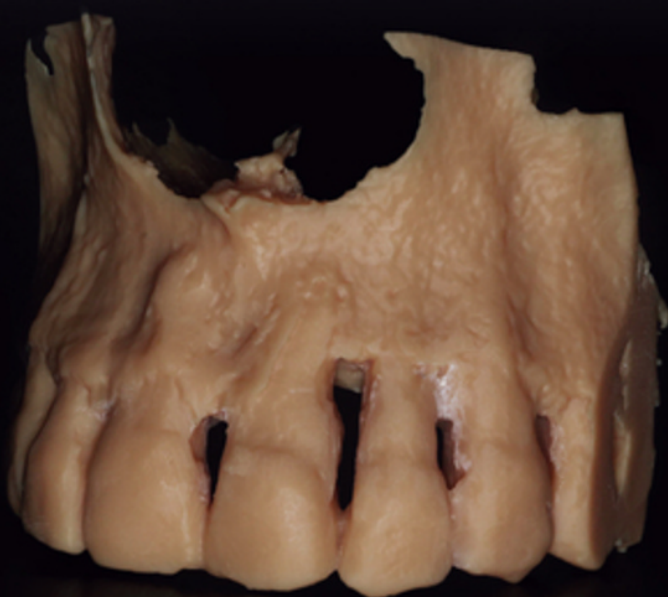


Practical Techniques in Periodontics and Implant Dentistry

Edited by
Edgard El Chaar



WILEY Blackwell

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WILEY Blackwell

This edition first published 2023

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Library of Congress Cataloging-in-Publication Data applied for

ISBN: 9781119793557 (hardback)

Cover Design: Wiley

Cover Images: Courtesy of Edgard El Chaar

Set in 9.5/12.5pt STIXTwoText by Straive, Chennai, India

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Introduction

In the past 28 years, from being a resident to academician and clinical practitioner in the science of Periodontics and Implant Dentistry, I have witnessed an exponential evolution in the possibilities of treatments. Consequently, that comes with a wealth of information to the practitioners making the discernment between validity of treatment choices difficult. I worked throughout the years on basing my treatments and my teaching around solid biological foundation because I always believed that fundamentals never change. With that in mind, the practitioner has to always set the goal of treatment and then work his/her way back to evaluate the steps it takes to execute it. These steps have to be based on, as stated before, solid biological foundations.

In order to understand these solid foundations, we built this manuscript in a way to start with a review of fundamentals, mainly the wound healing, preparing a more in depth focused vented information that the practitioner can review. These will be done in a facilitated manner without compromising on the needed fundamentals. This manuscript will help either a practitioner in preparing a surgical decision, a resident preparing for his/her boards,

or a dental student/surgical resident learning the science of Periodontics and Implant Dentistry.

I am grateful for my colleagues that contributed to this manuscript, without their invaluable participation this manuscript would have not become a reality, thus benefiting the user of this work. I would like to specifically thank my oldest daughter, Lauren, for encouraging me and helping me in the writing of the proposal to the publisher during the lockdown for the Covid-19 pandemic. I hope that she, or one of my other children, one day use it for their studies if they decide to take dentistry as their vocational professional career. Finally, for you the reader, I am honored and humbled that you chose this book in your endeavor. Periodontology-Implant Dentistry has been a great journey for me and I hope it will be the same for you. Keep learning and always remember three things: biology always wins, fundamentals never change, set your goal, and work your way back.

Sincerely,
Edgard El Chaar

Part I

Fundamentals

1

Anatomy and Physiology

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Overview of Gingival Tissue and Periodontium

Macroscopically, the dental organ appears to be limited to the dental crown surrounded by soft tissue, which is scalloped around a well delineated circular line called the cemento-enamel junction (CEJ).

The morphology of the dental crowns change shape from the midline to the posterior dentition and with it, the function and dimension change. The soft tissue changes as well to accommodate these differences. That soft tissue will comprise two distinct parts, the mucosa and the keratinized tissue separated by the mucogingival line (MGL). In the keratinized zone, we have the attached gingiva and the marginal gingiva. The latter is a non-attached tissue that extends few millimeters from the margin to the junctional epithelium (JE), delineating the sulcus that is a gap on the inner side of the non-attached gingiva around the CEJ. JE is non-keratinized epithelium as it is on the border of the attached and non-attached gingiva.

In a microscopic cross-sectional view, we can appreciate the different parts of hard and soft tissue interacting together making the periodontium of the dental organ from its incisal tip apically (Figure 1.1). This figure shows the intricate components of the dental organ and the harmony needed to make this interaction work reminding us of a well-tuned opera. All of this hard and soft tissue requires irrigation from perfectly lined up blood circulation, which originates from an alveolar artery dividing itself in a periodontal ligament (PDL) branch, dental branch, and an intra-marrow branch. Inside the mucosa, an intricate circular system leads to a supra-periosteal artery crossing into the keratinized gingiva in a linear manner up to the gingival collar in which the three arteries,

PDL, intra-marrow, and supra-periosteal form the gingival crevicular plexus (Figure 1.2).

Radiographically, the PDL space can be observed and its width ranges between 0.1 and 0.25 mm (Figure 1.3). Any widening beyond these margins is considered a “widening of the periodontal ligament,” which can be a sign of inflammation either from an early periodontal disease at the coronal level or excessive occlusal trauma.

This harmonious intricate system called the dental periodontium will be reviewed in this manual, wishing you great reading and enjoyment.

Embryonic Development

At approximately four to five weeks into embryonic development, there is downgrowth of the ectoderm of the primitive oral stomatodeum into the underlying ectomesenchyme. At the terminal end of this downgrowth, the cells form a knoblike structure or bud. Cells in the surrounding ectomesenchyme begin to concentrate around this bud.

Several weeks later, this ectodermal bud has developed into a cuplike structure with four distinct layers: an outer enamel epithelium (OEE), an inner enamel epithelium (IEE), a stellate reticulum (SR), and a stratum intermedium (SI). Directly beneath the IEE, cells of the underlying ectomesenchyme have condensed into a dental papilla (DP). Surrounding these two structures is a third condensation, the dental follicle (DF), which will give rise to most of the cementum, periodontal ligament, and alveolar bone.

At the apical extent of the root, the IEE and OEE have fused to form Hertwig's epithelial root sheath (HES). More coronally, this root sheath breaks down to form islands of