

CS 3600: COMPLETE SMILE TRANSFORMATION USING A MINIMALLY INVASIVE APPROACH



INTRODUCTION

Advanced digital dentistry workflow allows the practitioner to deliver highly esthetic smiles using state-of-the-art technologies and materials. The process is as simple and pain free as it is minimally invasive.

This case features a patient who traveled by plane to my practice for a total smile transformation. It was essential that the work was completed quickly to achieve these life-changing results.

THE CASE

A 45-year-old male came to my office seeking a nice smile with a preference for a minimally invasive approach. The patient presented with significant staining, a few bonded restorations, old amalgam fillings, crowding on the mandibular central incisors, and general occlusal wear. The patient's periodontal situation was determined to be adequate, and there was no decay or infection found, making this purely an aesthetic issue. Intraoral photographs and a panoramic radiograph were taken.



Dr. Miguel Stanley

Dr. Miguel Stanley, is a dental surgeon with a passion for complex oral rehabilitation, who has a team of highly specialized dentists that focus on everything from basic family dentistry to full mouth complex oral cosmetic rehabilitation. A trained implant surgeon and cosmetic dentist that graduated in 1998, Dr. Stanley has become a recognized opinion leader in the field of both cosmetic dentistry and complex implant surgery.

For the past 15 years he has been lecturing around the world, sharing his passion for this field. In recent years, Dr Stanley has transitioned his practice and his team into the digital era. Today, he has a team entirely dedicated to the complete digital workflow in dentistry. He created the No Half Smiles® philosophy and the Slow Dentistry® concept. He is passionate about ethics and quality in dentistry. Dr Stanley loves to share his vision with the younger future generations of dentists around the world.

He is licensed to practice in Portugal, UK and Dubai

Graduated DDS , 1998, Egas Moniz, Costa da Caparica, Portugal

Private practice in Dentistry since 1998 till present day

Implant & Cosmetic dentistry training, CEOSA Branemark center, Madrid 1998-2000

Functional Aesthetics, Hornbrook Group, Chicago, 2005

First Portuguese Dental XP expert since 2009

Author of the book "Saúde no caminho da felicidade", Grupo Leya

Creator & Executive producer, "DR Preciso de ajuda", TVI, 2006-2008

Creator & Executive producer, Dr White, SIC, 2011-2012

Dental consultant, The Doctors, CBS, Hollywood, USA, 2012-2013

International speaker, 2002-till present day (over 200 keynote lectures in more than 50 countries)

Author and co-author of innumerable scientific articles



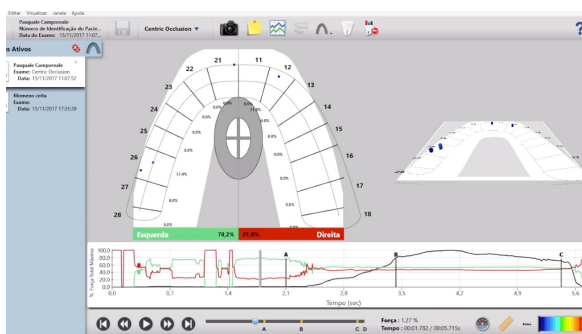
Initial situation

The patient's teeth were scanned using the CS 3600 intraoral scanner by Carestream Dental prior to treatment as part of the initial records.



Initial digital impressions captured by CS 3600 scanner

The patient's occlusion was checked to make sure the bite was good—which is generally one of the first things I like to do when planning treatment—because all aesthetic treatments should result in great occlusion. Unfortunately, too many dentists focus solely on the case from an aesthetic perspective, and they do not take a more holistic approach which would include the occlusion as a major focus. To perform this analysis, the digital impression was imported into the Teksan T-Scan 9 software.



Digital impression imported into T-Scan 9 software for occlusal analysis

THE TREATMENT PLAN

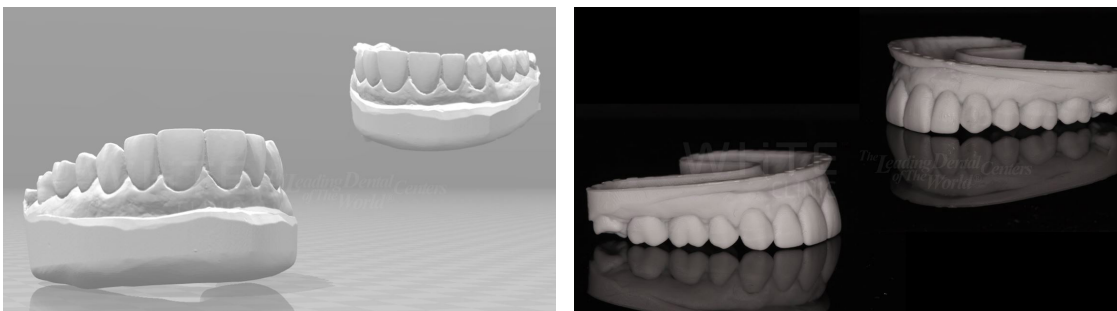
In this case, it was determined that it was best to take a minimally invasive approach and to treat both the maxillary and mandibular arches with veneers. For the mandibular arch, the patient first required a few months of Invisalign aligner therapy to correct the incisal crowding. In the meantime, the maxillary aesthetics could be addressed, and this case summary focuses primarily on the aesthetic approach that was taken for the maxillary arch.

We began with an in-office whitening treatment, which would provide an immediate aesthetic improvement as well as a better cosmetic outcome because it addresses the substrate.



Initial situation on left, post-whitening shown on right

Next, a mockup was completed using a digital smile design concept. In this case, we tested a new 3D printer from Voco, the SolFlex printer, since we wanted to try in-house printing. We used the smile design software to mock up the 3D design.



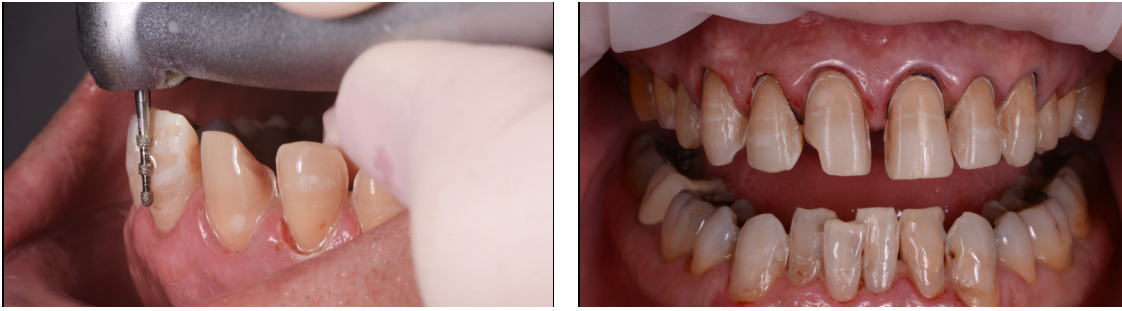
Digital design mock-up on left, 3D printed mock-up on right

The veneer design was tested in the patient's mouth, which allowed the patient to visualize how the final treatment would look like and gave me a better understanding of the thickness that was needed. Therefore, this served as more of a thickness guide rather than a cosmetic guide. The mandibular arch was not addressed at this time because the patient needed to complete the Invisalign treatment prior to planning and placing the veneers.



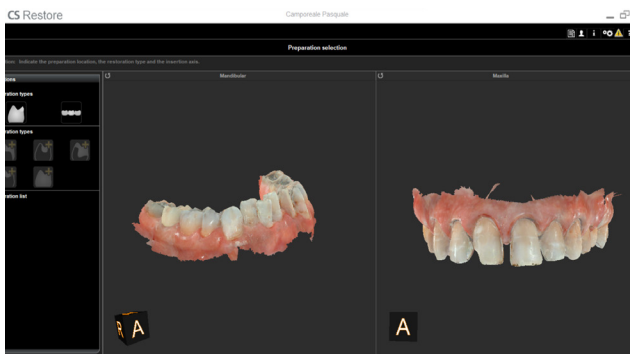
Initial try-in of the veneers to check thickness

A local anesthetic was administered, and the teeth were prepared through the bisacryl mock-up with a minimally invasive approach. The retraction cord was then placed, and the teeth were dried. The tetracycline staining that occurred below the superficial enamel became more apparent, indicating that the staining was quite deep and confirming that whitening would not have been an effective long-term aesthetic result for this patient.



Tooth preparation on left, retraction cord in place on right

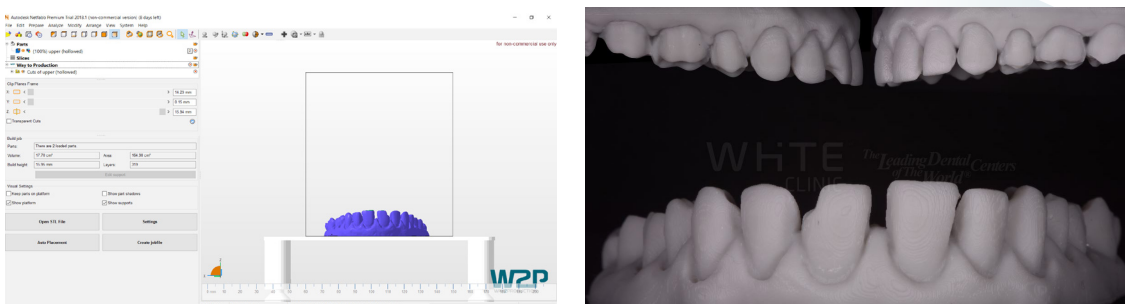
The CS 3600 intraoral scanner was used to scan the preparation. I used a laptop with a powerful upgraded graphics card and processor to further improve the performance and reduce the scanning and processing time. Digital scanning provides an overall better patient experience because the scan is fast and more comfortable. Patients are generally fascinated with the technology, which results in a much better first impression on our patients than a conventional impression.



Preparation scanned with CS 3600

I also find the digital impressions are a lot safer and less expensive than conventional impressions, as sometimes conventional impressions require retakes. Additionally, conventional impression materials require a great deal of skill to get a high-quality impression. Digital scanners, on the other hand, produce highly accurate digital impressions quickly and easily. The digital impressions are stored in the software, enabling digital models to be easily sent to the lab. I just think the technology is fantastic.

For this case, I created a 3D model of the scan using the Voco SolFlex printer. I find it to be incredibly accurate, and it provides me with a working model that is also digital. I used the original mock-up to fabricate the temporaries using Voco Structure 3, which is a nanoparticulated bisacryl, and the teeth were designed so there was enough gingival clearance with no excess material.



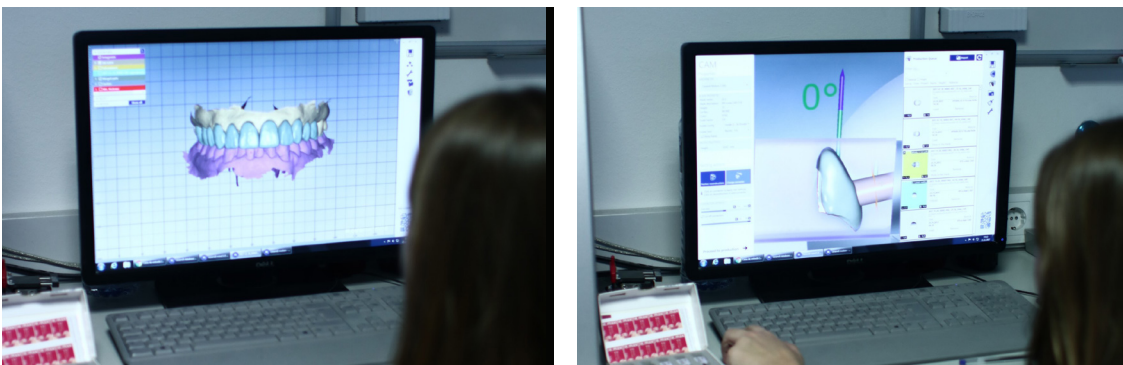
Printer software and printed 3D model

The patient was sent home with the provisionals. In the occlusal view of the maxillary arch, you can see that the lingual surface of the teeth remains untouched and that only the labial surface of the teeth was impacted by the preparation for the veneers.



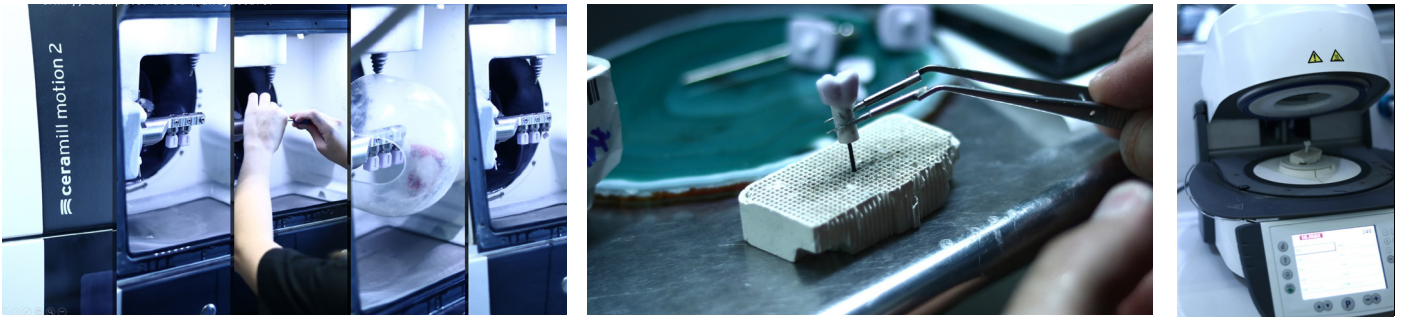
Provisional veneers

The digital impressions were sent to the lab digitally so they could complete the design and the manufacture of the veneers. The lab received the scan and started designing the veneers for each individual tooth in Exocad software.



Veneer design in Exocad software

The veneer designs were sent to the Amann Girrbach Ceramill Motion 2 mill for milling. Ivoclar e.max blocks were milled and then placed in the sintering furnace for the first cycle.



Veneers were milled, glazed, and sintered

Since this was one of the first cases I had performed using the CS 3600, I chose to perform an initial trial before the glaze to verify the fit. If you do not have to perform the try-in step, you can proceed with the final sintering.



Try in prior to glazing

Despite the fact that this was one of the first cases we ever scanned with the CS 3600, the fit was perfect. In fact, it could not have been better.



Perfect fit of the veneer for the central incisor

I also referenced the X-ray documentation to ensure that all was correct. I then added the ceramic layer to the e.max veneer for the ultimate aesthetic approach. Of course, if your preference is to use fully milled e.max, you can use that approach as it's a much simpler process and the overall aesthetics are fantastic.

The entire case was digitally planned, printed and milled. The final milled veneers, onlays and crowns were placed on the 3D printed model for final verification of aesthetic outcome and fit. The veneers covered only the buccal and incisal surfaces of the tooth. There was an onlay on tooth 16 for a minimally invasive approach, and I placed a full crown on tooth 17 because it required more comprehensive treatment.



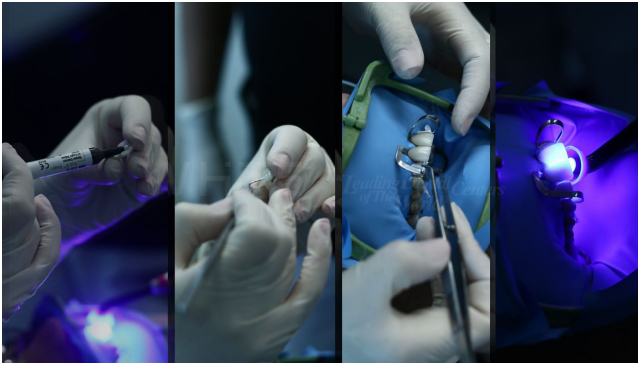
3D model with final veneers and onlays

Next, the veneers were placed one last time to check the final fit. Due to the conservative approach I took with this case, the final placement required minimal anesthetic. To create a completely isolated field, a rubber dam was placed and the teeth were acid etched. While the teeth were being prepared, the crowns and veneers were also etched and prepped for the cementation. We used Voco BiFix which is designed specifically for veneers.



Verify final fit of veneers and prepare teeth using rubber dam for proper isolation

The veneers were cemented into place. We refer to our cementation process as #lifechangingdentistry, because it truly does make such a significant impact on the life of our patients.



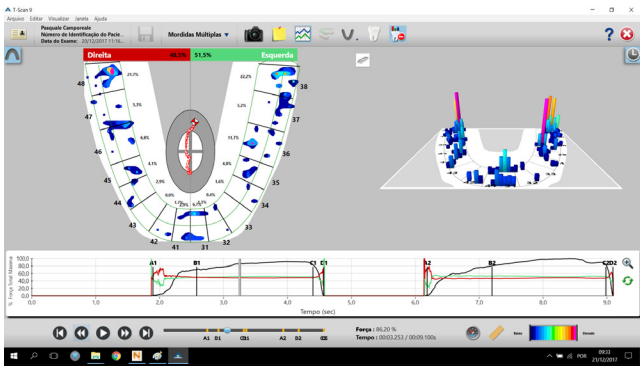
Veneers were milled, glazed, and sintered

In the final photographs, you can see that the treatment plan was executed in a 100% digital workflow, thanks to the CS 3600 intraoral scanner.



Final result

Most importantly, the patient's occlusion is absolutely perfect. In the final result, you can see how dramatic the change was to the patient's smile. And, due to the minimally invasive approach, the outcome was completed in a way that was very simple and very easy for the patient.



Final occlusion



100% digital workflow

In the future, if any of the veneers ever crack, I would not need to take a new impression because I still have the digital one on the computer file. I can simply mill a replacement veneer overnight, using 100 percent monolithic e.max and replicating what was milled previously. I would not even have to do the ceramic layer.

Additionally, one of the impressive things about digital scanning is that—due to the open nature of the scanner software—the files can be shared anywhere in the world. If the patient ever moves, the files can move with him or her, preventing the need to go through this lengthy process again. Additionally, if the patient required any additional dental work in the future, the same initial digital impression could be utilized, with only the need to rescan any areas where the dentition has changed. This is the benefit of a 100% digital workflow.

The digital workflow is exciting for everybody on the team. It's a lot of fun and quite incredible!