

Esthetic Dentistry – a Permanent Challenge

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Abstract

Background. Challenges in aesthetic dentistry often involve the development of direct restorations as “natural” as possible, this being possible by ensuring predictability of the final results.

Materials and methods. In this context, the article presents a concept and a modern aesthetic restoration technique called *Digital Smile Design* (DSD – digital projection of smile). The clinical cases presented are solved in a private practice equipped with adequate appliances using: Fotona laser for the preparations, a latest generation composite – Enamel Plus HRi (Gruppo Micerium S.p.A. Italy) – to restore and the protocol of DSD software.

Results. Two clinical cases were solved using the DSD protocol; the first patient complained from incisal wear of the upper front teeth and the second patient solicited the improvement of smile, altered by large diastema. By closely following the steps of the DSD technique, the restoration of smile was obtained, with satisfactory results for both patients.

Conclusion. By understanding the concepts of aesthetics combined with top-level materials and technologies, practitioners will introduce predictability, the most desired item in dentistry, to fully meet the expectations of patients.

Keywords: *Digital Smile Design, Enamel Plus HRI, Laser, predictability, minimally invasive treatment.*

Introduction

Currently, the demand for esthetic restorations in dentistry has become increasingly larger, stemming from knowledgeable, active, better-informed public, and who realized that, in addition to the social and romantic benefits, good, “embellished” and “rejuvenated”, looks entail economic benefits, job security, confidence and shaping out of distinctive personalities.

In their turn, practitioners understand that investment in modern, top level equipment, allows therapeutic approaches that equally respond functional and aesthetic needs of patients along with an increased confidence and higher professional satisfaction.

In cosmetic dentistry, success lies largely in understanding complaints and expectations of patients, therefore, before choosing an aesthetic treatment, it is important that they be able to visualize the desired outcome, be involved in decision making while storing medical records safeguards any unintended consequences.

Digital Smile Design (1) offers advantages in the following areas:

- **aesthetic diagnosis:** after careful examination of patient characteristics in terms of facial and dental analysis, digital analysis of photographs introduced into software and drawing reference lines allow observation and highlighting of issues that could not be observed clinically;

- **communication:** although rendering the aspects of cosmetic dentistry is achieved by the dental technician on a wax model – wax-up – according to the instructions on the teeth form, color, arrangement supplied by the dental practitioner, sometimes the final restoration is more likely to not fully meet patient’s expectations;

- **DSD** makes possible transmission of more elaborate data in four dimensions: aesthetics, functional, structural and biologic;

- **feedback**: treatment steps stored in slides with photos, videos, notes, charts and drawings allow accurate analysis and evaluation of all stages of restoration as well as revisions, revaluations or comparisons among different treatments.

- **patient management**: DSD can be used as a marketing tool, to motivate the patient; educationally, for explanation of the treatment; evaluatively, by comparing data prior and after treatment; furthermore, slide library of previous treatments can be used to demonstrate the possibilities of treatment during the analysis performed in cooperation with the patient;

- **education**: presentation at lectures and congresses in the form of slide-shows increases the visual impact of certain examples of clinical cases (2).

Materials and methods

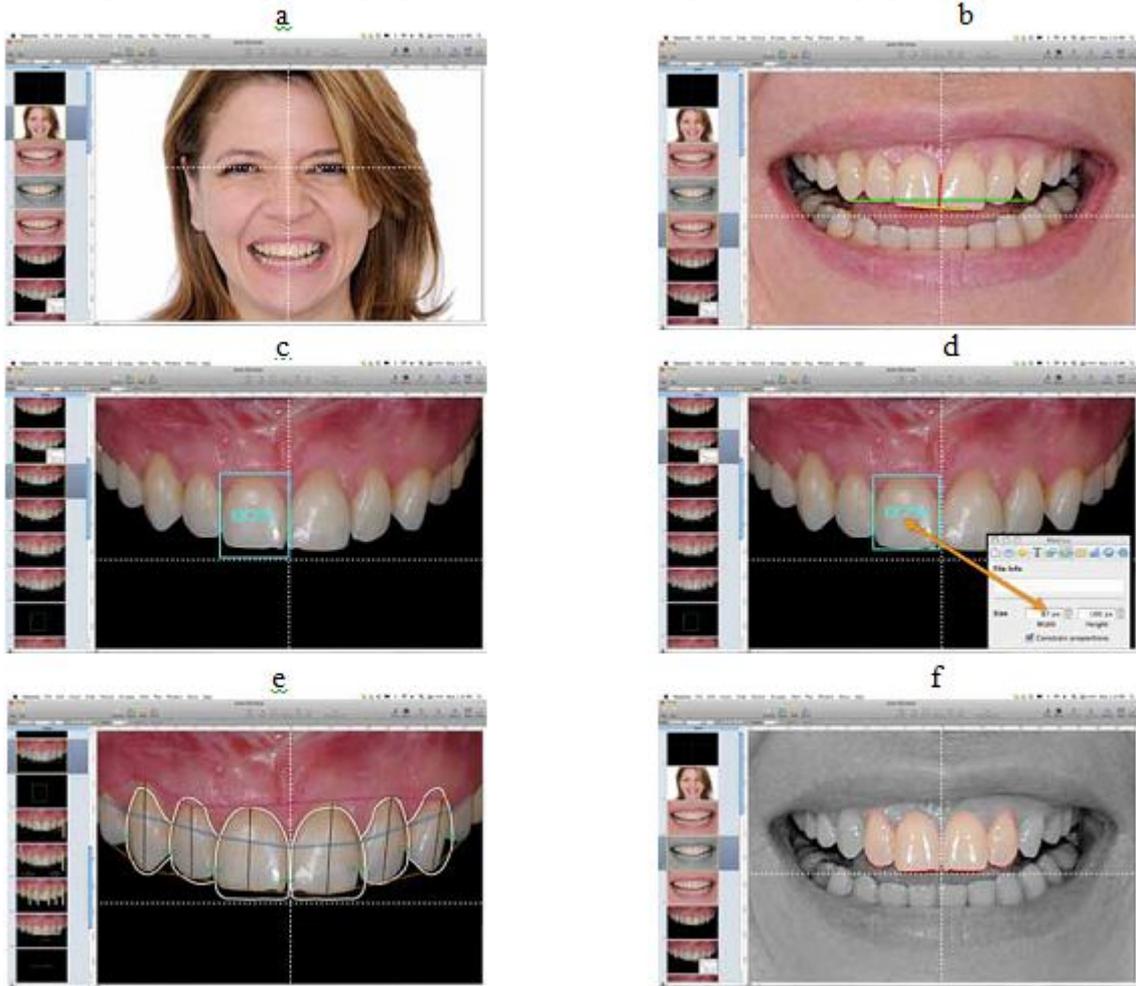
The protocol required by DSD technique, presented in the article, was followed in direct restorations, carried out for a diploma paper (3). A set of extra and intraoral photographs is made with a type DSRL (Digital Single Lens Reflex) camera under clearly established rules (1,4), (Figure 1a,b).

Figure 1 a,b. Photos taked at ideal parameters (1,4)



Images are inserted into Keynote software that allows tracing reference lines of the face and dental arches, measurements of ideal contour of teeth to be restored, simulating of ideal smile (5), (Figure 2 a-f).

Figure 2 a-f. Steps of the program followed for obtaining and simulating a perfect smile (1)

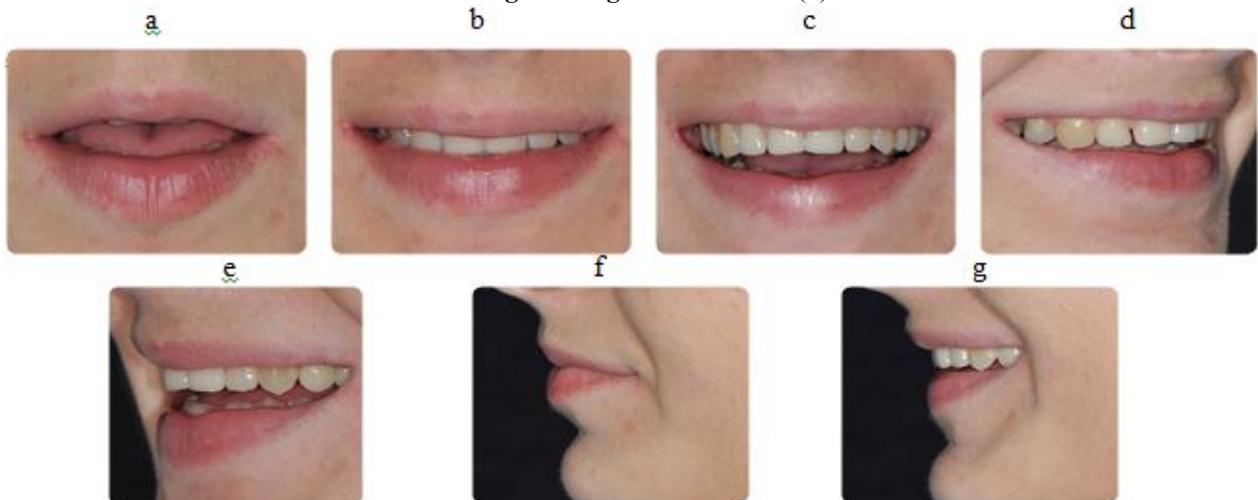


Clinical Cases Presentation

First case

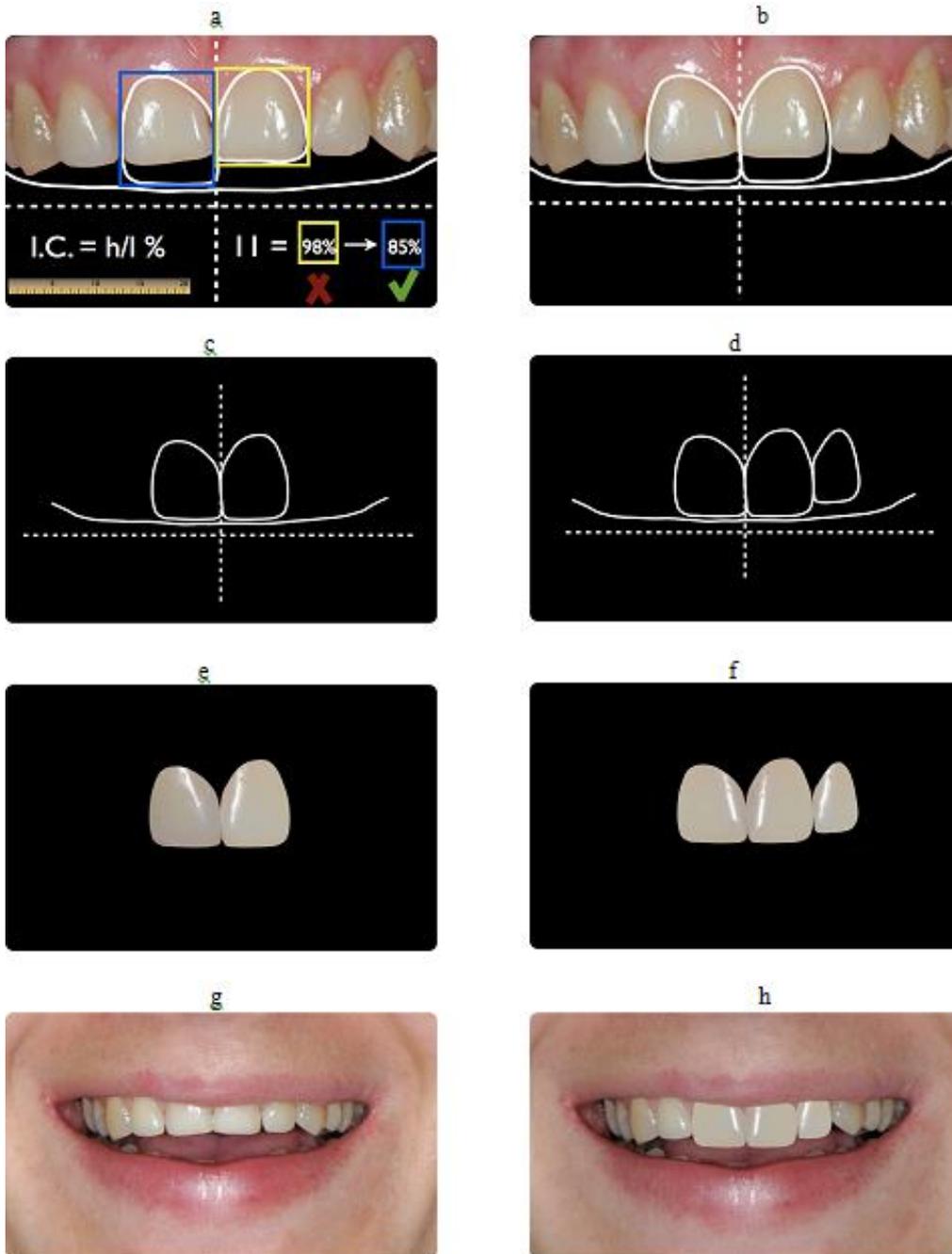
Patient S.A., of age of 26 years, requires improving smile affected by wear of incisal edges of anterior teeth. A set of portrait and intraoral photos is taken, and then a brief Power Point presentation of the patient with aesthetic issues is made for analysis and illustration (*Figure 3 a-g*).

Figure 3 a-g. Initial Pictures (3)



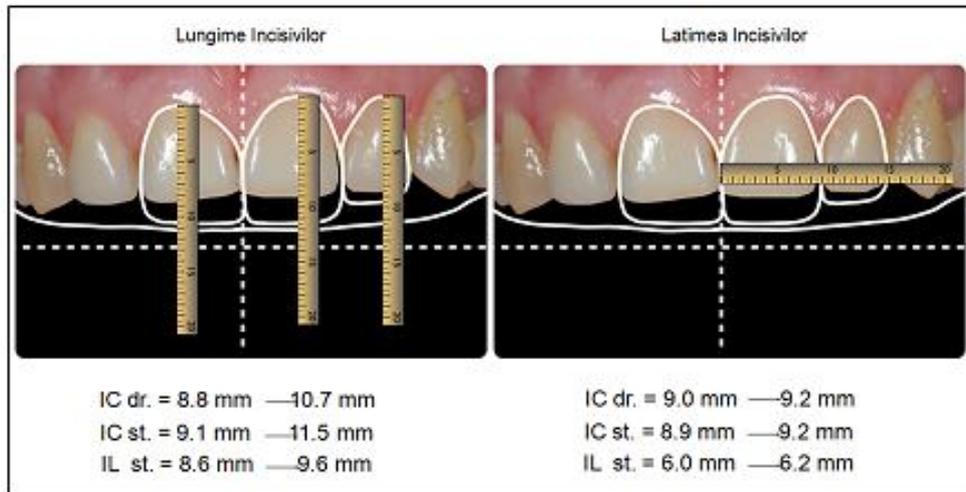
All DSD steps are covered by applying the reference lines and the measurements until a simulation of smile is accepted by the patient as the final result (Figure 4 a-h).

Figure 4 a-h. Certain DSD steps and smile simulation. (3)



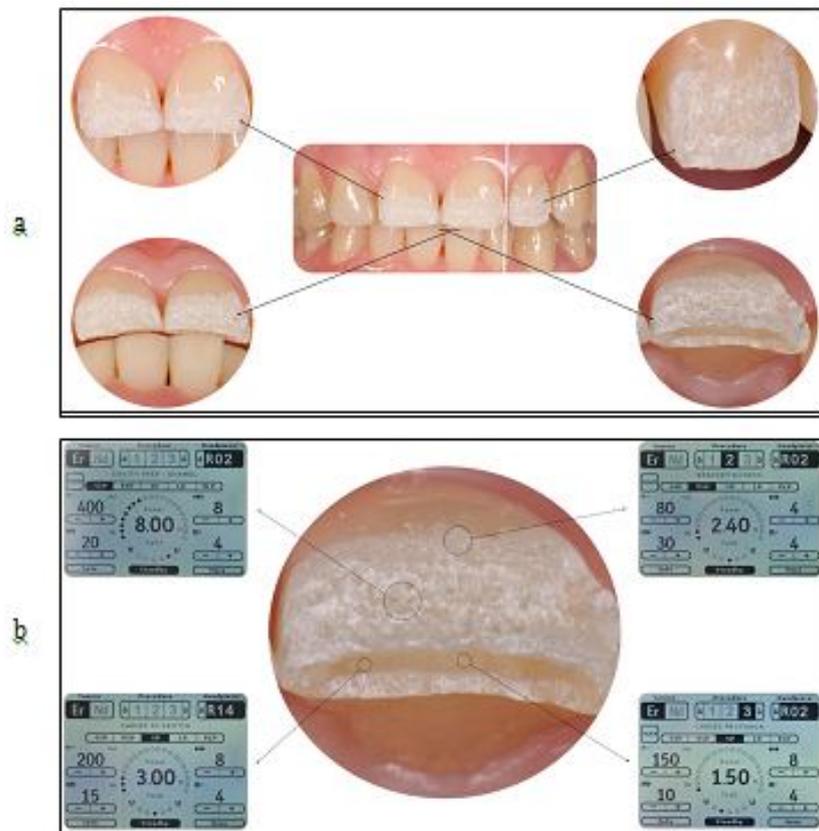
In order that restorations are consistent with the simulated digital layout, measuring is made of exact dimensions that central and lateral incisors must possess (*Figure 5*).

Figure 5. Teeth measurements



Preparation of tooth structure is achieved by Fotona laser leading to creation of micro retentivities of different sizes, thus acquiring a long bevel (*Figure 6 a,b*). (3)

Figure 6 a,b. Laser program used at different intensities creates micro retentivities of different sizes (3)



Direct restorations are made with Enamel Plus HRi (Gruppo Micerium, S.p.A., Italy) per protocol proposed by Dr. Vanini (6), (Figures 7,8).

Figure 7 a,b. Final aspect of direct restorations in maximum intercuspitation and protrusion.



Figure 8 a,b. Initial (a↓) and final (b↓) facial appearance (3)

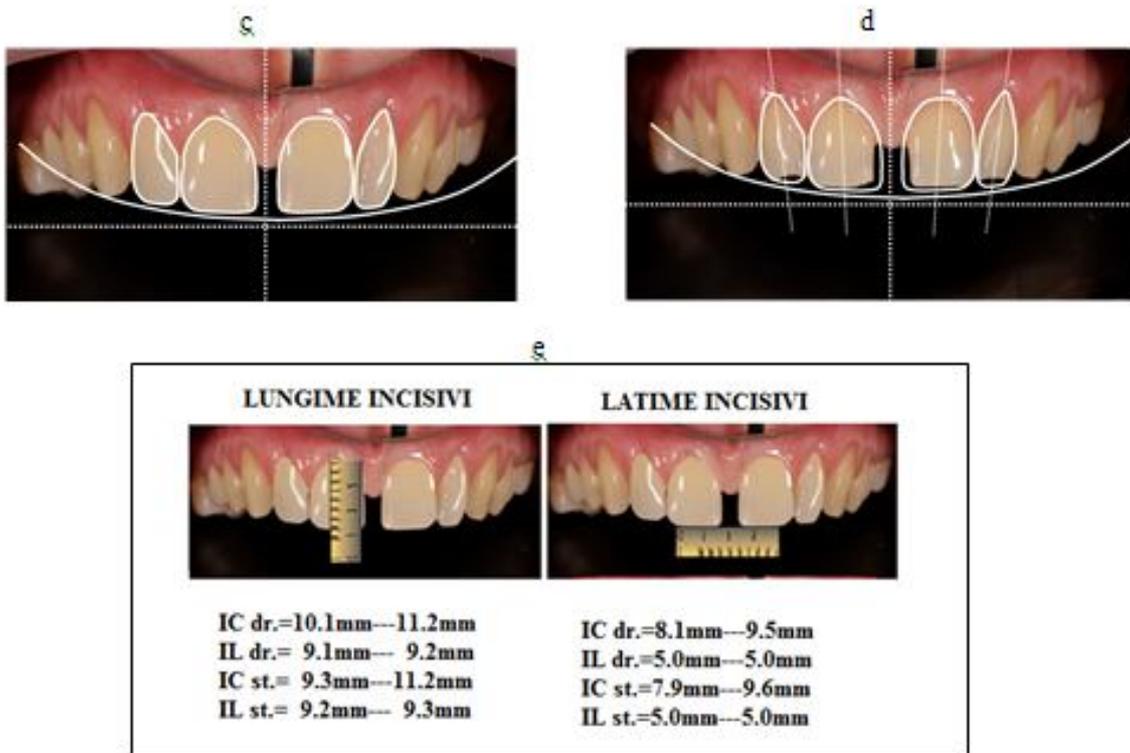


Second case

Patient R. M. aged 41 years, requires partial closure of diastema for improving aesthetics of smile. The images are some of the stages of analysis and data processing to simulate the result (Figure 9 a-e).

Figure 9 a-e. Stages of analysis, evaluation and measurement (3)





The solution proposed for aesthetic smile is accepted by the patient (*Figure 10 a,b*).

Figure 10 a,b. Appearance of simulated smile (3)



After establishing the new dimensions of the teeth, beveled surfaces are prepared by Fotona laser to restore partial direct closure of diastema (*Figure 11 a,b*).

Figure 11 a,b. Bevels of varying degrees of microretentivities made at various laser intensities (3)



After direct restoring the patient is pleased with the end result of smile (*Figure 12 a,b*).

Figure 12 a,b. Initial (a↓) and final (b↓) appearance (3)



Discussion

Dr. Robert Coachman, creator of the concept of Digital Smile Design states: “DSD is the most elegant and beautiful means of communication, which establishes an exact diagnosis and guides the treatment.”

Articles in recent years maintain that DSD software will become the main means of communication between doctor, patient and technician (7)

As to composite HRi Plus Enamel, Dr. Lorenzo Vanini (6) states that it is the type of restorative material that is closest to the natural enamel, possessing the same refractive index thereof. This was revealed by the study of testing fluorescence properties of sixteen restorative materials, of different colors subjected to a special reader Synergy™ Mx (BioTek Instruments Inc.) that demonstrated the best optical properties of Enamel Plus composite (8).

Conclusions

Although Digital Smile Design was originally designed to simulate indirect restorations, it can be successfully applied in minimally invasive direct restorations, as was demonstrated by clinical cases displayed.

Following anatomical stratification guided by tooth map, under particular characteristics, ultimately the medium is achieved of suitable light reflexion and diffusion with visual perception of natural tooth.

Preparation of tooth structure by laser, at different power parameters, allows acquiring microretentivities of different sizes, which secure optimal adhesion of the restorative material.

By understanding the concepts of aesthetics combined with top-level materials and technologies, practitioners will introduce predictability, the most desired item in dentistry, to fully meet the expectations of patients.

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