

# Restoring conservatively with confidence

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In many cases, direct restorations can achieve the strong, esthetic, long-lasting, affordable results that patients want – without unnecessarily removing tooth structure or requiring extra appointments. And while they do pose unique challenges, direct restorations can also open new avenues for your practice. Modern restorative materials and innovative methods take the direct procedure beyond traditional “drill and fill.” And when you master the technique, you can be confident in creating beautiful, lasting smiles that you and your patients will love. Here are some practical tips to get the most out of your materials, make procedures more efficient and less stressful – and that will help you take a direct route to restorative success.



### Benefits of Direct Restorations

Deciding *how* to restore a tooth can be challenging. Use a direct or an indirect procedure? Many factors can influence your choice, including the location of the restoration, its esthetic requirements and mechanical needs, how much tooth structure remains, as well as your confidence in the procedure. While it's easy to get bogged down in the variables, direct restorations come with a unique set of benefits including:

- ▶ **Conservation of tooth structure:** Dentists don't like to remove healthy tooth structure and patients would prefer to avoid it as well. The direct restorative method, when mastered, can be minimally invasive, yet functionally strong and esthetically pleasing.
- ▶ **Same-day dentistry:** Because you don't have to send anything out to the lab, many direct restorative procedures can be performed in a single appointment – opening up your schedule for more patients and helping you send patients home faster and with beautiful, functional results.

When you hone your skills, same-day direct restorations can have additional economic benefits. Let's take an esthetic example of a patient looking for diastema closures or veneers. Esthetic treatments are out-of-pocket for patients – insurance covers function, not esthetics. Closing diastemas with same-day direct restoratives can be a great practice builder. You can charge your normal fee, without considering insurance – and without the time and expense of veneers. And the faster and more confidently you can do these procedures, the more you can complete in a day.

- ▶ **Repairable:** Unlike laboratory fabricated restorations, composites are more forgiving in that they are both reversible and repairable. When you perfect your technique, you can confidently and consistently define the anatomy of the teeth and routinely get beautiful results.

- ▶ **Longevity:** Some clinicians defer to porcelain because they're concerned about the longevity of the direct restorations. However, with great materials and careful attention to technique, direct restorations are poised to last for many years.
- ▶ **Affordable:** Money is often a major roadblock for patient acceptance. By offering a more economical, esthetic treatment option, you're not only opening doors for improved patient satisfaction, but also for your practice.
- ▶ **Natural-looking esthetics:** Patients today want more confident smiles, without the "Hollywood" look. Composites allow you to create a very natural look by blending with the color of the surrounding teeth. And, in some cases, the color of the natural tooth shines through the composite, further helping the composite to disappear into the patient's smile.

As a patient, who wants to immediately jump to an irreversible, more expensive solution that requires your teeth to be "ground down"? Many patients today, especially younger patients, would prefer to start with a more conservative approach. And if they aren't satisfied, more invasive procedures, such as porcelain veneers, are always an option. By improving and streamlining your direct procedure, you're setting yourself up to provide your patients with a wide array of restorative options.

# Challenges of Direct Restorations

Many dental professionals may find themselves hesitant to try something new because they've grown accustomed to a certain technique or material or are unsure of their own skills – or they believe the challenges involved outweigh the potential benefits. While direct restorative procedures have many benefits, they also come with their own set of challenges, as with any dental procedure, that are worth considering:

► **Shade matching:** Picking the right color and translucency is an art all its own, and it's the key to patient satisfaction. Mastering this step means understanding the intricacies of shade and opacity, the unique qualities of natural dentition, and the esthetic properties of your materials – and how you can bring out the best in your composite.

► **Shaping:** With porcelain, the lab creates the anatomy for you, but direct restorations require *you* to take control. Matching the natural contours of the tooth can be difficult, particularly with larger restorations, which require a match of both color and form.

► **Creating approximal contacts:** Creating contacts means often means recreating a large portion of the tooth, which presents a number of challenges. There are several good techniques and matrices that help make contacts or midlines easier to create, but finding the right material will be key to your success.

Some materials are sticky and slumpy, and don't hold their shape. It's important to find a composite that's easy to manipulate, isn't sticky, and holds its shape during placement – enabling you to create contacts and midlines with confidence. But most of all, it's key to find a material that works well in your hands.

► **Long-term color stability:** Long-lasting esthetic results depend on more than composite chemistry. Light curing and finishing and polishing steps are critical to color stability. Your composite may be capable of great esthetics, but only you can bring out the best in its appearance. Patient habits like smoking, drinking coffee, tea, wine, and certain foods will produce discolorations in the short term – indirect restorations may be a better choice in these cases.

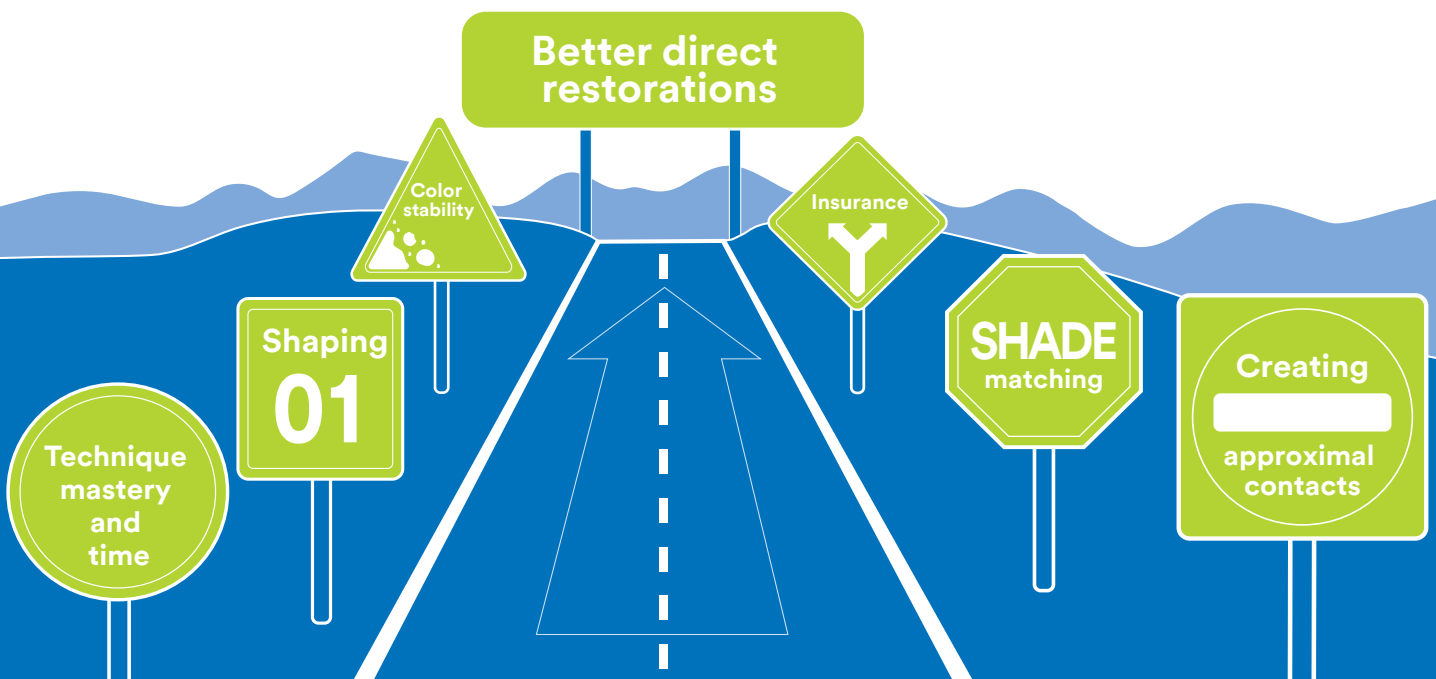
► **Insurance:** Insurance is often a constraining factor and therefore a challenge for patients and practice alike. Not only are patients less likely to accept treatments not covered by their insurance, but dental professionals are often constrained by the reimbursement rates they offer.

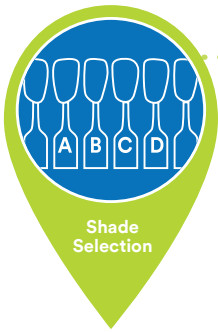
This means many clinicians will adjust their technique based solely on reimbursement. Contracting with an insurance company means the patient is not paying out of pocket – regardless of how much time you spend on esthetics. That means it can be a delicate balance to satisfy your patient's esthetic demands without compromising your practice's bottom line.

► **Technique mastery and time:** Dentists are often strapped for time, and the idea of having to dedicate even more time to mastering a new technique can be a major roadblock to change. However, once you've invested the time needed to master an esthetic technique, it has the potential to provide great benefits to both your patients and to your practice.

## Critical Steps for Success

Achieving restorative success means understanding how the pieces of the procedure fit together. Every individual step is important on its own, but knowing how they affect one another can help you optimize your procedure. Assuming you've decided to move forward with a direct restoration, it can be helpful to think in a linear way: what am I doing throughout the procedure? And then start from the very beginning, and break the procedure down into smaller steps.





## Shade selection

Reproducing the polychromatic characteristics of natural dentition is complex – and selecting the right shade should be your first consideration. It’s the best way to improve the esthetics of the final restoration. Patients want their restorations to look natural and match the rest of their smiles, and dentists choose their composites based not only on their esthetics but also on their strength. If you can improve your shade selection process, it will allow the restoration to disappear into the natural tooth structure. Again, it can be difficult to achieve the right color match and a natural appearance, but there are ways to simplify and improve shade matching:



► **Select a composite that is formulated to match the VITA® Shade Guide:** Many dental professionals rely on the VITA shade guide, but not all materials are aligned with it. By choosing a material that works *with* the guide, you’re taking one extra variable out of the equation. 3M™ Filtek™ Restoratives, for example, are formulated to match the VITA shade guide.<sup>1</sup>

► **Make/use a custom shade guide:** Creating a custom shade guide guarantees that you can match teeth with the composite you’re *actually* using – and helps you get more familiar with the shade variations in your inventory. Plus, you can create layered samples of commonly utilized dentin and enamel combinations, as well as different thicknesses, to see exactly how your materials match and interact with the light.

► **Try-in a small mass of composite directly on the tooth:** Similar to creating your own shade guide, placing a “button” of composite on the tooth itself and curing it helps you see first-hand how well your choice matches.

► **Color match before isolation:** Teeth can dehydrate in as little as one minute – but may take up to 24 hours to rehydrate. And dehydrated tooth structure is whiter and brighter than the tooth’s natural color – so you run the risk of choosing a lighter shade than you need.<sup>2</sup>

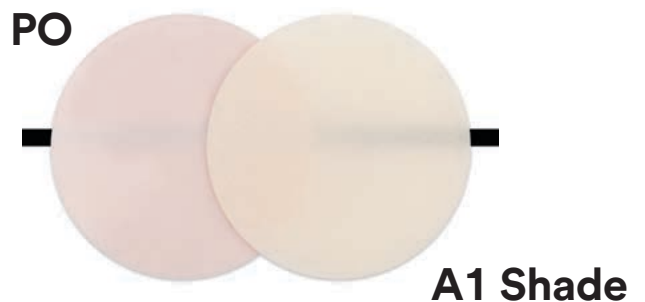
► **Optimize lighting:** Something as simple as the lighting in the room can impact your color selection. Make sure you have adequate lighting in the room, and check for things that could affect color, such as indirect light sources, outside color interferences (makeup or bright clothing) or even tired eyes.

### Block out dark spots:

Dark spots are a common occurrence in dentistry: you may uncover amalgam tattoos or dark dentin, or you may need to cover an existing metal restoration with composite. Patients certainly don’t want to see dark spots underneath their new restoration, and diagnostically, dark substructures can look like secondary decay.

Masking dark underlying tooth structure helps you achieve a more natural looking and esthetic final restoration. However, masking dark spots isn’t just about covering unattractive tooth structure; it also helps support minimally invasive dentistry. You don’t want another practitioner to find unexpected discoloration and unnecessarily replace the restoration because of suspected caries.

Utilizing an opaquer in a warm shade, such as pink, can help mask discoloration and help you better emulate the color of surrounding tooth structure by enabling you to control both the color and value of the final restoration. A pink opaquer, followed by either a single body shade or layers of dentin and enamel opacities of composite, provides an outcome that is both esthetic and functional.





## Technique selection

Once you've landed on a direct restoration, you need to choose the right placement technique. The technique you choose can improve marginal adaptation, reduce polymerization stress, and help you create adequate contacts to achieve esthetic, natural-looking results.

Keep in mind that the success of your technique is dependent on the properties of your material, and vice versa. My recommendation: find a material that handles well in your hands and that you enjoy using. The shades and other properties may be different, but you'll get used to those variables. If you can handle your material well, you can do great work with it.



### Single shade vs. multiple shade restorations

Natural teeth are complex in terms of both color and opacity – and achieving a natural look may mean working with materials with different opacities. With this in mind, your restoration should not only match the tooth in question but fit into the smile as a whole. Knowing when to use a monochromatic or multichromatic technique, and how to layer composites, can help you achieve the most life-like results:

- ▶ **Single shade:** When restoring monochromatic teeth with consistent color and opacity throughout, a single shade of composite may be all you need. Injection molding techniques are well-suited for single-shade restorations and can be accomplished using a body shade of composite with an opacity between enamel and dentin.
- ▶ **Two-shade:** Teeth frequently present a gradient of color and translucency from cervical to incisal. The cervical area is richer in chroma and in opacity, transitioning into an incisal third that is less chromatic and more translucent. In these cases, utilizing multiple shades and opacities will help you achieve a more natural result.
- ▶ **Multi-shade:** Highly characterized teeth may have a blueish incisal halo, yellow cervical third, or other natural gradients of color. These teeth will *require* a more complicated layering approach in order to blend with the surrounding natural tooth structure.

Reimbursement also comes into play. Insurance pays for function, not for esthetics. Multi-layer restorations require greater levels of training and expertise from the dentist, and take more time to place, but are

often offered low reimbursement rates. However, by refining your technique and making your procedure more efficient, it's possible to open the door to valuable esthetic work for your practice.

### Preparation design and biofilm removal

Preparation design has a direct impact on both the strength and esthetics of your final restoration. While there are many ways to approach preparation design, it starts with the existing condition of the tooth.

I recommend a two-step approach. First, focus on function and remove any decay. Then, create a prep that is conducive for bonding and esthetics. Rounded preparation designs and bevels allow for bonding to the end of the enamel rods, maximizing bond strength, and helping your composite blend in with natural tooth structure. A longer bevel allows the restoration to transition from thicker to thinner into the bevel. This helps the material disappear into the surrounding tooth structure.

Biofilm removal is always important, especially when bonding to uncut enamel. Clean the tooth surface to ensure optimal bond strength. Etchants and self-etch adhesives do not work when the tooth is covered with biofilm. And sometimes, prophy paste is not enough to remove stubborn biofilm. In these cases, air polishing using aluminum trihydroxide powder or aluminum oxide are both safe and effective.



## Adhesive application

Adhesives play a critical role in direct composite restorative procedures and deserve just as much consideration as any other material in the process. The following tips for adhesive selection and placement can help set you on the right track:

### Adhesive selection:

Start by selecting a clinically established adhesive. There are many options in the market, and the claims don't necessarily reflect the reality of their performance. So how do you find one? Review clinical trials. A five-year clinical study with a 95% success rate means the adhesive has been put to the test – and been proven successful. With this in mind, make sure to select an adhesive that has been proven to deliver virtually no post-operative sensitivity, along with excellent bond strength (to prevent premature failure, microleakage, and other issues).

The introduction of a radiopaque universal adhesive (3M™ Scotchbond™ Universal Plus Adhesive) provides new benefits for minimally invasive dentistry. Pooled adhesive under a composite may look like secondary decay on a radiograph. A radiopaque adhesive can help reduce the risk of misdiagnosis. Radiopacity, plus the ability to bond and seal caries-affected dentin, will also help you, and other dentists in your patients' future, to avoid overtreatment.

Finally, choose a system with the fewest bottles and steps – and a broad range of indications and techniques – both to reduce inventory and minimize the chance for errors.

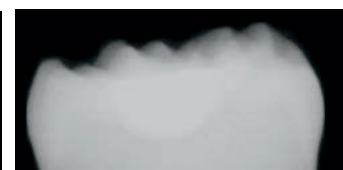


Make sure to pay attention to the little details. While they may seem obvious, there are several easy-to-overlook factors that can impact the success of your adhesive:

- ▶ **Know your material:** Follow the manufacturer's instructions, check the expiration date and check for any incompatibilities.
- ▶ **Dispense correctly:** Solvents in adhesives can evaporate quickly – make sure to dispense only when needed.
- ▶ **Moisture/contamination:** Avoid contamination or moisture – they can impact your bond. If the preparation becomes contaminated, do not proceed. Instead, check your adhesive's instructions for the appropriate course of action.
- ▶ **Prep:** Make sure to prep and etch appropriately, and only disinfect with approved products.
- ▶ **Keep an eye on the clock:** Use the appropriate timing during all steps.



Non-Radiopaque Adhesive



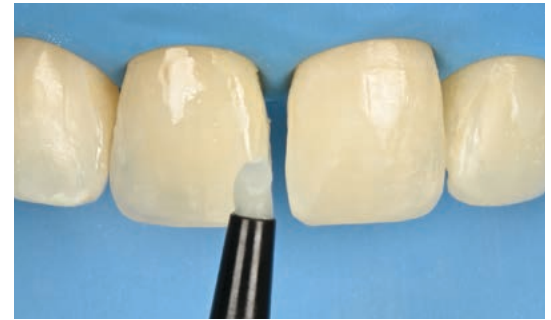
3M™ Scotchbond™ Universal Plus Adhesive

- ▶ **Technique:** Technique is so important. Even if clinical studies show the material is good, it needs to be placed properly for your patients to experience the benefits.
- ▶ **Air drying:** Make sure to use a clean, dry air source with the right pressure. It is important to not over dry the adhesive and to have a shining appearance.<sup>3</sup>
- ▶ **Light cure your adhesive:** Make sure your light curing unit is producing adequate irradiance and use a proper technique while light curing your adhesive.



## Composite placement

There's no doubt about it, direct composite placement can be challenging. While every dental professional has their own material and technique preferences, composites have come a long way and using modern advanced materials has the potential to give your procedure a boost. Composites are the result of complex chemistry and are made up of multiple components designed to produce a specific result. From fillers and pigments to handling and everything in between, each composite brings something else to the table – however, there are several things to keep in mind when selecting and placing composites directly.



Select a composite that handles well, has a range of shades and opacities, good physical properties, and polishes to a high, color stable gloss. While this may seem like a lot to ask from a material, modern composites have been formulated to meet the demands of direct procedures. For example, nanocomposites like 3M™ Filtek™ Universal Restorative are more color stable and polishable than microhybrids or glass ionomers, and some feature advanced monomers designed to reduce stress.<sup>1</sup> With all this in mind, different materials lend themselves to different placement techniques.

### Placement options:

#### ► Incremental placement

**vs. bulk fill:** Incremental placement and bulk fill techniques are both viable options uniquely suited for different clinical situations. Traditionally, composites are placed incrementally to reduce C-factor stress – as each layer is cured sequentially, rather than all at once. However, this can be time-consuming. On the other hand, bulk filling allows you to place large quantities of composite at once – saving clinical time without increasing post-operative sensitivity. In addition to efficiency, next-generation bulk fills even offer improved esthetics. However, to take full advantage of bulk fills, you also need to be fully confident in the performance of your curing light.



more easily, which reduces the extrusion force from both capsules and flowable syringes.<sup>1,4</sup> Studies suggest that warming may also improve the adaptation of the composite to the tooth structure. And the physical properties of warmed Filtek Restoratives remain unchanged, including diametral tensile and flexural strength, depth of cure, flexural modulus and color stability.

► **Flowables as a liner:** Utilizing a flowable composite as a liner under your restoration can have a number of benefits for your procedure, including blocking dark tooth structure and improving marginal adaptation. These low viscosity materials can fill all the nooks, crannies and irregularities at the base of the prep – leveling the surface and making it easier to fill to occlusion.

► **Composite warming:** Some clinicians hesitate to warm their composite due to misconceptions that the heat could damage the material or harm the pulp. But in my experience, those who try warmed composite never want to go back to using them at room temperature. If your composite is manufacturer-approved for warming – and backed by testing for safety and efficacy – adding a little heat can be beneficial both for your experience and the final restorative outcome.

3M has tested their composites extensively to determine that select Filtek Restoratives are both safe and effective when warmed. More than 5 years of testing have shown that warmed composite flows

#### Evolving dentistry. Evolving materials.

Dental professionals tend to stick with the materials and tools they know, which can sometimes lead to getting stuck in a rut and missing out on amazing opportunities. However, from composites to adhesives, dental materials have evolved to meet the demands of modern dental professionals.

Since their introduction in the 60s, composite resins have become increasingly popular – to the point that they've become the first choice for direct restorations in anterior and posterior teeth. This popularity was made possible by innovations in handling, physical properties and esthetics. Modern materials are formulated to meet the challenges that come with working directly on the tooth – such as advanced monomers designed to reduce polymerization stress, radiopaque adhesives, syringes designed to eliminate bubbles during extrusion, and nanocomposites with improved strength and esthetics. While it's easy to stay with the materials you know best, staying up to date on the latest formulations and innovations could help give your procedure a boost.

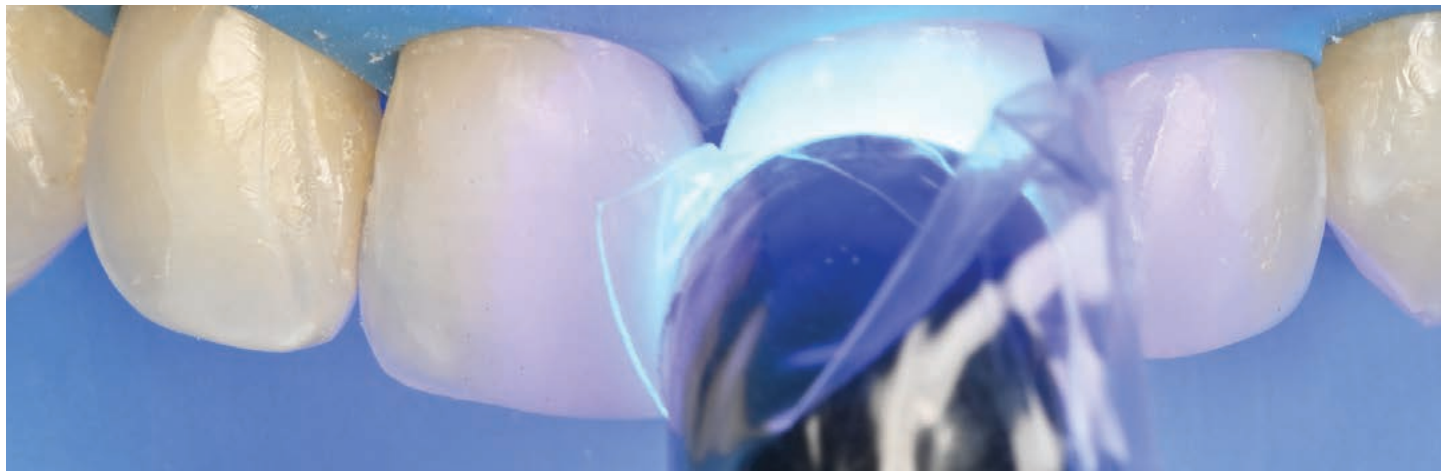




## Light curing

We talk a lot about composite properties – like color stability, strength and polish retention – but all that assumes the composite is cured properly. The prognosis of your restorations depends on the successful use of light-cured dental materials – which means not only knowing and maintaining your equipment, but also making sure your technique is on point.<sup>5</sup>

Every light-cured dental material requires a certain amount of light to polymerize in order to provide the best esthetic and physical properties. However, not every curing light is created equal, and an underperforming curing light can lead to inconsistent results. Just touching the composite to see whether it's hard doesn't actually mean it's polymerized all the way through. You need to be sure. Inadequate light curing can lead to clinical problems including composite fractures, secondary decay, debonding, discoloration and post-operative sensitivity. In order to ensure your device performs at its best and delivers the best results, clinicians need to:



► **Monitor and maintain the curing device:** The output and performance of your curing light is extremely important but isn't guaranteed. Just as with any other technology, curing lights need to be maintained in order to deliver peak performance. Make sure to regularly inspect, clean and test the output of your light.

I test my curing lights monthly using the Bluelight CheckUp Radiometer. However, the more frequently you check your device, the better.

► **Know their materials and the power and exposure time they require:** Dental materials require different levels of irradiance (aka power) and light exposure to polymerize. For example, translucent materials require less time to polymerize because light penetrates easily, while more opaque materials need more light to cure completely. Make sure your curing protocols are optimized for the materials you use in your practice.

Ask your 3M sales representative for a free Bluelight CheckMARC curing light test, or call Customer Care at 1-800-634-2249.

► **Check their technique.** Composite not only needs a certain amount of power, but that light needs to be delivered for the right amount of time, and in the right position. Make sure your light curing unit isn't drifting from the restoration while you're light curing. To ensure that your light guide is in the proper position, and to protect your vision, using orange eye goggles or a paddle is recommended to block exposure to blue light.<sup>6</sup>

While clinicians often focus on the handling of their composite during placement, light polymerization is *critical* to ensuring your composites are strong and color stable over time – and is worth extra time and attention by you and your dental assistant.

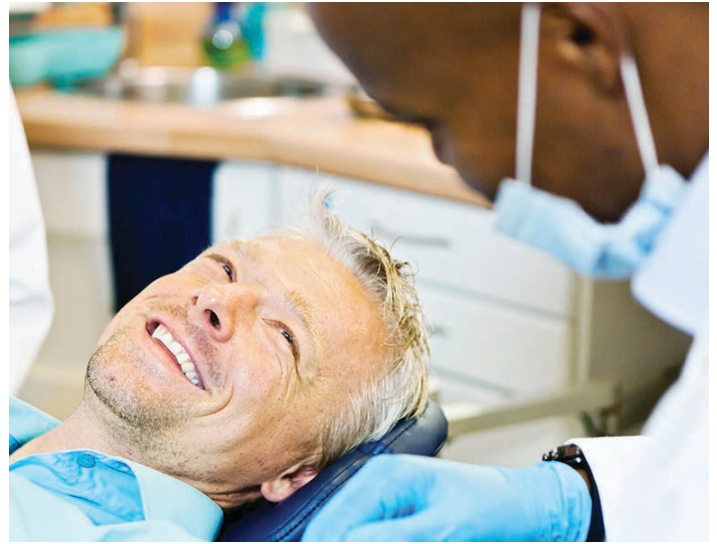




Finishing and Polishing

## Finishing and polishing

Proper contouring, finishing and polishing are critical to achieving long-lasting esthetic results – and patient satisfaction. These steps will help your composite reach its full potential for natural-looking shape and shine.



### Conquer contours

In order to give natural anatomy to a restoration, the material needs to blend esthetically not only in shade, but also in shape. Clinicians need to know the ins and outs of dental anatomy, such as how a lateral should look, or the anatomical features of an anterior or posterior tooth. The best way to shape something is to know how it's *supposed* to look. In addition, you need to match the adjacent teeth – the shape of the other central incisor, for example. It's easy to notice when shape doesn't look quite right, but it can be harder to diagnose when something goes wrong.



As with the entire procedure, it helps to think in a linear fashion. When I teach contouring and polishing, I use a 10-part checklist approach to compartmentalize, and then divide and conquer. When you look at a restoration, examine certain features one by one: the incisal facial/lingual composition; the facial contour; angles; etc. This approach lets you go step by step; when you're done, you'll have a proper shape and a good-looking restoration.<sup>7</sup>

### How to get the best finish and polish

While it may seem obvious, proper polishing can often end up as an afterthought – and lead to issues down the line. If improperly polished, rough surfaces can lead to plaque and stain accumulation. In addition, if surface roughness is higher than 0.2 microns, studies show that it may lead to secondary caries and gingival irritation.<sup>8,9</sup> Plus, patients can feel when a restoration isn't smooth enough compared to their natural teeth.

Polishing removes these surface irregularities, improving color stability and overall esthetics. You want a finish that respects the micro-anatomy of the tooth – the unique subtleties, stippling and subtle depressions found in natural dentition. The finish should match adjacent teeth and fit into the rest of the smile. By perfecting your polishing, you can improve your restorative success.

No matter which composite you use, make sure to choose a high-quality polishing system that polishes your material to the highest degree possible. And, be sure to complete all of the recommended steps, select a high-quality diamond finishing bur and work at the proper speeds. While nanocomposites have excellent polish retention, every material can be finished really well, even to the same degree as ceramics or enamel. Start by finding the right match between your material and your polishing system.

Over time, refresh your composites as needed to remove any surface stains. As with finishing a piece of wood, you want to start with the highest grit and work your way down, buffing out scratches as you go.

Finally, give finishing and polishing the time they deserve. After working on a restoration, it's tempting to rush the final finish and polish. But it's important to remember that this step is critical to preventing your restoration from picking up stains and plaque over time. It's really important to invest time in this step, for the sake of your patient's long-term satisfaction and to protect the results of your hard work.

As with every step in the procedure, your composite choice can have an impact on the final finish. For example, selecting a material that takes the tooth's natural structure into account can elevate your procedure. Teeth are nanostructured – they're made of nanocrystals called hydroxyapatite – which means that any material you choose should match as closely as possible to yield a natural looking result. Nanocomposites contain nanoparticles that wear similarly to natural enamel, therefore blending more seamlessly into natural tooth structure.



## Protection

Working proactively and protectively not only supports your patient's oral health but also improves the potential success of your restorative procedures. This means emphasizing both in-office and take-home fluoride treatments.

Unfortunately, some patients think restorative treatment can act as a substitute for regular dental hygiene, but dental professionals know that restorations need just as much upkeep as natural dentition. Fluoride treatments, like prescription-strength fluoride toothpaste and topical varnishes, help to remineralize and strengthen teeth – protecting your patients' smiles and your meticulously placed composite. By prioritizing patient engagement with fluoride-based prevention and treatment solutions, you benefit everyone involved.

And when a patient feels genuinely cared for, they're more likely to refer patients and come to you first if they have questions or need further treatment.



### **New techniques. New opportunities.**

Between a full schedule of patients and the business of running your practice, it can be hard to make the time to try new things – or even to consider changing your procedural routine. Any time you change materials, you also need to change your light cure parameters, shade selection, handling, and more. However, new materials and techniques do present opportunities that are worth exploring. And if you're not consistently getting the results you want from your materials, it's time to try something new.

What makes a clinician successful in integrating something new or different? Start out slow and dedicate the time to mastering it. Every time I try a new technique, I have to find the time to practice. This can mean working after hours or on weekends – you need to commit to investing the time in further developing your skillset. Go slow and take your time on a dentaform to learn new techniques. Of course, life can get in the way. Even so, finding time to practice is a game-changer – it makes it much easier and less stressful when you're ready to apply your skills to clinical practice.

### **CONCLUSION:**

Mastering the direct restorative procedure opens more possibilities for conserving natural tooth structure, same-day dentistry, affordability and reparability. If you find anterior esthetics to be challenging, there are many new materials and techniques designed to boost your confidence and deliver fantastic results. Make these tips and tricks part of your protocol to further improve control over your conservative direct procedure – for predictably beautiful and lasting outcomes.

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