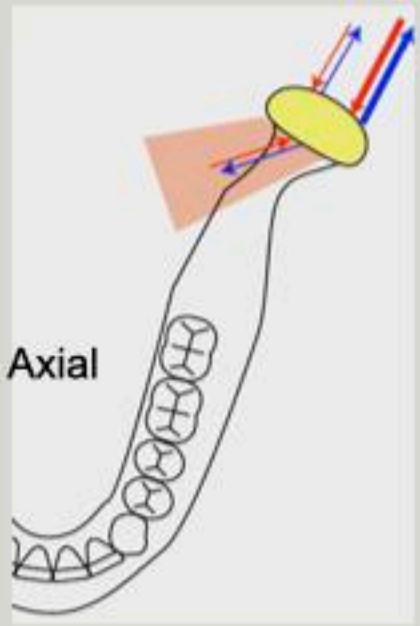
*These are my guesses on %, no research to back up to backup

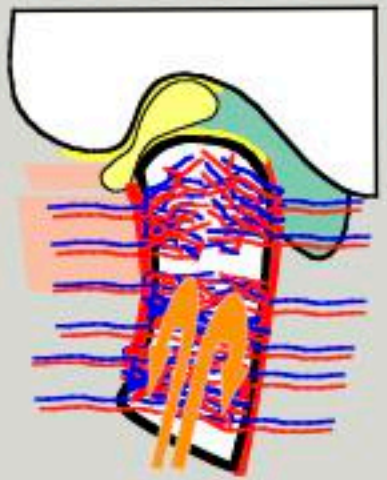
Age 30 Female
Start

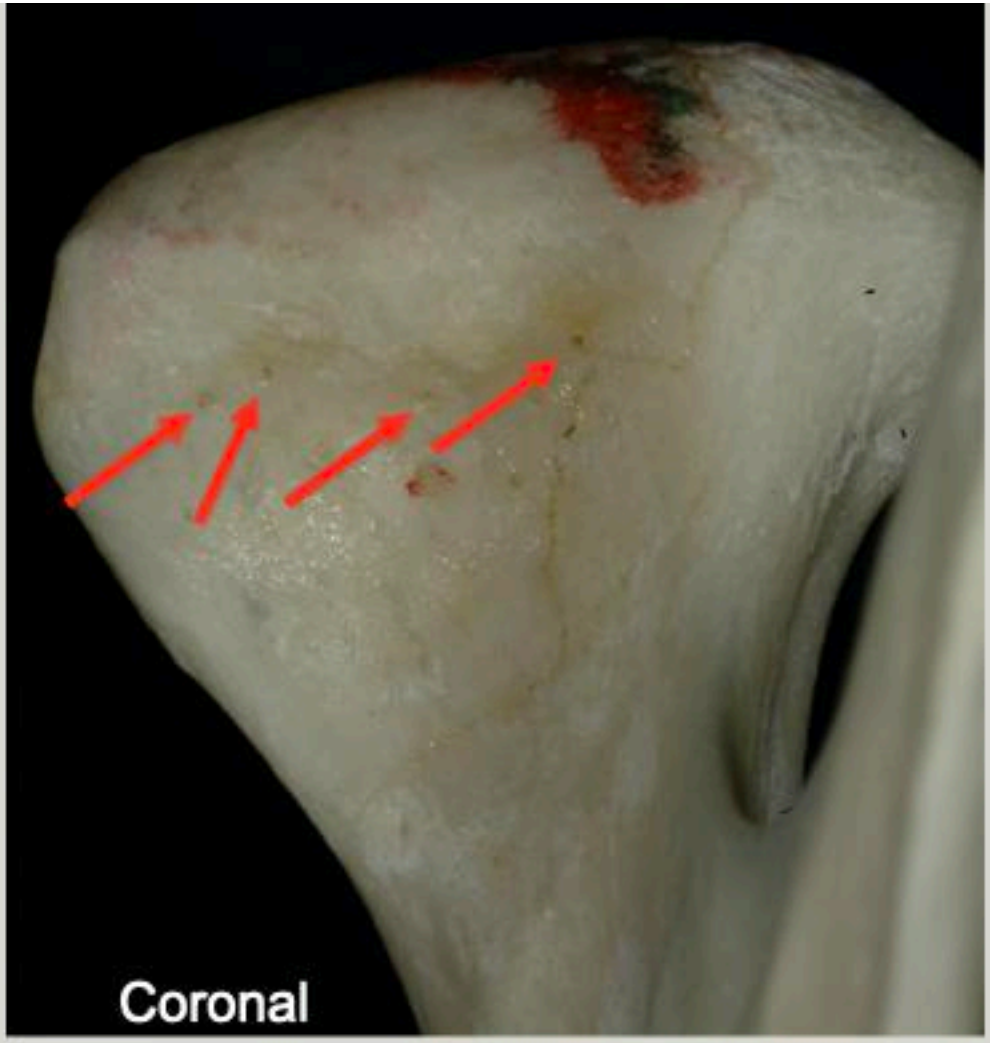
Front teeth use to touch 1 year ago

Condylar Perfusion

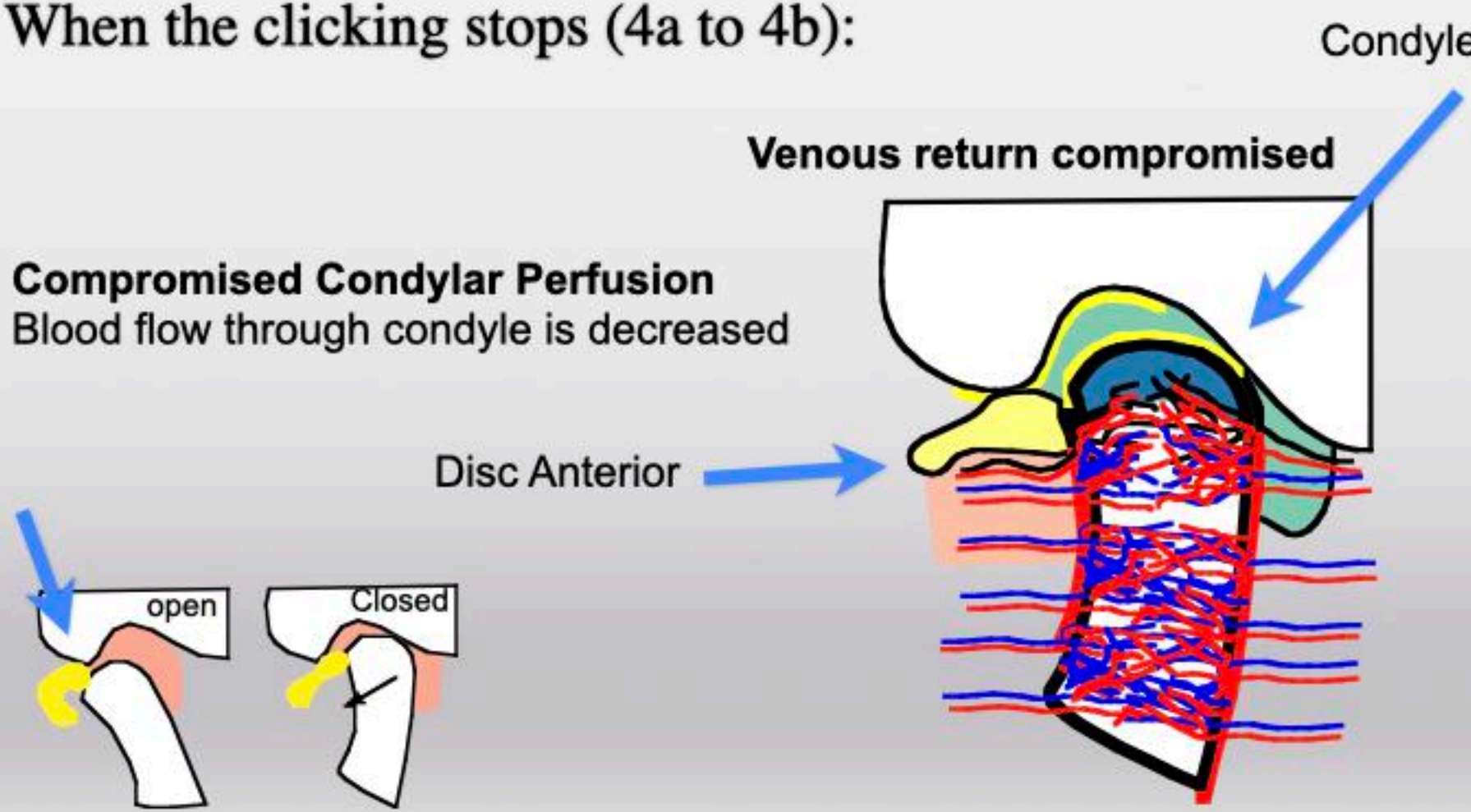
Blood flows in and out of the condylar head through vessels that pierce the cortex







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



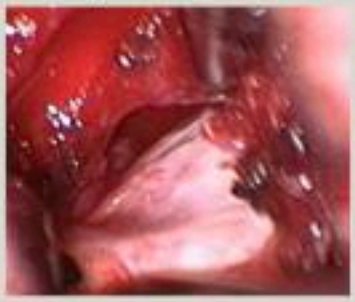
3 Outcomes of Compromised Condylar Perfusion

Bone cells die

Avascular Necrosis

One and Done

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



or

Nothing

Compromised but adequate.
99% patients have no problems

Inflammatory Tissue Bone Resorption

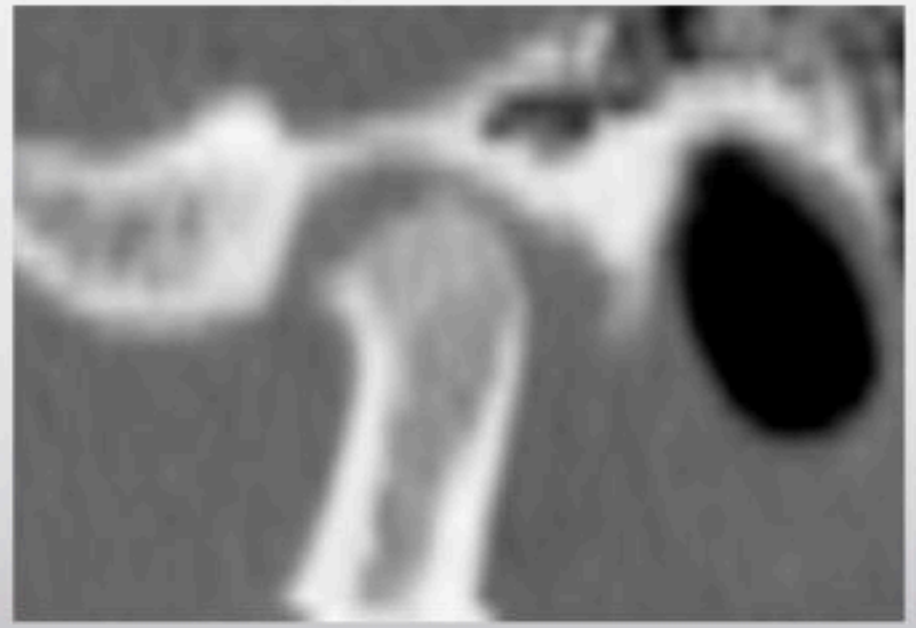
Cortex Collapses, Cartilage tears
Inflamed tissue contacting bone
Inflammatory cells activate Osteoclasts

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

Hypoxia Induced Progressive Condylar Resorption
HI-PCR

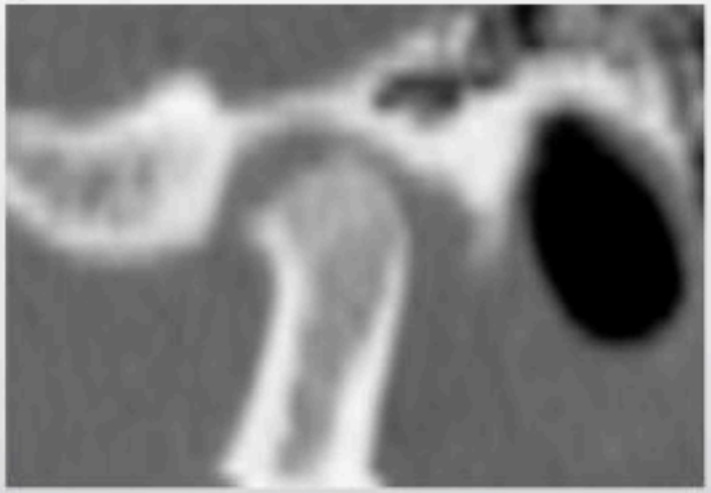
On CT see Flat condylar surface
Missing Subchondral Cortex During Active Phase
Slow, Progressive Condylar Resorption

Occlusion will constantly be changing



1 year after the clicking stops is the "Danger Zone"

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



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

$558,000 Malpractice Verdict

Failure to diagnose condylar resorption during orthodontic treatment

Dental Liability Alert, Vol 5, Issue 6, May 2002

Additional Dental Malpractice Verdicts

■ **$558,000 VERDICT - Failure to diagnose Condylar Resorption - Excessive use of cervical head-gear as part of orthodontic treatment - TMJ Syndrome - Occlusal deficiencies - Osteotomy recommended for minor plaintiff.**

This dental malpractice action was brought on behalf of the minor female plaintiff, age 11 at the time in question, against her treating orthodontist. The plaintiff alleged that the defendant failed to diagnose idiopathic condylar resorption (a condition similar to osteoarthritis) and excessively utilized cervical head gear in her orthodontic treatment, causing permanent mouth and jaw injuries.

The minor plaintiff treated with the defendant for approximately two years for a Class II malocclusion (secondary to crowding in the upper arch), a mid-line shift and a deep bite/overbite. The defendant prescribed cervical head-gear, comprised of a wire which connects behind the head to pull the molars rearward and leave more room for the incisors. The plaintiff wore the headgear for approximately nine months.

The plaintiff's dental experts testified that the plaintiff suffered from condylar resorption of the jaw during the time period the plaintiff was under the defendant's care and that the condition would have been evidence on x-ray. The plaintiff contended that the standard of care required the defendant to stop all orthodontic treatment under these circumstances and allow the condylar resorption to run its course. The plaintiff contended that the defendant failed to recognize that the plaintiff's jaw was rotating open due to the loss of calcification of the teeth and jaw associated with condylar resorption and that the defendant negligently attempted to reverse the open bite by inappropriate methodology.

The plaintiff's dental expert testified that the methodology employed by the defendant worsened the plaintiff's open bite, causing her to develop TMJ syndrome and requiring a future Lefort I (lower jaw) osteotomy. The cost of the plaintiff's surgery was estimated as between $25,000 and $30,000, according to the plaintiff's oral surgeon. The plaintiff alleged that had the defendant performed a proper examination, treated the dental dysfunction adequately and referred her to the proper specialists, the plaintiff would have suffered no injury.

The defendant denied negligence and contended that the plaintiff's resorption process was not detectable with any routine diagnostic study normally used in orthodontic treatment. The defense expert opined that the treatment provided by the defendant comported with the standard. The defense expert additionally maintained that all injuries suffered by the plaintiff were the result of her idiopathic condition. The defendant asserted that he made a timely referral to an oral surgeon who diagnosed the bilateral condylar resorption, a rare condition which is not well understood by the medical community.

The jury found for the plaintiff and awarded $558,000.

"DENTAL LIABILITY ALERT (USPS 015947 is published Bi-monthly for $150/year by Jury Verdict Review Publications, Inc., 45 Springfield Ave., Springfield, N.J. 07081. Periodical Postage Paid at Springfield, N.J. and additional mailing offices. Postmaster: Send Address Changes to Dental Liability Alert, 45 Springfield Ave., Springfield, N.J. 07081"

EXPERTS

Plaintiff's orthodontia expert: Ira Farkas from Woburn, Ma. Plaintiff's expert oral surgeon: Charlotte White from Tallahassee, Fla. Defendant's dental experts: Charles S. Green from Skokie, Ill. and Daniel M. Laskin from Richmond, Va. Defendant's orthodontic expert: Cyril Sadowsky from Skokie, Ill.

REFERENCE

Orange County, Fla. Haughey vs. Powell. Case no. 98-1024. Judge Jeffords D. Miller. Attorney for plaintiff: Christopher M. Lamoureux of Montgomery & Lamoureux in West Palm Beach, Fla.; Attorney for defendant: Kenneth L. Baker and John S. Derr of Bush & Derr in Orlando, Fla. ■

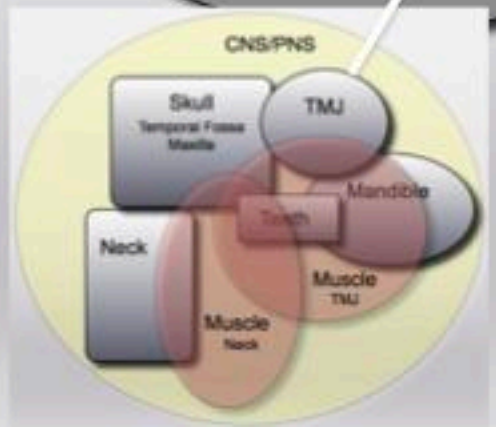
The TMJ:What You need to Know before you change an occlusion

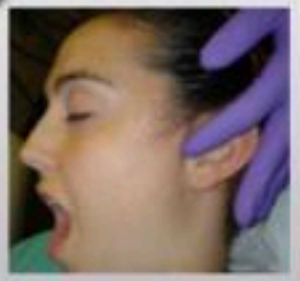
TMJ

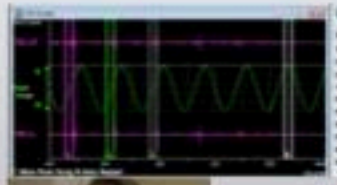
Does it Hurt?
Does it Move?
Does it Wobble?
Is it Structurallv Stable?

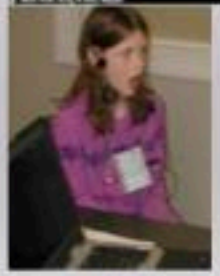
Palpate and Load the TMJ.
Measure Smoothness and Range of Motion (Quality and Quantity), Record JVA
Put in Anterior Stop Orthotic 24/7 for 2 days- Not Painful
Take CT scan- see intact cortex of condylar bone and fossa

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









Palatal Anterior
Stop Orthotic

Adult Onset Anterior Open Bite Differential Diagnosis

Developed Post-Puberty

TMJ has changed
- TMJ Bone Loss (See bone loss choices)
- Recent Large Disc Displacement
- Condylar Fracture

Teeth have moved
- Tongue- used as occlusal cushion
- Tongue used to stabilize neck or TMJ
- Iatrogenic- Orthotics, Retainers

Both have loss of anterior coupling

KO

Age 30 Female
Start

Front teeth use to touch 1 year ago

Age 30 Female
Start

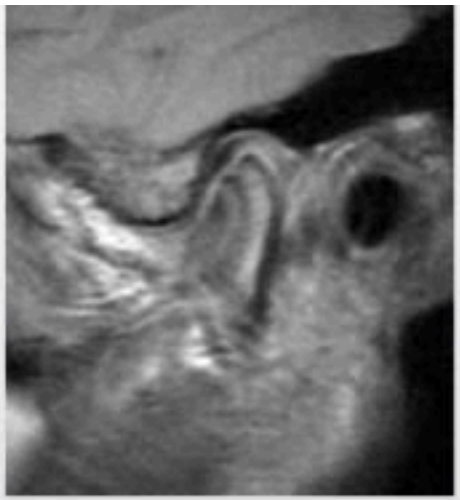
Front teeth use to touch 1 year ago

Start

Right Condyle Missing Cortex= Active Degeneration

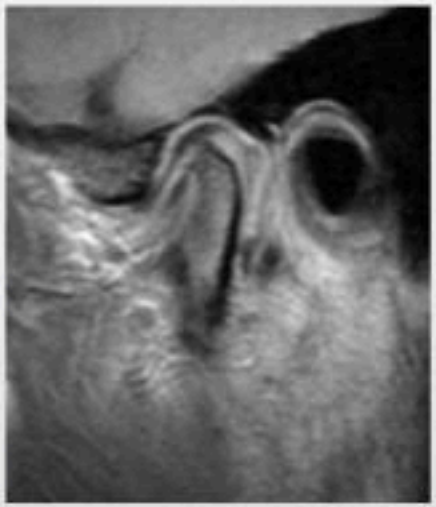
Left Condyle Missing Cortex= Active Degeneration

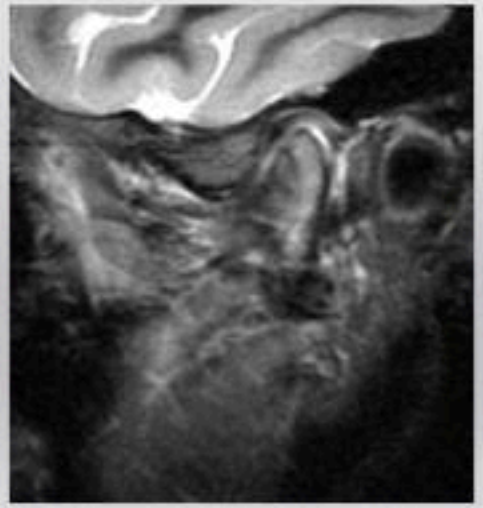
Start MRI
R2,L2



Right
PD

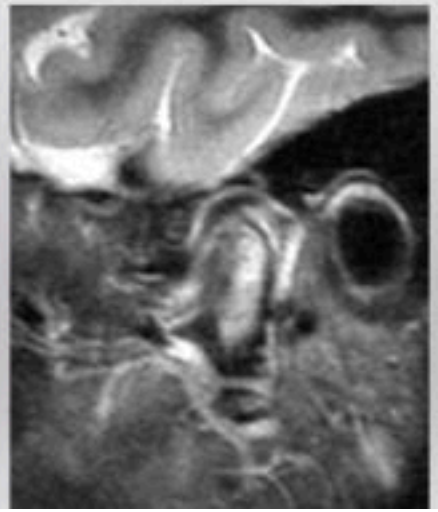
Left
PD





Right
STIR

Left
STIR



Tx: NSAID (Aleve 220mg bid), Doxycycline 20mg bid
Condylar Distraction
Rheumatologist and Infectious Ds MD add Plaquenil- Lyme neg, RhA neg, Equivical bebosa bacteria

Distract Condyles on SAM MPV Articulator
Right down 6.2, back 2mm, Left down 4.5, back 2mm
Make upper essex, Lower full coverage indexed appliance

Switched Aleve to
Meloxicam 7.5mg bid at 4 weeks
due to joints still sore

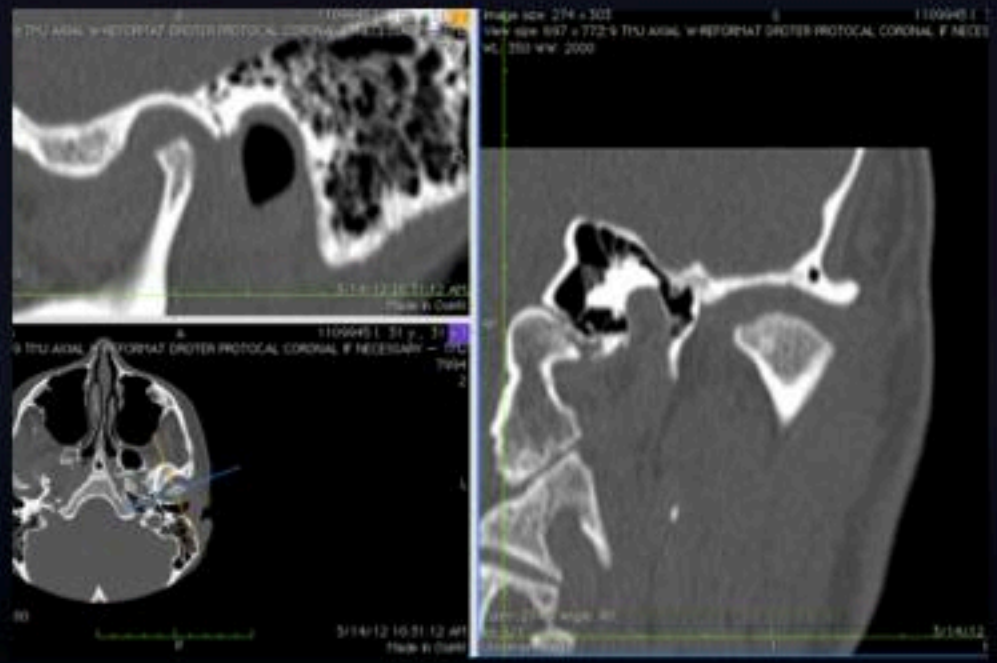
Distraction orthotic try in prior to start

2 months

Much reduced TMJ pain

2 months- just able to tolerate full traction

Cortex has reformed



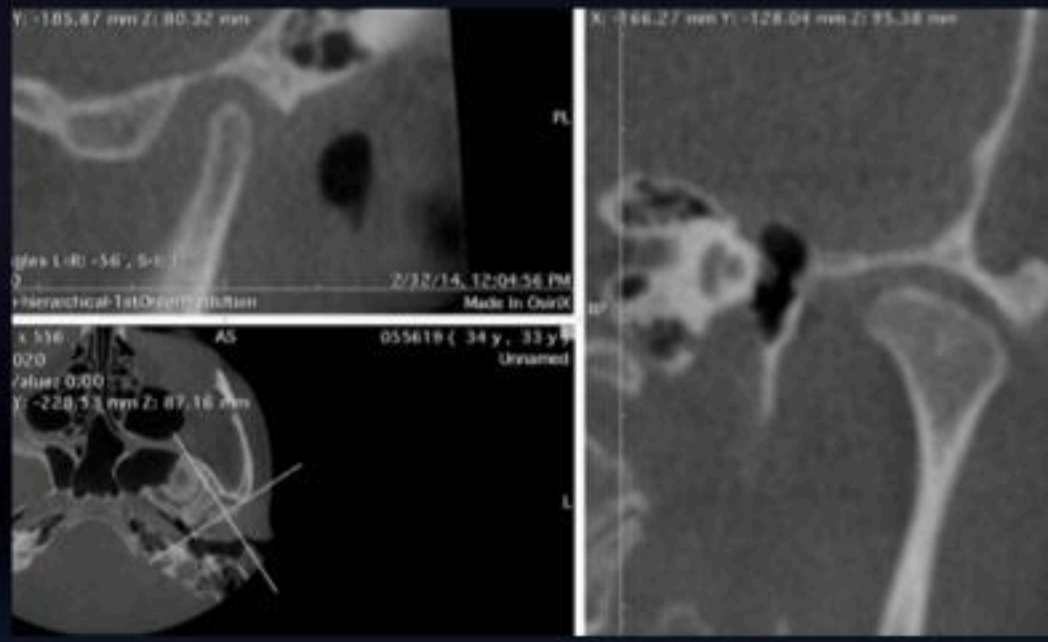
Start Age 30

Start

Age 33

Left TMJ

Left TMJ



11 months

Age 33

Invisalign Orthodontics 2 years

Age 34

Start Age 30

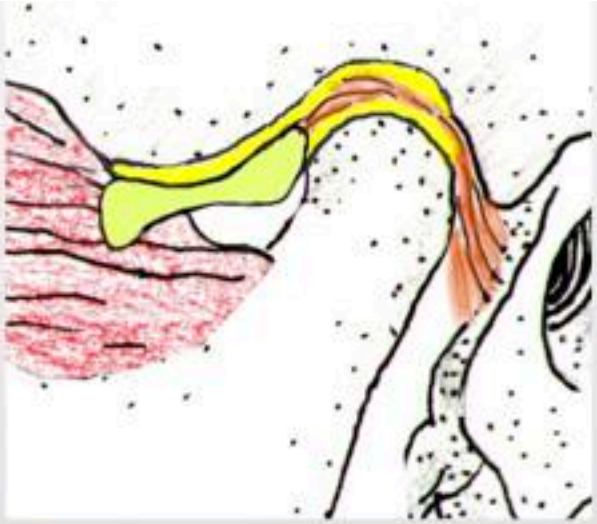
Non Surgical Therapies

Age 34

All Clicking Joints are Damaged

Not so Dangerous Clicks

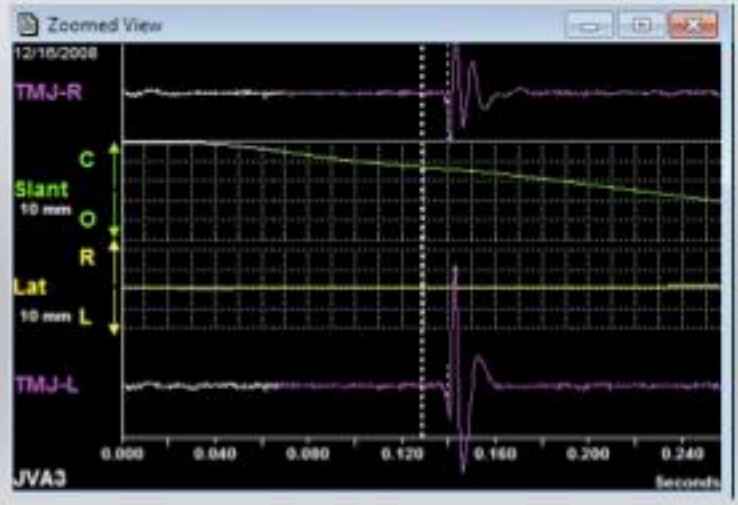
- Unchanging click for 2+ years
- Consistent, easy reduction of Disc
- Good range of motion with clicking
- Stable occlusion with clicking



Clicks that need further Evaluation/ Scans

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

Simple Click on JVA
Joint Vibration Analysis
BioResearch

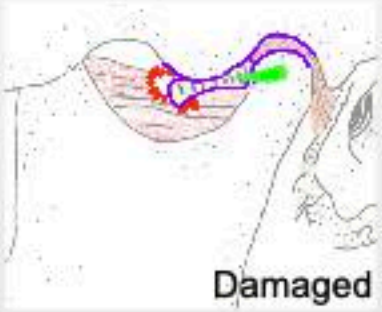


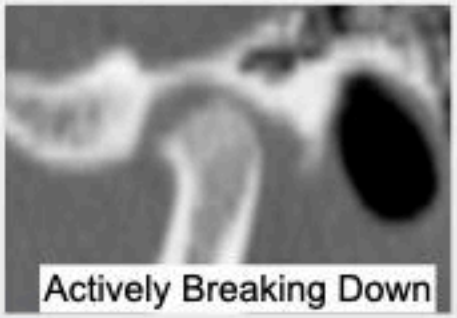
Basic Orthopedics

Joints are either
- Healthy or
- Damaged

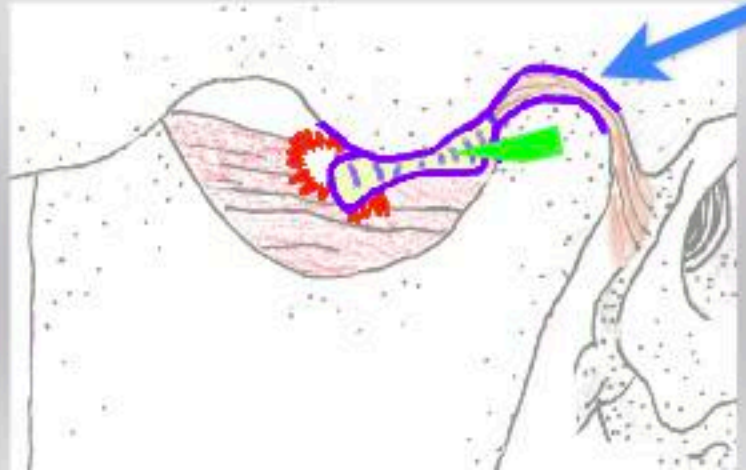
If damaged, joints will be either:
- Actively Breaking Down
- Adapting
- Adapted
  - Structurally, Mechanically
  - Favorably, Unfavorably


Healthy


Damaged


Actively Breaking Down

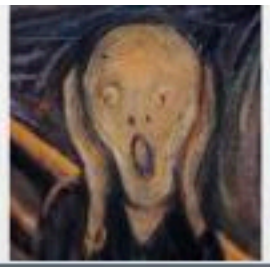
Majority of damaged TMJs adapt favorably



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

Pseudo-disc

Tissue Fibrosis



Damaged TMJs

Adapt Favorably **85%**
Adapt Fairly **14%** → Occlusal Muscle Dysfunction, Osteoarthritis
Adapt Poorly **<1%** → Avascular Necrosis, Progressive Condylar Resorption

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

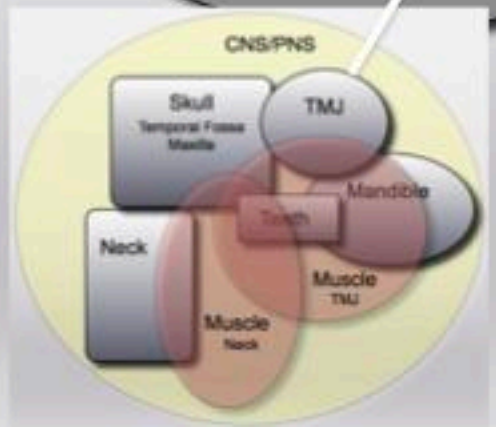
The TMJ:What You need to Know before you change an occlusion

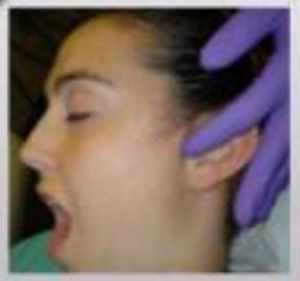
TMJ

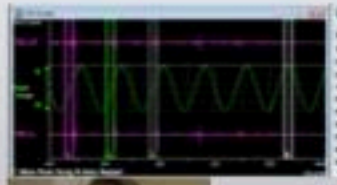
Does it Hurt?
Does it Move?
Does it Wobble?
Is it Structurallv Stable?

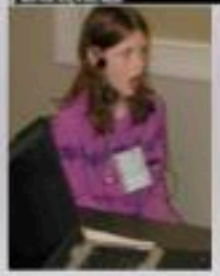
Palpate and Load the TMJ.
Measure Smoothness and Range of Motion (Quality and Quantity), Record JVA
Put in Anterior Stop Orthotic 24/7 for 2 days- Not Painful
Take CT scan- see intact cortex of condylar bone and fossa

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

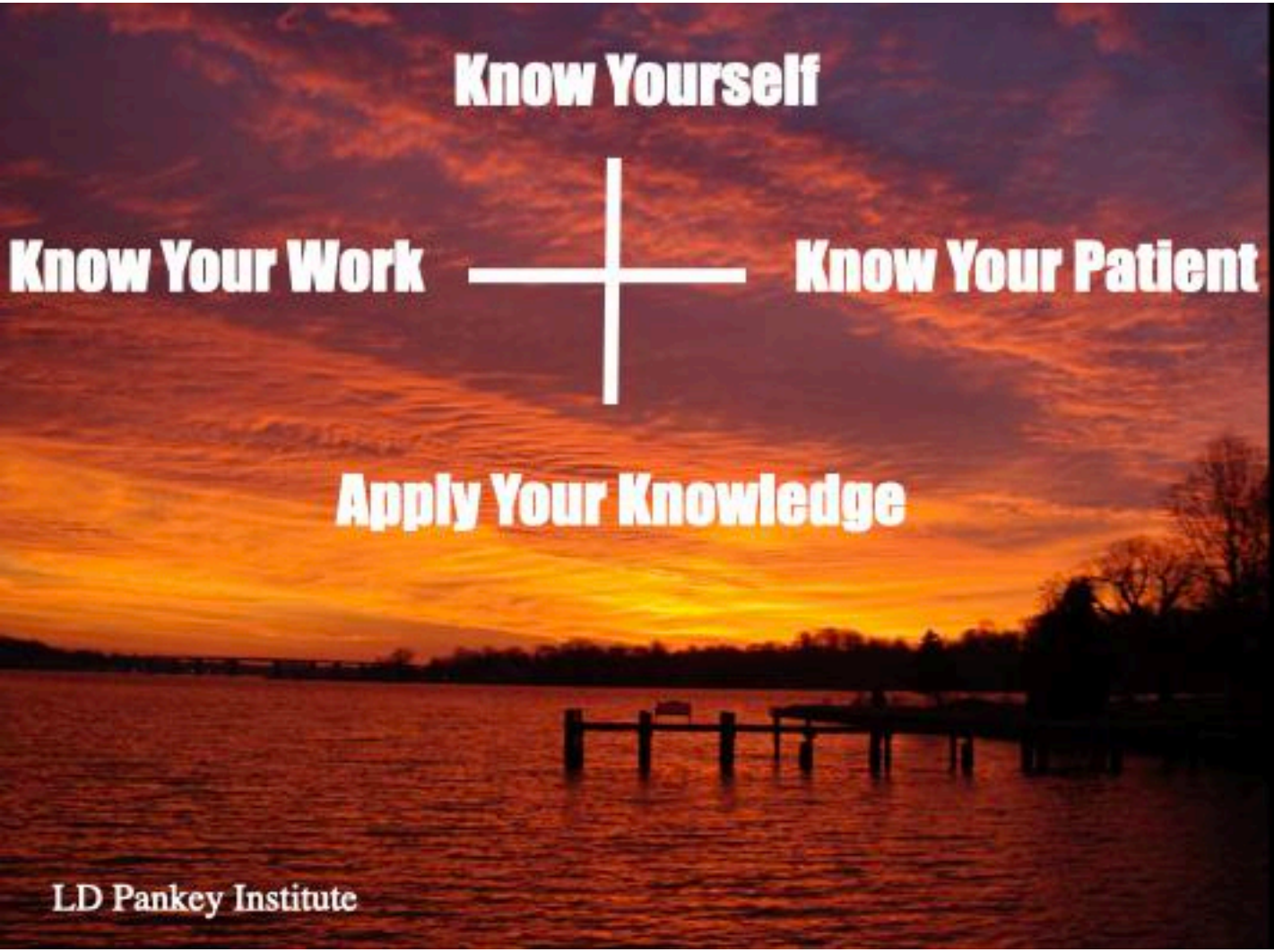








Palatal Anterior
Stop Orthotic



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