

Case Report

Finishing composite veneer restorations: The rainbow technique

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BACKGROUND AND OBJECTIVE: Direct veneer restorations, as a definitive treatment plan in esthetic therapies, have only been a second choice to porcelain veneers when it comes to the final esthetic result and longevity. Achieving a highly polished surface on the composite resin has always been a clinical challenge and numerous techniques and systems have been introduced to accomplish this. The aim of this article is to discuss the various tools and techniques available and to demonstrate the use and results of a recommended multi-step disk based polishing technique on various clinical cases restored with resin veneer build-ups. **MATERIALS, METHODS AND CONCLUSION:** Three different clinical situations requiring esthetic anterior veneer restoration were restored with composite resin veneers. The completed resin veneers were finished and polished using a multi-step disk-based polishing system (Super-Snap® Rainbow Technique Kit, Shofu Inc.). The system was found to be very cost effective, easy to handle, hassle free, faster and therefore it definitely guarantees an excellent finish without a compromise on quality.

Key words: Bonded restorations, direct veneer restorations, porcelain laminate veneers, the rainbow technique

Esthetics in composite veneers have always lost out to porcelain laminates by virtue of their drawback in achieving and maintaining the final esthetics of the restoration, which has been the single major consideration in the overall clinical success of porcelain veneers vs composites.^[1,2] The highly polished porcelain surface has always been preferred over the use of composites in veneer restorations because of its durability and high level of esthetics.^[3-5] Undoubtedly, the presence of highly evolved composites in the market today assure the practitioner excellent results in terms of reproducibility and esthetics; the success and failure in resin restorations however has always been governed by the achievement of a highly finished and polished resin surface, regardless of the brand of composite employed.^[6,7] A smooth and highly glossed surface is always preferred and indicated in all composite restorations regardless of the location or the class of the restoration.^[2] Properly finished composite veneer restorations are desirable not only for their esthetic considerations but also for sound oral health. Poorly finished resin veneers with their surface irregularities can and will result in a multitude of clinical problems such as plaque accumulation, gingival irritation, staining, higher wear rates and recurrent or secondary caries^[8-10] and an overall long-term esthetic failure.^[11,12] High-quality finishing and polishing can mark the overall esthetic success and longevity of the resin veneer restoration.^[13,14] Direct veneer restorations, if properly

built up, sufficiently finished and polished can produce excellent esthetic results on par with porcelain and also guarantee a long-term clinical success.

The purpose of this article is to outline the various different finishing and polishing systems available for composite restorations and demonstrate one particular effective, convenient multiple-step polishing technique (Super-Snap® Rainbow Technique, Shofu Inc, Japan), which has proven to be an excellent technique, that highlights its clinical performance in direct veneer restorations by demonstrating it with suitable clinical solutions.

AN OVERVIEW OF COMPOSITE FINISHING AND POLISHING INSTRUMENTS^[15]

Various techniques and systems for finishing and polishing composites are employed by clinicians, which include - fluted carbide burs, diamond burs, stones, abrasive discs and strips, polishing pastes, rubber cups and abrasive wheels (various grits).

Carbide burs

A variety of shapes of carbides are available that are employed for contouring and finishing. The frequently employed ones have a blade number ranging between 8-30 flutes and are best recommended for the gingival margins as they are safer to use with soft tissues in comparison to other instruments.

Finishing diamonds

Diamonds are used to contour, adjust and smoothen composites. These are available in various sizes, shapes and different grits. The grit sizes range from 8 to 50 μ and the burs are applied in a sequence, starting with a coarser grit and ending with a finer grit. These have to be utilized with water spray and with speeds less than 50,000 rpm. The uses of other adjunct polishing instruments (rubber polishing instruments, pastes, etc.) are usually based on the use of these diamond burs.

Finishing stones

These are used where maximum abrasion is required and do not leave a glossy finish. Other difficulties with the use of stones are in achieving refined anatomy.

Rubber cups, points and wheels

Although these are predominantly used in polishing they may also be used in contouring. These are available in different sizes, shapes and grits. The abrasives impregnated in these are predominantly silicon carbide, aluminum oxide or even diamond. The instrument is loaded on a mandrel and used with a low-speed hand piece. They are often sold as kits comprising of different shapes and grits.

Pastes

Aluminum oxide and diamond pastes are the most frequently employed as composite polishing pastes, out of which aluminum oxide is the primary one. Both pastes are available in different grits and have to be delivered to the tooth with instruments like felt, proph cups and brushes. The disadvantages of these pastes are that they are relatively messy and do not get into embrasures.

Disks and strips

Disks are used for gross reduction, contouring, finishing and polishing. These have the reputation of providing the highest polish. Most manufacturers coat their disks with aluminum oxide abrasives. These have to be sequentially used starting with the coarse grit and gradually progressing to the superfine grit. They are best suited for using with anterior restorations and to a limited extent on posterior restorations. The strips are used in smoothening and polishing proximal surfaces of bonded restorations. They are available with metal or plastic backing with different abrasives. Metal-backed strips are used when the contact points are tight and usually for smoothening, porcelain, plastic strips are used with composites and other resin materials.

One-step polishing systems

These are the recent systems utilizing diamond

polishers that were introduced to reduce the clinical time for restoration. These are known as one-step systems because contouring, finishing and polishing can be completed using a single instrument and meets the clinical criteria in achieving a smooth surface in minimal amount of time.^[16]

RESEARCH

All researches conclude that the esthetic appearance of a restoration depends on the polishing methods and finishing techniques that are employed.^[17] Numerous studies have been conducted to study the efficiencies of the various polishing systems that are available. The studies compare the different types of polishing systems based on the following: the abrasives used, size of the abrasives, type of backing, single or multiple steps, surface texture after polishing, heat generation during polishing; polishing time; polishing material; polishing geometry, etc. These studies by various researchers have provided in-depth analysis on the merits and demerits of the different composite finishing systems/techniques and the following conclusions are obtained:

- Surface roughness of composite veneer restoration is determined by the mechanical properties of the resin and also the mechanical properties of the polishing materials (flexibility, grit size, backing material, hardness and geometry).^[18-20]
- Finishing and polishing procedures require a sequential use of abrasives with gradually decreasing grit size in order to achieve desired gloss.^[17]
- Highly flexible polyurethane finishing and polishing disks coated with aluminum oxides were the most widely used systems.^[17]
- The degree of surface gloss achieved after polishing influences the final esthetics of the composite veneer restoration;^[21] and a smooth and final glossy surface is the final objective of any polishing procedure.^[22]
- Although the one-step polishing systems achieve satisfactory surface smoothness in less time, the best composite surface finish was obtained only with the multi-step disk polishing systems.^[17,23]

CASE REPORTS

The rainbow technique kit is a multi-step composite polishing system for all microfilled and hybrid composites with four color-coded disks of different grits: black - coarse, violet - medium, green - fine and red - superfine [Figure 1]. All grits are available in disks of two sizes: standard and mini. The coarse and medium grit disks are further divided as safe side down and double-sided disks. The fine and superfine

disks are only double sided. The mandrel is made of metal and is of single size and fits all the disks. The disks can be just snapped on and secured onto the mandrel by an elastic shank mount on the disks. There are no metal centers in the disks; this leaves no metal exposure during use.

The kit contains poly-strips that are also color coded similarly and used for interproximal finishing and polishing. The kit is also equipped with Dura-White stone that can be used for finishing and polishing composites, compomers, enamel; and CompoSite Fine polishers for microfilled and hybrid composites.

Case 1

A young lady visited the dental surgery complaining of an unaesthetic upper right lateral incisor. On further examination, the lateral incisor was observed to have deep developmental grooves on the labial surface covering almost the entire labial surface. The grooves had further stained and a probability of decay was also suspected. There was no pain or any other associated symptoms with the tooth.

Treatment recommended

Since the anomaly existed only on one tooth; and patient being cost and time conscious, a light curing composite veneer restoration with very minimal tooth preparation was advised and executed.

Treatment performed

Tooth preparation: The tooth was very minimally prepared. The grooves were first moderately widened to eliminate all visible stains and caries dentin.

The tooth was then prepared using a laminate veneer preparation kit (KG -Sorenson) adhering to all guidelines for tooth preparation for veneers. The preparation was limited only to the labial surface and the proximal margins were untouched.

Build Up: The direct resin build-up was done under a rubber dam and a light curing composite resin. The material used was Tetric ceram (Vivadent/Ivoclar). Since the size of the tooth was small and the preparation minimal, a very elaborate use of enamel and translucent shades was not required.

Finishing and polishing: Upon the completion of the build-up, the rainbow technique kit was employed to contour, finish and polish this restoration. It is advisable to remove the dam before the polishing with the disks as the dam material may get caught in the disks and cause injury. The disks were used sequentially starting with the coarse (black) disk and gradually progressing to the red disk. No step or grit has to be skipped as it will affect the final finish. After the use of each grit, the tooth has to be rinsed and dried before proceeding to the next grit. It is important

to maintain a dry field for the use of these disks. The disks have to be used with a low-speed handpiece and should not exceed a speed of 10,000-12,000 r.p.m. with 15,000 r.p.m. as the maximum. Higher speeds may generate excess heat and dislocate the disk and cause injury. It is imperative for both the patient and operator to be clad with protective eyewear.

The polishing procedure carried out in the summarized sequence of steps below produces a high quality finish regardless of the composite material used:

1. Remove excess from margins using a fine fluted carbide bur. Rinse and dry.
2. The coarse (black) disk was then used for gross reduction, removing excess material and establishing primary morphology [Figure 2], which was very minimal. The recommended speed is 10,000 r.p.m. Rinse and dry.
3. The medium (violet) grit disk was then employed to recontour and establish the final form and morphology [Figure 3]. Rinse and dry.
4. For finishing, the fine grit is applied at 15,000 r.p.m for 15-25 s with gentle pressure, allow the disk to perform the process. The initial gloss will start appearing during the procedure [Figure 4]. Rinse and dry.
5. For final polishing, the super fine grit is then applied at 15,000 r.p.m. for approximately 15-25 seconds. It is almost now that the final gloss will appear during the disking. Very gentle pressure or no pressure should be applied [Figure 5]. Rinse and dry after completion [Figures 6, 7].
6. The interproximal areas can be finished using the poly strips with the same sequence of grits positioned in the interproximal areas with to and fro motions.
7. The disks and strips have to be discarded after use. The mandrel, Dura-White stone and the CompoSite fine polisher can be reused after autoclaving.

The above mentioned sequence of steps produces an excellent esthetic result with the rainbow kit. The steps may deviate from user to user, but none of the disking steps can be skipped, other wise the overall esthetic result will not be achieved.

Case 2 [Figures 8, 9]

A young male patient with unsightly spaces in the upper front teeth visited the dental practice and wanted to close the gaps with limited cost immediately. Examination revealed diastema in the upper and lower anterior teeth with plaque and calculus deposits. No other preexisting problems were associated with the symptoms of the upper central incisors.

Treatment recommended

A thorough complete scaling and polishing procedure was to be performed followed by a minimally prepared

composite veneer build-up on the upper central incisor teeth. The patient did not opt for porcelain veneers and did not want the lower anterior diastemas to be corrected.

Summary of treatment performed

A thorough complete scaling and polishing procedure was first performed. The patient was asked to report the following day for the diastema closure.



Figure 1: Super-Snap® rainbow technique kit



Figure 4: Finishing the contoured restoration with fine grit (green)



Figure 2: Gross reduction and establishing preliminary morphology with the coarse grit (black)



Figure 5: Final step of polishing with superfine grit (red)



Figure 3: Establishing the final contour and form with medium grit (violet)



Figure 6: Case 1 - Preoperative photograph of 12 before build-up



Figure 7: Case 1 - Postoperative photograph of the finished composite veneer in 12 after final finishing and polishing



Figure 10: Case 3 - Preoperative photograph of incisal fracture in 11



Figures 8 and 9: Case 2 - Diastema closure. Preoperative and postoperative photographs after final finishing and polishing



Figure 11: Case 3 - Postoperative photograph of the composite veneer build-up in 11 after final finishing and polishing

An unconventional conservative tooth preparation extending from the midline and up to the mesial proximal was done on both the teeth. This was to ensure that the adequate bulk of the resin veneer was present for the build-up to ensure good esthetics and fracture resistance.

Tetric ceram composite material was employed for this case and the build-up was conducted under a rubber dam. After the final build-up and curing, the finishing and polishing sequence was carried out as explained in the previous section. The results were excellent and the patient was extremely satisfied.

Case 3 [Figures 10, 11]

A young female patient with a complaint of fractured central incisor tooth reported to the surgery in order to obtain an esthetic solution for the problem. The patient mentioned that the tooth had been broken for the many years. Intraoral examination revealed an

Ellis Class I incisal edge fracture of the upper right central incisor tooth. No other associated symptoms were present to the tooth.

Treatment recommended

A light curing composite resin veneer was recommended on the right maxillary central incisor.

Summary of treatment performed

A gross scaling procedure was performed and a conventional laminate veneer preparation was done in order to provide extended bulk to the restoration and avoid pins. After preparation, the direct veneer was build-up using light-curing composite resin material (Tetric ceram, Vivadent/Ivoclar) under the rubber dam. After final build-up and curing, the rainbow technique of finishing and polishing was carried out as explained in the previous section of this article.

DISCUSSION

Direct veneer build-ups are a very effective treatment protocol as they reduce the patient visits and costs and produce instantaneous results. The esthetics of the resultant restoration is dependent on many factors but the primary factor being the finishing and polishing of the resin veneer to achieve a highly glossed and smooth finished surface. This will result in a restoration with esthetics of exceptionally high quality. Finishing composite resin restorations have not been given paramount importance by most practitioners and can easily be the factor that marks the esthetic success or failure. Seldom practitioners consider the requirement to thoroughly finish and polish a composite restoration and possibly engage this particular step with inadequacies either in terms of armamentarium or know-hows. Finishing composite restoration is by itself a procedure and the restoration is just not complete unless a thorough protocol is carried out. There are many different techniques and tools available for finishing and polishing composite resins. Most of them produce good results, but the technique must be both easy and result oriented. Studies have indicated that multi-step disk-based polishing systems by far produce the best results. The use of such a system enhances the esthetic solution to a very great extent. Selection of a particular system is entirely based on personal discretion and working comfort of the esthetic dentist. The results achieved by this particular technique are in par with some of the best systems available. This technique however has a bit of the edge over the other systems for the following reasons: the disks are manufactured without a metal center and gouging of the metal onto the restoration is avoided; easy to snap on and snap off; the sequence of disking is restricted to just four disks; flexible enabling them to reach interproximally without breaking and the double-sided discs prove to be an added advantage; and a small size that enables the access of hard-to-reach interproximal areas are a definite advantage.

SUMMARY

Finishing composite resin procedures form an entity in direct resin restorations, which requires meticulous adherence to a definite protocol. The adoption of these procedures is entirely at the preference of the operator. Of the various systems and techniques available today, this article demonstrates a certain technique with suitable examples; this technique is cost effective, easy to handle, hassle free, faster and therefore definitely guarantees an excellent finish without a compromise on quality.

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