

# Chapter 23

## Digital Smile Design and Digital Occlusion

Serdar Gözler

 <https://orcid.org/0000-0002-4899-9517>

Istanbul Atlas University, Turkey

### ABSTRACT

*Occlusal adjustment is one of the most necessary elements for the completion of treatment in every branch of dentistry. Dentists in their clinical work may face painful, loose and worn teeth, broken or cracked veneer or implant crowns, or treat patients with TMD problems and facial pain. Dentists must correctly explain such problems to their patients and make the necessary treatment corrections. Therefore, dentists must always carefully evaluate and analyze the occlusion during their treatment procedures. Trying to simplify the correction of the occlusion by only removing the premature contacts with articulating paper often results in unnecessary effort and wasted time. For this reason during Smile Design, dentists should carefully evaluate the occlusion (as in almost every dental discipline) to prevent patient occlusal dissatisfaction that may occur after treatment. Smile Design evaluations are “boutique analyses” that are presently in high demand, but that come with both higher costs and higher patient expectations compared to other dental evaluations. Therefore, undesirable situations may occur after the aesthetic treatment has been rendered, which may leave the dentist to face difficult patient situations. This chapter’s Specific Aims are to address with clinical examples why the occlusion is so necessary to manage well in Smile Design cases, why both the aesthetics and the dental occlusion form an inseparable whole, and why examining the corrected Smile Design occlusal result with the T-Scan 10 technology is critically important to case longevity.*

### INTRODUCTION

In today’s ongoing dental technology evolution, new possibilities that technology affords modern-day life have markedly raised patient expectations, thereby altering the concept of “patient” to a new status. In the past centuries, Medicine has focused intensively on increasing the survival rate during

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deadly disease epidemics. However, today's Medicine has added aesthetic expectations to the treatment possibilities, in addition to the classical "health" expectations.(Erdemir & Yildiz 2015).

Dentistry has had its' share of this change as well, as dentists employ chemical drugs for aesthetic purposes, and may perform invasive surgical operations to theoretically improve patient appearance. In today's dental patient photography, not only are functional expectations required for the initiation of treatment, but the concept of aesthetics has also come to the forefront among the indication options of dental treatments (McCunniff et al. 2017). In both orthodontics and restorative procedures, the concept of aesthetics has become very important in defining outcome results. The finished form of dental treatment, is not only the completion of the function, but any dental treatment is deemed incomplete without a highly successful aesthetic result.

The concept of "aesthetics" has become an indispensable factor in dental patient expectations. Today's patient requires that not only will the incising and chewing functions be comfortably completed, but that their aesthetic requirements will be met, often taking precedence over their occlusal function, whereby the patient may elect to initiate treatment, solely driven by an aesthetic flaw that fuels their reasoning. While the need to improve function is not considered alone, in modern dentistry the aesthetic need may be the patient's singular motivation to seek out treatment. The most important reason driving this significant change in the concept of "dental indications" is that today's digital technologies offer clinicians and patients important opportunities to reach both functional harmony, which is the basic element of the aesthetic concept, and beautiful aesthetic outcomes. T-Scan 10 Novus (Tekscan, Inc., Norwood, MA USA), is a Computerized Occlusal Analysis System (COAS), that represents the State of the Art in occlusal diagnosis, making it is a powerful component of Aesthetic Dentistry.

According to Dawson, aesthetic indications are among the optional requirements for dental treatment, but are not a mandatory treatment (Dawson, 2007). However, similar to other aspects of Dental Care, aesthetic treatment should encompass the following clinical components:

1. To purify the structures in the entire chewing system from disease
2. To protect a healthy periodontium,
3. To promote stable Temporomandibular Joint Health (TMD)
4. To provide for a stable Occlusion
5. To Protect overall dental health,
6. To provide for convenient function
7. To create optimal aesthetics

The integration of all these intended provisions (listed above) constitutes the principles of integrated dental treatment.

Dentists in their clinical work may encounter many different pathologies. Excessive wear on teeth, loose teeth in the alveolar bone, TMJ problems, or fractured veneers, are all commonplace. Patients want to understand the causes of their cracks or breaks in their anterior teeth. Dentists should be able to provide correct answers to patients, regarding a problem's cause, and suggest reasonable and effective treatment solutions. Repairing only what is visible, without solving the underlying problem's cause will allow the same problem to recur, which wastes the clinician's time, increases treatment cost, and will promote a negative reaction from the patient. A complete treatment plan, therefore is an integrated treatment protocol that eliminates all etiological problems as much as is possible. Importantly, a dentist who

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