Chapter 19

Digital Occlusal Force Distribution Patterns (DOFDPs): Theory and Clinical Consequences

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ABSTRACT

This chapter describes the many clinical applications of Digital Occlusal Force Distribution Patterns (DOFDPs) recorded with the T-Scan Computerized Occlusal Analysis system. Movements made by the Center of Force trajectory as force travels around the dental arches during the occlusion and disocclusion creates these patterns. The repetitive occlusal contact data points locate the force distribution received when teeth occlude against each other. These force distribution patterns correlate to intraoral compromised dental anatomy found in radiographs, photographs, and during the clinical examination of teeth and their supporting tissues. Moreover, they directly influence the envelope of motion, the envelope of function, and head and neck posture. This chapter illustrates with clinical examples the correlation between Stomatognathic System structural damage and repeating patterns of abnormal occlusal force distribution. The T-Scan technology isolates these damaging regions of excess microtraumatic occlusal force, absent of clinician subjectivity, thereby helping clinicians make an accurate, organized, and documented occlusal diagnosis.

INTRODUCTION

Technological Innovation and Dental Medicine

New paradigms brought on by technological advances offer fresh perspectives and solutions to old problems. As an example, the Hubble telescope is a technological advance that changed humanity’s perception of the universe (Figure 1). Concepts evolve over years or decades, and sometimes over centuries. Technology can validate concepts developed by master teachers of the past, not by seeking to change the definition or the parameters of a concept, but rather to provide undeniable proof of a concept’s inherent soundness.

The science of occlusion has developed using traditional, accepted definitions (contained within

DOI: 10.4018/978-1-4666-6587-3.ch019
Digital Occlusal Force Distribution Patterns (DOFDPs)

The Glossary of Prosthodontic Terms) as a method of standardizing the interpretation of concepts related to the Stomatognathic system. Traditional occlusion is the study of spatial relationships that uses non-digital tools, such as stone casts, facebow transfers, and articulators, to assess these spatial relationships. Modern dental technologies, such as digital photography and radiology, enhance the diagnosis made with traditional, non-digital methods, which then further develop the science.

Digital applications will continue to grow as dental professionals keep finding ways of incorporating technology into the diagnosis and treatment of many dental conditions. Implementation must be simple, make sense to patients, and motivate them to seek comprehensive treatment. Digital data should also be affordable, productive, organized, and practical for clinicians to employ.

Currently, digital technologies assist during diagnosis, treatment sequencing, and treatment. They also electronically document, educate, and monitor patient progress. Specialized software applications can image, design, and fabricate restorations while facilitating future diagnostic and treatment innovations. In Dental Medicine’s digital evolution, computer-based applications are becoming instruments of change. Ultimately, economic benefits that provide a win-win situation for both patients and practitioners will transform evolution into revolution, providing Dental Medicine with new and innovative solutions.

In the oral cavity, articulating paper is the “Standard of measurement” used by every dentist worldwide, to “measure” and analyze occlusal contact pressure. Interestingly, articulating paper does not actually measure occlusal force or oc-