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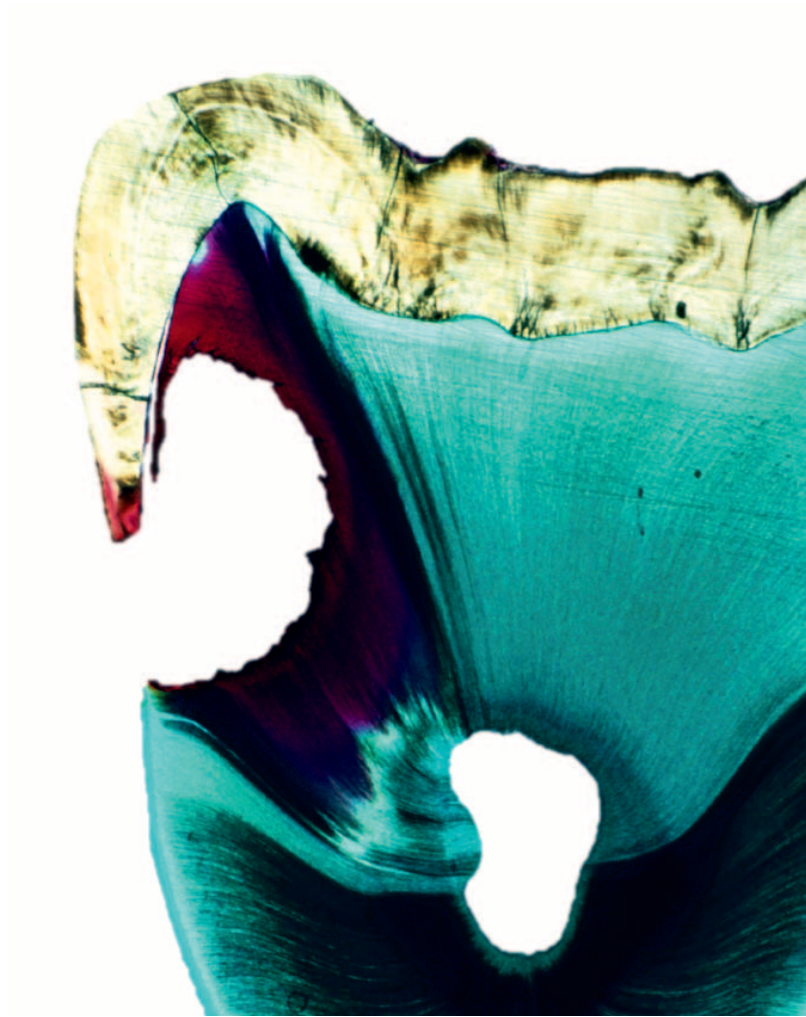
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# Root Caries: From Prevalence to Therapy

Editor

**M.R.O. Carrilho**



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## **Root Caries: From Prevalence to Therapy**

# **Monographs in Oral Science**

**Vol. 26**

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# Root Caries: From Prevalence to Therapy

Volume Editor

**Marcela Rocha de Olivera Carrilho** São Paulo

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## Foreword

It is not very common in the academic life to have the pleasure and opportunity to write a Foreword for such an important and timely publication as “Root Caries: From Prevalence to Therapy.” Only yesterday, I was treating a lovely elderly lady with severe root caries problem in and under her otherwise well-functioning bridgework. While trying hard to save her functioning and esthetic occlusion, I could not help but think – again – how difficult and devastating the final outcome of the root caries can be to the patient.

Is this book really timely as I claimed above? Absolutely! For example, just a few months ago, the President of the IADR, Professor Angus Walls titled his IADR 2017 congress opening ceremony speech “Aging – A Call to Arms!” [1]. In his speech, he addressed the challenges posed by the progressive global aging of society and not surprisingly, clearly pointed out that root caries is an important threat to the oral health, well-being, and quality of life of the elderly. The accumulation of the predisposing factors, together with the increasing number of aged people with increasing number of their own teeth, is a growing concern for the clinicians and policy makers alike. But age is not the only factor to consider. For example, patients with removable partial denture or fixed prosthodontic structures, orthodontic appliances or systematic diseases with or without medication may be affected.

Is this book important? Definitely, it is! It is a general assumption that dentin caries is the same

whether it occurs in enamel-covered crown or root surface, and the same preventative strategies apply for fissure and root surface caries. I personally do believe this is a false assumption: as a disease, root caries is definitely an entity of its own. The population at risk, risk factors, microbiology, the critical pH for demineralization, the role of endogenous preventive and destructive factors, the progression rate, etc. are significantly different between coronal enamel and root caries [2]. Therefore, our knowledge of the pathogenesis, prevention, and operative treatment of pit-and-fissure or smooth surface enamel caries may not be enough to face the challenge of root caries.

The volume title, as short and simple as it is, tells it all. This monograph takes the reader from the epidemiology of root caries through its biological determinants and lesion assessment and features to build up a comprehensive background for the last part of the book, preventive and operative therapies. This volume has brought together current knowledge and concepts relating to root caries in a comprehensive and lucid fashion. After all, only after understanding the patients at risk and risk factors, and the pathological mechanisms and features of the disease, will the clinician be fully equipped to successfully fight and win the battle. The significance of the text stems from the contributions of distinguished scientists and authorities in this field.

The problem has been recognized, it has been under active research and a lot has been published in dentistry literature, too. Simple PubMed search with key words “root caries” and “review” resulted in over 300 hits. Therefore, it is surprising that even an extensive search for a textbook focusing

specifically on root caries failed to find any. This volume of *Monographs in Oral Science* fills this enormous gap, and I am fully confident that it will be welcomed by the under- and postgraduate students, teachers, researchers, and practicing dentists alike.

Enjoy!

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- 1 Walls A: Aging – a call to arms! *J Dent Res* 2017;96:721–722.
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# Incidence, Prevalence and Global Distribution of Root Caries

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## Abstract

High quality epidemiological data are essential for both the development of national oral health policies and cost-effective targeting of resources. Unfortunately, a high level of clinical heterogeneity between studies in this area makes it difficult, and inappropriate, to try to produce any definitive figures on the global prevalence or incidence of root caries. Published studies have reported wide ranges for the prevalence of root caries (25–100%) and the mean Root Caries Index (9.7–38.7). The reported range for annual root caries incidence is also wide, from 10.1 to 40.6%. While more research is needed in this area, most studies conclude that the burden of root caries is high in the older age population.

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## Introduction

Unfortunately, estimating the prevalence and incidence of root caries can be challenging as loss of teeth confounds the data and the diagnostic criteria for root caries differ between studies. In addition to the differences in diagnostic criteria applied to root caries, epidemiological studies of root caries report their findings in a variety of

ways using different indices. There was great interest in the epidemiology of root caries among the dental research community in the 1970s and 1980s. During this time, a number of epidemiological studies were published. Many of these simply counted the number of carious and restored root surfaces and presented it as root decayed and filled surfaces (RDFS). Some studies felt that restorations on the root surface could not definitely be attributed to past caries experience and felt it was more accurate to report root decayed surfaces. Others counted the number of teeth which had evidence of root caries or previously restored root caries and presented root decayed and filled teeth.

Sumney et al. [1], in 1973, reported the percentage of the population with one or more root surface caries lesions and also presented the average number of lesions per person per tooth available. In 1980, Banting et al. [2] reported the percentage of the population with at least one filled or decayed root surface and also the mean number of decayed root lesions per patient alongside the mean number of restored root surfaces per patient. As further studies were published during

this period, researchers began to highlight the inconsistent reporting methods and the difficulty in comparing the results of studies [3, 4].

In 1980, Katz [5] proposed a new measure which he named the Root Caries Index (RCI) for scoring and reporting root surface caries. From the mid-1980s onwards, the RCI became one of the 2 standard measures used for reporting root caries prevalence (the other being RDFS), with most studies reporting both in conjunction to give as rounded a picture as possible. While there is no doubt that the RCI is imperfect, it has yet to be superseded by a more useful measure. Given the lack of consensus on a definition for root caries and the considerable debate about how best to measure it, it can be seen how complicated the epidemiology of this disease is. Authors writing about root caries have been calling for increased agreement in this area for over forty years [3, 6]. In light of the level of clinical heterogeneity between studies in this area, it is difficult, and inappropriate, to try to produce any definitive figures on the prevalence or incidence of root caries. However, it is interesting to look at the variety of populations in which root caries has been studied and the methods used to collect the data.

### **Prevalence of Root Caries**

Prevalence data from cross-sectional studies serve a number of purposes. These data are used to monitor the amount of disease existing in a population, to delineate the characteristics of people who have the disease, to generate hypotheses regarding the etiology of the disease, and to plan public oral health services. The use of cross-sectional studies to identify the association between risk factors and a disease are limited, however, the fact is that they are carried out at a single time point and give no indication of the sequence of events – whether exposure occurred before, after or during the onset of the disease outcome. This being so, it is impossible to infer

causality. As the term “risk factor” implies causality, it may be more accurate to describe any associations as “risk indicators” or “risk markers” for the disease.

Examining epidemiologic studies of root caries reveal numerous threats to their external and internal validities. Very few studies of root caries use a random sampling technique. Most studies recruit volunteers according to pre-defined criteria. These criteria are unique to each study, which impedes cross-study comparisons and limit generalizability. The notable exceptions to this are the national surveys [7, 8]. Studies recruiting volunteers should be interpreted with caution unless they can be proven to be representative or are a subpopulation of interest in their own right, for example, individuals with Alzheimer’s disease [9]. Studies on root caries prevalence have been reported for institutionalized elderly [2], independently living elderly [10], those attending day centers [11], adults in fluoridated areas [12], adults in non-fluoridated areas [13], urban dwellers, and rural dwellers [14], as well as the notable Piedmont 65+ studies which looked at African-Americans and Caucasians in North Carolina [15]. Many of the studies reported baseline data from large clinical trials [12, 16, 17]. Clinical trials include selected populations, designed to maximize the likelihood of finding differences between 2 therapies and are often not representative of a general population of interest.

The studies involving some type of sampling frame should provide estimates of prevalence, with proper weighting for the sampling design and unbiased responses. Unfortunately, this level of reporting is rare in root caries epidemiology. An exception to this is the study of Locker et al. [18], which reported a 26% response rate for individuals aged 50 and older. It was not possible to identify any clinical studies which reported the characteristics of non-responders. This is expected as participation in any research is voluntary and it may not be possible to gather any form of data on those who choose not to partici-