



Monolithic Zirconia as Permanent Solution for Bruxism (Two years follow up)

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Abstract

The management of patients with severe worn dentition due to bruxism often necessitates an esthetic and functional approach. It is often challenging for the dentist, the dental technician, and the patient because of the loss of occlusal vertical dimension, loss of tooth structure, incorrect plane of occlusion, and para-functional habits.

Bruxism has a considerable negative impact on teeth and increases odds of failure for ceramic restorations, especially fracture and chipping failures. The choice of an appropriate material is essential to improving treatment prognosis and should be guided by mechanical and aesthetic properties. In This clinical report, we describe the successful use after two years of a CAD/CAM monolithic Zirconia as a permanent solution for a female patient with severe bruxism.

الخلاصة

غالبًا ما تستلزم إدارة المرضى الذين يعانون من الأسنان البالية الشديدة بسبب البروكسيمية نهجًا جماليًا ووظيفيًا. غالبًا ما يكون من الصعب بالنسبة لطبيب الأسنان، وفي الأسنان، والمريض بسبب فقدان البعد الرأسي الإطباق، وفقدان بنية الأسنان، ووضع غير سليم للإطباق، وكذلك العادات الوظيفية. فرط الإطباق له تأثير سلبي كبير على الأسنان ويزيد من احتمالات الفشل في ترميم السيراميك، ومنها حدوث فشل، كسر وانفصال طبقة السيراميك. يعد اختيار المادة المناسبة أمرًا ضروريًا لتحسين تشخيص العلاج ويجب أن يسترشد بالخصائص الميكانيكية والجمالية. في هذا التقرير السريري، وصفنا الاستخدام الناجح بعد عامين من الزركونيوم المتجانسة CAD/CAM كحل دائم للمريض المصاب بالبروكسيم الشديدة.

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INTRODUCTION

Bruxism can be defined as a diurnal or nocturnal parafunctional activity including repetitive jaw-muscle activity characterized by clenching or grinding of the teeth and/or by bracing or thrusting of the mandible. Bruxism can be defined as a diurnal or nocturnal parafunctional activity including repetitive jaw-muscle activity characterized by clenching or grinding of the teeth and/or by bracing or thrusting of the mandible

Bruxism can be defined as a wakeful or sleep parafunctional activity including repetitive jaw muscle contraction characterized by clenching or grinding of the teeth and/or by bracing or thrusting of the mandible (1). The management of patients with severe worn dentition due to bruxism often necessitates an esthetic and functional rehabilitation of a full dentition. It is often challenging for the dentist, the dental technician, and the patient because of the loss of occlusal vertical dimension, loss of tooth structure, uneven wear of teeth creating an uneven plane of occlusion, and para-functional habits (2).

Bruxism has a considerable negative impact on teeth and increases odds of failure for ceramic restorations, especially fracture and chipping failures (3).

A potential solution to mitigate this problem is to use Monolithic zirconia crowns. Several studies proved that it could provide a valid treatment modality in the aesthetic and posterior zones for patients

with severe tooth wear. It is a predictable treatment option that provides excellent results, recognizing a lower risk of failure in patients with bruxism activity (4). In addition to that, the recent introduction of computer-aided design/computer-aided manufacturing (CAD/CAM) monolithic zirconia dental prostheses appears to be the most common technique currently available, which is rapid, easy and keeps time (5).

This clinical report describes the successful use after two years of a CAD/CAM monolithic zirconia as a permanent solution for a female patient with severe bruxism.

CASE REPORT

This case report describes a 54-year-old woman with aesthetic complaints and compromised masticatory function. Prior to treatment, a detailed dental, medical and social history was obtained from the patient. She started to notice that her teeth were "getting short" many years ago. However, she chooses to leave the problem unattended. Clinically, the patient's facial appearance showed signs of a collapsed occlusal vertical dimension. The clinical examination showed that tooth wear was generalized, but most teeth could be maintained in both jaws. In addition to complaints from sleep partners, signs of teeth grinding include masticatory pain, headaches, tooth sensitivity and tooth wear, as well as tender or hypertrophied masticatory muscles and joints were noticed. (Figure 1)



Figure 1: Initial oral situation – improper occlusal plane orientation caused by abraded upper and lower teeth

The findings were explained to the patient, and treatment options were presented. In fact, she was aware of bruxism and wished for full mouth rehabilitation. The treatment goals were to restore the lost occlusal vertical dimension (OVD), correct the occlusal plane, restore function, and restore the esthetics of the patient's dentition. In the clinical examination, there was no sign of gingival inflammation, periodontal infection, or tooth mobility.

In the radiographic examination, the root to crown ratio of the teeth was more than two, and there was no alveolar bone resorption. Bruxism management started with cognitive behavioral therapies (CBT) in order to teach patients how to manage emotional problems and to modify their praxis (6). The occlusal splint was also used to protect teeth from the deleterious effects of bruxism (Figure 2).



Figure 2: The occlusal splint must be hard and equilibrated on the articulator in centric relation

Indeed, the splint makes bilateral and simultaneous loading possible and helps with the treatment of this disorder through the regulation of bruxism by creating a biomechanical equilibrium between the

physiological loading and the generated stress. But there is not enough evidence in the literature to show that occlusal splints can reduce sleep bruxism(7). It may also act as a stress relaxer and dissipate the extra

stresses generated as well as the deviations due to bruxism. A six-month preliminary phase with CBT and splint therapy was maintained prior to the final fabrication of a fixed prosthesis.

A full rehabilitation using esthetic planning with the digital smile design system (DSD) and a direct mock-up technique was realized. Indeed, sometimes the DSD simulation is not enough for the patient to understand and observe the changes that will be performed on her teeth. This combination of the two techniques can offer predictability in results as well as increase patient satisfaction. Indeed, the digital information serves as a starting point for the virtual wax-up and the mock-up, which are objective and efficient communication tools among dentist, patient, and technician.(8) The digital wax-up was performed to enhance the aesthetics of the maxillary anterior region, especially to restore the occlusal plane. Based on a virtual wax-up of the final restorations, CAD/CAM enabled the patient to visualize the final treatment outcome and also served as a model for the temporary restoration. (Figure 3,4)

Provisional or interim restorations are an important element of fixed prosthodontic treatment both biologically and biomechanically. These restorations provide an important diagnostic function while in place, as well as being critical in evaluating the physiologic position and the design of the final prosthesis. (Figure 5)

High strength and translucency are generally not coincident in one restorative material, and there is still continuous development for a better balance between these two properties. Zirconia and lithium-disilicate glass ceramics are currently the most popular alternatives for monolithic restorations. In this case, Zirconium was chosen to restore the teeth in both jaws. (Figure 6)

The mechanical properties and, more importantly, the slow crack growth (SCG) resistance, which rules long-term durability, were thoroughly studied for zirconia ceramics, which are interesting in comparison to lithium-disilicate glass ceramics.(9)

The patient was also given an occlusal splint with nocturnal wear to protect the restoration against bruxism. Definitive restorations were evaluated and adjusted for optimal contacts, contours, and esthetics. We opted for a semi-adaptable articulator for recording the occlusal reports in Centric Relation.

And then the crowns were sealed with glass ionomer cement. After prosthetic management, the patient was instructed about individual oral hygiene care.

After insertion of the prosthesis, the patient reported no muscular or dental discomfort. She was also placed in a maintenance recall program. Follow-up treatments were done to evaluate the patient's comfort, arch form, and potential occlusal vertical dimension problems. The patient was recalled twice for postoperative examinations during the

two-year follow-up period. In the controls, it was seen that marginal adaptation of the prostheses was appropriate, and there were

no signs of gingival inflammation, recession, or cosmetic fracture. (Figure 7)

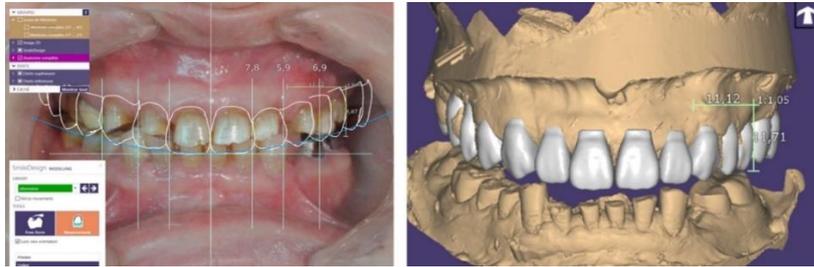


Figure 3: Digital smile design and virtual wax up creation



Figure 4: mock up placement after recontouring the interfering tooth structure. Occlusal adjustment and veneering were done to keep the mock up as long as we can for diagnostic and aesthetic purposes



Figure 5: Silicon index used to guide teeth trimming



Figure 6: Intra oral image showing cemented upper and lower zirconia crown



Figure 7: Intra oral image after 24 months of follow up showing good marginal adaptation with no signs of gingival inflammation, recession, or cosmetic fracture

DISCUSSION

The rehabilitation of worn dentition usually includes extensive treatment approaches. Among all the available treatment alternatives, there is a need to identify the modality that combines the best relative cost-effectiveness with the most acceptable longevity and the greatest benefit to the patient for the longest period of time (10).

The choice of an appropriate material for the rehabilitation of these patients is essential to improving treatment prognosis and should be guided by mechanical and aesthetic properties. In This clinical report, we opted for monolithic Zirconia for the full-mouth tooth-supported rehabilitation. Unfortunately, for many years, some clinical evidence of ceramic failure, especially for posterior restorations due to fracture, has been reported. In addition, the use of these restorations in patients with bruxism would considerably increase the risk of complications and failure (11).

The present report aims to illustrate an alternative approach to the rehabilitation of a bruxer patient with conventional and digital techniques using monolithic Zirconia crowns. However, many studies reported minor clinical complications and acceptable patient satisfaction.(12) In fact, monolithic Zirconia crowns may provide a valid treatment modality for severe tooth wear, especially in the aesthetic zone where minimally invasive treatment fails. (13)

A systematic review from 2010 reported excellent results regarding core fracture: less than 1% in the zirconia group and 0%

in the metal-ceramic group after 3 years. Therefore, the monolithic zirconia crowns do not have a veneering ceramic and are expected to have fewer chipping and fracture complications.(14)

However, it should be noted that the monochromic and opaque aesthetic properties of monolithic zirconia could be a limitation.

CONCLUSION

Dentists have the responsibility of developing proper form and function to protect the integrity of the masticator system and must connect the new materials and technology with traditional functional concepts to be successful. Monolithic zirconia fabricated by computer showed good results for patients with severe bruxism. However, further investigations are required to confirm its long-term efficiency.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this manuscript

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