COURSE REGISTRATION
Pre-registration is required for all continuing education courses with the exception of the “Live” Dentistry and Affiliated Groups. Your seat will be held for 15 minutes after the start of the course; after that, those without tickets will be seated according to space availability. When the room is filled, no additional people will be admitted due to fire department regulations. If you have not pre-registered, please be prepared to select an alternate session to attend.

Tickets
Tickets are required for all courses excluding Live Dentistry. Tickets for all functions can be purchased at all general registration booths located in the Registration Area on the Upper Level in the Crystal Palace and online.

6 Days of Education Seminars, Hands-on Workshops & Essays
Friday - Wednesday

4 Days of Exhibits
Sunday - Wednesday
Apthous Ulcers

- T-cell mediated immunologic reaction
- Familial tendency
- Disruption of mucosal barrier on non-keratinized mucosa
- Do not occur on surface of lips
- Not contagious

Children with celiac disease experience a higher incidence of apthous ulcers and enamel defects.


- Sodium laryl sulfate may disrupt mucin layer.
- Study showed that removal of SLS did not decrease the occurrence of RAU, but did decrease pain and duration.


- Cyanoacrylate medical adhesive is a synthetic adhesive.
- 2-octyl cyanoacrylate is a topical medical adhesive formulation.
- Only FDA approved is ORABASE. Soothe.N.Seal liquid protectant.
- Polymerizes into a thin, flexible polymer film that adheres to mucosal tissue.


Asthma & Yeast Infection

- Corticosteroids in inhalers may cause yeast infection.
- Rinse, gargle and swallow water after use.
• Nystatin Suspension- Mycostatin
  100,000 U/ml (60, 473ml)
  – Swish and swallow 4-6ml QID
  – Hold in mouth as long as possible when swishing
  – May cause GI upset/diarrhea
  – Treat for 48-72 hours after resolution of symptoms

• Children with asthma are 5.5 times more likely to be diagnosed with GERD


• Powdered inhalers have pH less than 5.5 (ph for hydroxyapatite dissolution) causing erosion.

• Fall in pH lasts about 30 minutes after use of the oral inhalers.


• Asthma & Acetaminophen

  • Children ages 6-7 years who received Tylenol once a year were at 70% greater risk for asthma.

  • Those who received Tylenol once a month were 540% more likely to have asthma.


• Decreased Salivary Flow

  • Medications to treat asthma may decrease the secretion of whole saliva (mix of salivary fluids from major and minor salivary glands by 20%.

  • Salivary reduction is associated with an increase in lactobacilli and increased caries susceptibility.

• Streptococcal Pharyngitis

  • 10% have sore throat and fever

  • Vesicles or ulcers suggest viral

  • Beefy red uvula or exudate suggests strep

  • Penicillin VK, cephalosporin or erythromycin for at least 10 days

  • Not contagious after 24 hours of Ab
• Orthodontic retainers should be soaked in Listerine and the patient should rinse with Listerine if over age 12 and tolerated.

• When the prescription is filled, two new toothbrushes should be purchased. One brush is begun 24 hours after beginning the antibiotic, and the second brush is begun upon completion of the antibiotic.

Primary Herpetic Gingivostomatitis

• Herpes simplex virus type I (HSV-I) most often causes oral ulcers.

• Approximately 85-90% of US population is positive for previous infection for HSV-I.

• Even when infected, most individuals do not develop primary lesions (silent infection).

• Mouth tender with swollen gingiva that bleeds easily

• Grouped vesicles with erythematous base on lips, tongue, buccal mucosa, hard & soft palate and gingiva

• May extend into pharynx with thumb or finger habit

• Lymphadenopathy, fever, malaise

• Acetaminophen or ibuprofen for fever - according to age/dosing chart on label

• Do not treat with steroids or antibiotic


Prolonged high fever or lethargy may warrant emergency visit for impending Herpes Encephalitis.

• Maintain hydration

• Watch urine output

• Avoid citric acid and carbonated beverages

• Virus can survive 48 hours on dry toothbrush and 7 days on moist surface

• Immediate referral with nasal tip or eye involvement

• Most individuals are infected once and never have a recurrent episode.

• Virus is transmitted directly from the site of infection to the site of contact in saliva, blood and other body fluids.

• The viruses can infect any mucosal surface or break in the skin.

• Face contains extensive mucous membranes, such as the oral mucosa, the pharynx, the nasal cavity and the eyes.

• Wear face shield or eye protection with side shields!


Coating agent for over age 2

• 12.5mg/5ml diphenhydramine syrup. Mixed 1:1 with Maalox or Kapectate. 200ml dispensed. Rinse with 1-2 tsp every 4 hours for 2 mins. Can be swallowed

• Can use cotton tipped applicator if cannot rinse

• Max dose diphenhydramine 5mg/kg/day

Magic Swizzle for over age 8

1 part 2% viscous xylocaine
1 part liquid diphenhydramine
1 part Maalox or Mylanta

Adolescent

• Chloraseptic

• Orajel

• Abreva (docosanol)
  only OTC approved by FDA
  age 12 and over
  10% cream
  $15-20.00 - can get coupons

• Viroxyn- Benzalkonium chloride in glass vial

Gelclair Oral Rinse

• Bioadherent - Good coating agent
• Gel packet mixed with water
• Keep out if reach of children <12yrs
• Rinse around mouth for 1 minute and expectorate
• Use 3 times/day
• No eating or drinking for 30-60 mins
• Good for all mucositis, stomatitis, aphthous or traumatic ulcers (braces)
• PERIDIN - C  A proprietary blend of Vitamin C and bioflavonoids (Amazon)

• *Super L lysine 1000mg/day before onset during prodromal stage. Purchase at health food stores.

• Denavir/Penciclovir cream 1% 5g tube $$$
  Systemic with Prescription
• Valacyclovir (Valtrex) 500mg $$$

• Acyclovir- physician consult - cream or 200/400mg tablet

• After initial infection, the virus remains latent in the body throughout life.

• When an immune system is compromised, recurrence occurs.

• “Cold sores” with prodrome of tingling (trigeminal neuritis) followed by fluid-filled vesicles containing viral particles.

• Ulcers rupture and heal without a scar.

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**Coxsackie A-16 Enterovirus**

- Hand, foot, & mouth disease

- Primarily young children between 6 months and 5 years of age

- Fever, lymphadenopathy, rhinorrhea, diarrhea, nausea, anorexia & malaise

- Vesicles/red papules on tongue, palate, & buccal mucosa

- Smaller percentage of patients have involvement of lips, gingiva & pharynx including the tonsils

- Dehydration main complication

- Rash on hands, feet, legs, arms when fever abates

- Most contagious during first week, but can be contagious for weeks after symptoms abate

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**Perleche/Angular Cheilosis**

- Fungus Candida Albicans - Yeast infection

- Superficial exudative crust with ulcerated appearance

- Saliva collects in folds

- Possible riboflavin deficiency with superimposed fungal infection

- Nystatin Cream/Ointment
  100,000 U/gm (15gm or 30gm)

- Must treat for 48-72 hours after resolution of symptoms

- Change toothbrush
• Oral squamous cell carcinoma does occur in children.

• Most often on the tongue.


• Most common age for occurrence is birth to age 10.

• May unroof but surgical excision is most successful treatment.

• Stones may also form in the salivary gland or excretory duct.


Classified according to location
• sublingual - simple ranula - pseudocyst that results from extravasation or retention of mucous in the floor of the mouth & is confined to the floor of the mouth

• sublingual-submandibular - plunging ranula that occurs due to herniation of the mucous content through the mylohyoid muscle which separates the sublingual and submandibular spaces. (may see swelling in neck if below muscle)

• submandibular

Ranula

• Results from trauma or obstruction of the salivary duct or of the salivary gland situated in the submandibular or sublingual space.

• Asymptomatic, fluctuant, well-circumscribed, bluish in color swelling on the floor of the mouth.

• Obtain a lower occlusal radiograph to identify calcifications in duct.

• Instruct the patient to eat sour candy or lemons in an attempt to flush out any blockage.

• Diagnosis with needle aspiration, MRI, CT or ultrasound.

• Aspirated liquid is highly viscous with some salivary content.

• If cyst >2cm in diameter, MRI, CT or ultrasound are recommended to determine the extent of the lesion.

Treatment

• Non-invasive:
  Carbon dioxide laser has limited side effects. Cyst has high water content which is vaporized by the carbon dioxide laser. Heat causes coagulation of blood vessels and hemostasis. Less chance of tissue scarring and risk for injury to the submandibular lingual nerve & artery and the submandibular duct.

• Sclerotherapy with injections into the cyst

• Surgical:
  Marsupialisation- unroofing- for cyst <2 cm in size. High rate of recurrence.
  Complete excision of the sublingual gland. Complication of paresthesia of tongue due to proximity of the lingual nerve and damage to the lingual artery.

Complications

• Recurrence
• Sensory deficit of the tongue
• Damage to Wharton’s duct
• Postoperative hemATOMA

• Reports of 13-90% recurrence with marsupialisation (incise and suture edges of wall to edges of wound), which is minimally invasive.

• Total sublingual gland excision is best for no recurrence.


Retention Cyst of the Maxillary Sinus

• Well-defined, homogeneous dome-shaped or hemispheric retention phenomenon from mucous glands associated with the lining of the maxillary sinus.

• Asymptomatic but rarely complaint of discomfort in cheek or maxilla

• Disappear spontaneously

• No treatment necessary

Benign Polypoid Fragment of Chronically Inflamed Sinonasal Mucosa

• Asymptomatic

• History of chronic sinus infection

• Mom insists on thyroid collar
Gemination

- Etiology possibly trauma causing contact between developing tooth germs, environmental and familial genetics.
- Results one dental follicle that attempts to divide.
- A split begins at the incisal edge and stops before cleavage is complete creating mirror image coronal halves.

- Occur more frequently in the primary dentition.
- Higher prevalence in Asian populations.
- Maxillary central incisors most commonly affected.

- Not associated with missing teeth in the permanent dentition.
- May result in crowding and/or delayed eruption of the permanent successor.
- Extraction may be necessary to permit normal eruption of the permanent successor.
- In permanent dentition, poor esthetics results.
- Modification of the crown may be attempted.
- The mesio-distal width of the crown and the CEJ will determine how much tooth structure may be removed. Full coverage, autotransplantation and in severe cases, extraction with implant may be required.
Fusion

- Etiology may be due to physical forces placing adjacent developing teeth in contact or embryological persistence of the interdental lamina between two tooth germs.

- Results from the fusion of two teeth, often at an angle with two roots and possibly a double pulpal space.

- Fused teeth are counted as one tooth, so the number of teeth in the arch is reduced.

- Double teeth involving two adjacent teeth (fused teeth) are often associated with a missing permanent successor or other anomalies.

- Fusion of a maxillary primary central and lateral incisors most often results in microdontia or impaction of the permanent successor.

- Fusion of the mandibular lateral and canine resulted most often in congenital absence of a permanent successor.

- Fusion of the permanent dentition occurs with less frequency.

- Treatment options include: reshaping the crown, sectioning and separation into two teeth if double pulpal space & restoration, hemisection and amputation of one root, extraction or no treatment.

Pre-eruptive Intracoronal Resorption

"...a well-defined radiolucent lesion located in the coronal dentin, just beneath the enamel-dentin junction of unerupted teeth."

- Radiograph necessary for diagnosis

Etiology is speculation

- Ectopic eruption with prolonged pre-eruptive period
- Local pressure from adjacent teeth
- Developmental anomaly of dentin

- No association with gender, race, fluoride, medical or systemic conditions.
Resorptive lesion with the replacement of the coronal tissue by vascular connective tissue or the invagination of osteoclasts (resorptive cells) into the dentin during crown formation.

- Unlikely that radiolucency in an unerupted tooth is carious.
- The tooth is within the dental follicle and not in contact with oral fluids.
- Histopathology shows resorptive cells composed mostly of macrophages, osteoclasts and inflammatory cells with no microbial contamination.

- Progression is asymptomatic.
- Most often occurs in permanent mandibular second molar, followed by permanent maxillary second premolars.


Treatment Options

- Surgical exposure to hasten eruption
- Restore after eruption and monitor pulp
- Extraction


Molar Incisor Hypomineralization

- “No amount of dietary regulation or calcium therapy” will correct these defects.


- Difficult to obtain good anesthesia.
- Pulp shows inflammatory changes.
- Parent should be informed that restoration will need to be replaced more frequently.

• Structural defect of enamel.
• Involves one to four of the permanent first molars.
• May be associated with changes in the permanent incisors.


• Initial formation of the first permanent molars’ enamel occurs en utero around week 20.
• Permanent incisors’ enamel formation begins after birth at 3 to 12 months of age.
• Enamel formation continues over the first 3 years of life.


• Consequently, the etiology of MIH may involve events occurring at the same time and/or independently during gestation, infancy and/or the first three years after birth.
• Etiology may be multifactorial or genetic.


• Enamel prisms are disorganized with lower enamel hardness, resulting in continued enamel breakdown.
• Bacteria deep in porous enamel contribute to dentin hypersensitivity.
• Larger dentinal tubules contribute to pulpal inflammation.


• Sensitivity to hot, cold, warm air/water or toothbrushing. Poor oral hygiene.
• Increased caries with enamel porosities trapping plaque deposits.
• Restoration repair/replacement frequent due to difficulties with bonding and disintegration of marginal enamel.


• There is a significant advantage to using articaine over lidocaine for supplementary infiltration after mandibular block.
• There was no significant difference between lidocaine and articaine for IAN or maxillary infiltration.

• Fluoride varnish

• Desensitizing toothpaste

Little Teeth CHAT AAPD on-line conversations

• Anti-inflammatory 200mg tid for 2-3 days prior to appointment if sensitivity to air/water.

• 60-90 second NaOCl pretreatment to deproteinize the enamel. Studies show this increases the bond strength.

• Remineralizing agents such as Casein phospho-peptide-amorphous calcium phosphate - CPP-ACP to create a state of supersaturation followed by deposition of calcium and phosphate ions at the enamel surface.

• Sealants

• Flowable composite - For small areas

• Composite - Margins should be on sound enamel. Need good moisture control.

• Resin infiltration may increase the hardness of the enamel with penetration, but not consistently.


• Silver diamine fluoride, SDF, is a topical antimicrobial agent that is effective in treating not only caries but dentinal hypersensitivity.

• Occludes dentinal tubules, creates fluorohydroxyapatite, and increases mineral density and hardness.

• Cover with fluoride varnish.

• Reappoint in 2-4 weeks for GI. This period permits the SDF to arrest caries and decrease sensitivity. If light cure the high-viscosity GI at time of SDF, the silver ions precipitate out of solution and turn the GI black.

• Amalgam

• Stainless steel crown or zirconia crown - severe involvement and where cusps are involved

• Orthodontic band with GI or composite - Palmetto Technique

• High viscosity glass ionomer cement
  – ease of placement without rubber dam
  – fluoride release that reduces biofilm
  – chemical and micromechanical bonding
  – 20% polyacrylic acid 10 seconds to remove smear layer, rinse & dry- do not desiccate.
  – no phosphoric acid or bonding agent because will block bonding of GI to tooth.
  – use spoon or slow speed as necessary for removal of non-painful superficial dentin/ ART technique
  – cover with light cured, self-adhesive resin
  – Disadvantage is poor wear resistance - adjust to very light occlusion
• Must choose appropriate restorative material and assure pulpal anesthesia.

• Conventional amalgam or resin restoration may not have a positive outcome—consider SSC


• Full coronal ceramic restorations have been found to be successful in patients as young as 11 years of age.


• Ceramics have a better marginal fit and are less plaque retentive. Normal crown contour offers improved periodontal health and esthetics.

• Preformed SSC’s are preferable to cast-metal ceramic or all-ceramic crowns during childhood and adolescence, but periodontal status must be followed.


Indications for IPT

• No symptoms of pulpitis and PA does not show carious involvement of pulp chamber.

• Instead of creating a pulp exposure, requiring endodontic treatment with complete excavation of caries, the deepest decay is left in place.

IPT for Young Permanent Molars

• Allows completion of root maturation prior to endodontic treatment.

• Persistent long-term follow-up is required with PA every 6 months.

• One-step now recommended over stepwise.

• Some state that by continuing excavation into the pulp, infected dentin chips are displaced into the pulp, thus increasing the risk of pulpal inflammation.

• After exposure due to caries, the pulp’s repair capacity is questionable.

• Young permanent molars/ hypoplastic molars.
Partial caries removal with amalgam or composite restoration had 99% success rate with a single session vs 86% success rate with step-wise excavation.

Single session is better for behavior considerations, cost and follow-up.


Tooth treated on first appointment.

No plan to re-enter tooth for pulpotomy.

Large round bur w. slow speed preferable to spoon for caries excavation.

May leave 1-2mm of leathery dentin over pulp.

Affected dentin should be able to remineralize due to decreased number of micro-organisms.

Calcium hydroxide is very soluble and not a good choice adjacent to resin, which has hydroscopic properties that make water available within the restoration. (CaOH interferes with composite set - Robert Lowe DDS)

Glass ionomer cement (GIC) is a good base or liner with resin-based composite.


Lamination
Sandwich Technique
Stratification

Combination of glass ionomer for dentin replacement and bonded resin-based composite enamel replacement.


Placement of a adhesively bonded resin-based composite over a resin-modified glass ionomer dentin replacement layer almost guarantees no post-operative sensitivity for the young patient.


GIC or resin-modified GIC photochemically bonds to the dentin. The need for dentin bonding adhesive is eliminated with GIC.

Bonding agent for the composite is placed over the GI or RMGI.

Early First Permanent Molar Loss

- Third molar development accelerated
- Third molar may erupt earlier


- Best outcome if at least half of the second permanent molar’s root is developed. (age 9-10)

- Acceptable development of the permanent dentition can be expected when severely hypomineralized permanent first molars are extracted prior to the eruption of the permanent second molars.


MTA Pulpotomy

- Investigated success of mineral trioxide aggregate pulpotomy as an alternative to root canal therapy in patients age 10-15 years.
- Success rate of 90%.
- Presents a possible option to endo or extraction.


Crown Size & Shape

- Extraction may be a good choice for the population who can not afford the initial expense or repeated restorations.


Etiology

- Anomalies of crown size and shape occur during the morphodifferentiation stage of tooth formation.
- Disruption during the morphogenic stage may result in one, multiple or all teeth with this anomaly.
Enamel and dentin are normal since disturbances during morphodifferentiation do not impair the function of the ameloblasts or odontoblasts.

Chemotherapy, environmental influences, irradiation and syndromes may be causative factors.

Microdontia & macrodontia

Etiology

- Environmental influences, genetic, radiation, chemotherapy and syndromes/

- Disruption during the morphogenic stage of tooth formation can result in one, multiple or all teeth affected by this anomaly.

- Because disturbance occurs during morphodifferentiation, the function of the ameloblasts and odontoblasts is not impaired.

- Microdontia is often associated with hypodontia.

- Higher incidence in females.

- Microdontia of a permanent lateral incisor is often associated with a missing lateral incisor in the same arch.

- Palatal impaction of the maxillary canine is associated with microdontia.

Maxillary Lateral Morphology

- Lateral incisors adjacent to palatally displaced canines had a mean length of 2.1mm shorter and mean root width smaller, particularly in the buccolingual dimension.

- Microdontia of lateral incisor(s) may be a risk indicator for palatal impaction of maxillary permanent canine(s).

- Esthetics is most common issue

- Food impaction

- Malocclusion

- Treatment may involve multiple disciplines

• No treatment indicated unless for esthetics.

• Enameloplasty with interproximal stripping, but must be aware of possible pulp exposure with risk of vitality.

• If severe with central incisor, may extract and orthodontically move laterals into space or replace with Maryland Bridge or implant.

• Treatment may involve multiple disciplines.

**Etiology**

• Both environmental and genetic.

• Occurs in the dental lamina formation stage during induction and proliferation.

• Local hyperactivity of the dental lamina has been suggested along with both autosomal recessive and dominant genes.

• Occurs twice as often in males, supporting an X-linked mode of inheritance.

**Complications**

• Arrested root development or root resorption of adjacent incisors

• Rotation or impaction of permanent incisors

• Cystic degeneration

• Over-retention of primary incisors

• Delayed eruption

• Nasal eruption

**mesiodens**

*mesiodens* is a dental anomaly where an additional tooth develops mesially to the central incisors. It occurs in the dental lamina formation stage during induction and proliferation. Local hyperactivity of the dental lamina has been suggested along with both autosomal recessive and dominant genes. It occurs twice as often in males, supporting an X-linked mode of inheritance.


**Complications**

• Arrested root development or root resorption of adjacent incisors

• Rotation or impaction of permanent incisors

• Cystic degeneration

• Over-retention of primary incisors

• Delayed eruption

• Nasal eruption

**Cone Beam Computed Tomography-CBCT** provides more information regarding the location of a supernumerary tooth, the presence of root resorption and aids in treatment planning.
• Arrested or delayed eruption of the permanent incisors

• Mesiodens has caused a large diastema that is interfering with orthodontic treatment

• Mesiodens has begun to erupt and is close to the alveolar bone margin


Timing of treatment

Early:

• Must consider possibility of damage to the developing adjacent tooth germs

• To induce spontaneous eruption of permanent incisors

• Prevent anterior space loss and surgical/orthodontic treatment later

Late:

• Wait for eruption of mesiodens

• Wait for complete root formation of adjacent teeth in order to avoid iatrogenic damage to adjacent roots

• Patient age for cooperation

• Easier surgery

• Most frequent defect found by delaying treatment was increased resorption of the roots of the adjacent permanent teeth—especially after 10 years of age

• Optimal time is 6 to 7 years of age


• More than 90% of mesiodens remained impacted.

• More than 50% of patients experienced no complications with observation.

• Most common complication was diastema.

 Deep lingual fossa with accentuated marginal ridges.

 Different degrees of shoveling.

 Most often central and lateral maxillary incisors.

 Primarily in Asians and nearly 100% in Inuit & Native Americans. Rare or absent in African and European populations.

 Primarily genetic factors.

 Reshaping or restoration of the clinical crown may be necessary to achieve ideal overjet or overbite during orthodontic treatment.

 Examination to reveal deep fissures or enamel defects to avoid ingress of caries with the large, young pulp.

 Disruption during the Bell stage of tooth development.

 Abnormal proliferation of inner enamel & ectomesenchymal cells within the dental papilla.

 Cells fold into the stellate reticulum of the enamel organ resulting in a tubercle or extra elevation on the enamel surface.

 Genetic & environmental factors.

 Accessory Cusps

talon Cusp

 cusp of carabelli
dens evaginatus

 Accessory cusp may be in traumatic occlusion.

 Difficulty fitting orthodontic band with protostylid.

 Any reduction of an accessory cusp should be cautiously performed since pulp tissue may extend into the accessory cusp,

 Talon Cusp

 Protruding cusp from the cingulum of the maxillary permanent or primary lateral incisors.

 May be unilateral or bilateral.

 Pulp tissue may extend into the cusp.

 Genetic influences: Asian, Arab, Inuit, Native Americans.

 Multiple Syndromes especially Rubenstein-Taybi.
• Type I - cusp extends at least half of the distance from the CEJ to the incisal edge.

• Type II - semitalon 1mm or more in size extending less than half the distance from the CEJ to the incisal edge.

• Type III - trace talon bifid, conical, tuberculate extending from cervical third of root.

Cusp of Carabelli

• Protruding cusp from the mesiolingual surface of maxillary molar.

• 90% prevalence in Caucasians & rare in Asian.

• Protostylid comparable cusp on mesiobuccal surface of mandibular permanent first molar

Dens Evaginatus

• Protruding cusp from the occlusal surface of a premolar.

• Often accompanies shovel shaped incisors.

• Females, Inuit, Asians

• Radiograph should be obtained to determine if pulpal tissue extends into the tubercle.

Eruption Disturbances


Etiology

• Prior to eruption, the tooth germ of the maxillary first permanent molar is positioned backward, downward and outward.

• During eruption, the tooth assumes a vertical position.

• If this positional change does not occur, impaction under the distobuccal cusp of the second primary occurs.

ectopic eruption maxillary first permanent molar

Larger than normal size of the first permanent molar and inadequate arch length have been suggested as contributing factors.

More common in children with cleft palate.

19.9% prevalence in siblings, suggests a genetic component.

Usually presents between five and seven years of age on radiographic exam.

First permanent molar is impacted in the distobuccal root of the second primary molar.

69.4% spontaneously correct.

14.3% pulpal exposure of primary molar.


Treatment Options

- Orthodontic elastic or spring separator
- Remove SSC if molar impacted under distal of SSC and place a separator
- Disk distal of second primary molar - D9951
- Brass wire
- Halterman or Ectopic spring loaded distalizer appliance - interceptive ortho tx for redirection of ectopically erupting teeth - D8060
- Brass wire 0.020, 0.025 or 0.028.
- May need local.
- May flatten one end with Howe plier and tighten until resistance, then tighten some more.
- Try 0.028 first. Make sure encircles the area of contact.
- Obtain a bitewing before and after insertion.

When permanent molar is deimpacted, the brass wire will slip through the contact area.

Obtain PA to check stability of primary molar and ability to act as space maintainer.

Halterman Appliance

- Primary maxillary second molar banded with a soldered wire that extends distal to the first permanent molar.
- The end of the wire is bent into a hook that is distal to the first permanent molar.
- A button is bonded to the occlusal of the impacted first permanent molar.
- A chain elastic is placed on the button and stretched distally to the recurved hook.


ectopic eruption maxillary permanent canine


Etiology

- Longer eruption path of 22mm from floor of the orbit to eruption are suggested are contributing to ectopic eruption.

- Genetic theory suggests abnormalities of tooth shape, number, structure and size are contributory.

- Disturbance of normal development with normal eruption path.

- After third molars, maxillary permanent canines are the second most commonly impacted teeth.

- Palatally displaced canines (PDCs) occurs in about 85% of cases.

- Eruption of PDCs is significantly facilitated by extraction of maxillary primary canines.

If the canine bulge is absent with palpation on a 10-12 year old child, there is a significantly high possibility of a palatally displaced canine.


- Palpate buccal alveolar bone contour around ten years of age.

- If canines not palpable by eleven years of age, panoramic radiograph should be obtained.

- Rapid resorption of permanent lateral root(s) may occur without intervention.

- Resorbed incisors are typically pain-free.

- If the canine is angled toward the permanent incisor, the risk of resorption increases by 50%.

- May be an autosomal dominant genetic predisposition.

- 90% involve a single canine.
• CBCT provides more accurate information than panoramic, occlusal or PA.

• If CBCT is not available, panoramic shows root resorption and tooth position.

• Periapical radiographs are more specific than panoramic to show buccal-lingual position and root resorption.


• The long-term prognosis for maxillary incisors with root resorption associated with ectopically positioned canines is good.

• In most cases the resorption heals spontaneously.


• Extract maxillary primary canines after the permanent laterals have fully erupted.

• First premolars erupt prior to the maxillary permanent canines.

• Adding extraction of the primary first molar may stimulate the first premolar to erupt and have a positive effect on the path of the canines.


Primary canine and first primary molar extractions were more effective as a preventive approach to promote eruption of permanent maxillary canines that were positioned centrally or palatally.

• Must have a minimum of one-half root formation on the premolar if chose to extract the first primary molar or may cause delay in premolar’s eruption.


Unilateral or Bilateral Extraction?

• Case by case decision

• Amount of maxillary arch-length deficiency. If unilateral ectopic canine and no arch-length deficiency, may extract only the primary canine on the affected side.

  Moderate to significant arch length deficiency, extract both primary canines.
Maxillary Expansion
- Expansion improves the eruption path of maxillary canines with ectopic eruption in patients with maxillary transverse deficiency.


Distally Displaced Premolars
- A significant relationship between distal displacement of mandibular premolars & palatally displaced canines was found.

- Because DDP is diagnosed earlier than PDC, it can be a valuable developmental risk indicator.


Palatal Impaction

With a palatal impaction, surgical exposure and orthodontic force will be necessary to bring the maxillary permanent canine into the arch.

Etiology
- May result from interchange of the involved teeth in the dental lamina, multifactorial factors, or a traumatic injury.

- Extreme form of ectopic eruption with interchanged position of two permanent teeth

- Other anomalies typically occur on the same side of the arch such as microdontia, missing maxillary permanent lateral, maxillary and mandibular premolars and rotation of adjacent teeth.
The transposed teeth may be orthodontically moved to the proper position in the arch, reshaped or orthodontic space closure after extraction.

Most commonly occurs with maxillary canine and first premolar

submerged/infraoccluded ankylosed primary molar

Etiology
- Genetic or congenital gap in the periodontal membrane.
- Excessive masticatory pressure or trauma.
- Disturbance in the local metabolism.
- Genetic cause most accepted since high frequency in siblings.

Increased association with:
- distal angulation of the mandibular second premolar
- microdontia of the maxillary permanent lateral incisors
- palatally displaced canines
- tooth agenesis

Fusion between the root cementum and/or dentin with surrounding bone.

Tooth appears to be submerging as the alveolar height of the bone increases with the eruption of the adjacent teeth.

Interruption of the integrity of the PDL impedes eruptive forces

Radiographic detection may be difficult since only a small area of the root is affected.

The presence or absence of a permanent successor is the primary consideration in a treatment plan.

Orthodontic consultation is recommended with absence of the permanent successor.

• With a permanent successor, if a second primary molar is maintaining arch length and preventing the mesial tipping or shift of the first permanent molar, there is no need for intervention until exfoliation of the contralateral primary molar.

• If the premolar is erupting with a mesial or distal path of eruption, determined with a periapical radiograph, the primary molar should be extracted when 2/3 to 3/4 of the premolar’s root is developed.

• Restoration with a composite build-up, composite crown with reshaping, stainless steel or zirconia crown will keep adjacent teeth from tipping and avoid super eruption of opposing teeth.

• With absence of the permanent successor, and decision to maintain the primary molar:

  In absence of ankylosis and with flat interproximal bone levels, the primary molar may remain and function for many years prior to exfoliation.

• The mesial and distal surfaces of the mandibular primary molar may be disked to achieve the width of a premolar.

• The mesiodistal width at the CEJ, measured on a bitewing or periapical radiograph, or comparison to the width of the premolar on the contralateral side, provide good guides for the reduction.

• A Boley gauge may also be used to determine the amount of reduction.

• The average width of a mandibular second premolar is 7 to 7.5mm.

• This size can be placed on the occlusal of the primary molar with a marking pen.

• After local anesthesia and rubber dam placement, a carbide fissure or diamond bur are used in an upright position to remove the interproximal enamel, avoiding pulpal exposure.

• The occlusal surface may be augmented to achieve a level occlusal plane and composite may be added on the mesial and distal surfaces to prevent caries.
• If active surveillance is the chosen plan, risk to alveolar bone development must be considered and followed with periapical radiographs.

• Vertical or oblique bone loss signals need for extraction to maintain marginal alveolar bone height along with consideration for space maintenance.

• After extraction, a vertical bony defect may be present, but the continued eruption of the adjacent teeth will promote growth of the bone and tissue, eliminating the bony defect.