

***Comprehensive Periodontics for the Dental Hygienist, 4e (Weinberg)***  
**Chapter 1 Anatomy of the Periodontal Structures: The Healthy State**

**Multiple-Choice Questions**

1) The bone that lines the tooth socket is referred to as

- A) lamina propria.
- B) lamina dura.
- C) trabecular bone.
- D) radicular bone.
- E) cancellous bone.

Answer: B

2) Which of the following cells are responsible for the synthesis of collagen?

- A) Keratinocytes
- B) Mast cells
- C) Fibroblasts
- D) Plasma cells
- E) Lymphocytes

Answer: C

3) All of the following structures are composed of collagen *except* one. Which one is the exception?

- A) Sulcular epithelium
- B) Principal fibers
- C) Gingival fibers
- D) Cementum
- E) Alveolar bone

Answer: A

4) Which of the following structures represents the fusion of the interproximal junctional epithelia of two adjacent posterior teeth?

- A) Fenestration
- B) Col
- C) Papilla
- D) Frenum
- E) Bone

Answer: B

5) The alveolar crest is parallel to a line connecting the

- A) cusp tip.
- B) root prominence.
- C) cementoenamel junctions.
- D) alveolar crest.
- E) periodontal ligament.

Answer: C

6) Collagen has been found in many types of body tissue. In which of the following oral tissues is collagen *not* found?

- A) Enamel
- B) Epithelium
- C) Bone
- D) Cementum

Answer: B

7) Which of the following statements pertains to the function of the periodontal ligament fibers?

- A) They support and give contour to the attached gingiva.
- B) They transmit occlusal forces to the bone.
- C) They protect the interproximal bone from inflammation.
- D) They anchor the tooth to the gingival tissues.
- E) They attach the gingiva to the alveolar bone.

Answer: B

8) Which of the following definitions is correct for the junctional epithelium?

- A) Connective tissue structure involved in the attachment of the gingiva to the tooth
- B) Connective tissue that functions to hold the gingiva against the tooth and bone
- C) Epithelial tissue contributing to the adherence of the soft tissue to the tooth
- D) Epithelial tissue functioning to protect the underlying oral structures and acting as a mechanical barrier

Answer: C

9) Which of the following periodontal ligament fibers is last to develop?

- A) Oblique
- B) Horizontal
- C) Apical
- D) Circular
- E) Dentogingival

Answer: C

10) Which of the following definitions refers to Sharpey's fibers?

- A) Directly embedded into alveolar bone and cementum
- B) Running from alveolar bone and inserting into the cementum
- C) Originating from the crest of the interradicular bone and inserting into the furcation area
- D) Extending from the cementum into the free gingiva

Answer: A

11) Which of the following terms also refers to the dentogingival unit?

- A) Junctional epithelium + gingival fibers
- B) Sulcular depth + sulcular epithelium
- C) Periodontal ligament + gingival fibers
- D) Periodontal ligament + biologic width

Answer: A

12) Which of the following fibers function to resist the forces of pulling out and tipping of a mandibular molar?

- A) Interradicular
- B) Intraradicular
- C) Oblique
- D) Horizontal
- E) Transseptal

Answer: A

13) Healthy gingival tissues are considered to be firm and resilient because the main component of the gingival connective tissue is about 60% collagen fibers.

- A) Both statement and reason are correct.
- B) Both statement and reason are incorrect.
- C) The statement is correct, but the reason is incorrect.
- D) The statement is incorrect, but the reason is correct.

Answer: A

14) All of the following are considered part of the attachment apparatus *except* one. Which one is the exception?

- A) Oral epithelium
- B) Alveolar bone
- C) Periodontal ligament
- D) Cementum

Answer: A

15) Which of the following oral structures is considered to be a semipermeable membrane?

- A) Oral epithelium
- B) Lamina propria
- C) Periodontal ligament
- D) Junctional epithelium
- E) Sulcular epithelium

Answer: D

16) Which of the following structures is responsible for holding the free gingiva in close contact with the tooth?

- A) Periodontal ligament fibers
- B) Circular fibers
- C) Lamina propria
- D) Oral epithelium

Answer: B

17) Which of the following substances/cells is found in the gingival epithelium?

- A) Keratin
- B) Collagen
- C) Fibroblasts
- D) Collagenase

Answer: A

18) Which of the following features occurs with aging?

- A) Increased cementum thickness
- B) Decreased cementum thickness
- C) Increased number of cells in the periodontal ligament
- D) Increased vascularity of connective tissue

Answer: A

19) Which of the following cells are responsible for synthesizing bone?

- A) Osteoclasts
- B) Osteoblasts
- C) Fibroblasts
- D) Cementoblasts

Answer: B

20) Which of the following features is characteristic of cementum?

- A) Contains many blood vessels
- B) Contains a good supply of nerves
- C) Periodontal ligament fibers attach to it
- D) Surface is hard

Answer: C

### Fill-in-the-Blank Questions

1) The most coronal part of the free gingiva is the \_\_\_\_\_.

Answer: free gingival margin

2) The gingival crevice is the space between the free gingiva and the \_\_\_\_\_.

Answer: tooth surface

3) Horizontal fibers connect the alveolar bone proper with the \_\_\_\_\_.

Answer: cementum

4) The gingival epithelium is \_\_\_\_\_ and relies upon the underlying lamina propria for its nutrients.

Answer: avascular

5) The junctional epithelium is composed of \_\_\_\_\_ stratified squamous epithelium.

Answer: nonkeratinized

6) Cementum does not contain blood vessels and thus is considered to be \_\_\_\_\_.

Answer: avascular

### Critical Thinking Questions

1) Explain the differences between gingival epithelium and gingival connective tissue.

Answer: The gingival epithelium consists of the oral epithelium, sulcular epithelium, and junctional epithelium. It is avascular and does not contain blood vessels or lymphatics. The oral epithelium functions to protect the underlying structure and acts as a mechanical barrier. The oral epithelium is parakeratinized, the sulcular epithelium is less keratinized, and the junctional epithelium is nonkeratinized. Underlying the epithelium is the vascular gingival connective tissue (lamina propria), which is composed of collagen.

2) What is the function of the gingival connective tissue attachment (fibers)?

Answer: The gingival connective tissue attachment comprises the gingival fibers, which are composed of collagen. The gingival fibers include the circular fibers, which encircle the tooth and provide support and contour to the free gingiva, and the dentogingival fibers, which originate from the cementum and flare coronally into the free gingiva, laterally into the attached gingiva, and apically into the periosteum. Fibers contributing to the support of the gingiva are the dentoperiosteal fibers, which function to anchor the tooth; alveologingival fibers, which attach the gingiva to the alveolar bone; and transseptal fibers, which function to keep teeth in alignment (Figure 1-9).

3) List and explain the functions of the principal fibers.

Answer: The periodontal ligament fibers, which are also composed of collagen, run from the alveolar bone proper to the cementum. The fiber groups are alveolar crest, horizontal, oblique, apical, and interradicular. They function to resist lateral movement, oppose lateral forces, absorb occlusal forces, resist tipping of the tooth, and resist forces of luxation and tipping, respectively.

4) What are the clinical features of gingival versus alveolar mucosa?

Answer: The gingiva is more pink in color than the alveolar mucosa because of the presence of keratin in the gingiva. The color of the alveolar mucosa is darker red than the gingiva because of its highly vascular underlying connective tissue. The alveolar mucosa is compressible and movable due to the presence of a submucosa, which the gingiva does not have.

5) What is the difference between junctional epithelium and oral epithelium?

Answer: The junctional epithelium is considered to be a semipermeable membrane because it is more permeable than the oral or sulcular epithelium. It is composed of nonkeratinized squamous epithelium while the oral epithelium is parakeratinized squamous epithelium. The junctional epithelium is thin.

## Case Study Questions

### Case Study 1.1

A patient presents to the clinic. During the gingival examination it is noted that the interdental papilla between the maxillary lateral and canine is retractable from the tooth surface. The patient has probing depths ranging from 1 to 3 mm and localized bleeding on probing. The color of the gingiva is coral pink with brown areas. On the radiograph there is close root proximity of the mandibular incisors. The right mandibular first molar has extensive caries. After endodontics is completed, the patient will need a crown.

1) Suggest etiologies for the retractable gingiva.

Answer: The gingival fibers are responsible for holding the gingiva in close proximity to the tooth surface. Since the free gingiva is not close to the tooth, the circular fibers are destroyed, thus not holding the free gingiva close to the tooth.

2) Why is the gingiva brown in localized areas?

Answer: In health, the gingiva is a coral pink but in many individuals there is melanin pigmentation, which is a physiologic feature and not indicative of disease.

3) What is the clinical significance of the radiographic finding in this patient?

Answer: Alveolar bone proper or cribriform plate (on the x-ray it is referred to as the lamina dura) lines the tooth socket. Thus, this bone is in direct contact with the tooth. This bone is hard compact bone. Compact bone also consists of buccal and lingual cortical plates that are continuous with the alveolar bone proper. In between the compact bone is spongy, cancellous bone. Think of a peanut butter sandwich. The two slices of bread are the compact cortical bone, and the peanut butter is the cancellous bone. If the roots of two adjacent teeth are close together (root proximity), there may be a very thin layer of cortical bone, but most likely there will be little to no cancellous bone. Thus, this is clinically important because there will be less interdental bone (in between the teeth) so the bone will be more vulnerable to inflammation that develops in the interdental area.

4) Before endodontics is started, what should the dental clinician be concerned about?

Answer: Before root canal therapy is started, the periodontal condition of the tooth must be evaluated because when caries is present, the amount of tooth remaining becomes important. The biologic width of the tooth is important to determine. Crown lengthening may be necessary if the biologic width has been invaded due to caries or a fracture. There must be an adequate biologic width to place a crown. The biologic width consists of the junctional epithelium (0.97 mm) and the gingival connective tissue attachment (1.07 mm). Thus, about 3–4 mm of tooth structure (measured on the x-ray from the alveolar crest to the anticipated finish line of the crown) must be present to have a healthy biologic width.

## Matching Questions

Match the term in Column A with the correct definition in Column B.

- A) Separates the attached gingiva from alveolar mucosa
- B) Consists of the cementum, periodontal ligament, and alveolar bone
- C) Separates the free gingiva from attached gingiva
- D) Consists of the junctional epithelium and gingival connective tissue attachment
- E) Is avascular

- 1) Mucogingival junction
- 2) Free gingival groove
- 3) Oral epithelium
- 4) Attachment apparatus
- 5) Biologic width

Answers: 1) A; 2) C; 3) E; 4) B; 5) D