
Nitrous Oxide in Pediatric Dentistry

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Editors

Nitrous Oxide in Pediatric Dentistry

A Clinical Handbook

 Springer

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*Dedicated
to all the child patients
and
pediatric dentists*

Foreword

It is with great pleasure that I write a few words for my colleagues about their exciting new book. This publication provides the reader with theoretical and clinical knowledge on the use of nitrous oxide sedation, a sedation technique used in dentistry for decades, but not available to dentists in all countries. It also highlights the ever-increasing need for knowledge in the field of pediatric sedation worldwide.

India is considered one of the emerging superpowers of the world. This potential is attributed to several indicators, the primary ones being its demographic trends and a rapidly expanding economy. As such, there is a large child population and the growth in demand for dental services has forced professionals to explore and develop techniques used in the field of sedation elsewhere.

Children require specific behavior management techniques to provide them with adequate and compassionate care. Dentists address this clinical requirement with a diversity of non-pharmacological and pharmacological techniques, which differ according to country and resources. Important variables include cultural aspects, current trends in parental expectations worldwide, training and experience in the field of pediatric dentistry, and especially, education in the field of pediatric sedation. Dentists now face many challenges in the management of their young patients.

Dr. Gupta and Dr. Sethi's vision and experience among their colleagues are a sign of the new demands for services in the field of pediatric dentistry. Prof. Emmanouil brings diversity and vast experience in this field. He is a well acclaimed and renowned lecturer internationally and he continues to research on the use of nitrous oxide in our profession. As an experienced pediatric dentist myself, a sedationist and lecturer in the field of pediatric dental sedation, it is heartwarming to see colleagues join forces and edit this publication for the benefit of dentists and children overall.

This publication is a comprehensive book on the history and background, mechanism of action, and the clinical use of nitrous oxide in children. Each chapter addresses different components and the publication is well referenced. Although nitrous oxide has been around for a long time, its use in pediatric dentistry is not widespread worldwide. Increasing demand for the use of sedation in our field makes this book the perfect reference for the clinician learning the use of nitrous oxide.

I am sure this publication will become a great tool for clinicians wanting to expand their knowledge, and a second edition at some stage in future will continue its legacy.

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Preface

Pediatric dentistry is one of the most challenging specialities of dentistry because providing good quality clinical work to child patients is dependent not only on the clinical expertise of the operator but more importantly on the behavior guidance skills. Behavior management is an integral part of pediatric dentistry; however, many a time nonpharmacologic techniques are not adequate.

After graduating, I practiced pediatric dentistry without nitrous oxide for quite a few years. Although having seen its use in many countries, and reading about it, I always wondered why was it not used in India. Some dreams do come true, and I got an opportunity to practice this technique. Soon after, I began to realize the change it brought in my clinical practice, and I termed it as the “backbone of pediatric dentistry.”

However, it has a stigma attached to it for being a “pharmacologic agent” of behavior management and is commonly but incorrectly kept at the same pedestal as general anesthesia. Aren't we doing operative/surgical procedures which do require the use of pharmacologic agents like local anesthesia? Then why do we shy away from the routine use of nitrous oxide in pediatric dentistry when, with its use, we can make fearful children grow into adults without having fear of dentistry? Why is a pediatric dentist termed an “ideal pediatric dentist” only when he/she uses non-pharmacologic behavior management?

Child is not a miniature adult, and similarly, nitrous oxide in pediatric dentistry is little different from that in adults, mainly because of the lack of adequate communication from children and lower cognitive ability than grown-ups. However, with appropriate use of behavior guidance skills, nitrous oxide can be practiced well in children. And this stimulated me to write this book, because I felt a need to highlight the integration of basic behavior guidance, which starts with recognition of fear, with nitrous oxide-oxygen inhalation sedation. This book, therefore, focusses on the use of nitrous oxide in child patients and is the first book on nitrous oxide exclusively for pediatric dentistry.

The book begins with understanding fear and anxiety. This step is crucial for a clinician to successfully practice nitrous oxide in children because one of the main purposes of nitrous oxide is to bring about anxiolysis. The synergism between basic behavior management and nitrous oxide is explained step-by-step in children with different behaviors. Various aspects of employing this technique in child patients have been supported with videos for better understanding of the readers. A chapter

has been dedicated for use of this technique in children with special healthcare needs.

Numerous other dimensions such as the mechanism behind its action, hazards and risks, equipment, and basic properties have been covered, which will make this book an enjoyable read for dentists dealing with children.

Gurugram, India
May 2019

Kunal Gupta

Preface

Nitrous Oxide: The Nearly “Ideal” Clinical Sedative

I am pleased to present this book as the product of an international collaboration from authors, experts in the field of inhalation sedation. It has been an honor for me to have worked together with the young generation of India’s clinicians on this book.

China and India, nearly 40% of the world’s population, have lately introduced nitrous oxide in their inventory of sedation techniques. This book represents an expansion of the chapter I coauthored for the book *Behavior Management in Dentistry for Children* (editors G. Wright, A. Kupietzky, Wiley 2014), which has been translated into Chinese.

My first contact with nitrous oxide was 35 years ago in 1985 when I walked in Dr. Quock’s lab at Marquette University Dental School looking for a research subject for my master’s thesis. I was captivated by how psychopharmacology could replicate human attributes with animals and the innovative ways there, to test a gaseous agent like nitrous oxide. I felt I had found my calling.

Since then, nitrous oxide research took me from Marquette University to the University of Illinois and Washington State University, USA, working with Dr. Quock’s team. I consider myself very fortunate to have chosen this field of study and blessed to have been able to contribute, through my research, some small pieces of the “nitrous oxide” puzzle.

A discussion of the mechanism of action of nitrous oxide, a simple inert compound of only three molecules, has also revealed a long and fascinating history, making it a “laughing gas” not only for patients but also for the researchers trying to decipher its multitude of actions.

Its popularity has been turbulent over time: used as anesthetic, then fell out of favor becoming a recreational drug; came back full force helping anesthesiologists bring faster and painless anesthesia to their patients; used in labor and in dentistry as the favorite analgesic and anxiolytic; today falling out of favor from the anesthesiology departments but gaining favor not only in dentistry but also in the emergency and outpatient hospital departments and at the same time used by young people in today’s society as a recreational drug of choice and in “nitrous” bars.

This book is an attempt to bridge the new knowledge of nitrous oxide mechanism of action with its clinical application in pediatric dentistry. There is a lot of material covered with clinical tips and scientific backing, and we have tried to include all the updated literature on nitrous oxide. This book will help the reader advance the knowledge and practice of inhalation sedation with nitrous oxide. Furthermore, the clinician will also have access to videos helping to better understand the concepts of each chapter.

I would like to thank all the contributors for the excellent work on this book and my family for their support throughout the years.

Athens, Greece
May 2019

Dimitris Emmanouil

Acknowledgments

First and foremost, I would like to thank God for giving me the strength to undertake this project and pen down my passion of practicing the technique of nitrous oxide in child patients. My heartfelt thanks to my family including my parents, wife Jyotsna, and daughter Kimayra who gave me the power to believe in myself and pursue this dream.

Dr. Justin Lee needs a special recognition for being my mentor for this technique and ensuring that I employ this technique in nearly all my child patients. As a result I could gain good experience in using this technique in child patients and formulating my thoughts.

It was a great privilege and honor to have Dr. Dimitris Emmanouil as a coeditor for this book. Thank you for deciding to trust me, motivate me, and build a professional relationship which will last forever. His vast knowledge on this subject has added value to this book, which the reader will appreciate and benefit from.

I would extend my sincere gratitude to Dr. Amit Sethi who endorsed my idea of this book from its inception to its completion. Each and every contributing author of this book has done a commendable job, especially Dr. Priyanshi Ritwik who left no stone unturned to submit her contributions in time. I would like to thank Prof. Shobha Tandon who has been a constant driving force for me to undertake such projects.

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Last but not least, big thanks to all my friends and colleagues who appreciated my practice of nitrous oxide in pediatric dentistry. Many of them directly or indirectly motivated me and stimulated my mind to take up this task.

Gurugram, India
May 2019

Kunal Gupta

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