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## Objectives

| | |
|---|---|
| Appreciate | • **oral systemic health** connection |
| Learn | • basics of **oral and facial examination** |
| Understand | • **anatomy of temporomandibular joint** (TMJ) |
| Recognize | • **signs** and **symptoms** pertinent to headache and facial pain disorders |
| Know | • when and to whom to refer patient for the **next level of care** |

MORE THAN

**90%** OF ALL

SYSTEMIC DISEASES

have ORAL manifestations

Oral Systemic Connection | **Source:** aaosh.org

THE AMERICAN ACADEMY FOR ORAL SYSTEMIC HEALTH

World Leaders in Proactive Healthcare Collaboration

AAOSH.org

| SYSTEMIC CONDITION/DISEASE | ORAL SYMPTOM/MANIFESTATION |
|---|---|
| **HIV/AIDS** | **Kaposi's sarcoma**, hairy leukoplakia, linear gingival erythema |
| **Hypoglycemia / ketoacidosis** | Fruity **ketone scented breath** |
| **Tuberculosis** | Ulcers, **indurated patches**, radiolucent **jaw lesions** |
| **Xerostomia (various etiologies)** | **Rapid dental decay**, bad breath, **dysphagia** |
| **Tetanus** | **Jaw stiffness**, dysphagia |
| **Diabetes** | **Slow mucosal healing**, periodontitis |
| **Leukemia** | Ulcerations, **spontaneous gingival bleeding** |
| **Anxiety /extrapyramidal /sleep apnea** | Bruxism, clenching, jaw pain, **severe dental wear** |
| **Eating disorders/gastric reflux** | Dental erosion |
| **Various genetic syndromes** | Dental **malocclusions** and **malformation of teeth** |
| **Iron deficiency anemia** | Atrophic **glossitis**, loss of tongue papillae, **mucosal pallor** |
| **Vitamin B1, B2, B12, and E deficiency** | Associated with **glossitis** |
| **Vitamin D deficiency** | **Yellowing of teeth** due to impaired dental remineralization |

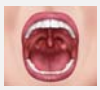
## Systematic Examination

Oral cavity

Face

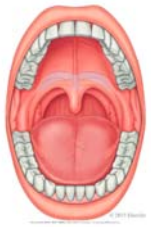
Temporomandibular joint

## Examination

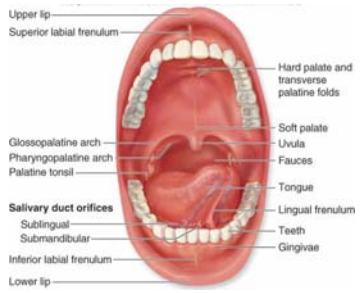


Oral cavity

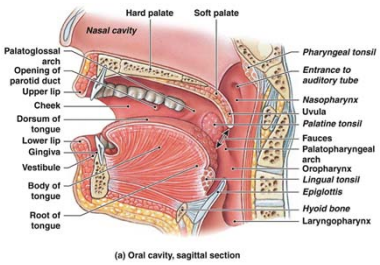
## Oral cavity



## Oral cavity
anatomy



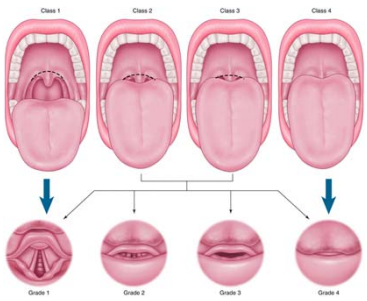

## Oral cavity
anatomy



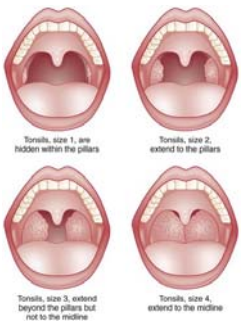

(a) Oral cavity, sagittal section

## Oral cavity
overview

## Oral cavity
airway




## Oral cavity
airway



Oral cavity
teeth

Oral cavity
teeth

Oral cavity
teeth

Dental decay

- Meth mouth

Dental decay

- Xerostomia



Acid erosion

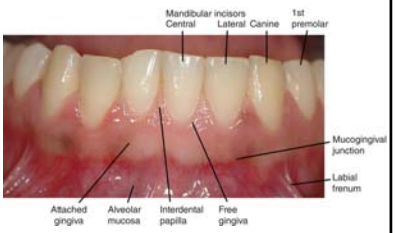
- GERD
- Bulimia nervosa
- Anorexia nervosa



## Bruxism

- Habitual/anxiety-related
- Correlated with hypoxia/sleep apnea
- Oromandibular dystonia
- Other dystonic or dyskinectic disorder
- Basal ganglia/thalamic stroke

## Oral cavity
gingiva




## Oral cavity
gingiva

## Oral cavity
gingiva

## Periodontal disease

**95%** OF AMERICANS WHO HAVE DIABETES, ALSO HAVE PERIODONTAL DISEASE

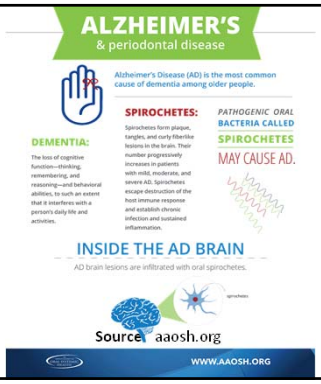
PERIODONTAL DISEASE IS LINKED WITH BLOOD VESSEL DISEASE, HEART ATTACKS, AND STROKES

PERIODONTAL DISEASE AND TOOTH LOSS INCREASE RISK OF ALZHEIMER'S DISEASE

**80%** OF AMERICANS OVER **35** HAVE SOME FORM OF PERIODONTAL DISEASE

**Source:** aaosh.org

## Association found between **Alzheimer's Disease** and oral and gut microbiota

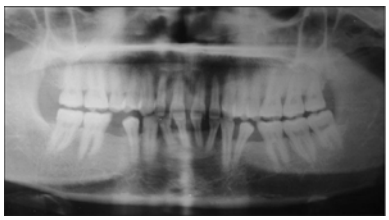


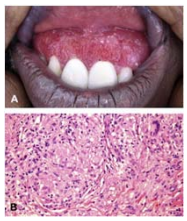
HSV
(herpes simplex virus)

- No latent pain

Sarcoidosis

- Migraine common in sarcoidosis patients
- Gingiva (“strawberry skin” appearance}
- Tongue (heterogeneous presentation)
- Lip






Sarcoidosis

- Migraine common in sarcoidosis patients
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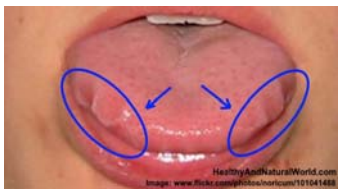
- Lip

## Oral cavity
tongue



### Bruxism

- Habitual/anxiety-related
- Correlated with hypoxia/sleep apnea
- Oromandibular dystonia
- Other dystonic or dyskinectic disorder
- Basal ganglia/thalamic infarct

### Geographic tongue
(benign migratory glossitis)

- Benign
- Etiology not clear


## Glossitis

- Folic acid deficiency
- Iron deficiency anemia
- Vitamin B deficiency (B1, B2, B3, B6, B12)
- Differentiate from median rhomboid glossitis
- Differentiate from burning mouth syndrome (BMS)


## Sarcoidosis

- Migraine common in sarcoidosis patients
- Gingiva (“strawberry skin” appearance}
- Tongue (heterogeneous presentation)
- Lip


## Amyloidosis

- Tongue enlargement
- Late-onset migraine-like aura

## Oral cavity
mucosa

**HSV**
(herpes simplex virus)

- No latent pain

**VZV**
(varicella zoster virus)

- May lead to PHN

## Aphthous ulcer
(canker sore)

- Common
- Stress
- Local trauma
- Drug-induced
- No latent pain

## Examination

Oral cavity

Face

Temporomandibular joint

## Examination

Face

| | |
|---|---|
| Asymmetry | • Vertical and horizontal relations<br>• Muscle tone and strength |
| Skin assessment | • Topography<br>• Color change<br>• Lesion |
| Palpation for pain | • Muscles of mastication<br>• Temporal artery |
| Sensory evaluation | • CN V1-V3 perception |

Asymmetry

Skin assessment

Palpation for pain

Sensory evaluation

**Asymmetry**

Differential diagnosis

- Dentofacial deformity
- CN VII (Bell's) palsy
- Stroke
- Ramsey Hunt Syndrome
- Complication of botulinium toxin injection
- Trigeminal motor neuropathy
- Progressive hemifacial atrophy (PHA)

Dentofacial deformity

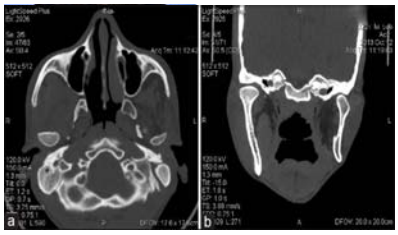
- Rule out stroke
- Rule out Bell's palsy
- Rule out malignancy
- Rule out endocrine disorder

Dentofacial deformity

- Clear skeletal asymmetry

Dentofacial deformity

Skeletal deformity visualized clinically and confirmed radiographically



Dentofacial deformity

Skeletal deformity visualized clinically and confirmed radiographically


CN VII Palsy

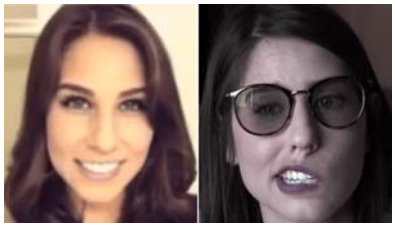
**Differential diagnosis:**
- Stroke
- HSV-1, VZV infection
- Autoimmune
- CN VII lesion
- Malignancy
- Sarcoidosis
- Diabetes
- Skull fracture


CN VII Palsy

- Strictly unilateral
- Upper and lower half of face involved
- Inability to smile close eye, raise eyebrow, wrinkle forehead
- Loss of blink reflex
- Mask-like appearance
- Altered or lost sense of taste

Stroke

- Lower half of face
- Blink reflex intact
- Able to furrow the brow
- Other sensory and/or motor deficits (extremities, etc.)



Stroke

Fortunate patient!


## Zoster Oticus

- Complication of VZV reactivation
- Otalgia, vesicles in the auditory canal, and ipsilateral facial paralysis
- Taste perception, hearing (tinnitus, hyperacusis), and lacrimation are affected in selected patients

Asymmetry

Skin assessment

Palpation for pain

Sensory evaluation

**Skin assessment**

## Skin Assessment

Lupus erythematosus

- **Systemic Lupus Erythematosus (SLE)**
- **Drug-induced Lupus (DIL)**
  - Procainamide
  - Hydralazine
  - Quinidine

## Drug-induced Lupus (DIL)

| | High | Moderate | Low | Very Low |
|---|---|---|---|---|
| Antiarrhythmics | Procainamide | Quinidine | | Disopyramide, propafenone, amiodarone |
| Antihypertensives | Hydralazine | | Methyldopa, captopril, acebutolol | Enalapril, lisinopril, clonidine, atenolol, labetalol, pindolol, minoxidil, prazosin |
| Antipsychotics | | | Chlorpromazine | Phenelzine, chlorprothixene, lithium |
| Antibiotics | | | Isoniazid, minocycline | Nalidixic acid, sulfamethoxazole, quinine |
| Anticonvulsants | | | Carbamazepine | Clobazam, phenytoin, trimethadione, primidone, ethosuximide, valproic acid |
| Antithyroid | | | Propylthiouracil | |
| Diuretics | | | | Chlorthalidone, hydrochlorothiazide |
| Biologics | | | TNF-α inhibitors | IFN-α |
| Miscellaneous | | | | Statins, levodopa, aminoglutethimide, timolol drops, ticlodipine |

## Skin Assessment

**Psoriatic arthritis**

## Skin Assessment
Psoriatic arthritis

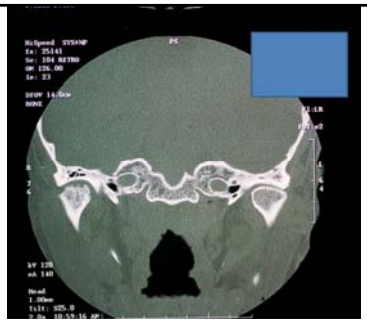
- **Plaque** over affected joint

## Skin Assessment
Psoriatic arthritis

- **TMJ** involvement

## Skin Assessment
Psoriatic arthritis

- **TMJ** degeneration

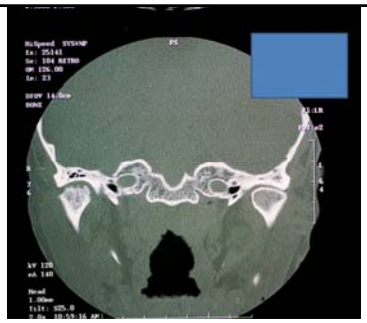


1. Gout of the temporomandibular joint: a review of the literature.*Bhattacharyya I, Chehal H, Gremillion H, Nair M. J Am Dent Assoc. 2010 Aug; 141(8):979-85.*

## Skin Assessment
### Psoriatic arthritis

Differential diagnosis:

- Osteoarthritis
- Traumatic arthritis
- Secondary degenerative arthritis
- Rheumatoid arthritis
- Systemic lupus (SLE)
- Drug-induced lupus (DIL)
- Ankylosing spondylosis
- Reactive arthritis
- Juvenile idiopathic arthritis
- Septic arthritis
- Gout (1)

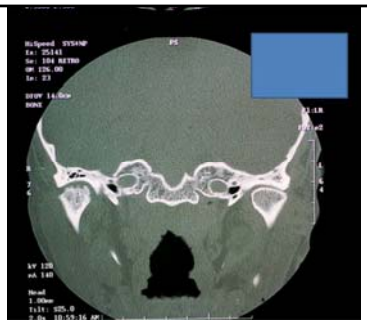


1. Silvy F, Bertin D, Bardin N, et al. Antinuclear Antibodies in Patients with Psoriatic Arthritis Treated or Not with Biologics. *PLoS One*. 2015;10(7):e0134218. Published 2015 Jul 31. doi:10.1371/journal.pone.0134218

## Skin Assessment
### Psoriatic arthritis

Serology:

- **Negative** anti-cyclic citrullinated antibody (anti-CCP Ab)
- **Negative** rheumatoid factor (RF)
- ANA **low specificity**
  - 1:160 >50% of patients (1)



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Skin Assessment

**Varicella zoster virus (VZV)**

## Skin Assessment

- **Varicella zoster virus** (VZV)

**Day 1**

## Skin Assessment

- **Varicella zoster virus** (VZV)

**Day 2**

## Skin Assessment

- **Varicella zoster virus** (VZV)

**Day 3**

## Skin Assessment

- **Varicella zoster virus** (VZV)

**Day 4**

## Skin Assessment

- **Varicella zoster virus** (VZV)

**Day 5**

## Skin Assessment

- **Varicella zoster virus** (VZV)

**Day 6**

## Skin Assessment

- **Varicella zoster virus** (VZV)

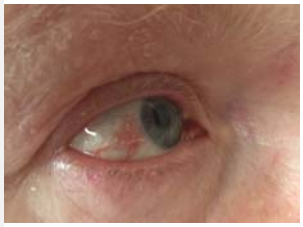
**Day 7**

## Skin Assessment

- **Varicella zoster virus** (VZV)

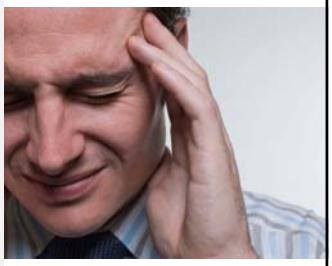
**Day 30**

- Post-herpetic Neuralgia (**PHN**)
- Posterior **synechia** (iris-lens adhesion)
- Mild **anisocoria**
- Mild **photosensitivity**



## Skin Assessment

- **Zoster sine herpete** (ZSH)
  - No lesion (blister or rash)
  - Headache (unilateral or bilateral)
  - Malaise and/or fever (common)
  - Generalized body aches
  - Higher severity and prolonged persistence of pain in patients with **ZSH** than in **typical herpes zoster**(1)



**Reference**

1. Drago F, Herzum A, Ciccarese G, Broccolo F, Rebora A, Parodi A. Acute pain and postherpetic neuralgia related to Varicella zoster virus reactivation: Comparison between typical herpes zoster and zoster sine herpete. J Med Virol. September 2018.

## Skin Assessment

- **Herpes simplex** (HSV)
  - Outbreaks before migraine onset
  - Vestibular neuronitis
  - Globus hystericus
  - Carotydina
  - CN VII palsy
  - Meniere's disease

**Reference**

1. Dylewski JS, Bekhor S. Mollaret's meningitis caused by herpes simplex virus type 2: Case report and literature review. Eur J Clin Microbiol Infect Dis 2004;23:560-2. [PubMed] [Google Scholar]
2. Kupila L, Vainionpaa R, Vuorinen T, Marttila RJ, Kotilainen P. Recurrent lymphocytic meningitis: The role of herpesviruses. Arch Neurol 2004;61:1553-7. [PubMed] [Google Scholar]

Asymmetry

Skin assessment

Palpation for pain

Sensory evaluation

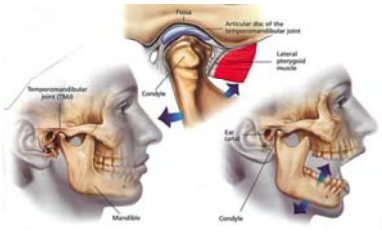
**Palpation for pain**

**Palpation for tenderness**
**Giant cell arteritis**

- Highly tender
- Tongue involvement
- Hardened and no pulse
- Claudication on chewing
- Biopsy definitive diagnosis

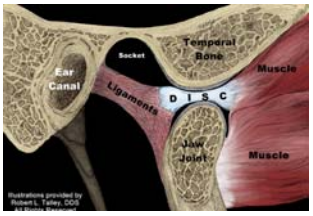
## Examination

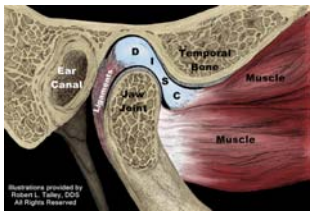
Temporomandibular joint




## Temporomandibular disorders (TMD)

- Highly misunderstood
- Heterogeneous etiologies
  - Musculoskeletal
  - Myofascial pain (central)
  - Mechanical dysfunction
  - Malignancy
  - Degenerative joint disease (OA, RA, other autoimmune disease)
  - Migraine
  - Trigeminal neuralgia




TMJ

- Normal function

TMJ

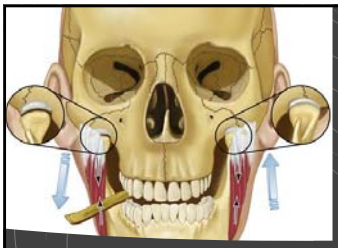
- Disc displacement

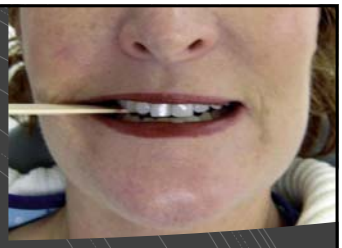
## TMJ Assessment

- **Range of motion**
  - Normal adult: **40mm** to **60mm**
  - Evaluate the extent of pain in relation to the range of opening

## TMJ Assessment

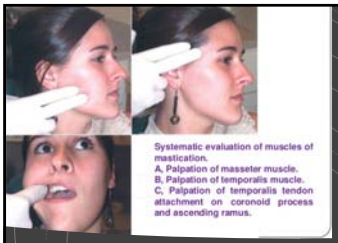
- **Path of opening**
  - deflection (points to the locked side)
  - deviation (not locked)





## TMJ Assessment

- Bite maneuvers
  - Ipsilateral pain usually muscular
  - Contralateral pain typically TMJ



Systematic evaluation of muscles of mastication.
A, Palpation of masseter muscle.
B, Palpation of temporalis muscle.
C, Palpation of temporalis tendon attachment on coronoid process and ascending ramus.

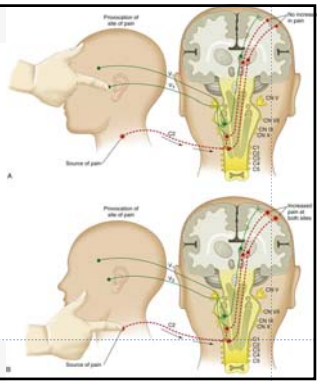
Palpation of TMJ.

## TMJ Assessment

- Palpation over joint capsule
- Palpation of masseter muscles
- Palpation of temporalis muscle
- Palpation of temporalis tendon (intraorally)
- Listening and auscultation for joint sounds

## TMJ Assessment

- **Referred pain**
  - Myofascial pain
  - Myofascial trigger point
  - **Convergence** of cervical and trigeminal sensory afferents in nucleus caudalis (1)



1. Piovesan, E.J., Kowacs, P.A. & Oshinsky, M.L. Convergence of cervical and trigeminal sensory afferents. *Current Science Inc* **7,** 377–383 (2003) doi:10.1007/s11916-003-0037-x

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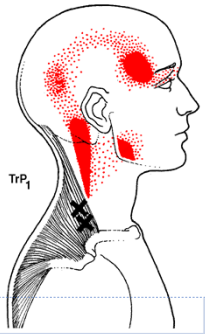


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## TMJ Assessment

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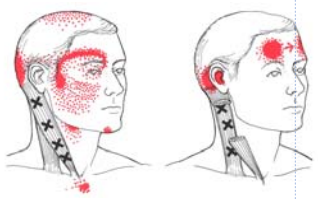

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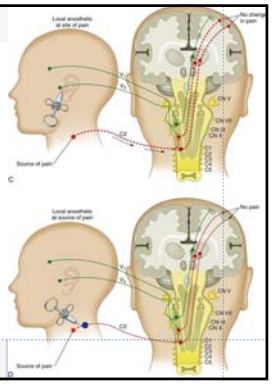
## TMJ Assessment

- Diagnostic **anesthetic block**
  - If pain local, then anesthetic block will block pain
  - If source of pain not local then blocking the source will stop pain and site of pain



| TMJ Assessment | • **Referred pain**<br>  • If pain local, then anesthetic block may stop pain<br>  • If source of pain not local then only blocking the source will stop pain |
|---|---|

- Asymmetry
- Skin assessment
- Palpation for pain
- Sensory evaluation

Sensory evaluation

## Sensory evaluation

- Diagnostic **anesthetic block**
  - If pain local, then anesthetic block will block pain (peripheral)
  - If source of pain not local then blocking the source will stop pain and site of pain (central)

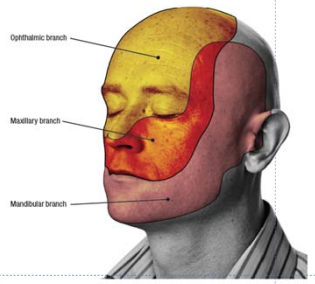



Figure 1. Distribution of the cranial nerve V: the ophthalmic nerve ($V_1$), the maxillary nerve ($V_2$), and the mandibular nerve ($V_3$).

Thank you!