School of Dentistry
Department of Restorative Dentistry

not corrected

RESTORATIVE DENTISTRY V (D553)

Mid-Term Examination

October 19, 2005

TEST CODE 03

-16

INSTRUCTIONS

- Verify that you have an examination booklet with eight pages and sixty-five 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.

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

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

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

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

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

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

5. According to research findings summarized by Lussi and others (J Dent Res, 2004), the sensitivity of DIAGNOdent is consistently

a. higher than the specificity
b. lower than the specificity
c. equal to the specificity
d. none of the above; the relationship of sensitivity to specificity varies depending on research methods

6. The DIAGNOdent works by detecting

a. opalescence of demineralized enamel and dentin
b. an increase in dentin permeability
c. opacification of carious tooth structure
d. a reduction in electrical resistance due to bacterial colonization
e. fluorescence of bacterial metabolites

7. Which one of the following statements about the DIAGNOdent is true?

a. multiple studies have demonstrated very good inter-examiner reliability of DIAGNOdent readings
b. DIAGNOdent is useful for occlusal surfaces, but *not* the accessible smooth surfaces of teeth
c. DIAGNOdent is a "stand alone" diagnostic tool that renders conventional examination techniques obsolete
d. false negative readings are common with DIAGNOdent when there is stain and calculus on the surfaces being tested

8. 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

9. 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

10. 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

11. 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

12. 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

13. 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?

a. disparities in caries experience exist along socioeconomic lines, which can only be reduced with a broad fluoridation effort
b. caries risk assessment can be employed to differentiate between low and high risk patients
c. a quarter of the population between the ages of 6 and 17 has the vast majority of the caries lesions
d. the cariostatic benefits of water fluoridation are derived mainly from the topical (post-eruptive) effects

14. 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

15. Failing to use a caries risk assessment protocol to help manage a population of dental patients is likely to result in

a. standardized preventive regimens that are *not* tailored to individual patient need
b. under-treating some patients who are at high risk for the disease (*i.e.*, failing to provide beneficial treatment)
c. over-treating some patients who are at low risk for the disease (*i.e.*, providing unnecessary treatment)
d. two of the above
e. a, b and c above

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

F 16. The first dental material to exhibit true chemical adhesion to tooth structure was zinc phosphate cement.

F 17. Unlike the total-etch adhesive systems, no self-etching adhesive system is capable of forming a resin-collagen hybrid layer.

T 18. 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*.

T 19. 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 20. Bonding any adherent to dentin with a resin adhesive using an "etch and rinse" technique is best achieved in a dry (moisture-free) environment.

T 21. 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.

T 22. When using a total-etch ("etch and rinse") adhesive, the most effective way to remove excess water after rinsing is to blot with a moist cotton pellet.

T 23. 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 24. The clinical applications of glass ionomer and resin-modified glass ionomer materials are limited primarily by their mechanical strengths and wear resistance.

T 25. Long-term fluoride release of traditional glass ionomers tends to be greater than resin-modified glass ionomers, which tends to be greater than the fluoride-releasing composite resins (*e.g.*, compomers).

F 26. 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 27. Replacement of restorations due to a diagnosis of secondary caries should decrease if better diagnostic methods are developed that exhibit higher specificity.

28. 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

29. Delaying surgical intervention for some Class II caries lesions discovered on bitewing radiographs may be justified because

a. the integrity (absence of cavitation) 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

30. 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

31. 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 long-term cariostatic effect?
d. Can fluoride ions present in the oral cavity influence the de- and re-mineralization kinetics of dental hard tissues?

32. 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

33. Which of the following scientific findings strongly supports the hypothesis that systemically administered fluoride (pre-eruptive) is important for cariostasis?

a. the prevalence of caries lesions in the primary and permanent dentitions was lower in study subjects who lived in areas with fluoridated drinking water compared to subjects living in non-fluoridated areas
b. fewer caries lesions developed in a study group using fluoridated lozenges (slowly dissolved in the mouth) compared to a group using fluoride pills (swallowed)
c. the prevalence of caries lesions in a study group gradually increased after community water fluoridation was discontinued
d. none of the above

34. Fluoride is believed to inhibit all of the following bacterial enzymes EXCEPT which one?

a. enolase
b. glucosyl transferase
c. dextran sucrase
d. ATPase

35. Fluoride promotes remineralization after an acid challenge by

a. inhibiting bacterial enzymes
b. replacing hydroxyl groups in dental apatite
c. reacting with and neutralizing hydrogen ions
d. acting as a catalyst in the reaction between free calcium and phosphate ions
e. adsorbing onto dental apatite crystal surfaces and protecting them from hydrogen ions

36. 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

37. 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

38. 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

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

T 39. Rubber dam isolation is an effective means of minimizing the risk of contamination during bonding procedures.

F 40. 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 41. 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.

F 42. A post is indicated for an endodontically treated molar primarily to strengthen the tooth and reduce the risk of crown fracture.

T 43. After making the necessary post space, the first step in the process of making a burnout pattern for a cast post and core is to prepare the remaining tooth structure for crown coverage, removing weak dentin walls as needed.

F T 44. 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 45. Failure of the cement seal of the abutment crowns is a likely outcome of flexure of a fixed partial denture substructure subjected to occlusal loading.

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

T 46. 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 F 47. Ante's law, which addresses the suitability of teeth as potential fixed partial denture abutments, is based on total periodontal ligament area.

T 48. If a patient must have tooth #28 extracted, a possible consequence of not replacing the missing tooth is mesial migration of tooth #29 and distal migration of tooth #27.

T 49. A "pick-up" impression may be used to make a new master cast that re-aligns multiple crown castings that were fabricated on different working casts.

F T 50. The primary reason for using a shoulder in a tooth preparation for a crown is to maximize retention and resistance.

T 51. According to Goodacre and his coauthors (J Prosth Dent, 2001), the axial walls of molars prepared for crowns need to be longer occlusoginigivally for adequate resistance and retention as compared to canines and incisors (assuming the total occlusal convergence is held constant).

F 52. 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 T 53. A logical reason for placing the margin of a restoration within the gingival crevice is to end the restoration in an area where plaque does not form.

F 54. 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.

F T 55. The attachment apparatus that exists within the biological width connects the tooth to alveolar bone.

T 56. If the margins of a crown were placed within the biologic width, the likely result would be gingival inflammation followed by alveolar bone loss.

T 57. If crown margins must be placed in the gingival crevice, a useful guideline is to limit the penetration to one-half the available sulcus depth, to a maximum of 1.0 mm.

T 58. The emergence profile of a PFM or all-metal crown is a potential iatrogenic risk factor for periodontal disease and dental caries.

T 59. 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 T 60. If a tooth is decayed to the level of the alveolar crest and crown-lengthening is desired, the reduction of 2mm of bone height would permit restoration of the tooth and periodontal health.

F 61. After surgical crown-lengthening, tooth preparation for crowns should be delayed ~~3-4~~ 6 mos weeks to permit adequate periodontal healing.

62. Which of the following modes of treatment represent a sensible use of xylitol for cariostasis?

a. xylitol gum following chlorhexidine (CHX) therapy for high risk adult patients
b. xylitol mints or candies for high risk children with a mixed dentition
c. xylitol gum for high risk mothers of young children
d. two of the above
e. a, b and c above

63. Xylitol is

a. a sugar-alcohol, like saccharine
b. sweet, like sucrose
c. anti-cariogenic, like sorbitol
d. non-nutritive, like aspartame

64. Which of the following are considered disadvantages of chlorhexidine (CHX) when used to suppress cariogenic oral bacteria?

a. CHX loses its therapeutic effect within an hour of application
b. lactobacilli are not as sensitive to CHX as mutans streptococci
c. the success of the therapy is dependent on many factors, and may not always be predictable
d. two of the above
e. a, b and c above

65. 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