

Cementum

Cementum, substantia ossea, is a hard connective tissue covering the surface of the root of the tooth, which in its structure resembles fibrous-type bone. It consists of cells, cementocytes and a basic substance that contains 50% of mineral substances. The organic matter consists mainly of collagen fibers (type I and III collagen) and a small amount of interfibrillar matter.

There is a cemento-enamel border in the cervical part of the tooth. In 30% of cases, the cement adheres closely to the enamel, in 60% it slightly overlaps the enamel, and in about 10% there is a gap between the enamel and the cement where the exposed dentin is located. The cement layer thickens from the neck towards the root.

Cement has a very important property, which is the ability to respond to load. Just like bone tissue, cement can provide better mechanical resistance through resorption or tissue formation, but unlike bone tissue, it is not capable of remodeling. Another difference between cementum and bone is that cementum is an avascular tissue, nutrition takes place through the periodontium, and a non-innervated tissue.

Based on the presence of cells, we distinguish **two types of cement**:

Acellular

Primary, acellular cementum forms a thin layer of mineralized matrix cementum. It is located in the upper 2/3 of the neck, during development it happened that the cementoblasts "escaped" from the extracellular matrix towards the apex, so the primary cementum is without cementocytes. So -called Sharpey fibers are embedded in it. Its thickness is around 50 µm.

Celular

Cellular, also secondary, cement consists of lamellae with cementocytes located in lacunae. Cementocytes are star-shaped cells with small, short processes. Some processes may communicate with Tomes fibers of odontoblasts. The width of the cement in the neck area is around 500 µm.

The deposition of cementum on the tooth surface is a lifelong process that occurs mainly in places of excessive load or in areas of trauma. Thus, incremental lines are created during the process, which indicate the gradual replenishment of cement.

Bundles of collagen fibers called Sharpey's fibers enter the cementum.

Sharpey's fibres

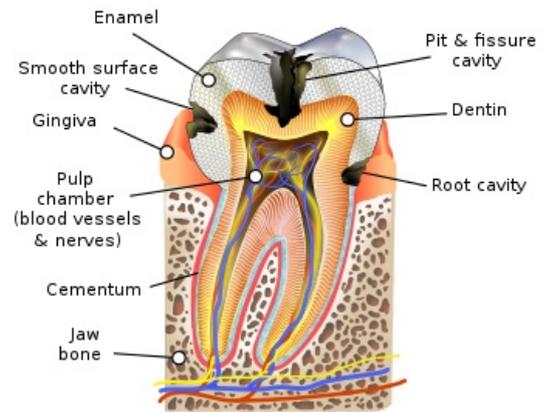
Sharpey's fibers are bundles of collagen fibers passing through the periodontal fissure.

Gingival - they attach to the free gingiva. It forms the so-called circular ligament, which we disrupt before tooth extraction. Transseptal - connect adjacent teeth in a row. When the alveolar process decreases, these fibers increase. Ridge - they come from the ridge of the alveolus to the cervical region of the cementum. It acts against tensile forces. Horizontal - support previous threads. Obliques - capture the main part of the occlusal load on the tooth. It acts against pressure forces. Apical - lead from the apex of the tooth to the bottom of the tooth bed. This arrangement is called a functional arrangement.

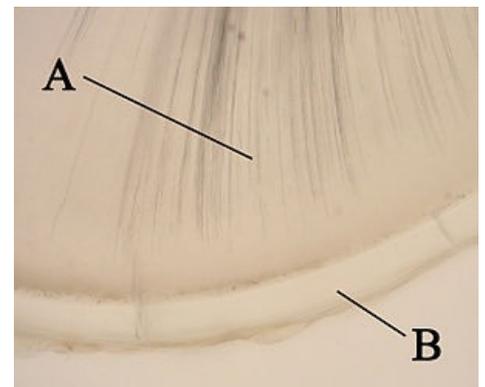
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Schematic representation of cement (blue color).



A - dentin; B - cement (acellular).

References

- KLIKA, Eduard, et al. *Histologie pro stomatology*. 1. edition. Praha : Avicenum, 1988. pp. 448.