Preface

Dental caries is still one of the most common diseases in human beings, causing smaller or larger problems to millions of people around the world every day. As dental professionals we have to help people to understand the disease to enable them to prevent caries by themselves (self-management). When more severe decay is diagnosed, we, together with the patient, should manage the caries disease in a minimally interventional way.

This introductory chapter will present some general thoughts about caries and where we come from in cariology. Moreover, we will explain why we think it is important to have another book about cariology and will describe the concept of the book, which is presented in two main parts: science and practice.

Caries—Important but Preventable

Dental caries is the term used for pathoanatomical changes of the dental hard tissues. These changes are caused by acids that are created in the dental plaque (biofilm) covering the affected tooth surface, when certain microorganisms ferment sugars, which in turn demineralize the dental hard tissues. Thus, the disease, which professionals perceive as changes of the dental hard tissues, in fact reflects activities within the overlying dental biofilm. If these unfavorable biofilm activities are occurring frequently, the signs of the caries process on the dental hard tissues will become more easily detectable. Nonetheless, the caries "scar" starts with signs that are only visible with high magnification in the laboratory but end up with clinically visible alterations of the tooth surface integrity. Thus, caries is a term which actually covers changes in the dental hard tissue from the time the first mineral ion leaves the tissue to when no mineral is left. This development takes several years, fortunately, giving the dental professional and the patient time to act. In the clinically nonvisible stages we can adopt a risk-related approach to intervene noninvasively; in the early visible stages of the disease, we can intervene noninvasively or microinvasively. Later stages of the disease need invasive intervention that aims to preserve the tooth as much as possible.

Where We Come From…

Numerous individuals or groups of scientists have contributed to our understanding of caries over time. In the following we have selected a few of the many contributors and taken the liberty to sketch their faces and make a small note about their contribution. We have not included those who are still among us. The figure captions will give the reader a good idea of the history and development of cariology including adhesive dentistry.

Do We Need Another Book about Cariology?

Nowadays the dental professional has to face an overwhelming amount of **information** concerning dental caries and its clinical management, which is derived from various "traditional" sources such as pre- and postgraduate courses at dental schools and from continuing educational programs. In addition, the Internet updates current knowledge not only for dental professionals, but also for their patients. As with everything else, when a variety of goods is on offer, the choice becomes more difficult!

From a researcher's perspective this also holds true for the increasing variety of scientific journals that provide us with evidence on related issues for dental caries and allied topics such as tooth wear. Thus, the choice and assessment of scientific information are becoming more difficult compared with former years, although this process has been formalized and professionalized in the form of **evidence-based dentistry**. Here, systematic reviews or even meta-analyses about a certain topic should help to inform the professional, being based on relevant science. Nonetheless, this systematic approach is not always feasible, either because there is not much clinical evidence available or the subject matter is quite complex. For the dental practitioner systematic reviews might even be too impracticable to provide clinical guidance in the daily grind.

In this area of conflict a textbook may be of help. Although, it cannot and need not be as objective as a scientific paper, the format of a book is capable of summing up the most relevant points in a readable manner, and is thus still an important tool in teaching. This is what we have aimed for, together with over 20 other authors from more than 10 countries, who are all experts in their respective fields of cariology.

Proposal to Read the Book

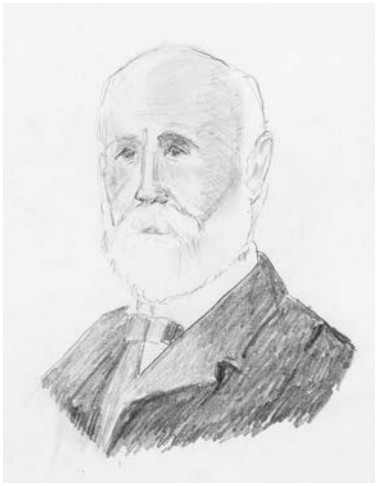
The **target groups** for this book are those studying or working within dentistry: dental hygienists, dental students, graduates, and dentists whether working in the public dental service or in private practice. Dental assistants who would have their working arena extended within the field of cariology may also benefit from reading parts of this book.

The book is divided into two parts: science and clinical practice. The **science part** is divided into five main subparts. Starting from oral ecology merging to etiology and (clinical) pathogenesis of caries and noncarious defects, the first subpart (Chapters 1–4) is rounded off by a more philosophical approach on how caries can be seen from a "modelling aspect." The second subpart (Chapters 5–9) is about clinical and radiographic detection of caries and assessment at the tooth surface level, as well as taking into account the individual level, meaning caries risk assessment. After a brief introduction to epidemiological

A. Van Leeuwenhoek, Holland
As far back as the 1650s Van Leeuwenhoek observed small animals in dental plaque, by using simple microscopes which he had made himself.

P. Fauchard, France
Around 1710, Fauchard asserted that sugar-derived acids like tartaric acid were responsible for dental decay. He also introduced dental fillings as treatment for dental caries.

W.D. Miller, USA
In the 1870s Miller observed that a multitude of microorganisms could produce acid. He suggested *the chemoparasitic caries theory*, which is still valid today.



G.V. Black, USA
From the 1860s onward Black organized, among other things, Black's classification system for caries lesions (Class I, II, III, VI, V) and principles of tooth preparations for fillings.

F.S. McKay, USA
In the 1930s McKay described the phenomenon of Colorado stained teeth, which later became synonymous with dental fluorosis.

H.T. Dean, USA
In the 1930s and 40s Dean observed an inverse relationship between dental fluorosis and dental caries.

matters on the topics of the book, the second subpart concludes with a proposal of how to transfer the knowledge about the caries process and its clinical assessment into clinical action. The noninvasive strategies (biofilm, diet, and mineralization modification) of how to deal with the caries process are described in the third subpart (Chapters 10–13) and possible ways of implementation in individualized and community-based dentistry are presented. The fourth subpart (Chapters 14–19) of the scientific section deals with microinvasive and minimally invasive caries treatment. This includes adhesion technology, sealing and infiltration, caries removal, and tooth-coloured direct restorations. The fifth subpart (Chapters 20–22) focuses on decision-making in treating caries in general as well as on special aspects of the presented concept in children. The scientific part concludes with some thoughts on future aspects in cariology.

H. Klein, USA
In the late 1930s, Klein and co-workers introduced the DMF index for recording caries in the United States, where D corresponds to decayed teeth/surfaces, M to missing teeth/surfaces due to caries, and F to filled teeth/surfaces due to caries.

B. Krasse, Sweden
In the 1950s, Krasse and co-workers showed that the caries increment in mentally handicapped people (Vipeholm caries study) increased if sugar was consumed between meals in a form that was retained in the mouth for a long time. In contrast, no caries increment was seen if the diet did not contain sugar.

M.G. Buonocore, USA
In the mid-1950s Buonocore introduced a method for increasing the adhesion of acrylic filling materials to enamel surfaces, which was necessary for realizing the concept of sealing in caries.

R. Bowen, USA
In the 1950s and 60s Bowen devised Bowen's resin, a forerunner for the majority of the composite materials that dentists have used for fillings ever since.

P.H. Keyes, USA
In the 1960s Keyes described the etiology of caries by means of three overlapping circles.

A. Thylstrup, Denmark
In Denmark during the 1980s, Thylstrup and co-workers disagreed with the principle of caries resistance as being due to embedment of fluoride in the dental hard tissue, but instead explained that the effect of fluoride on caries was related to its presence in small concentrations in the plaque fluid.

D. Bratthal, Sweden
During the 1980s and 90s Bratthal introduced the caries risk assessment program, CARIOGRAM.

The **clinical practice** part describes step-by-step clinical processes as well as clinical cases, for which treatment decisions are reflected on and the treatment outcomes shown.

As the target readership for this book is very broad, the different groups within the dental profession will probably read the book differently. The best advice we can give a reader before tackling a chapter is to read the introduction, the headings, the fact boxes, and the concluding summary. Then it is time for detailed study of the chapter. Enjoy!

Hendrik Meyer-Lueckel
Sebastian Paris
Kim Ekstrand
The Editors