

Clinical Examination

A Peer-Reviewed Publication
Written by Steven R. Olmos, D.D.S.

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Educational Objectives

1. Know what is required for evaluation of patients complaining of TMD.
2. Understand the steps involved in a full clinical examination, including testing that will be required.
3. Understand the uses, pros and cons of the imaging that may be required.

Introduction

In order to diagnose whether a patient has a temporomandibular disorder (TMD) or a different problem, a thorough evaluation is necessary. A differential and definitive diagnosis must then be made. The patient can subsequently be selected for oral appliance therapy or referred to a specialist if required.

Clinical Examination

Step 1. Full Medical and Dental History

A full medical and dental history must be taken, and the patient's chief complaint and current symptoms ascertained. The medical history must include a complete list of drugs taken within the last year. Homeopathic medicines and vitamins must be included in this history – some of these are chemically related to manufactured drugs and may have a negative potentiating effect.

Step 2. Mandibular Ranges of Motion

Following completion of the full medical history form, the assistant performs an initial examination and compiles data for the dentist to review.

WHAT IS THE CHIEF COMPLAINT FOR WHICH YOU ARE SEEKING TREATMENT IN OUR OFFICE?

NOTE: PLEASE IDENTIFY YOUR CHIEF COMPLAINT AS #1, LIST ALL OTHER SYMPTOMS IN PRIORITY #2–#9

	Recent	Chronic (6 mo. +)		Recent	Chronic (6 mo. +)
___ Headache pain	<input type="checkbox"/>	<input type="checkbox"/>	___ Limited ability to open mouth	<input type="checkbox"/>	<input type="checkbox"/>
___ Ear pain	<input type="checkbox"/>	<input type="checkbox"/>	___ Jaw joint locking	<input type="checkbox"/>	<input type="checkbox"/>
___ Jaw pain	<input type="checkbox"/>	<input type="checkbox"/>	___ Jaw joint noises	<input type="checkbox"/>	<input type="checkbox"/>
___ Pain when chewing	<input type="checkbox"/>	<input type="checkbox"/>	___ Ear congestion	<input type="checkbox"/>	<input type="checkbox"/>
___ Facial pain	<input type="checkbox"/>	<input type="checkbox"/>	___ Sinus congestion	<input type="checkbox"/>	<input type="checkbox"/>
___ Eye pain	<input type="checkbox"/>	<input type="checkbox"/>	___ Dizziness	<input type="checkbox"/>	<input type="checkbox"/>
___ Throat pain	<input type="checkbox"/>	<input type="checkbox"/>	___ Tinnitus (ringing in the ears)	<input type="checkbox"/>	<input type="checkbox"/>
___ Neck pain	<input type="checkbox"/>	<input type="checkbox"/>	___ Muscle twitching	<input type="checkbox"/>	<input type="checkbox"/>
___ Shoulder pain	<input type="checkbox"/>	<input type="checkbox"/>	___ Fatigue	<input type="checkbox"/>	<input type="checkbox"/>
___ Back pain	<input type="checkbox"/>	<input type="checkbox"/>	___ Vision problems	<input type="checkbox"/>	<input type="checkbox"/>
___ Other: _____					

WHAT ARE YOUR CURRENT SYMPTOMS?

Head Pain			Recent	Chronic (over 6 mo.)	Severity			Duration			Frequency		
L=Left	R=Right	B=Bilateral			Mild	Mod.	Severe	Min.	Hrs.	Days	Occasional	Frequent	Constant
L R B	Frontal (Forehead)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L R B	Generalized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L R B	Parietal (Top of head)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L R B	Occipital (Back of head)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L R B	Temporal (Temple area)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The assistant measures the maximum jaw opening in millimeters, degree of protrusion, distance from the CEJ to CEJ (upper to lower central incisor), and the amount of lateral movement. These measurements can be obtained by using an instrument or a flexible measuring device such as a Whale Scale/ROM device.

Normal ranges of motion in mm

	Opening	Lateral	Protrusive
Brachy-facial	52	12	10
Mesofacial	47	10	8
Dolicho-facial	42	8	6

Step 3. Dental Classification Assessment

The next step requires classification of the patient's dental condition. A basic dental examination, and notation on the presence of any prostheses is required.

Name of patient _____
Date of examination _____

Vitals

____ B.P. _____ Review of questionnaire
____ Pulse _____ Signatures noted
____ Respirations _____ Allergies noted
____ Temperature _____ Medication noted

A. Mandibular ranges of motion measurements

____ mm Maximum opening without pain
____ mm Maximum opening with pain
____ mm Maximum left lateral excursion
____ mm Maximum right lateral excursion
____ mm Maximum protrusion
____ mm Deflection to the left
____ mm Deflection to the right
____ mm Deviation to the left
____ mm Deviation to the right

Normal ranges of motion based on cranial skeletal types are:
42–52 mm maximum opening, 8–12 mm protrusive,
and 10–14 mm of lateral movement both right and left.



Measurement of maximum opening



Measurement of lateral movement



Studies conducted by Duane Grummons, DDS, MSD, assessed the normal ranges of opening for three facial types and found that there are normal ranges for each type.

B. Dental Classification and Relationships

Left Class _____, Division _____

Right Class _____, Division _____

CEJ to CEJ _____ mm

Posterior openbite: left _____ mm, right _____

Other: _____

Overjet (horizontal relationship)
_____ mm, normal range 1–2 mm

Overbite (vertical relationship)
_____ mm, normal range 1–2 mm

Anterior openbite: left _____ mm, right _____

Mandibular dental midline deviation:
left _____ mm, right _____ mm

Mandibular skeletal midline deviation:
left _____ mm, right _____ mm

Tongue thrust: anterior _____, lateral _____

C. Dental Examination

Missing teeth _____ Mobile teeth _____

Sensitivity _____ Attrition _____

Caries: large/deep _____ Caries: small/superficial _____

Fractured/trauma _____ When _____

Damaged restoration _____ When _____

Step 4. Cervical Range of Motion

Flexion 80 – 90 degrees/Extension 70 degrees



Side bending 45 degrees



Rotation 70 – 80 degrees



The cervical range of motion is measured using an arthroidal protractor. Cervical ranges of motion tests help assess plane of occlusion cants. The patient needs to be able to turn their head equally to the right and left. If not, they have a cervical problem and need to be referred.

Step 5. Full Face and Body Posture Assessment

Cant uphill to right



Posture should be assessed for canting to the side, slumping, and evenness of shoulders. Patients with TMDs frequently present with mandibular cants, slanted body posture, and forward head posture. Inflammation of the TM joint as a result of uneven loading due to occlusal cant relationships may result in forward head posture, as well as cervical and or lumbar pain and dysfunction. Studies have demonstrated that reduction of inflammation, and restoration, have resulted in correction of forward head posture by an average of 4.43 inches.

Step 6. Clinical Muscle Palpation

Palpation is performed on only one structure at a time and on both sides, one side at a time. It must be performed with a consistent force of 3 to 5 pounds for every structure being evaluated.¹ The patient must be given a control such as the fleshy deltoid area (not the bone), as a reference to compare discomfort. The control is rated on a scale of 0 to 3 (0 = no pain, 1 = mild discomfort, 2 = moderate pain, and 3 = severe pain that causes the patient to move away from the pressure). The patient should be asked to describe the level of pain they experience, on the scale of 0 to 3, when you palpate the control area.

Extra-oral muscle palpation

Extra-oral palpation begins with an evaluation of the temporalis, masseter, and anterior digastrics bilaterally.

For the clinical importance of these muscles, please refer to the anatomy section of this digest.

Temporalis: To palpate this muscle, ask the patient to clench. After location of the anterior and posterior fibers, palpate this muscle at rest. Palpation is done bilaterally: first the anterior temporalis, then the medial temporalis, and then the posterior temporalis.



Masseter: The superficial masseter is palpated while the muscle is contracting. Ask the patient to clench. Palpate the origin at the maxillary zygoma and the insertion at the gonial angle externally. The body of the masseter is palpated by pinching the muscle between the thumb and second finger. The deep masseter is palpated with the muscle under tension (mouth open). Palpate the origin on the temporal zygoma, and the insertion at the gonial angle of the mandible intra-orally.



Inferior lateral pterygoid: Place a thumb on the patient's chin and ask him or her to protrude against it. Ask the patient if there is discomfort, and if there is, on which side.



Anterior digastric: Have the patient hold their mandible in a protruded position (i.e., the muscle is contracting). Palpate underneath the chin, where the mandible is V-shaped below the lower incisors.



Intra-oral muscle palpation

Intra-oral palpation follows a series of steps.

- Step 1.** Begin by evaluating the temporalis tendon. This palpation is performed with the mouth open. Begin the process with your finger on the antero-medial portion of the ramus at the level of the retro-molar area and work your way up to the coronoid process.
- Step 2.** Keeping the examination finger in place, ask the patient to close their mouth and press laterally to evaluate the medial pterygoid. Ask the patient to open, and gently palpate the angle of the mandible on the inside of the mouth. Ask first if the patient is a gagger. If gagging is not a problem, palpate below the area of the lower third molar.
- Step 3.** Palpate the insertion of the buccinator above the first and second molar on the maxilla and then just below these molars on the mandible.
- Step 4.** Palpate the insertion of the deep masseter at the gonial angle and the inferior border of the mandible.

Leave the finger in the mouth as you move to the other side for examination of the same structures in the same order.

Neck muscles palpation

Extensor muscles that should be palpated at the base of the skull include the trapezius and splenius capitis insertions. The trapezius is found just lateral to center at the base of the skull (supreme nuchal line). The splenius capitis insertion is found just distal to the mastoid process on each side.

The sternocleidomastoid muscles are flexors. Their insertion at the mastoid process should be palpated. They oppose the action of the trapezius muscles.

Sternocleidomastoid



Splenius Capitis



Trapezius

Ligaments

The styloid process is an important structure to evaluate. There are four structures that originate from this process: the stylopharyngeal and styloglossus muscles, the stylomandibular and stylohyoid ligaments. Inflammation in these structures can refer pain to the ear, eye, jaw, throat and tongue.

Capsular Palpation



Styloid Process



Stylomandibular and Stylohyoid Ligament

Step 7. Joint Vibration Analysis

Vibration Analysis is an objective test of the TMJ in function. It works on the simple principle of motion and friction. The TMJ should function as smoothly as any other joint, without clicking, popping, grating, or making any of the other noises that patients describe as emanating from their TMJ.



JVA will detect vibrations associated with degenerative changes earlier than evidenced on radiographs; is useful in documenting pretreatment joint status; and is more useful than subjective methods of assessment (auscultation and palpation).² JVA uses a silicone-embedded transducer that reduces room noise and transmits joint vibrations to a computer where graphs are generated that can be used for objective analyses.

Step 8. Assessment of Joints

Joint sounds such as clicking and crepitation "are found to occur only in joints with disc dysfunction and/or arthrotic changes of the articulate surface." Widmalm and Westesson were not able to produce noises in those joints with normal anatomy. They concluded that joint sounds indicate joint abnormality, but the absence of joint sounds did not exclude intra-articular pathosis.³ It is important to differentiate a quiet normal joint from a quiet joint with an advanced pathology such as disc displacement without reduction (the disc is dislocated in all movements of the jaw).

Triaging joint noises or identifying the disc position changes that produce the noises enables a more accurate prognosis. For example, it is far more predictable to stabilize an early anterior disc displacement with reduction than a late medial disc displacement with

reduction. Joint Vibration Analysis enables the dentist to understand what the noises mean to ensure a proper diagnosis, treatment plan, and long-term result.

Digital palpation and stethoscopes can be used in the absence of JVA to help assess joints and joint noises, however this has been shown to be less than 50% accurate. In the recently published book “TMDs: An Evidence-Based Approach to Diagnosis and Treatment” by D. Laskin and C. Greene (Quintessence 2007) they describe the “relatively limited information with respect to the status of the temporomandibular joint (TMJ)”, in the clinical assessment of TMD. This is why it is so important to use an objective tool like JVA.

Capsular Palpation

The lateral temporomandibular joint is palpated with the mouth closed. The lateral portion of the condyle as well as the lateral portion of the temporal zygoma are evaluated at this time. Inflammation present would result in a diagnosis of capsulitis.

Posterior Joint Space



The posterior joint space is palpated with the mouth open. The index finger is used to compress the indentation that develops as the condyle translates away from the tragus of the ear. Inflammation in this area would result in a diagnosis of retro-discitis.

Step 9. Airway and Obstructive Sleep Apnea Assessment

Morning headaches are a common symptom of obstructive sleep apnea (OSA), caused by a decrease in oxygen saturation and are also a sign of TMJ dysfunction. Scalloping of the tongue is 70 percent predictive for a diagnosis of OSA. Patients with headaches and facial pain are frequently classified as having TMJ disorders, when in fact many are suffering from OSA. It is important to include an assessment for OSA when examining patients complaining of TMDs. In OSA, the entire upper airway is blocked. Patients should be assessed using the Epworth Sleepiness Scale. This is a self-administered test that assesses the amount of daytime sleepiness, sleeping pattern, restfulness of sleep, and situations in which the patient falls asleep (such as in the car or while watching television).

Step 10. Dental orofacial examination

Dental orofacial examination is the next step in the assessment and includes an assessment of the oropharyngeal airway and tonsillar region. In addition, an assessment of the cranial nerves is required. This should include questions to the patient and evaluation of smell, salivation, taste, hearing, balance, lack of sensation of feeling or touch, eye movement and pupil

Epworth Sleepiness Scale Form

Patient Name _____

How likely are you to doze off or fall asleep in the situations described in the box below, in contrast to feeling just tired? This refers to your usual way of life in recent times. Even if you haven't done some of these things recently try to work out how they would have affected you. Use the following scale to choose the most appropriate number for each situation:

- 0 = Would never doze
- 1 = Slight chance of dozing
- 2 = Moderate chance of dozing
- 3 = High chance of dozing

Situation Score

- Sitting and reading _____
- Watching TV _____
- Sitting, inactive in a public place
(eg a theatre or a meeting) _____
- As a passenger in a car for an hour
without a break _____
- Lying down to rest in the afternoon
when circumstances permit _____
- Sitting and talking to someone _____
- Sitting quietly after a lunch without alcohol _____
- In a car, while stopped for a few
minutes in traffic _____

Sum for total score out of 24 _____

Thank you for your cooperation.

Epworth Sleepiness Scale Interpretation

- 0-7:** It is unlikely that you are abnormally sleepy
- 8-9:** You have an average amount of daytime sleepiness
- 10-15:** You may be excessively sleepy depending on the situation. You may want to consider seeking medical attention
- 16-24:** You are excessively sleepy and should consider seeking medical attention

dilation. Head movement, tongue movement, and shoulder lifting movements should also be assessed.

Cranial nerve assessment

Smell	C1
Sight	C2
Eye movement, pupil activity	C3,4,6
Chewing, feeling front of head	C5 (Trigeminal)
Facial movement, taste, crying, salivating	C7
Hearing and balance	C8 (Vestibulo-cochlear)
Taste, swallowing, salivation	C9
Taste, swallowing, lifting of palate, speech	C10
Head turning, shoulder lifting	C11
Tongue movement	C12

Final Step. Imaging

The initial X-rays that I recommend for every patient to be evaluated for TM pathology include: a panoramic, sub-mental vertex, and sagittal tomograms in centric occlusion, rest, and maximum opening. These can be ordered from an imaging laboratory if the dentist does not have a machine capable of taking these type of images. I use a CT scan of every patient prior to treatment using the ICAT (cone beam imaging). Depending upon the patient, additional imaging may be necessary such as: CT scans or MRIs, and similar tests may be required in addition to the radiographs previously mentioned.

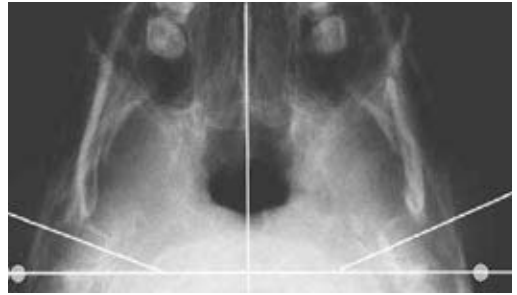
The minimum number of images required should be taken, and you should only take or order images that you can read. Images can be generated from plain film, digitally, or from CT scans. CT scans allow for a cut to be taken at a particular depth or angle through the tissue to show the anatomy (particularly useful when assessing the position of the condyles).

Submental Vertex

Sagittal tomograms are taken with the X-ray beam directed down the long axis of the condyle. This is found using the sub-mental vertex image. The angle of the condyle in relation to a straight line that runs through the ear holes allows the technician to orient or correct the tomograms. When tomograms are taken in this way they are referred to as “corrected” tomograms. This X-ray also allows the clinician to evaluate the condyle size from right to left when it is suspected that there is hypertrophy or hypoplasia.

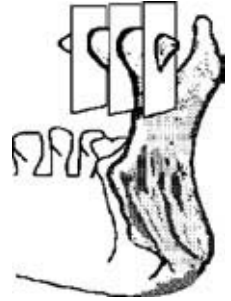
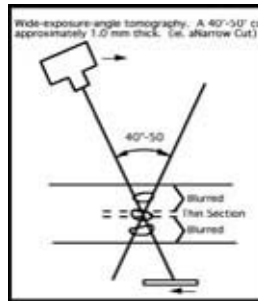
Tomograms may be “corrected” or “uncorrected”. Corrected tomograms of the TMJ are based on a submental vertex radiograph, whereby the condylar long axis is determined, the slice selected and the information transferred to the X-ray machine. *The corrected sagittal tomogram is inherently more accurate and repeatable than the transcranial and is the projection of choice.*

Corrected tomogram

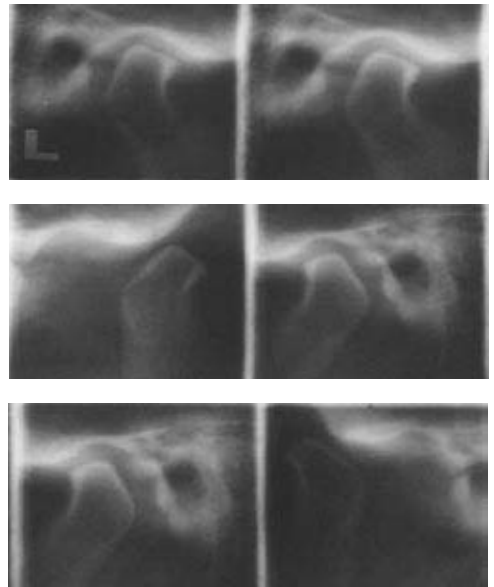


Tomography of the TMJ

Tomography of the temporomandibular joint has proven to be the most accurate radiographic technique with “slices” or “cuts” of the specific anatomical structures. A slice is superior to its comparable plain film technique because underlying structures that are obstructed on conventional radiographs can be differentiated.



Tomography Slices



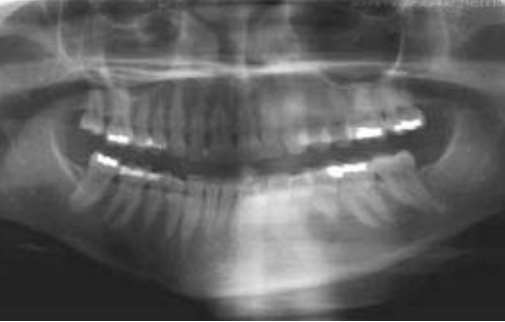
Tomography of the TMJ yields an extraordinary amount of even subclinical information by narrowly “slicing” the medial, center and lateral poles of the condylar head in both sagittal and coronal planes. The narrower the “slice”, the greater the detail of the targeted anatomy due to the relative absence of adjacent anatomical structures within the same “slice”.

Examples of each position are shown above in order: centric occlusion, rest, and maximum opening.

Panoramic radiography

Panoramic radiographs are of benefit for evaluation of gross osseous changes, elongated stylohyoid processes and its ossified ligaments (Eagle's syndrome), antegonial notching, as well as coronoid process hyperplasia.

Panoramic radiograph



From a TMD perspective, the panoramic projection is assessed for the following:

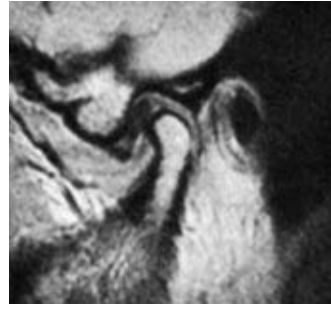
- Relative morphology of the condyles, bilaterally. Are the condyles and ascending rami symmetrical or magnified due to patient rotation?
- Relative size (height) and shape of the coronoid processes. Do they extend above the height of the condyles (condylar hyperplasia)?
- Anti-gonial notching (bone deposition at the gonial angle). Is there more bone deposition on one side indicative of masseter hyperactivity?

The vast majority of the osteogenic degeneration found in the TMJ occurs on the lateral pole and opposing fossa surface, which supports the validity of the CT, tomogram and transcranial projections for viewing the lateral pole. The panoramic radiograph should not be used to determine the condylar position in the glenoid fossa, or to assess subtle degenerative changes. This is because the central ray projects up at an average angle of negative 10-15°, thereby projecting the medial pole up at 12 o'clock and lateral pole superimposed over the ascending ramus at 6 o'clock. Panoramic radiographs are taken with the patient biting on a bite block, so this could not be an accurate method of evaluating the condyle-fossa relationship.

Magnetic resonance imaging (MRI)

This is considered by many as the gold standard for soft-tissue imaging of the TMJ, particularly for the meniscus/disc. Using this technology enables the clinician to diagnose disc position in the mouth closed or open positions, as well as to identify inflammation that cannot be determined (proven) any other way. As with tomography and CT scans, MRI images are typically taken in sagittal, coronal, and basilar (SMV) planes with 2 mm cuts.

Magnetic resonance imaging



Computerized axial tomography (CT)

A new single Volumetric Cone-beam CT scan can replace all of the aforementioned procedures (conventional Panoramic radiograph, Cephalogram, PA skull and tomograms of the TMJs and paranasal sinuses). The volumetric cone-beam CT requires just one 20 second scan. Its use reduces radiation exposure, significantly increases detail, and is less expensive for both the clinician and the patient.

In cone-beam CT (CBCT) geometry, the entire subject is exposed from a single point source using a hydrogenated amorphous silicon (aSi:H) flat-panel sensor as its detector. The single rotation results in a volumetric scan of the entire subject with innate rapid volumetric data acquisition. In contrast, with conventional CT scans, 3D Volumetric image reconstruction is achieved by scanning the series of cross-sections and then stacking these slices.

Cone beam CT scan



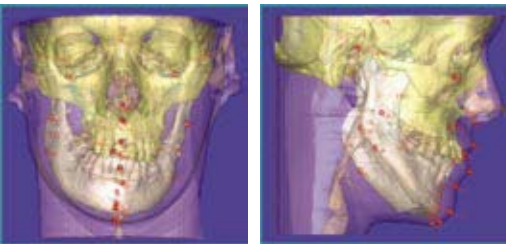
With a single 20 second CBCT scan, one has the full 3D volume of the head and neck from C4 to Nasion including the TMJ's, pharyngeal airway, paranasal and

maxillary sinuses, etc. – automatically whether you want it or not. 3D rendering such as the MIP (maximum intensity projection) will undoubtedly demand new cephalometric landmarks and analyses.

Maximum intensity projection



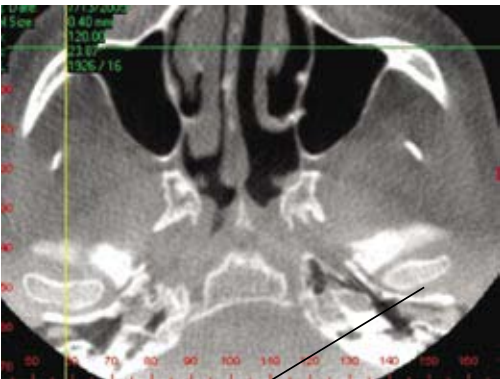
Cephalometric landmarks



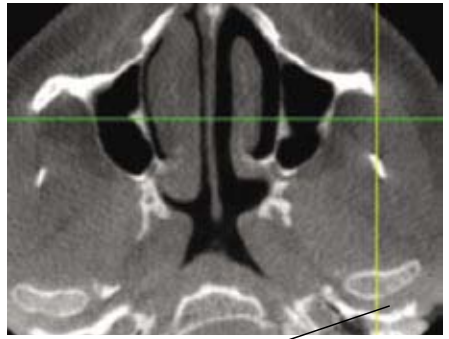
Such 3D data can only enhance our existing knowledge with:

1. Accurate assessment of bone quality and density (Hounsfield units).
2. Accurate corrected TMJ morphology and condylar position.
3. Upper airway evaluation.
4. The ability to measure before and after treatment arch widths.
5. Actual impacted dentition orientation in 3D.

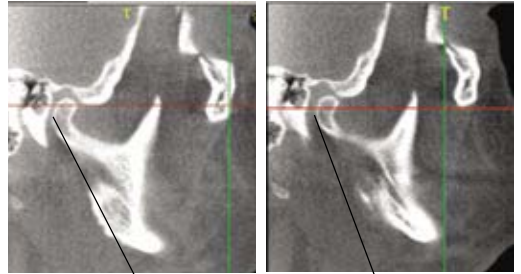
The following images were taken using the phonetic (sibilant) registration for orthotic position. Notice the improvement in oropharyngeal airway with the orthotic. Observe the proper condyle-fossa relationships with the orthotic as opposed to the narrowed relationships without.



Disc space without orthotic/appliance in place. Note joint space and how condyle is almost touching skull.



Disc space with orthotic/appliance in place. Joint space is enlarged.



Disc space without orthotic/appliance in place. Note joint space and how condyle is almost touching skull. Disc space with orthotic/appliance in place. Joint space is enlarged.

CT imaging is available by either purchasing a CT unit, or ordering images and a report from your local radiology lab. Costs are as low as \$250 in some areas for a CT image.

Summary

A full clinical examination is of utmost importance in the diagnosis of TMDs. This must include data collection by the assistant, a full medical history, followed by a thorough examination by the dentist, and imaging. Following evaluation, a diagnosis and triage should take place to determine which patients should be treated with oral appliances and which should be referred.

Endnotes

1. Conti P, Santos C, et al. Interexaminer Agreement for Muscle Palpation Procedures: The Efficacy of a Calibration Program. *Cranio* 2002
2. Brooks CP. Joint vibration analysis in 314 patients presenting with TM dysfunction: correlation with clinical tomographic data. Presentation, 8th International Congress, International College of Craniomandibular Orthopedics. Banff, Alberta, Canada, October 1993.
3. Widmalm SE, Westesson PL, et al. Temporomandibular joint sounds: correlation to joint structure in fresh autopsy specimens. *Am J Orthod Dentofacial Orthop.* 1992;101(1):60-69.

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Reader Feedback

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Questions

- 1. A comprehensive examination to determine if a patient has TMD must include _____.**
 - A health history and review of chief complaints
 - A clinical examination
 - Test and imaging
 - All of the above
- 2. When taking a patient's medical history it is important to obtain information on pharmaceutical medications as well as homeopathic medicines and vitamins.**
 - True
 - False
- 3. The initial examination performed by the assistant should include _____.**
 - Measurement of maximum jaw opening
 - Measurement of degree of protrusion
 - Measurement of CEJ to CEJ distance and lateral movement
 - All of the above
- 4. The normal range of opening for a patient with a dolichofacial type is _____.**
 - 52 mm
 - 47 mm
 - 42 mm
 - 40 mm
- 5. The cervical range of motion is measured using _____.**
 - An arthroidal protractor
 - Calipers
 - A face bow
 - None of the above
- 6. The articular disc is composed of _____.**
 - Dense fibrous connective tissue
 - Hyaline cartilage interspersed with connective tissue
 - Bone with a cartilage coating
 - None of the above
- 7. Joint vibration analysis works on the _____.**
 - Principle of motion and friction
 - Principle of friction and velocity
 - Principle of mass and velocity
 - None of the above
- 8. The temporalis muscle should be palpated _____.**
 - With the patient clenching
 - At rest
 - After the patient has clenched
 - b and c
- 9. The superficial masseter muscle is palpated _____.**
 - While the muscle is contracting
 - With the patient clenching
 - a and b
 - None of the above
- 10. The anterior digastric muscle is palpated underneath the chin with the patient's mandible in a protruded position.**
 - True
 - False
- 11. Morning headaches are a sign of _____.**
 - Obstructive sleep apnea
 - TMJ dysfunction
 - a and b
 - None of the above
- 12. Initial X-rays taken will include _____.**
 - A panoramic radiograph
 - A sub-mental vertex radiograph
 - Sagittal tomograms
 - All of the above
- 13. The neck muscles that must be palpated include _____.**
 - The trapezius
 - The splenius capitus
 - The sternocleidomastoid
 - All of the above
- 14. The _____ originates from the styloid process.**
 - Styloglossus muscle
 - Stylopharyngeal muscle
 - Stylomandibular and stylohyoid ligaments
 - All of the above
- 15. Muscles must be palpated _____.**
 - One at a time
 - One side at a time
 - Bilaterally
 - All of the above
- 16. The lateral temporomandibular joint is palpated _____.**
 - With the mouth open
 - With the mouth closed
 - With the neck rotated
 - None of the above
- 17. The corrected sagittal tomogram is _____.**
 - Only useful in assessing intra-oral structures
 - Less accurate than a panoramic radiograph
 - Inherently more accurate than the transcranial projection
 - None of the above
- 18. The TMJ should not _____.**
 - Click
 - Pop
 - Produce a grating noise
 - All of the above
- 19. The Epworth Sleepiness Scale _____.**
 - Is self-administered by the patient
 - Assesses the amount and restfulness of sleep
 - Assesses the sleeping pattern
 - All of the above
- 20. Following a full evaluation of patients, _____ should take place.**
 - A diagnosis
 - Triage
 - a and b
 - None of the above

ANSWER SHEET

Clinical Examination

Name: _____

Title: _____ Specialty: _____

Address: _____ E-mail: _____

City: _____ State: _____ ZIP: _____

Telephone: Home () _____ Office () _____

Instructions to obtain dental continuing education credits: 1) Complete all information above. 2) Complete answer sheets in either pen or pencil. 3) Mark only one answer for each question. 4) Successful completion of this course will earn you 3 CEUs. 5) A blank duplicate answer sheet may be copied for additional course participants.

Mail completed answer sheet to
Academy of Dental Therapeutics and Stomatology
 P.O. Box 116, Chesterland, OH 44026
(216) 398-7822

For IMMEDIATE results, go to www.ineedce.com and click on the button "ENTER Answers Online." Answer sheets can be faxed with credit card payment to (216) 255-6619, (440) 845-3447, or (216) 398-7922.

Payment of \$49.00 is enclosed. **(Checks and credit cards are accepted.)**
 If paying by credit card, please complete the following:
 MasterCard Visa AmEx Discover

Acct. Number: _____
 Exp. Date: _____

Course Evaluation

Please evaluate this course by responding to the following statements, using a scale of Excellent = 5 to Poor = 0.

1. How would you rate the objectives and educational methods?
 5 4 3 2 1 0
2. To what extent were the course objectives accomplished?
 5 4 3 2 1 0
3. Please rate the course content.
 5 4 3 2 1 0
4. Please rate the instructor's effectiveness.
 5 4 3 2 1 0
5. Was the overall administration of the course effective?
 5 4 3 2 1 0
6. How do you rate the author's grasp of the topic?
 5 4 3 2 1 0
7. Do you feel that the references were adequate?
 Yes No
8. Do you feel that the educational objectives were met?
 Yes No
9. If any of the continuing education questions were unclear or ambiguous, please list them.

10. Was there any subject matter you found confusing?
 Please describe.

11. Would you participate in a program similar to this one in the future on a different topic? Yes No
12. What additional continuing dental education topics would you like to see?

- | | | |
|---|--|--|
| <ol style="list-style-type: none"> 1. ① ② ③ ④ 2. ① ② ③ ④ 3. ① ② ③ ④ 4. ① ② ③ ④ 5. ① ② ③ ④ 6. ① ② ③ ④ 7. ① ② ③ ④ 8. ① ② ③ ④ 9. ① ② ③ ④ 10. ① ② ③ ④ 11. ① ② ③ ④ 12. ① ② ③ ④ 13. ① ② ③ ④ 14. ① ② ③ ④ 15. ① ② ③ ④ | | <ol style="list-style-type: none"> 16. ① ② ③ ④ 17. ① ② ③ ④ 18. ① ② ③ ④ 19. ① ② ③ ④ 20. ① ② ③ ④ 21. ① ② ③ ④ 22. ① ② ③ ④ 23. ① ② ③ ④ 24. ① ② ③ ④ 25. ① ② ③ ④ 26. ① ② ③ ④ 27. ① ② ③ ④ 28. ① ② ③ ④ 29. ① ② ③ ④ 30. ① ② ③ ④ |
|---|--|--|

PLEASE PHOTOCOPY ANSWER SHEET FOR ADDITIONAL PARTICIPANTS.

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INSTRUCTIONS
 Each question should have only one answer. Grading of this examination is done manually. Participants will receive verification in the mail within three to four weeks after taking an examination.

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 Questions can be e-mailed to aeagle@ineedce.com or faxed to (216) 255-6619, (440) 845-3447, or (216) 398-7922.

COURSE CREDITS/COST
 All participants scoring at least 70% (answering 14 or more questions correctly) on the examination will receive verification of 3 CEUs. The formal continuing education program of this sponsor is accepted by the AGD for Fellowship/Mastership credit. For current terms of acceptance, please contact the ADTS. "DANB Approval" indicates that a continuing education course appears to meet certain specifications as described in the DANB Recertification Guidelines. DANB does not, however, endorse or recommend any particular continuing education course and is not responsible for the quality of any course content. Participants are urged to contact their state dental boards for continuing education requirements. The cost of this course is \$49.00.

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RECORD KEEPING
 The ADTS maintains records of your successful completion of any exam. Please contact our offices for a copy of your continuing education credits report. This report, which lists all credits earned to date, will be generated and mailed to you within five business days of receipt of your request.

CANCELLATION/REFUND POLICY
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COURSE EVALUATION
 We encourage participant feedback pertaining to all courses. Please be sure to complete the survey included within the answer sheet.

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