Occlusal considerations in implant therapy: clinical guidelines with biomechanical rationale.

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Abstract

Due to lack of the periodontal ligament, osseointegrated implants, unlike natural teeth, react biomechanically in a different fashion to occlusal force. It is therefore believed that dental implants may be more prone to occlusal overloading, which is often regarded as one of the potential causes for peri-implant bone loss and failure of the implant/implant prosthesis. Overloading factors that may negatively influence on implant longevity include large cantilevers, parafunctions, improper occlusal designs, and premature contacts. Hence, it is important to control implant occlusion within physiologic limit and thus provide optimal implant load to ensure a long-term implant success. The purposes of this paper are to discuss the importance of implant occlusion for implant longevity and to provide clinical guidelines of optimal implant occlusion and possible solutions managing complications related to implant occlusion. It must be emphasized that currently there is no evidence-based, implant-specific concept of occlusion. Future studies in this area are needed to clarify the relationship between occlusion and implant success.

Implant-protected occlusion: a biomechanical rationale.

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Abstract

The clinical success and longevity of endosteal dental implants are controlled, in a large part, by the mechanical milieu within which they function. The occlusion is a critical component of such a mechanical environment. "Implant-protected occlusion" refers to an occlusal schema that is often uniquely specific to the restoration of endosteal implant prostheses. Implant orientation and the influence of load direction, the surface area of implants, occlusal table width, and protecting the weakest area are blended together from a biomechanical rationale to provide support for a specific occlusal philosophy.
**Guidelines for occlusion strategy in implant-borne prostheses. A review.**

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**Abstract**

Medium- or long-term failure of endosseous dental implants after osseointegration, when it has occurred, has been associated in the great majority of cases with occlusal overload. Overload depends ultimately on the number and location of occlusal contacts, which to a great extent are under the clinician's control. Much of our current understanding of occlusal contacts in this context is based on concepts derived from non-implant-borne prosthetics and has not been rigorously tested. The present article reviews occlusal contact designs and offers occlusion strategy guidelines for the main types of implant-borne prostheses.

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**Retrospective analysis of porcelain failures of metal ceramic crowns and fixed partial dentures supported by 729 implants in 152 patients: patient-specific and implant-specific predictors of ceramic failure.**

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Erratum in:


**Abstract**

STATEMENT OF PROBLEM: Porcelain fracture associated with an implant-supported, metal ceramic crown or fixed partial denture occurs at a higher rate than in tooth-supported restorations, according to the literature. Implant-specific and patient-specific causes of ceramic failure have not been fully evaluated.

PURPOSE: The purpose of this retrospective study was to evaluate the potential statistical predictors for porcelain fracture of implant-supported, metal ceramic restorations.

MATERIAL AND METHODS: Over a 6-month period, a consecutive series of patients having previously received implant-supported, metal ceramic fixed restorations were examined during periodic recall appointments. The number of supporting implants, number of dental units, type of restoration, date of prosthesis insertion, location in the dental arch, opposing dentition, type of occlusion, presence of parafunctional habits, use of an occlusal protective device, presence or absence of ceramic fractures, gender, and age were recorded for each
The generalized estimating equation (GEE) approach was used for the intrasubject correlated measurements analysis of categorical outcomes (presence or absence of ceramic fractures) to determine which patient- and implant-specific factors would predict porcelain fracture (alpha=.05).

RESULTS: Data were collected from 152 patients representing 998 dental units (390 single crowns and 94 fixed partial dentures) supported by 729 implants. Porcelain fractures of 94 dental units occurred in 35 patients. The fractures were significantly (P<.05) associated with opposing implant-supported metal ceramic restorations, bruxism, and not wearing a protective occlusal device. Metal ceramic prostheses (single crown or fixed partial dentures) had approximately 7 times higher odds of porcelain fracture (odds ratio (OR)=7.06; 95% confidence interval (CI): 2.57 to 19.37) and 13 times greater odds of a fracture requiring either repair or replacement (OR=13.95; 95% CI: 2.25 to 86.41) when in occlusion with another implant-supported restoration, as compared to opposing a natural tooth. In addition, patients exhibiting bruxism or not wearing an occlusal device had approximately 7 times higher odds (OR=7.23; 95% CI: 3.86 to 13.54), and 2 times higher odds (OR=1.92; 95% CI: 1.01 to 3.67) of porcelain fracture when compared to patients without bruxism and patients not wearing an occlusal device.

CONCLUSIONS: Implant-supported metal ceramic single crowns and fixed partial dentures were found to have a significantly higher risk of porcelain fracture in patients with bruxism habits, when a protective occlusal device was not used, and when the restoration opposed another implant-supported metal ceramic restoration.

Veneer fracture in implant-supported metal-ceramic restorations. Part I: Overall success rate and impact of occlusal guidance.

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Abstract

PURPOSE: The aims of the presented study were to define the fracture rate of implant-supported metal-ceramic restorations delivered in private practice, and to identify if a restoration's contact during eccentric mandible movements has any influence on ceramic fracture rates.

Material and METHODS: Within the period from 2005 to 2008, 251 patients, namely 105 men (42%) and 146 women (58%), received 775 dental implants which later were restored with metal-ceramic restorations. Data was gathered and analyzed in the form of a specially-designed electronic questionnaire. In total, 251 patients were rehabilitated with 350 prostheses consisting of 151 single crowns, 208 fixed partial dentures of various extents and 21 full-arch restorations. The method for retention of prostheses included cement-, screw-, or hybrid cement-screw retained prosthetic devices. The patients were recalled and examined for the presence of mechanical complications, namely ceramic fractures. Fractures were distinguished as adhesive or co-adhesive. The follow-up time was registered.
RESULTS: The mean ceramic fracture rate was 6.7%, as fracture occurred in 24 restorations. In the single crown group, the fracture rate was 1.3%, in the fixed partial denture division it was 6.7%, and the full-arch metal-ceramic restorations experienced 38.1% chipping. The mean follow-up period of prostheses was 9.5 months, ranging from 1 to 42 months. The analysis revealed that 66 prostheses had contact in protrusive and/or lateral mandibular movements, constituting 17.4% of all restorations; while 13 restorations had ceramic fractures, composing 19.7% of all guiding prostheses.

CONCLUSIONS: Within the limitations of this trial, it can be noted that ceramic veneer fracture rate was 6.7% in 380 restorations, and a conclusion that a restoration’s contact during eccentric excursions may significantly enlarge fracture rates can be made.

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**Occlusal principles and clinical applications for endosseous implants.**

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Erratum in:


**Abstract**

Endosseous implant dentistry has become a predictable clinical modality. The role of the restorative dentist is to minimize overload to the crestal bone by utilizing implant occlusal principles. The prosthetic stages of treatment should follow a disciplined sequence. This article reviews occlusal principles and clinical applications for long-term success of endosseous implants.

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**Occlusal stability in implant prosthodontics -- clinical factors to consider before implant placement.**

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**Abstract**

The success of any prosthetic design depends on proper management of the occlusion. The clinical variables influencing occlusal stability must be determined and considered in the design of the final prosthesis. This paper outlines some of these variables.
Treatment planning for the single-tooth implant restoration--general considerations and the pretreatment evaluation.

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Abstract

This article reviews relevant clinical and radiographic information necessary to formulate an appropriate treatment plan for a patient requiring a single-tooth implant restoration. A step-by-step approach to collecting and analyzing this information at the pretreatment evaluation is presented. General considerations affecting implant treatment planning are discussed as are the parameters dictating ideal implant position and angulation.

Treatment planning of implants in posterior quadrants.

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Abstract

Differences in anatomy and biomechanics make treatment of posterior quadrants with dental implants substantially different to that of anterior areas. Without implants, when posterior teeth were lost, treatment options included a long span fixed partial denture or a removable prosthesis, especially when no terminal abutment was available. Today, with the use of implants, options are available that allow preservation of unrestored teeth.(1) When teeth are missing, implant supported restorations can be considered the treatment of choice from the perspective of occlusal support, preservation of adjacent teeth and avoidance of a removable partial denture.