


## Book Review

# 2nd Handbook of Research of Computerized Occlusal Analysis Applications in Dental Medicine

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The field of computerized occlusal analysis started in 1984 when Tekscan Inc introduced a Windows-compatible, digitized occlusal analysis T-scan system. The system was a dynamic method for registering inter-arch occlusal contacts during various mandibular movements and representing them in a real-time graphic form. Although the T-Scan system precisely and dynamically records the time, force and area of occlusal contacts, views on its reliability as a method for occlusal contact registration have been questioned, especially regarding its repeatability and accuracy.

In this context, the entire system has undergone tremendous revisions of hardware, sensor and software to come up to the latest version of T-Scan™ software v10, a release that signifies its most significant improvement. T-Scan™ software v10 introduces a new era of dental occlusion which takes into account the importance of data integration, intraoral workflows, and chairside efficiency. It also marks a new turning point for digital occlusion technology, as currently, it is the only tool that reveals the force, timing, balance, and location of contacts in the mouth in real-time. The most notable updates are:

- The alignment tool for digital impressions to overlay bite forces.
- All-in-one handpiece control to create, record, and review scans.
- A remodeled layout for EMG and T-Scan data views.

With a history of 35 years, T-Scan has evolved as the principal diagnostic tool for the determination of correct occlusal pattern. T-Scan™ software v10 is a diagnostic armamentarium that allows for evaluation of the occlusal contact forces before, during, and after fixed restorative or complete denture care. The integration of digital impressions is ground-breaking, allowing dentists to combine the current digital techniques (STL files) with the digital occlusion data. The system also offers a dentition, which may be suffering from simple timing and force overload issues, a predictable treatment method to resolve the time prematurity, the force overload and the damage from progressing.

The benefits include improved diagnosis, increased quality of care, decreased treatment time, increased comfort of dental prosthetics, reduced risk of implant failure, traumatized teeth, unstable

dentures, ineffective splints, and porcelain fractures, legal documentation of outcome, and enhanced patient education.

From that angle, the 2nd Handbook of Research of Computerized Occlusal Analysis Applications in Dental Medicine accounts for an exciting compendium of scientific research which is designed to illustrate the breadth of computerized occlusal analysis. The editor-in-chief, Dr. Robert Kerstein is an innovator who has extensively studied and helped to evolve an objective technology that utilizes at least three dimensions of measurement to quantitatively assess and qualitatively describe a patient's existing occlusal scheme.

The organization, coherence, cohesion, and mechanics of the 2nd Handbook of Research of Computerized Occlusal Analysis Applications in Dental Medicine are arresting, as it has been divided into six sections. Section 1 introduces the history of the T-Scan system from its initial inception in 1984, through until the present-day T-Scan 10 system. Section 2 serves as a comprehensive introduction to the present-day version of the T-Scan technology, that is, the T-Scan 10 which has a similarly revised desktop to T-Scan 8 that simplifies the clinical display to help minimize the T-Scan 10 user learning curve. However, T-Scan 10 is the first T-Scan system to incorporate a Digital Impression Overlay (DIO), which allows a clinician to superimpose T-Scan relative force data on top of a virtually scanned impression of a dental arch. Section 3 includes chapters that showcase other digital dental technologies, which enhance and complement the T-Scan system's clinical use. Section 4 describes how various forms of occlusal microtrauma and tooth flexure cause dentin hypersensitivity, abfraction formation, and occlusal surface wear. Section 5 illustrates the T-Scan use specifically with dental implants, while section 6 describes T-Scan use in a wide range of clinical scenarios.

Conclusively, the 2nd Handbook of Research of Computerized Occlusal Analysis Applications in Dental Medicine serves a well-intended audience which includes dental healthcare providers who practice within the many disciplines of Dental Medicine, Dental Medicine educators and researchers, dental school Occlusion program directors, present-day undergraduate dental students, postdoctoral programs, directors, and graduate students in Prosthodontics, Implant-supported Prosthodontics, Periodontics, Orthodontics, Temporomandibular Disorders, and Laboratory Technology.

It should also be read by dental hygienists and chairside assistants, as these auxiliaries are often called upon by their employer – dentist to use the technology with new patients as one component of a comprehensive patient examination. Most notably, the authors have targeted the book at the dentist clinician, as it is the clinician who is regularly called upon to treat occlusal problems in daily dental practice. By reading this compilation, a practicing clinician will be greatly aided in their daily practice of occlusion by applying the T-Scan use principles and measured occlusal concepts.

Specific efforts have been made to provide a scientific foundation for the included T-Scan-based treatment procedures, and to include only highly correct examples of T-Scan force, timing, and graph data sets, so that clinicians who utilize the book as a clinical guide will be learning to correctly apply T-Scan data sets to treat occlusal problems with an evidence-based approach, rather than with a subjective one.

Finally, although the book is not explicitly directed at researchers in the field of dental occlusion, the relative occlusal force and time-sequence measurement capabilities of the T-Scan technology make it ideal for documenting occlusal function in a study environment. Researchers are encouraged to read this book to gain proper T-Scan use skill knowledge before designing their own T-Scan occlusal function studies, or when replicating existing, previously-published T-Scan studies. That way, future T-Scan researchers will better understand how to properly employ T-Scan data sets, which will make any results reported from future T-Scan based research studies far more reliable.

It is worth mentioning that the reference section at the end of each chapter is consistent, reinforce one another, justify the authors' stance, and represent an up-to-datedness level regarding dental information.

Overall, the 2nd Handbook of Research of Computerized Occlusal Analysis Applications in Dental Medicine raises important dental issues:

- The use of articulating paper and the clinical accuracy of the subjective interpretation of articulating paper markings.
- The role of friction in Orthodontics.
- The function of masticatory muscles.
- The function of the Temporomandibular joint.
- Occlusal analysis, occlusal contacts. occlusal force.
- The mechanism, accuracy and application of the T-Scan system.

As a result, it provides an original and unique compilation of scientific research which illustrates the scope and breadth of the field of computerized occlusal analysis in modern dental medicine.

The vision of the book is timely, its approach most needed, and the scholarly content immediately amenable to applied research, and practice.

*Anastasios Moutzoglou is a Former Executive Board Member of the European Society for Quality in Health Care, President of the Hellenic Society for Quality & Safety in Health Care, holds B.A in Economics, MA in Health Services Management, MA in Macroeconomics, Ph.D. in Economics. He teaches the module of quality at the graduate and postgraduate level. He has also written three Greek books, which are the only ones in the Greek references. The first deals with "Marketing in Health Care", the following with "Quality in Health Care" and the third with "Quality and Patient Safety in Health Care." He has edited the books "E-Health Systems Quality and Reliability: Models and Standards", "E-health Technologies & Improving Patient Safety: Exploring Organizational Factors", "Cloud Computing Applications for Quality Health Care Delivery", "Laboratory Management Information Systems: Current Requirements and Future Perspectives", " M-Health Innovations for Patient-Centered Care", "Design Development and Integration of Reliable Electronic Healthcare Platforms", and "Mobile Health Applications for Quality Healthcare Delivery", and 'Quality Assurance in the Era of Individualized Medicine'. He is the Editor-in-Chief of the "Advances in Healthcare Information Systems and Administration" book series and the International Journal of Reliable & Quality in Healthcare (IJRQEH). He has also served as the scientific coordinator of research programs in Greece and participated as a researcher in European research programs. In 2004, he was declared "Person of Quality," with respect to Greece.*