Foreword

The title of this opus presents the philosophy of the authors, namely that dentistry is only one part of a multi-faceted service for temporomandibular dysfunction. Dentists would argue that their service is the most important. Indeed, TMJ problems are largely within the province of dental care; however, like a horse with blinders, therapy has concentrated on the mechanical aspects, largely ignoring the physiological and psychological areas that are so important, if we are to render optimal service. In other words, dentistry itself must broaden its diagnostic and therapeutic horizons and de-emphasize the tooth-oriented vision and mechanical procedures. The authors clearly state this in their preface – based on their great clinical experience. If the reader is looking for a fancy articulator that replicates the stomatognathic system, he is in the wrong place.

Too many dentists have been led down the primrose path, aided by TOT (tincture of time) as patients improve, regardless of the therapy employed. TMJ problems are largely cyclic, and are often self-correcting via homeostasis, with time and advancing age.

The pseudo-science of Gnathology has been built around the mechanical contrivances of articulators and facebows, but provide only part of the answer, at best. Lysle Johnston, a highly respected professor of orthodontics at the University of Michigan, has facetiously defined Gnathology as "The science of how articulators chew!" They are only a tool in the panoply of diagnostic aids; sometimes more important, if the teeth are a major factor in the TMJ complaint. Too often, however, they are only a part, as the authors wisely say, based on their great clinical experiences. Thus this book is dedicated to making dentists into applied biologists, applied physiologists, applied psychologists, as well as good mechanics who can restore, reshape, reposition and beautify teeth and get that smile winning smile. Mounting of casts is carefully and completely covered by Drs. Bumann and Lotzmann, as only one part of the diagnostic mosaic.

The beautifully illustrated section on the anatomy and physiology of the stomatognathic system provides a comprehensive discourse on all essential components of the stomatognathic system. Skeletal, structural, and neuromuscular aspects are well illustrated, providing an excellent understanding of each part and the interrelationships, without verbosity. We must remember that the teeth are in contact roughly 60-90 minutes per 24 hours. The dominant structures are the neuromuscular structures, which suspend the mandible and provide its vital function in mastication, deglutition, breathing and speech. Dentistry must get over its pre-occupation with the idea that it is "the teeth, the whole teeth, nothing but the teeth!" This book is a breath of fresh air, as it analyzes the basic structures involved and the roles that the skeletal osseous parts, the condyle, the glenoid fossa, the articular disk, the capsule, ligaments, muscles and that too-often neglected retrodiskal pad (bilaminar zone) play in the whole picture. Equally important, as we assemble the diagnostic mosaic for treatment, is the psychological role, the stress-strain-tension release mechanisms that we resort to in our complex society today. We must make sure, in our diagnostic exercise, that we know which is *cause* and which is *effect*. Wear facets on teeth may well be the result of nocturnal parafunctional activity, i.e., bruxism. And even more important, and too often neglected, is nocturnal clenching, which is also a manifestation of the stress-strain release syndrome, especially at night. Lars Christensen showed conclusively that as little as 90 seconds of clenching can cause neuromuscular response, i.e., pain and muscle splinting. Does the condyle impinge on the retrodiskal pad, with it's network of nerves and blood vessels, and the important role it plays in the physiology of the temporomandibular joint? Here again, important information is provided by the authors, based on the landmark work of Rees, Zenker and DuBrul. Recent research validates the important role that the bilaminar zone or retrodiskal pad plays in TMJ physiology. Thilander showed in 1961 that pain response in the temporomandibu-

lar joint can come from condylar impingement on this neglected post-articular structure. Isberg showed graphically the damage possible by forced impingement on the same tissues. Yet we have to be smart enough to know the difference between cause and effect.

Functional analysis is a key to most TMD diagnostic exercises. Only then can articulator-oriented rebuilding of teeth be biologically based and physiologically sound. Drs Bumann and Lotzmann have stressed this orientation in their fine book. Their sections on functional analysis is state of the art. The role of physical therapy is clearly defined. Orthodontist perhaps have been exposed to this more in their training and the knowledge should benefit general dentists. As well.

We realize that we are clearly in the new millennium, when we read the section on Imaging Procedures. What are the best diagnostic tools available? For what structures? Because of the difficulty of getting precise images of the complex temporomandibular joint, more than one radiographic assessment may be needed. Knowing what each imaging tool can produce is important. Yet, the material presented is lucid and understandable and not needlessly technical. Criteria are tied to the various potential abnormalities.

Diagnosis is the name of the game and its imperfect application by countless clinicians has made it the Achilles heel of TMJ therapy. Tying together the anatomic, physiologic, and psychological elements is essential for optimal patient service. As in all other sections, a comprehensive bibliography permits the reader to explore these tools further.

The multifaceted nature of cause-oriented TMD therapy is covered well, as the various types of appliances are described and the indications for their use given. The aphorism that “a splint is a splint is a splint” is ludicrous, in light of the biologic background elucidated by the authors. Depending on the diagnostic assessment and classification described beforehand, the clinician may use a relaxation splint, a stabilization splint, a decompression splint, a repositioning splint, or a verticalization splint. Again, diagnosis is the name of the game in their choice. Along with supplemental use of muscle relaxants, heat, infrared radiation, stress relief and counseling.

Profuse color illustrations make following the text easy and enhance the understanding of the concepts. A recent scientific study showed conclusively that color pictures are easier to comprehend by the human brain. This color atlas is a good example of this fact. Excellent production, for which Thieme is noted, enhances the value of the book. Read, enjoy and learn!

T.M. Graber, DMD, MSD, PhD, MD, DSc, ScD, Odont.Dr. FRCS.
Professor

Foreword

The authors of this extraordinary atlas have given the dental profession an extremely comprehensive and well-organized treatise on the functional diagnosis and management of the masticatory system. Historically, dental literature in the field of occlusion has been primarily based on clinical observations, case reports and testimonials. This extremely well referenced atlas is a welcome addition to the momentum within the dental profession to move the field forward to a more evidenced-based discipline. The multidisciplinary diagnostic approach presented in the atlas is well established and supported by published data. Chapters include up-to-date information and exquisite photography on the anatomy, physiology, pathology and biomechanics of masticatory system, as well as detailed diagnostic techniques. The theme of the atlas is based on the importance of the coordinated functional interaction between the tissue populations of the various stomatognathic structures. The authors emphasize the need for thorough functional analyses in order to accurately determine if the dynamic physiologic relationship between the various tissue systems is functional or dysfunctional. As so beautifully illustrated in the text, when there is a disturbance in this dynamic functional equilibrium due to injury, disease, adverse functional demands or a loss in the adaptive capacity of the tissues, tissue failure and functional disturbances can occur. The authors present precise and very comprehensive clinical functional analysis techniques for establishing specific diagnoses, and ultimately, improved treatment planning. Multidisciplinary treatment planning based on the data derived from diagnostic functional analyses including established orthopedic techniques, intraoral examinations, imaging and instrumented testing systems is expertly explained in easy to follow steps. The emphasis throughout the atlas is that diagnostic-driven treatment is based on the specific needs of the individual patient rather than based on a preconceived belief system or on a stereotyped concept thought to universally ideal. Treatment plans are based on cause-oriented functional disturbances that may need to be modified by the patient's compliance, general health and emotional status in addition to the clinician's abilities, training and experience.

I congratulate Drs. Alex Bumann and Ulrich Lotzmann for their outstanding efforts in providing the profession with an extremely well organized, skillfully written, and beautifully illustrated atlas. I especially appreciated their attempt to provide the reader with, wherever possible, current and complete references and, thus, add important evidenced-based literature to the field. This treatise on functional disturbances of the stomatognathic system should be required reading for anyone interested in the diagnostic process and treatment planning in dentistry in general. Additionally, the detailed chapters describing the various diagnostic functional techniques with accompanying exquisite illustrations make this an outstanding comprehensive teaching atlas in occlusion for students and clinicians.

Charles McNeill, D.D.S.
Professor of Clinical Dentistry & Director,
Center for Orofacial Pain
School of Dentistry, University of California, San Francisco

Foreword

Dr Bumann and Dr Lotzmann are two authors with an outstanding amount of information and illustrations at their disposal. Working together with Thieme, a publisher known for its ability to communicate through the use of illustrations, to produce this book has proven to be a perfect collaboration.

Imaging can play an important role in the diagnostic and treatment processes associated with orthodontic, restorative, and craniomandibular disorder patients, because finding the correct diagnosis is crucial for the development of the optimum treatment strategy as well as for the application of the appropriate treatment. This book illustrates successfully a range of complex anatomic conditions involving the maxillofacial structures through the clever use of high-quality illustrations and diagnostic images.

Nevertheless, rather than recommending diagnostic imaging as a routine procedure, the authors correctly point out that diagnostic imaging is best applied when there is a likelihood of benefiting the patient. The potential value of the use of imaging for a patient is most often determined during the physical examination and history taking. To achieve the full value of diagnostic imaging, the clinician is required to develop specific imaging goals, to select the appropriate imaging modalities, to develop an imaging protocol, and to interpret the resultant image(s). The ideal imaging solution is one which meets the clinically derived imaging goals while maintaining the lowest achievable patient risk and patient cost. The authors discuss and illustrate the most common imaging modalities available today.

Dr Bumann and Dr Lotzmann applied a “systems” approach to facilitate understanding of the functional or biomechanical relationships between the craniomandibular structures, including the jaws, teeth, muscles, and temporomandibular joints. This type of approach would seem to be a must for all clinicians interested in the restoration of occlusion or in the diagnosis and management of selected craniomandibular disorders.

This textbook illustrates a wide range of maxillofacial, musculoskeletal, and articular conditions that may be associated with crandiomandibular disorders. I was intrigued by the proposed functional analysis which produces selected diagnostic data about intracapsular conditions of the temporomandibular joints that until now have been the exclusive domain of diagnostic imaging.

The authors have created a well-illustrated textbook, detailing many of the biomechanical aspects of craniomandibular disorders. The imaging portions alone would make this a valuable reference text for all practitioners trying to understand or diagnose patients with craniomandibular disorders.

David C. Hatcher, DDS, MSc, MRCD (c)
Acting Associate Professor
Department of Oral and Maxillofacial Surgery
University of California San Francisco
San Francisco, CA

Foreword

Craniomandibular disorders are a group of disorders that have their origin in the musculoskeletal structures of the masticatory system. They can present as complicated and challenging problems. Almost all dentists encounter them in their practices. In the early stages of the development of this field of study the dental profession felt that these disorders were primarily a dental problem and could most often be resolved by dental procedures. As the study of craniomandibular disorders evolved we began to appreciate the complexity and multifactorial nature that makes these disorders so difficult to manage. Some researchers even suggested that these conditions are not a dental problem at all. Many clinicians, however, recognize that there can be a dental component with some craniomandibular disorders and when this exists the dentists can offer a unique form of management that is not provided by any other health professional. Dentists therefore need to understand when dental therapy is useful for a craniomandibular disorder and when it is not. This understanding is basic to selecting proper treatment and ultimately achieving clinical success. This is the greatest challenge faced by all dentists who manage patients with craniomandibular disorders.

The purpose of this atlas is to bring together information that will help the practitioner better understand the patient's problem thereby allowing the establishment of the proper diagnosis. A proper diagnosis can only be determined after the practitioner listens carefully to the patient's description of the problem and past experiences (the History) followed by the collection of relative clinical data (the Examination). The interpretation of the history and examination findings by the astute practitioner is fundamental in establishing the proper diagnosis. Determining the proper diagnosis is the most critical factor in selecting treatment that will prove to be successful. In the complex field of craniomandibular disorders misdiagnosis is common and likely the foremost reason for treatment failure.

Dr. Alex Bumann and Dr. Ulrich Lotzmann have brought together a wealth of information that will help the practicing dentist interested in craniomandibular disorders. This atlas provides the reader with techniques that assist in the collection of data needed to establish the proper diagnosis. This atlas brings together both new and old concepts that should be considered when evaluating a patient for craniomandibular disorders. Some of the old techniques are well established and proven to be successful. Some of the newer techniques are insightful and intuitive, and will need to be further validated with scientific data.

In this atlas the authors introduce the term "manual functional analysis" as a useful method of gaining additional information regarding mandibular function. They have developed these techniques to more precisely evaluate the sources of pain and dysfunction in the craniomandibular structures. Each technique is well illustrated using clinical photographs, drawings and, in some instances, anatomical specimens. Elaborate, well thought out, algorithms also help the reader interpret the results of the mandibular function analysis techniques. Although these techniques are not fully documented, they are conservative, logical, and will likely contribute to establishing the proper diagnosis. The authors also provide a wide variety of methods, techniques and instrumentations for the reader to consider.

This atlas provides an excellent overview of the many aspects that must be considered when evaluating a patient with a craniomandibular disorder. Appreciating the wealth of information presented in this atlas will certainly assist the dentist in gaining a more complete understanding of craniomandibular disorders. It will also guide the practitioner to the proper diagnosis. I am sure that the efforts of Dr. Bumann and Dr. Lotzmann will not only improve the skills of the dentists, but also improve the care of patients suffering with craniomandibular disorders. My congratulations to these authors for this fine work.

Jeffrey P Okeson, DMD
Professor and Director
Orofacial Pain Center
University of Kentucky College of Dentistry
Lexington, Kentucky, USA 40536-0297

Preface

Medicine and dentistry are continuously evolving, due largely to the influences and interactions of new methods, technologies, and materials. Partly because of outdated testing requirements, our students can no longer adequately meet the increasing demands these changes have placed on a patient-oriented education. With limited classroom and clinic time and an unfavorable ratio of teachers to students, the complex interrelations within the area of dental functional diagnosis and treatment planning are precisely the type of subject matter that usually receives only perfunctory explanation and demonstration in dental school. Consequently, recent dental school graduates are obliged to compensate for deficiencies of knowledge in all areas of dentistry through constant continuing education. And so the primary purpose of this atlas is to provide the motivated reader with detailed information in the field of dental functional diagnosis by means of sequences of illustrations accompanied by related passages of text. The therapeutic aspects are dealt with here only in general principles. Diagnosis-based treatment will be the subject of a future book.

The method of clinical functional analysis described in detail in this atlas is based largely on the orthopedic examination techniques described earlier by Cyriax, Maitland, Mennell, Kalternborn, Wolff, and Frisch. Hansson and coworkers were the first to promote the application of these techniques to the temporomandibular joint in the late seventies and early eighties. In cooperation with the physical therapist G. Groot Landeweer this knowledge was taken up and developed further into a practical examination concept during the late eighties. Because the clinical procedures differ from those of classic functional analysis, the term "manual functional analysis" was introduced.

The objective of manual functional analysis is to test for adaptation of soft-tissue structures and evidence of any loading vectors that might be present. This is not possible through instrumented methods alone. The so-called "instrumented functional analysis" (such as occlusal analysis on mounted casts or through axiography) is helpful nevertheless for disclosing different etiological factors such as malocclusion, bruxism, and dysfunction. Thus the clinical and instrumented subdivisions of functional diagnostics complement one another to create a meaningful whole.

In recent years the controversy over "occlusion versus psyche" as the primary etiological element has become more heated and has led to polarization of opinions among teachers. But in the view of most practitioners, this seems to be of little significance. In an actual clinical case one is dealing with an individualized search for causes, during which both occlusal and psychological factors are considered.

Within the framework of a cause-oriented treatment of functional disorders one must consider that while the elimination of occlusal disturbances may represent a reduction of potential etiological factors, it may not necessarily lead to the elimination of symptoms. The reason for this is that there can be other etiological factors that lie outside the dentist's area of expertise.

Some readers may object to the fact that the chapters "Mounting of Casts and Occlusal Analysis" and "Instrumented Analysis of Jaw Movements" do not reflect the multitude of articulators and registration systems currently available. We believe that for teaching purposes it makes sense to present the procedural steps explained in these chapters by using examples of an articulator and registration system that have been commercially established for several years. This should not be interpreted as an endorsement of these instruments over other precision systems for tracing and simulating mandibular movements.

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Axel Bumann
Ulrich Lotzmann

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Graphic artist Adrian Cornford has demonstrated his great skill in translating our sometimes vague sketches into instructive illustrations. For this we are grateful.

Our thanks are due also to Prof. Sandra Winter-Buerke who, in posing as our patient for the photographs demonstrating the manual functional analysis procedures, submitted to a veritable “lightning storm” of strobe flashes. She endured the tedious photographic sessions with amazing patience.

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