

Natural teeth-supported prosthesis prototype

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Purpose of this document

In an effort to provide excellence for all DSD clients, we have chosen to help our clients by providing guidance on the requirements necessary for us to deliver Natural Restorations in a consistent way. This document will describe the Natural Restorations protocols including the intraoral scan requirements. Initially, we will describe the protocol

to obtain the ideal Natural Restorations for natural teeth prostheses. A second document will detail the protocols to follow for implant restorations.

Video inserted

Client Onboarding

The onboarding process involves an initial discussion between the clinician and members of the DSD Lab Customer Support team. This allows us to establish the ideal workflow and review with the client the general aspects of the support that the lab will provide. This onboarding process consists of:

1. New clients need to schedule an appointment with our DSD Lab Customer Support Team. Existing clients are welcome to review the protocol as well.
2. Review this document
3. Review the workflow to ensure that we can deliver excellence.
4. Review checklist of the 6 steps for a Digitally Guided Tooth Preparation:
 - Ideal Design Analysis
 - Pre-prep Reduction Guides
 - Prepping Through
 - Defining Finishing Line
 - Post-prep Quality Control Guides
 - Chairside Prep Evaluation with Intraoral Scanner
5. Restorative materials
6. Recommendation for cementation
7. Review the communication protocol
8. Review the DSD restoration repetition policy

Case Preparation - Workflow Sequence Summary

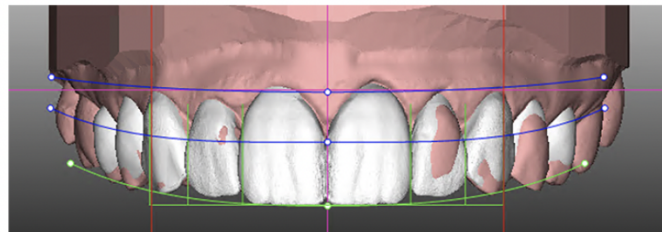
Workflow sequence:

1. Ideal Design Analysis
2. Pre-Prep Reduction Guides
3. Prepping Through
4. Defining Finishing Line
5. Post-Prep Quality Control Guides
6. Chairside Prep Evaluation with Intraoral Scanner

Case Preparation - Step 1 - Ideal Design Analysis

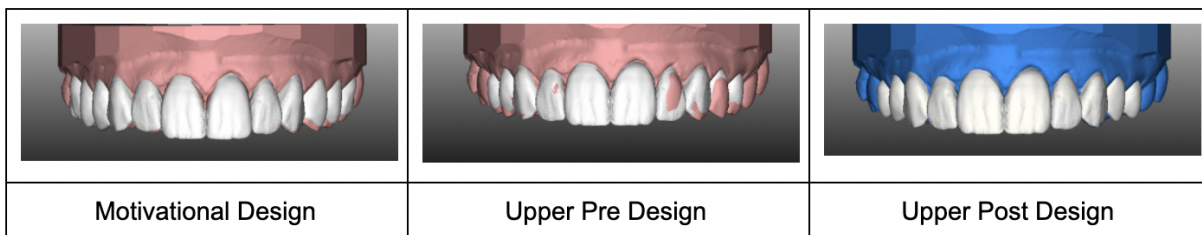
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IDEAL DESIGN ANALYSIS
Subtractive or Additive
Ortho or Reshaping



- Evaluate the DSD Ideal Design and perform the DSD Mock up with the patient (Motivational Design).
- Remember that the Motivational design often does not represent the ideal final outcome. The Ideal design is what will be used for the Prep Guides and the Natural Restorations.
- After testing the mock up you can suggest changes to the project if you feel it is necessary. If you are not happy with the selected tooth library, this is the moment to change. In cases that entail major modifications to the design, we suggest trying in a new mock up to receive final approval from the patient.

- Evaluate details like morphology and surface texture of the chosen 3D tooth library. All these small details will be copied in the final restorations. The ideal moment to review all these details and approve the final Ideal design is right before the restorative phase, not necessarily at the initial pre-treatment acceptance, especially in cases that will need different pre-restorative treatments such as ortho, crown lengthening, implants, etc.
- Remember that the DSD Natural Restorations will exactly follow the natural shapes from the library used at this moment.
- If any intermediate treatment is necessary (ortho, crown lengthening, surgeries), we suggest making a new Ideal & Motivational design before the restorative phase. Please remember to send updated intraoral scans before the final restorative design if changes have been made.



- **We strongly recommend that you perform the treatments that our design is suggesting, such as ortho, gingival recontouring, implants, etc. If you decide not to follow the full treatment plan suggestion, please note that the initial Ideal Design will certainly need changes.**
- For natural teeth restorations, we strongly recommend that you also order the DSD Prep Guides, to guarantee enough clearance.
- The use of Prep Guides is highly recommended to ensure consistent and predictable Natural Restorations results. The Complete Prep Guides consist of three or more individual guides. These guides are:
 - Reduction Guide - only when the case requires a clear subtraction of either the buccal or incisal edge.

- Incisal Quality Control Guide - used to determine if the incisal edges have been sufficiently prepared.
- Buccal Quality Control Guide - used to determine if the buccal surfaces have been sufficiently prepared.
- Interproximal Quality Control Guide - used to determine if the interproximal areas have been sufficiently prepared.
- Please avoid undercuts and be aware that the Prep Guides are not designed to prevent any retentive areas.
- After prepping, share the intraoral STL files of the preps, antagonist, and bite relation. In addition, please provide intraoral photos of stump shade and final desired shade. All these files should be uploaded to the patient case on the DSD website.

Case Preparation - Step 2 - Pre-Prep Reduction Guides



The Pre-Prep Reduction Guides are used only when the case requires a clear subtraction of either the buccal or incisal edge.

- To transform your case into an additive one, we will design the Reduction Guides to be used before this mock-up. In this way, the subtractive areas will be removed and the technical mock up can be performed.

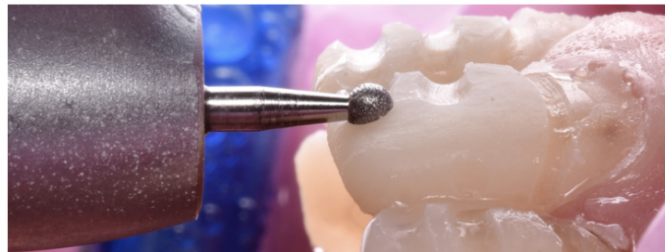
Reduction guide



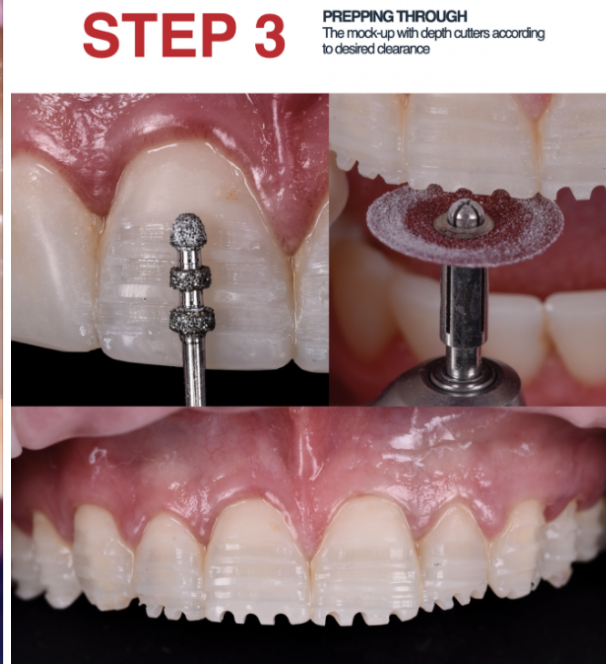
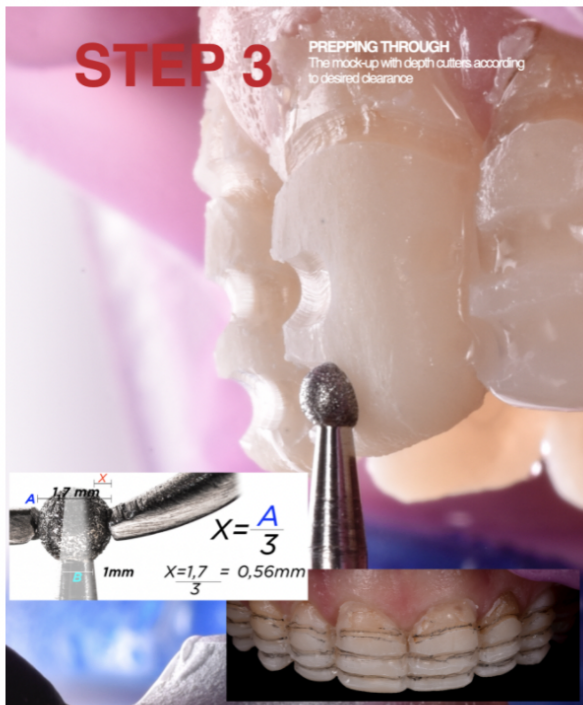
Case Preparation - Step 3 - Prepping Through

3

PREPPING THROUGH
The mock-up with depth cutters
according to desired clearance



- Perform the Technical Mock up after you have used the Reduction Guide(s) if they are needed for your specific case.
- Perform the preparations through the Technical Mock up.
- The depth of the preparation will depend on the shade of the stump, final desired shade and material selection. Please follow this link for help in determining the required depth: [DO THE MATH](#)

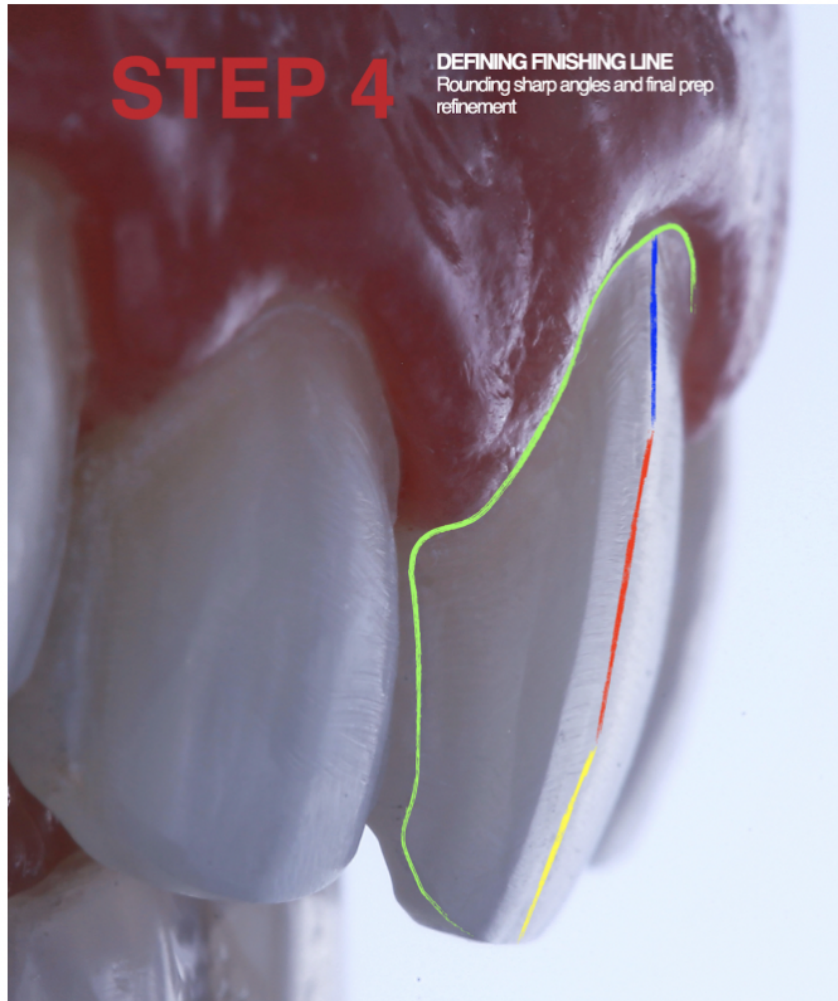


Case Preparation - Step 4 - Defining the Finishing Line

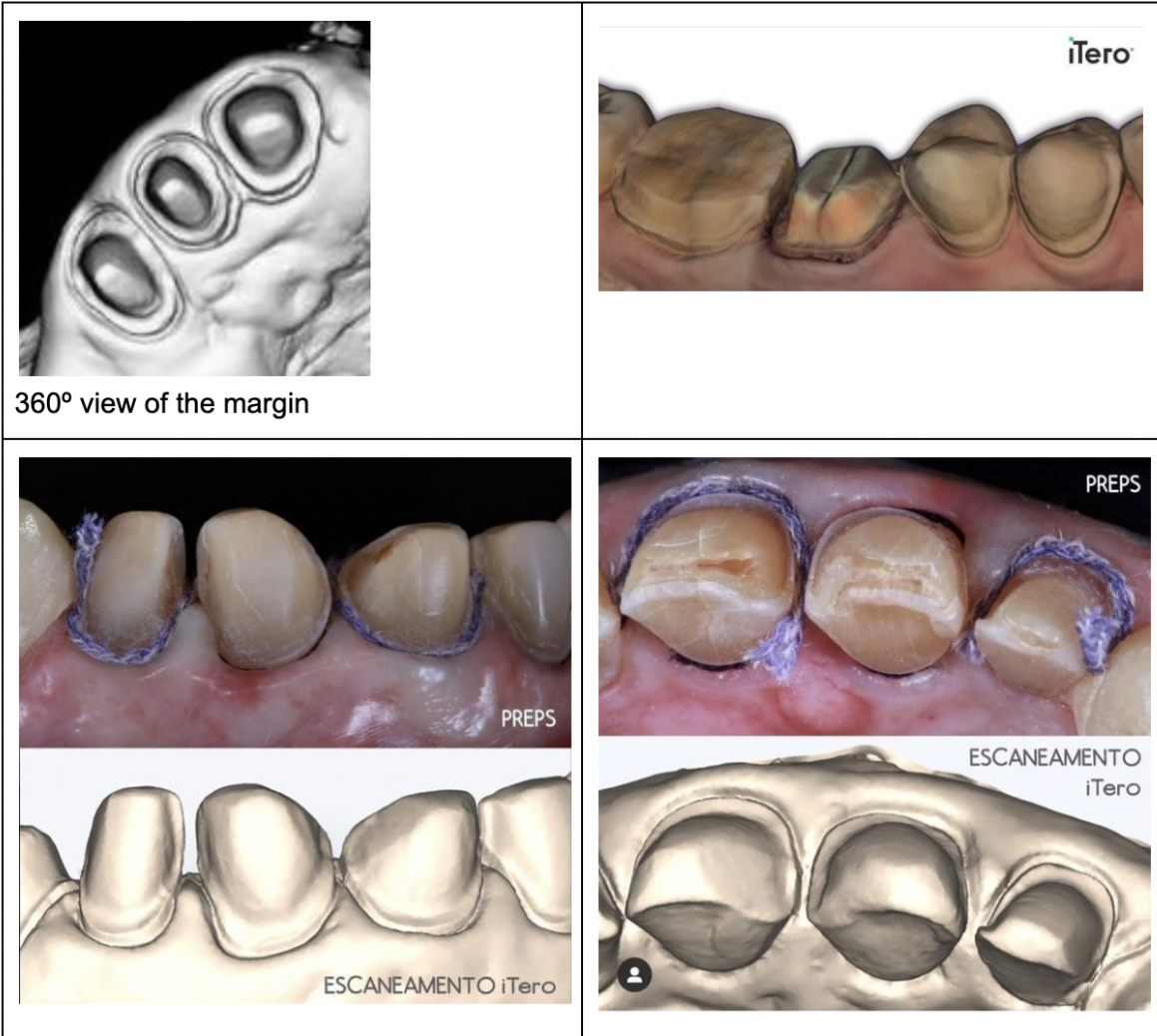


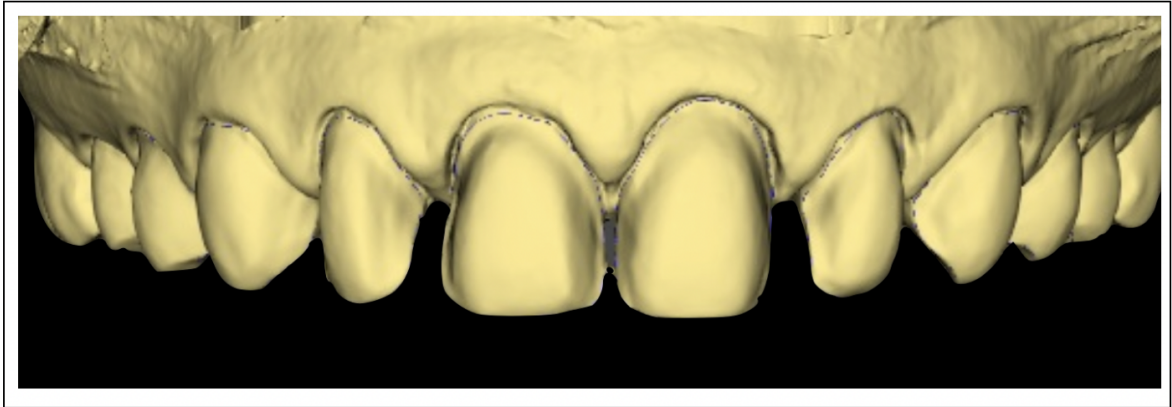
- Important points to always consider:
 - margins must be perfectly visible,
 - a clear insertion axis must be achieved (with no undercut areas),
 - sufficient clearance for the restorative material (please check step 5),

- avoid sharp angles.

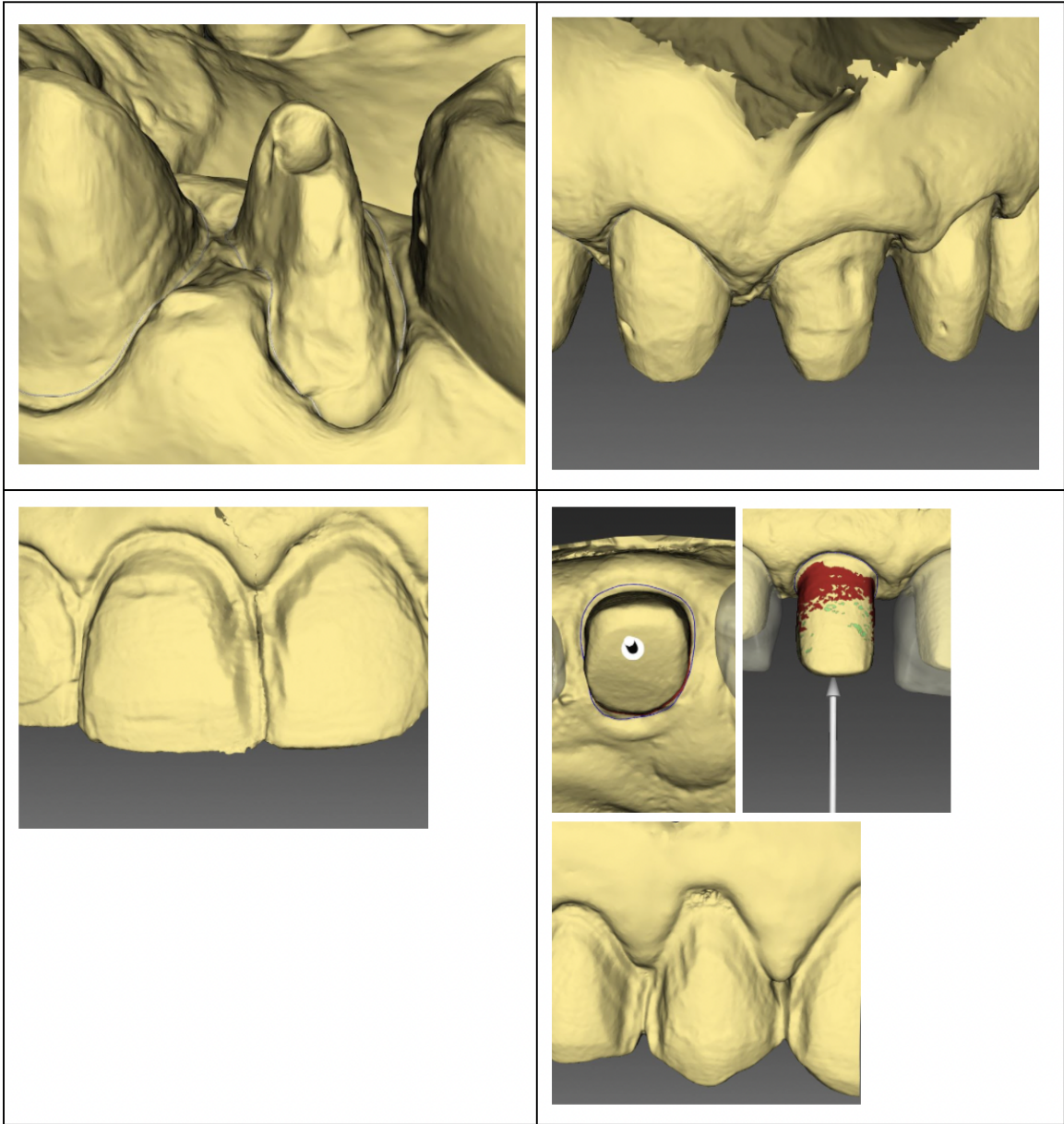


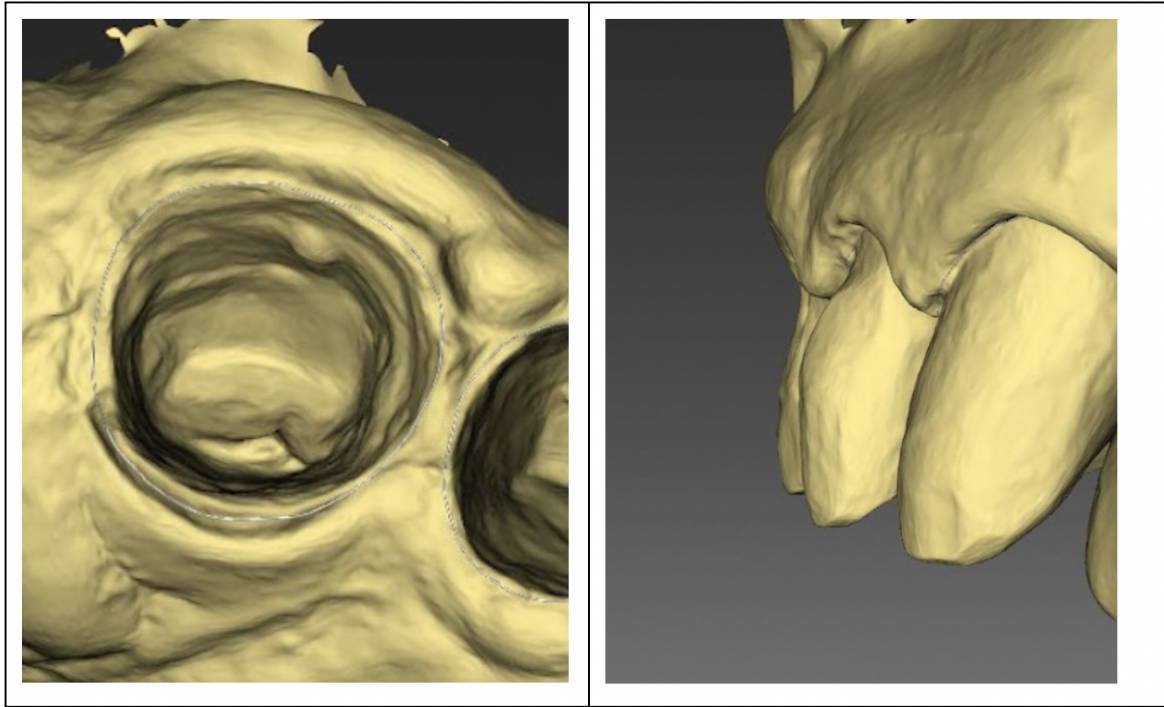
Examples of good preparations:





Examples of poor preparation scans that will be rejected by DSD Lab.





Case Preparation - Step 5 - Post-Prep Quality Control Guides

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POST PREP QUALITY CONTROL GUIDES

Buccal, Incisal and inter proximal
clearance control



The Quality Control Prep Guides consist of three guides. These are:

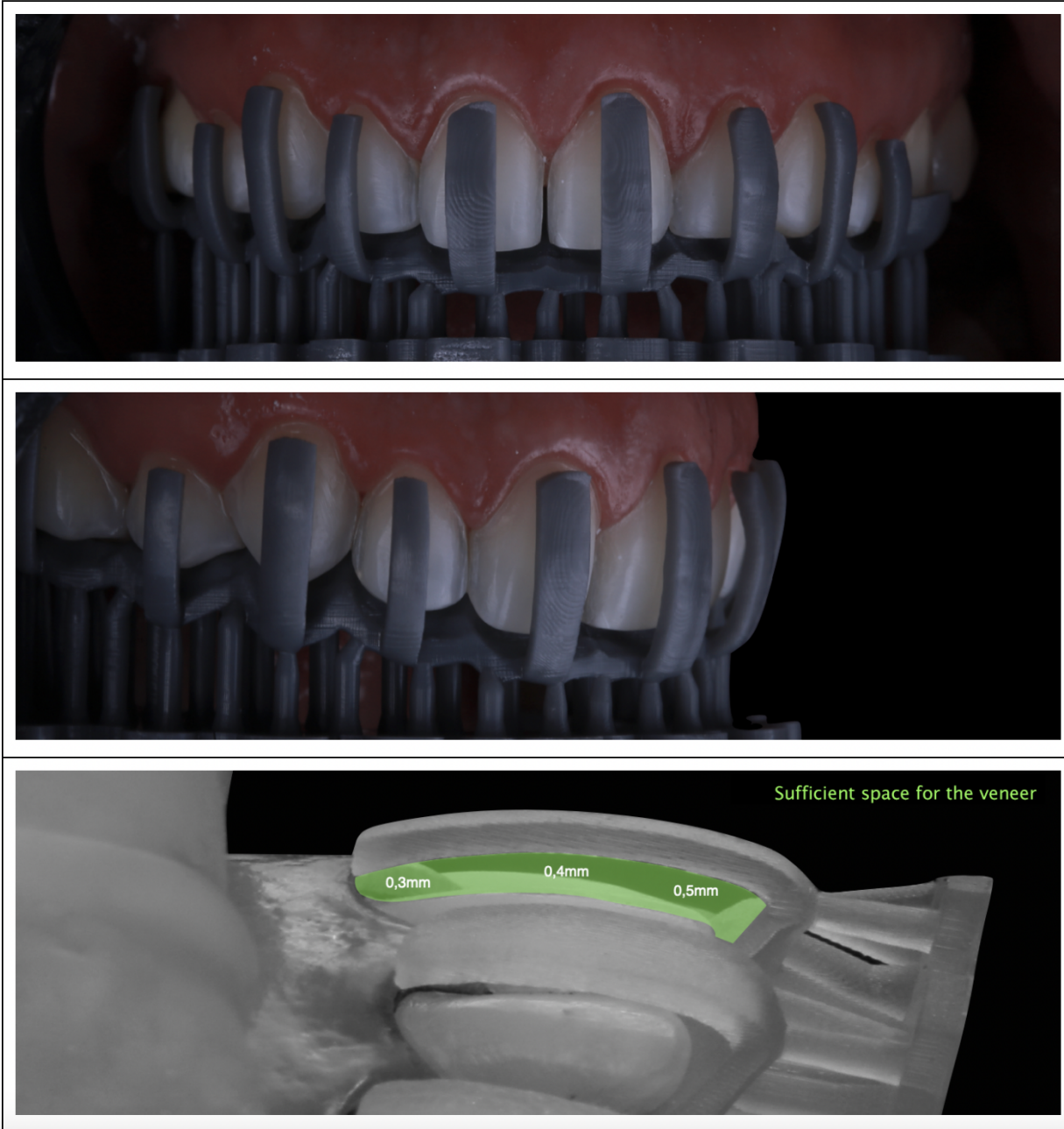
- Incisal Quality Control Guide - used to determine if the incisal edges have been sufficiently prepared.
- Buccal Quality Control Guide - used to determine if the buccal surfaces have been sufficiently prepared.

- Interproximal Quality Control Guide - used to determine if the interproximal areas have been sufficiently prepared.

Incisal Quality Control Guide



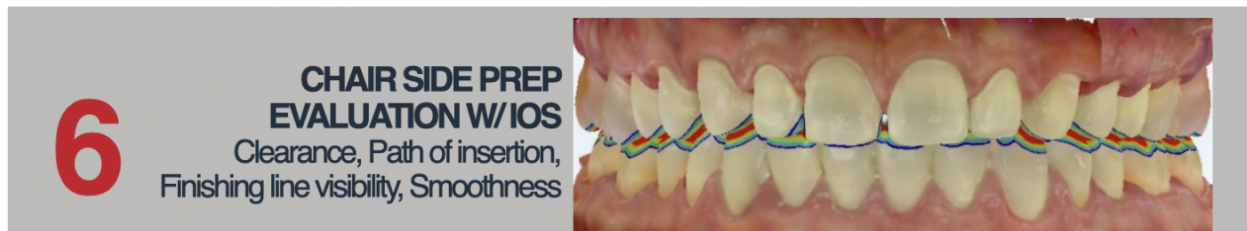
Buccal Quality Control Guide



Interproximal Quality Control Guide



Case Preparation - Step 6 - Chairside Prep Evaluation with Intraoral Scanner



Intraoral scans of your patient are required. The intraoral scans must be uploaded to the patient case file on the DSD website.

If you use an iTero, Trios or Sirona intraoral scanner, you can send the scans to DSD directly. Please check with the IOS manufacturer on how to activate our lab in your scanner. It's highly recommended that you trace your preparation margins using the scanner feature to identify them. Each of the three IOS systems mentioned above allows for this to be performed.

For reference, the DSD Lab identification numbers for the different IOS are:

- iTero: 21653
- Trios: 3dtech@digitalsmiledesign.com or DSD PLANNING CENTER
- Sirona Connect: DSD Planning Center

Scanning sequence and use of retraction cord:

1. After performing the preparation, we require a scan of the prepped arch WITHOUT retraction cord for our lab to be able to have a clear view of the state of the soft tissue. This will guide us to the realistic limit of the papilla and cervical contour.
2. A second scan of the prepped arch WITH retraction cords. The Double Cord technique is strongly recommended for subgingival preps (exact same protocol used for analog impression, leaving the second cord for 5 to 10 min, then removing it and scanning the teeth with the first cord in place). *Add link to technique*
3. Opposing arch scan
4. Bite registration (Some IOS systems generate a third file from the bite. If your system generates this file, please send it as well).
5. **Mark the preparation margins in your intraoral scanner software.** This is not mandatory but highly recommended.
6. For the immediate Provisional, we strongly suggest that you use the Upper/Lower Post Design Model. If any direct adjustments are made to the provisional, please scan as well and send to us so that we can take it into consideration for the final Natural Restorations design.

All scans must capture the PALATE and the maximum amount of the soft tissue as possible.

Sending the case

On the DSD website, please send the prescription of the case.

1. We require both the stump and desired final shade

Please send intraoral photos of the stump shade showing Vita Classic shade guide and any other special considerations.



- Upload the STL files:
 - Prepped arch without cord - standard resolution (we do not need HD mode)
 - Prepped arch with cord - in high resolution (HD mode)
 - Antagonist
 - Bite, if produced by your system
 - Provisional, if adjustments have been made
 - If treating a full arch for crowns, please request our advice on how to perform the bite registration
- Make sure bite registration is taken in the ideal OVD and final desired CR or MIC relationship.

Restorative materials

DSD can produce the Natural Restorations in several monolithic ceramic materials. Our recommendation is as follows, however, the client has the final decision on how to proceed:

1. EmpressCAD: for single-unit anterior veneers with good and homogenous stump shade.
2. e.maxCAD: in the anterior region when veneers and crowns are mixed and with different stump shades. Also, posterior single-unit crowns and up to three unit bridges.
3. Zirconium: for bridges of four or more units or situations that require more strength.
4. PMMA: for any provisional restoration.

Recommendation for Cementation

The Natural Restorations are not etched in the DSD Lab, we recommend etching them after the patient try in has been performed. The clinical manipulation in the try-in process may contaminate the restoration.

DSD Lab's suggested protocol for etching consists of using Floridic acid for 20 seconds for e.maxCAD and 60 seconds for EmpressCAD.

We recommend Ivoclar cements for best results. Please follow Ivoclar's recommended cementation technique for each of the materials that we provide: EmpressCAD, e.maxCAD, ZirCAD and PMMA. If you select another cement provider, please follow their instructions.

Communication Protocol

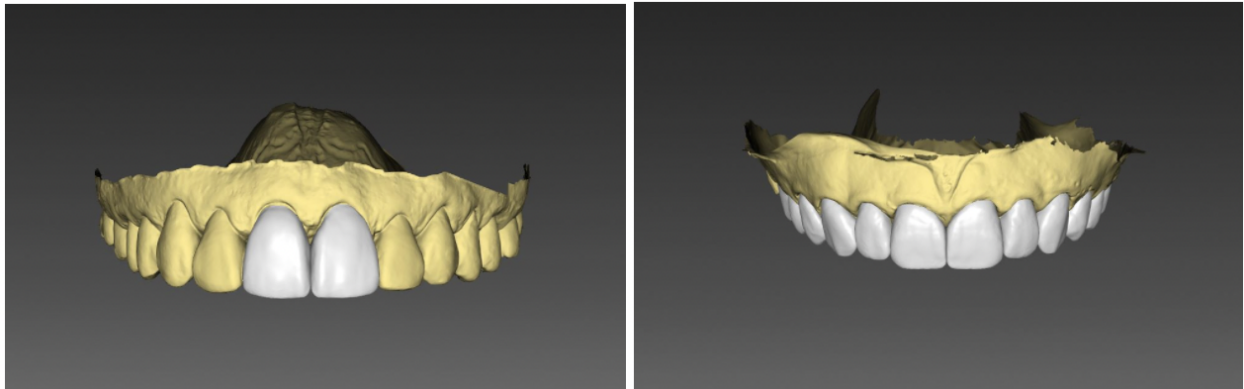
To ensure an excellent result with the Natural Restorations, we all need to communicate in an effective and clear manner. This communication will occur through the DSD website and/or the DSD Concierge group, when available.

The process begins by a client ordering a case with Natural Restorations and submitting the required information and files.

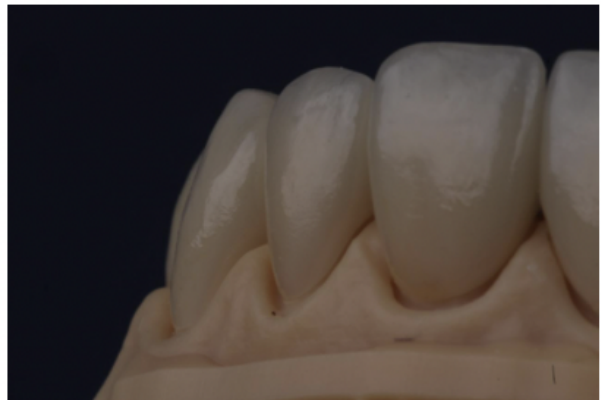
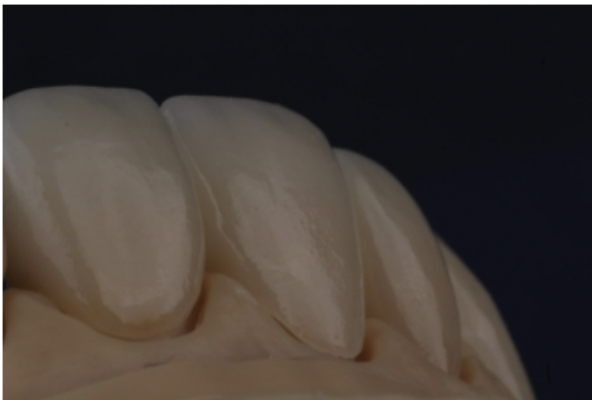
1. DSD Lab will confirm within 2 business days that the files have been received and inform of any issues identified with the scans. If the files need to be rejected, the

reason will be identified and explained.

2. If needed, the Lab will send you a margin validation video for you to approve the delimitation of the preps.
3. After the prosthetic design is done, we will send a video of our CAD design (Design Validation) for your consideration. A confirmation or modification request must be made for us to manufacture the restorations.



4. After the restorations have been milled and finished, a new set of photos will be taken and sent for your consideration. Before we can ship the Natural Restorations, we need to have your final approval.



5. The DSD Lab team will always be available for a live web chat, or audio or video call, upon request.

Repetition of one or more Natural Restorations

If all the previous steps have been followed, and something goes wrong during the cementation appointment (e.g. fitting, shape, shade, or fractures), the Lab will repeat the work at no extra cost.

If any fracture or failure of the ceramics occurs after cementing the case, regardless of the time, the dentist will have to order a new unit on our website. For these repetitions, we will cordially offer a 30% discount on the purchase.

Most frequently encountered mistakes

Christian has made a great Instagram post on this exact topic. Here's a [link](#) to his original Instagram post.

Below is a list of the most frequently encountered mistakes in the restorative workflow and recommendations for improvements:

1. **Poor treatment planning**Lack of facially driven treatment planning understanding. No skills to convince the patient to do the right thing. Choosing the shortcut.
2. **Poor information shared with the lab**No facial information. Photos with wrong angles, or no video. Lack of protocols. Non-ideal tools. No standardized communication system. This is not only when starting the plan but also during treatment, when ordering modifications is necessary.
3. **Inadequate tooth preps**The majority of preps coming into labs shouldn't be accepted. Bad prep design. Lack of respect for enamel (key for longevity). No visible margins, path of insertion, clearance, sharp angles, unnecessary exposed dentine. Lack of hand skill training and vision of link between prep design and desired final restoration design. Lack of understanding of the link between prep design and gingiva behavior.
4. **Bad impressions or scans**This is a huge historical problem in restorative dentistry. The majority of impressions/scans shouldn't be accepted by labs. Challenges with proper soft tissue handling to allow ideal impressions. Lack of protocols. Bad provisionalization. Doing it in a rush. Not wanting to repeat.
5. **Inadequate bite registration**This is another historical challenge. Poor understanding of MIP/CR and when to use what. Poor training on why and how to register each one. Poor understanding of how to avoid distortions, how to deprogram, how to open, manipulate the jaw, adjust a jig, use the materials and transfer the information to the lab.
6. **Try in and adjustments**This sounds easy but is not! Lack of protocols for the dry try in, how to sequence the try in of multiple restorations, interproximal adjustments,

checking the fit, understanding why it is not fitting and how to improve it, calibrating the emergence profile and its relationship with the gum. Wet try in color check. How to improve all the above chair-side or how to communicate with the lab to improve it.

7. **Proper bonding protocol** The big difference in longevity between doing it by the book and not doing it by the book; doing it with care and doing it in a rush. Many details can go wrong. When failures happen because of poor bonding/ cementation quality, labs are asked to redo for free or at a discounted price.
8. **Post-bonding occlusion adjustment/ refinement** This is one of the main reasons for restorative failure. Unfortunately there is very little education here as well. Having the comprehensive clinical experience to delicately check, adjust, refine and polish the occlusion. Distributing the load properly, creating smooth balanced movements. Making the patient comfortable and protecting teeth and restorations by minimizing risks.

Regardless of whether you use analog or digital, material X or Y, technique A or B, the topics above are the ones that create real quality and define a great restorative case.