

NIKOS TSELIOS
Prosthodontist
Graduate of the University of Michigan and Baylor College of Dentistry, USA
Scientific partner in The Department of Prosthodontics at the University of Athens Dental School



Designing the **perfect smile**

The role of all-ceramic dental restorations



A beautiful smile is one of the basic features of a beautiful face. People with an attractive smile do so more often, exuding confidence. Patients about to undergo any form of cosmetic facial surgery may not take full advantage of the positive results, if there is a distracting esthetic problem in their smile.

Sometimes even small changes, such as cleaning or bleaching the teeth can make all the difference, whilst on other occasions more invasive techniques are required.

Designing a smile usually involves techniques from the specialties of prosthodontics (porcelain veneers, all-ceramic crowns and inlays, onlays), orthodontics and operative dentistry (bonding and "white" fillings-resin).

More rarely, the specialties of Periodontology, maxillofacial surgery and plastic surgery are required, because a nice smile also depends on the health and shape of the gums, as well as the skeletal structure of the jaws and other adjacent anatomical structures. It is common for a combination of techniques, from all these specialties, to be used on a patient.



Prosthodontics - All-ceramic restorations

All-ceramic restorations such as porcelain veneers, crowns, inlays and onlays are indicated in Prosthodontics when there are high esthetic expectations. All-ceramic restorations obliterate the metal framework which is incorporated in routine metal-ceramic restorations offering transparency and natural light diffusion through the restorations, like natural do.

In addition, the transition from the restoration to the tooth structure is not demarcated by a dark metal line which is quite common in ceramic-fused-to-metal restorations (photo 1a and 1b).

All-ceramic restorations are usually prescribed for the 6-8 front upper and lower teeth, without excluding all the teeth, especially when the aesthetic zone (teeth and gums seen within the smile) includes more posterior teeth.

The dental restorations require the preparation of the natural teeth, the impression of the prepared teeth and the construction of the restorations by the dental technician so that they can be fitted and permanently bonded to the natural teeth in the dental clinic.

These restorations replace the dental structure, whilst creating a new tooth shape, which leads to a better overall arrangement of the teeth and a brighter smile.

Indications

PORCELAIN VENEERS

Porcelain veneers are thin porcelain layers that are bonded to the teeth. They only cover the surface of the tooth that can be seen when smiling. The porcelain veneers are indicated for improving the shape and color of teeth, correcting crooked teeth and closing gaps in teeth that do not have extensive fillings. The advantage of prosthodontics is that the



Photo 1a and 1b.



Photo 2a and 2b.



Photo 3a. Before.

Photo 3b. After bonding (την ίδια μέρα).

Εικόνες 4α. Πριν, 4β. Προσωρινές, 4γ. Μόνιμες ολοκεραμικές αποκαταστάσεις.



Εικόνα 5.





final result is achieved fast (instant orthodontics), in exchange for the sacrifice of dental tissue due to the tooth preparation.

ALL-CERAMIC CROWNS

All-ceramic crowns (caps) provide full coverage of the tooth and are made entirely of ceramic materials. The all-ceramic crowns are suitable for replacing old crowns (photo 2a and 2b) as well as teeth that are suitable for veneers, but have extensive fillings or excessive discoloration.

CERAMIC INLAYS-ONLAYS

Ceramic inlays and onlays are indicated for the treatment of caries, instead of the usual fillings, or to replace old non aesthetic extensive fillings. The construction of porcelain veneers and inlays is better applied for achieving more complex, but predictable results, with better margins and contacts with adjacent teeth, even when the margins are deep in the gums or there is a lot of missing tooth structure. Furthermore, the material is more durable although when it breaks it is not repaired, but it must be reconstructed. Bonding (photos 3a and 3b) and white fillings may also have impressive immediate results in easier cases.

Contraindications

Patients who grind and clench their teeth (bruxism) are not suitable candidates for extensive all-ceramic prosthetic restorations as there is a risk of fracture. In addition, patients with extremely crooked teeth can only expect an average result. Great results in difficult cases, without compromises, are usually achieved with the assistance of other specialties such as orthodontics, periodontics and maxillofacial surgery.

Procedure-Visits

At least 5 visits are required over a period of 1-2 months until the restorations are permanently fitted. Of these visits, two are both long and tiring for the

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patient (see stage II and III below). On both occasions, only mild sensitivity is expected and the patient fully recovers within 1-2 days, whereas on the rare occasion, when the restorations are extensive, it may take up to 1 week. Should painkillers be required, they are usually prescribed for 1 day after these two visits.

I. TREATMENT PLANNING SESSION

The treatment plan must correspond to the patient's main reason for visiting the dental office (chief complaint), taking into account all the information that arises during the interview, the medical history and physical examination. All alternatives, such as orthodontics or dental surgery should be discussed. The final result should be described as accurately as possible, before commencing with any irreversible invasive techniques. This should be conveyed to the patient with the assistance of visual means such as digital programs, diagnostic wax-ups and finally dental mock ups on patient's teeth before tooth preparation commences. A broad variety of changes can be made at this phase.

II. TOOTH PREPARATION- TEMPORARY RESTORATIONS

When the treatment plan has been reached, the teeth are prepared, preferably in one visit, and the temporary restorations are fitted (photo 4a and 4b). These were constructed by a dental technician based on the previous diagnostic procedures. After being modified in the patient's mouth by the



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dentist, the temporary restorations not only will protect the prepared teeth but also will serve as a guide for the dental technician in terms of the shape, color and the occlusion of the permanent all-ceramic restorations (photo 4c).

Exaggerations should be avoided. The most common exaggeration is excessively white teeth, which no longer look natural (photo 1b and 5). However, in many patients even this color complements their image, depending on their work environment.

III. TOOTH IMPRESSION - THE ROLE OF THE DENTAL TECHNICIAN

After adjusting the temporary restorations in the patient's mouth, the dentist provides the dental technician with information concerning the construction of the permanent restorations. This includes taking impressions of the prepared teeth and the temporary restorations. The restorations will be built in the laboratory.

The dental technician plays a significant role given that his skills will transform the dentist's intangible design and will put into display the clinical work carried out by the dentist. It is the dentist's responsibility to select suitable partners and delegate responsibilities efficiently.

IV. TRIAL FITTING-PREDICTABLE RESULT

The restorations are fitted in the mouth. Modifications will also be made during the trial fitting of the porcelain, but only minor changes will be possible at this stage.

Following the fitting, the patient should be able to see the expected result. It should be noted that a predictable result should be guaranteed by the multiple checks during all the above stages, thus ensuring patient satisfaction.

V. DELIVERY-BONDING INSTRUCTIONS

After the final porcelain fitting, the dentist permanently bonds the all-ceramic restorations with special reinforced dental adhesive that is available in a variety of colors, allowing for the final finetuning



of the final color configuration, even during the last visit.

Prognosis-Success-Duration

With the proper care the patient will enjoy the all-ceramic restorations for many years, but they will not last a lifetime. In a 5-10 year period approximately 80-92% of all-ceramic restorations are still considered successful even though they can survive longer, but without fulfilling all the success requirements.

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The dentist's instructions focus on oral hygiene and the maintenance of the result, which require a:

1. **Bite guard.** To be worn every night in the case of extensive all-ceramic restorations.
2. **Sports-mouth guard.** In sports activities where there may be intense physical contact
3. **Check-up every 6 months** for cleaning and checking of occlusion (bite).
4. **Dental records of porcelain samples and corresponding codes** for possible restoration in case of breakage.

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