

High-Shine Polishing with Only One Instrument: Creating Shiny Composite Surfaces Without Any Detours

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ABSTRACT

Composite fillings can be complicated to polish. After excess removal and finishing, up to four additional steps may be needed to obtain a smooth, shiny surface. A simpler technique involves the use of carbide finishers and only one high-shine silicone polisher. In just a few steps, this technique produces reliable, excellent results.

There is no such thing as a standard technique for composite finishing and polishing. Many methods can create a high-shine polish. Composite surfaces are finished and polished to improve their esthetic quality and to protect them against the aggressive oral environment and colonization by microorganisms. Patients want their restorations to feel smooth against their tongues and to have a pleasing appearance.

Excess composite can be removed with scalpels, scalers, or abrasive stones and discs. Interproximal areas can be treated with interdental strips or oscillating systems with diamond-coated inserts. Normally, dentists also use rotary instruments. Suitable types of carbide finishers have a clear advantage over fine-grit diamond burs in this step: they work selectively, which means they “differentiate” between soft composite and hard enamel and thus help to conserve the natural tooth structure.

In contrast to diamonds, carbide finishers perform a cutting, rather than grinding, action: ie, they remove material in the form of chips. The hardened metal blades act by means of plastic deformation of the substrate and deformation-associated shear forces occurring between blades and surface.¹ As a result, carbide finishers with a sufficient number of blades (20, 30, or 40) produce smoother surfaces than diamond finishers. Surprisingly, the roughness values may be better than those obtained by the use of aluminum oxide-coated polishing discs, which are frequently regarded as the standard tools for composite polishing.²

SUITABLE AND UNSUITABLE FINISHERS

However, not all carbide finishers are equally suitable. Working parts with nonrounded angles may damage composite and, in particular, enamel surfaces.³ This disadvantage applies to burs with



Figure 1 A 16-year-old patient had fallen from her horse during show jumping and fractured her left central incisor, with dentin involvement but without any pulp exposure or root damage. Also, minor enamel splintering was visible at the incisal edge of tooth No. 11, but there was no need for treatment.



Figure 2 The defect was restored with an esthetic composite in an incremental technique. For excess removal and contouring, a 10-bladed carbide finishing bur (Safe End SE8-10) was used. This instrument was more advantageous than a diamond bur because it selectively removed the composite and conserved the enamel.



Figure 3 A 20-bladed carbide bur (Safe End SE8-20) was used to create a smooth surface for polishing. The noncutting tip helped to avoid any grooves and to protect soft tissues when finishing areas close to the gingival margin.

nonrounded flat ends and burs with pointed cutting tips. Ideally, carbide finishers with noncutting tips and rounded transitions between tip and cutting blades should be used. This also will help to protect soft tissues when finishing transitional areas between composite material and tooth structure close to the gingival margin.

The Safe End system (SS White Burs, Inc, Lakewood, NJ) is a good example of finishing burs designed to meet these requirements. The burs were developed especially for the trimming and finishing of tooth-colored plastic filling materials. The 10-bladed versions are used for excess removal and contouring. The 20-bladed versions, used subsequently, produce smooth surfaces ready for polishing. The blades of both versions remove composite material effectively, while selectively ensuring maximum conservation of the highly valuable enamel layer.

INSTRUMENT LENGTH ADAPTED TO ANATOMY

Ronald Goldstein, a pioneer of esthetic restorative dentistry, described the principle of “procedure specific” instrument lengths:

a principle applied with the Safe End system, which has a variety of burs available, specially adapted to the type of tooth and the length of the area to be treated. The long Safe End burs SE6, SE8, and SE9, for example, are indicated for use on large surfaces of maxillary anterior teeth, while the short burs, SE3 and SE4, are best suited for the emergence profile at the gingival margin and for posterior teeth. The slender shape of the Safe End burs is ideal for the treatment of transitions from composite to enamel surfaces. Additional advantages include a long service life and a straight-blade design that allows for easier cleaning before disinfection.

The 10-bladed Safe End burs should rotate at high speeds, precisely at a maximum of 40,000 rpm. To ensure optimal tactile control, an electric handpiece should be used. To avoid excessive heat generation and prevent the bur from producing grooves, it is advisable to apply almost no pressure, and to work intermittently with maximum water-cooling. The 20-bladed burs should be used at a maximum of 20,000 rpm, also with abundant spray cooling. For final finishing, low speeds and reduced cooling are sufficient. The result is checked when the tooth has dried.



Figure 4 The short Safe End burs SE3 and SE4 were best suited for the interproximal spaces and transitional areas at the gingival margin.



Figure 5 For final polishing, a single-step silicone polisher (Jazz Supreme) was used. The instrument did not remove any additional material because only light pressure was applied. A perfect high-shine polish was achieved by giving the surface a “tender stroke” that removed the fine debris produced during polishing.



Figure 6 The final restoration was an excellent match for the adjacent tooth in shape, color, and surface quality.



Figure 7 The cup-shaped polisher is best suited for large surfaces or transitions between the composite material and tooth surface in cuspal areas.



Figure 8 The knife-edge Jazz Supreme polisher can be used for fissures, lingual surfaces, or transitional areas in interproximal spaces. The fourth shape is the small flame, which is optimal for finishing and polishing pits and fissures.



Figure 9 Jazz Supreme composite polishers come in kits with an autoclavable aluminum block containing four different instrument shapes, and in refills containing three pieces of each shape.

POLISHING MADE EASY

Surfaces appear shiny when they reflect light. There are a variety of polishing systems for composite surfaces, such as abrasive-coated polishing discs, diamond- or silicon carbide-impregnated silicone polishers, ceramic polishers with embedded aluminum oxide, diamond-impregnated polishing brushes and felt discs, and many more. Additionally, polishing pastes designed to be used with polishing cups, silicone polishers, and rotary carbide burs are available to produce the ultimate high-shine polish.⁴ Most of these systems create smooth, shiny surfaces.

Observations as to which system produces the best results depend on the test method used or the sponsor of the respective study.¹⁻¹³ However, it is advantageous to have a quick, systematic, and uncomplicated product that allows the user to achieve an excellent polish in as few steps as possible. One highly effective technique starts with a 10-bladed Safe End carbide finishing bur (Figure 1 and Figure 2), followed by a 20-bladed Safe End carbide finishing bur to create a very smooth surface that is virtually ready for polishing (Figure 3 and Figure 4). Then, diamond-impregnated, single-step silicone polishers create a high shine easily (Figure 5 and Figure 6). These reusable instruments differ from multistep polishers in that the amount of material removed can be varied simply by applying more or less pressure. This process eliminates the need to change instruments, and the polishing consumes much less time than in the case of multistep systems.

In addition to Safe End carbide burs, SS White Burs, Inc has recently launched the Jazz™ polishing system. Jazz polishers are available for composites or ceramics/metals, as one-, two- or three-step systems, and in reusable or single-patient use versions. Jazz Supreme single-step polishers are suitable for all tooth-colored direct restorative materials (Figure 7 through Figure 9). The special room temperature manufacturing process, in which very fine diamond particles are embedded in a flexible rubber matrix, makes them particularly heat-resistant, colorfast, and durable.

SUCCESS WITHOUT PRESSURE

The manufacturer recommends using Jazz Supreme single-step composite polishers in a blue-ring contraangle at approximately 8,000 rpm to 15,000 rpm. Apart from speed considerations, another point should be observed: a true high-shine polish will be achieved only if the correct pressure is applied. The contact pressure influences the number of diamond particles exposed, consequently almost no enamel will be removed if only light pressure is used. The diamond grains are subject to microscopic fracturing when under load, so new cutting edges are produced again and again. In other words, diamond-impregnated polishers are self-sharpening. Because of this feature, contouring, finishing, and polishing can be done with only one instrument.

Before using this system on patients, it is advisable to test the action of these polishers on a cured composite sample to practice applying the correct pressure. The debris produced during polishing is best removed by giving the surface a “tender stroke” with Jazz Supreme. This final step creates the excellent high-shine polish desired. Polishing pastes are not needed in this technique.

CONCLUSION

Selecting a proper finishing and polishing system for composite restorations can become a guessing game. Dentists have to choose from countless products and recommendations; this article presents one simple and effective approach. After the pretreatment of the restoration's surface with special carbide finishers (in two steps), only one additional step is required for polishing: the use of a diamond-impregnated composite polisher at the correct pressure quickly creates the natural high-shine polish desired, without using any polishing pastes or continually changing instruments.

REFERENCES

1. Eliades T, Gioka C, Eliades G, et al. Enamel surface roughness following debonding using two resin grinding methods. *Eur J Orthod.* 2004; 26(3):333-338.
2. Jung M, Sehr K, Klimek J. Surface texture of four nanofilled and one hybrid composite after finishing. *Oper Dent.* 2007;32(1):45-52.
3. Radlanski RJ. A new carbide finishing bur for bracket debonding. *J Orofac Orthop.* 2001;62(4):296-304.
4. Radlanski RJ, Best T. New carbide finishing burs to reduce polishing efforts of light-cured restorations. *Quintessence Int.* 2007;38(9): 555-563.
5. Attar N. The effect of finishing and polishing procedures on the surface roughness of composite resin materials. *J Contemp Dent Pract.* 2007;8(1):27-35.
6. Gedik R, Hürmüzlü F, Cofkun A, et al. Surface roughness of new microhybrid resin-based composites. *J Am Dent Assoc.* 2005;136(8): 1106-1112.
7. Jung M, Eichelberger K, Klimek J. Surface geometry of four nanofiller and one hybrid composite after one-step and multiple-step polishing. *Oper Dent.* 2007;32(4):347-355.
8. Özgünaltay G, Yazici AR, Görücü J. Effect of finishing and polishing procedures on the surface roughness of new tooth-coloured restoratives. *J Oral Rehabil.* 2003;30(2):218-224.
9. Schmidlin PR, Göhring TN. Finishing tooth-colored restorations in vitro: an index of surface alteration and finish-line destruction. *Oper Dent.* 2004;29(1):80-86.
10. St-Georges AJ, Bolla M, Fortin D, et al. Surface finish produced on three resin composites by new polishing systems. *Oper Dent.* 2005;30(5): 593-597.
11. Türkün LS, Leblebicioğlu EA. Stain retention and surface characteristics of posterior composites polished by one-step systems. *Am J Dent.* 2006;19(6):343-347.
12. Türkün LS, Türkün M. The effect of one-step polishing system on the surface roughness of three esthetic resin composite materials. *Oper Dent.* 2004;29(2):203-211.
13. Uçtaşı MB, Arisu HD, Omrülü H, et al. The effect of different finishing and polishing systems on the surface roughness of different composite restorative materials. *J Contemp Dent Pract.* 2007;8(2):89-96.