

# **OROFACIAL MYOLOGY**

#### ABOUT THE EDITORS

**Marvin L. Hanson, PhD**, is one of the founders of the IAOM, and served two terms as president. He retired as Chair, Department of Communication Disorders, at the University of Utah, in 1994, after serving in that position for ten years. He is a Fellow in ASHA. He presently is engaged in a part-time private practice in speech pathology in Kitty Hawk, North Carolina. He is co-author of several textbooks, and single author of one, *Articulation* (W. B. Saunders, Philadelphia, 1983). He has published over 40 articles in professional journals, many of which were reports of his own research in orofacial myology.

**Robert M. Mason, DMD, PhD**, is in private practice in orthodontics in Durham, North Carolina. He was previously Professor and Chief of Orthodontics at the Department of Surgery, Duke University Medical Center. He is past president of the American Cleft Palate-Craniofacial Association, and is a Fellow in ASHA. He has served in several capacities with the IAOM, and has contributed a great deal of clinical research about interdisciplinary interactions in the areas of craniofacial anomalies and oral myofunctional disorders.

Second Edition

# OROFACIAL MYOLOGY

International Perspectives

*By*

**MARVIN L. HANSON, PH.D.**

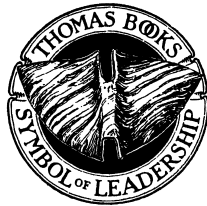
*Speech-Language Pathologist and  
Orofacial Myologist*

*and*

**ROBERT M. MASON, DMD, PH.D.**

*Orthodontist and  
Speech-Language Pathologist*

*With Contributed Chapters by  
Eight Authors from Four Continents*



**CHARLES C THOMAS • PUBLISHER, LTD.**  
*Springfield • Illinois • U.S.A.*

*Published and Distributed Throughout the World by*

CHARLES C THOMAS • PUBLISHER, LTD.  
2600 South First Street  
Springfield, Illinois 62704

This book is protected by copyright. No part of  
it may be reproduced in any manner without  
written permission from the publisher.

© 2003 by CHARLES C THOMAS • PUBLISHER, LTD.

ISBN 0-398-07358-9 (hard)  
ISBN 0-398-07359-7 (paper)

Library of Congress Catalog Card Number: 2002073737

*With THOMAS BOOKS careful attention is given to all details of manufacturing  
and design. It is the Publisher's desire to present books that are satisfactory as to their  
physical qualities and artistic possibilities and appropriate for their particular use.  
THOMAS BOOKS will be true to those laws of quality that assure a good name  
and good will.*

*Printed in the United States of America  
MM-R-3*

#### **Library of Congress Cataloging-in-Publication Data**

Hanson, Marvin L., 1932-

Orofacial myology : international perspectives / by Marvin L. Hanson and Robert  
M. Mason ; with contributed chapters by eight authors from four continents.—2nd ed.  
p. cm.

First ed. published under title : Fundamentals of orofacial myology / Marvin L.  
Hanson and Richard H. Barrett. Springfield, Ill. : Thomas, 1988.

Includes bibliographical references and index.

ISBN 0-398-07358-9 (hard) — ISBN 0-398-07359-7 (paper)

1. Tongue thrust. 2. Mouth—Muscles—Abnormalities—Treatment. 3. Face—Muscles—  
Abnormalities—Treatment. 4. Oral habits. I. Mason, Robert M., 1937-. II. Hanson,  
Marvin L., 1932-. Fundamentals of orofacial myology. III. Title.

RC429.H36 2003  
617.5'22—dc21

2002073737

## CONTRIBUTORS

**Susanne Codoni** is presently vice president of the Arbeitskreis für Myofunktionelle Therapie, the European myofunctional organization. She is editor of the children's book *Stomatopagheti* and co-author of the *Lutschzwerge*. She is a speech pathologist, a teacher of the deaf, and a certified oral myofunctional therapist. She lives in Basel, Switzerland.

**Ana Lia Garretto, PhD** in speech pathology, is an international lecturer in the area of orofacial myology. She maintains a private practice, and is a faculty member of the Department of Pediatric Dentistry at the Buenos Aires University in Argentina. She studied extensively in the United States. Ana is the author of seven clinical and research articles in professional journals.

**Hermann Hahn, DDS** is present president of the Arbeitskreis, and editor of that organization's journal. He and his wife, Vevi, have provided training courses in orofacial myology to clinicians for several years. He has been a major contributor to the field of orofacial myology in Europe. He maintains a private practice in dentistry in Munich.

**Vevi Hahn, PhD**, her dissertation is an excellent volume on oral myofunctional disorders, and was published in 1998 in Germany, with the title *Myofunktionelle Therapie*. Dr. Hahn lectures in the Department of Speech Pathology, at the University of Munich, on speech disorders and on myofunctional therapy. She has worked hand-in-hand with Hermann in the development of the Arbeitskreis.

**Cynthia Landis, MA** is a certified speech pathologist and orofacial myologist. She has been active in the IAOM for several

years. She is a therapist at Fairview Ridges Hospital in Minnesota. Cindy, along with several of the other contributors to the present volume, expresses her indebtedness to those from whom she has learned. Her chapter reflects an unusual ability to organize past learning into practical, effective therapy techniques.

**Ehrhard Thiele, DDS** has a private practice in Kiel, Germany. He is an extraordinarily creative clinician, whose work as a therapist, teacher, and author is well known throughout the world. He has published three volumes of “Myofunctionelle Therapie” during the past decade. His approach to the treatment of oral myofunctional disorders is systematic, inventive, and effective.

**Branca Vairdergorn, MHSD** (Master in Human Communication Disorders), is a speech pathologist and orofacial myologist in Sao Paulo, Brazil. She is acknowledged by her peers to be one of Brazil’s leading clinicians, teachers, researchers, and writers in the field of orofacial myology.

**Dr. Hideharu Yamaguchi** is Chief Professor at the Department of Orthodontics at the Tokyo Dental College. His research and writing in the areas of clinical and surgical orthodontic treatment are well known to dental surgeons and orofacial myologists in all four continents represented by authors contributing to this book. He holds a PhD as well as a DDS degree.

Orofacial myologists who contributed therapy suggestions that constitute Chapter 23 are: Suzanne Barnes, Paulette Bergounous, R. Castillo-Morales, Galen Peachey, Robert Grider, Patricia McLoughlin, Roberta Pierce, Anne Struck, Sylvia Zante, and Barbara Greene. These ten clinicians are well known in the field for their innovative approaches, techniques, and procedures.

## PREFACE

The journey of the authors to bring this book to fruition is a fitting compilation of separate experiences. There is much that we have shared along the way, foremost of which is a strong respect, affection, and fondness for the memory and contributions of Richard H. (“Dick”) Barrett, B.A., M.Ed., whose tireless efforts toward understanding and elucidating truths about orofacial myology are both particular and pervasive. His legacy is seen throughout this update of information contributed originally by Dick and further honed with one of the current authors, Marvin Hanson, Ph.D.

Both authors of this text have been profoundly influenced by Dick Barrett, as a colleague, friend, and mentor in the field of orofacial myology. It is with great respect for his memory that we offer this volume, which is a sequel to *Fundamentals of Orofacial Myology*, by Marvin Hanson and Richard Barrett (Charles C Thomas, Publisher, Springfield, Illinois, 1988). We trust that Dick would approve of this new edition.

We also owe a debt of gratitude to Hugh E. Bateman, Ph.D., the senior author of the text with Dr. Mason entitled, *Applied Anatomy and Physiology of the Speech and Hearing Mechanism* (Charles C Thomas, Publisher, 1984). Dr. Bateman is the artist for many of the illustrations in the present text that were originally published in Bateman and Mason. Some chapters here also borrow heavily from information found in Bateman and Mason. We appreciate Dr. Bateman’s permission to use his talents to the benefit of our readers.

The authors of this book have a long history of professional and personal interactions, and have traveled a circuitous route to share authorship of this compilation. At first, Hanson and Mason had an adversarial relationship, since their backgrounds and perspectives differed significantly. Out of these professional exchanges evolved a shared urgency toward finding and presenting the truth about a variety of issues and facts. Over time, we realized that there were more commonalities than differences in our perspectives as well as in our goals for the field of orofacial myology.

In 1990, we served together on a committee of the American Speech-Language-Hearing Association (ASHA), the purpose of which was to rewrite

the ASHA position statement of 1975 regarding the role of the speech-language-hearing pathologist with orofacial myofunctional disorders (published in 1991). This shared opportunity, with the valuable aid of others on the committee, helped to unlock rigid perspectives about tongue thrust and other disorders, leading later to a revised and updated position by the American Association of Orthodontists (1993). Since that time, we have co-authored several articles for the *International Journal of Orofacial Myology* and have appeared together as speakers in a variety of professional venues.

Although we do not always agree completely on all issues relating to orofacial myology, our differences are few and relatively unimportant in the continuing development of a shared experience in this area. Together, we are a more effective and restrained voice than our individual rantings would demonstrate.

Dick Barrett and the other professionals who met 30 years ago in San Francisco to lay the groundwork for the founding of the International Association of Orofacial Myology wanted to make sure the new organization would truly be international in scope. Speech pathologists present at that meeting had perceived that members of their profession had journals and conventions that paid very little attention to any clinicians or researchers who did not live within the boundaries of the United States of America.

That organization continues to become increasingly international. Important contributions to research and to clinical advancements have come from Asia, Europe, and South America. In the spirit exemplified by the IAOM founders, we wanted to include in the present book contributions from the acknowledged experts from those continents, as well as from the United States. Complete chapters are included from orofacial myologists and dental specialists from all four continents. Another chapter includes therapy approaches, procedures, and exercises from ten other clinicians, all well known and respected by their peers. Including the co-authors, 20 writers have united to make the wide range of information available to professionals all over the world.

Contributing authors of chapters were encouraged to state their cases in their own words. As we edited those chapters we tried to not distort any translation so as to lose the perspective of the authors. Not everything they wrote conforms to our beliefs or experiences; their inclusion here should not imply an endorsement by us. We feel that it is helpful to the reader to know what is happening in other countries, and we thank the authors for their contributions.

There is a lot to know in preparing for clinical work with orofacial myofunctional disorders. We have attempted to provide this background in the text as well as information we feel surpasses a basic level. Although we



have tried to be inclusive, we are certain that there are areas where selected readers would desire more detailed information. Our apology for this is followed by the challenge to become an ever-better clinician by digging out additional information from other sources.

We commend this text for your reading, study, and enjoyment and trust that it will inspire you to contribute further to this exciting field of specialization, through your own creativity and research.

M.L.H.  
R.M.M.



## CONTENTS

	<i>Page</i>
<i>Preface</i> .....	vii
 <i>Chapter</i>	
1. The Nature of Oral Myofunctional Disorders .....	3
2. Scope of the Problem: Prevalence of Tongue Thrust and Associated Disorders .....	11
3. History .....	18
4. Etiologies .....	31
5. The Team Approach .....	44
6. Anatomy for the Orofacial Myologist .....	49
7. Physiological Perspectives .....	89
8. Speech: Some Guidelines for the Dental Specialist .....	134
9. The Dentition .....	147
10. Orthodontic Concepts and Procedures .....	185
11. Evaluating Structures and Functions .....	208
12. Treatment: Basic Considerations .....	243
13. Hanson's Therapy for Tongue Thrust .....	257
14. Sucking and Other Habits .....	288
15. Orofacial Myology in Argentina— <i>Ana Lia Garretto</i> .....	313
16. Orofacial Myology in Brazil— <i>Branca Vaidergorn</i> .....	329
17. State of the Art in Europe— <i>Hermann Hahn</i> .....	354
18. Oral Stereognosis— <i>Vevi Hahn</i> .....	362
19. The Action Chain of the Swallow Reflex: Activities and Assignments— <i>Erhardt Thiele</i> .....	369
20. Oral Myofunctional Therapy: Essential for Surgical Orthodontic Treatment— <i>Hideharu Yamaguchi</i> .....	392
21. Ballovent: A Supplementary Tool— <i>Susanne Codoni</i> .....	417
22. Basic Sensorimotor Procedures— <i>Cynthia F. Landis</i> .....	426

23. Supplementary Exercises and Procedures from Ten Clinicians .....	434
24. Professional Matters .....	458
<i>Index</i> .....	471

# **OROFACIAL MYOLOGY**



## Chapter 1

### THE NATURE OF ORAL MYOFUNCTIONAL DISORDERS

“**O**rofacial myology” is the study of normal and abnormal patterns of use of the mouth and face and their relationships with dentition, speech, and vegetative functions. The term “oral myofunctional disorders” refers to a collection of oral patterns that are variably related to psychological and physiological factors. The most common of these is called tongue thrust. It has several other names as well, such as deviate swallow, infantile swallow, and abnormal swallow. The term “tongue thrust” is currently being used by more people than are the other terms. It refers to a pattern wherein the tongue exerts more than the ordinary amount of pressure against the teeth, chiefly the anterior ones.

#### *Tongue Thrust: A Definition*

When in resting position, the anterior or lateral portions of the tongue contact more than half the surface of either the upper or lower incisors, cuspids, or bicuspid, or protrude between them; or when, during the moving or swallowing of any two of the three media (liquids, solids and saliva) there is an observable increase of (1) force, (2) degree of protrusion, or (3) amount of surface area of the teeth contacted by the tongue, there is a tongue thrust.

An examination of this definition will help give the reader a better understanding of the nature of those disorders collectively called a “tongue thrust.”

“When in resting position . . .” In the rest position, the upper and lower teeth are not in contact with one another. The space between the upper and lower teeth (the freeway space) normally measures from two to three mm. at the molars, or from two to five mm. between the incisors. In this position in adults, the lips are lightly touching. In the absence of a normal freeway space, growth and oral functions will become abnormal. Habits such as tongue thrust seem to open the freeway space beyond the normal range and

disturb the oral equilibrium.

For decades, the primary focus of researchers and clinicians dealing with oral myofunctional disorders was swallowing, and, more particularly, eating. Tongue pressures against anterior teeth were so obviously strong during chewing and swallowing of food that they were thought to be the real culprits in unwanted anterior movements, and incomplete eruptions, of anterior teeth. Research and clinical experience of orthodontists revealed that teeth were moved more effectively by light, constant pressure than by strong intermittent ones. The focus gradually, and often reluctantly, changed from swallows to resting postures of the lips and tongue. Not only are these rest postures better producers of malocclusions than are those of swallowing, but they are primary determinants of swallowing behaviors. Studies have shown that people swallow several hundred times each 24-hour period. Some kind of anterior seal, involving some combination of tongue, teeth, and lips, is necessary to produce a swallow. If the tongue is resting against the front teeth, and the lips are resting apart, the freeway space opens excessively. Because of these events, the easiest way to swallow is to create that seal between the anterior tongue and the teeth. The lips can also tighten against the protruding tongue, making a tell-tale grimace. Conversely, if the tongue is resting against the upper alveolar ridge, and the lips are resting in a closed position, whenever its owner needs to deal with saliva, the easiest thing to do is to bite down, suck the lips back against the teeth, leave the front of the tongue where it has been resting, squeeze the tongue up against the roof of the mouth, and swallow. Nearly all therapists now give primary attention to training tongue and lips to rest in proper positions, thus closing the freeway space to within the normal range.

“. . . the anterior or lateral portions of the tongue. . . .” The tongue tends to protrude, or to push against the teeth, in areas of greatest need. In patients referred to the clinician for treatment, these areas tend to correspond with malocclusions. If the primary malocclusion is an anterior open bite or overjet, the “thrust” will be against those front teeth. If the open bite is bilateral, the tongue will be seen to protrude out both lateral openings.

“. . . contact more than half the surface area . . .” The fraction is an arbitrary one, but the concept is valid: the greater the lingual surface of the teeth contacted by the tongue at rest or during function, the greater the chance that teeth will be moved out of natural position. If only a millimeter or two of a tooth nearest the gingiva is contacted, the tongue has insufficient leverage to move it.

“. . . or protrude between them . . .” A tongue that rests between upper and lower teeth or pushes in that space during chewing or swallowing can impede their eruption. During the period of time when children have lost their primary incisors and are waiting for permanent teeth to erupt, it is pos-



sible for them to condition a between-teeth tongue seal that is continued as the new teeth are trying to erupt. This also serves to open the freeway space and encourage an abnormal pattern and amount of posterior vertical eruption.

“. . . during the moving or swallowing of any two of the three media . . .” Tongue thrust during swallowing ordinarily occurs only once or twice per mouthful of food. During chewing and collecting of food, though, upwards of a dozen, or a score, of thrusts can occur. Therapy to correct abnormal eating patterns has to include attention to all portions of the process.

“. . . there is an observable increase . . .” Human behavior is rarely binary, i.e., either-or. It usually is describable along a continuum. If the therapist notices that the tongue rests against the upper gingiva and against only the upper part of the front teeth, but lowers and pushes noticeably during swallowing, she or he should so note on the examination sheet.

### ***Other Oral Habits***

Children and adults do a number of things with their mouths that can contribute to dental and speech problems. Many actions tend to open the freeway space beyond the normal range. Some contribute also to the development of psychological disorders, and many seem to accompany, or be the result of, emotional disturbances. All these problems are amenable to treatment.

**DENTALIZATION OF CONSONANTS.** The linguoalveolar consonants (/t, /d, /n, /l, /s, and /z) are often produced linguodentally by children with a tongue thrust problem. The most noticeable of these are the sibilant sounds. Also, the voiced and whispered forms of the “th” sound, normally produced by approximating the tip of the tongue and the posterior biting edge of the upper and lower central incisors, are often produced with an exaggerated tongue protrusion.

**THUMB OR FINGER SUCKING.** Some children suck their thumbs for a short period of time, or in a way that does not seem to be detrimental to the occlusion. Prolonged exertion, though, of a constant and heavy pressure against the anterior teeth by a thumb or finger can cause an increase in the posterior vertical dimension of occlusion and produce an anterior malocclusion. Certainly normal tongue functioning is not possible while the digit is in the mouth.

**LIP LICKING.** This habit is self-perpetuating. The licking coats the lips with saliva, which dries, becomes sticky and fosters repeated licking. Children who come to us for treatment very often have chapped or cracked lips. The lips become healthy again when the licking ceases. On its way to the lips the tongue pushes against the teeth. The repetitious protruding of the tongue