Minimally invasive aesthetics: simple, reproducible and predictable workflow

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KEYWORDS ABSTRACT
Feldspathic ceramic, Lithium disilicate, Minimal invasiveness, Simulation softwares.

Aim Developments in dental ceramics have increased the range of opportunities for the esthetic rehabilitation of anterior segments through minimally invasive techniques and the possibility to restore posterior segments without removing extensive amounts of remaining dental tissue, which also result in reduced patient morbidity. A technique for minimally invasive rehabilitation is described.

Materials and methods Impressions, for the case study, and digital intra and extra-oral pictures are taken, then the dental technician prepares the study models and the corresponding wax-ups are used for the digital simulation of the case with rendering on screen. Treatment is discussed with the patient and then multiple resin trays are prepared and applied to the patient in order to simulate the final result. Before applying the provisional restorations, precision impressions of the prepared teeth are taken. Restorations can be manufactured in lithium disilicate or in feldspathic ceramic. Recalls are then planned.

Conclusion The use of CAD-CAM technology in the dental field greatly improves treatment planning, as well as designing and constructing prosthetic frameworks thanks to the possibility to simulate complex cases rehabilitation. This also results in enhanced patient communication. Being able to explain the patient the treatment plan is crucial in esthetic dentistry more than in other dental fields, since the final esthetic result is the main motivation spurring the patient to undertake this type of treatment. In these situations digital software represents an effective tool to show patients their initial situation and the results after treatment.

Introduction
Developments in the field of dental ceramics have brought a wide range of opportunities for the rehabilitation of anterior segments through minimally invasive techniques and the possibility to restore posterior segments without removing extensive amounts of remaining dental tissue (1, 2, 3). Ceramic veneers and onlays are the recommended treatment options in many different clinical situations; according to a classification proposed by Magne and Belser (4) the following indications are eligible for this treatment.

Type I, whitening resistant teeth:
– type IA: tetracycline discoloration;
– type IB: teeth not responding to bleaching.

Type II, dental morphology changes:
– type IIA: conoid teeth;
– type IIB: diastemas or black triangles requiring closure;
– type IIC: increased incisal length or lip prominence.

Type III, large restorations:
– type IIIA: large crown fracture;
– type IIIB: extensive enamel loss due to erosion;
– type IIIC: congenital malformations.

Depending on the material used for veneers, onlays and overlays, the thickness of dental tissue to be removed can vary from 0 mm (no-prep approach) to 0.7 mm; materials of choice are currently feldspathic ceramic or lithium disilicate (5, 6). Since each material has different optical and mechanical properties, the dentist and dental technician should select the most appropriate veneering material according to its use in the treatment of individual cases. The advent of the digital era has also strongly influenced dental medicine in many aspects, such as designing and constructing prosthetic frameworks by means of CAD-CAM technology (7, 8), treatment planning and...
the communication tools available to the dentist to present treatment plans to patients (9, 10). Dental literature reports on treatment options currently available for standard and complex cases, in anterior and posterior segments; these are based on simple, reproducible and predictable clinical protocols which exploit the potential in available materials and in the communication tools to present «digital» treatment plans to patients (10-15). The possibility of communicating with patients by means of digital instruments has a great «emotional» impact and very much helps increase the knowledge of patients, which
can be decisive in their acceptance of what might be a complex treatment plan. This is not a matter of «selling» a treatment but of effectively explaining it, for a better understanding of its individual steps, which can often result in a total change of the patient’s restored segments.

Clinical protocol for all-ceramic restorations

A clinical protocol for minimally invasive all-ceramic restorations is presented (Fig. 1-28).

Step 1, the dentist listens to the patient’s expectations and needs, performs the clinical examination, and takes pictures and dental impressions for the case study.
Step 2, the dental technician prepares the study models and corresponding wax-ups which will be used for the digital simulation of the case with rendering on screen. The result is shown to and discussed with the patient.

Step 3, once the plan has been accepted, multiple resin trays can be prepared and applied to the patient in order to simulate step by step the final result of the treatment before starting it.

Step 4, once the plan has been accepted, the patient’s teeth are prepared using silicone templates obtained from the tray. The provisional restorations can be obtained by rebasing the tray (direct technique) or can be manufactured by the dental technician according to the ‘smile design’ proposed to the patient (indirect technique).

Step 5, during the same session, before applying the provisional restorations, precision impressions of the prepared teeth are taken.

Step 6, restorations can be manufactured in lithium disilicate or in feldspathic ceramic, depending on the patient’s needs and the thickness required.

Step 7, after removal of provisional restorations, the ceramic veneers/crowns are cemented in place.
Discussion and conclusion
The advent of the digital era in the dental field introduced CAD-CAM technology in the planning, designing and constructing of prosthetic frameworks and the possibility to simulate complex cases rehabilitation results in better treatment planning, but also in enhanced patient communication. In fact, being able to explain the patient the treatment plan is crucial in esthetic dentistry more than in other dental fields, since the final esthetic result is the main motivation spurring the patient to undertake this type of treatment. Therefore, digital softwares are effective tools to show patients their initial situation and the results after treatment.

References


