

PEDO/ORTHO/PUBLIC HEALTH/RAD

1. Which of the following are true regarding tooth eruption pattern?

1. The first permanent premolars replace the primary molars.
 2. The maxillary succedaneous incisors usually erupt before the mandibular incisors.
 3. The most favorable eruption sequence for primary teeth in either arch is ABDCE (using Palmar notation)
 4. The eruption sequence for the succedaneous dentition in the mandible usually includes eruption of the canines before the premolars.
 5. The eruption sequence for the maxilla usually includes eruption of the canines before the premolars.
-
- a. 3 and 4 only are correct
 - b. 1, 2, and 3 are correct
 - c. 1, 3, and 4 are correct
 - d. 2, 4, and 5 are correct
 - e. 2, 3, and 4 are correct

PRIMARY DENTITION: ERUPTION

TOOTH	LETTER	<i>ERUPTION</i>
CENTRAL	A	~ 6 - 9 MONTHS
LATERAL	B	~ 7 - 10 MONTHS
CANINE	C	~ 18 MONTHS
1ST MOLAR	D	~ 14 MONTHS
2ND MOLAR	E	~ 24 MONTHS

Primary Root completion 18 months post eruption. (12-18 mos.)

Teeth erupt when the root is 2/3 complete.
most favorable eruption sequence for primary teeth both
Max & Man: ABDCE

Primary teeth:
germs form at 6-8 wks IU
enamel forms 4-6 months
roots complete approx 1 yr after eruption

Permanent Dentition Eruption Sequence:

Max: 61245378
Man: 61234578

Emergence when 2/3 root present
Root completion 3 years post eruption (2-3 yrs.)

Eruption sequence:

- mandibular incisors
- 1st permanent molars, upper incisors
- canine (mand)
- 1st premolar

- max canine
- 2nd premolar

Also:

Maxillary: 1st molar, CI, LI, 1st PM, 2nd PM, Cuspid, 2nd molar, 3rd molar

Mandibular: 1st molar, CI, LI, Cuspid, 1st PM, 2nd PM, 2nd molar, 3rd molar

The correct answer is c.

Reference: Casamassimo, Fields, Mctigue, Nowak: Pediatric Dentistry, Infancy through Adolescence. Pinkham. 3rd ed., 1988.

2. Which of the following is false regarding prevention of transmission of M. tuberculosis bacilli?

- a. M tuberculosis bacilli (Mtb) transmission cannot occur via fomites.**
- b. Mtb are major spore forming organisms, making them exceptionally difficult to kill with conventional germicides.**
- c. Mtb organisms are sensitive to heat and ethylene oxide. All reusable instruments should be sterilized with heat or ethylene oxide.**
- d. Patients with untreated TB should have their surgery postponed until they can receive treatment for their TB.**
- e. Mtb organisms are sensitive to irradiation**

The only mycobacterial organism of significance to most dentists is Mycobacterium tuberculosis. TB is uncommon in the US and Canada, however, immigration from SE Asia, where tuberculosis is common, brought a new reservoir of M. tuberculosis organisms. Patients who are infected with HIV are another group who may harbor tuberculosis organisms. Some newer strains of TB are resistant to drugs commonly used to treat TB.

Etiology: In the majority of cases of human TB the causative agent is M. tuberculosis, an acid fast, nonmotile, intracellular rod that is an obligate aerobe; hence, it exists best in an atmosphere of high oxygen tension. *Humans are the only known reservoir. This explains why it commonly infects the pulmonary system. But, it can infect any organ of the body. Typical mode of transmission is via infected airborne droplets of mucus or saliva that have been forcefully expelled from the lungs, usually by coughing, speaking, sneezing or singing. It is not spread by fomites (dishes, toys, clothes or linens). It can be spread through unpasteurized milk. (M. bovis).*

Oral lesions can occur via ingestion of sputum and coughing up infected sputum thereby inoculating the oral cavity.

Diagnosis:

“Tuberculosis infection”

Positive TB skin test, no active disease

“LTBI” latent TB infection

“TB disease”

Presence of clinical signs and symptoms

May result from primary infection or activation of latent TB

Highest risk of activation in first two years after exposure

Diagnosis

- 1) Physical examination
- 2) Tuberculin skin test
- 3) Radiographs
- 4) Acid-fast smear
- 5) Culture “gold standard”
- 6) Others: CT, MRI, Gene probes, PCR, Serology-remains elusive

Dental management:

Updating the patient’s medical history

Recognizing signs and symptoms of TB

Following infection control guidelines

Need to ascertain potential infectivity of patients

Active TB (Infectious)

History of TB (Infected)

Positive tuberculin test (Infected)

Undiagnosed but with suggestive signs and symptoms and risk factors

Patients with clinically active TB:

Emergency treatment only

Minimized aerosolization

Use rubber dam

Minimize handpiece use

Treatment in hospital setting/isolation rooms-6-12 room-air exchanges per hour

Directional airflow “negative-pressure vent”

Air enters room from hallways and leaves only via outside exhaust

Automated room-pressure monitors with alarms

HEPA filtration, UV radiation (germicidal)

Patients with clinically active TB

O.K. to treat routinely:

After 2 weeks of anti-TB therapy and confirmed noninfectious by physician

Pediatric patient under age 6

Considered noninfectious since TB bacilli are rare in sputum and unable to cough up sputum

Confirm status with pediatrician

Patient with history of active TB

Initial caution

Consultation with physician

Confirm history of treatment , periodic physical exams, chest radiographs

Relapse is rare if treat adequately

Has patient becalm immunosuppressed since completion of treatment

Patients with positive skin test

Ask for history of evaluation for active TB, chest RG's, history of anti-TB drugs

Routine treatment O.K.; no special precautions

Patients with suggestive signs and symptoms

Unexplained, persistent signs and symptoms

Cough, chest pain, dyspnea, fatigue, fever, weight loss, hemoptysis

Presence of risk factors

Defer dental treatment until after medical evaluation

Effective chemotherapy of TB is dependent on 1) patients education and compliance, 2) appropriate selection of drugs, 3) multiple drug use, and 4)drug administration continuance for a sufficient time.

Common drug regimens:

Non-drug resistant TB

3 drugs for 2 months (INH + rifampin + pyrazinamide), followed by 2 drugs for 4 months (INH + rifampin)

6 months total treatment time

Drug resistance

4 drugs for 2 months (INH + rifampin + pyrazinamide + either ethambutol or streptomycin)

Determination of resistance again: if resistant only to INH: rifampin + pyrazinamide + either ethambutol or streptomycin for 6 months or rifampin + ethambutol continued for 12 months

Immunosuppressed patients receive treatment for a minimum of 9 months

Confirmed multiple-drug resistance

3-7 drugs (INH + rifampin + pyrazinamide + ethambutol, an aminoglycoside, or capreomycin, ciprofloxacin, or ofloxacin and either cycloserine, ethionamide, or aminosalicylic acid)-this is continued for 12-24 months or until negative cultures are evident.

The correct response is b. (it is false)

References:

Petersen, Ellis, Hupp, Tucker: Oral and Maxillofacial Surgery, Mosby, 3rd Ed., 1998.

Little and Falace, et. Al.: Dental Management of the medically Compromised Patient, Mosby, 6th Ed., 2002.

3. Which of the following are true regarding disadvantages of Nitrous oxide inhalation use for conscious sedation?

- 1. Nitrous oxide is considered to be reactive and toxic in doses greater than 60%.**
- 2. It is a weak agent and should be titrated carefully in increments.**
- 3. Inconvenience may be a factor when the nasal mask hinders exposure of the maxillary anterior teeth.**
- 4. Potential chronic toxicity has been shown to occur in office personnel.**
- 5. Potentiation may occur when combined with other drugs.**

- a. 1 only**
- b. 1 and 2**
- c. 2, 3 and 5**
- d. 1, 2, 3 and 4**
- e. 2, 3, 4 and 5**

1. is false. Nitrous oxide is inert and nontoxic when administered with adequate oxygen.

2. is true. It is a weak agent with which attempts to push up the concentration can be fraught with failure when attempting to control moderately to severely anxious patients.

3. is true. Inconvenience may be a factor when the nasal mask hinders exposure of the maxillary anterior teeth. This is especially true in very small children.

4. is true. Potential chronic toxicity has been shown to occur in office personnel. Retrospective studies have shown that office personnel who were exposed to trace levels of nitrous oxide have suggested an increased incidence of spontaneous abortions, congenital malformations, certain cancers, liver disease, kidney disease, and neurological disease.

5. is true. Potentiation may occur when combined with other drugs. Although nitrous oxide is a weak and safe agent when used with oxygen, deep sedation or general anesthesia may be easily produced if it is added to the effects of other sedatives given by parenteral or other route.

The correct answer is e.

Reference: Casamassimo, Fields, Mmctigue, Nowak: Pediatric Dentistry, Infancy through Adolescence. Pinkham. 3rd ed., 1988.

4. Which of the following statements are true causes and effects regarding patient positioning in panoramic radiography?

- a. Anterior positioning error: Widening and blurring of the anterior teeth images.**
- b. Patient placed too far posteriorly, outside of focal trough: Causes narrowing of tooth images.**
- c. Midsagittal plane positioning error: If patient is place asymmetrically in Panorex chin rest, images farthest from the film will be decreased in size**
- d. Spinal column positioning error: will result in an unexposed area in the middle inferior portion of the film.**
- e. Occlusal plane positioning error: Downward overangulation: This overangulation results in flattening of the occlusal plane.**

Anterior positioning error: Narrowing and blurring of the anterior teeth images

Patient placed too far posterior outside of focal trough: Causes widening of tooth images.

Midsagittal plane positioning error: If patient is place asymmetrically in Panorex chin rest, images farthest from the film will be magnified, whereas images of structures closest to the film will be decreased in size.

Spinal column positioning error: Will result in an unexposed area in the middle inferior portion of the film. If the spine is not kept erect, the radiation will be excessively absorbed by the spinal column, resulting in the low density area near the lower center of the film. Also, there may be superimposition of a portion of the spinal column over the neck of the condylar process of the mandible.

Occlusal plane positioning error: Downward overangulation: This overangulation (the ala tragus line is greater than the proper 5 degree downward and forward) results in a severe curvature in the occlusal plane and a lack of definition of the incisors on the image.

The only correct answer is d.

Information about Ghost images: (should know for the Boards)

A ghost image is formed what the object is located between the x-ray source and the center of rotation.

1. The ghost image has the same morphology as its real counterpart.
2. The ghost image appears on the opposite side of the radiograph from its real counterpart.
3. The ghost image appears higher up on the radiograph than its real counterpart.
4. The ghost image is more blurred than its real counterpart.
5. The vertical component of a ghost image is more blurred than the horizontal component.
6. The vertical component of a ghost image is always larger than its real counterpart, whereas the horizontal component of a ghost image may or may not be severely magnified.

Langlais RP, Langland OE, Nortje CJ. Diganostic Imaging of the Jaws. Willams & Wilkins. 1995

Langland, Langlais, Morris. Principles and Practice or Panoramic Radiology.Saunders. 1982.

5. Neglect is defined as the inattention to the basic needs of a child, such as food, clothing, shelter, medical care, education, and supervision. Physical abuse tends to be episodic and neglect is chronic.

- a. Both statements are true**
- b. Both statements are false**
- c. The first statement is true and the second is false**
- d. The first statement is false and the second statement is true**

Dental neglect is a willful failure of parent or guardian to seek and follow through with treatment necessary to ensure a level of oral health essential for adequate function and freedom from pain and infection.

Abuse can occur as physical, sexual or emotional abuse. Physical abuse is the most easily recognizable form of abuse. If the reported history of abuse is not consistent with the injury abuse should be investigated. Facial and head injuries were 50% of physical abuse and oral injuries were 25% of abuse injuries. Neglect was 50-65% of child maltreatment and 25% was physical abuse. The rest was sexual or mental abuse. If children are abused in one method they are more likely to be maltreated in another.

The average age for identification of maltreatment victims is 7.4 years; 49% are male and 68% white, 21% black, and 11% ethnic. Infants to two years are most often neglected. Older children 12-17 years are least likely to be neglected but most often sexually or emotionally abused.

Unexplained or multiple fractures of various stages of healing, spiral fractures, or fractures of very young children should be investigated. Depression, withdrawal, acting out, and clinginess are possible signs of abuse. Delayed treatment or aggression or defensiveness of the parent or caretaker could be signs of abuse.

The answer is A

McDonald RE and Avery DR, Dentistry for the child and adolescent. Seventh edition. Pages 24-28

- 6. Which of the following are not advantages of digital radiography?**
- a. Reduced need for chemicals to process film**
 - b. Reduced radiation exposure to the patient**
 - c. Ability to manipulate and enhance images**
 - d. Small size of sensor device**

There is no need to process films so the need for caustic chemicals is no longer needed. This makes digital radiography more environmental friendly. Less radiation is required to capture an image with the sensor (coupler). Images are viewable in only a matter of seconds. The ability to send images immediately by computer for consult is a benefit for remote clinics. Some programs have functions that let the polarity to be reversed and contrast to be adjusted. This can allow for improved diagnostic skills. The cost for the initial set up can be high. The cost savings in chemicals to develop will offset this eventually. The sensors can be large and bulky and difficult to place in some patients.

The answer is D.

1. *Van der Stelt PF. Principles of digital imaging. Dent Clin North Am 2000;44(2):237-48, v.*
2. *Versteeg CH, Sanderink GC, van der Stelt PF. Efficacy of digital intra-oral radiography in clinical dentistry. J Dent 1997;25(3-4):215-24.*
3. *Wenzel A, Grondahl HG. Direct digital radiography in the dental office. Int Dent J 1995;45(1):27-34.*

7. HIV can infect most human cells with the most common being those with the CD4 receptors including the T-helper lymphocytes and macrophages. HIV has been found in saliva but transmission has not been documented.

Both statements are true

- A. Both statements are false**
- B. The first statement is true and the second is false**
- C. The first statement is false and the second statement is true**

HIV is composed of two subtypes (HIV-1 and HIV-2) with many strains. HIV has been located in blood, saliva, breast milk, cerebrospinal fluid, amniotic fluid, urine, and semen. Antibodies develop in 6-12 weeks after infection. It may take 6 months to seroconvert. Mean incubation for AIDS is 10-12 years. Ninety percent die in three years after diagnosis with AIDS. Most people develop an acute brief viremia within two to six weeks of infection. A temporary fall in CD4 cells occurs. A progressive fall in CD4 cells will occur leading to AIDS. When CD4 cells counts drop below 200 they become more susceptible to opportunistic infections. Candidiasis, herpes zoster, oral hairy leukoplakia, Kaposi's sarcoma are oral conditions that can occur with low CD4 cell counts.

The correct answer is A.

Little JW, Dental Management of the Medically Compromised Patient, Fifth edition

8. The permanent teeth are typically smaller than the primary teeth they replace. The leeway space of the mandibular is approximately 3.4mm to 4.2mm and the maxillary is 1.8mm to 2.4mm.

- a. Both statements are true**
- b. Both statements are false**
- c. Statement one is true and two is false**
- d. Statement two is true and one is false**

Leeway space is the term to describe the space available when the permanent premolars and canine replace the deciduous primary molars and canine. The mesiodistal width of the permanent teeth is almost always smaller than the primary teeth they replace. This space allows for room in the posterior portion of the arch to accommodate the permanent canine which is usually larger than the primary canine. Sometimes there is a mesial shift of the permanent first molar into the leeway space. The leeway space can be used to solve crowding issues by preventing the permanent first molar from shifting mesial. This can be accomplished with a lingual arch bar.

The answer is a.

Braham and Morris, Textbook of Pediatric Dentistry, Pages 42-44

9. What is the oral pediatric dose of Amoxicillin for SBE prophylaxis (for those not allergic to Penicillins)?

- a) 100 mg/kg one hour prior to dental procedure**
- b) 75 mg/kg one hour prior to dental procedure**
- c) 20 mg/kg one hour prior to dental procedure**
- d) 50 mg/kg one hour prior to dental procedure**

Answer: d) 50 mg/kg one hour prior to dental procedure

Suggested Antibiotic Prophylactic Regimens by the American Heart Association:

Children not allergic to penicillin	Amoxicillin 50 mg/kg (maximum 2 g) orally 1 h prior to dental procedure
Children not allergic to penicillin and unable to take oral medications	Ampicillin 50 mg/kg (maximum 2 g) IV or IM within 30 min before dental procedure
Children allergic to penicillin	Clindamycin 20 mg/kg (maximum 600mg) orally 1 h prior to dental procedure
Children allergic to penicillin and unable to take oral medications	Clindamycin 20 mg/kg (maximum 600mg) IV or IM or Cefazolin 25 mg/kg (maximum 1 g IV or IM within 30 min before dental procedure

Utilization of antibiotic patients at risk does not provide absolute immunity from infection. Post procedural symptoms of acute infection (eg, fever, malaise, weakness, or lethargy) may indicate antibiotic failure and need for further medical evaluation.

Indications for antibiotic prophylaxis in general:

Patients with cardiac conditions associated with endocarditis.

Patients with compromised immunity.

Patients with shunts, indwelling catheters or medical devices.

Pediatric Dentistry Vol 24(7), American Academy of Pediatric Dentistry, Page 107

10. What does not occur with the premature loss of a mandibular primary canine?

- a) **Shortening of the arch length**
- b) **Shift of midline to affected side**
- c) **Development of a posterior crossbite**
- d) **Incisor teeth drift distally and lingually**
- e) **Space maintenance is initiated**

Answer: c)

Missing primary mandibular canine, what happens....

Primary mandibular canine erupted at 20 months.

Permanent mandibular canine erupts at 10.5 years.

The permanent canines are positioned to lie nearly in line with the primary canines.

Canine usually comes about as a result of root resorption caused by erupting lateral incisors without enough space.

Early loss of a single primary canine in the mixed dentition requires space maintenance or extraction of the contralateral tooth to eliminate midline changes and the loss of arch symmetry. Arch length shortens as the incisor teeth drift distally and lingually. If the contralateral canine is extracted, a lingual arch space maintainer may still be needed to prevent lingual movement of the incisors.

Space tends to close as the incisors drift lingually and toward the affected side. Asymmetric activation of a lingual lower arch is usually the best approach.

The primary lower canine is usually displaced labially if there is not enough room.

Contemporary Orthodontics, Proffit, W.R., 3rd Ed. Mosby 1999 Page 70, 219

11. What is the optimal age for the child's first dental visit?

- a) After all primary teeth have erupted
- b) Within 6 months of first primary tooth eruption
- c) After the child's first birthday
- d) After eruption of the permanent first molar

Answer: b) Within 6 months of first primary tooth eruption (and no later than 12 months of age)

Infant oral health care begins ideally with prenatal oral health counseling for parents.

At the infant oral evaluation visit, the dentist should:

1. Record a thorough medical and dental history.
2. Complete a thorough oral examination.
3. Perform risk assessments for oral and dental disease and determine a prevention plan and interval for periodic reevaluation.
4. Discuss and provide guidance regarding dental and oral development, fluoride status, non-nutritive oral habits, injury protection, oral hygiene and effects of diet on the dentition.

Pediatric Dentistry Vol 24(7), American Academy of Pediatric Dentistry, Page 47

12. Which of these statements concerning asepsis is true?

1. Moist heat is more efficient than dry heat for sterilization.
2. Ethylene Oxide gas is safe to use on human tissue.
3. Moist heat does not corrode instruments.
4. Antiseptics are chemical agents used topically on skin.
5. Sanitization eliminates all viable microorganisms from a surface.

- a) 3,5
- b) 1,4
- c) 2,5
- d) All of the above
- e) None of the above

Answer: b)

Asepsis Definitions

1. Sepsis – breakdown of living tissue by action of microorganisms and usually accompanied by inflammation.
2. Medical asepsis - is the attempt to keep patients, health care staff, and objects as free as possible of agents that cause infection.
3. Surgical asepsis - is the attempt to prevent microbes from gaining access to surgically created wounds.

Levels of Asepsis

Antiseptics (for living tissue) or **disinfectants** (for inanimate objects) – refer to substances that can prevent the multiplication of organisms capable of producing sepsis.

Sterility – is the freedom from viable forms of microorganisms. An absolute state, no varying degrees.

Sanitization – reduction of the number of viable microorganisms to levels judged safe by public health standards.

Decontamination - similar to sanitization except not connected to public health standards.

The microbes most resistant to elimination are bacterial endospores. Any sterilization or disinfection method that eliminates endospores should be effective against bacteria, viruses, mycobacteria, fungi, mold, and parasites.

Techniques of instrument sterilization:

Physical

1. Dry heat – for glassware and items that are susceptible to rust. Range: 250 to 280°F (12h to 1h respectively)
2. Moist heat – steam autoclave, more effective at lower temperatures, takes less time, more efficient than dry heat. Dulls and rusts instruments. Range: 240 to 280° (60min to 1.5 minutes respectively)
3. Mechanical dislodgement
4. Radiation

Chemical

1. Antiseptics – used to prepare the surgical team's hands and arms before donning gloves and to disinfect the surgical site. Iodophors, chlorhexidine, hexachlorophene.
2. Disinfectants – glutaraldehydes, iodophors, chlorine compounds, formaldehyde. (30 min to 10 hours)
3. Ethylene Oxide gas – diffuses through porous materials such as plastic and rubber. At 50°C is effective for killing all organisms including spores, in 3 hours. Highly toxic to animal tissue.

Contemporary Oral and Maxillofacial Surgery, 3rd Ed. Peterson, Ellis, Hupp, Tucker. Mosby 1998.

13. Which of the following is not a device used to correct crossbite or constricted maxillary arch?

- a) **W arch**
- b) **Quad helix**
- c) **Split plate hawley**
- d) **Nance**
- e) **Hyrax with jackscrew**

Answer: d) The Nance appliance is used for space maintenance.

Indications for palatal expansion:

1. Growth modification in the treatment of skeletal problems. Extent growth may be modified. Advantageous to start early.
2. Treatment of posterior crossbite or bilateral maxillary constriction.
3. Transverse maxillary deficiency, narrow skeletal width of maxilla = narrow width of the palatal vault. Can be assessed from dental casts.

The most common transverse problem in preadolescent is maxillary constriction and posterior crossbite. Early correction is needed if there is a mandibular shift. If there is no shift, treatment is delayed until eruption of the first molars. Treatment prior to adolescence and midpalatal suture closure is recommended.

Goals of palatal expansion:

1. Arch expansion – groups of teeth are moved to expand the arch perimeter.
2. Repositioning of individual teeth.

Fixed appliances are reliable and require little patient cooperation. **Removable appliances** require greater patient cooperation and risk being lost or not used at all. Removables also may become dislodged with the strong forces used in expansion.

Fixed appliances:

W arch (36mil wire or Quad helix 38mil wire, more flexible, more wire).

Quad Helix and W arch for treatment of palatal constriction. Gives skeletal and dental movement in the 3-6 year old.

By adolescence, more force may be required to separate the mid palatal suture as it starts to interdigitate. Rapid palatal expansion may be indicated. This consists of a mechanical screw device that is cemented or bonded, opened 0.5mm/day, 2000 to 3000g of force. Active treatment takes 10-14 days. Widens skeletally since PDL is hyalinized. After adolescence, the suture will probably be interlocked, making skeletal expansion impossible.

Slow palatal expansion gives 900-1300 g of force, 1mm/week. Widens skeletally and dentally. Expect 3-5mm of expansion. Lip bumpers or buccal shields work as well.

Removable appliances:

Most are Hawley split plate type designs that use clasps to provide retention. Wire springs or jackscrews may be used to provide the expansion force.

Contemporary Orthodontics, Profitt, W.R. 3rd Ed. Mosby 2000, Page 260.

Pinkham, J.R., Pediatric Dentistry, Infancy Through Adolescence, 3rd Ed. 1999 Saunders pp 273 and 405.

14. Concerning the epidemiology of fluoride which of the following questions are true?

- 1. McKay was the first to note the mottling of enamel in Dental patients in Denver Colorado in 1902.**
 - 2. In 1944, in the famous Michigan fluoridation study, the city of Muskegon had 1 ppm of Fluoride added to its water supply and Grand Rapids was the control city.**
 - 3. In the Michigan study, caries incidence decreased about 50%.**
 - 4. In 1970 it was estimated that 7 million people in 1900 communities in the U.S. have been drinking natural fluoridated water with a concentration of \geq to .7 ppm.**
 - 5. Adequate ingestion of Fluoride at an early age of enamel development is important in decreasing pit and fissure caries.**
 - 6. Fluoride decreases pit and fissure caries more than smooth surface caries.**
- A. 1,2,3,4 are true**
 - B. 2,3,4,5 are true**
 - C. all are true**
 - D. 1,3,5,6 are true**
 - E. 1,3,4,5 are true**

The correct answer is E.

Source is Fluoride and Caries Prevention 2nd edition Murray and Ruggs-Gunn p. 10-27.

Statements 1-3 are here for historical purposes. Statement number 4 addresses the safety issue of Fluoride therapy.

2 is false=Grand Rapids was the experimental city, the city officials of Muskegon were so impressed with the results of 50% reduction in caries experience in Grand Rapids that they added Fluoride to their water 6 years later-only negative was the control for the study was then lost after 6 years of results. 6 is false= fluoride ingestion may alter the morphology of pits and fissures decreasing their susceptibility, but Fluoride exerts its effect mostly on decreasing smooth surface caries.

Source is Fluoride and Caries Prevention 2nd edition Murray and Ruggs-Gunn p. 10-27.

15. Which of the following are true concerning water lines in dental operatories?

1. The NIDCR has documentation of disease transmission arising from DUWL (Dental Unit Waterline microbial contamination).
2. The goal is to bring microbial content of dental water to no more than 200 CFU/ml.
3. Biofilms are microscopic communities consisting primarily of naturally occurring water bacteria and fungi that form thin layers on surfaces that remain in contact with water.
4. The CDC recommends not using water from dental water lines when performing surgical procedures and that the use of sterile irrigating solution should be used.
5. A prudent guideline is to run the handpiece for 45 seconds to 1 minute before each patient and at the end of the day.
6. These guidelines will reduce the biofilm formation in the waterlines.
7. Four categories of products to improve DWL's are: independent water systems, chemical treatment protocols, point of use filters and sterile water delivery systems.
8. The EPA's recommended drinking water standard is 500 CFU/ml of noncoliform bacteria, and *Legionella pneumophila*, *Pseudomonas aeruginosa* and non-tubercular mycobacterium have been isolated from DUWL's.

- A. All are true
- B. 1,3,5,7,8 are true
- C. 2,4,6,8 are true
- D. 2,3,4,7,8 are true
- E. None of the above

The correct answer is D

#1 is false- The NIDCR (National Institute of Dental and Craniofacial Research) has **NO** documentation of disease transmission arising from DUWL (Dental Unit Waterline microbial contamination). There is however irrefutable evidence that water delivered to most patients is of poor microbiological quality.

#5 is false the guideline is to run the water for several minutes at the **beginning** of the day and 20-30 seconds **after** every patient. #6 is false- These guidelines will **NOT** reduce the biofilm formation in the waterlines- it only seeks to decrease the number of microorganisms present in the treatment water. To reduce the biofilm you must use a protocol of 5.25 % sodium hypochlorite diluted in a 1:10 ratio. Weekly 10 minute treatments improved the quality of the water and reduced the biofilm. You **MUST** have multiple treatments and **COMPLIANCE** is a big issue. Filters help a lot also-more \$\$.

SOURCE: JADA, Vol. 133 September 2002 p.1199-1206.

16. Which of the following can cause foggy films?

1. Light leaks in the darkroom
2. Incorrect bulb, or defective safelite filter or bulb.
3. Developer temperature too high.
4. Improper storage of film.
5. Contamination of the fixer in the developing solution.
6. Processing too fast or fixer solution is depleted.

- A. All are true
- B. 1,3,5,6 are true
- C. 2,3,4,5 are true
- D. 4,5,6 are true
- E. 1,2,3,4 are true

The answer is E

1-4 are true causes of foggy films. #5 is false contamination of the fixer in the developing solution will cause **brown** discoloration of the film. #6 is false- processing too fast or fixer solution is depleted-will cause a **Greenish-Yellow** discoloration of the film.

The source is Principles and Practice of Panoramic Radiology-Langland, Langlais, and Morris, p. 82.

17. Which of the following are true concerning latex allergies?

1. Delayed allergies-Type IV-or irritant dermatitis, are caused by processing chemicals.
2. Immediate allergies are caused by antigens from *Hevea brasiliensis* trees where latex is harvested from=Immediate –Type 1 reaction. 5-10% of health care workers may have an immediate allergy to NRL.
3. In the 1980's it was ascertained that natural rubber latex (NRL) allergy is An IgE mediated reaction.
4. Possible symptoms are- pruritis, urticaria, eczema, rhinitis, angioedema, asthma and possibly anaphylaxis.
5. Three common routes of transmission are-cutaneous, percutaneous, and mucous membrane through inhalation of aerosols.
6. Cerebral Palsy patients have a latex allergy incidence of 18-45 %.
7. The SPT is used to determine latex allergy.
 - A. all are true
 - B. 1,3,5,7 are true
 - C. 2,4,6,7 are true
 - D. 1,2,3,4,5,7 are true
 - E. 1,2,3,4,5,6 are true

The answer is D

All are true except #6- **SPINA BIFIDA** patients have an incidence of 18-45 %.

SPT is skin prick test, this study quoted data taken from 2166 dental health care workers who volunteered to take the test at the ADA conventions over a two year period.

Source: JADA, Natural Rubber Latex Hypersensitivity: Incidence and prevalence of Type 1 Allergy in the Dental Professional, 1998, p. 43-54.

18. Moyers prediction table is used for mixed dentition space analysis.

To utilize Moyers prediction, the mesiodistal width of the lower incisors is measured and this number is used to predict the size of the both lower and upper unerupted canines and premolars.

- A) Both statements are true.
- B) Both statements are false.
- C) The first statement is true, second statement is false.
- D) The first statement is false, second statement is true.

Answer: A

Mixed dentition space analysis to estimate the size of the unerupted permanent teeth to calculate the space required. There are 3 basic approaches:

1. Measurement of teeth on Radiograph. A simple proportional relation is set up to estimate the size of the unerupted permanent teeth.
2. Estimation from proportional tables. Most predictions are based on American white school children

Moyers: the mesiodistal width of the lower incisors is measured and this number is used to predict the size of the both lower and upper unerupted canines and premolars from the table.

Tanaka and Johnson: small bias to over estimate.

$\frac{1}{2}$ mesiodistal width of 4 lower incisors + 10.5mm= mandibular unerupted canine and premolars in one quadrant.

$\frac{1}{2}$ mesiodistal width of 4 lower incisors + 11.0mm= mandibular unerupted canine and premolars in one quadrant.

3. Combination of radiograph and prediction table

Stanley and Kerber: Canine width to be estimated directly from the sums of incisors and premolar widths using a graph. Only for mandibular arch.

Tooth size analysis: to determine the disproportion among the sizes of individual teeth (as tooth size discrepancy). If the discrepancy is 1.5mm or greater, it should be included in the problem list.

Bolton Analysis: is determined by measuring the mesiodistal width of each permanent tooth. A standard table is used to compare the total width of maxillary and mandibular anterior teeth and the total width of all upper and lower teeth.

Contemporary Orthodontics, Proffit, 2nd ed, p: 156-160.

19. SNA angle measures the relative anteroposterior relationship of the maxilla to the anterior cranial base. SNB angle measures the relative anteroposterior relationship of the mandible to the posterior cranial base.

- A) Both statements are true.
- B) Both statements are false.
- C) The first statement is true, second statement is false.
- D) The first statement is false, second statement is true.

Answer: C

- SNA angle (*Steiner*) ($82^{\circ} \pm 7^{\circ}$) formed by intersection of the planes Sella-Nasion and Nasion-Point A. measures the relative anteroposterior relationship of the maxilla to the anterior cranial base.
- SNA angle greater than 82° would indicate a forward or prognathic position of the maxilla relative to the anterior cranial base. Less than 82° would indicate a retrognathic position of the maxilla.
- SNB angle (80°) measures the relative anteroposterior relationship of the mandible to the *anterior* cranial base.

Proffit, WR, Contemporary Orthodontics, 2nd ed., 1993 pp176

20. FMA angle is formed by the intersection of Frankfort horizontal plane and the (Down's) mandibular planes. As the FMA increases the amount of vertical growth exceeds horizontal growth and the chin is more posterior.

- A) Both statements are true.
- B) Both statements are false.
- C) The first statement is true, second statement is false.
- D) The first statement is false, second statement is true.

Answer: A

- FMA angle (25°) is formed by the intersection of Frankfort horizontal plane and the (Down's) mandibular planes (tangent to the lower border of the mandible and the lowest point on the symphysis, Menton). It determines mandibular growth pattern and directions.
- As the FMA increases the amount of vertical growth exceeds horizontal growth and the chin is more posterior.
- High mandibular plane angles are frequently associated with unfavorable vertical growth and anterior open bites.
- Low mandibular plane angles are associated with horizontal mandibular growth and deep bites.

Proffit, W.R. Contemporary Orthodontics, 2nd ed., 1993 pp174

21. Which of the following statement is (are) correct?

- 1) Sterilization strip changes color on exposure to sterilization temperature.
- 2) The indicator strip is placed on top of the packaging.
- 3) The spore of the bacteria *Bacillus stearothermophilus* is used to test the reliability of heat sterilization.
- 4) The spore test is used bimonthly to judge the effectiveness of sterilization technique and equipment.

- A) 1, 2
- B) 2, 4
- C) 3, 4
- D) 1, 3

Answer: D

- Sterilization strip changed color on exposure to sterilization temperature. It doesn't indicate duration of sterilization cycle. The indicator strip is placed in the most interior part of the packaging.
- The spore of the bacteria *Bacillus stearothermophilus* is used to test the reliability of heat sterilization. The spore test is used weekly to judge the effectiveness of sterilization technique and equipment.
- Dry heat oxidizes the cell proteins where as moist heat causes coagulation of proteins quickly. Dry heat requires higher heat for longer time to achieve sterility.
- Autoclaving: pressurized steam

Temp	Pressure	Duration of treatment
115°C	10 PSI	60 min
121°C	15 PSI	24 min
126°C	20 PSI	16 min

- Advantages: effectiveness and speed.
- Disadvantages: Cost of the autoclaves, and dull and rust instrument.

Contemporary Oral and Maxillofacial Surgery, Peterson, Ellis, Hupp and Tucker, 3rd ed, 1998, p 73-77.

22. Which of the following statement is (are) incorrect?

- 1) It is important to intrude a tooth rapidly to gain periodontal attachment.**
- 2) Excessive force may produce necrosis of the PDL and adjacent alveolar bone.**
- 3) The physiologic extrusion or intrusion is when the alveolar bone is brought along with the tooth.**

- A) 1**
- B) 2**
- C) 3**
- D) 1,3**
- E) None of the above**

Answer: A

- To successfully intrude a tooth, it requires careful control of magnitude so that very light forces are applied to the tooth and the force will be concentrated in a small area at the tooth apex. Tooth is expected to tip somewhat as it is being intrude.
- If the tooth is intruded, the bone height tend to be lost at the alveolar crest, so that about the same percentage of the root remains embedded in bone as before, even if the intrusion was over a considerable distance.
- The bone support around periodontally involved teeth could be improved by intruding the teeth and forcing the roots deeper into the bone; but this doesn't lead to soft tissue attachment.
- Physiologic extrusion or intrusion that brings the alveolar bone along with the tooth, followed by gingival and osseous recontouring is preferable.

Contemporary Orthodontics, Proffit, 2nd ed, p: 280

23. The use of orthodontic headgear can be utilized to treat Class I, Class II and Class III malocclusions. The most common type of headgear is designed to treat the Class III malocclusion.

- A. Both statements are true**
- B. Both statements are false**
- C. First statement is true, second statement is false**
- D. First statement is false, second statement is true**

Headgear is used for growth modification, molar correction, vertical control, root torque and dental movement. There are designed to treat Class II malocclusion and Class III malocclusion.

Class II headgear is implemented in the following types: High Pull, Cervical Pull, and Combination Pull. These types change Maxillary Apical Base (ANB) in retarding the advancement of maxillary molar position. The high pull rests on the crown of the skull and is designed to place forces in an upward distal manner. The cervical pull rests on the back of the neck and is designed to place only distal forces. The combination rests in both positions and place more distalising forces than upward.

Class III headgear is implemented in the following types: Chin Cup and Orthopedic Face Mask. These types correct the sagittal-vertical relationship. The chin cup applies a force to against mandibular growth and is for short-term restriction, redirects growth, and is utilized infrequently by orthodontists. The orthopedic face mask (a.k.a. reverse pull) is attached to maxillary molars and rests on the forehead and chin and does the above as well but primarily protracts the maxilla

Answer is B both statements are false.

*Moles, J. A. NPDS, NNDC, Orthodontic 240,
lecture: Growth Modification dated 18 Nov 02*

Anthony D. Viazis. Atlas of Orthodontics: A guide to Clinical Efficiency

24. Which series of radiographs would you order for a new 6-year-old patient exam?

- a. M&M occlusals, posterior BWx, Panorex
- b. M&M occlusals, R&L M&M primary molar PAX, posterior BWx Panorex
- c. M&M ant PAX, posterior BWx, R&L M&M Primary molar Pax
- d. R&L M&M primary molar PAX, Posterior BWx, lateral ceph, Panorex

The ADA's suggested radiographic protocol for a new pediatric patient exam is as follows:

<u>AGE</u>	<u>RADIOGRAPHS</u>
3-5 y/o: No apparent abnormalities, open contacts	-None
No apparent abnormalities, closed contacts	-2 posterior bitewings
Abnormalities / Caries	-Series of 4 films
	2 posterior BWx
	M&M occlusals
Extensive or deep caries	-additional selected PAX
6-7 y/o: No apparent abnormalities	-Series of 8 films
	M&M occlusals (PAX)
	R&L max post 1° PAX
	R&L mand post 1° PAX
	R&L posterior BWx
	Panoral
Extensive or deep caries	-additional selected PAX
8-9 y/o: No apparent abnormalities	-Series of 12 films
	2 incisor PAX
	4 cuspid PAX
	4 1° premolar/molar PAX
	2 posterior BWx
	Panoral
10-12 y/o: No apparent abnormalities	-Series of 12 or 16 films
	In addition to the above,
	4 quadrant permanent molar PAX

All high caries risk patients receive new BWx at the 6-month recall visit.

Standard BWx is done in 12-month cycles.

The Pan-oral radiograph is indicated following eruption of the first permanent tooth.

The correct answer is B.

M&M occlusals, R&L M&M primary molar PAX, posterior BWx Panorex

McDonald, R.E., Avery, D.R., Dentistry for the Child and Adolescent 7th Edition. Mosby 1999. Pages 64-67.

25. List the LeFort classifications in order of decreasing severity:

- a. Class I, Class II, Class III, Class IV
- b. Class III, Class II, Class I
- c. Class IV, Class III, Class II, Class I
- d. Class I, Class II, Class III

In 1901, the Frenchman Rene LeFort published three consecutive papers on the now famous classification of facial fractures. His work described the great lines of weakness in the face through which most fractures occur by using low velocity impact forces directed against cadaver skulls. These lines, where the facial bones break in trauma, have become known as the LeFort I, II, and III fractures.

The Lefort I fracture, or transverse fracture, extends through the base of the maxillary sinuses above the teeth apices essentially separating the alveolar processes, palate, and pterygoid processes from the facial structures above. This transverse fracture across the entire lower maxilla separates the alveolus as a mobile unit from the rest of the midface. Fracture dislocations of segments of the alveolus may be associated with this fracture. With high-energy injuries, the palate may be split in the midline in addition to the LeFort I fracture.

The LaFort II fracture is synonymous with a pyramidal fracture of the maxilla. This fracture pattern begins laterally, similar to a LeFort I, but medially diverges in a superior direction to include part of the medial orbit as well as the nose. The fracture extending across the nose may be variable, involving only the nasal cartilage or as extensive as to separate the nasofrontal suture. The fracture extends diagonally from the pterygoid plates through the maxilla to the inferior orbital rim and up the medial wall of the orbit to the nose. This separates the maxillary alveolus, medial wall of the orbit and nose as a separate piece.

A LeFort III fracture or craniofacial dysjunction denotes a complete separation of the midface or facial bones from the cranium. This fracture transverses the zygomaticofrontal suture, continues through the floor of the orbit, and finally through the nasofrontal suture. The bones of the orbit are separated through the lateral wall, floor, and medial wall. It is unusual to have this fracture as a single segment of bone; more commonly, it comminutes with varying combinations of zygomatic, nasoethmoid, and orbital fractures. The fractures may not be symmetric on both sides and minimal mobility may be present.

The LeFort IV fracture is a figment of my imagination that tends to run freely at such this late hour during which I am typing this question for all of you. I hope you appreciate it.

The correct answer is B. Class III, Class II, Class I

Website:

http://www.erlanger.org/craniofacial/book/Trauma/Trauma_3.htm

26. Which of the following is/are indication(s) for a pulpotomy on a primary tooth?

- 1. Asymptomatic carious pulp exposure**
 - 2. Inflammation confined to the coronal aspect of the pulp not extending radicularly**
 - 3. Healthy periradicular tissues**
- Internal coronal resorption**

- a. All of the Above
- b. 1, 2, 4
- c. 1, 2, 3
- d. 1, 3, 4

A pulpotomy is the removal of the coronal portion of the pulp of both primary and permanent teeth with carious exposures. Justification for carious exposure is that the coronal pulp tissue contains microorganisms and inflammatory products. Healing can take place in the canals of the normal pulp tissue. Most commonly performed with formocresol to fix the amputated tissue remaining in the orifice, then restoring the tooth with IRM and stainless steel crown

Contraindications are listed as follows: non-restorable teeth, teeth nearing exfoliation, spontaneous or provoked discomfort, periapical or furcal pathosis, internal or external resorption, lack of hemostasis from amputated pulp stumps, fistula, parulis, purulent pulpal discharge, pulpal calcification, pathologic mobility.

For permanent teeth, if the exposure is traumatic and not too large or not a significant amount of time has passed since the injury a Cvek (partial) pulpotomy can be performed when the coronal pulp inflammation is not wide spread. This preserves as much of the health tissue as possible for maturation of the tooth, root and apex.

The correct answer is C. Asymptomatic carious pulp exposure, inflammation confined to the coronal aspect of the pulp not extending radicularly, healthy periradicular tissues, mildly symptomatic tooth

McDonald, R.E., Avery, D.R., Dentistry for the Child and Adolescent 7th Edition. Mosby 1999. Pages 421-425, 498-500.

27. Which of the following statements regarding fluoride is (are) true?

- 1. Fluoride adsorbs to the crystal surface of enamel attracting phosphate ions, followed by calcium ions leading to new mineral formation.**
 - 2. Advantages of fluoride varnish are they:**
 - contain high concentrations of fluoride**
 - are applied locally/topically**
 - are protective**
 - are surface active**
 - do not stain teeth**
 - 3. The most popular in-office fluoride is 8% SnF₂**
 - 4. The typical over-the-counter dentifrice contains 2000 ppm of fluoride.**
- a. all of the above**
 - b. none of the above**
 - c. 1,2,3**
 - d. 4 only**
 - e. 2**

Answer: b. none of the above

- 1 – calcium ions are attracted first followed by phosphate ions.
- 2 – fluoride varnish can stain.
- 3 – Sodium fluoride is the most popular.
- 4 – the typical over-the-counter dentifrice is 1000 ppm of fluoride

Proffit, W.R. Contemporary Orthodontics, 2nd ed., 1993 pp174

28. What is the appropriate dosage for supplemental fluoride for 5-year-old children who live in a non-fluoridated water area and what is the proper concentration in the drinking water for a community with a fluoridated water program?

- a. .25 mg/day, 0.6ppm
- b. .50 mg/day, 1 ppm
- c. .25 mg/day, 1ppm
- d. .50 mg/day, 0.6 ppm

Answer: d

The fluoride supplement chart:

AGE	Less than .3ppm	.3-.6ppm	Over .6ppm
	No Flouride	½ dose	Ideal flouride
Birth-6 mos	0	0	0
6mos-3years	.25	0	0
3-6 years	.5	.25	0
6-16 yrs	1.0	.50	0

There is currently some controversy here since there is 1mg of flouride in a toothbrush size strip of toothpaste and children frequently ingest much of the toothpaste they use. Additionally, there is fluoride present in many of the beverages children drink today including some bottled water.

Pediatric Dentistry. Vol.24, No.7pp66

29. Increasing kVp will will increase the contrast of the film image. Decreasing the mA will increase the density of the film image.

- a. The first statement is true, the second is false**
- b. The first statement is false, the second is true**
- c. Both statements are false.**
- d. Both statements are true**

Answer: c

High contrast is observed with fewer shades of gray and is better for viewing endodontic files in the canals. Many practitioners use 70 kVp for endo and 90 kVp for caries detection. Low contrast is more desirable for caries diagnosis. Increase of kVp *and* mA will both increase density. Density is the *degree of blackness* of a film.

Langland, Langlais Principles of Dental Imaging. Pp53,54

30. Serial extractions are recommended in class I malocclusions, (skeletal and Dental) when the space discrepancy is > 6mm but < 13mm. The first extractions are the primary 1st molars when the underlying premolar has 2/3 root formation completed.

- a. The first statement is true and the second is false.**
- b. The first statement is false and the second is true.**
- c. Both statements are true**
- d. Both statements are false.**

Answer: a

The first extractions are the primary canines and they are removed as soon as all mandibular permanent incisors are erupted. An evaluation for serial extractions is done at age 8 when there is evidence of crowding. After age 8, there will be continued growth of the arches *without* an increase in arch length.

Glossary of Dentofacial Orthopedic Terms-Orthodontic Glossary-American Association of Orthodontists