The ABCs of Oral DIAGNOSIS in the Pediatric Patient
The ABCs of **Oral Diagnosis**
in the Pediatric Patient

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Demonstrate knowledge and understanding of the most common issues in the field of oral diagnosis in a busy pediatric dental practice.

Identify the most common soft tissue lesions in the oral cavity of children and adolescents.
Disclaimers

All clinical pictures were authored by myself unless otherwise listed on the slide.

I evaluated all the patients by myself and provided treatment/guidance.

Patients and/or parent consent was received for all photos.

I don’t have any financial conflict to disclose.
Oral Diagnosis
Oral Cavity Conditions

10,032 US Children and youths aged between 2 and 17 years

Oral Cavity Conditions

10,032 US Children and youths aged between 2 and 17 years

Distribution by age

Recurrent herpes labialis

Geographic tongue

Cheek/lip bite
The Diagnostic Challenge in the Pediatric Patient

History
Chief complain
Parents “version”
Child “version” (if any...)
Past medical history
Behavior
Behavior
Behavior
Behavior
1. Ulcers in the oral cavity of children
2. Gingival lesions in children
3. Common tongue lesions
4. Common radiographic lesions in children
5. Vascular lesions in children
6. Systemic conditions with oral manifestations
7. "Bumps" in the oral cavity of children
Ulcers in the oral cavity of Children
Ulcers in the oral cavity in children, are all the SAME? (caused by a virus!)
Busy week!!!!!!
Ulcers in the oral cavity in children, are all the SAME?

Yepes’s approach

- Patient age !!!!!
- MEDICAL HISTORY !!!
- ULCER history !!!
- Family history
- Clinical aspect!!!!!
Ulcers in the oral cavity in children are all the SAME?

Yepes’s approach

AGE !!!
- baby
- Pre-K child
- Kindergarten child
- Teenager
Ulcers in the oral cavity in children, are all the SAME?

Yepes’s approach

MEDICAL HISTORY !!!
- Chronic GI issues
- Lesions in other places (skin – genitals)
- Periodicity (every 90 days?)
- Other systemic symptoms
- Joint pain

Not assuming the role of the PCP
Ulcers in the oral cavity in children, are all the SAME?

Yepes’s approach

Ulcer history !!!
- First time
- Often
- Almost daily
- For a long time (more than 2 weeks)
Ulcers in the oral cavity in children, are all the SAME?

Yepes’s approach

Clinical appearance !!!

Round? 
Irregular? 
Location ➔ Gum line?, NK mucosa? 
Keratinized mucosa? 
Cluster?
Ulcers in the oral cavity in children, are all the SAME?

NO!

- RAS
- Herpes virus
- Herpangina
- Hand foot mouth disease
- Crohn’s disease
- Cyclic neutropenia
- SLE
- Trauma

- Erythema multiforme
- Mononucleosis
- Bechet's disease
- MAGIC syndrome
- PFAFA syndrome
Ulcers in the oral cavity are all the **SAME** *(caused by a virus!)*?
Recurrent Aphthous Stomatitis
(canker sores)
RAS
• RAS is the most common ulcerative disease of the oral mucosa.

• AGE – AGE - AGE

• Healthy individuals.

• Involvement of the heavily keratinized mucosa of the palate and gingiva is uncommon.

• Often complex differential diagnosis: cyclic neutropenia, Crohn’s, SLE, etc..

• Several factors have been proposed as a possible etiology.

• Extensive research has focused on immunological factors, but a definitive etiology of RAS has not been conclusive established.
Recurrent Aphthous Stomatitis

- **RAS**
  - **Major**
    - Larger than 1cm
    - Persists for weeks and months
    - Heal with scar
  - **Minor**
    - Less than 1cm
    - Heal without scars
  - **Herpetiform**
    - Differential diagnosis
Recurrent Aphthous Stomatitis

Clinical Manifestations

- RAS patients usually experience a short prodromal burning sensation that last from 2 to 48 hours before an ulcer appears.

* NO GINGIVITIS

- Ulcers are round, well defined with erythematous margins and shallow ulcerated center covered by a yellow pseudomembrane.

- Usually develop in non-keratinized mucosa.

- They last approximately 7 to 10 days.

- Histological characteristics are no specific.
Epidemiology

- Approximately 20% of the general population is affected by RAS.

- The epidemiology of RAS is influenced by the population studied, diagnostic criteria and environmental factors.

- In children, prevalence of RAS may be as high as 40% and is influenced by the presence of RAS in one or both parents.

- The onset of RAS seems to peak between the ages of 10 and 19 years before becoming less frequent in advanced age.
Recurrent Aphthous Stomatitis

Etiology (a lot of theories!!!)

Local factors:
- Trauma
- Negative association with smoking
- Changes of saliva pH

Microbial factors (؟):
- Helicobacter pylori → No strong association
- S. sanguis → Antigen stimulant

Underlying Medical Condition:
- Behçet’s syndrome
- MAGIC syndrome: mouth and genital ulcers with inflammation of the cartilage
- Crohn’s disease
- Cyclic neutropenia
- PFAPA syndrome: periodic fever, RAS, pharyngitis, and cervical adenitis
Recurrent Aphthous Stomatitis

**Etiology**

**Hereditary and Genetic (😊) Factors**

The role of heredity is the **BEST** defined underlying cause of RAS

Children have a 90% chance of developing RAS, if parents suffered during the adolescent years

HLA-A2, HLA-B5, HLA B12

Sollecito T. Oral soft tissue lesions. Dental Clinics of North America 2005; 49: 1
Recurrent Aphthous Stomatitis

Etiology

**Allergic Factors**
- Hypersensitivity to food
- Microbial heat shock proteins
- Sodium Sulfate → toothpaste **

**Immunologic factors (😊)**
- Abnormal proportion of CD4 and CD8
- Elevated levels of interleukin-2
- Elevated levels of IFN alpha
- Local – dysregulated cell-mediated immune response → accumulation of T cells (CD8).

**Nutritional factors**
- Small number association with low levels of iron, folate, zinc, Vitamins B
Recurrent Aphthous Stomatitis

Treatment \rightarrow \text{TOPICAL}

- The treatment depends on the frequency, size, and number of ulcers.

- Patients with occasional episodes of minor aphthous ulcers experience relief with topical therapy (Zilactin®, Canker Melts®)

- Nonsteroidal topical preparations (Amlexanox®). Safety and efficacy unknown

- Patients with more frequent or more severe disease \rightarrow \text{Topical steroids} (Fluocinonide 0.05% or Clobetasol 0.05%) (Triamcinolone in dental paste, Orabase®) (Dexamethasone elixir 0.5mg/5m)

- Topical antibiotics: Tetracycline mouth rinses have been reported to decrease both the healing time and pain of the lesions in several trials. More recently \rightarrow \text{Penicillin G troches}
Recurrent Aphthous Stomatitis

Treatment ➔ SYSTEMIC

• Short course of systemic steroids (prednisone).

• **Pentoxifylline (PTX)** a methylxanthine related to caffeine, has been used for many years to treat intermittent leg cramps in patients with peripheral vascular disease. PTX improves circulation increasing the flexibility of RBC. PTX has also shown to decrease inflammation by itself.

• Several reports of the use of PTX, 400mg three times a day.

• Other medications: colchicine, thalidomide and dapsone.

Most Common ulcers caused by virus in the oral cavity of children
Most Common Viral Infections of The Oral Cavity

RNA → Coxsackievirus group A

DNA → Herpes Simplex Virus
Human Papilloma Virus
Most Common Viral Infections of The Oral Cavity

RNA ➔ Coxsackievirus group A
Most Common Viral Infections of The Oral Cavity

RNA ➔ Coxsackievirus group A

✓ Herpangina
✓ Acute lymphonodular pharyngitis
✓ Hand-foot-and-mouth disease
Most Common Viral Infections of The Oral Cavity

RNA ➔ Coxsackievirus group A

**Herpangina**
- Oral ulcerations limited to the soft palate, uvula tonsils, and fauces.
- Incidence of the disease peaks during the initial months of summer and fall.
- Sudden fever, sore throat, headache, dysphagia, and malaise followed in 24 to 48 hours by erythema and vesicular eruption.

Pinto A. Pediatric soft tissue lesions. Dental Clinic of NA 2005; 49: 241-258
Most Common Viral Infections of The Oral Cavity

RNA → Coxsackievirus group A

HFMD

Frequently seen in epidemics outbreaks in day care or school age children.

Mild headache and malaise followed by skin and oral lesions.

Presence of limb lesions.
Edward, 10 year-old
Erythema Multiforme
Erythema Multiforme

• Erythema multiforme (EM) is a typically mild, self-limiting, and recurring mucocutaneous reaction characterized by target lesions of the skin and mucous membranes.

• Great variability between episodes

• Typical age is between 7 and 21 years. More females than males.

• EM is characterized by symmetrically distributed skin lesions.
Erythema Multiforme

Etiology

• **Herpes simplex virus (HSV)** is the infectious agent in 60% to 70% of the cases.

• HSV antigens are expressed in the endothelial cells of the blood vessels and keratinocytes of EM lesions → target for the immune attack.

• EM: drugs precipitate some cases of EM (sulfonamides: trimethoprim-sulfamethoxazole, NSAIDs, PNC, etc.)
Erythema Multiforme

Clinical Presentation

• The lesions are in a fixed position with a symmetric distribution.

• A central blister or area of necrosis may be present.

• Prodromal symptoms are rare, and few systemic symptoms are present during the EM episode.

• Oral mucosal lesions occur in more than 70% of cases of EM although less well recognized, EM does present as oral mucosal ulcerations with few or NO skin lesions.

• Preferred sites of involvement include the lips, alveolar mucosa, and palate.

• Oral lesions are painful and may compromised speech and eating heal without scarring

Leaute et al. Diagnosis, classification, an management of EM and SJS. Arch Dis Child 2000; 83: 347
Erythema Multiforme

Treatment

• Mild symptoms associated with EM are typically treated symptomatically.

• Topical corticosteroid suspensions provide symptomatic relief of painful oral ulcers

• Systemic antiviral agents (valacyclovir 500 mg bid → abortive or Valacyclovir 500 mg bid x 1 year suppressive)

• Systemic steroids: 48 to 72 hours
**Topical Anesthetics and Coating Agents:**

**Rx:** Diphenhydramine hydrochloride liquid 1.25 mg/ mL and aluminum hydroxide, magnesium hydroxide oral suspension (Maalox); Mix in a 1:1 ratio  
**Disp:** 200 mL  
**Sig:** Rinse with 1 to 2 teaspoons (5-10 mL) every 4 hours for 2 minutes; swish and spit or swish and swallow. Shake well before use and store suspension at room temperature.

**Rx:** Diphenhydramine hydrochloride liquid 1.25 mg/ mL / lidocaine viscous 2% oral solution / aluminum hydroxide, magnesium hydroxide oral suspension (Maalox); Mix in a 1:1:1 ratio  
**Disp:** 200 mL  
**Sig:** Rinse with 1-2 teaspoons (5-10 mL) every 4 hours for 1 minute and spit out excess. Shake well before use and store suspension at room temperature.
Gingival Lesions in Children 2.
Viral Infections

2. Gingival Lesions in Children
Viral Infections

DNA → Herpes virus
Human Papilloma Virus
Oral Herpetic Infections

• Herpes virus cause a **primary infection** when the patient initially contacts the virus and then remain latent within the nuclei of specific cells for the life of the individual.

• HSV 1, and VZV **remain latent** in sensory nerve ganglia.
Oral Herpetic Infections

• After reactivation, HV can cause localized symptomatic or asymptomatic recurrent infections.

• They are transmitted from host to host by direct contact with saliva or genital secretions.
Primary herpes virus infections

- The incidence of primary infections with HSV-1 increases after 6 months.
- The incidence reaches a peak between 2 and 3 years of age.
- A significant percentage of primary herpes infections are subclinical or cause pharyngitis difficult to distinguish from URI.
- Significant prodromal with generalized marginal gingivitis.
- Primary HSV in healthy children is usually self-limiting disease.
- Treatment: palliative Antiviral?
Recurrent herpes simplex infections

• Several studies have been published comparing topical antiviral medications for treating RHV

• Topical penciclovir (Denavir®) and topical acyclovir (Zovirax ®) reduce the duration and pain of RHV by 1 or 2 days.

• N-docosanol (Abreva®) is a topical cream ONLY OTC approved by the FDA

• Other topical products: L-lysine

• Systemic treatment: Acyclovir, valacyclovir and famcyclovir
Oral Herpetic Infections

Systemic Antiviral Therapy:

Rx: Zovirax or generic (acyclovir) 200 mg/5 mL suspension (children)
Disp: Appropriate mL
Sig: Take appropriate mL every 4 hours or 5 times a day for 7 days.

Pediatric significance: It is not FDA-approved for this use. Limited pediatric studies have shown that systemic acyclovir may be beneficial in treating primary herpetic gingivostomatitis (see Cochran Review). The dosage for mucocutaneous herpes simplex viral infection in this age group is 15 mg/kg (maximum dose 200 mg), five times a day or 1000 mg/day PO in 3—5 divided doses for 7-10 days or until clinical resolution occurs. Maximum dosage is 80 mg/kg/day. Systemic antiviral therapy is usually reserved for children with moderate to severe primary orolabial infections because therapy results in shortened duration of symptoms and viral shedding.
Oral Herpetic Infections

**Rx:** Zovirax or generics (acyclovir) capsules 400 mg (adolescents)
**Disp:** 21-30 capsules
**Sig:** Take 1 capsule 3 times daily for 7-10 days.

** Pediatric significance:** It is not FDA-approved for this use. Systemic antiviral therapy is usually reserved for children with moderate to severe primary orolabial infections because therapy results in shortened duration of symptoms and viral shedding. Alternative dosing includes 800 mg PO every 8 hours for 7-10 days. (CDC recommendations)

**Rx:** Valtrex or generics (valacyclovir) caplets 1 g (adolescents)
**Disp:** 14-20 caplets
**Sig:** Take 1 caplet BID for 7-10 days.
Oral Herpetic Infections

• Differential diagnosis:

  RAS (NO prodromal symptoms and NO gingivitis)

  Coxsackie viral infections (hand-foot and mouth – herpangina)

  Erythema multiforme

• Laboratory testing: It may be necessary to diagnose atypical presentations.

  Gold standard ➔ tissue culture

  Cytology smears ➔ Tznack smear

  Immunology test ➔ (DFA)
Autoimmune Disorders

2. Gingival Lesions in Children
Josephine, 12 y.o.
4 years 4 months old

Past Medical History: Unremarkable
No medications
No allergies
Oral exam within normal limits. No caries lesions were noted. Follow-up: 6 months. Excellent oral hygiene

5 years 2 months old

Past Medical History: Unremarkable
No medications
No allergies
Oral exam within normal limits. No caries lesions were noted. FU: 6 months. Excellent oral hygiene

6 years 2 months old

Past Medical History: Unremarkable
No medications
No allergies
Oral exam within normal limits except for marginal gingivitis. No caries lesions were noted. Excellent oral hygiene
7 year old

Past Medical History: Unremarkable
No medications
No allergies
Oral exam within normal limits except for *marginal gingivitis*. No caries lesions were noted.
Excellent oral hygiene

7 year 8 months old

Past Medical History: Unremarkable
No medications
No allergies
Oral exam within normal limits except for *marginal gingivitis and some “blisters” in the lips and gums*. No caries lesions were noted.
Moderate plaque. Treatment: reinforce OH

8 year 6 months old

Past Medical History: Unremarkable
No medications
No allergies
Oral exam within normal limits except for *marginal gingivitis*. Caries lesions were noted on tooth # A (MO) and tooth # B (DO).
Excellent oral hygiene
12 year old

Past Medical History: Unremarkable No medications No allergies
Oral exam revealed *inflammation and erythema on facial gingiva* (mandible and maxilla) with NO plaque accumulation. Diagnosis: *Puberty gingivitis*
Treatment: Patient referred to periodontics for assessment and treatment

12 year old

Emergency Appointment
Chief Complain: “tissue sloughing from the back of the mouth”
PE: *Noted generalized gingivitis. Gingiva appears to be sloughing* (but good OH). Large ulcerations noted lingual to # 20 and # 21.
The clinical exam revealed no precipitating factors for gingivitis
12 year old 5 months

PMH: Unremarkable    No medications    No allergies

Erythema associated with “peeling off” was noted over the gingiva around the anterior maxillary and mandibular teeth.

Impression: Desquamative gingivitis

- Erosive lichen planus (ELP)
- Mucous membrane pemphigoid (MMP)
- Pemphigus vulgaris (PV)

Plan: Stop all OH products and excisional (“punch”) biopsy
Desquamative Gingivitis (pediatric patients)

- Clinical term to describe red, painful, “peeling off” gingiva.
- At least three different mucocutaneous conditions present as desquamative gingivitis in children.
- Desquamative gingivitis can be mistaken for plaque induce gingivitis and this can lead to delayed diagnosis and inappropriate treatment.
- There is loss of stippling and the gingiva may desquamate easily with minimal trauma.

Desquamative Gingivitis (pediatric patients)

- Gingival erosive lichen planus (ELP)
- Mucous Membrane Pemphigoid (MMP)
- Pemphigus Vulgaris (PV)
- Crohn’s disease, Linear IgA, plasma cell gingivitis

Pemphigus and pemphigoid are two of a group of bullous diseases affecting the oral mucosa and skin.

They are both autoantibody-mediated disease, although the target antigens are quite different in type and location.

Mucous membrane pemphigoid (MMP) comprises a heterogeneous group of disorders characterized by sub-epithelial separation and the deposition of Ig and complement along the basement membrane (BMZ).

Pemphigus is characterized by acantholysis within the epithelium owing to the binding of IgG auto-antibodies to desmogleins. (1)

Pemphigus affects between 0.1 and 0.5 patients per 100,000 depending on the population studied. (2)
Etiopathogenesis

Epithelial structure

Desmosomal plaque

Desmocollin

Desmoglein

Keratinocyte

\( P = \text{Plectin} \)

\( Pe = \text{Periplakin} \)

\( D = \text{Desmoplakin} \)

\( E = \text{Envoplakin} \)

IgG 4 and IgG 1 polyclonal antibodies

(Bhol et al., 1995; Tremeau-Martinage et al., 1995)

Pemphigus Vulgaris III
Pemphigus
Immunoglobulins from a patient with active pemphigus

Etiopathogenesis

Pemphigus Vulgaris IV
<table>
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<th>Etiology</th>
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<tr>
<td>Diet</td>
<td>Garlic</td>
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<td>Drugs</td>
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<td>Other factors</td>
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Pemphigus → Auto-antibodies → Unknown

Suppression

Azathioprine
Cyclophosphamide
Methotrexate
Gold
Cyclosporine
Prednisone

Removal

Oportunistic infections
Bone marrow suppression
Renal failure
Skin problems
Bladder problems
Other gingival lesions in children no classified as viral or autoimmune

2. Gingival Lesions in Children
Theresa, 10 y.o.
Localized Juvenile Spongiotic Gingival Hyperplasia

This lesion is considered a unique and distinctive form of inflammatory gingival hyperplasia seen in young patients (average age 11.8 years), predominantly female and generally found in the maxillary anterior region.

This type of lesion was first described by Darling et al. as juvenile spongiotic gingivitis.

After the investigation of a larger sample size by Chang et al. the more accurate term LJSGH had been suggested.

It appears as a bright red raised overgrowth with a papillary or finely granular surface, however, it does not seem to be a plaque related lesion.
Localized Juvenile Spongiotic Gingival Hyperplasia

The lesion presents as a small (average size was 6 mm), localized and easily bleeding overgrowth on the gingiva of a child.

It is usually given the clinical diagnosis of pyogenic granuloma and frequently seen in conjunction with orthodontic brackets, which may be purely coincident with the patient population.

The lesion is not painful, but bled easily.
Localized Juvenile Spongiotic Gingival Hyperplasia

The histologic presentation is an exophytic lesion with a subtle papillary architecture composed of interconnecting bands of epithelial hyperplasia.

The histology is unique and characterized by prominent intercellular edema (spongiosis) and neutrophilic exocytosis.

The presence of highly vascular connective tissue cores is seen containing mostly acute, but with some chronic inflammatory cells

LJSGH displays as a gingival overgrowth rather than a pure inflammatory process with minimal to no tissue swelling.
Localized Juvenile Spongiotic Gingival Hyperplasia

The etiology is unknown and the lesion does not respond to periodontal treatment showing a lack of association with plaque or calculus.

Darling et al. compared juvenile spongiotic gingivitis/LJSGH with puberty gingivitis and found several distinguishing features including a lack of immunoreactivity for estrogen and progesterone receptors in LJSGH.

Treatment for LJSGH is conservative surgical excision and the carbon dioxide laser is ideal for treating this lesion. The young age of the patient makes laser ablation a preferred and very efficient procedure, well tolerated by this population of patients. Recurrence is rare and when it does occur, may be due to incomplete removal of the lesion.
Juanita, 4.5 year-old

Special thank you to Dr. Jennifer Garvey, DABPD, pediatric dentist in Greenville, SC
Incisional biopsies

Incisional biopsy lower gingiva

These are portions of stratified squamous epithelium with small amount of underlying stroma. There are scattered, distorted neutrophils within the squamous epithelium, with moderate number of plasmatic inflammatory cells with foci of noncaseating granulomata within the underlying stroma. Foci of fibrous exudate and bacterial overgrowth are present on the surface. No malignancy is seen.

Incisional biopsy lower lip

This is stratified squamous epithelium with underlying stroma and fragment of accessory salivary gland tissue. The squamous epithelium shows acanthosis with scattered intraepidermal leukocytes, while the underlying stroma contains numerous chronic inflammatory cells, predominantly plasma cells with foci of noncaseating granulomata composed with multinucleated giant cells with a few sarcoidal type of cytoplasmic inclusions.

DIAGNOSIS: Orofacial Granulomatosis
Orofacial granulomatosis has become a well-accepted and unifying term encompassing a variety of clinical presentations (biopsy = non-specific granulomas)

Orofacial granulomatosis ~ Aphthous stomatitis (idiopathic but appears to be an abnormal immune reaction)

Systemic disease that mimic OG: Crohn’s disease, sarcoidosis, tuberculosis

Several triggers are involved
The majority of patients are adults. However, when in children → strong association with asymptomatic inflammatory gastrointestinal process (different from Crohn’s disease) and associated with dietary triggers.

Clinical presentation is highly variable. Most common site: LIPS.

When the signs are combined with facial paralysis and fissure tongue: **Melkersson-Rosenthal syndrome**

Intraoral: Tongue and gingiva (swelling and erythema)
The diagnosis of OG → histopathology: presence of granulomas associated with negative stains for organisms and no foreign material

Treatment:

• First goal → identify the possible cause (not easy at all)

• In children → Strong consideration to dietary allergens or an association with underlying GI disease

• Topical use of steroids (similar to RAS), TNF-α antagonist (infliximab), intra-lesional injections of steroids

Prognosis → highly variable
Diana
Gingival Overgrowth

- Gingival Fibromatosis
  - Hereditary
  - Idiopathic
- Poor OH
- Drug induced
  - Phenytoin
  - Cyclosporine
  - Calcium channel blockers (Verapamil, Nifedipine)
- Leukemia
• Generalized firm, collagenous overgrowth of the gingival fibrous connective tissue
• Onset: childhood, correlated with eruption of teeth
  • Teeth necessary for initial process
• Hereditary or Idiopathic
  • Hereditary Gingival Fibromatosis (HGF):
    • AD
    • Zimmerman-Laband, Murray-Puretic-Drescher, Rutherfurd, Cross Syndrome
      • Clinical features commonly associated with HGF
        • Hypertrichosis, Hearing loss, Hypothyroidism, Cherubism
  • Idiopathic
• Recurrence—very common
Idiopathic gingival fibromatosis (IGF) is an enlargement localized or generalized of the gingival tissue characterized by an expansion and accumulation of the connective tissue, mainly collagen type I.

The enlargement is more prominent during the eruption of the primary and permanent teeth. Poor oral hygiene has been also associated with the condition.

The diagnosis is established through history, clinical examination and histopathology.

Surgical treatment including gingivectomy and gingivoplasty are usually the treatment.
Marcos
• Cyclosporine has improved the 5-year success rates for solid-organ transplantations from 50% to 96%.

• Multiple side effects including nephrotoxicity, HTN, hypercholesterolemia, and gingival overgrowth.

• Serum concentration, drug dose, time since transplantation, age, gender, concomitant meds, and OH can relate to the gingival overgrowth.

• Presence of plaque seems to be more associated with overgrowth than dose or serum conc. of drug in therapeutic dose range.
“Drug-induced gingival enlargement” is the most accepted term by the Am. Academy of Periodontology

Prevalence estimated to be about 25 to 30%

Prednisolone does not contribute to gingival overgrowth or periodontal disease, but may actually decrease the two

Dental plaque was related to overgrowth and indicated that plaque control after cyclosporine administration may play an important role in eliminating gingival enlargement

Young females more susceptible than adults
Fernando
Based on the clinical pictures and history, which of the following diagnosis at this point, you will place higher in the differential?

1. Idiopathic gingival overgrowth
2. Hereditary gingival overgrowth
3. Poor oral hygiene
4. Medication induce gingival overgrowth
5. Malignancy? (Leukemia)
A 13-year-old boy presented to the pediatric dentist for routine dental care. Clinical evaluation revealed gingival overgrowth on the left side of his mouth.

**Past medical history ➔** Essential hypertension

ADHD

Asthma

**Medications ➔** Nifedipine, albuterol

The diagnosis of essential hypertension was made when he was 3 year-old. Initially was monitored without pharmacologic intervention. Nifedipine was added at the age of 11.
Gingival Overgrowth

- Gingival Fibromatosis
  - Hereditary
  - Idiopathic
- Poor OH
- Drug induced
  - Phenytoin
  - Cyclosporine
  - Calcium channel blockers (Verapamil, Nifedipine)
- Leukemia
Hypertension in Children

The prevalence of hypertension in the pediatric population has been calculated between 1 and 5%.

A significant increase in the cases of hypertension in children is expected in the next decade because of close association between obesity (16% of US children) and hypertension.

Hypertension in children is defined as systolic and/or diastolic above 95% percentile for age, sex and height.

Staging of hypertension in children follows the percentile classification. Measurements below 90th percentile are considered NORMAL, 90-95th: pre-hypertensive, between 95 to 99: stage 1.
Hypertension in Children

Conditions that may cause hypertension in children

• Renal parenchymal disease (60–80%) → “essential”

• Coarctation of the aorta: the most common non-renal etiology (5–15%)

• Renal artery stenosis (5–25%)

• Endocrine: excess mineralocorticoids (congenital adrenal hyperplasia) or catecholamine (pheochromocytoma, neuroblastoma)

• Obesity, Solid organ transplants, Medications
Gingival enlargement is a well-documented side effect of three classes of medications: CCB, anti-epileptics, immunosuppressant.

- Nifedipine is the most common CCB associated with gingival overgrowth (6-85%).
- Not common reported in children.
- Not reported as unilateral pattern.
- Gingival enlargement can be observed 1-3 months after the start of the therapy.
- CCB affect the calcium metabolism
- CCBs limit Ca2+ influx into the cell, altering matrix metalloproteinase metabolism and reducing the production of active collagenase → collagen degradation is reduced and there is an increase in the extracellular volume.
- Genetic variability in the susceptibility of the fibroblast
- Role of oral hygiene
Common Tongue Lesions in Children

3.
Affects approximately 2% of the U.S. population

Occurs more frequently in females and is asymptomatic

Patients usually see for treatment upon observing the unusual appearance of the tongue

The etiology has not been established, however some contributor factors are: atopy, stress, and hormonal changes
Clinically, geographic tongue is characterized by the presence of atrophic patches, typically in the anterior ¾ of the tongue.

The patches are surrounded by raised, yellow-white borders.

The clinical appearance persists for several days or weeks, and then disappear only to migrate and reappear in other locations.

Association of fissure tongue

Treatment ➔ Topical steroids
**Topical Anesthetics and Coating Agents:**

**Rx:** Diphenhydramine hydrochloride liquid 1.25 mg/mL and aluminum hydroxide, magnesium hydroxide oral suspension (Maalox); Mix in a 1:1 ratio

**Disp:** 200 mL

**Sig:** Rinse with 1 to 2 teaspoons (5-10 mL) every 4 hours for 2 minutes; swish and spit or swish and swallow. Shake well before use and store suspension at room temperature.

**Pediatric significance:** This mouthrinse is compounded by the pharmacy and is stable for 60 days. For children who cannot rinse, the suspension can be swabbed inside of mouth with a disposable oral swab or cotton-tipped applicator. If swallowed because of concurrent throat pain, the maximum amount is 4 mL/kg/d or 5 mg/kg/d of diphenhydramine. Because there are several diphenhydramine liquid formulas available, one that is alcohol-free should be used.
Median Rhomboid Glossitis

Median rhomboid glossitis is also known as central papillary atrophy.

It is characterized by an area of redness and loss of the lingual papillae, situated in the dorsum of the tongue.

Related with a chronic fungal infection (oral candidiasis).

Usually asymptomatic and sometimes with a “mirror” lesion in the palate.

Predisposing factors: Use of antibiotics in children.
Median Rhomboid Glossitis

The diagnosis is based on the clinical appearance.

Usually no biopsy is needed.

Treatment with topical or systemic anti-fungal medications
Median Rhomboid Glossitis

Topical Antifungal/Steroid Agent for Symptomatic Lesions:

**Rx:** Nystatin/triamcinolone acetonide ointment, 100,000 units/g; 0.1%
**Disp:** 15 g tube
**Sig:** Apply a thin layer to the tender areas on the tongue; use after meals and before bed for 5-7 days and re-evaluate.

**Pediatric Significance:** This is for short-term use only, when symptoms are problematic and a secondary *candida* infection is suspected.

In general, it is helpful to avoid acidic, carbonated or spicy foods and beverages when the tongue is symptomatic.
## Median Rhomboid Glossitis

<table>
<thead>
<tr>
<th>Name</th>
<th>Dose</th>
<th>Duration</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clotrimazole</td>
<td>Oral troche</td>
<td>14 days</td>
<td>OK</td>
</tr>
<tr>
<td>Fluconazole</td>
<td>Tablets 100 or 200 mg day</td>
<td>7-14 days</td>
<td>$</td>
</tr>
<tr>
<td>Itraconazole</td>
<td>Capsules and Oral solution</td>
<td>7-14 days</td>
<td>Systemic fungal disease</td>
</tr>
<tr>
<td>Ketoconazole</td>
<td>Tablets 200-400mg daily</td>
<td>1-4 weeks</td>
<td>OK</td>
</tr>
<tr>
<td>Nystatin</td>
<td>Oral suspension 400,000-600,000 UI 4 times/day</td>
<td>14 days</td>
<td>OK</td>
</tr>
<tr>
<td></td>
<td>Oral tablets 200,000-400,000 IU 5 times/day</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Common Radiographic lesions in Children
Andrea, 14 year-old
14-year-old, girl

According to patient mom “She had her wisdom teeth out 2 months ago and since then she is having pain over the back left side of the mandible”

PMH: Non contributory

Allergies: NKDA

Medications: None
Based on the radiographs and history, which of the following diagnosis at this point you will place higher in the differential for the radiopaque area at the apex of tooth # 20?

1. Condensing osteitis (why YES....why NO!!)
2. Fibrous dysplasia (Why YES....why NO)
3. Cemento-osseous dysplasia (Why YES.......why NO)
4. Idiopathic bone sclerosis (Why YES.......why NO)
CBCT in the Pediatric Patient
Sources of Radiation Exposure

- Natural: 83% (3 mSv/year)
- Artificial: 17% (0.6 mSv/year)

Radiation Safety and Protection

3.6 mSv/year

Cosmic
Terrestrial
Internal
- Radon
  - Ingestion of food
    - 2.4 mSv
<table>
<thead>
<tr>
<th>Examination</th>
<th>Effective Dose (mSv)</th>
<th>Equivalent background radiation (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intraoral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Posterior BW (F-speed) (rectangular collimation)</td>
<td>0.005</td>
<td>0.6</td>
</tr>
<tr>
<td>FMX (rectangular c.) FMX (round collimation)</td>
<td>0.035 0.171</td>
<td>4 21</td>
</tr>
<tr>
<td>Extraoral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Panoramic Cephalometric</td>
<td>0.006-0.026 0.002-0.066</td>
<td>1-3 0.5-1</td>
</tr>
<tr>
<td>CBCT I-CAT® (extended view: 16 x 13 cm) 10 y.o.</td>
<td>0.134</td>
<td>13</td>
</tr>
<tr>
<td>CBCT Accuitomo® 170 (small view: &lt;40 cm²) 10 y.o.</td>
<td>0.028</td>
<td>2.8</td>
</tr>
<tr>
<td>CBCT Kodak 9000 3D (small view: &lt;40cm²) 10 y.o.</td>
<td>0.016</td>
<td>1.6</td>
</tr>
<tr>
<td>CBCT I-CAT® Next generation (medium view) 10. y.o</td>
<td>0.063</td>
<td>6.3</td>
</tr>
<tr>
<td>CT Head</td>
<td>2</td>
<td>243</td>
</tr>
</tbody>
</table>

Background radiation: 3.6 mSv / year
3D Imaging for Pediatric Dentistry: Potential Risks and Diagnostic opportunities

The introduction of intraoral digital imaging in the late 1980’s and dental cone beam CT in the late 1990s ushered in a paradigm shift in oral and maxillofacial radiology. Both of these methodologies promise enhanced diagnostic potential with integration into the digital office but they bring with them their own set of challenges and concerns.
3D Imagining for Pediatric Dentistry: Potential Risks and Diagnostic opportunities

We take for granted that volumetric imaging provide us with more information, but......

There is at this point little evidence for improved diagnostic efficacy over alternative radiographic examinations.
Clinical Recommendations Regarding Use of CBCT in Orthodontics
Position statement by the AAOMR

“...there is not clear evidence to support the routine use of ionizing radiation in standard orthodontic diagnosis and treatment planning including the use of CBCT”
3D Imagining for Pediatric Dentistry: Potential Risks and Diagnostic opportunities

• Explaining benefit to patients:

Accurate diagnosis

• Explaining risk to patients

In terms of background radiation
(don’t use wrong analogies)

• Answering the exposure question:

“..Yes, a small amount of radiation is require to make your images (or your child); however the dose that you will receive (or your child) is roughly equivalent to the amount of background exposure that we receive in (days or weeks)”
Bone Disorders

1. Idiopathic Bone Sclerosis
2. Fibrous Dysplasia
3. Simple Bone Cyst
4. Cemento-osseous dysplasia
Idiopathic Bone Sclerosis vs. Cemento-osseous dysplasia
Idiopathic Bone Sclerosis

IBS is a focal solitary sclerotic lesion that arises in the late 1st or early 2nd decade of life.

Its cause is unknown.

It is asymptomatic, is not associated with inflammation, and may remain static or demonstrate slow growth that usually stops when the patient reaches skeletal maturity.
Idiopathic Bone Sclerosis

In 90% of patients it occurs in the mandible, usually near the first molar or second molar or premolar.

At imaging, IBS is radiopaque, well defined, well localized, non-corticated, located at the apex of vital teeth. No root resorption and no teeth displacement.

Some patients may have multiple lesions.
According to the patient's mother “she had her wisdom teeth out 2 months ago and she had a knot in the area right after the extraction but eventually went away”. Then 2 months later with swelling and pain over the left mandible.

Mom consulted with the oral surgeon. No concerns over the area of extraction of tooth # 17

Pain partially controlled with ibuprofen and antibiotics (?)

According to the patient, “my whole jaw hurts, those three teeth are aching (18-19-20)”

Initially referred to the endodontist for root canal of tooth # 20

My differential diagnosis ➔ Neuropathic pain?
Differential diagnosis ➔ Neuropathic pain?

Neuropathic pain is chronic pain condition caused by an alteration in the peripheral or central nervous system (trigeminal neuralgia, atypical odontalgia, burning mouth syndrome, traumatic neuropathies, post-herpetic neuralgia, and complex regional pain syndrome).

Often neuropathic pain is misdiagnosed which can lead to unnecessary treatment.

Vascular compression, radiation, inflammation, trauma, infection, etc. can lead to neuropathic pain.
Differential diagnosis ➔ Neuropathic pain?


Extraction of third mandibular molars, dental injections, implant treatments, and endodontic treatments are the most common procedures in dentistry associated with neuropathic pain

Treatment: Amitriptyline, pregabalin, gabapentin

Suggested to see a neurologist
Odontogenic Cyst

- Radicular Cyst
- Residual Cyst
- Dentigerous Cyst
- Buccal bifurcation cyst
- Keratocystic Odontogenic Tumor
- Basal cell nevus syndrome
- Lateral Periodontal Cyst
- Calcifying odontogenic Cyst

Non-Odontogenic Cyst

- Naso-palatine canal cyst
Buccal Bifurcation Cyst
Buccal bifurcation cyst (BBC) is an inflammatory odontogenic cyst that usually occurs at the buccal region of the first or second primary mandibular molars.

Several names are used to describe this condition including the term juvenile paradental cyst. According to the World Health Organization the BBC is listed under the category of “paradental cyst” and named “mandibular infected buccal cyst”.
Buccal Bifurcation Cyst

BBC occurs in children between 5 and 13 years of age. Usually affects the second primary molar. Delayed tooth eruption and swelling at the affected area is commonly observed.

In some cases, partial tooth eruption with crown buccal tilting and deep periodontal pockets is observed.

Radiographically, the BBC is characterized by a well-defined radiolucent area, often corticated around the roots of the involved teeth. Usually the lamina dura is not affected.

Surgical excision of the lesion is the treatment of choice.
Systemic Conditions in Children with Oral Manifestations
Francisco, 9 year-old
This seems to have all started with a virus that most of his family got.

“He started with small white bumps on his tongue (early April) very painful. Parents took him to the pediatrician who prescribed Chlorhexidine. Then, parents took him to the pediatric dentist. His pediatric dentist said that his tongue was inflamed and prescribed a steroid rinse (Dexamethasone). Within the next 2 days (May 12) the lesion(s) were got worse. His dentist then send him to an oral surgeon. He couldn’t give the parents any idea what it was and said sometimes things like this just happen and if you get rid of the opening then it would heal. Parents called his pediatrician again who refer him to the ENT. The ENT physician referred again to pediatric dentistry”
Never before. First time of something like this

**Past Medical History**

- PMH: Unremarkable
- Medications: None
- Past Surgical history: Unremarkable
- Allergies: NKDA
- Social history: Excellent family support

**Review of systems:**

- Neurologic: No symptoms
- GI: Occasional GI “disturbances” (not well explained by the mom)
- Immune: No symptoms
- Cardiovascular: No symptoms

**PE:** Within normal limits, except for below ideal percentile weight and height
Based on the clinical pictures and history, which of the following diagnosis at this point you will place higher in the differential?

1. Recurrent aphthous stomatitis (RAS)
2. Intraoral Herpes
3. Fungal infection
4. Other (Idiopathic ulcers 😞)
Inflammatory Bowel Disease: Crohn’s Disease

- IBS is a chronic relapsing disorder of unknown etiology (probably immune related) that encompasses two different conditions: Crohn disease (CD) and ulcerative colitis (UC)
- In CD the inflammation occur anywhere in the GI tract (including the mouth)
- CD causes abdominal pain, diarrhea, weight loss and in some cases anorexia
- The annual incidence of pediatric CD in the US is between 0.2-8.5 cases per 1000,000
- Approximately 10% of patients with CD have oral mucosa ulcers, and the oral manifestations occasionally precede GI symptoms
- Oral ulcers in CD often have indurated borders and are histologically different from RAS
Tammy, 5 year-old
Patient laboratory results

- Platelet count: 16,000
- PT: 12 sec
- PTT: 26 sec
- INR: 1.1
- Bleeding time: prolonged
CBC:
Platelet count : 16,000
PT: 13.2 sec
PTT: 26.3 sec
WBC: 10,700
Mechanisms of Hemostasis

Bone Marrow          Coagulation Factors

Quantity

Platelets          Fibrin

Quality

Adhesion

CLOT = platelets + fibrin
Mechanisms of Hemostasis

- Platelets
- Thromboxane A2
- GPIIb-IIIa
- vWF
- GPIb
- Endothelial cell
1. **CBC and peripheral blood smear**
   Used to determine adequacy of platelets, red cell morphology

2. **Prothrombin time**
   Normal value 10-12 seconds
   Evaluation of the extrinsic and common pathways of coagulation
   Prolonged by deficiencies in factor VII, X, V, prothrombin and fibrinogen
   Used for: Monitor Warfarin, Evaluate liver disease, Vitamin K deficiency and DIC

* INR: International Normalized Ratio: $\frac{PT\ (patient)}{PT\ (Control)} \ ISI$
3. Partial thromboplastin time

- Normal Value 25-35 seconds
- Evaluation of the intrinsic and common pathways
- Prolonged in patients deficient in any plasma-clotting factors except VII or XIII

4. PFA-100® ➔ Platelet function
Platelets

The amount of bleeding with thrombocytopenia depends on the severity:

<table>
<thead>
<tr>
<th>Platelets</th>
<th>Spontaneous bleeding</th>
<th>Post-traumatic bleeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;50,000</td>
<td>No</td>
<td>Rare</td>
</tr>
<tr>
<td>30-50,000</td>
<td>Rare</td>
<td>Occasional</td>
</tr>
<tr>
<td>10-30,000</td>
<td>Occasional</td>
<td>Always</td>
</tr>
<tr>
<td>&lt;10,000</td>
<td>Frequent</td>
<td>Always</td>
</tr>
</tbody>
</table>
Immune Thrombocytopenic Purpura

- No more idiopathic
- IPT has an incidence of up to 6.4 cases per 100,000 children
- The condition is immune-mediated and is caused by an excessive destruction of platelets by the spleen
- ITP is a diagnosis of exclusion. The combination of **patient history and clinical examination** is by far the most important diagnostic tool
- A considerable proportion of children achieve remission between 6-12 months
- In the majority of cases → no treatment is necessary
- Precautions → contact sports and IM injections
Isabella, 3 year-old
3 year old, girl

Patient is a 3 year old healthy girl who presented to the pediatric dental office with “white stuff” in her mouth for the last week. No complain of pain.

PMH: Non contributory

Allergies: NKDA

Medications: None

Review of systems: Essentially negative except for a recent episode of otitis media
Based on the clinical pictures and history, which of the following diagnosis at this point you will place higher in the differential?

1. Candidiasis
2. Candidiasis
3. Candidiasis
4. Other (Idiopathic candidiasis 😞)
Patient laboratory results

- **RBC**: 4.5 mm³
- **Platelet**: 250,000
- **WBC**: 6,300
- **Hg**: 14 gr/dl
- **Lymphocytes**: 10%
Clinical features which may indicate immunodeficiency

- Three or more episodes of otitis media in 6 months
- Persistent purulent ear discharge
- Two or more serious sinus infection within one year
- Two or more episodes of pneumonia within one year
- Failure to thrive
- Recurrent deep skin infections
- **Persistent candidiasis**
- Family history
Primary Immunodeficiency

- B-cell
- T-cell
- Both
Primary Immunodeficiency Disorders

- B cell (antibody) deficiencies
- T cell deficiencies
- Combination B and T cell deficiencies
- Defective phagocytes
- Complement deficiencies
- Unknown (idiopathic)
Immunity to infection

The areas of the immune system to consider are:

- Humoral immunity (B cells and Immunoglobulins production)
- Cell-mediated immunity (T cells), neutrophils
- Complement cascade
T cell disorders

B cell defects

Phagocyte disorders

Complement disorders

Selective IgA Deficiency
stem cell

Myeloid progenitor cell

Neutrophil

Monocyte

Lymphoid progenitor cell

B-cell

Ig-A
Selective IgA deficiency

• Selective IgA deficiency is one of the most common types of primary immunodeficiency

• Many patients go undiagnosed because they are never sick enough to be seen by a doctor

• Patient with selective IgA deficiency do produce all the other Ig

• The cause is unknown

• Children with selective IgA deficiency are at risk of infection. about half have repeated infections of the ears, sinus and airway

• Children with IgA deficiency are at increased risk for anaphylactic reactions
Alicia, 13 year old
13 year old, girl

Patient is a 13 year old otherwise healthy girl who presented to the pediatric dental office with her mom because pain and “sores” in her mouth. Not the first time.

PMH: Non contributory  Allergies: NKDA

Medications: None
13 year old, girl
Review of systems

Neurologic: No symptoms
Head and neck: No symptoms
Cardiovascular: No symptoms
Gastrointestinal: Some occasional abdominal discomfort
(NO diarrhea, nausea or vomit)
Urinary: No Symptoms
(No genital ulcers)
Based on the clinical pictures and history, which of the following diagnosis at this point you will place higher in the differential?

1. Recurrent aphthous stomatitis (RAS)
2. Intraoral Herpes
3. Fungal infection
4. Other (Idiopathic ulcers 😞)
Young patient, “acute” (not too acute!!) multiple ulcer, skin lesions negative past medical history, negative laboratory exams:

- RAS
- Crohn’s disease
- Behçet’s syndrome
- MAGIC syndrome
- Cyclic neutropenia
- Pathergy test (+)
Behcet’s disease

• BD is an idiopathic condition, chronic, relapsing, multi-systemic, characterized by recurrent oral and genital ulcers, ocular disease and skin lesions.

• The prevalence is higher in countries around the Mediterranean sea

• The prevalence in the US varies between 0.2 – 5.2 per 100,000

• BD is more common in females (in North America)

• The diagnosis is based on clinical criteria
Behcet’s disease

- There are NOT pathognomonic laboratory test for BD

- Diagnosis requires the observation of recurrent oral ulcerations (three episodes within any 12 month period) plus ANY two of the following: recurrent genital ulcers, eye lesions, skin lesions or a positive pathergy test.

- Management of BD is challenging → use of anti-TNF-α, colchicine steroids, immunomodulators and immunosuppressants.
Bumps in the oral cavity of children
• Common lesion of the oral mucosa that results from rupture of salivary gland duct and spillage of mucin into the surrounding soft tissues

• The most common reason: TRAUMA

• It is not a true cyst (no epithelial lining)

• Typically they are dome shaped swelling that can range from 1 to 2 mm

• Most common lesion in children

• Often translucent

• Fluctuant at palpation. From a few days to few years: History of recurrent swelling
Mucocele

- The lower lip is by far the MOST common site
- Some mucoceles are short-lived lesions that rupture and heal by themselves
- Some mucoceles are chronic in nature and surgical excision is necessary
- Excellent prognosis
Pyogenic Granuloma

It is a common tumorlike growth of the oral cavity that traditionally has been considered to be non-neoplastic.

Unrelated with infection and granulomas!

It is an exuberant tissue response to local irritation or trauma.

It is a smooth, lobulated mass, usually pedunculated.

Microscopic evaluation shows a highly vascular proliferation.
Pyogenic Granuloma

- Red in color, bleeds easily
- Pedunculated or broad based
- Usually seen on gingiva
- May occur on lips, buccal mucosa or tongue
- More frequent in females

Neville, Damm, Allen, Bouquot. Oral and Maxillofacial Pathology 3 edition
Pyogenic Granuloma

Etiology:
- Connective tissue reaction to injury or other stimulus
- Hormonal changes/puberty
- Composed of hyperplastic granulation tissue

Treatment:
- Surgical excision
- Frequently recurs
The eruption cyst (or in some textbooks, eruption hematoma) develops from separation of the dental follicle from around the crown of a tooth who is erupting.

The eruption cyst is a soft, swelling in the gingiva overlying the crown of an erupting primary or permanent tooth. The majority of cases of eruption cysts are seen in children under the age of 10.

The lesion is most commonly associated with the central permanent incisors or central primary molars.

Treatment is usually not required because the eruption cyst ruptures spontaneously.
Leiomyomas are benign tumors that originate from smooth muscle. The most common place that leiomyomas are found is the uterine myometrium. However, leiomyomas are also found in the gastrointestinal tract, skin and lower extremities. Leiomyomas are rare in the oral cavity, the most common place is the lips followed by tongue, cheeks, palate and gingiva.
Leiomyomas

Usually the lesion is asymptomatic, slow-growing. In children is rare. Histopathology has a key role in establishing the diagnosis.

The differential diagnosis when is located in the oral cavity is Mucocele and fibromas. Leiomyomas in the oral cavity are characterized by a solitary, usually ovoid and mobile mass covered by normal appearing epithelium.

The consistency is usually firm with a well-defined margins. The treatment of leiomyomas in the oral cavity is the complete resection of the lesion.
Giant Cell Fibroma

The giant cell fibroma is a fibrous tumor that is probably unrelated with chronic trauma (difference with the traumatic fibroma).

Typically the giant cell fibroma is asymptomatic and represents 2% to 5% of all oral fibrous proliferations submitted for biopsy.

A common differential diagnosis is papilloma. Compared with the irritation fibroma, the lesion occurs at a younger age.

There is a slightly female predilection. The mandibular gingiva is affected twice as often as the maxillary gingiva. The palate is also a common place. From the histopathology perspective, the hallmark is the presence of fibroblast within the superficial connective tissue. The treatment is conservative surgical excision.
Peripheral Giant Cell Granuloma

- Found only in gingiva
- Usually distal to incisors
- May cause bone resorption
- Appear as red or blue broad-based masses
- More frequent in females
Peripheral Giant Cell Granuloma

Etiology:

- Hyperplastic connective tissue response to gingival tissue injury
- Histologically see multinucleated giant cells
- Similar in appearance to pyogenic granuloma

Treatment:

- Surgical excision
- Recurrence is uncommon
Human papillomavirus infection of the oral mucosa
Human papillomavirus infections of the oral mucosa

Classification

• Papillomaviruses are small, double stranded DNA viruses.

• Human can be infected only by HPV’s, not by papillomaviruses found in animals.

• The HPV genome contains eight open reading frames (ORFs) which are potentially coding sites of six early proteins (E) and two late proteins (L). The L1 ORF is used to identify the different types of HPV because it is the most conserved of the eight ORFs within the genome. (1)

1. Rautava J, Syrjanen S. Human papillomaviruses infections in the oral mucosa. JADA 2011; 142(8):905-914
Human papillomavirus infections of the oral mucosa

Classification

• Investigators have described **more than 120 different HPV types** on the basis of the isolation and sequencing of complete genomes. (1)

• Most HPV that infect oral mucosa site **belong to the alpha papillomaviruses, which consist of 15 species**. (2)

• To date, investigators have identifies 30 HPV genotypes: 15 high-risk types, 3 types that probably are high risk and 12 low-risk types.

1. Rautava J, Syrjanen S. Human papillomaviruses infections in the oral mucosa. JADA 2011; 142(8):905-914
Human papillomavirus infections of the oral mucosa

Classification

HPV-16

LCR → Regulation and virus gene expression and virus replication

- E1
- E2
- E3
- E4
- E5
- E6
- E7

Minor capsid protein
Major capsid protein
Membrane signaling protein

Rautava J, Syrjanen S. Human papillomaviruses infections in the oral mucosa. JADA 2011; 142(8):905-914
Human papillomavirus infections of the oral mucosa

Human papillomavirus infections of the oral mucosa

Acquisition of oral HPV infection

• HPV infections are transmitted mostly by means of close contact.

• Infectious HPV spreads especially through sexual contact but also vertical (cervical canal during the delivery) and through autoinoculation. (1)

• Investigators detected HPV in placental (4.5%) and cord blood samples (3.5%), both of which indicate an increased risk among newborns of becoming carriers of oral HPV at birth. (2)

• Horizontal transmission among family members also is possible in childhood, and in that the role of the mother seems to be more important than the father. (3)

Human papillomavirus infections of the oral mucosa

Acquisition of oral HPV infection

• A mother’s persistent HPV infection might increase the infant’s risk of developing oral HPV (OR=5.7; 95% CI). (1)

• Oral sex has been speculated to be the main transmission mode of HPV infection. However, follow-up studies are lacking, and most of the data are derived from studies of head and neck SCC in which the risk factors have assessed at a general level. (2)

• In a cohort study of spouses, oral sex was not associated with oral asymptomatic HPV infection. Instead, persistent HPV infection in one spouse was a significant factor (OR=4.3; 95% CI, P=0.06) for persistent oral HPV infection in the other spouse. (3)

2. D’Souza G et al. Oral sexual behavior associated with the prevalence of HPV infection. Journal of Infectious Disease 2009
Human papillomavirus infections of the oral mucosa

Viral life cycle
Human papillomavirus infections of the oral mucosa

Figure modified with permission of Elsevier from von Knebel Doeberitz and Vinokurova
Human papillomavirus infections of the oral mucosa

Viral life cycle

• After cell division, the infected daughter cells migrate towards the suprabasal region and begin to differentiate, which triggers a coordinate transcriptional cascade of the viral genome. (1)

• Viral proteins (E6 and E7) retard the normal terminal differentiation by stimulating cellular proliferation and DNA synthesis through interfering with and inhibiting several cell cycle regulators to allow amplification of the viral genome.

2. Image from Google open access images
Human papillomavirus infections of the oral mucosa

HPV and oral conditions: asymptomatic oral mucosa
HPV and oral conditions: benign lesions

- Low risk HPV genotypes are often responsible for benign oral mucosal lesions such as ordinary warts, condylomas, focal epithelial hyperplasia and oral papillomas.

- The most common low-risk genotypes are HPV-6 and HPV-11. The skin types HPV-2 and HPV-4 have been found also in oral lesions. (1)

- Both girls and boys with HIV are at increased risk of developing genital and anal HPV. Also HPV lesions in the oral cavity are more frequent. (3)

- Interestingly enough, during the anti-retroviral treatment of HIV, the occurrence of many HIV-associated disease decline dramatically, EXCEPT HPV associated lesions. (2) (immune response is not a major determinant in the development of HPV)

References:
2. Termine N et al. HPV in OSSC. American Journal of Oncology 2008
The microscopic sections reveal a papillary nodule of mucosa that is surface by parakeratotic stratified squamous epithelium which forms several short projections of mucosa with connective tissue cores.

The underline lamina propria consists of fibrous connective tissue with scattered small vascular channels and neural bundles.

Diagnosis: Papilloma
• Age: 13 y.o, girl.
• Chief Complaint: “There is something in my gums”
• HPI: Asymptomatic lesion between 10 and 11. Unknown duration. pedunculated.
• Past Medical History (PMH):
  - Hypothyroidism
  - Anemia
  - Vision problems
• Past Dental History (PDH): Last visit to the dentist: 18 months ago
• Age: 4 y.o, girl.
• Chief Complaint: “There is something in the back of my mouth”
• HPI: Asymptomatic lesion at the junction between hard and soft palate at the right side. Unknown duration. Well pedunculated.
• Past Medical History (PMH): Unremarkable
• Past Dental History (PDH): Last visit to the dentist: 6 months ago
• Age: 7 y.o, boy
• Chief Complaint: “There is something on my lips”
• HPI: Asymptomatic lesion at the lower lip. Unknown duration. Well pedunculated.
• Past Medical History (PMH):
  Unremarkable
• Past Dental History (PDH): Last visit to the dentist: 6 months ago
• Age: 17 y.o, boy.

• Chief Complaint: “There is something in the front of my mouth”

• HPI: Asymptomatic lesion between maxillary central incisors. Unknown duration. Well pedunculated.

• Past Medical History (PMH):
  Asthma well controlled. Using steroids PRN

• Past Dental History (PDH): Last visit to the dentist: 6 months ago
HPV

- Squamous Papilloma
- Verruca Vulgaris (common wart)
- Condyloma Acuminatum
- Multifocal Epithelial Hyperplasia (Heck Disease)
Squamous papilloma

- Benign proliferation of stratified squamous epithelium
- The lesion is induced by HPV
- Exact mode of transmission is unknown
- Equal frequency in boys and girls
- More common places: tongue, lips and soft palate.
- The papilloma is usually solitary
- Histopathology: proliferation of keratinized stratified squamous epithelium in “finger like projections” with fibro-vascular connective tissue cores.
Verruca Vulgaris

- It is a benign, virus-induced, focal hyperplasia of the stratified epithelium
- HPV is found in almost all the lesions
- Frequent lesion in children
- Hands is usually the site of the infection. Oral cavity: anterior tongue - lips
Condyloma acuminatum is a STD appearing most frequently as a soft, pink cauliflower like growth.

The condition is highly contagious

Both genders are affected equally

The peak incidence is between 17 to 20

The histology shows → papillary lesions
Thank you!!!!!!