



THE IMPORTANCE OF PERIODONTAL FIBERS: A REVIEW

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ABSTRACT

The PDL fibers are a group of connective tissue fibers that attaches a tooth to the alveolar bone. The PDL consist of cells and extracellular fibers. Damage to the PDL may lead to ankylosis of the tooth making the tooth lose its continuous eruption ability. Dental trauma may cause tearing of the PDL resulting in pain during masticatory function. This article focuses on the importance of PDL fibers in human and also reviews a few patents on PDL fibers.

Keywords:PDL Fibers, Types, Function, Patents etc.

INTRODUCTION

The periodontal ligament, commonly known as the PDL, is a group of connective tissue fibers that attaches a tooth to the alveolar bone [1]. These develop from the dental sac of the tooth germ and consist of cells and extracellular compartment of fibers. The cells consist of fibroblast, epithelial cells, cementum cells etc. The extracellular compartment consists of collagen fibers bundles embedded in intercellular substance [2]. The PDL collagen fibers are categorized as per their orientation and location along the tooth. Damage to the PDL may result in ankylosis of the tooth making the tooth lose its continuous eruption ability. Dental trauma may cause tearing of the PDL leading to pain during masticatory function [3]. The epithelial rests of Malassez can become cystic, usually forming non-diagnostic, radiolucent apical lesions. This occurs as a result of chronic periapical inflammation after pulpitis and must be surgically removed. The fibers of the PDL become disorganized with the occurrence of periodontal diseases and their attachments to cementum through Sharpey fibers are lost [4]. When traumatic forces of occlusion are placed on a tooth, widening of the periodontal ligament space is seen. Clinically, occlusal trauma is noted by the increased mobility of the tooth [5].

Types of PDL fibers [6,7]

It consists of fibersubgroups namely: alveolar crest, horizontal, oblique, apical, inter radicular on multirrooted teeth and transseptal fibers. These fibers help

the tooth to withstand the compressive forces which occur during chewing. The ends of the principal fibers that are within either cementum are known as Sharpey fibers.

- **Alveolar Crest Fibers:** They run from the cervical part of the root to the alveolar bone crest.
- **Horizontal Fibers:** They get attached to the cementum apical to the alveolar crest fibers and run perpendicularly from the root of the tooth to the alveolar bone.
- **Oblique Fibers:** These are numerous in number and runs from cementum in an oblique direction to insert into bone coronally.
- **Apical Fibers:** These are found radiating from cementum from the apex of the root to the bone forming base of the alveolus.
- **Inter Radicular Fibers:** These are only found between the roots of multi rooted teeth like premolars and molars. They are attached from the cementum and get inserted to the nearby alveolar bone.
- **Transseptal Fibers:** It extends inter-proximally over the alveolar bone crest and is embedded in the cementum of adjacent teeth. There function is to keep all the teeth aligned and they also lacks the osseous attachment.

Periodontal Disease [8-10]:

It affects one or more of the periodontal tissues like alveolar bone, periodontal ligament, etc. Gingivitis is the mildest form of periodontal disease which causes the gums to become red, swollen and bleeds easily with

usually little or no discomfort. Gingivitis is reversible with treatment and by maintaining good oral hygiene. Periodontitis is the advanced stage of gingivitis.

Toxins produced by the bacteria in plaque irritate the gums by inducing a chronic inflammatory response in which the tissues and bone that support the teeth are broken down and destroyed. Pocket formation occurs and as the disease progresses, the pockets deepen and more gum tissue and bone are destroyed leading to tooth mobility. Plaque induced periodontal diseases are the most common of all.

The plaque-induced periodontal lesions are divided into four stages:

- **Initial Lesion:** It becomes quite difficult to differentiate between health and disease state during this stage of disease. This stage occurs for a very shorter period of time and can be missed by the examiner easily.
- **Early Lesion:** Differentiation between early and initial lesion is difficult still some inflammatory changes can be seen in this stage. These changes occur after 4-6 days of plaque formation. Immunoblasts are commonly seen in the area of infiltration.
- **Established Lesion:** Its features include the presence of plasma cells which are not found in earlier stages. It usually begins two to three weeks after first plaque formation and can be seen commonly associated with the placement of orthodontic bands on molars.
- **Advanced Lesion:** It includes periodontal pocket formation, gingival ulceration and suppuration, destruction of the alveolar bone and periodontal ligament, tooth mobility etc.

Some Patents on PDL fibers

1. Method for Treating Periodontal Disease: It

provides a dilute aqueous solution of a non-toxic benzo-c-phenanthridine salt to treat periodontal pockets [11].

2. Vaccine for Periodontal Disease: This tells us about the novel bacteria that cause periodontal disease in companion animals. It also tells us about the methods for treating and preventing periodontal disease [12].

3. Pressure Operated Pulsatile Fluid Flow Device: Pulsations are created in a fluid flow stream by a pulsatile device. The device includes a flexible, resilient element which oscillates under the influence of a pressure differential to interrupt the fluid flow at regular intervals, thereby causing the outlet flow to pulsate. The device may be connected directly to a supply of fluid under pressure [13].

4. Treatment of Periodontal Disease: this patent focuses on the use of Omega-3, 20-22 carbon atom, hexa- or penta-unsaturated fatty acids in the treatment of periodontal disease.

5. Sustained Release Compositions for Treating Periodontal Disease: This invention tells us about the compositions and methods for treating diseases of the oral cavity using polypropenoic acid compositions [14].

CONCLUSION

PDL fibers not only help in tooth stabilization but also help in mastication and other normal function of the tooth. Periodontal disease like gingivitis and periodontitis commonly affects the PDL fibers. Untreated gingivitis can advance to periodontitis. A good oral hygiene and professional care is needed for a better life of such fibers.

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