ANATOMY OF THE PERIODONTIUM
Part II Cementum and Alveolar bone

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Cementum

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Calcified mesenchymal tissue that forms the outer covering of the anatomic root
• **Cementum**: is calcified tissue that covers the root of the tooth and provides a means of attachments for the periodontal ligament fibers to the tooth.

• It consists of calcified collagen fibers and interfibriller ground substance.

• It is made up of 45% to 50% inorganic material and 50% to 55% organic matter and water.
• Width varies from 16 to 60 microns in the coronal half of the root and 150 to 200 microns in the apical third of the root.

• Width increases with age, 95 microns at age 20 and 215 microns at age 60.
Cementum

What are the sources of collagen fibers in cementum?

Extrinsic Sharpeys fibers formed by Fibroblasts.

Intrinsic Fibers of the cementum matrix formed by cement oblasts.
• Two types of cementum **acellular** and **cellular**
  – acellular cementum is found on the coronal areas of the root.
  – cellular cementum is found in the apical areas of the roots and in the furcation areas of multirooted teeth.
TWO MAIN FORMS OF CEMENTUM

ACELLULAR - first to be formed

• covers approximately the cervical third of half of the root

• does not contain cells

• formed before the tooth reaches occlusal plane

• sharpey’s fibers make up most of the structure of acellular cmentum

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CELLULAR

- formed after tooth reaches occlusal plane
- contains cells in lacunae
- less calcified than acellular
- more common on apical half of tooth
- greatest increase with age is cellular type in apical half of root

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Types of Cementum

Schroeder's Classification

Acellular Afibrillar Cementum
Acellular Extrinsic Fiber
Cellular intrinsic Fiber cementum.
Cellular mixed stratified cementum
Intermediate Cementum
• **Cementoenamel junction**: the area where enamel and cementum meet at the cervical region of the tooth.

• Three different relationships among the enamel and cementum:
  – 60% to 65% of the cases the cementum overlaps the enamel
  – 30% of the cases edge to edge
  – 5% to 10% cementum fails to meet enamel resulting in exposed dentin

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CEMENTOENAMEL JUNCTION

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Alveolar Bone
• **Alveolar bone**: are the parts of the maxilla and mandible providing the housing for the roots of the teeth.

• Bone that forms and support tooth sockets
• **Alveolar bone:**
  1- alveolar bone proper
    (lamina dura in radiographs)
  2- trabecular bone
  3- compact bone

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1) Alveoli: The space in the alveolar bone that accommodate the roots of the teeth (tooth socket).

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**Alveoli:** covered lined with a layer of bone known as alveolar bone proper or the cribriform plate. This layer of bone shows as a white line on radiographs and called lamina dura. This layer also covers the crest of interproximal bone and called crestal lamina dura.

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2) Supporting alveolar bone: cancellous and cortical bone that surrounds the alveolar bone proper
3) **Interproximal bone** (*interdental septum*): bone located between the roots of adjacent teeth.

4) **Interradicular bone**: bone located between the roots of multirooted teeth.
5) **Radicular bone**: alveolar process located on the facial or lingual surfaces of the roots of teeth
CELLS OF ALVEOLAR BONE

Calcified matrix with osteocytes enclosed in lacunae

Constantly changing

Osteoblasts deposit

Osteoclasts resorb

Matrix deposited by osteoblasts is not mineralized and is termed osteoid. As new osteoid is deposited the old osteoid mineralizes.

Osteoclasts are large multinucleated cells that are often on surface or in Howship’s lacunae. Main function is resorption of bone.

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**FENESTRATION** - isolated areas which the root is denuded of bone and root surface is covered only by periosteum and overlying gingiva

**DEHISCENCE** - denuded areas extend through the marginal bone

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Fenestration:
some bone present in the most coronal portion

Dehiscence:
the bone coverage is missing at the coronal portion of the roots

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• **Summary:**

  – Periodontium consists of 4 different tissues:
    • Gingiva
    • Cementum
    • PDL
    • Alveolar bone

  – They are anatomically separate, but functionally, they all depend on another in maintaining a viable, healthy supporting structure for the tooth.

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