The Journal of the Michigan Dental Association

Volume 105 | Number 5 Article 3

5-1-2023

A Clinical Reference Guide to the Treatment of Common Oral Lesions

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SPECIAL MDA *JOURNAL* PULL-OUT SECTION

A Clinical Reference Guide to the Treatment of Common Oral Lesions

By Janet Zalucha, DDS; Felipe Nör, DDS, MS, PhD; and David Tindle, DDS, MS

This special MDA *Journal* pull-out is created as a quick reference for practitioners to assist their patients who present with some of the most common oral pathology manifestations. When encountering these conditions, please consider coordinating care and collaborating with practitioners who have had additional, specialized training in the respective fields. Treatment recommendations for each condition described are included. **Note that many of these are considered off-label use of the listed agents.** Full prescribing information is beyond the scope of this quick reference guide, so practitioners should thoroughly familiarize themselves with each agent chosen for use.

Alert

Many of the listed medications are considered off-label use. Practitioners should familiarize themselves with prescribing information for each agent chosen and consult with the patient's PCP when necessary.

Table 1 — Abbreviation Key

BMS	burning mouth syndrome
ODT	oral disintegrating tablet
Tx	treatment
QD	once a day ("quaque die")
BID	two times daily ("bis in die")
TID	three times daily ("ter in die")
QID	four times daily
PO	by mouth ("per as")
PCP	primary care physician
VDO	vertical dimension of occlusion
OTC	over the counter
U/mL	units per milliliter
HH1/HSV1	human herpesvirus 1/ herpes simplex virus 1
HH2/HSV2	human herpesvirus 2/ herpes simplex virus 2
HHV3/VZV	human herpesvirus 3/ varicella zoster virus
IgG	immunoglobulin G
C3	one of 60 blood plasma complement proteins
DSG1/DSG3	group of desmoglein autoantibodies
RT	radiation therapy
TMJ	temporomandibular joint
IMRT	intensity modulated radiation therapy
Gy/cGy	units of radiation: 1 Gy (gray)= 100 rad = 100 cGy (centi-gray)

Burning mouth syndrome[1-5] (BMS)

- BMS (glossodynia) is a type of chronic pain disorder that is typically associated with the anterior two thirds of the tongue. Other intraoral sites may also be involved, such as the hard palate (anterior), and labial mucosa. Importantly, no visible lesions are noted in association with this condition.[i-ix]
- Most symptoms seem to have a sudden onset, and may be accompanied by xerostomia, dysgeusia (altered taste), and thirst. Dysgeusia may alter the patient's capability to taste bitter, sour, and/or sweet. The pain may decrease during eating; it also tends to be low after awakening, with a continuous progression throughout the day with worsening at bedtime.
- Demographic incidence favors females>males, especially for peri- and post-menopausal women, ≥40 years old.
- The diagnosis is one of exclusion. Therefore, other etiologies need to be ruled out (i.e., xerostomia, candidiasis, medications (systemic or topical), nutritional deficiencies (vitamin B12, iron, folate), diabetic neuropathy, autoimmune conditions (Sjogren's and lichen planus, food allergies, etc.).

Recommended treatment:

1. Clonazepam (1 mg) In the a.m., take ½ to 1 tablet and dissolve in mouth before swallowing. Repeat at bedtime.
2. Clonazepam (0.25 – 0.5 mg oral disintegrating tabs – ODT) Dissolve 1 tab in the a.m. and p.m. and 2 tabs at bedtime.
3. Amitriptyline or nortriptyline (10-25 mg tablets), take 1 tablet at bedtime.
4. Capsaicin (0.025%) cream, disp: 1 tube, apply small amount to affected areas TID/QID.

Special Considerations:

For Tx #1 and #2: Medication may cause drowsiness; do not drive/operate machinery until considered stable. For #1 Use with caution in elderly due to fall risk

For #1-3: Consider working with specialist and PCP due to medication nuances and restricted drug schedule.

For #4: Expect increase of discomfort for the first 2-3 weeks (the repeated activation of the nerve fibers may create desensitization of those pain receptors).

Candidiasis[1-3,6-12]

Oral candidiasis is considered an opportunistic infection primarily by Candida albicans due to a shift in the normal oral microflora induced by medications (antibiotics, corticosteroids, etc.), altered immune status, xerostomia/hyposalivation, etc. This condition may present clinically in multiple forms.[iii,vi,x-xvii] Some are listed below.

Candidiasis — Angular Cheilitis (Figure 1)


1

- Infection (fungal but can also be coincident with bacterial) located at the corners of the mouth involving skin and labial mucosa, typically bilateral.
- Characterized by cracking, erythema, moisture, fissuring, and pain at corners of mouth.
- Additional etiology may be vitamin B (riboflavin, thiamine, folic acid) and/or iron deficiency as well as decrease in vertical dimension of occlusion (VDO).

Recommended treatment:

1. Clotrimazole cream 1% or 2% (OTC). Apply a thin film to corners of mouth TID/QID for 10-14 days and use for 4 additional days after lesions clear (disp: 15 g or 30 g tube). Combine with mupirocin 2% ointment if suspected bacterial co-infection.
2. Nystatin cream or ointment (100,000 U/ml) apply to corners of mouth TID/QID for 14 days (disp: 15 g tube).
3. Iodoquinol/hydrocortisone cream (1%) Apply to corners of mouth TID/QID for 10 days (disp: 15 g tube).

Special considerations:

All: Stop using lipsticks and chapsticks, and replace toothbrush/denture brush when starting treatment, as these can be source of reinfection.

For Tx #1: Typically marketed for athlete's foot or jock itch.

For Tx #3: Most expensive option.

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Candidiasis — Denture Stomatitis[1-3,6-12] (Figure 2)

- Considered a form of erythematous candidiasis associated with the prolonged use of removable prosthesis.
- Limited to areas contacting the internal surface of removable prostheses. Rarely symptomatic.

Recommended treatment:

Denture soaks:

1. Nystatin suspension (100,000 U/ml) soak denture overnight in container with liquid covering denture, change liquid every day for 10 days.
2. Chlorhexidine digluconate (0.12%) same directions as nystatin suspension.
3. 3% sodium hypochlorite diluted in water (1:10) same as nystatin instructions, need to rinse thoroughly before seating in mouth.
4. Can use any of the angular cheilitis topical options to paint on the denture.
5. Can use the pseudomembranous options as well (see below).

Special considerations:

All: Complete denture, partial denture, athletic mouthguard, etc., should not be left in the mouth overnight.
For Tx #3: Only for complete dentures, not safe for metal clasps/metal substructures (i.e. partials) or soft liners.

Candidiasis — Pseudomembranous[1-3,6-12] (Figure 3)

- Characterized by white plaques that often can be removed by wiping with dry gauze/ scraping off exposing normal or erythematous tissue below.
- May be symptomatic (mild burning sensation).
- Typically located on palate, buccal mucosa, and dorsal of the tongue.

Recommended treatment:

1. Fluconazole (100 mg capsules) 200 mg loading dose, 100 mg QD for 10-14 days.
2. Clotrimazole (troche 10 mg) dissolved PO 5x/day for 10-14 days (2 troches in succession a.m., 1 p.m., and 2 at bedtime). Do not eat or drink for 20-30 min after use.
3. Nystatin oral suspension (100,000 U/ml) use 15 ml, rinse 2-3min and expectorate QID for 10 days.

Special considerations:

For TX #1: Check for multiple drug interactions.
For TX #2: May have nausea, vomiting; contains sugar.
For TX #3: If swallowed, may have nausea, vomiting, diarrhea. Often high sugar content to mask bitter taste.

Drug-Induced Gingival Overgrowth[1-3,13,14] (DIGO) (Figure 4)

- Prevalence for drug-related gingival overgrowth with Dilantin (phenytoin) for dentate patients is about 50% compared to other medications (10% for calcium channel blockers and 30% for cyclosporine)[iii,vi,xvi,xviii,xix]
- May have hormonal etiology as it is most common for children and teenagers taking Dilantin.
- Amount of enlargement seems to be related to patient's susceptibility and oral hygiene. If excellent oral hygiene is present, the amount of overgrowth is significantly reduced or eliminated. Patients taking multiple medications associated with gingival enlargement will have an increase in prevalence, but not in severity.

Drug-Induced Gingival Overgrowth (cont'd)

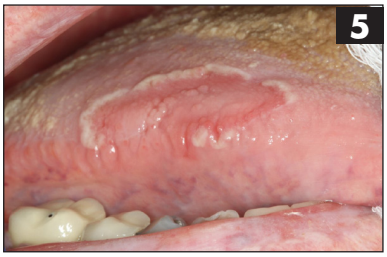
Recommended treatment:

1. Good/excellent oral hygiene for plaque control.
2. Change medication (if possible).
3. Professional plaque control with surgical intervention (gingivectomy).
4. Chlorhexidine mouthwash (0.12%) BID for 2 min. Do not eat/drink/rinse or use fluoride mouthwash within 30 min of use (especially post-surgery).

Special considerations:

Discussion with medical team/PCP required to determine if changing medication is possible.

Geographic Tongue[1-3,10,15] (Figure 5)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- Erythema migrans/benign migratory glossitis.[iii,vi,xiv,xvi,xx]
- Common condition; most cases are asymptomatic.
- Characterized by multiple well-demarcated erythematous areas of loss of filiform papillae on the anterior two-thirds of the tongue surrounded by white-yellow scalloped borders. In rare cases, it may also be seen in other intraoral sites, such as buccal mucosa, labial mucosa, soft palate, and floor of the mouth.
- Patients may report a painful or burning sensation with certain foods (i.e. spicy foods).
- De-papillated areas may take a few days to weeks to heal and can occur in new locations.

Recommended treatment:

1. Topical steroid (betamethasone 0.05% cream or fluocinonide 0.05% gel/cream) dry area and apply to affected site(s) TID/QID, do not eat/drink for 20 min after use.
2. Dexamethasone rinse (0.5 mg/5 ml) (disp: 300 ml or more): swish with 5 ml for 2-3 min and expectorate TID/QID; no food/drink for 20 min after use.
3. Zinc supplement.
4. Topical anesthetic (viscous lidocaine 2%): swish with 5-15 ml and expectorate, TID/QID prn pain).

Special considerations:

If asymptomatic, no treatment required.

Herpes Simplex Virus[1-3,9,12,15-17]

The Human Herpesvirus family includes HH1/HSV1, HH2/HSV2, HHV3/VZV (plus many others) which are discussed in this section. Following a primary symptomatic infection, the virus will remain dormant in a ganglion until reactivation, then cause symptomatic and/or asymptomatic infections (recurrent).[iii,vi,xvi,xvii,xx-xxii]

Herpes Simplex Virus[1-3,9,12,15-17]
Acute Herpetic Gingivostomatitis (Figure 6)


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- HSV1/2 (>90% cases with HSV1)
- Infection usually occurs before 30 years of age, most common in patients 6 months to 3 years old.
- Characterized by acute onset, fever, cervical lymphadenopathy, nausea, irritability, avoidance of eating due to ulcerative lesions.

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Herpes Simplex Virus
Acute Herpetic Gingivostomatitis (cont'd)

- Lesions initiate as vesicles that rapidly rupture, creating ulcerations that frequently coalesce to form larger ulcerations. The lesions present most commonly on keratinized gingiva, non-keratinized alveolar mucosa, and may even extend past the mucosal wet line onto the vermilion border.
- Cases may take 5 days to 2 weeks to resolve.

Recommended treatment:

1. Hydration, analgesics/antipyretics during viral cycle.

Retroviral therapy at first prodrome to decrease severity:

2. Valacyclovir (1 g tabs) 2 tablets at onset of symptoms, then 2 tablets 12 hours after first dose.

Systemic for acute herpetic gingivostomatitis:

3. Acyclovir (200 mg tabs) 5x/day for 5-7 days (for adults, children 12+ years old or >88 lbs (40 kg).
4. For children (<12 years old), acyclovir (suspension) rinse and swallow 15 mg/kg 5x/day for 5 days.

Palliative Care:

5. Dyclonine hydrochloride lozenges (OTC).
6. Viscous lidocaine (only adults).

Special considerations:

For children: Avoid viscous lidocaine and topical benzocaine due to association of lidocaine-induced seizures and methemoglobinemia, respectively.

For Tx #5: A dyclonine rinse is available only through a compounding pharmacy.

Herpes Simplex Virus[1-3,9,12,15-17]
Recurrent Herpes Labialis/Intraoral (Figure 7)


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- HSV1/2, "cold sores," "fever blisters."
- The recurrent infection typically occurs at site of primary inoculation but may also occur at sites supplied by the affected ganglion.
- Lesions may present as vesicles on lip/perioral skin (labialis), or gingiva/hard palate (intraoral).
- Herpes labialis will present with crust covering the ruptured lesions and start to heal.
- Intraoral lesions will rupture and create small ulcerations that may coalesce into larger lesions.
- Prodromal signs (burning, erythema, warmth of site, itching/tingling) typically occurs 6-24 hours prior to the first appearance of vesicles.
- Lesions take about 7-10 days to resolve.
- Triggers/stimulants for recurrence:
  - Sunlight.
  - Stress.
  - Infection.
  - Trauma (including dental treatment).

Recommended treatment:

Anti-viral therapy at first prodrome to decrease severity:

1. Valacyclovir (1 g tabs) 2 tablets at onset of symptoms then 2 tablets 12 hours after first dose.

Systemic for labialis:

1. Valacyclovir (500 mg or 1 g tabs), take 1 g BID for 1 day.

Systemic for intraoral:

2. Acyclovir (200 mg tabs) Take 200-400 mg 5x/day for 5-7 days.
3. Valacyclovir (500 mg tabs) Take 500 mg – 1 g BID for 1 day.

Herpes Simplex Virus
Recurrent Herpes Labialis/Intraoral (cont'd)

Topical for labialis:

4. Penciclovir cream (1%) Apply at first prodrome every 2 hours while awake for 4 days.
5. Acyclovir cream (5%) Apply 5x/day for 4 days.
6. Docosanol (Abreva) OTC cream (10%) Apply 5x/day until healed

Special considerations:

Use sunscreen as preventative for herpes labialis.

Herpes Simplex Virus[1-3,9,12,15-17]
Herpes Zoster (Shingles) (Figure 8)

- VZV (HHV3) Varicella Zoster Virus (VZV) is causative agent.
- Primary infection (chickenpox) presents as vesicles on skin and in the mouth that can result in ulcers. Peri- and/or intraoral lesions may be the first sign of the primary infection.
- Reactivation of virus (shingles) tends to occur in older patients and immunocompromised patients, including those with medication-related immunosuppression.
- Typically, one dermatome (epithelium of affected sensory nerve) is affected, but two or more may be involved. The most common location is the thoracic region. The lesions characteristically terminate at the midline.
- 3 phases of infection: prodrome, acute, chronic. The prodrome is characterized by sharp, severe pain and tingling associated with the affected dermatome. Next, the acute phase presents with vesicles in the dermatome that will quickly rupture about 3-4 days, with crusting at around 7-10 days. They may take about 2-3 weeks to heal for healthy adults. In the chronic stage, pain may manifest and can persist for more than 90 days after rash development. This is known as post herpetic neuralgia (PHN). Commonly the areas with lesions may heal with scaring and hypo/hyperpigmentation.
- Encourage patients to get herpes zoster vaccine (will not always prevent shingles but can significantly prevent PHN at a rate of 89% for those 70+ years old and 91% for 50 to 69 years old).
- If the lesions present on the dermatome associated with V1 (ophthalmic branch of trigeminal nerve), including the tip of nose, it is critical to refer to an ophthalmologist.

Recommended treatment:

1. Valacyclovir (500 or 1000 mg tabs) take 1000 mg TID for 7 days within 72 hours of vesicle formation.
2. Famciclovir (500 mg tab) Take 1 tab TID for 7 days within 72 hours of vesicle formation.

Special considerations:

Shingles vaccine (Shingrex) to prevent shingles and PHN.
If detect lesions associated with V1 (ophthalmic branch of trigeminal nerve), such as tip of the nose, it is critical to refer to an ophthalmologist.

Lichen Planus[1-3,18-21]
Erosive Lichen Planus and Reticular Lichen Planus (Figures 9-10)

- Considered a chronic, inflammatory, immune mediated condition involving mucosal surfaces and skin.[iii,vi,xvi,xxiii-xxvi]
- Most common in those ≥40 years old, 3:2 ratio of females:males; rare in children.
- In the dental setting, 1/3 of patients with oral lichen planus will have cutaneous involvement.
- Debated in medical community if lesions can progress to cancer (1%-2% possible rate of progression). If patient also has HPV, then potentially there may be an increased risk for squamous cell carcinoma.[xxiii]

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Lichen Planus[1-3,18-21]
Erosive Lichen Planus and Reticular Lichen Planus (cont'd)


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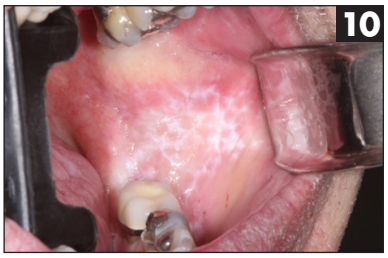
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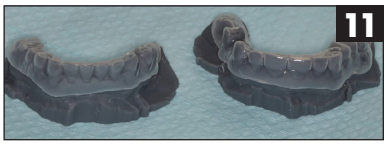
- Different forms: reticular, patch, atrophic, erosive, bullous
  - **Erosive:** painful, atrophic, erythematous, ulcerated, usually with white lines (Wickham striae) bordering ulcerations and atrophic areas **(Figure 9)**.
  - **Reticular:** often asymptomatic, bilateral, posterior buccal mucosa with white lines **(Figure 10)**.
    - If erythematous background→check for coexisting candidiasis.
    - May occur on any mucosal surface including the dorsum of the tongue.
- Gingival lesions:
  - Keratotic: raised, white papules, plaque-like, linear, or reticular lesions.
  - Erosive or ulcerative (i.e., desquamative gingivitis): localized or generalized, bleeding, exacerbated even by brushing.
  - Vesicular or bullous: raised, fluid filled. Rare, short lived, rupture, and leave ulcerations.
  - Atrophic: erythema from epithelial tissue thinning.
- Main features for histopathology:
  - Hyperkeratosis or parakeratosis.
  - Hydropic degeneration of basal layer.
  - Dense, band-like infiltrate of T-lymphocytes in lamina propria.
  - Epithelial rete ridges as "saw tooth" pattern.
  - Colloid (Civatte) bodies detected.
  - Direct immunofluorescence studies: shaggy (linear/fibrillar), non-specific deposits of fibrinogen in the basement membrane zone.

Erosive Lichen Planus recommended treatment:
Topical corticosteroids
Class 1 steroids: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1. Clobetasol propionate (0.05%) gel/ointment, disp: 15 g tube.
2. Betamethasone dipropionate (0.05%) gel, disp: 15 g tube.

Class 2 steroid:

3. Fluocinonide (0.05%) gel/ointment, disp: 15 g tube.

Nonsteroidal topical agent:

4. Tacrolimus (0.1%) ointment.

Apply each of these based on location and ease for patient (avoid eating and drinking 20-30 min after use):
Dry area, apply to site for TID/QID.
Saturate moist gauze or moist makeup remover pad with gel and apply to affected for 20 min BID/TID.
Place thin strip of gel in medicament tray and wear for 20 min BID/TID. **(Figure 11)**

Rinse:

5. Dexamethasone (0.5 mg/5 ml) Disp 300 ml or more, swish with 5 ml for 2-3 min. and expectorate TID/QID.

Erosive Lichen Planus special considerations:
Consider taking digital impressions for medication tray fabrication (will avoid further desiccation and desquamation of tissues if using conventional impression taking methods). **(Figure 11)**
First re-evaluation at 2-3 weeks, then maintain at 3-6 month intervals.
May develop candidiasis while using these medications.
For Tx #4: very expensive/not recommended for first line treatment/may burn on application.

Reticular Lichen Planus recommended treatment:
If asymptomatic, continue to observe lesions.
Determine when necessary to complete incisional biopsy.

Lichenoid Mucositis[1-3,18-21] (Figure 12)

- Although the clinical manifestations will appear similar to lichen planus, lichenoid mucositis typically refers to a group of mucosal lesions from contact with dental materials, contact stomatitis, medications, or dental restorations, in addition to a long list of medications, flavoring agents (i.e., cinnamon, mint flavor), and dental materials including amalgam and gold alloys have demonstrated an association.
- The most common presentation is the erosive type, but the reticular type may also occur.
- If the source of reaction is successfully identified and removed, the lesions should heal, but this may take several weeks or months and may result in hyperpigmentation.

Recommended treatment:

1. Aim to rule out potential medications/source of reaction.
2. Consider discussing care with PCP if medication changes are possible.
3. **Topical agents** (see Erosive Lichen Planus section).

Special considerations:

Many of the associated medications causing lichenoid mucositis are for managing systemic conditions; changing medication may not be medically recommended.

Mucous Membrane Pemphigoid[1-3,20,22] (Figure 13, 14, 15)

- Characterized as a chronic, vesiculobullous, autoimmune disorder. Often presents with scarring affecting mucous membranes (oral, conjunctiva, nose, vagina, rectum, esophagus, urethra). Desquamative gingivitis is the clinical term for lesions affecting the attached gingiva and is the most common oral manifestation.[i,iii,vi,xvi,xxiii]
- Positive Nikolsky sign (bulla formed when applying firm lateral pressure on unaffected mucosa/skin). (Figure 15.)
- Females>males, ≥ age 50, rare in children, 20% have skin lesions.
- Lesions usually rupture after 2-3 days. Healing time may take ≥3 weeks.
- Symblepharon: adhesion of the eyelid to eyeball may occur due to lesions on the conjunctiva (leading to scarring, corneal damage, and blindness).
- If patient presents to dentist first, 25% will have ocular lesion (25% of patients first manifesting oral lesions will also develop ocular lesions) **It is critical to refer to an ophthalmologist.**
- Histopathology:
  - Epithelium separates from connective tissue + inflammatory cells = vesicular lesion.
  - Inflammatory cells = mainly lymphocytes and plasma cells, but also neutrophils and eosinophils.
  - Direct immunofluorescence studies: linear deposition of immunoreactants (primarily IgG and C3) on the basement membrane.

Recommended treatment:

1. Obtain biopsy for definitive diagnosis.
2. **Topical agents** (see Erosive Lichen Planus section).
3. **Consider systemic medication** (consult with specialist and/or PCP).
   Dapsone (25 mg) starting with 25 mg and gradually increase to 75-100 mg/day.

Special considerations:

Refer to ophthalmologist.

If considering Dapsone, severe side effects, such as anemia/hemolytic anemia may occur, and both baseline and intra-treatment monitoring is necessary.

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Pemphigus Vulgaris[1-3,20,22,23] (Figures 16-17)


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- Most common type of the pemphigus diseases. Presents as small to large bullae which rupture and create extensive ulcerations.[i,iii,vi,xvi,xxiii,xxvii]
- 10% mortality rate, females>males, ≥ age 40, possible in newborns and children.
- 60% of cases present with oral lesions as first clinical sign (oral lesions are typically "the first to show, and the last to go").
- Locations: soft palate (80%), buccal mucosa (46%), ventral, dorsal tongue (20%), lower labial mucosa (10%). Positive Nikolsky sign.
- Presents as desquamative gingivitis when gingiva is affected.
- Histopathology:
  - Cell-cell adhesions damaged by desmoglein autoantibodies (DSG) leads to suprabasilar clefting.
  - Acantholysis (+)→Tzanck cells within the cleft.
  - "Tombstone appearance" of remaining basal cells.
  - Increased DSG1 → increased severity of cutaneous disease.
  - Increased DSG3 → increased severity of oral disease.
  - Direct immunofluorescence studies= IgG/IgM and C3 deposition in intercellular spaces.
  - Indirect immunofluorescence=if negative may be an early stage. When positive it may indicate more severe disease.[xvi]

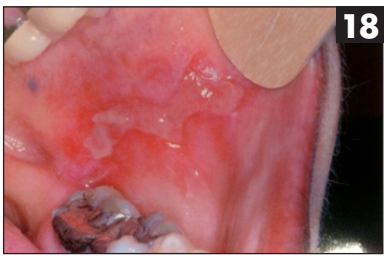
Recommended treatment:

1. Obtain incisional biopsy for definitive diagnosis.
2. Topical agents (see Erosive Lichen Planus section).
3. Consider systemic medications (consult with specialist and/or PCP).
   Prednisone 0.75-1 mg/kg for 7-10 days with taper over 2-3 weeks.
   Mycophenolate mofetil (500 mg) take 500 mg-1500 mg BID.
   Azathioprine, take 1-2 mg/kg daily.

Special considerations:

Refer to dermatologist and rheumatologist; dental role is primarily supportive with this condition.
For systemic options, need to closely monitor immunosuppression, renal, and liver function; GI upset is a common side effect.

Radiation Therapy[1,3,20,22,24-28] (Figure 18)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- Radiation therapy (RT) of the head and neck, with or without chemotherapy, may increase the risk for acute and long-lasting debilitating effects, such as trismus, xerostomia, taste alteration, mucositis, radiation caries, candidiasis, etc.[i,v,vi,xvi,xxiii,xxviii-xxxii]
- The risk for trismus increases when radiation involves the muscles of mastication and the temporomandibular joint (TMJ). When delivered at 60cGy or more of radiation, the prevalence for trismus is 25.4% with conventional radiation therapy compared to 5% for intensity modulated radiation therapy (IMRT).
- Mucositis presents as atrophic, erythematous, epithelial sloughing with painful mucosa that may resemble oral ulcers and/or burns. Virtually all radiation therapy patients will experience mucositis, typically starting a week after RT is initiated. The severity for mucositis increases with metallic restorations present, if the dose of RT is ≥200cGy/week, and more so in patients with immunocompromised status (medications, blood values, chemotherapy, etc.).
- Salivary gland dysfunction may lead to xerostomia, which will exacerbate mucositis. It will also increase the risk for radiation caries, and significantly affect the patient's ability to eat, speak, function, and their overall quality of life. IMRT has the ability to avoid unnecessary radiation exposure to the major salivary glands. If ≤26Gy, it is possible for the major glands to recover after 12 months.[xxxii]

Radiation Therapy[1,3,20,22,24-28] (cont'd)

Recommended treatment:

Topical anesthetics:

1. Viscous lidocaine.
2. Ice chips (melt in mouth, do not chew, swallow, prn for pain).
3. Zilactin (OTC).
4. Salt/soda rinse (½ tsp. salt, ½ tsp. baking soda, add to glass of 8-16 oz water, put in refrigerator for 2 hours to chill, rinse and expectorate prn for pain).
5. Magic Mouthwash (viscous lidocaine, Maalox, Kaopectate, diphenhydramine).

Salivary substitutes/stimulants (see Xerostomia section).

Antifungals (see Candidiasis section).

Systemic analgesics.

Special considerations:

For Tx #1: Avoid in pediatric patients. Patient needs to be evaluated before, during, and after radiation therapy by a dentist.
For Tx #5: may have high sugar content.
For systemic analgesics, avoid interactions with current medications.
Avoid under-treating. Opioids may be indicated for pain management if non-opioids alone are not sufficient.

Taste Disorders[1,4,5,22,29]

- Ageusia is classified as a lack of taste, dysgeusia is considered a persistent abnormal taste or phantom taste, hypogeusia is a noted reduction in taste, and hypergeusia is an increased sense of taste.[ii,iii,v,vi,xxxiii]
- Causes for taste and smell disorders may be associated with infections (bacterial, viral, fungal), medications (multiple medications can affect taste), or trauma (i.e., dental/facial surgery). Taste alterations tend to be less tolerated by patients compared to olfactory alterations alone.
  - COVID-19 had a significant impact on taste and smell disorders, with the prevalence of taste disturbances increasing to 71%-88.8% and olfactory disturbances rising to 68-85%.[xxxiii]
  - Although zinc deficiency is rare, multiple studies and reviews demonstrated patients who had COVID-19 and took a zinc supplement had significant benefit.

Recommended treatment:

If discomfort is reported, topical options:

1. Viscous lidocaine.
2. Diphenhydramine (OTC Benadryl).
3. Dyclonine.

Zinc Supplement:

4. Zinc supplement with B vitamins (Z-BEC OTC) take 1 tab QD with food or after eating.
5. Zinc lozenges (OTC) dissolve in mouth QD/BID.

Special considerations:

For Tx #1: Avoid in pediatric patients. If associated medication is stopped, may take a few months for taste to return.

Ulcers[1,3,22]

Recurrent Aphthous Ulcers

- Most recurrent ulcers are considered idiopathic but may be a local altered immune response. Multiple recurrences may be associated with Behcet's, Crohn's/inflammatory bowel disease, diabetes, anemia, vitamin deficiency, and immunosuppression.
- Risk factors for developing aphthous ulcers: stress, trauma, endocrine alteration, diet (acidic foods, gluten), allergies (sodium lauryl sulfate in toothpaste). May also have a genetic predisposition (ask if parents also have history of ulcers).
- Ulcers will present as painful, episodic, or continuous, can be single or multiple, typically only on nonkeratinized mucosa,

(Continued on next page)

Ulcers[1,3,22] (cont'd)

with clearly demarcated borders, a central, yellow fibrin membrane, and an erythematous halo surrounding the border.

Minor Aphthous Ulcer (Figures 19 and 20)

- Size ≤0.5cm.
- Most common recurring aphthous ulcer.
- Typically, will heal after 2 weeks, and rarely leave a scar.

Major Aphthous Ulcer (Figure 21)

- Size >0.5 cm.
- May take 6 weeks to months to fully heal; can leave scars.
- Most common type in patients with HIV/AIDS.
- Due to size and presentation, may mimic granulomatous or malignant conditions. If present with ≥6 lesions, consider Behcet's (ask if have any ocular or genital ulcers in past/present).[vi,xvi]

Traumatic Ulcers (Figure 22)

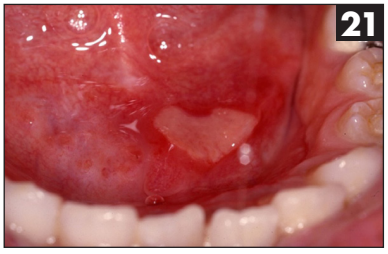
- Ulcers that have a history or identifiable cause from trauma. These may present an enlarged tissue demonstrating past irritation/trauma (i.e. lesion on fibromas, nodules, exostoses, etc.).
- Trauma can be due to sharp or coarse food, tongue or lip biting during chewing, aggressive toothbrushing habits, broken teeth and broken oral appliances, sutures, facial trauma, parafunctional habits (i.e. picking at gingiva, biting tongue/buccal mucosa, etc.). If the source of trauma can be removed, then lesion should heal in 2 weeks depending on size of ulcer. If lesion does not heal once the suspected source is removed, an incisional biopsy is indicated.

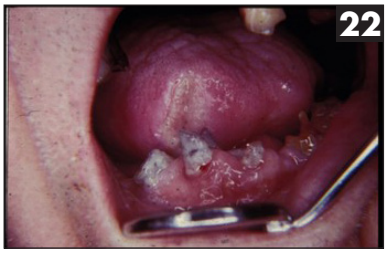
Burns (Figure 23)

- There are 2 main types of burns that can occur in the oral cavity: electrical and thermal burns.
  - Electrical burns can produce heat up to 3000°C and cause significant tissue destruction. Electrical burns for the oral cavity usually are associated with a patient chewing through a live wire or the female end of an extension cord that is plugged into a socket.
    - 90% of electrical burns in the oral cavity are found with patients who are ≤4 years old.
    - Process of burn healing:
      - Immediate to 12 days: Edema.
      - Around day 4: Tissue will slough with/without bleeding.
      - Several weeks to months: lesion will heal and nerve paralysis, if present, should resolve at this point.
    - May require surgical intervention with a specialist (plastics, oral surgeon) to avoid wound contracture of the mouth especially if the burn involves the commissures.
      - Thermal burns are associated with foods of elevated temperatures. This tends to be common with foods that are heated in the microwave and may feel cool on the outside while the inner contents are much hotter.
    - Most common locations: Palate, tongue, posterior buccal mucosa. The patient may also present with a burn in the upper digestive tract and/or upper airway.
    - If the upper airway is not affected and the patient is without breathing difficulties, most burns will resolve in 2 weeks, depending on the size.

Recommended treatment: (Recurrent Aphthous Ulcers — Minor, Recurrent Aphthous Ulcers — Major, Traumatic Ulcers, Burns)

Topical Anesthetics (see list for Radiation Therapy and Erosive Lichen Planus), also





Ulcers[1,3,22] (cont'd)

numerous OTC products for "canker sores."
Triamcinolone acetonide in orabase dental paste (0.1%).
1. Topical steroids/Nonsteroids gels/creams, dexamethasone rinse.
2. Zilactin.
3. Dyclonine lozenges.
4. Viscous Lidocaine.
5. OTC Canker Relief (Canker Cover).

For more **severe cases of aphthous ulcers**, consider **systemic options** as well to decrease recurrence:
1. Pentoxifylline (200 mg) take 400-800 mg TID.
2. Colchicine (0.6 mg tablet) take QD/BID.
3. Thalidomide (50 mg) take 50-100 mg BID/TID then gradually decrease weekly to maintenance dose or discontinue.

Special considerations:

For Tx #4: Avoid in pediatric patients.
Keep patient hydrated.
For systemic medications, many side effects can occur, need to coordinate with specialist and/or PCP.
Severe/major aphthous ulcers may require corticosteroid injections (shallow on the ulcer bed) to aid with healing.

Xerostomia[1-4,22,26] (Figure 24)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- The sensation of decreased salivary flow can occur for multiple reasons, such as medications/polypharmacy, cancer therapies, infection, dehydration, pathosis (blockage-sialolith), systemic conditions (Sjogren's, diabetes, etc.), and others as well as past surgeries.[i,v,vi,xvi,xxx]

Recommended treatment:

Topical:
1. Rinse (e.g., Biotene, ACT DryMouth, Colgate Hydris DryMouth, etc.).

Mechanical:
2. Lozenges (e.g., ACT DryMouth lozenges, Xylimelts, SalivaSure, etc.).
3. Gum (Sugarfree/Xylitol gum e.g., Spry gum, Trident gum).

Systemic (muscarinic agonists):
4. Pilocarpine (Salagen) (5 mg tablets) Disp: 100 tablets, take 1 to 2 tablets TID, an extra tablet may be taken at bedtime. Max 6 tabs/day.
5. Cevimeline (Evoxac) (30 mg capsules) take 1 capsule QID.

Special considerations:

Need to increase fluoride exposure (consider Rx fluoride toothpaste, e.g., Prevident DryMouth toothpaste).
For Tx #4 and #5: Mild to moderate side effects include hot flashes, excessive salivation and sudoresis (excessive sweating); check for drug interactions.

(Continued on next page)

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