3M Science. Applied to Life.™

3M℠ Health Care Academy

Making better impressions

Tips & tricks

Success Simplified

Making better impressions

3M Oral Care – more than 50 years of experience in impressioning

Dear Reader,

As one of the worldwide leaders in impression solutions, 3M is renowned for its dedication to quality and its innovative products. Today, a wide range of polyether and VPS impression materials are available that meet virtually all dental professionals´ requirements and preferences – ranging from different impression techniques and indications to delivery choices.

3M impression materials are easy to use and offer the highest level of accuracy possible, while the 3M™ Pentamix™ Automatic Mixing Units, the 3M™ Garant™ Dispenser and the single-use 3M™ Intra-oral Syringes provide easy automix delivery of the materials.

Even the most experienced practitioner using the best materials can encounter difficulties when making an impression. These “Tips & tricks” are based on 3M’s experience, know-how and clinical input, and help to identify common impression problems and provide solutions. And, most importantly, help to empower you to improve the quality of your impressions and restorations.

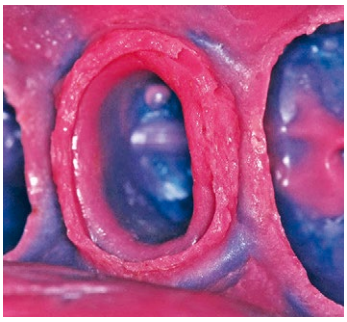
Sincerely,

Your 3M Oral Care Team

Content

It’s all about control

Making an impression is probably the most critical step for dentists in the process of creating a restoration that fits. A perfect impression needs to deliver an exact copy of the clinical situation – including a complete, void-free, and accurate reflection of the margins – ideally on the first take.



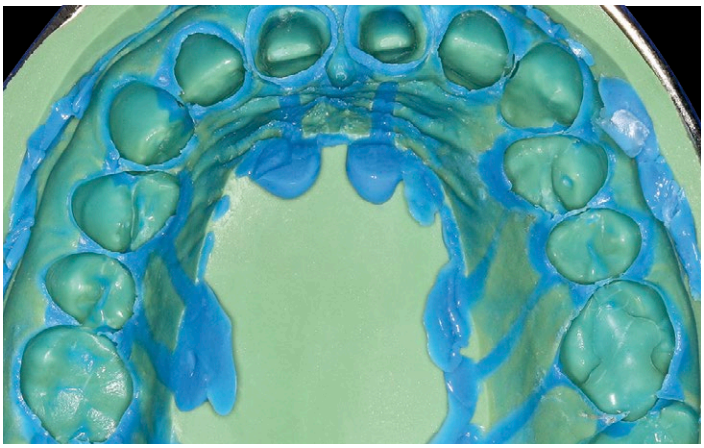
Impressions made with 3M™ Impregum™ DuoSoft™ Polyether Impression Materials.

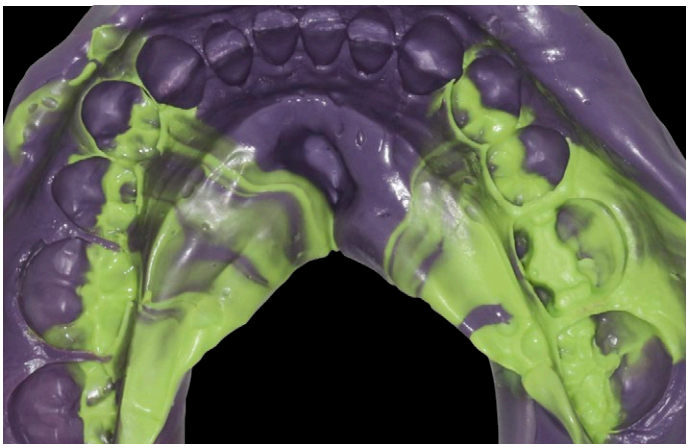
Photos courtesy of Jorge Perdigao, DMD, and Holmer Meiser, DDS, University of Minnesota, USA.

Impressions made with 3M™ Express™ 2 VPS Impression Materials.

Photos courtesy of Dr. med. dent. Gunnar Reich, Munich, Germany.

It’s all about precision





Impressions made with 3M™ Imprint™ 4 VPS Impression Material (left) and 3M™ Impregum™ Super Quick Polyether Impression Material (right). Photos courtesy of Dr. med. dent. Gunnar Reich, Munich, Germany.

Top 20 golden rules for perfect impressions

Making an accurate and detailed impression is one of the most important steps in creating superior prosthetic restorations for your patients. In order to make a good impression you should consider the following:

1
Ensure healthy tissue (complete periodontal treatment prior to prosthodontic restoration).

2
Ensure adequate retraction and hemostatic procedure, if necessary. If retraction agents are used, rinse and dry thoroughly.

3
Choose appropriate tray and wash material viscosities as well as setting versions (regular or quick) according to impression technique and indication.

4
Use proper fitting, rigid, and sturdy impression tray.

5
Thoroughly apply tray adhesive and let dry appropriately.

6
Assure a uniform and homogeneous mix of material.

7
Fill tray sufficiently with impression material.

8
Use gloves that do not inhibit the setting of the impression material.

9
Avoid air entrapment during intra-oral syringing of the wash material by immersing tip into the material.

10
Apply controlled pressure upon seating the tray to avoid contact between teeth/tissue and bottom of tray.

11
Avoid any movements that could shift the position of the tray and may lead to distortions.

12
Stay within working time of tray and wash material.

13
Follow setting time before removing impression from mouth.

14
When removing tray from mouth avoid unilateral rotation.

15
Check if preparation margins are captured entirely: no voids, tears, displacements, and flow defects.

16
Make sure that the tray does not show through.

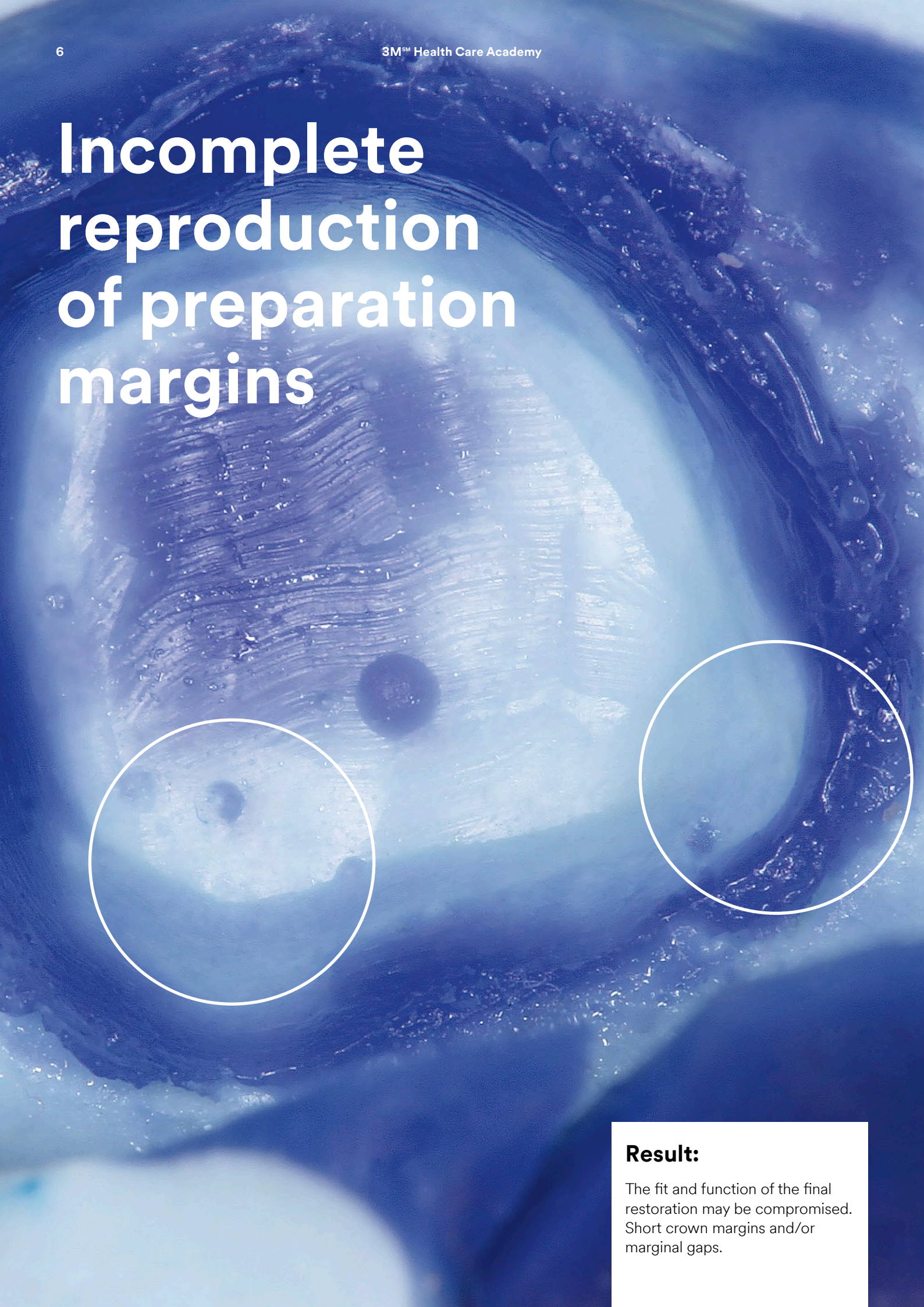
17
Check for proper blend between tray and wash materials as well as proper bond to the tray.

18
Disinfect impression according to manufacturer's instructions for use.

19
Rinse impression after disinfection with water and dry before sending it to the lab.

20
Exact brand of impression material and disinfection protocol must be communicated to the dental laboratory.

Incomplete reproduction of preparation margins

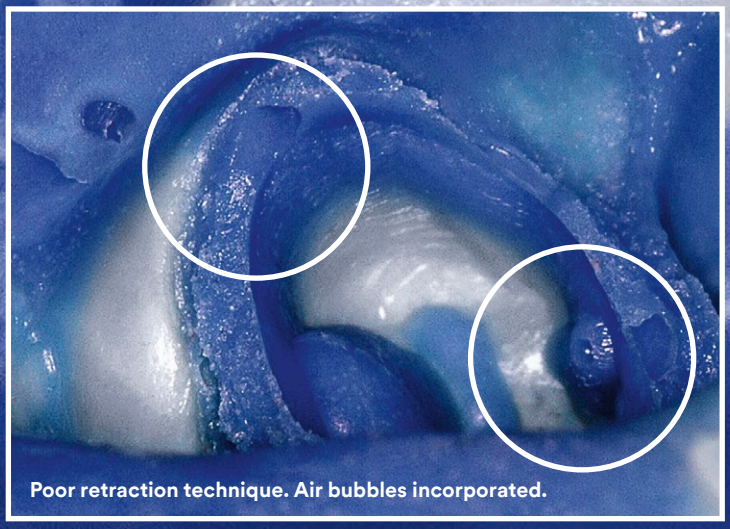


Result:

The fit and function of the final restoration may be compromised. Short crown margins and/or marginal gaps.

Cause	Solutions
Blood and saliva contamination around preparation.	Use good moisture control technique. Rinse and dry the prepared area before making the impression. Stop bleeding by using appropriate retraction technique and hemostatic agent procedure. Leave cord in sulcus until no blood or saliva are present before syringing the light body impression material. Consider the use of astringents and two-cord retraction technique.
Insufficient retraction.	Displace gingival tissue to allow the impression material to access and entirely capture the prepared area. Consider two-cord retraction. Leave initial cord in the sulcus when making the impression and make sure that the initial cord is positioned below the preparation margins.
Inadequate coverage of marginal area with light body impression material.	Use wash material liberally on preparation and abutments.
1-step technique: Wash material displaced/washed away from preparation margins.	Avoid high viscosity contrast between tray and wash material when using 1-step impression technique. Use putty materials with high viscous wash materials.
2-step technique: Initial impression not sufficiently carved.	Carve tray material properly before applying wash material or use foil as spacer when making the initial impression.
Working time exceeded.	Follow manufacturer's working time specifications. Choose material with longer working time.
Impression material has low tear resistance.	Use impression material with sufficient tear resistance.

Voids on the margin



Poor retraction technique. Air bubbles incorporated.

Result:

The fit and function of the final restoration may be compromised. Short crown margins and/or marginal gaps.

Cause	Solutions
Improper syringe technique.	Keep syringe tip immersed in wash material to avoid entrapping air. Wiggle and stir while syringing. Push material forward.
Blood and saliva contamination around preparation.	Use good moisture control technique. Rinse and dry the prepared area before making the impression. Stop bleeding by using appropriate retraction technique and hemostatic agent procedure. Leave cord in sulcus until no blood or saliva are present before syringing the light body impression material. Consider the use of astringents and two-cord retraction technique.
Inadequate coverage of marginal area with light body impression material.	Use wash material liberally on preparation and abutments.
Air trapped in intra-oral syringe.	Properly bleed filled elastomer syringe. Do not stop in the middle of loading the syringe. In case you are transferring material from hand-dispenser into intra-oral syringe: Keep tip immersed in material when loading syringe.
Tray not seated properly.	Insert impression tray properly. Ensure that correct centric bite is recorded when using dual-arch impression trays.
Working time exceeded.	Follow manufacturer's working time specifications. Choose material with longer working time.
Impression material stored at elevated temperature.	Store impression material at room temperature.
Air trapped while filling impression tray.	Keep mixing tip immersed in tray material while filling the tray.

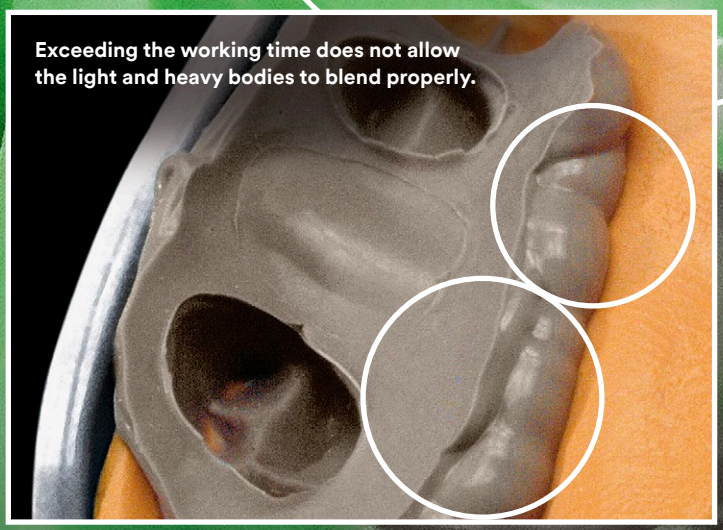
Tearing at the margin

Result:

Short crown margins and/or marginal gaps.

Cause	Solutions
Insufficient retraction.	Displace tissue to allow the impression material to access and entirely capture the prepared area. Consider two-cord retraction. Leave initial cord in the sulcus when making the impression and make sure that the initial cord is positioned below the preparation margins.
Impression material has low tear resistance.	Use impression material with sufficient tear resistance.
Polyether materials: Inhibition of setting due to use of acidic retraction materials/hemostatic agents like aluminium or ferric salts.	Use retraction materials with a pH ≥ 4. Select retraction materials and hemostatic agents that do not contain epinephrine and ferric salts. Rinse to remove hemostatic agents from the preparation with water spray and suction. Dry before making the impression.
Vinyl Polysiloxane materials: Inhibition of setting due to contact with sulphur from latex gloves with tissue/tooth/retraction material or impression material.	Wear gloves proven not to contain traces of sulfur. If contamination is suspected, scrub affected area with diluted hydrogen peroxide.
Smear layers from custom temporary, provisional cements (acrylics) or core built-up present.	Fabricate the provisional crown or bridge after making the final impression or remove the airinhibited layer on the exposed surface with an alcohol wipe before making the final impression. Do not use impressions already used to fabricate the provisional restoration for subsequent precision impression making.
Premature removal of the impression.	Check at peripheral areas that impression material has completely set before removal. Follow manufacturer's instructions for intra-oral setting time.
Inadequate mix.	Bleed before applying mixing tip to ensure even dispensing. Use recommended mixing tip. Ensure mixing instructions are followed and materials have a streak-free appearance.
Expired impression material.	Do not use expired impression material.

Preparation margins complete but not sharp



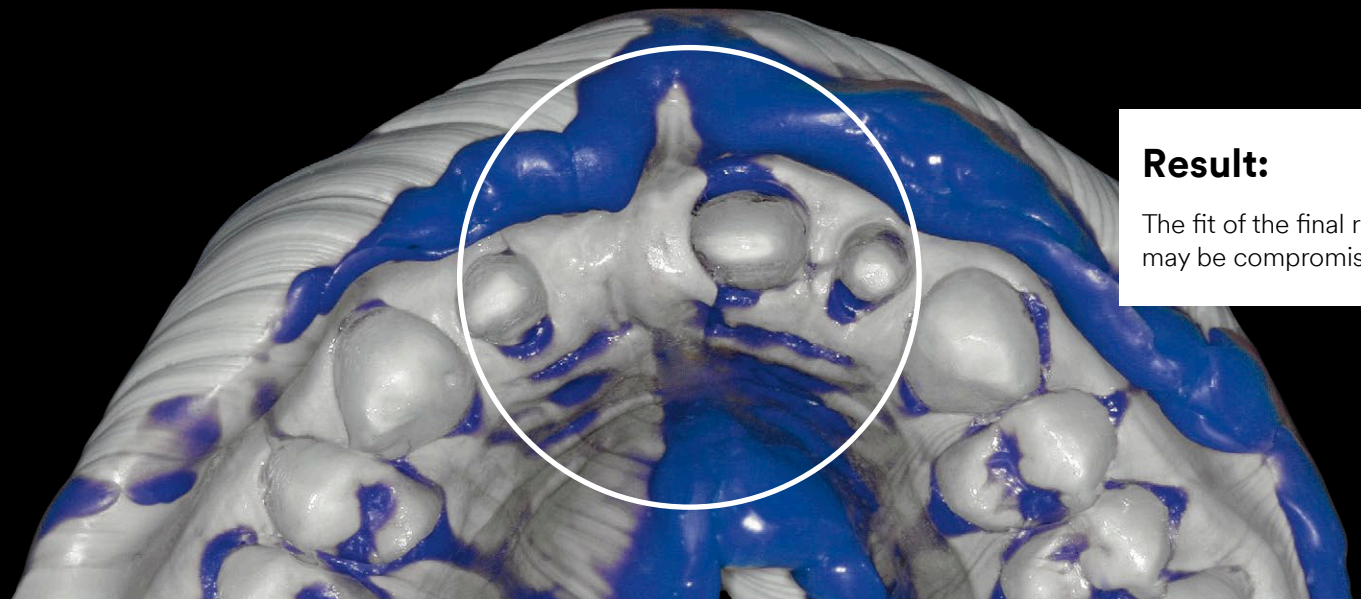
Exceeding the working time does not allow the light and heavy bodies to blend properly.

Result:

Crowns may not fit properly (too tight, too loose, too short, too long).

Cause	Solutions
Thick blood/saliva pooled around preparation.	Remove blood and saliva prior to making impression. 2-step impression technique may help pushing remaining blood/saliva out of the sulcus.
Inadequate retraction of sulcus around preparation.	Use good retraction technique and adequate moisture control.
Polyether materials: Inhibition of setting due to use of acidic retraction materials/hemostatic agents.	Use retraction materials with a pH ≥ 4. Select retraction materials and hemostatic agents that do not contain epinephrine and ferric salts. Rinse to remove hemostatic agents from the preparation with water spray and suction. Dry before making the impression.
Vinyl Polysiloxane materials: Inhibition of setting due to contact with sulfur from latex gloves with tissue/tooth/retraction material or impression material.	Wear gloves proven not to contain traces of sulfur. If contamination is suspected, scrub affected area with diluted hydrogen peroxide.
Working time exceeded.	Follow manufacturer's working time specifications. Choose material with longer working time.
Inadequate disinfection affects surface quality, detail reproduction and dimensional stability.	Use recommended water based disinfectants. Follow manufacturer's instructions for use.
Impression material stored at elevated temperature.	Store impression material at room temperature.
Impression material stored at too low temperature (prolongs the setting reactions and changes viscosity).	Keep impression material at a temperature of 18 °C / 64 °F at least one day prior use.
Incorrect storage conditions of the final impression affects surface quality (detail reproduction) and dimensional stability.	Rinse polyether impressions with water and blow dry before sending it to the lab. Do not send the impression in the same bag as an alginate impression to the lab. Avoid storing impressions in sealed bags. Store the impression at room temperature away from direct sunlight.

Wash material displaced from preparation area



Result:

The fit of the final restoration may be compromised.

Cause	Solutions
1-step technique: Contrast in viscosity between tray material and wash material too high.	Avoid high viscosity contrast between tray and wash materials. Combine putty with high viscous wash materials.
1-step technique: Working time of tray material exceeded when tray is seated.	Make sure that the tray is seated within the working time of the tray material.
Insufficient amount of wash material applied.	Use wash material liberally on preparation and abutments.
Blood and saliva contamination around preparation.	Rinse and dry the prepared area before making the impression. Use good moisture control technique. Stop bleeding by using appropriate retraction technique and hemo-static agent procedure. Consider two-cord retraction technique or the use of a retraction paste (like 3M™ Astringent Retraction Paste). When using cords, leave cord in sulcus until no blood or saliva are present before syringing the light body impression material.

Distortions

Result:

Restorations may be too tight/too short (especially 2-step technique) and require excessive adjustment.

Cause	Solutions
2-step technique: High viscous wash material used for second impression that displaces set tray material.	Use low viscous thixotropic wash materials for 2-step technique. Carve tray material properly before applying wash material.
2-step technique: Too high pressure applied upon seated second impression. Teeth are pressed towards alveolar bottom.	Apply controlled pressure upon seating second impression by slow and straight tray insertion.
Lack of support of the tray by operator during the initial phase of polymerization.	Support tray until impression material is sufficiently hardened.
Distortions during impression removal.	Balanced impression tray removal. Avoid unilateral rotation causing high distortion forces. Use impression material with excellent elastomeric properties.

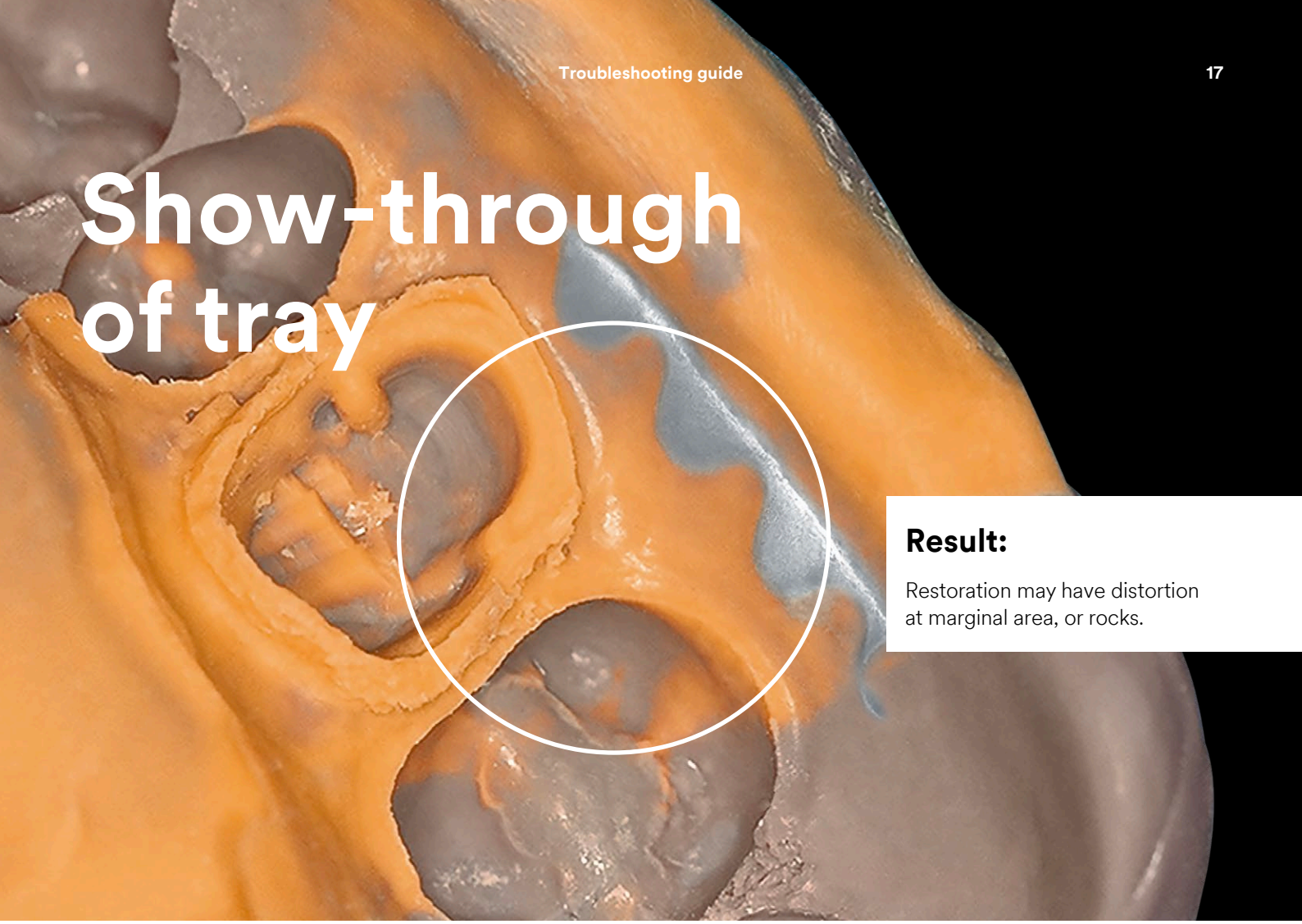
Facial-oral flow defects

Result:

Failure to capture complete and accurate dentition.

Cause	Solutions
Impression tray does not support flow of impression material.	Apply facial/oral/distal stops to direct flow of material. Use an impression tray that supports the flow of the material, e.g. trays with side walls. Fabricate custom tray.
Insufficient amount of impression material used.	Use more material to create a back flow effect.
Tray movement or repositioning after seating.	Do not move tray after seating.
Working time exceeded.	Follow manufacturer's working time specifications. Use a timer to stay within the working time. Choose material with longer working time.

Show-through of tray



Result:

Restoration may have distortion at marginal area, or rocks.

Cause	Solutions
Tooth or tissue contact with impression tray.	Use proper size tray. Test various tray sizes to ensure proper size. Fabricate custom tray. Consider occlusal or palatal stops.
Insufficient impression material used.	Fill tray adequately.

Impression material not completely set

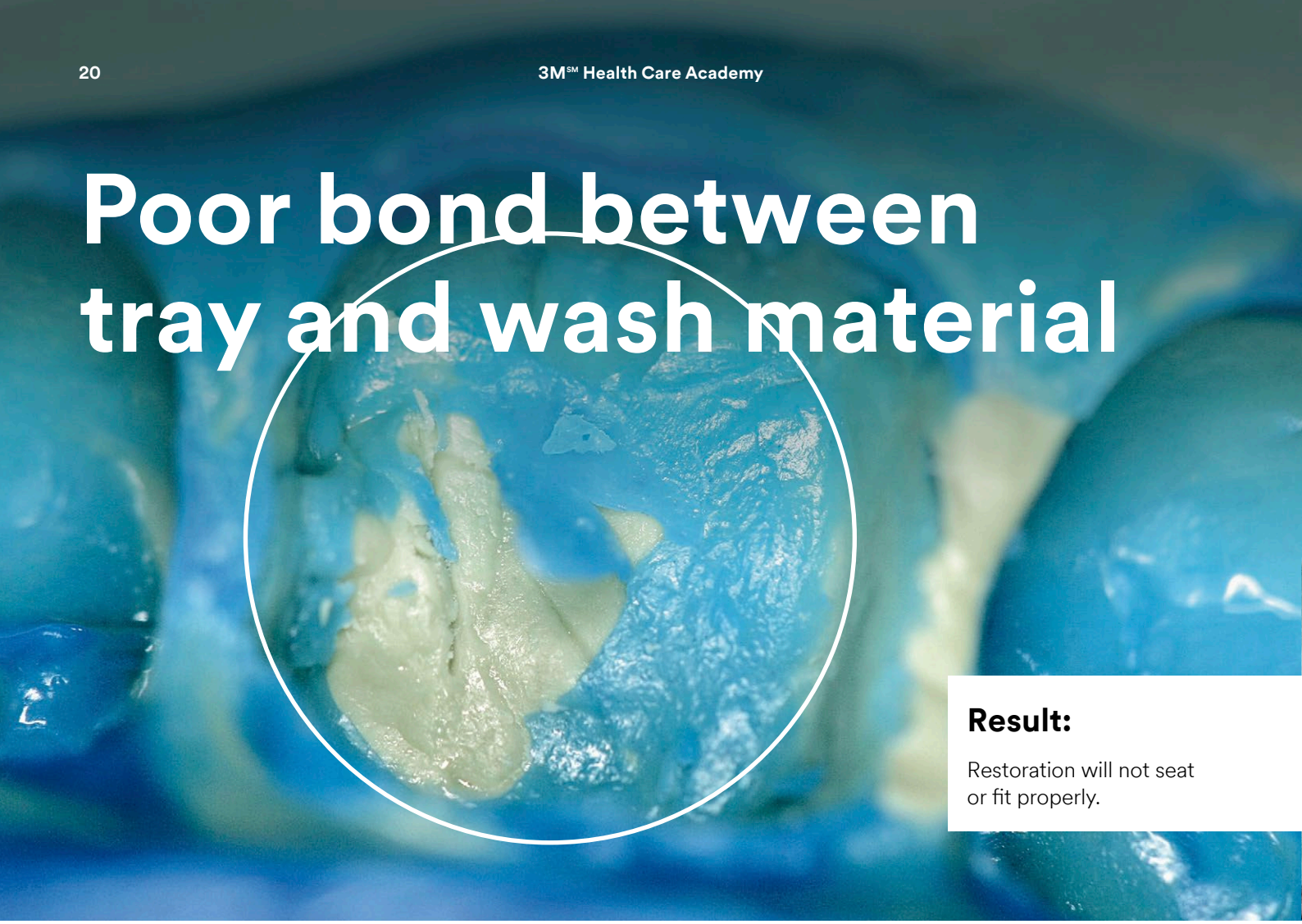
Inadequate mix.

Result:

Inadequate surface detail on stone cast, unset parts may stick to cast, ill fitting restorations.

Cause	Solutions
Vinyl Polysiloxane materials: Inhibition of setting due to contact with sulfur from latex gloves with tissue/tooth/retraction material or impression material.	Wear gloves proven not to contain traces of sulfur. If contamination is suspected, scrub affected area with diluted hydrogen peroxide, then rinse and dry.
Polyether materials: Inhibition of setting due to use of acidic retraction materials/hemostatic agents.	Use retraction materials with a pH ≥ 4. Select retraction materials and hemostatic agents that do not contain epinephrine and ferric salts. Rinse to remove hemostatic agents from the preparation with water spray and suction. Dry before making the impression.
Smear layer from custom temporary, provisional cements (acrylics) or core built-up present.	Fabricate the provisional crown or bridge after making the final impression or remove the air-inhibited layer on the exposed surface with an alcohol wipe before making the final impression. Do not use impressions already used to fabricate the provisional restoration for subsequent precision impression making.
Inadequate mix.	Bleed before applying mixing tip to ensure even dispensing. Use mixing tip according to manufacturer's recommendations. Ensure that the mixing tip is correctly attached. When using handmix materials, ensure thorough mix of catalyst and base as well as correct mixing ratio.
Expired impression material.	Do not use expired impression material.

Poor bond between tray and wash material

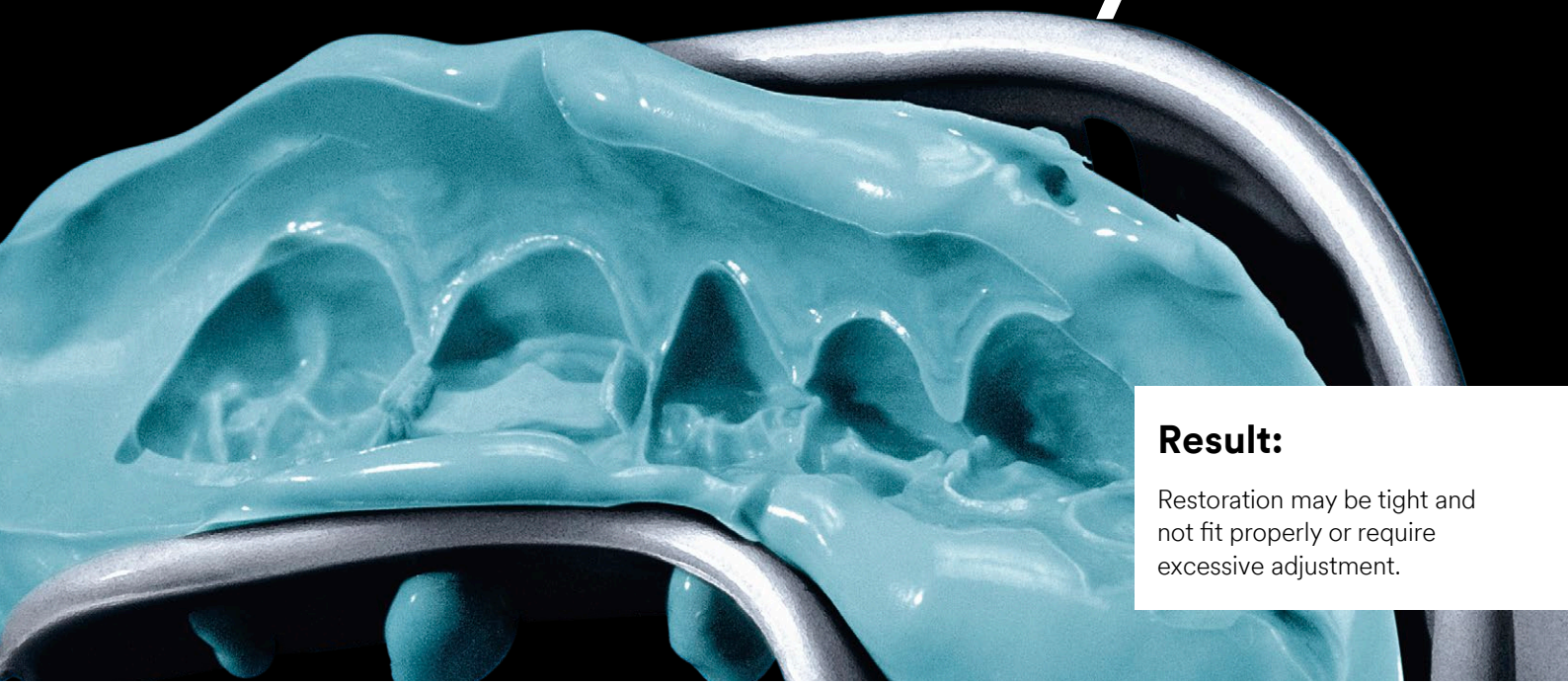


Result:

Restoration will not seat or fit properly.

Cause	Solutions
Working time exceeded.	Follow manufacturer's working time specifications. Use a timer to stay within the working time. Choose material with longer working time.
Impression material stored at elevated temperature.	Store impression material at room temperature.
Relining of impression material with wash material.	Avoid relining. Remake the impression.
2-step technique: Initial impression not completely cleaned and dried.	Ensure initial impression is completely cleaned (blood, saliva, debris) and dried when making second impression.
2-step technique: Sulfur or acrylic contamination of set initial impression.	Avoid contact with sulfur contaminants: Wear gloves proven not to contain traces of sulfur. Avoid contact with acrylic and methacrylic contaminants: Ensure impression material does not come into contact with methacrylate residue from provisional acrylics.

Poor bond of impression material to the tray

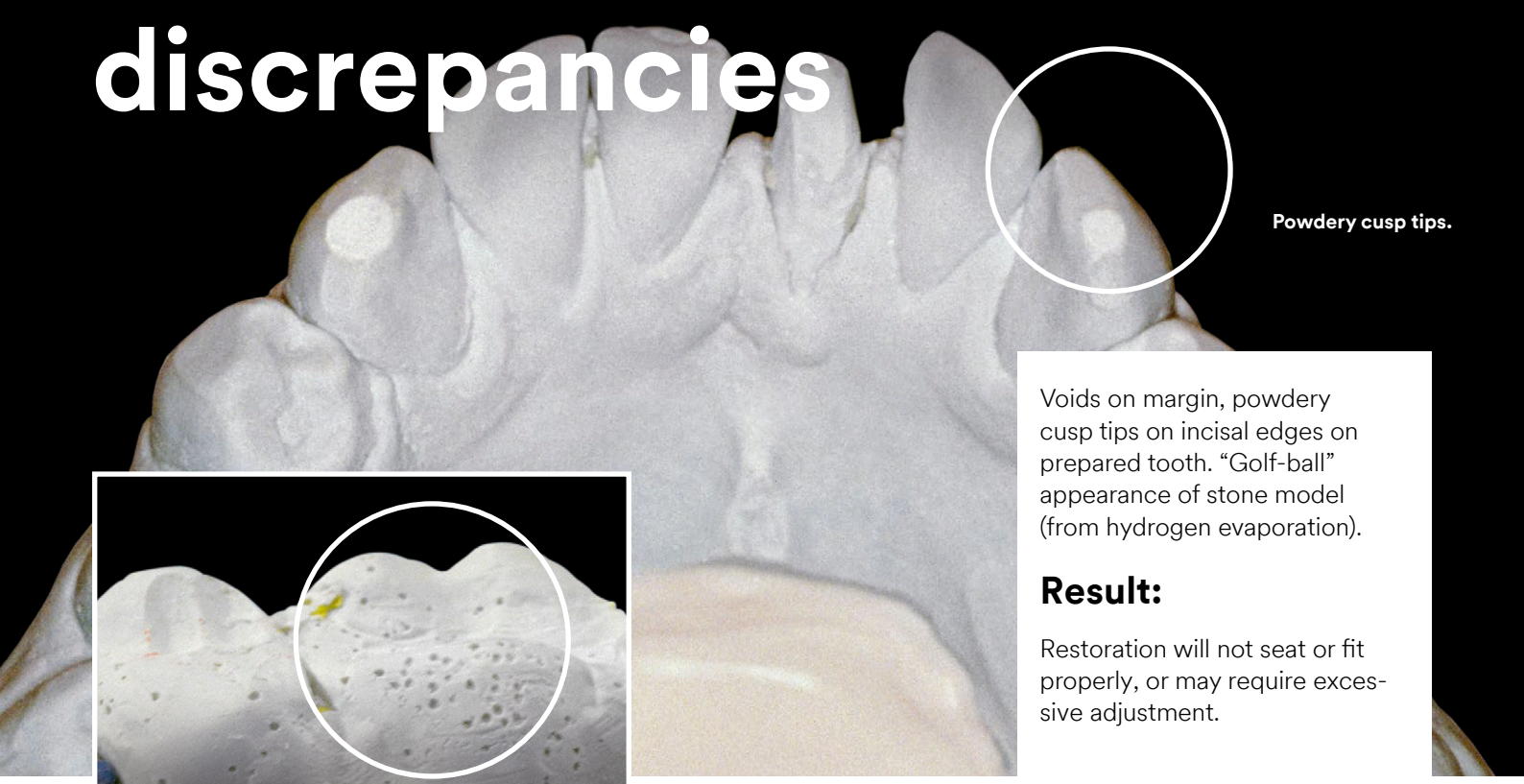


Result:

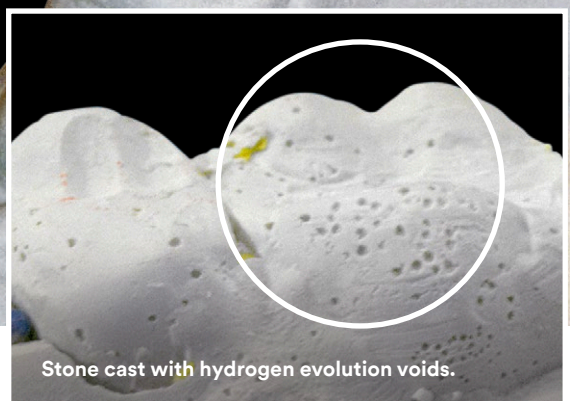
Restoration may be tight and not fit properly or require excessive adjustment.

Cause	Solutions
No tray adhesive used.	Use tray adhesive for all types of impression trays (full arch, quadrant, dual-arch). Apply adhesive on bottom and on inner sides of tray, including gauze of dual-arch trays.
Smear layer on custom trays.	Remove smear layer with acetone or sandblasting.
Inadequate drying time for tray adhesive.	Follow manufacturer's instructions for application and drying time.
Tray distortion upon removal.	Use stiff and rigid trays. Make sure that trays fit well.

Stone cast discrepancies



Powdery cusp tips.



Stone cast with hydrogen evolution voids.

Voids on margin, powdery cusp tips on incisal edges on prepared tooth. “Golf-ball” appearance of stone model (from hydrogen evaporation).

Result:

Restoration will not seat or fit properly, or may require excessive adjustment.

Cause

Vinyl Polysiloxane materials:
Hydrogen gas emission.

Cast not made according to preparation guidelines and lacks detail.

Solutions

Follow manufacturer’s instructions for use on minimum waiting time to pour cast.

Provide as much information as possible to the lab: indicate type of impression material (polyether or VPS), whether or not the impression has been disinfected and date when impression has been made.

Be impressed.
3M impression solutions.

Retract

3M™ Astringent Retraction Paste

Faster and gentler way to retract gingival tissue and control bleeding.

Mix & Syringe

3M™ Intra-oral Syringe Green/ Purple

Apply VPS and poly-ether wash materials with extreme accuracy and less waste.

3M™ Pentamix™ 3 Automatic Mixing Unit

Void-free mixing of impression materials at high speed.

Impress

3M™ Impregum™ Polyether Impression Material

Unrivalled precision for perfectly fitting restorations with fewer retakes and remakes.

New Impregum™ Super Quick Materials

Superfast 2-minute setting for impressive accuracy in smaller cases.

The 2 MIN Polyether

3M™ Imprint™ 4 VPS Impression Material

Fastest intra-oral setting time among VPS materials.

3M™ Impression Tray

Easy-to-customise full-arch tray with self-retentive fleece strip and no need for a tray adhesive.

3M

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