



School of Dentistry
Department of Restorative Dentistry

Corrected

~~Q10023~~

RESTORATIVE DENTISTRY V (D553)
Mid-Term Examination
October 11, 2007

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TEST CODE 01

INSTRUCTIONS

- Verify that you have an examination booklet with nine pages and sixty-six questions.
- Write your name on the computer answer sheet, as well as a nine digit personal identification number of your choosing in the field labeled "social security number", and blacken the appropriate circles with a #2 pencil. *Note: Test scores will be posted by PINs.*
- Sign and date the back of the computer answer sheet.
- **IMPORTANT!** Write the Test Code Number (above) on the computer answer sheet in the "Test Code" field under "Optional Codes", and blacken the appropriate circles.
- For each question answered, blacken the appropriate circle on the computer answer sheet corresponding to the letter of your choice.
- Students are not permitted to ask questions of the proctors during the examination. Do your best to answer each question with the information provided.
- When you have completed the examination, turn in your computer answer sheet. You may keep the question booklet.

Indicate whether the following statements are true (a) or false (b).

- T** 1. Flexure of a fixed partial denture substructure under occlusal loading is a risk factor for the failure of the cement seal of the abutment crowns.
- F** 2. The capacity of a fixed partial denture to resist flexing under occlusal loading is inversely related to the occlusogingival dimension of pontics and connectors.
- T** 3. Using splinted paired abutments for a fixed partial denture ("double abutting") is an effective way to compensate for unfavorable lever arm forces inherent in some bridge designs.
- T** 4. According to Goodacre and his coauthors (J Prost Dent, 2001), the axial walls of molars prepared for crowns need to be longer occlusogingivally for adequate resistance and retention as compared to canines and incisors (assuming the total occlusal convergence is held constant).
- F** 5. The primary reason for using a shoulder in a tooth preparation for a crown is to maximize retention and resistance.
- F** 6. The most reliable way to compensate for molar crown preparations that are short occlusogingivally, and therefore offer little resistance to dislodgement of the restoration, is to use a glass ionomer luting agent.
- F** 7. When making crowns in the maxillary anterior area, it is usually reasonable and prudent to finalize the tooth preparations and make the final impression in the same patient visit.
- T** 8. In their discussion of restoration overhangs ("Interactions between the gingiva and the margins of restorations", J Clin Perio, 2003), Padbury and his coauthors present evidence that overhanging margins are associated with a plaque mass that contains an unusually large proportion of periodontal pathogens.
- F** 9. The tissue that exists within the "biologic width" connects the tooth to alveolar bone.
- T** 10. If the margins of a crown were placed within the biologic width, the likely result would be chronic gingival inflammation followed by alveolar bone loss.
- T** 11. The emergence profile of a PFM or all-metal crown is a potential iatrogenic risk factor for periodontal disease and dental caries.
- F** 12. After surgical crown-lengthening, tooth preparation for crowns should be delayed 3-4 weeks to permit adequate periodontal healing.
- F** 13. A post is indicated for an endodontically treated molar primarily to strengthen the tooth and reduce the risk of crown fracture.
- F** 14. The diameter is the characteristic of an endodontic post that has the greatest influence on retention.
- T** 15. The indicated restorative treatment for an incisor that is intact except for a root canal access opening is a direct one-surface resin-based composite restoration.
16. In the paper "Acquisition and transmission of mutans streptococci" (CDA Journal, 2003), Berkowitz maintains that
 - a.** the earlier a child is infected with MS, the greater the caries risk later in life
 - b. infection with MS occurs after the age of 5 years
 - c. MS cannot colonize the mouth of a pre-dentate child
 - d. mothers should be treated to reduce caries risk 18-24 months after giving birth

17. Which one of the following examples represents "vertical" transmission of a microbial infection?

- a. mother infects husband
- ☒ b. mother infects daughter
- c. brother infects sister
- d. child infects young playmate

18. Which of the following services for a patient who presents with detectable caries lesions is consistent with a "minimally-invasive" or "preservative" treatment philosophy?

- a. use a medical approach to inhibit the growth of cariogenic microorganisms
- b. consider invasive sealants or PRRs instead of assuming all fissures must be prepared into dentin
- c. restore all teeth with proximal E2 lesions, but monitor E1 lesions with radiography
- ☒ d. two of the above
- e. a, b and c above

19. The most serious flaw of GV Black's principles of cavity preparation is the

- a. lack of rational procedural order
- b. over-emphasis of marginal form and finish
- ☒ c. weakening of teeth through excessive preparation
- d. improper management of the caries lesion

20. In his paper "What is minimally invasive dentistry?" (Oral Health Prev Dent, 2004), Ericson suggests that practitioners can help avoid the "tooth death spiral" by

- a. preserving healthy tooth structure when designing restorations
- b. repairing instead of replacing restorations whenever possible
- c. postponing restorations for primary lesions by using potentially effective alternative therapies
- d. two of the above
- ☒ e. a, b and c above

21. A minimally invasive treatment philosophy takes into account the risk of iatrogenic events that may occur during instrumentation (Ericson, 2004). These events may include

- a. damage to a healthy surface of an adjacent tooth
- b. loss of healthy tooth structure during the removal of an existing restoration
- c. pulp exposure, necessitating endodontic therapy
- d. two of the above
- ☒ e. a, b and c above

22. Which one of the following is a compelling (evidence-based) reason for restoring *posterior* teeth with proximal D1 caries lesions, as opposed to managing them with a medical approach?

- a. teeth with D1 lesions are usually sensitive to thermal and osmotic stimuli
- b. D1 lesions are plainly visible in most posterior teeth, so they adversely affect dental esthetics
- c. D1 lesions usually cause the marginal ridge enamel to collapse under occlusal loading
- ☒ d. a significant proportion of D1 lesions will progress because the enamel surface is cavitated
- e. all of the above

23. Delaying surgical intervention for some Class II caries lesions discovered on bitewing radiographs may be justified because
- a. the integrity (absence of cavitations) of the surface enamel can easily be judged with radiography
 - b. medical management may be effective in arresting and remineralizing some lesions
 - c. caries lesions in the enamel of proximal surfaces usually progress at a slow rate
 - ☒ d. two of the above
 - e. a, b and c above
24. CPP-ACP is a calcium phosphate remineralizing compound stabilized by a protein derived from
- ☒ a. milk
 - b. egg whites
 - c. saliva
 - d. plant tissue
 - e. blood
25. Caries risk assessment is based on which one of the following fundamental principles?
- ☒ a. some patients should be treated for dental caries even though no caries lesions can be detected
 - b. most people in a given population have the same risk factors for dental caries
 - c. the level of mutans streptococci in the saliva alone is a valid predictor of future caries experience
 - d. the disease is caused by microorganisms in dental plaque, so patients who do not exercise good oral hygiene are at high risk for dental caries
26. When using a caries risk model to help manage a population of adult dental patients, possible consequences of false positive results include
- a. failure to provide adequate treatment for the disease
 - ☒ b. unnecessary costs for preventive treatment
 - c. fluorosis
 - d. two of the above
 - e. a, b and c above
27. Of the following questions concerning the cariostatic effects of fluoride, which one has *not* yet been answered to any reasonable scientific certainty?
- a. When fluorine is incorporated into dental apatite crystals (FAP), is the solubility in acid affected?
 - ☒ b. What is the daily topical dose of fluoride required to prevent caries lesion formation?
 - c. Does systemic exposure to fluoride during tooth development provide a life-long cariostatic effect?
 - d. Can fluoride ions present in the oral cavity influence the de- and re-mineralization kinetics of dental hard tissues?
28. Dental apatite crystals that have a relatively high _____ content are dissolved preferentially during an acid challenge.
- ☒ a. carbonate
 - b. phosphate
 - c. carpopol
 - d. magnesium
 - e. chloride

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29. Fluoride promotes remineralization after an acid challenge by
- inhibiting bacterial enzymes
 - replacing hydroxyl groups in dental apatite
 - reacting with and neutralizing hydrogen ions
 - ☒ acting as a catalyst in the reaction between free calcium and phosphate ions
 - adsorbing onto dental apatite crystal surfaces and protecting them from hydrogen ions
30. In his paper, "Fluoride and social equity" (J Public Health Dent, 2002), Burt argues that fluoridation of community water is a policy that should be continued and expanded. What is the basis for his argument?
- 25% of American children between the ages of 6 and 17 account for 80% of the caries experience
 - caries risk assessment can be employed to differentiate between low and high risk patients
 - ☒ disparities in caries experience exist along socioeconomic lines, which can only be reduced with a widely-applied fluoridation effort
 - the cariostatic benefits of water fluoridation are derived mainly from the topical (post-eruptive) effects
31. When assessing arguments for or against community water fluoridation, many factors must be weighed. Which of the following relevant factors is/are considered scientific fact?
- fluoride consumed in drinking water causes learning deficits in children
 - ☒ the prevalence of mild to moderate fluorosis in US children has increased in recent years
 - water is a critical and essential vehicle for topical fluoride delivery
 - two of the above
 - a, b and c above

Indicate whether the following statements are true (a) or false (b).

- F** 32. Bonding any adherent to dentin with a resin adhesive using an "etch and rinse" technique is best achieved on a dry (moisture-free) dentin surface.
- T** 33. When a typical dentin sample is exposed to 35% phosphoric acid for 15 seconds, then rinsed, the smear layer is completely removed, including the smear plugs in the dentinal tubules.
- F** 34. Unlike the total-etch adhesive systems, no self-etching adhesive system is capable of forming a resin-collagen hybrid layer.
- T** 35. Self-etching adhesive systems offer a simplified enamel/dentin bonding procedure that eliminates the error-prone etch-rinse-blot step, which is highly technique sensitive.
- F** 36. A significant reason why practitioners should be cautious about using self-etching adhesive systems is that these materials exhibit low bond strengths to enamel and dentin *in vitro*.
- F** 37. The first dental material to exhibit true chemical adhesion to tooth structure was zinc phosphate cement.
- T** 38. The bond between glass ionomer materials and tooth structure can best be described as a complex ionic bond characterized by an ion-exchange layer.
- T** 39. The clinical applications of glass ionomer and resin-modified glass ionomer materials are limited primarily by their mechanical strengths and wear resistance.

Indicate whether the following statements are true (a) or false (b).

- T** 40. The rate of fluoride release from glass ionomers is highest during the initial setting reaction, then decreases precipitously during the first year in service.
- T** 41. Replacement of restorations due to a diagnosis of secondary caries should decrease if better diagnostic methods are developed that exhibit higher specificity.
- T** 42. Rubber dam isolation is an effective means of minimizing the risk of contamination during bonding procedures.
- F** 43. A patient who develops a red rash around his mouth after coming into contact with latex examination gloves unquestionably has a type I hypersensitivity reaction.
- T** 44. The best and safest course for managing a patient who suspects she is allergic to latex is to refer her to an allergist for a skin prick test.
45. The DIAGNOdent works by detecting
- opalescence of demineralized enamel and dentin
 - an increase in dentin permeability
 - opacification of carious tooth structure
 - a reduction in electrical resistance due to bacterial colonization
 - ☒ fluorescence of bacterial metabolites
46. According to research findings reviewed by Lussi and others ("DIAGNOdent: an optical method for caries detection", J Dent Res, 2004), the DIAGNOdent
- is especially useful for detecting caries lesions in the middle and inner third of dentin
 - exhibits good sensitivity, specificity and reproducibility
 - may give false positive responses in the presence of calculus and stain
 - two of the above
 - ☒ a, b and c above
47. Which of the following modes of treatment represent a sensible use of xylitol for cario-stasis?
- xylitol gum following chlorhexidine (CHX) therapy for high risk adult patients
 - xylitol mints or candies for high risk children with a mixed dentition
 - xylitol gum for high risk mothers of young children
 - two of the above
 - ☒ a, b and c above
48. Which of the following are considered disadvantages of chlorhexidine (CHX) when used to suppress cariogenic oral bacteria?
- CHX loses its therapeutic effect within an hour of application
 - lactobacilli are not as sensitive to CHX as mutans streptococci
 - the success of the therapy is dependent on many factors, and may not always be predictable
 - ☒ two of the above
 - a, b and c above

49. A 19 year old female patient has 6 detectable caries lesions at the time of examination, including two in tooth #30: a distal E1 lesion and a mesial D1 lesion (as seen on a bitewing radiograph). Of the options presented here, the most appropriate "surgical" treatment plan for tooth #30 is

- a. MOD amalgam or composite restoration
- b. MO amalgam or composite restoration with extension into the occlusal fissures
- c. MO amalgam or composite restoration using the "proximal slot" design
- ☒ d. MO amalgam or composite restoration using the "proximal slot" design, and a conventional or invasive occlusal sealant

50. When chlorhexidine gluconate is prescribed as an oral rinse against mutans streptococci, it should be used to a therapeutic endpoint. This often occurs in as little as

- a. 6-9 months
- b. 5-6 months
- c. 2-3 months
- ☒ d. 2-3 weeks

51. In their 10-year study of Class I restorations placed over large caries lesions (JADA, 1998), Mertz-Fairhurst and her coworkers found that

- a. residual dentin caries lesions sealed inside teeth with superficial composite resin restorations tended to remain active and grow larger over time
- b. the traditional concept of removing all demineralized dentin prior to restoration was the only reliable way to prevent further loss from the caries process
- ☒ c. conservative amalgam restorations sealed with a flowable resin exhibited the fewest failures, even when placed over large residual caries lesions in dentin
- d. glass ionomer liners were essential in preventing residual dentin caries lesions from progressing under amalgam or composite resin restorations

52. Which of the following choices would be a reasonable application of the findings of the Mertz-Fairhurst clinical trial (cited above) to everyday restorative dental practice?

- a. place all amalgam and composite resin restorations directly over undisturbed dentin caries lesions
- b. place restorations without removing the deepest carious dentin where there is a risk of pulp exposure ✓
- c. seal new amalgam and composite resin restorations with a flowable resin, and reseal periodically
- ☒ d. two of the above
- e. a, b and c above

53. Viscostat is 20%

- a. aluminum chloride
- b. aluminum potassium chloride
- c. aluminum sulfate
- d. potassium sulfate

no correct answer

→ correct answer is 20% ferric sulfate

54. The best advice when considering crown preparation for patients with shallow gingival sulcus measurements and little or no attached gingiva is to

- a. extend crown margins only 0.7-1.0 mm into the sulcus
- b. use a beveled shoulder finish line
- ☒ c. end the crown margins in a supra-gingival location
- d. retract the free gingiva with a small cord before beginning the crown preparation

55. Which of the following are significant risks of tooth replacement using a conventional PFM fixed partial denture?

- a. adverse short- and long-term effects on the periodontium
- b. adverse effects on the natural abutment teeth
- c. difficulty with oral hygiene
- d. two of the above
- ☒ e. a, b and c above

56. Which of the following are good reasons for replacing missing natural teeth?

- a. to enhance chewing efficiency
- b. to maintain a stable occlusion
- c. to reduce the risk of altered proximal contact relationships due to tooth movement
- d. two of the above
- ☒ e. a, b and c above

57. A Kennedy Class I removable partial denture with conventional clasps and natural abutment teeth is an example of a

- a. tooth supported and retained prosthesis
- b. soft tissue supported and retained prosthesis
- ☒ c. soft tissue supported, tooth retained prosthesis
- d. none of the above

58. The principal reason for using a sloping shoulder finish line for the facial margin of an anterior PFM crown instead of a traditional beveled shoulder is to

- a. reduce the risk of porcelain fracture
- b. conserve tooth structure
- ☒ c. eliminate the metal collar for better esthetics
- d. improve resistance and retention of the crown

59. A posterior PFM crown design with a facial porcelain veneer and a mostly metal occlusal surface has which of the following advantages compared to full occlusal porcelain coverage (extended veneer)?

- a. permits a more conservative tooth preparation
- b. may reduce the risk of wear by attrition of opposing natural teeth
- c. equally useful in maxillary and mandibular posterior areas
- ☒ d. two of the above
- e. a, b and c above

60. Extending the facial shoulder onto proximal surfaces while preparing a maxillary incisor for a PFM crown is indicated when the

- a. proximal contact areas of the PFM crown will be metal
- b. occlusal contacts on the lingual surface of the crown will be on porcelain
- ☒ c. patient exhibits gingival embrasures that are *not* completely filled with gingival tissue
- d. gingival sulcus is greater than 2 mm in depth

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61. Crown margins created in metal should form an X-degree cavosurface angle. Crown margins created solely in ceramic should form a Y-degree cavosurface angle.

- a. both X and Y = 30-45
- b. both X and Y = 90
- ☒ c. X = 30-45, Y = 90
- d. X = 90, Y = 30-45

62. A modified ridge lap pontic design has which of the following advantages compared to a full ridge lap (saddle) design?

- ☒ a. permits more effective daily plaque removal
- b. reduces risk of connector failure
- c. minimizes food entrapment
- d. two of the above
- e. a, b and c above

Indicate whether the following statements are true (a) or false (b).

Match the saliva component (right) with each of the following descriptions of function (left).

63. This salivary protein relies on enzymatic activity to hydrolyze bacterial cell wall polysaccharides

e

64. This protein's anti-bacterial action is generally attributed to its iron-chelating property

c

65. In addition to its anti-microbial actions, this glycoprotein lubricates dental surfaces, offering protection against mechanical wear

b

66. This peptide, which represents a small proportion of all salivary proteins, is known to possess anti-fungal properties

d

- a. amylase
- b. mucin
- c. lactoferrin
- d. histatin
- e. lysozyme