

# PROSTHETIC-RESTORATIVE APPROACH FOR THE RESTORATION OF TOOTH WEAR. VDO INCREASE, REHABILITATION OF ANATOMY AND FUNCTION AND AESTHETIC RESTORATION OF ANTERIOR TEETH. CASE REPORT

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## SUMMARY

### Prosthetic-restorative approach for the restoration of tooth wear. Case report

**Objective.** This article presents a case report of combined prosthetic-adhesive rehabilitation in a patient with a generalized tooth wear.

**Methods.** A combined treatment adhesive - prosthetic was proposed to a male patient of 65 years old having a clinically significant tooth wear, with dentine exposure and with a reduction in clinical crown height. The erosive/abrasive worn dentition have been reconstructed with direct resin composite restorations on the posterior teeth and with zirconia crown on the anterior teeth.

**Results.** Direct composite restorations have a number of distinct advantages. These restorations have proved durable and aesthetic, protect tooth structure and posterior occlusal contact is predictably re-established.

**Conclusions.** A combinations of direct and indirect restorations, based on the new vertical dimension of occlusion (VDO), can help to reestablish anatomy and function.

**Key words:** VDO, tooth wear, resin restoration, full-mouth rehabilitation.

## Introduction

Tooth wear represents a frequent pathology with multifactorial origins. Behavioral changes, unbalanced diet, various medical conditions and medications inducing acid regurgitation or influencing saliva composition and flow rate, trigger tooth erosion, awake and sleep bruxism, which are widespread nowadays with functional disorders, induce attrition (1).

It can be generalized throughout the dentition, but is often localized to the incisor and canine teeth (2).

Significant loss of tooth structure caused by attrition can result in flattened occlusal surface with little original form remaining and significant proportion of exposed dentine (3).

Tooth wear treatment consist of three fases: 1) etiological, clinical, functional and aesthetic valuation for a treatment strategy based on etiology; 2) preventive and restorative fase; 3) maintenance program (4).

A diagnostic wax-up can help the determination of occlusal plane and the evaluation of correct height of vertical bite (VDO) that compensates for the loss of tissue and creates space for the anterior restora-

tions with a better guide of anterior teeth (reducing the potential excessive incisal overbite) (4).

If the loss of dental tissue is small or moderate the increasing of vertical bite (VDO) is obtained through the application of resin direct restorations. The increase of vertical bite (VDO) is maintained through anterior restorations made from a material strong and wear resistant (resin or ceramic).

The wax-up is the guide of teeth restoration and a silicon guide is fabricate from the wax-up to transfer in the mouth the correct occlusal plane and the smile line.

The idea of increasing vertical bite for tooth wear restoration was described and popularized by Dhal (4, 5). Is the state of the posterior teeth which determines the most appropriate restoration option: 1) in case of limited loss of tissue and small fillings using only direct restorations; 2) in case of moderate loss of tissue and medium-sized restorations using a combination of direct and indirect resin restorations; 3) in case of severe loss of tissue, loss of dental anatomy and large restorations using mainly indirect restorations (crows and veneers) (4, 5).

Dental treatment improves the patient's oral hygiene, reduces thermal sensitivity, prevents pulpal involvement and further abrasion, and aesthetics are improved (6).

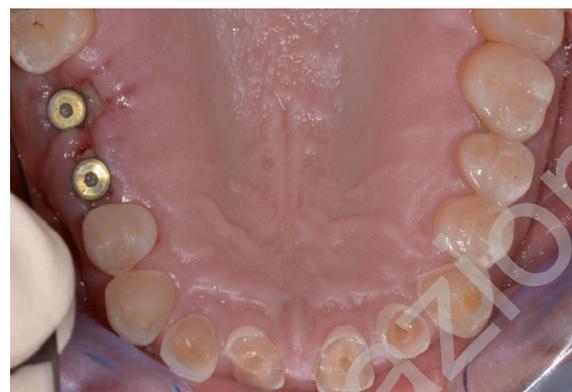
This paper presents a case report of combined prosthetic-conservative rehabilitation in a patient with a generalized tooth wear.

## Methods

A combined treatment adhesive – prosthetic was proposed to a male patient of 65 years old having a clinically significant tooth wear, with dentine exposure and with a reduction in clinical crown height. He had a stable periodontal condition but a poor oral hygiene (Figs. 1,2).

The patient is in good general health, he doesn't have allergies to medications, he doesn't smoke.

In this case report, the erosive/abrasive worn dentition have been reconstructed with direct resin composite restorations on the posterior teeth and with ceramic-zirconia crown on the anterior teeth 1.1 - 2.1 and 2.2.



**Figure 1**  
Palatal view of the toothwear.



**Figure 2**  
Lingual view of the tooth wear.

Before the treatment, the patient signed the informed consent and periodontal evaluation and prophylaxis were done for removing any signal of plaque accumulation.

After clinical exam, impressions of maxillary and mandible arches were taken with alginate to obtain preliminary casts for diagnostic waxing from right central incisor to left lateral incisors and fabrication of 3 provisional crowns in acrylic resin, and from the diagnostic wax-up were fabricated a silicone guide masks (Fig. 5).

The vertical bite (VDO) was increased by raising the bite of 3 mm on the articulator according to the gnathologic parameters. This has allowed the reconstruction of the anterior elements through a fiber pin and the subsequent reconstruction using zirconium-ceramic crowns.

Before the beginning of restoration procedures, the silicone guide should be tested as to its adaptation. The teeth were isolated with a rubber dam (Dental Dam, HYGIENIC, 6" X 6", 152X152 mm, Coltène/Whaledent Inc., 235 Ascot Parkway, Cuyahoga Falls, OH 44223 / USA) that is useful to keep the operative field dry; the rubber dam was fixed on each tooth with wires (Fig. 3).



**Figure 3**  
Isolation of operative field with rubber dum.

A 35% phosphoric acid gel with Benzalkonium Chloride was applied for 20 seconds over the occlusal posterior tooth surface. The tooth was then washed with an air-water spray (Wet technique). Then the adhesive system (Tokuyama Bond Force, Tokuyama Dental Corporation, 38-9, Taitou 1-chome, Taitou-kuu, Tokyo, Japan) was applied on the exposed dentine surface. The air-water spray has been used for 10 seconds to evaporate the solvent before the light curing (30 seconds).

Using a round-ended spatula a small ball of translucent enamel microhybrid composite (Estelite Sigma Quick, Tokuyama Dental Corporation, 38-9, Taitou 1-chome, Taitou-kuu, Tokyo, Japan) was placed on the silicone guide and spread over the silicone guide surface; the composite was placed in layer of enamel and dentine of appropriate color. The composite was aimed to cover all the exposed dentin at the occlusal surface. Subsequently, the silicone guide was placed into position and the entire layer of resin was polymerized for approximately 40 seconds (Figs. 4-6). Static and dynamic occlusion was checked.

The final polishing of restoration surface was carried out with silicon rubber.



**Figure 4**  
Occlusal surface built with aid of rubber dum.



**Figure 5**  
Diagnostic wax-up.



**Figure 6**  
Completed ocusal built-up.

The front teeth 1.1, 2.1 and 2.2, where the amount of tissue lost was greater, were reconstructed with fiberglass pins and ceramic-zirconia aesthetic crowns.

The front teeth were prepared to adjust the tempo-

rary crown. After a week was taken the precision impression with polyvinylsiloxane (Panasil, Putty Soft Type 0 and Initial Contact Light, Kettenbach GmbH & Co. KG, Im Heerfeld 7, 35713 Eschenburg, Germany) through single-step technique and two components with different viscosities.

For the recording of the beyond preparation have been used 2 different sizes of wires retraction: size "00" more deeply in the gingival sulcus and size "1" more superficial. The first wire was moistened with ferric sulfate at 25% of concentration and the second with aluminum chloride at 20% of concentration. After the test of the structure and the aesthetic valuation, the crowns were cemented with adhesive resin cement. Static and dynamic occlusion was checked. The complete treatment was carried out in 3 months (Fig.7).



**Figure 7**  
Composite build-up in a severe wear case: pre-operative and completed case.

The maintenance program includes a silicone night-guard to protect the remaining tooth structure and restorations (4).

## Discussion and Results

Traditionally, a full-mouth rehabilitation based on full-crown coverage has been recommended treat-

ment for patients affected by severe dental erosion. Nowadays, thanks to improved adhesive techniques, the indications for metal-ceramic crowns have decreased and a more conservative approach may be proposed (7).

Direct composite restorations have a number of distinct advantages over indirect techniques for localized tooth wear, particularly metal ceramic crowns which are:

- Minimally invasive;
- May restore aesthetics and function;
- Afford the clinician control over the final aesthetics;
- Can reduce costs and treatment time for patient and clinician by being performed over fewer sessions;
- Tends to be more appealing to patient than crown-lengthening surgery and crowns as discomfort is minimal (8).

These restorations have proved durable and aesthetic, protect tooth structure and posterior occlusal contact is predictably re-established (8).

The direct technique involves intra-oral build-up with composite in order to restore the lost crown height and construct a balanced, protective anterior occlusion.

The results were very favorable, and the patient was satisfied.

## Conclusions

The treatment of eroded teeth, caused by sleep bruxism, acid regurgitation and other factors, with direct composite resin appears to be a conservative and aesthetic procedure that is well accepted by patients.

Based on the new vertical dimension of occlusion (VDO), combinations of direct and indirect restorations can then help to reestablish anatomy and function. The use of adhesive techniques and resin composites has demonstrated its potential, in particular for the treatment of moderate tooth wear (1).

Tooth wear is an increasing problem and restoring worn teeth with composite resin is a viable and relatively straightforward option in a general practice setting (8).

Further studies and research need to better define the guidelines for a correct approach to increasing clinical cases of dental wear.

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