TECHNIQUES

IMPRESSION-TAKING TIPS AND TROUBLESHOOTING GUIDES

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Communicating through the impression . . . The Laboratory Technician's Viewpoint

The impression is the first critical communication between dentist and technician and is the key to an accurately fitting crown and bridge restoration. Many clinical articles and printed materials have been devoted to ensuring proper impressioning techniques; yet the technical challenges impressions can present continue to plague the dental industry as a whole.

No other procedure can as quickly undermine all the time you have put into careful design as an inaccurate and/or incomplete impression. Ideally, the completed impression accurately communicates clear, detailed information on the surface anatomy of the preparations, surrounding soft tissues and remaining natural dentition. A carefully prepared impression allows final seating of the restoration to be completed with minimal time and adjustment.

What makes a "Perfect Impression"

The following checklist outlines key points to be considered for successful simultaneous impressions (additional details are available in the Technique Tips and Impression Troubleshooting Guide):

1. Take complete and accurate upper and lower master impressions.
2. Vinyl polysiloxane impression material preferred because it is repourable.
3. Use rigid tray with stability to prevent distortion. Apply tray adhesive thoroughly.
4. Work in dry field. Rounded cervical areas or margins full of bubbles frequently caused by moisture in sulcus. Be sure prepared tooth, sulcus and surrounding tissues thoroughly dry prior to placing syringeable material.
5. Proper tissue management critical for good impression. If you can't see margins, neither can impression material. Prepare initial finish line to gingival margin. Then pack retraction cord and allow three to five minutes for gingival tissue to retract. Remove cord and finish preparation in open and dry sulcus. After prepping, place retraction cord in sulcus and below preparation line. Place thicker cord on top of first. Provides retraction as well as lateral displacement of tissues, creating sufficient space for impression material to flow into a trough (results in thicker material margins less susceptible to distortion upon removal of impression). When ready to take impression, remove top cord (leaving bottom cord in place) and inject impression material. Remove remaining cord after removing set impression from mouth.
6. Block out undercuts on prepared teeth to prevent impression material from tearing.
7. Make sure technician will be able to see all 360° of the margins. Margin detail should be captured in syringeable material - clear, crisp and free of voids, tears and pulls.
8. Record accurate detail in putty material. Best impressions with putty obtained by seating putty within one minute of mixing. If not seated when fluid, putty impression will capture less detail.
9. Tooth structures should be evenly centred within impression material.
10. Include vestibules in impression.
11. Include adjacent and opposing teeth in impression, especially on facial surface. Ceramists cannot match surface texture and contours of contra lateral teeth if they can't see them!
12. Avoid tray burn-through. If impression tray not properly seated and immobilized until fully set, preparation may contact tray. With weaker plastic trays, this can cause expansion of tray that will rebound upon removal and create tight-fitting crown (one early sign of such flexing is the perforation of the material and a show-through of the tray along its lateral borders).
13. If more than four teeth being prepared, full arch impressions in full arch trays recommended.
14. Ensure there is a good bond between putty and wash (no separation) prior to removal from the mouth.
15. Ensure there is a smooth putty/wash junction without ledges.
16. No voids, bubbles or pulls should be evident in the finished impression.
17. To avoid surface porosity in the model, avoid pouring vinyl poly siloxane impressions for at least 15 minutes. Ensure selected tray is not distorted by weight of stone bending unsupported sections.

Impression Troubleshooting Guide

Looking at the Impression/Model

Challenge	What to look for	Possible Causes	Solutions
Discrepancies in stone model.	• Voids on model margin; powdery cusp tips or incisal edges on prepared tooth. • Voids on occlusal surfaces.	• Small voids due to hydrogen gas evolution from vinyl polysiloxane polymerization. • Water leaching due to tooth contact with impression tray or gauze, dehydrating stone. • Cotton rolls left in mouth don't allow full tray seating. • Moisture present in sulcus or pooled on occlusal surfaces. • Large voids due to poor model pouring technique.	• Follow manufacturer's pouring instructions. • Avoid tooth contact with any surface of impression tray. Remove cotton rolls. • Good retraction technique, leave cord in sulcus until no blood or saliva present (or use Expa-Syl). Rinse and dry prep area. Consider two-cord retraction to displace tissue and control fluids. Avoid pools of water or saliva on occlusal surfaces. • Use surfactant with vinyl polysiloxane impression.
Inadequate surface detail on stone reproductions.	• Impression not completely set. Tacky to touch.	• Surface inhibition/slow set. • Sulphur in latex gloves or rubber dam inhibiting vinyl polysiloxane setting. • Latex glove touching prepared teeth or surrounding tissue. • Rolling retraction cord with latex gloved hands. • Exposure to residues from temporary materials. • Exposure to air inhibited methacrylates (i.e., composites, adhesives).	• Wear nitride gloves (or gloves proven not to inhibit set of vinyl polysiloxane). • If contamination of prepared teeth or surrounding tissue suspected, scrub affected area with diluted hydrogen peroxide. • Do not use same impressions used to fabricate temporary restoration. Fabricate temporaries after final impression. • Remove air inhibited layer on exposed surface of methacrylates with alcohol wipe before making final impression.
Impression material drags.	• Overall lack of detail in impression.	• Placing and seating tray in mouth in one motion. • Impression material doesn't adapt to teeth. • Teeth rebounding off tray and sliding into position. • Tray disturbed during impression setting. • Early removal of impression from mouth.	• Carefully position tray before seating. Once positioned, seat tray vertically. • Seat tray slowly. • Avoid contact of teeth with tray. • After tray seating, use passive pressure to immobilize tray for manufacturer's full recommended oral set time.
Facial-Lingual pulls.	• V-shaped void, trough-like. • Failure to capture complete and accurate dentition.	• Improper tray seating. • Improper syringe technique. • Too little impression material.	• Seat tray slowly. Follow manufacturer's working time. • Use proper syringe technique. • Use more material.

Challenge	What to look for	Possible Causes	Solutions
Burn-through of light body impression material. Leads to crowns that are too tight, too small or rock when seated.	• Impression tray exposed.	• Improper tray positioning. • Prepared teeth contacting sides or bottom of tray. • Tooth contact with pre-set tray material when using two-step technique. • Tray seated too quickly or forcefully. • Tray movement or rocking during impression. • Weaker plastic trays can allow deflection of tray, which may rebound on removal.	• Use more rigid stock tray. • Avoid contact of teeth with any tray surface. Ensure proper tray size. • If using two-step technique, relieve heavy body material to ensure 2-3 mm space. • Slowly position tray into patient's mouth. • Use passive pressure to immobilize tray for recommended set time. • Hold tray very steady and still. Do not switch with someone else halfway through setting time.
Poor bond of impression material to tray. Leads to crowns that do not seat fully or require occlusal adjustment.	• Impression pulling away from sides/bottom of tray.	• No tray adhesive used. • Incompatible tray adhesive. • Inadequate drying time for tray adhesive.	• Use appropriate tray adhesive. • Follow manufacturer's instructions for application and drying time.
Poor bond between putty and wash prior to removal from the mouth (this bond is the last to reach sufficient strength). Resulting indirect restoration will not seat properly.	• Impression delaminated (heavy body/putty and light body materials not blending or adhering together). • Premature removal of impression can lead to tearing of syringeable material from putty.	• Exceeding working time of impression material. • Contamination of pre-set heavy body material in two-step technique. • Tray movement after seating.	• Follow manufacturer's working time recommendation. • Ensure vinyl polysiloxane does not come into contact with latex gloves or methacrylate residue from acrylate temporary materials. • After tray seating, use passive pressure to immobilize tray for manufacturer's full recommended oral set time. • Recommend one-step technique (light wash on teeth and regular body in tray).
Slow setting of impression material.	• Non-homogeneous mix. • Unset impression materials. • Streaking in putty.	• Improper ratio of catalyst to base. • Mix tip not attached correctly. • Air in cartridge. • Putty improperly mixed.	• Bleed cartridge prior to attaching mixing tip to ensure proper catalyst/base expulsion. • Use manufacturer's recommended mix tip. • Use fingertips to mix putty, avoiding palms of hands. Remove latex gloves and thoroughly cleanse hands prior to mixing putty.

Technique Tip — Use of Adhesive

- Critical with all impression techniques, all impression materials and all trays, whether perforated or not (good impression can create enough suction to dislodge body of impression from sides of best tray).
- If impression not securely affixed to tray, even slightest movement during removal will cause distortion.
- Thermic contraction naturally occurs in addition reaction silicones due to difference in room and intraoral temperatures. Proper use of adhesive will direct polymerization shrinkage towards walls of tray (when adhesion poor, this contraction occurs towards preparations or centre of mass resulting in slightly smaller crown or bridge with poor fit).

Challenge	What to look for	Possible Causes	Solutions
Inadequate capture of gingival margins in impression. Leads to short and/or open crown margins.	• Incomplete margins in impression.	• Inadequate coverage of marginal area with light body impression material. • Insufficient retraction of sulcus around prep. • Fluids such as blood and saliva present within sulcus. • Syringe tip not immersed while syringing. • Exceeding working time of material.	• Use double cord retraction technique (or Expa-Syl). • Maintain clean and dry field. • Gently stir while syringing. • Check manufacturer's instructions for working and setting times.
Tearing at margin. Leads to short and/or open crown margins.	• Rough occlusal and/or incisal surfaces and tearing visible on margin of preparation. • Poor lamination between tray material and wash may also be evident.	• Poor retraction technique. • Surface inhibition. • Moisture present. • Wash partially set at tray seating. • Slow setting material. • Early removal from mouth	• Use double cord retraction technique (or Expa-Syl). • Avoid pools of water or saliva on occlusal surfaces. • Avoid contamination from sulphur or methacrylate. • Follow manufacturer's working time recommendation. • Set timer to ensure impression remains in mouth for full recommended set time.
Voids on margin.	• Voids on margin or around prepared teeth.	• Air incorporated in intraoral syringe or while filling impression tray. • Improper syringing technique. • Blood/saliva contamination around prep. • Inadequate retraction around prep. • Retraction cords not left in place adequate amount of time so that blood or saliva are not present. • Prolonged period between mixing and seating impression material.	• Seat putty immediately after mixing. If not seated when fluid, putty impression will capture less detail. • Follow suggested syringing technique. • Use double cord retraction technique (or Expa-Syl). • Follow manufacturer's working time recommendation.

Technique Tip — Suggested Syringing Technique

- Front load syringe by inserting mix tip directly into intraoral syringe and forcing plunger backwards.
- Keep the intraoral tip of impression syringe totally submerged in material being extruded during placement to prevent formation of air pockets or bubbles.
- Syringe in a continuous circular movement to avoid entrapping air. Do not stop and go backwards (will create voids and bubbles).
- While syringing marginal area, maintain constant pressure on plunger of syringe and advance syringe tip forward. Will burst any air bubbles that do occur.
- Syringe around entire margin twice prior to covering complete tooth. Ensure impression material covers moist prepared areas completely, producing exact replica of clinical condition.

Technique Tip — Adhering to Published Working and Setting Times

- Always keep to exact instructions for total working time and intraoral setting time published by manufacturer.
- Shortening putty mixing times results in non-homogeneous mixture.
- Exceeding total working time usually results in endogenous strain (i.e., when material starts to harden prior to placement in mouth).
- In Two-Step impressions, bond between putty and wash material last to reach optimal strength.
- Tearing at margins can be minimized by better retraction of sulcus and leaving impression in mouth for designated setting time.

Challenge	What to look for	Possible Causes	Solutions
Lack of impression detail. Resulting crowns too tight or too small. Extensive occlusal adjustments required.	• Muted impression detail reproduction and inadequate margins.	• Blood/saliva contamination around prep. • Inadequate retraction around prep. • Exceeding working time of impression material. • Using fast set syringeable material for multiple impressions.	• Rinse and dry prep area prior to making impression. • Use double cord retraction technique (or Expa-Syl). • Follow manufacturer's working time recommendation. • Use material with intraoral working time indicated for number of units involved. Fast set material designed for cases involving one to two crown preparations. Use regular set material for cases involving multiple preparations where proper syringing cannot be accomplished within manufacturer's recommended fast set time limit.
Ledges at putty/syringeable wash junction.	• Ledges difficult to see in impression but become apparent in stone model.	• Rapid tray seating.	• Position tray before seating. Use slow, steady, vertical seating motion to allow blending of tray/wash materials. • Occurrence of ledges can be lessened by preparing deep indentation in putty (extending to two adjacent teeth) opposite preparation site. Fill indentation with syringeable material and slowly, but firmly, seat and immobilize tray.

Technique Tip — Proper Preparation

- Definite correlation between good tooth preparation with clear margins and good impression.
- Impression can look distorted when it is really preparation that's poor.
- Adequate impression design incorporating smooth and precise finish lines will result in enhanced margin visibility and ultimately improved fit of restorations.
- Good, smooth preparation also allows impression material to flow better.
- Excessive subgingival placement of finish lines makes accurate capture in impression difficult.
- Utilization of feather-edge finish line demands more aggressive lateral tissue displacement to avoid thin material margins that may distort during impression removal or fabrication of master model.

Technique Tip — Tray Selection

- Full arch perforated metal, rigid plastic or custom trays (i.e., border lock trays) are recommended for restorations involving three or more units (veneers and long span bridges).
- For cases involving only one or two simple restorations (single crowns, inlays and onlays), small double-arch impression trays offer the advantage of capturing the restorative impressions, opposing dentition/occlusion and bite registration – all at once.
- Metal perforated, stock double arch trays are recommended for patients with strong tongues or gag reflexes (these tend to exert undesirable forces, especially on lower posterior impressions).
- Custom trays should be made at least one day in advance as the acrylic has a 24-hour distortion factor.
- Ensure stock trays closely fit arch form of patient (reduces amount of impression material required and facilitates seating of loaded impression tray intraorally).
- If there is not enough space between equatorial line of tooth and side of tray, potential exists for material tears during removal. Permanent distortion may also occur due to strong distortion of the lower parts of undercuts.

Looking at the Crown & Bridge Results

Challenge	Possible Causes	Solutions
Tight fitting crown.	• Impression tray not properly seated. • Impression contacting tray (with weaker plastic trays, can cause expansion of tray which will rebound on removal and create tight fitting crown). • Impression tray not immobilized until impression fully set. • Failure to use adhesive leads to separation of impression from tray upon removal from mouth (produces distortion).	• Avoid contact of teeth with tray or pre-set impression material. • Carefully position tray before seating. Once positioned, seat tray vertically. Seat tray slowly. • Use appropriate tray adhesive. Follow manufacturer's instructions for application and drying time.
Rocking crown.	• Teeth in contact with tray and/or not adequately relieving pre-set impression material.	• Avoid contact of teeth with tray or pre-set impression material.
Occlusal adjustment too high.	• Patient not in occlusion.	• Try-in tray prior to making the impression. • Establish repeatable orientation of the teeth. • Identify contact areas or distinguishing features. • Ensure that crossbar does not interfere with achieving complete occlusion.
Short crowns.	• Teeth in contact with tray. • Insufficient tray support. • Poor tissue retraction and/or moisture control. • Early removal from mouth.	• Avoid contact of teeth with tray. • Use custom or inflexible (preferably metal) stock tray. • Use double cord retraction technique (or Expa-Syl). • Closely follow manufacturer's recommendation for oral setting time.
Tight crowns.	• Early mouth removal. • Seating partially set impression material. • Poor bond of material to tray.	• Closely follow manufacturer's recommendation for oral setting time. • Closely follow manufacturer's recommendation for oral working time. • Always use a vinyl polysiloxane tray adhesive and allow to dry as per manufacturer's instructions.

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