



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم



MONA MAGHRABY



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكرو فيلم



شبكة المعلومات الجامعية التوثيق الإلكتروني والميكرو فيلم



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شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

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تحفظ هذه الأقراص المدمجة بعيدا عن الغبار



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**“Histological Assessment of Albino Rats Periodontal
ligament in different ages comparing its width with
human”**

Thesis submitted in partial fulfillment for Master Degree in Oral
Biology

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Dedication

I dedicate this work to my sweet family and beloved husband who gave me all their love and care.

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Abstract

Introduction: The periodontal ligament is a complicated connection tissue system connecting the alveolar bone to root surface. Like any other tissue periodontal ligament undergoes changes by age either in its fibers, ground substance, cells or blood vessels. **Aim of the work:** This work aimed to assess the histological changes of periodontal ligament in different ages of albino rats and correlating these changes with corresponding human ages. **Material and methods:** 30 rats were divided evenly into 3 groups (10 rats each). Group 1: 6 months old group, Group 2: 12 months old group and Group 3: 24 months old group. Rats were terminated by I.V. overdose of sodium thiopental, the mandibles of the rats were excised to allow for laboratory processing for H&E stain, Masson's trichrome stain and Periodic acid –Schiff (PAS) with subsequent examination, 30 periapical films from three categories of persons aged between 12-18 years, 30-36 years old and 68-72 years old. **Results:** Histologically, group 3 showed significant reduction in immature fibers, cells and ground substance. Statistically, regarding morphometric analysis of periodontal ligament width in periapical human films, there were no significant difference in width between oblique and apical regions in both rats and human. Both experimental rats and human showed increased Periodontal ligament width by age **Conclusion:**

There is gradual reduction in fibers and cellularity of periodontal ligament by aging. However, periodontal ligament width mostly increased by age in rats and in examined periapical films in human.

Keywords: Aging, periodontal ligament, PDL width, rat age.

Introduction

The periodontal membrane is a complicated connection tissue system, containing blood vessels, nerves connecting the alveolar bone to root of the tooth. The connecting tissues contain organized and ordered collagen fiber bundles, which penetrate the adjacent tissues (cementum and alveolar bone) and contribute to the fixation of teeth (**Valponi et al., 2015**).

The constituents of Periodontal ligament (PDL) are cells, fibers, ground substance which contains blood vessels, nerves and lymphatics and epithelial rests of Malassez. Cells of PDL are fibroblasts, fibrocytes, cementoblasts, osteoblasts and few immune cells (**Washio et al., 2010 and Valponi et al., 2015**).

Like any other tissue periodontal ligament undergoes changes by age either in its fibers, ground substance, cells or blood vessels (**Anthony, 2010**) Which worthy need to spot light on.

Review of literature

Periodontal ligament structure:

A) An Overview:

The periodontal ligament is a fibrous connective tissue that is highly innervated and vascularized (**Katchburian and Arana, 2004**). Periodontal ligament connects the root of teeth with the alveolar bone. The periodontal ligament has two main functions: 1- transmission and absorption of mechanical stresses, it is responsible for shock absorption and proprioceptive sensorial perception aiming to comfort dental arch during chewing. 2- provide vascular supply and nutrients to cementum, alveolar bone and periodontal ligament itself (**Nanci and Bosshardt, 2006**).

The periodontal ligament is crossed by thick bundles of fibers type I collagen fibers which are the major component of the extracellular matrix in the PDL and play an important role in teeth anchoring on alveolar bone and cementum. There are some oxytalan fibers embedded within the periodontal ligament and usually they are associated with blood vessels (**Omar et al, 2017**).

The orientation of fiber bundles depends on their location into gingival and principal, the principal fiber groups are alveolar crest, horizontal, oblique and interradicular. The gingival groups are the ligament fibers in the gingival lamina propria and they are: transseptal, dentogingival, alveogingival and circumferential.