A Mixed Bag of Practical Oral Lesions in Tots & Teens: Diagnostic Tips & Treatment Options

CATHARINE M. FLAITZ, DDS, MS
PROFESSOR, ORAL & MAXILLOFACIAL PATHOLOGY
UNIVERSITY OF COLORADO
SCHOOL OF DENTAL MEDICINE
CATHERINE.FLAITZ@CUANSCHUTZ.EDU
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Course Objectives

Improve the practitioners' ability to:

- Diagnose a variety of common oral lesions in children
- Discover useful new entities and new findings about well-known disorders
- Select the best management approaches for the child-patient

Selected References

- The Handbook of Pediatric Dentistry. 5th ed. AJ Nowak and PS Casamassimo. AAPD, Chicago, 2018


- Aphthous ulcer
- HSV lesions
- Trauma
- Migratory glossitis
- Candidiasis
- Ulcer
- Cheilitis
- Hyperkeratosis
- Tobacco-induced
- Melanotic macule
- Hairy tongue
- Fordyce granules
- HPV lesions
- Mucocoele
- Fissured tongue
- Nevi
- Coated tongue
- Commisural lip pits
- Other
- Tumors

What's New In The Bag?

Oral Manifestations of COVID-19 Infection

- Loss of taste and smell
- Mucosal erythema, palatal petechiae
- Mucosal erosions, vesicles, bullae, ulcers
- Desquamative gingivitis
- Swollen chapped lips
- Angular cheilitis
- Candidiasis
- Pharyngitis
- Xerostomia
- Lymphadenopathy
- Strawberry tongue
- Cervical lymphadenopathy
- Facial pain/numbness
- Benign migratory glossitis

Kawasaki-like Disease: Manifestation of COVID-19

- Multi-system inflammatory syndrome in children (MIS-C)
- Vasculitis disease in young children – triggered by viral infection
- Acronym – CREAM
  - C = conjunctivitis
  - R = rash, widespread
  - E = edema, erythema of hands, feet
  - M = mucosal involvement – strawberry tongue, red chapped lips, mucosal erythema
  - Cardiac complication – 5-20%
- Oral findings mimic erythematous candidiasis

Perioral Dermatitis: A New Cause!

Perioral Dermatitis
- Inflammatory disease of the perioral and perinasal area +/- proliferation of bacteria
- Cause: Idiopathic, topical steroids, toothpastes, heavy creams, cosmetics, moisturizers
- Exacerbated by UV light, heat, wind
- May start as an irritant or allergic contact dermatitis
- S/S: Persistent, pruritic red rash, pustules
- Tx: DC facial products, steroids, change to toothpastes; topical antibiotics, topical pimecrolimus, others
- Diff Dx: Drool dermatitis, lip sucking habit, impetigo

Benign Migratory Glossitis
- Geographic tongue, erythema migrans
- Cause: Unknown; genetic, allergy
- Prevalence: Up to 3%; all ages; 1 in children
- Site: Tongue, esp. dorsum; extraglossal
- Duration: Persistent; waxes and wanes
- S/S: Multiple, red annular patches with white scalloped border; loss of filiform papillae; +/- burning sensation; +/- fissured tongue
- Concerns: Food restrictions; cosmetics

Concurrent lesions:
- Fissured tongue
- Crenations on lateral borders
- Lingual papillitis
Benign Migratory Glossitis

- Early onset may be a marker for psoriasis and disease severity
- BMG tends to be non-tender when associated with psoriasis


Geographic Tongue

Mimics: Candidiasis, lichen planus, allergic reaction, leukoplakia, erythroplakia

Geographic Tongue

CC: This is a healthy child with a sore tongue of several days' duration. Dad and son were having a bonding moment.

Irritant Contact Glossitis

What is the Evidence?

Conclusions: There is substantial heterogeneity in the available studies providing very low-quality evidence for the treatment of symptomatic benign migratory glossitis.

What Else Is In The Bag?

- Benign migratory glossitis
- Contact allergy
- Candidiasis
- Traumatic erosion
- Transient lingual papillitis
- Glossitis due to vitamin deficiency (Vit B)
- Lichen planus
- Erythroplakia

Benign Migratory Glossitis

ID factor; use gentle oral hygiene products; dietary restrictions
Topical coating agents, anesthetics, antihistamines:
- Diphenhydramine liquid 12.5 mg/5ml + aluminum hydroxide, magnesium hydroxide + distilled H₂O susp (1:2:3 ratio)
- OTC gels, rinses, pain-relievers
Nutritional supplementation, if deficient: Zinc, vitamin B₁₂
Topical steroids +/- antifungals:
- Fluocinonide gel .05%
- Triamcinolone paste .1%
- Triamcinolone-Nystatin ointment
Topical immune suppressants: tacrolimus

Pizza burn erosion
**Transient Lingual Papillitis**

- **Lesion:** Inflamed fungiform papillae
- **Cause:** Unknown, trauma, allergy/sensitivity, GERD, hormonal, URI, viral infection
- **Gender/Age:** F>M; Wide age range
- **Site:** Dorsal tongue; Anterior, lateral
- **Duration:** 1 to 7 days
- **3 types:** Single, diffuse or clustered
- **S/S:** Painful, red or white papules +/- fever, lymphadenopathy, may recur
- **TX:** Topical steroids, anesthetics, coating agents

**Median Rhomboid Glossitis**

- **Form of candidiasis**
- **AKA:** Central papillary atrophy
- **Site:** Midline, posterior dorsal tongue
- **S/S:** Red or white rhomboid patch, nontender
- **Kissing lesion on palate**
- **Tx:** Antifungal agents

**Oral Candidiasis**

- **Cause:** Candida species, Candida albicans
- **Prevalence:** 40 – 60% normal oral inhabitant
- **Predisposing factors:** ↓ immune status, medications, poor oral hygiene, appliances, pacifiers, poor diet, diabetes, dry mouth
- **Candida-streptococcal interactions in biofilm** (Koo H, PLoS Pathog 2018;14(12):e1007342)
- **Site:** Usually multifocal oral involvement
- **Variants:** Pseudomembranous, erythematous, hyperplastic
- **S/S:** Red or white patches, erosions, burning sensation, taste perversion, sore throat

**Erythematous Candidiasis**

- **Dentinal caries are a reservoir for fungus**
- **Gingivitis, glossitis, palatal erythema, chapped lips**
- **Mimics:** allergic reaction, viral infection, mucosal purpura
- **Cause:** Steroid inhaler use
Pseudomembranous Oral Candidiasis

Healthy 8YOM with asymptomatic white papules

Diff Dx: Pseudomembranous candidiasis, sloughing, Kuplik spots, transient lingual papillitis

Dr. Sati Khalsa

Oropharyngeal Candidiasis

Topical Agents:
- Nystatin suspension 100,000 U/mL
- Clotrimazole troches 10 mg
- Oravig (miconazole) buccal tabs 50 mg
- Chlorhexidine oral rinse 0.12% (rare severe allergic reaction)

Systemic Agents:
- Diflucan, g (fluconazole) 100 mg tabs, 10 mg/mL, 40 mg/mL susp
- Sporanox (itraconazole) 100mg/10mL
- PO X 14 days; continue 48 hr after resolved

Other Agents:
- Probiotics for prevention? Yogurt? Fermented foods?

Angular Cheilitis in Children

- Inflammatory lip lesion
- Cause: Candida albicans, S. aureus
- Factors: Drooling & licking lips, oral candidiasis, lip incompetence, chapped lips, vitamin deficiency
- Site: Corners of mouth
- S/S: Erosions, ulcerated fissures, papules; may bleed; tender; recurs
- Complication: Scar, pigment changes

Angular Cheilitis

- Identify and eliminate the cause
- Nystatin ointment 100,000 U/g
- Clotrimazole cream 1% (RX and OTC)
- Miconazole cream, ointment 2% (RX, OTC)
- Ketoconazole cream 2%
- Triamcinolone/Nystatin ointment, cream
- Impetigo - Bactroban (mupirocin) oint 2%

Pigmented Candidiasis

- May trigger inflammatory melanosis in children of color
**New Treatments in the Bag**

- **New Drug for Candidiasis**
  - Oravig (Miconazole Buccal Tab): Topical
  - Form: Adherent, slowly dissolving 50 mg tab
  - Usual dosage: 50 mg tablet
  - Adolescents >16 yrs: 1 tablet for 14 days. Apply to the upper gum region, just above the upper lateral incisor. Alternate sides of the mouth.
  - Contains milk protein
  - Cost: 50 mg (14): $1004.93

**New Findings in the Bag**

- **Probiotics and Oral Health**
  - Probiotics: Living microorganisms (primarily bacteria) that are safe for consumption and when ingested in sufficient quantities have beneficial effects on human health beyond basic nutrition

**New Evidence in the Bag**

- **Probiotic species:**
  - *Lactobacillus* spp., *Bifidobacterium* spp., *Saccharomyces* spp.
- **Preventive effect:** *Candida* colonization
- **Population:** Preterm neonates and elderly
- **Systematic reviews:**

**What Else Is In The Bag?**

- Pseudomembranous candidiasis
- Mucosal sloughing
- Mucosal burn
- Plaque/materia alba
- Koplik spots
- Sucking keratosis in infants

HX: Infant had 3 rounds of Nystatin with no resolution
Breastfeeding Keratosis

- Frictional keratosis
- Cause: Forceful sucking
- Site: Labial mucosa, anterior buccal mucosa
- S/S: White adherent plaques, nontender; +/- leukoedema, sucking calluses
- Tx: Modify sucking habits
- Mimics: Candidiasis


Mucosal Sloughing

- AKA: Irritant contact mucositis
- Bonding etchant on mucosa
- Direct contact may result in mucosal inflammation
- S/S: Irregular, white semi-adherent patch; rough and mildly tender
- Resolves within 24 hrs
- Mimics: Frictional keratosis, mucosal burn, candidiasis

Mucosal Sloughing

- Reaction to oral hygiene products, xerostomia
- Mimics: Pseudomembranous candidiasis

Irritant Contact Dermatitis

- Etchant gel: 37-38% phosphoric acid
- S/S: Sudden burning, itching, swelling, vesicles, color changes
- Tx: Emollients, +/- topical steroids, topical antibiotics
- Complications: Scarring, pigmentation changes
- +/- contact allergy


HX: 13 YO female who had sealants placed with rubber dam isolation

Suspected cause: Etchant gel, 37% phosphoric acid

Role of Mouth Rinses in COVID-19

- Goal – reduce salivary viral load
- SARS-CoV-2 – found in nasopharyngeal secretions
- Detected in saliva of 91.7% patients
- Viral load is consistently high, especially early stage
- 1 cough or 5 min of talking produces 3000 saliva droplets
- 1 sneeze produces 40,000 saliva droplets
- Saliva transmission droplets: 1-8 m depending on size
- Droplets enter mouth, eyes or inhaled through nose

**Mouth Rinses and Inactivation of HCoV**

Reduced amount of infectious virus >99% at 1 min rinsing time in vitro

- Crest Pro-Health .07% cetylpyridium
- Listerine Antiseptic – alcohol, essential oils at 30 sec also
- Listerine Ultra – alcohol, essential oils
- CVS Antiseptic, Mouth Wash – alcohol, essential oils
- Betadine 5% - povidone-iodine 5%


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**Adverse Events of Mouth Rinses: Systematic Review**

- Tooth and mucosal staining
- Mucosal sloughing, desquamation
- Erythema, vesicles, ulcers
- Gingival inflammation
- Dry mouth
- Cracked lips
- Coated tongue, hairy tongue
- Taste disturbances/loss

- Taste disturbances/loss
- Sore mouth, burning sensation
- Oral itching
- Numbness, dysesthesia
- Sore throat
- Hyperkeratosis
- Dental hypersensitivity
- Calculus formation


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**20 YO Asian-American Male with Sore Mouth of 1 Month Duration**

Mild perioral dermatitis, chapped lips, tender gingival erythema and edema

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**CC: Sore Mouth**

Gingival erythema, erosions, tooth staining, bad taste

Diff Dx: Chemical irritation, contact allergy, erosive lichen planus

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**New Crazes in the Bag**

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**Sloughing Sore Mouth**

- ID: 19 YOWM, college student
- CC: Gums and under tongue burn when eating
- Hx: Healthy but vapes daily
- S/S: Viscous saliva, gingivitis, multifocal areas of white pseudomembrane, swelling of the tongue

Kelby Mansour, DMD
**Sloughing Sore Mouth**

- Increased risk for caries
- Increased risk for periodontal disease
- Dry mouth
- Mucosal sloughing
- Mucosal burning, irritation
- Beware: drugs can be placed under the tongue and cause a similar problem

**Vaping and Oral Health?**

- Candidiasis and mucosal irritation with sloughing

**CDC: Youth and Tobacco Use, 2019**

Overall: 27.1% of HS students use 1+

**Hot Topic – e-Cigarettes and Adolescents**

Unique Complications:

- Contains nicotine or tetrahydrocannabinol (THC)
- Exploding devices cause orofacial burns, fractured teeth, jaw
- Chemical toxicity in young children has escalated
- Addictive potential that tastes good
- Cariogenic potential of the aerosols
- Water-soluble reactive toxins alter oral microbiome and host cells
- Carcinogens include nitrosamines, formaldehyde, acetaldehyde
- Serious lung disease (EVALI) – vitamin E acetate

**Hookah-Smoking in Teens**

- Heated water pipes with tobacco and other chemicals, including marijuana
- Smoking 200 puffs/hr (1 cig = 20 puffs)
- 15-17% HS students
- Physical adverse effects
- Spread infectious diseases
- Second-hand smoking

**Hookah & Soft Tissue Findings**

- Lip or palatal burn
- Lip or palatal keratosis
- Nicotinic stomatitis
- Soft palate, uvula: edema and erythema
- Oral dryness, coated tongue
- Superficial mucoceles
- Prominent leukoedema

[Photo: Rick Wood / Milwaukee Journal Sentinel]
Stress-induced Oral Lesions

- Cheek, tongue biting keratosis
- Factitial gingival ulcers
- Superficial mucoceles
- Mucosal sloughing (mouth rinses, vaping)
- Aphthous ulcers
- Recurrent herpetic lesions
- Purpura
- Lip sucking habit
- Xerostomia
- Dental erosion
- Bruxism, clenching, tooth fractures, TMJ disorder
- Oral disease associated with poor hygiene

Aphthous Stomatitis

- T cell-mediated immunologic reaction
- Prevalence: 20-30% of US children
- Causes: Immune defect, genetics, ↓ mucosal barrier, ↑ antigenic exposure, nutritional [↓ B1,2,6,12, folate, iron, zinc]
- Site: Nonkeratinized oral mucosa
- Duration: 2 days to 6 weeks
- Types: Minor, major, herpetiform
- S/S: Single or multiple painful ulcers; sudden onset

Aphthous Minor: 80%

Findings: 1-3 ulcers, <1 cm in size that heal in 7-10 days without scarring; variable recurrence rate

Aphthous Major: 10%

Findings: Single to several ulcers that are deep and >1 cm, Prolonged healing > 2 weeks with scarring

Herpetiform Aphthae: 10%

Findings: 10-100 ulcers, 1-3 mm in size, may develop in waves Variable healing pattern and may scar

Aphthous Stomatitis

- Hematologic abnormalities in children: 20%
- Laboratory Studies:
  - White blood cell count and differential
  - Hematocrit and hemoglobin
  - Red blood cell count
  - Erythrocyte sedimentation rate
  - Serum ferritin, B12, folate
  - Antigliadin, tissue transglutaminase Ab, endomysial Ab
## Potential Allergens/Triggers for Aphthae

- **Food:** Chocolate, coffee, peanuts, almonds, strawberries, pineapple, cheese, tomatoes, citrus, wheat, carbonated beverages, spicy foods
- **Other:** Benzoic acid, cinnamaldehyde, sodium lauryl sulfate, menthol, peppermint, eugenol, Balsam of Peru
- **Medications:** NSAIDs
- **Metals:** Nickel, chromium

## What's New In The Bag?

### Genome Wide Analysis for Mouth Ulcers

- **Source:** UK Biobank and 23andMe meta-analysis
- **GWAS:** n= 461,106
- **Heritability:** 8.2%
- **97 genetic variants with mouth ulcers**
- **Important genetic variants associated with IL12A and IL10**
- **Supports role of T cell regulation in etiology of mouth ulcers**
- Dudding T et al. Nature Communications 2019

## Questions to Ask?

- Recurrence rate, duration, location, other sores on body?
- Any known allergies? Food likes and dislikes?
- Weight loss? Growth rate?
- Meds, OTC products, oral hygiene products
- Any other family member get them?
- Any oral habits? What else put in the mouth?
- Any stomach, joint, bowel, bruising problems?
- Headaches, dizziness, fever, swollen glands?
- Bad taste? Hot burps?

## Aphthae & Systemic Disorders

- Periodic fever, aphthous, pharyngitis, adenitis
- Gastroesophageal reflux disease
- Crohn disease, ulcerative colitis
- Celiac disease
- Neutropenia, anemia
- Immunodeficiency syndromes
- Reactive arthritis
- Nutritional deficiency
- Bechet disease

## GERD: Oral Ulcers & Erosions

Ulcers tend to occur in posterior of mouth
**OTC Products for Oral Ulcers**

**Aphthous Ulcers: Topical Agents**
- Bioadherent OTC anesthetic or coating agents
- Triamcinolone in dental paste 0.1%
- Betamethasone valerate ointment 0.1%
- Fluocinonide gel, ointment .05%
- Temovate (clobetasol) gel, ointment .05%
- Chlorhexidine oral rinse .12%
- Low-level laser

Weak evidence for topical steroids

**Aphthous Stomatitis**

**Topical or systemic agents:**
- Dexamethasone elixir, solution 0.5mg/5mL
- Celestone (betamethasone) syrup 0.6mg/5mL

**Systemic agents:**
- Prednisone 20 mg tabs (20-60mg/day) X 5 days
- Cimetidine 300 mg tabs, solution (if associated with GERD)

**Nutritional supplement:**
- Vitamin B12 1000 mg (SL, PO)
- Peridin-C (citrus bioflavonoids + ascorbic acid)

**Natural agent:** Honey (>1 YO), turmeric paste, baking soda paste

**What’s New In The Bag?**

- Otezla (apremilast) by Celgene
- Disease-modifying Antiinflammatory Drugs
- Indications: psoriatic arthritis, plaque psoriasis, Behcet syndrome, oral ulcers
- Dosage for oral ulcers: 30 mg BID, 2-6 wk
- Not approved for pediatric use < 18 YO
- Cost: $3398/mo
  - *N Engl J Med 2019*

**What Else Is In The Bag?**

- Aphthous minor ulcer
- Traumatic/factitial ulcer
- Recurrent HSV infection
- Transient lingual papillitis
- Superficial mucocoele
- Contact allergy
- Systemic diseases

Superficial mucocoeles
Celiac Disease

- Genetic immune-mediated enteropathy
- Trigger: Gluten grains (wheat, barley, rye)
- Prevalence: .5% to 1% (1 in 100)
- S/S: GI distress, anemia, joint pain, fatigue, asthma, short stature, arthritis, vitamin K deficiency
- Oral S/S: Enamel hypoplasia, oral ulcers, gingivitis, dry mouth
- Tests: IgA antihuman tissue transglutaminase (TTG), IgA endomysial antibody IF (EMA), antigliadin AB
- Risk: DM, type I, SS, osteoporosis, lymphoma

Secondary HSV Infection

- Cause: Reactivation of HSV-1
- Types: Herpes labialis, facialis, intraoral HSV
- Prevalence: 20-35%; ↑ with lower SES
- Risk factors: UV light, trauma, fever, teething, menses
- Site: Perioral skin, vermilion, gingiva, hard palate
- Duration: 7 – 14 days
- S/S: Recurrent, acute onset, prodromal redness, tender, clustered vesicles & ulcers, referred pain
- Complication: Scars, erythema multiforme, Bell’s palsy, herpetic whitlow, blindness

Herpes Labialis & Facialis

3 YOWF with oral ulcers, erosions, lichenoid mucositis
Duration: 1 year of recurrent oral problems

Recurrent Intraoral HSV

Mild enamel hypoplasia
Resolving tongue ulcer
Mucosal pallor
What's New In The Bag?

New Pattern: Zosteriform HSV

- Recurrent HSV
- Distribution: Follows an affected nerve to midline
- S/S: Burning, tingling, itchy sensation; painful cluster of vesicles, ulcers
- Mimics: Herpes zoster
- ID the trigger; may be dental treatment
- Tx: Antivirals, palliative

Id: 20 YO healthy woman
C.C.: Very tender gingiva of sudden onset, but no fever, malaise or lymphadenopathy

Zosteriform HSV

Recurrent HSV & Dental Trauma

16% of adults undergoing invasive dental procedures had reactivation of HSV.
(Miller CS, et al. JADA 2004;135:1311)

Recurrent Herpetic Infection

Systemic Agents:
- Sitavig (acyclovir) 50 mg buccal tablets
- Zovirax, g (acyclovir) 400 mg capsules
  - Take 1 capsule 3 times a day X 5 days
- Valtrex, g (valacyclovir) 1 g tablets
  - Take 2 tablets twice daily, 12 hours apart, when symptoms first develop
- Famvir, g (famciclovir) 500 mg tablets
  - Take 3 tablets as a single dose at first sign of infection (not as effective in adolescents)

Summary: Herpes Labialis Treatment

- Decreased healing time (-0.74 days) – classic lesions (-1.09 days)
- Decreased time to resolution of pain (-0.38 days)
- Increased percentage of aborted lesions – only acyclovir & valacyclovir
Recurrent Herpetic Infection

- Topical Antiviral Agents for Lips:
  - Abreva (docosanol) cream 10% (OTC)
  - Denavir (penciclovir) cream 1%
  - Acyclovir cream 5%
  - Xerese (acyclovir 5%/hydrocortisone 1%) cream

No evidence for prevention with topicals. The CDC 2015 recommends avoidance of topical antivirals, owing to a lack of clinical benefit.

Treatment Evidence for HSV

- Sunscreen SPF 30 Lip Balm: No evidence
- Nutritional Supplements: No evidence
- Lysine 1000–3000 mg per day
- Zinc sulfate 22.5 mg tablets, BID
- Vitamin C 600 mg or more
- Topical Agents with Supplements: No evidence
  - Zinc oxide cream
  - AverTeaX ointment [Green tea extract + aloe]
- Low level laser therapy: Inconclusive evidence

Summary: HSL Prevention

✓ The current evidence demonstrates that long-term use of oral antiviral agents can prevent HSL, but the clinical benefit is small.
✓ No evidence of an increased risk of adverse events with oral antiviral agents.
✓ The evidence on topical antiviral agents and other interventions either showed no efficacy or could not confirm their efficacy in preventing HSL.

New Drug for Herpes Labialis

- Sitavig (acyclovir buccal tab): Transmucosal
- Form: Adherent, slowing dissolving 50 mg
- Usual dosage: 50 mg tablet
- Adults: 1 tablet as a single dose placed on the the upper gum region (canine fossa).
- Contains milk product
- Cost: 50 mg (2): $1070.00

New OTC Cold Sore Meds

- Docosanol 10% (FDA-approved, not new)
- Lidocaine with botanicals, aloe
- Benzalkonium chloride, echinacea – for oral lesions
- Benzy alcohol 1.0%, aloe vera, green tea extract

Stress-induced Oral Lesions

FACT: WE KNOW THAT MENTAL HEALTH ISSUES HAVE INCREASED SIGNIFICANTLY DURING THE PANDEMIC
Groups struggling the most:
- Age group: 18–24 years
- Race/ethnicity: Hispanics
- Work status: Essential
- Income: < $25,000/y
- Education: < high school diploma

Aggressive Lip and Cheek Biting

Body Focused Repetitive Behavior
- Repetitive, self-directed behavior that damages the skin, hair, or nails.
- Coping mechanism for uncomfortable or anxious situations
- Common habits
  - hair-pulling, skin-picking,
  - nail-biting
- Starts: 11-14 YO
- ↑ risk, if close relative has behavior
- Tx: Behavior therapy, anti-depressants, anti-obessive drugs

Case History
- ID: 7 YOF with sore gums of sudden onset
- Mother is nurse in emergency department
- Med Hx: Asthma and allergies
- Meds: Singulair, Allegra and steroid inhaler; rinses mouth after use of inhaler
- CC: Sore gums – no history of trauma
- S/S: Ulcerated lesion of buccal gingiva adjacent to teeth, # I and J
- Tx: Swab with chlorhexidine, tid
- FU: Improved over 2-3 days and then larger and more pain. Rx Canker-X for pain

Factitial Oral Injuries
- Type: Self-inflicted oral lesions
- Age/Gender: 80% < 12 years old; F > M
- NB: When >12 y consider self-harm, depression
- Method: Fingernails, teeth, toothpick, pacifier, toothbrush, hair, pen, toy
- Site: Easy to reach location; facial gingiva, lips, buccal mucosa
- S/S: Chronic ulcers, gingival recession, bizarre shape, sharp outlines; single or multiple
- TX: ID cause; palliative; psychological assessment

History - Day 6
- Mother feels that they should go to ER – pain is increasing and lesion is spreading
- Lots of stress in the family over the lesions
- Recommended discontinuation of all treatment, except gentle toothbrushing (bid) and rinsing with diluted baking soda after meals and before bed
- What is going on?
New and Old Crazes in the Bag

The Case of Blood Blisters
- ID: Healthy adolescent female with lip swelling of sudden onset
- History is unknown
- S/S: Multiple and symmetrical blood-filled vesicles and bullae with scattered petechiae on the labial mucosa. Crusted blood at the junction of the wet line. Generalized edema of the lips.
- Gingiva appears healthy with serosanguineous fluid located interproximal teeth.
- Surrounding perioral skin has scattered red macules

Lip Suction Trauma
- Cause: Forceful pressure to lips
- Examples:
  - Sucking on a cup
  - Lip plumbing devices
  - Respiration for CPR
  - Forceful kissing
  - Orogenital sex
- No treatment; resolve in 2-7 days
- Ask if they enjoy Tik Tok!

Submucosal Hemorrhage
- Entrapment of blood in the tissues
- Terms: Petechiae, purpura, ecchymosis, hematoma
- Causes: Traumatic and nontraumatic
- Nontraumatic causes: Blood dyscrasias, viral infections (IM, measles), anticoagulants

Childhood Leukemia
- Acute lymphocytic/lymphoblastic leukemia
  - Most common form; 80% of cases
  - Petechiae, palpable purpura of skin, mucosa: 50%
  - Other S/S: MUG, cellulitis, persistent ulcers, gingival bleeding and mobile teeth
- Acute myeloid leukemia
  - Second most common form; 20% of cases
  - Diffuse gingival enlargements
  - Chloroma (myeloid sarcoma)

Acute Lymphocytic Leukemia
- Purpura of the soft palate
- Petechial lesions of face with swelling
Acute Myeloid Leukemia

Primary Herpes Simplex Infection
- Cause: HSV-1, HSV-2
- Types: Gingivostomatitis, pharyngitis
- 2 age peaks: 6 mos - 5 yrs; early 20s
- Transmission: Direct contact, saliva, sexual
- Symptomatic disease: 12-30% infected
- Site: Oropharyngeal, anogenital & cutaneous
- Duration: 7 - 14 days
- S/S: Acute onset, fever, lymphadenopathy, malaise, pain, erythema, vesicles, ulcers, drooling, dysphagia; widespread oral lesions

Primary HSV Infection
- Note large palatal ulcer

Primary HSV Infection

HSV Pharyngitis
- Mimics:
  - Infectious mononucleosis
  - Herpangina
  - Gonococcal pharyngitis

Primary HSV: When to Treat?
- No evidence for treatment in healthy children
- Early infections - the first 3 days
- Severe cases with extensive skin lesions
- Cases with periorbital or ocular lesions
- Immunosuppressive drugs, steroids
- Children who are immunocompromised
- Multiple siblings who are close in age?
- Caution with renal disease, dehydration
**Primary HSV Infection**

- Topical Coating Agents:
  - Benadryl/Maalox susp +/- lidocaine viscous 2%
  - Sucrets (dyclonine)throat lozenges (older child)
- Systemic Agents:
  - Zovirax, g (acyclovir) 200mg/5mL, caps 400mg
  - Valtrex, g (valacyclovir)tabs 1g
- Nutritional Liquid Supplements and Fluids
- Topical Antimicrobial Agent for 2' Infection:
  - Chlorhexidine rinse .12% (after ulcers resolved)

**Mucosal Burn Masking HSV**

- Following painful gingiva, adolescent rinsed repeatedly with OTC mouthrinse for 7 days.
- Note Fordyce granules, mucosal pseudomembrane, erosions and ulcers

**What Else Is In The Bag?**

- Primary herpetic gingivostomatitis
- Herpangina & Roseola infantum
- Hand, foot, and mouth disease
- Varicella and herpes zoster
- Herpetiform aphthae
- Erythema multiforme
- Necrotizing ulcerative gingivitis
- Streptococcal or Staphylococcal stomatitis
- Infectious mononucleosis (EBV)
- Gonorrheal stomatitis

**New Mucocutaneous Disease In The Bag**

8 YO&M. CC is sores intra- and extra-orally. Was seen at ER, given antifungal rinse, made things worse. Severe pain to touch, difficult to open, difficult to eat...Afebrile at this visit, but had fevers 3 days prior.

**Mycoplasma Pneumoniae-induced Rash and Mucositis (MPRM)**

- Mycoplasma pneumoniae-induced rash and mucositis is a new entity distinct from erythema multiforme major
- Extraluminary complication
- Significant mucosal involvement with no or minimal skin lesions.
- Mean age of diagnosis = 11.9 years
- Sex: Males = 66%
- Tx: Antibiotics +/- steroids
- Complications: Scars, recurs (8%), death (3%)
**Erythema Multiforme, Major**

**Drug-Induced Erythema Multiforme**
- Amoxicillin
- Cephalosporin
- Bactrim (Sulfamethoxazole)
- Erythromycin
- NSAIDS
- Phenytoin
- Phenobarbital
- Carbamazepine

**Erythema Multiforme**
- Refer to MD → EM major - hospitalization
- Remove orthodontic appliances, if severe
- Lubrication of lips and oral debridement
- Topical anesthetics and coating agents
- Systemic analgesics
- Topical antimicrobial: Chlorhexidine oral rinse
- Systemic antibiotics for infection
- Prophylaxis for HAEM recurrence: Low-dose systemic acyclovir or valacyclovir

**White Lesions in Children**
- White Surface Thickening
- White Surface Material

**Frictional Keratosis**
- Common reactive lesion
- Chronic low-grade trauma
- Causes: Biting or sucking habits, orthodontic appliance, fractured tooth, toothbrush
- Site: Buccal mucosa, lateral tongue, gingiva
- S/S: Focal, white, adherent, rough patch; nontender
- TX & Prog: Eliminate cause, lesion regresses

**Cheek-biting Keratosis with Ulcers**
- Chronic habit
- Increased anxiety – may be associated with OCD in severe cases
- May be factitial
- Additional trauma with local anesthetic or orthodontic appliances
New Diagnosis in the Bag

What Else Is In The Bag?

- Hairy leukoplakia
- Lichen planus
- Cinnamon reaction
- Frictional keratosis
- Leukaeodema
- Linea alba
- Cheek biting keratosis
- Smokeless tobacco keratosis
- Leukoplakia

16 YD with leukoplakia of posterior ventral tongue

Cinnamon Contact Stomatitis

- Common allergy from cinnamon oil, but other flavoring agents may be culprit
- Sources: Ice cream, soft drinks, gum, candy, toothpaste, breath freshener, mouthwashes, floss
- Site: Gingiva, lips, buccal mucosa, tongue
- S/S: White shaggy patches with erythema; chapped lips; red, swollen gingiva; burning sensation
- TX: DC product – resolve in 1 week; topical steroids, if severe

Contact Cinnamon Stomatitis

Toothpaste Allergens

- Flavors, unspecified
- Cocamidopropyl betaine
- Sodium lauryl sulfate
- Propylene glycol
- Essential oils
- Parabens
- Peppermint, Spearmint
- Vitamin E
- Grape extract
- Propolis
- Tee tree oil

New Crazes in the Bag

**Latest Craze Reviewed**

- Most do not have fluoride
- Bentonite clay (38%) – some are carcinogens
- Betel leaf (1%) – carcinogen
- Charcoal is an abrasive

**HX: 16 YO female with recurrent ulcers**

Residual charcoal toothpaste and aphthous ulcers

**Mucous Patch**

- Associated with secondary syphilis
- Treponema pallidum → oral sex, deep kissing
- Develops 4-10 wks after initial infection (chancre)
- General S/S: Painless lymphadenopathy, sore throat, malaise, headache, fever, painless rash
- Oral site: Tongue, lip, buccal mucosa, palate
- Oral S/S: Multiple, tender white patches, oval to serpentine; 30% develop these lesions
- Resolve 3-12 weeks; may recur within the year
- TX: Pen G (IM), doxycycline, if allergic

**Soft Tissue Enlargements**

- Papillary Surface Enlargements
- Acute Inflammatory Enlargements
- Reactive Hyperplasias
- Benign Submucosal Cysts & Neoplasms
- Aggressive & Malignant Neoplasms

**2018 STD Data in US**

- Youth, aged 15-24 years acquire half of all new STDs
- One in four sexually-active adolescent females has an STD
**Squamous Papilloma**
- Type: HPV 6,11
- Sexual, nonsexual transmission
- Incubation: 3 wk – 2 yr
- Comprise 8% of all oral growths in children
- Site: Palate, tongue, lips
- S/S: Solitary, pink, red, or white papillary nodule
- Tx: Excise; no malignant potential

**Verruca Vulgaris**
- Cause: HPV 2, 4
- Prevalence: 10-50% of children
- Site: Hands, face are common
- Oral Site: Lip, labial mucosa, anterior tongue
- S/S: Nodule with fingerlike projections or rough, pebbly; pink, brown or white; painless
- TX: Remission – 20% in 6 mos; 65% in 2 yr; excise, laser, cryotherapy, salicylic acid (first line on skin), duct tape, imiquimod, retinoic acid, others

**Verruca Vulgaris**

**Pigmented Labial Warts**
- Cluster of brown labial warts
- Increasing in size, spreading
- Tx: Tretinoin cream .05% X 12 wk

**What Else Is In The Bag?**
- Verruca vulgaris
- Squamous papilloma
- Condyloma acuminatum
- Multifocal epithelial hyperplasia
- Giant cell fibroma
- Localized juvenile spongiotic gingival hyperplasia
- Inflammatory papillary hyperplasia
- Molluscum contagiosum

**Condyloma Acuminatum**
- Cause: HPV 6, 11 (90%), 16, 18 and others
- Occurs in 1% of sexually active individuals
- Incubation period: 1 to 3 months
- Site: Anogenital and oral mucosa
- Oral Site: Labial mucosa, palate, ventral tongue
- S/S: Pink nodules with short, blunted projections; painless; usually multiple
- Tx: Excision, laser, imiquimod cream, other
- Prognosis: Recurs, malignant potential (anogenital)
Condyloma Acuminatum

In children may indicate:
- Vertical transmission
- Direct contact
- Sexual abuse
- Sexual activity

Condyloma Acuminatum

Oral HPV Infection in Children

- Newborns: 6.5% (1.5%-47%) (in review LaCour D, 2012)
- Pediatric prevalence: 2%
- Adolescents: 2.5% for HPV 16/18 (Flake C, et al 2012)
- Female adolescents (14-19y): 35% HPV positive overall (in review LaCour D, 2012)

New Recommendation In The Bag

HPV Vaccine

- Gardasil® 9 (Merck): Prevents cervical, vulvar, vaginal and anal cancers and anogenital warts
- Protects: HPV 6,11,16,18, 31, 33, 45, 52, 58
- Recommended for ♀ and ♂ ages 9-26y
- FDA approved for adults – 27-45y
- 50% of new HPV infections occur in 15-24 YO
- Protective role in 92% of HPV-associated cancers
- Oral HPV: 11.5% of ♀ and 3.2% of ♂ (14 M)

More HPV Vaccine News

- Children aged 9-14y can be vaccinated on 2-dose schedule
- 3 doses, if 15y + or if immunocompromised
- Long-lasting protection after 2-doses (Meites E, et al. MMWR 2016)
- Effectiveness: 97-100% effective when HPV naive:
  - Herd protection – 34% for unvaccinated
  - Duration of effectiveness: 10 years
Old Lesion With New Name In The Bag

Localized Juvenile Spongiotic Gingival Hyperplasia

- Distinct, new subtype of gingival hyperplasia
- Other names: Juvenile spongiotic gingivitis or juvenile gingival papillomas
- Origin: Sulcular/junctional epithelium
- Cause: Unknown – not strong biofilm association; cervical enamel irregularities
- Factors: Orthodontics (15%), tooth eruption, lip incompetence, mouth breathing, puberty
- Age/Gender: Ave = 12 YO (range 5-39)/ F>M

Biofilm is not the only factor
May occur in primary dentition

Localized Juvenile Spongiotic Gingival Hyperplasia

- Site: Anterior facial gingiva, esp. maxillary (84%); may be multifocal
- S/S: Papillary, red nodule or velvety - granular patch; bleeds easily; nontender
- Minimal response to OH
- TX & Prog: Biopsy; 6-16% recur in 1 yr; may resolve

Case History of a Red Macule

- ID: 10 YO male presents for recall exam
- CC: Mother concerned about a red “cut” above a new tooth that has not gone away
- Med Hx: tubes in ear
- Oral Exam: Asymptomatic, not irritated, 3 mm red area above erupting tooth #10

Velvety and papillary pattern was tender when brushing
Excisional biopsy – 1 month post-op
Some clinicians claim to have good results with topical steroids, lasers

Velvety and papillary pattern was tender when brushing
Excisional biopsy – 1 month post-op
Some clinicians claim to have good results with topical steroids, lasers

Dr. Selit Khalsa
Differential Diagnosis

- Localized juvenile spongiotic gingival hyperplasia (flat variant)
- Vascular anomaly
- Superficial erosion from trauma

LSJGH or Not?

12.6 YOWF undergoing orthodontic treatment for 6 weeks
CC: Pink translucent papules of the gingiva in 2 adolescents
HX: Nontender swelling that bleeds with brushing; duration unknown

Pyogenic Granuloma

- Cause: Exuberant response to local irritation
- Age/Gender: Children, F > M
- Site: Gingiva > lips > tongue > buccal mucosa
- S/S: Red soft nodule; ulcerated surface; bleeds; nontender
- TX: Biopsy; remove irritation, may recur
- Variants: Pulp polyp, epulis granulomatous, pregnancy tumor

Pyogenic Granuloma

Crusted on outside
Fibrinous necrosis on inside

Fibrosed Pyogenic Granuloma

Atypical findings in kids
- Painful
- Interferes with eating
- Tooth displacement
- Widened PDL
- Labial bone loss
- May mature into fibroma or peripheral ossifying fibroma

Gotta Love Those PeeWees
**Mucoceles**

- **Type:** Reactive lesion of salivary glands
- **Cause:** Trauma to ducts and glands
- **Age:** Children and young adults
- **Site:** Lower lip (81%), buccal mucosa (5%), ventral tongue (6%), floor of the mouth (6%)
- **S/S:** Translucent blue, fluid-filled swelling; fluctuates in size; may be tender
- **TX:** Excisional biopsy with adjacent glands; 40% spontaneously resolve; recur – 6%
- **Variant:** Ranula – floor of the mouth

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**COVID-19 Stay at Home Lip Lesion**

- **ID:** Healthy 4 YO Male
- **CC:** “Bump” on the lower lip
- **Hx:** Swelling developed suddenly about 1 week ago; unsure of any habit or recent trauma
- **S/S:** Pale soft papule with erythematous halo; nontender; second papule noted close to midline
- **Dx:** Superficial mucoceles

**Case of the Swollen Tongue**

- **ID:** 18 YO healthy male
- **CC:** Lump on tongue
- **Hx:** Noticed the swelling for a few days and it is increasing in size. No history of trauma
- **S/S:** Asymptomatic swelling of the right ventral tongue
- **Dx:** Mucocele
- **Referred to OMS for evaluation
**Ranula**

- Involves the sublingual gland
- May be translucent pink, blue or red
- Usually not tender, but interferes with eating and speaking
- Do not incise and drain it
- May progress to plunging ranula

**Cherry Angioma**

- Superficial vascular lesion
- Cause: Trauma in children
- Gender/Age: Males > 5y
- Site: Vermilion of lip
- S/S: Red, blue, purple papule; blanches
- TX: Laser, sclerosant or excise; no involution
- Cosmetic concern

**Caliber-Persistent Labial Artery**

- Abnormally dilated artery
- Age: Adolescents
- Site: Upper > Lower lip
- S/S: Tubular to nodular elevation; pink to blue; pulsatile; disappears when stretched
- TX: None required unless symptomatic
- Problem: Brisk bleeding

**Melanocytic Nevus**

- Type: Benign proliferation of nevus cells
- Age/Gender: 15% of oral nevi occur in children; may be congenital (10%); F > M
- Site: Palate, buccal mucosa, gingiva, lip
- S/S: Pink, brown, blue or black macule or nodule; 85% pigmented; 70% elevated
- Most common types: Intramucosal, blue
- TX & Prog: Excisional biopsy; rare malignant transformation

**Cherry Angioma**

- Bleeding may be brisk
- If multiple, may be syndrome
- Hereditary hemorrhagic telangiectasia
Dysplastic Nevus

What Else Is In The Bag?
- Melanocytic nevus
- Melanotic macule
- Amalgam or lead tattoo
- Drug-induced pigmentation
- Physiologic pigmentation
- Inflammatory melanosis
- Smoker’s melanosis
- Late petechiae, purpura

Smoker’s Melanosis
- >20% of cigarette smokers
- Occurs within the first year
- Higher frequency in females
- Common location: attached facial gingiva, lower lip
- Nicotine and benzpyrene stimulate melanin production by melanocytes
- Reversible over 3-year period

Smoker’s Melanosis: Pigmentation is darker and more widespread in those with ethnic pigmentation

Minocycline Pigmentation
- Cause: Drug binds to certain types of collagen
  → pulp, dentin, bone, nails, dermis, sclera
- Purpose: Primarily used to treat acne
- Prevalence: 3-6% of chronic users; 15% - acne
- Develops: 1 month to several years of use
- Site: Ant alveolar mucosa, hard palate, teeth
- S/S: Diffuse blue-gray to muddy brown
- TX: DC med → soft tissue fades; permanent tooth discoloration

Minocycline Pigmentation
- Pigmentation of periosteum
**Drugs & Oral Pigmentation**

- Antibiotic: Minocycline
- Pepto-Bismol, others containing bismuth (extrinsic stain)
- Antimalarial medications: chloroquine, hydroxychloroquine, quinidine
- Antipsychotic drug: chlorpromazine
- Antineoplastic: doxorubicin, busulfan, cyclophosphamide
- Kinase inhibitor: Gleevec (imatinib) for leukemia, soft tissue sarcoma, aggressive fibromatosis

**New Recommendation In The Bag**

**Doxycycline for Young Children**

- Teeth staining with use of tetracyclines in young children
- No evidence of teeth staining following multiple short courses of doxycycline
- When doxycycline is treatment of choice for a serious infectious disease, it should be given regardless of age.
- AAP Red Book 2018

**Case of the Incidental Finding**

- ID: 15 YO female
- CC: Incidental finding - Mom and child do not know if was present
- HX: Just received this panoramic radiograph (as a copy to the office) after the OMFS extracted the mandibular third molars recently.
- Radiopaque lesion interproximal of roots #22/23
- No history of pain/symptoms.
- Differential diagnosis? Should I refer back to the OMFS? Treatment?

**Radiographic Findings**

Differential diagnosis: Idiopathic osteosclerosis, condensing osteitis, osteoma

**Idiopathic Osteosclerosis**

- Cause: Unknown
- Prevalence is as high as 5%
- Age: 2nd decade
- Site: Mand, molar-premolar
- X-ray: Well defined, oval opacity; peralpical region
- Tx/Prog: Periodic evaluation; stabilizes; may delay eruption
- DDx: Condensing osteitis, osteoma, complex odontoma, central ossifying fibroma

Dr. Katie Galm

9 YOWF
10 YO WF with an Incidental Finding

What is this periradicular radiopacity? Dr. Andrée-Anne Pagé

Case of Multiple Abscesses

- ID: 3 YO healthy boy
- CC: Multiple, nontender, abscess-like lesions of the gingiva
- Med Hx: Healthy, no medications, NKDA
- Dental Hx: Previous dental rehabilitation under GA in 2018
- Oral Exam: Multiple gingival abscesses associated with restored and nonrestored teeth. 6 months ago abscess developed adjacent to #E and responded to amoxicillin, but other lesions developed. Also, mom stated that the patient never complains of pain or any classic signs of infection

Clinical Findings

Multiple Gingival Lesions

Dr. Helia Koleini

Differential Diagnosis: Multiple Gingival Swellings

- Pulpal necrosis following restorative treatment
- Dental anomaly resulting in increased risk for pulpal necrosis
- Vitamin D-resistant rickets
- Contact allergy to crowns
- Granulomatous gingivitis
- Hematologic disease, neutropenia, leukemia

Panoramic Radiograph

Dr. Helia Koleini
**Vitamin D-Resistant Rickets**

- Hereditary hypophosphatemia – most common XLH
- X-linked dominant; 1:20,000 births
- Mutation: Zinc metallo-proteinase gene (PHEX)
- ↓ reabsorption of phosphate in renal tubules
- Short, bowed extremities
- Dental: Large pulps (may be normal), high pulpal horns, abscesses, enamel hypoplasia
- New Tx: Crysvita (burosumab)

**Case of the Ghost Teeth**

- 6 YO Asian-American girl
- CC: Poorly formed teeth
- Med Hx: Unknown
- Oral Exam: SM due to loss of #L: delayed eruption #19
- Rads: Poorly formed permanent teeth, left mandible

**Regional Odontodyplasia (Ghost Teeth)**

- Developmental dental abnormality
- Cause: ?, vascular compromise
- Affects contiguous teeth
- S/S: Gingival hyperplasia, hypodense bone, malformed erupted teeth, ghost teeth, delayed eruption, premature exfoliation, abscess

**Lots of Oral Stuff In The Bag**