Tooth shedding lect. 19 أ.د عذراء

Shedding or exfoliation of deciduous teeth is a term given to describe the physiologic process that ultimately leads to replacement of the deciduous teeth by their corresponding permanent successors . Significance of shedding

A. To accommodate the growing jaw, thus , another generation of teeth is needed to fulfill this requisity

B. To withstand the masticatory force by growth of muscle of mastication from infant to adult .

Pattern of shedding :

The shedding of deciduous teeth is the result of progressive resorption

of the roots of teeth and their supporting tissue, the periodontal ligament.

In general, the pressure generated by the growing and erupting permanent

tooth dictates the pattern of deciduous tooth resorption.

A. Shedding of deciduous anterior teeth : the permanent incisors and canines tooth germs initially develop in apico-lingual position to their deciduous predecessors , so, the permanent anterior tooth germs move into an inciso-labial direction and, in latter stages, they are frequently located apical to their deciduous predecessors .

B. Shedding of deciduous molars : the premolars begin their development lingual to their corresponding primary molars . In later stage, however , they are frequently

found between the divergent roots of the primary molars .Therefore resorption of the roots of deciduous molars first begins on their inner surfaces because The early developing bicuspids are found between them, then come to lie apical to deciduous molars . At this time , the developing premolars become away and pressure is relieved from deciduous root so the areas of early resorption are repaired by deposition of new-cementum like tissue.

Histology of Shedding:

The resorption of dental hard tissue is achieved by cells with a histologic feature similar to that of osteoclasts, but because of their involvement in the removal of dental hard tissue, they are called odontoclasts.

1.Its derived from monocytes and migrate from B.V. to the resorption sites, where they fuse to form the

2. It is a multinucleated odontoclast with a clear ruffled (brush) border.

3.Characteristic feature of this cells is a high level of activity of the

enzyme acid phosphates

Odontoclasts are most commonly found on surfaces of the roots in relation to the advancing permanent tooth and they have also been found in the root canals and pulp chambers of resorbing teeth. Different patterns of resorption exist for different teeth. For example,

Single-rooted teeth are usually shed before root resorption is complete, therefore odontoclasts are not found within pulp chamber of these teeth and the odontoblasts layer remains intact.

In molars, however, the roots are usually completely resorbed and the crown is also partially resorbed before shedding.

Odontoclasts: Similarities to Osteoclasts

• Large multinucleated giant cell of variable shape

• Occupy resorption bays or lacunae

• Show ruffled border and clear zone peripheral to it

• Cytoplasm adjacent to ruffled border shows high amounts of mitochondria and vacuoles

• Acid phosphate activity within vacuoles

• Process of resorption similar

• Similar origin: from circulating monocytes

• Resorb dental hard tissues: dentin, cementum and enamel, therefore found on surfaces of dentin, cementum and enamel which are to be resorbed Seen also in pulp chamber and root canal of resorbing deciduous teeth.

Mechanism of resorption and shedding:

1. Pressure from the erupting successional tooth plays a key role as the odontoclasts differentiate at the sites of pressure.
2. The acid phosphatase content of the vesicles close to ruffled border suggests that these structure are phagosomes in which breakdown of ingested material is taking place.

Resorption occurs into 2 steps

1)An initial removal of minerals. 2)Extracellular dissolution of organic matrix (mainly collagen) to smaller molecules.

As an individual grows, the muscles of mastication increase in size and exert forces on the deciduous tooth greater than its PDL can withstand. This leads to trauma to the ligament and the initiation of resorption.

Clinical consideration:

1-Retained Deciduous Teeth

Deciduous teeth may be retained for a long time beyond their usual shedding time. Such teeth are usually without permanent successors, or their successors are impacted. They are invariably out of function.

Retained deciduous teeth are most often the upper lateral incisor, less frequently the second permanent premolar, especially in the mandible and **rarely the lower central incisor**. If a permanent tooth is ankylosed or impacted, its deciduous predecessor may also be retained . This is most frequently seen with the deciduous and permanent canine teeth.

Retained deciduous teeth

a. their successors are impacted.

b. most often the upper lateral incisor.

c. are without permanent successors.

d. retained for a long time beyond their usual shedding time.

e. their successors are ankylosed.

2-Submerged Deciduous Teeth

Trauma may result in damage to either the dental follicle or the developing periodontal ligament. If this happens, the eruption of the tooth ceases, and it becomes ankylosed **to the bone of the jaw**. Because of continued eruption of neighboring teeth and increased height of the alveolar bone, the ankylosed tooth may be either ‘shortened’or submerged in the alveolar bone.

Submerged deciduous teeth prevent the eruption of their permanent successors or force them from their position.

Submerged deciduous teeth should therefore be removed as soon as possible.

3-Remnants of Deciduous Teeth Sometimes parts of the roots of deciduous teeth are not in the path of erupting permanent teeth and may escape resorption. Such remnants, consisting of dentin and cementum, may remain embedded in the jaw for a considerable time. They are most frequently found in association with the permanent premolars, especially lower second premolars, Because the roots of the lower second deciduous molar are strongly curved or divergent. The mesiodistal diameter of the second premolars is much smaller than the greatest distance between the roots of the deciduous molar.

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Retained decidous lower molar

Exfoliation of anterior teeth