ENDODONTICS
Fifth Edition

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Notice: The authors and publisher have made every effort to ensure that the patient care recommended herein, including choice of drugs and drug dosages, is in accord with the accepted standard and practice at the time of publication. However, since research and regulation constantly change clinical standards, the reader is urged to check the product information sheet included in the package of each drug, which includes recommended doses, warnings, and contraindications. This is particularly important with new or infrequently used drugs. Any treatment regimen, particularly one involving medication, involves inherent risk that must be weighed on a case-by-case basis against the benefits anticipated. The reader is cautioned that the purpose of this book is to inform and enlighten; the information contained herein is not intended as, and should not be employed as, a substitute for individual diagnosis and treatment.
Dedicated to the Memory of my Father,
John James Ingle, Jr., DDS–1892-1954

Vanderbilt University Dental School, circa 1912.
Dr. Ingle is on the far right.

Dr. Ingle graduated from Northwestern University Dental School in 1914, the last class under G.V. Black.

These two pictures hung in my father’s dental laboratory for 35 years.

“TESTIMONIAL”, cover of the old Life Magazine, 73:(1890), January 16, 1919.
A number of years ago, I (JII) served on a committee to select a new dean for a school of medicine. The committee was made up mostly of physicians. I was the only dentist. The meeting started in the traditional way - each participant stating their name and specialty. When it came to my turn, I gave my specialty as endodontics.

“Endodontics,” said the neurosurgeon, “What in the world is endodontics?” “Endodontics,” I explained, “deals with the diagnosis and treatment of diseases of the dental pulp.” “You mean inside the tooth?” he inquired. “I guess you could say that.” I answered. He uttered an expletive and declared that endodontics had to be the ultimate in limited specialties.

Over the years I’ve thought many times of this encounter. How could one write 900 pages about the inside of the tooth? And yet, we have. Because it deserves it!

We have realized for a long time that one person could not be an expert in all phases of this limited, yet demanding discipline. For that reason we have mustered an assembly of world experts, each enjoying an international reputation in their particular area of expertise, be it microanatomy, pathology, pharmacology, microbiology, radiography, anesthesiology, pain management, canal preparation and obturation, trauma, surgery, bleaching, pediatric endodontics, whatever.

We are very proud of our contributing authors, and to them we owe an endearing debt of gratitude. And you– the reader should as well, for they bring you the finest, stated honestly and unsparingly!

Once again, I (JII) acknowledge the genuine assistance and loving care I have received from my wife of 62 years - Joyce Ingle. How fortunate I have been. And likewise, I (LKB) thank my wife, Grete, for her understanding when I spent numerous hours reading and writing.

At Loma Linda University, we wish to express our gratitude to the individuals who helped with the graphics: Richard Tinker and Richard Cross, and the secretaries who so carefully worked on the text: Luci Denger, Dawn Pellerin, and Marjorie Sweet. Without their care and dedication, this book would still be just a dream.

At the University of Southern California, we gratefully acknowledge the expertise of Frank Mason, Associate Professor and Director of the School of Dentistry library and his associates.

Special thanks to Ron and Mary Prottsman for their wonderful indexes.

In addition, we are indebted to Brian Decker, Peggy Dalling and the entire team at BC Decker Inc for their hard work involved in the preparation of this material.
This book was begun at Snee-oosh Beach, a quiet retreat overlooking Puget Sound and the San Juan Islands. At Snee-oosh it is possible to escape from complex civilization, and to concentrate upon the job at hand—writing a text.

Hard by Snee-oosh is an old Indian trail called PULL AND BE DAMNED ROAD. One can hardly imagine a more fitting location while writing a text on the pulpless tooth than nearby PULL AND BE DAMNED ROAD, for “Pull and be damned” could well be the motto of the dental profession from its inception.

PULL AND BE DAMNED ROAD goes down to the shores of Skagit Bay an inside passage of the gentle Pacific leading ominously to DECEPTION PASS. This delusive inlet which 50 easily deceived the early explorers reminds us how our profession has practiced self-deception over the years. Unfortunately, many pass into the “pull and be damned” deceptive phase of dental practice, never to return.

Inside DECEPTION PASS, however, lies HOPE ISLAND, a symbol of the future. HOPE we must have, coupled with resolve. HOPE that the future of dentistry will noticeably improve. HOPE that an enlightened profession will be guided by the concept of retention and rehabilitation of the dental apparatus. HOPE for the rejection of “oral amputation.”
To say that the ideas contained within this text are ours or are original is ridiculous. Nothing really is new under the dental sun. We have liberally borrowed from our contemporaries as well as from the past. We only hope we give credit where credit is due. The student who chooses this text for an encyclopedia will be disappointed. In this age of “do it yourself” this is a “how to do it” book. We have attempted to discuss and illustrate in great detail the operative aspects of endodontic therapy, for we estimate that in treating a pulpless tooth the dentist will spend at least 75 percent of treatment time in endodontic cavity preparation, canal debridement, and filling. Operative endodontics is therefore presented first in the text, and a correspondingly significant section deals with these matters.

We leave to other authors the detailed discussion of anti-infectives, local anesthesia, or oral microbiology. Although these subjects are dealt with in this text, we have tried to keep the material in proper context; brief, and to the point. We have spent, however, an unusual amount of space and time in developing the chapter on DIFFERENTIAL DIAGNOSIS OF ORAL AND PERIORAL PAIN.

Diagnosis of pain is an area of dental practice that more frequently is falling into the province of Endodontics. It has often been said that any well-trained person can practice the mechanics of dentistry, but that proper diagnosis is the discipline that separates the really competent dentist from the merely mechanical; hence the extensive coverage of the subject.

A great deal of thought and talent was put into developing the four chapters on the normal and pathologic pulp and periapical tissues. This discussion builds the background for diagnosis of endodontic problems and sets the stage for a better understanding of oral and perioral pain.

Snee-oosh Beach is no Walden Pond, nor we Thoreau for that matter. But we may learn a lesson from Walden. “Simplify, simplify!” was Thoreau’s text, and simplification is one text we may well take to heart. There has been far too much complicated mumbo-jumbo in endodontic treatment, a significant factor in discouraging the profession from including endodontic therapy in their practices.

We will attempt to present the subject not only in a simplified form, but in a systemic manner; for the simplified systematic practice of endodontics will lead to successful results achieved with pleasure and profit. We have attempted to remove the mystery and retain the basic core of the subject. We only hope we succeed in bringing some order out of the present chaos.

Finally, we would like to eulogize Dr. Balint J. Orban to whom the first edition is dedicated. Dr. Orban’s death was a great loss to the profession and an even greater loss to those of us fortunate enough to have known him well. His ability to clarify and delineate a problem is apparent in the Classification of Pulpal and Periapical Pain which we discussed just prior to his death. The profession is forever in the debt of Balint Orban; not the least for his matchless descriptions of pulpal histopathology. We are proud to be the recipients of this priceless collection of microscopic material. We are more proud to have been his friends and disciples.

JOHN INGLE
Seattle, Washington
1964
Thirty-six years ago, this text was started at “PULL AND BE DAMNED ROAD”. And now, after a third of a century, we have reached another road—a crossroads, as it turns out.

In our fast moving world, the publishing business is approaching a major intersection. What future directions will be taken: hard copy printing, CD-ROM, Internet, or a combination of all three? This is not a simple fork in the road. This is a freeway interchange, with more to come for sure.

The authors and publishers of this text were faced with a dilemma, a tectonic shift in storage and retrieval, so to speak. Should we just abandon the textbook altogether? Should we grossly reduce the contents and make it a paperback? Should we create a CD-ROM or a combination of text and CD-ROM? Or should we update the 4th edition to produce a 5th edition?

We decided on the latter option! BC Decker Inc, our publisher, stated that the text had become a classic—respected worldwide—and should continue as the pace-setter, the landmark, the milestone against which other texts are compared. The endodontic “Bible”, if you will.

This text will continue to provide eager students of the discipline with the latest and most complete information available—unvarnished, impartial, and reliable.

The discipline of endodontics is also reaching a crossroads, brought about by two elements—nickel and titanium (NiTi). More and more, root canal therapy today is done with the aid of mechanical means. As new instruments and materials are added, endodontics will be more precise and less time consuming. But, in this rush to mechanize, let us not forget our major concerns, namely bacteria and pain. We feel that this new edition of *Endodontics* addresses well all of these aspects of the discipline.
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