

Hans R. Mühlemann

**Introduction
to Oral Preventive Medicine**



Introduction to Oral Preventive Medicine

A program for the first clinical experience

Hans R. Mühlemann

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Introduction to the English-Language Edition

The reader of this English-language version of Professor Hans R. Mühlemann's *Einführung in die orale Präventiv-Medizin* may find the following comments helpful.

The original German-language book presents a series of 16 exercises introducing beginning dental students to virtually all aspects of dentistry. Despite the wide ranging content of the course, all dental teachers, regardless of their particular interests, have welcomed it, because it provides students a solid base upon which they can build. The purpose is to augment, not to supercede, existing programs.

This English edition has been revised and to a certain extent expanded, because it is intended for use not only as a workbook of "programmed instruction" for dental students but also as a "refresher course" for practicing dentists. The theoretical portions introducing each chapter have been reworked in such a way that the practitioner can reap significant intellectual and practical benefit even if it is not possible for him to participate in an actual course. The Results Sheets included at the end of each chapter show the reader what results he might have obtained if he *had* performed the practical exercises.

The exercises described herein were first performed at the Dental Institute, University of Zurich, Switzerland, under the direct supervision of Professor Mühlemann and his staff. The book was developed over several years, as experience and student feedback showed the way to a final presentation.

Our goal in preparing this English edition has not been to merely translate German words into English, but rather to put Professor Mühlemann's *ideas* into English. Because Mühlemann is an intense, dynamic person with a quick mind, his thoughts often seem to range far ahead of his words; he talks in a staccato style, seemingly to make up for the time lag. His German-language original is written in much this way, and rightly so, since it was intended for use by his own students and staff. But because we hope that the English edition will be used the world over by those who know of Mühlemann's work but don't know him personally, we felt that a somewhat less frenetic style would be more appropriate.

We were tempted at first to delete Professor Mühlemann's rather frequent references to continental Europe and to things Swiss in particular. In the end, we incorporated the Swiss "flavor," deciding it was indeed suitable for an international audience.

Perhaps the greatest challenge was transposition of Mühlemann's illustrative limericks into adequate English, a task not always successfully completed. We rejected some suggestions that the limericks be deleted altogether; Mühlemann without dry humor is not really Mühlemann at all. In short:

Translating Mühlemann is fun.
He's witty – a master of pun.
His limericks sensational
Are so educational.
Forget about classroom hum-drum!

Professor Mühlemann did not review this manuscript before it went to press. We like to think he would have approved it if he had.

Thomas M. Hassell
Alfred L. Ogilvie

Seattle, August 1975

What is the purpose of this course?

This book was prepared primarily for the instructor. Many young teachers today are convinced of the necessity for a broader presentation of preventive medicine. But oftentimes an instructor will procrastinate, because he is aware of the time involved in organizing such a program. This book should be welcomed by these teachers, because it gives them the wherewithall on the one hand to present a course without a tremendous investment of time, and on the other hand represents a collection of material which has proven beneficial for both dental students and dental hygiene students.

The central focus of this course is not gray theory, but rather observation of living things, of persons. Results gathered by students during the course may be compared to data in the literature. In this way, the often tiresome statistical reports in textbooks and journals suddenly become meaningful. Automatically, the question-and-answer game will begin; for example: Why is it that in Swedish studies the severity of gingival inflammation in students is considerably different from Swiss? What factors could be responsible for this difference? This book lays down the biological bases of prevention. The student comes to know the purpose of prevention and is motivated to practice it.

Introduction

Dental medicine today finds itself in a pervasive state of change. Numerous generations of dentists, while they stood at the treatment chair with their drills in their hands, were concerned with nothing else except how to repair carious lesions. Why did they never become more curious? Each decade brought new technological advances for easing or eliminating drudgery and busywork: the whining air turbine replaced the foot-driven handpiece; pharmacological progress made possible painless treatment; the age of plastics gave us new materials and simplified therapy. Dental technique has approached perfection and has achieved something that no other medical specialty has been able to do: dentistry has put to use each new technological development quickly and effectively. It is not surprising that young people are attracted to this type of perfection, to this fight for the highest precision.

That is one side of the coin. Should the other side be forbidden the hopeful student? Despite all the technical perfection, many an older dentist is dissatisfied with his life's work, seeing it merely as a constant process of tooth repair. He has experienced for himself the disappointment of seeing the primary dentition lost due to caries, only to be replaced by a permanent dentition which, apparently according to some unwritten law, is filled, then filled again, then crowned, then extracted. He participates in tooth replacement, first by bridgework, then by partial dentures and finally by a set of complete dentures. Why can't the situation be different? Many a father of a large family has fearfully asked himself this question, if only for purely financial reasons. Official spokesmen of the dental profession admit openly that "reparative dentistry" cannot provide adequate treatment for all levels of society. Yet "adequate," as they use the term, need not mean "expensive." A healthy oral cavity does not have to be full of gold. Nobody knows this better than dentists themselves. Thousands of them chew for years on temporary fillings, which seemingly are never replaced by definitive restorations because of a crowded waiting room and the lack of time.

The solution of the "dental problem" requires a *new orientation of dentistry*. The basis for this must be the recognition and acceptance of the fact that, in the long run, the *prevention of dental diseases is just as important, practically speaking, as is therapy of same*.

In Switzerland, the dentist-to-population ratio is such that about 2,200 persons must be cared for by each dentist. Dental treatment in terms of care for dental and periodontal destruction would require at least twice as many practitioners. In view of the impossibility of achieving a dentist-to-population ratio of 1,000:1, one has no choice but to *reduce the incidence of disease by one-half*. This represents the social medicine aspect of the "dental problem."

Does a dentist who practices "preventive dentistry" achieve self-satisfaction with his profession? One cannot contest that the treatment of a carious defect, i. e., artful preparation and filling of a cavity, represents craftsmanship and an art form which gives

tremendous satisfaction. One has set out upon a task, proceeds self-critically with the necessary manipulations, and stands before the result of one's perfectly performed work of art. But over the course of time, the failures return, although many of them remain undetected or are chalked up to the patient's lack of proper oral hygiene or to "soft teeth" which the unfortunate patient inherited from his parents . . .

A preventive measure, the topical application of fluoride for example, will only be performed by a practitioner who has been convinced of its efficacy and who believes in it. This is a difficult thing for every student to grasp: he paints a fluoride solution onto a tooth and waits, in vain, for a visible reaction... Treatment and result, fluoride application and caries-freedom, lie years apart. However, the happiness and professional satisfaction will come with time to the patient dentist. He will be able to observe, for example, that the numerous children of a large family, treated conscientiously with preventive measures, will require very few fillings, and that their mouths will remain almost completely caries-free.

"Preventive dentistry" does not mean only the *prevention of a disease*, it also implies the *early detection and the timely and simple treatment* of the clinical manifestations of the disease.

The early stages of periodontal disease, and this applies in some degree to dental caries as well, are often *reversible*. The diagnosis of initial symptoms motivates especially toward prevention. Microsymptoms require precise examination and observation. The patient himself can diagnose a hole in his tooth, but the early detection of a carious lesion, or the first inflammatory alterations in the periodontium and the oral mucosa is a more difficult thing. Precise observation implies the collection of quantitative data. The preventive-minded practitioner is not satisfied with merely knowing whether or not a patient has gingivitis. He wants to know the *extent* and the *intensity* of the pathological alterations, because these are prerequisites for the prevention of further damage or for the reversal of already existing disease. Prevention is a scientific process. Therefore, it does not exist without quantitative findings ("data").

One purpose of this book is to spare the student, during his first contact with dentistry, from the shock which the author's generation had to experience: tray after tray filled with thousands of formaldehyde-soaked extracted human teeth. The first command I can remember was: "Come in! Throw out those with no caries! (How ironic!) Drill 'em! Fill 'em!" The natural science and biological studies I had pursued before entering dental school appeared to be merely luxurious ballast.

In our opinion, the very first clinical experiences in dentistry should be based upon knowledge and experience which the new dental student has already achieved from a broad theoretical course of university-level studies. This is very meaningful where the field of prevention is concerned. *Introduction to Oral Preventive Medicine* is built upon this concept and has as its purpose the motivation of the clinical beginner towards quantitative observations and a critical view of both the literature and his instructors in the clinic. It seems to us that this course offers a means for educating dentists and modern dental auxiliaries who are motivated toward prevention.

Introduction to Oral Preventive Medicine was written for a learning team: student instructor and dentist learn from each other and with each other. The team should find both learning and the performance of the practical exercises easier with this program. This is the reason for the "cook book" style of the text.

Nothing would make this author happier than to find this book hopelessly outdated 10 years from now. It would mean that real progress had occurred. This course of work and study would then have been worthwhile indeed.

H. R. Mühlemann

Leitmotiv for Oral Preventive Medicine

1. The basis for preventive medicine is scientific fact. Only with this basis can we achieve real progress in the form of better health and less disease.
2. The arch enemy of true progress is dogma. Dogma blinds and manipulates. Beware of the teacher who tells you, "it is so."
3. Allow yourself to be convinced only by scientific facts. You are studying at a university, which, through you, should serve the public. Only the best is good enough for the public.
4. Cherish the teacher who admits that his assertions are open to discussion.
5. No one can forbid you to believe. Wherever scientific facts are lacking, belief is the alternative. But belief, like religion, must be declared.

The Scientific Facts

I. In the dogmatic lecture hall

Lecturing professor:

"The minute you discover even the tiniest carious lesion on a tooth, it must be filled immediately. Otherwise, the dental pulp will be diseased in a few months."

Pseudostudent (writing down every word without looking up):

"Interesting!"

Student untrained in stenography, probably a thinker:

"I haven't been to the dentist for 4 years. At that time, the dentist told me I had to have a beginning carious lesion filled as soon as possible. I've observed it since then. It hasn't gotten any bigger."

Professor (glaring):

"You observed incorrectly! How could you, an absolutely inexperienced beginning student, understand anything at all about dental caries? Your observation is unfounded and contradicts my vast experience in thousands of cases. It is so!"

Suicide candidate (student):

"Where can I review your thousands of cases?"

Professor (Dr. med., Dr. med. dent., Dr. h. c. sci., Ph. D., F.A.C.D. etc.):

"My modesty does not permit me to publish all my studies." (He clears his throat)
"I would not be standing here if I were not telling the truth."

II. In the scientific lecture hall

Teacher (without necktie):

"Although one hears it again and again, it is not true that the initial carious lesion progresses to pulpal disease in a few months."

Modern student:

"On what do you base this claim"?

Teacher (considered an "upstart" by his academic colleagues, because he wears no necktie):

"I'm happy that you accept only scientific facts and not mere claims or opinions. I have brought along a published investigation which supports my statements."

Disgruntled student (with necktie):

"A great deal of material gets published; some believe too much. Paper is patient."

Teacher:

"Yes, but this publication is by an internationally renowned author; his name is Marthaler."

Critical student:

"That expression you just used is impressive. But just how do you measure this quality called 'international renown'?"

Teacher:

"Once you get into the literature, especially the Anglo-Saxon literature, you will soon discover that the 5 or 10 best-known oral epidemiologists in the world cite Marthaler's work again and again in their publications. In other words, Marthaler's publications are recognized as the scientific blocks with which other scientists build. If you want still more evidence, try looking through the "Science Citation Index"¹. Judge for yourself the value of this Index as a measure of the competence of any scientist.

¹ Request literature about the Science Citation Index from:
Institute for Scientific Information, 325 Chestnut Street, Philadelphia, Pa. U.S.A. 19106

Orientation article:

Margolis, J.: Citation indexing and evaluation of scientific papers. *Science* 155:1213, 1967.

In principle, in the S.C.I. one finds how often a scientific publication from any given author is cited elsewhere. It has been demonstrated that valuable, creative publications are more often cited than pseudoscientific articles."

Numerous students:

"But we can't read English."

Teacher:

"That is most unfortunate. The language of biological and medical science today is English. I'm tempted to compare you with aspiring mountain climbers who have no ropes."

Female student:

"Are you going to abandon us without a 'rope'?"

Teacher (big-hearted):

"I really mean it. I would suggest that you skip several of my courses in order to make time to study English. You would benefit much more, because you have an entire life in front of you. Without a working knowledge of English, you'll be in no position to start out in any profession based on science. You will always regret your failure to master English."

Impatient student:

"Where was this study by Marthaler published?"

Teacher (an editor in his spare time):

"In Helvetica Odontologica Acta, Volume 16, page 69, 1972."

Student (dumbfounded):

"A Swiss journal in the English language? Treason!"

Teacher (apparently well-documented):

"Yes, sir. In the language of science. By this means, a journal reaches 3 to 4 times as many of those who are truly interested. Wouldn't it be a bad investment for the Swiss to publish research data, which has required hundreds of hours to accumulate and analyze, in a form which would be read by only a few people?"

Student (impatient):

"That may be, but it is still no guarantee that this particular publication by Marthaler has high scientific quality or makes valid statements about the rate of progression of carious lesions."

Teacher (addicted, lighting a cigarette):

"You are perhaps not aware that the leading journals in the field of dentistry, such as the Journal of Dental Research, Archives of Oral Biology, Caries Research, the Journal of Periodontal Research, Acta Odontologica Scandinavica and Helvetica Odontologica Acta do not publish any article until it has been submitted to a panel of experts for critical analysis. Suggestions for improvement are made by these referees, so that vague points will be clarified, thus making the article more valuable. Marthaler has probably never published a manuscript which has not first been reviewed by experts in the field. Only the lay press can't wait."

Student (coughing, a passive smoker): "Let's get to the point."

Teacher (more considerate):

"Marthaler examined 133 seven to fourteen-year-old children in the city of Zurich for carious lesions and the growth of same over a 7-year period."

Student (well prepared):

"How did he do the examining? I've read that even just the lighting conditions can influence the results of an examination."

Teacher (knows Marthaler):

"Dr. Marthaler knows that, too. He also knows the percentage of error in his examination technique. He knows as well the main factors responsible for the variations in his data. In reality, his study group is only a random sample. It is for this reason that there are also confidence limits associated with his mean values. On the basis of these, it is possible to make statements about a population with a certain mathematical probability that the random sample is representative of the population as a whole."

Insistent student:

"From Marthaler's study one sees that an initial proximal-surface carious lesion, as detected on the radiograph, requires an average of 25 months to progress from the most superficial enamel layer to the inner half of the enamel. But as future dentists, an average value doesn't help us very much. We'll be taking care of individual people."