A New and Economical Concept for No-Prep Veneers

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INTRODUCTION

In recent years, the public has become considerably more aware of the profound transformation in appearance that cosmetic dental treatments provide; in particular, laminate veneers. This newfound awareness is the result of direct marketing to the public through teeth-whitening ads, no-prep veneer ads, and popular TV shows (such as *Extreme Makeover*).

As awareness and demand grow, there are 2 main reasons that might prevent a patient from accepting cosmetic treatment: cost, and aversion to having natural teeth prepped. The average cost of a single veneer is approximately $1,000 and, in most cases, patients require a minimum of 8 to 10 veneers for a pleasing result. With a total fee of approximately $8,000 to $10,000, the cost for these services is inconceivable for many patients. It is difficult for them to understand that this cost (for the most part) represents the extensive amount of chair time required for seating and finishing laminate veneers.

There has been a "well kept secret" in dentistry for many years—indirect composite resin laminate veneers—and this "secret" is possibly the single best solution to the challenge we face in patient acceptance. Indirect composite can be used to create a laminate veneer that is ultra thin with an exact finished contour, thereby eliminating burdensome finishing time and decreasing chair time significantly. In addition, these materials and time-saving techniques allow the clinician to pass along savings to the patient. Furthermore, patient concern regarding tooth preparation is assuaged since the nature of indirect composite permits 0.3 mm overall thickness, with a razor thin finish line that virtually eliminates the need to prep and finish. It is amazing that so few dentists currently utilize a dental material that has been tested and proven for more than 2 decades.

In this article, we will discuss techniques using a comprehensive aesthetic restorative concept (Pearlfect Smile [Mizrachi Dental Lab]) that delivers an exquisite and predictable cosmetic result in a fraction of the time that it takes to deliver conventional porcelain veneers.[1-5]

CASE REPORT

Diagnosis and Treatment Planning

Last year, Dr. Lowe's youngest daughter Christine was featured in *Dentistry Today* as our first case in the placement of no-prep porcelain veneers. More than a year later, her case is performing extremely well. Dr. Lowe's oldest daughter, Caryn, (after seeing what was successfully accomplished with her sister's smile) wanted to have her teeth done as well. She also had orthodontics as a teenager and had been complaining that her teeth were "too small." Before Image and Figure 1 show Caryn's preoperative photos. Her tooth alignment was good, but the maxillary central incisors appeared somewhat dominant because of being positioned slightly facial to the lateral incisors (Figure 2). There was also some slight surface hypocalcification of the enamel present post-orthodontic treatment. Microabrasion had been previously performed to help reduce/eliminate some of the "white spot" lesions. Caryn wanted her maxillary teeth to be more proportional in size and length to her mandibular anterior teeth. Having slightly larger maxillary anterior teeth would help to play down the fact that she presented with a hyper mobile lip and excessive gingival display when smiling broadly.

Before Image. A preoperative full-smile view. She exhibits about 5 mm of excessive gingival display due to hypermobility in the upper lip.

After Image. Caryn's completed smile (Pearlfect Laminate Veneers [Mizrachi Dental Lab]). A beautiful aesthetic outcome provided in a noninvasive, economical fashion.

First Appointment: Making the Master Impressions

Caryn's first appointment was to take master impressions. A technique was used that allowed for an anesthesia- and retraction-cord free procedure. As a result, this procedure only took about 15 minutes of chair time!

First, a stock tray was selected to fit the patient's maxillary arch form. Next, a heavy-bodied impression material (Take 1 Advanced [Kerr]) was injected into the tray and placed into the patient's mouth until set. This effectively converted the stock tray into a "custom tray." The next step was to use a light-bodied impression material (Take 1 Advanced) as a wash to complete the master impression. However, there was a very important technique difference employed in this case from the typical putty-wash technique. When most clinicians perform a wash of a heavy bodied impression, the papillae between the tooth indentations are removed; then, the space is completely filled with light bodied wash material and reseated in the patient's mouth. It is very hard to displace the large amount of light-bodied material when seating the tray, and a less-than-desirable end result ensues from an incomplete seating of the tray. The difference in this case example is the *amount* of light bodied material that was used. It is very important to inject only a small amount of light-bodied material around the periphery of the tooth indentations in the heavy bodied material (Figures 3 and 4). The heavy-bodied material will then force the light bodied material into the intracrevicular spaces around the teeth. The smaller amount of light bodied material allows the operator to more accurately seat the impression and gain sufficient "retraction" to force the light bodied material into the crevice.

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After the maxillary arch master impression was completed, an opposing impression was taken of the mandibular arch, thus completing the first appointment. Figure 5 shows the stone model created in the dental laboratory from the maxillary master impression. Note the "retraction effect" that was created from the impression technique employed, without the use of retraction cord. Next, the maxillary model was trimmed, sectioned, and then articulated to the mandibular opposing model by the dental laboratory team (Figure 6).

Comments Regarding Shade Selection

Shade selection, while not a complicated process, is often an emotional issue for the patient. This is because, in many cases like this one, we are not simply changing the shade of the patient's teeth, we are drastically changing their overall appearance. Therefore, the patient should be involved in the shade selection and must be fully aware of how the end result will appear (Figure 7). Most patients envision a "Hollywood White" smile that may not always be the best choice. Others desire a dramatic change, but still want a "natural looking" smile. The patient must also be aware of the significant differentiation that might exist between the desired shade and the color of the opposing teeth. To best communicate the end result, a visual aid (such as digital imaging, direct composite [not bonded] mock-ups or shade tabs) should be used. Ultimately, the final decision should rest with the patient, regardless of the clinician's opinion and best intentions.

Laboratory Fabrication of the Composite Laminate Veneers

Due to the thickness of the veneer (0.3 mm), the underlying tooth structure plays a role in the end result. Often there is a need to mask discolored spots, hypocalcification, or tetracycline stains that could bleed through. It is important that the laminate veneer material of choice has the ability to mask the surface evenly. Indirect composite material offers a solution for masking spotty stains and assuring that there will be no bleeding through. The dentin shades available with indirect composite materials, with their different levels of opacity, can be layered to mask problem areas, thus producing an even and pleasing color. Although an indirect composite veneer can be made extremely thin, the dental technician (using multilayers of dentin, enamel, and translucency) is still able to create a beautiful veneer that is vital and lifelike in appearance. At times, allowing the patient's natural tooth color to bleed through creates a more harmonious and natural blend. In this case, purposely allowing the dark cervical color to slightly bleed through the cuspid created a more natural appearance.

Figure 1. A retracted full smile view shows teeth that are polychromatic, with some "white spot" lesions secondary to orthodontic treatment. The patient also exhibits "central dominance" due to facial prominence of the maxillary central incisors.

Figure 2. A maxillary full-arch occlusal view shows relatively flat facial surfaces on the anterior teeth. The facial embrasures are average in width except on the mesial aspect of the lateral incisors. However, since these teeth are in a slightly lingual position, the restorations can adequately "hide" the proximal surfaces of her natural teeth.

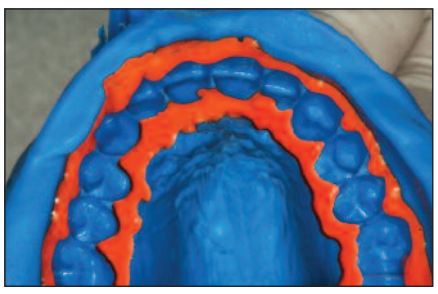

Figure 3. An intaglio view of the maxillary master impression. Note the small amount of wash material that was placed around the coronal aspects of the "tooth imprints" to impress the intracrevicular spaces.

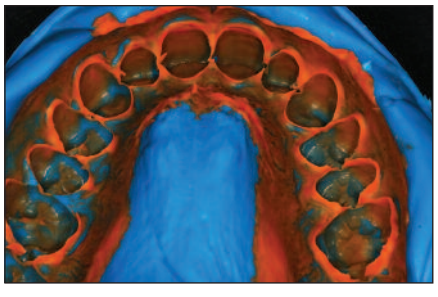

Figure 4. The completed master impression.

Figure 5. An incisal view of the stone model created from the master impression prior to trimming. Note the retraction gained by this variation of the putty-wash technique without the use of retraction cord or laser.

Figure 6. The master models were trimmed and articulated, ready for the fabrication of the indirect composite laminate veneers.

Figure 7. Mr. Mizrachi took the shade that would be used for Caryn's new smile.

Figure 8. A separator (Rubber Sep [Kerr]) was applied to create a 25-µm spacer, and to allow removal of the veneers from the die.

One of the most important steps in fabricating a veneer is creating a distinct and positive fit when seated on the tooth. Since there are no finish lines, no margins and no references for positioning the veneer on the tooth, the clinician must often deal with a "floating" veneer that does not necessarily lock into the correct position. This issue is magnified when the veneer is loaded with cement and is placed on the tooth. Indirect composite resin materials resolve this issue by delivering the intimate and positive seating one is looking for over the unprepared tooth. This is accomplished in the fabrication process by using the master die to build, layer, and bake the veneer; instead of using replicas as is done with ceramic systems.

The first step in fabricating a Pearlfect Laminate Veneer (Mizrachi Dental Lab) is applying a separating medium (such as RubberSep [Kerr]) over the master die (Figure 8). Using a separating medium directly on the master die is the key in delivering a positive and impeccable fit. This gives 20-µm of spacer to accommodate the film thickness of the resin cement that will be used in the final delivery of the case.

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Figure 9. Layering of the composite resin that utilizes biomimetic nanotechnology (Premise Direct [Kerr]) was begun over the Rubber Sep.

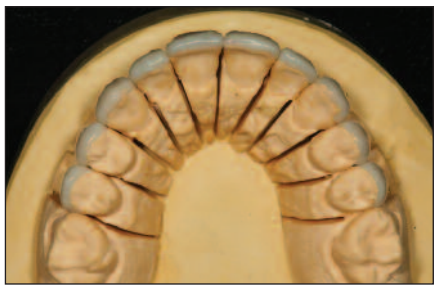

Figure 10. Occlusal view of the final layer.

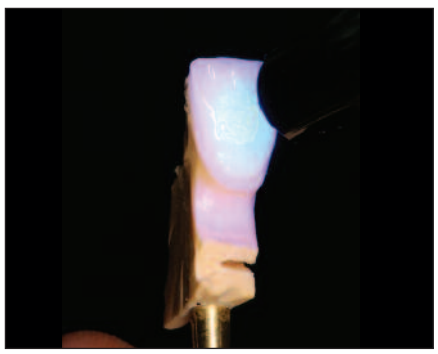

Figure 11. All layers were light-cured.

Figure 12. Removing veneers from die after light-curing.

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The next step is to apply a cervical layer of composite, which is then overlapped with a dentin layer. Finally, incisal translucencies are applied in varying thicknesses, depending on the desired effect (Figure 9). Next, after ensuring that the thickness, marginal integrity and final shape are satisfactory, we light-cure the layers (Figure 10) to polymerize and harden them (Figure 11). The veneer is then removed from the master model (Figure 12) and placed in a heat and pressure oven (part of the Premise Indirect system [Kerr Lab]) to complete the polymerization (Figure 13). The restoration is baked for 20 minutes in a 60 psi pressurized nitrogen atmosphere at 145˚ F. This optimized trimodal polymerization process achieves a 98% material conversion (to an inorganic state) as compared to 60% to 70% with light-cured composite materials. The resulting fully cured composite resin material has demonstrated wear resistance that is similar to human enamel.[6] Next, the veneer is placed on the master model to shape, smooth, and to create surface texture. Once detailed characterization is complete, the restoration is ready to polish. Using first a fine, then an extra fine rubber wheel, a brilliant luster and shine is created. A soft bristle brush with diamond paste (Abbot-Robinson wheel [Buffalo Dental]) will enhance the already lustrous surface and will highlight the layering affect and opalescent characteristic of the material (Figures 14 to 17).

FINAL DELIVERY OF THE RESTORATIONS

Caryn's second appointment was for the delivery of the composite resin laminate veneers. Again, this was done without local anesthesia since there was no dentin exposed and no provisional restorations to be removed. First, each veneer was tried on each tooth individually and evaluated for accuracy of fit. Next, all 10 restorations were tried in and evaluated for "passive fit." Although some operators espouse placement of porcelain veneers "en masse" (all 10 at once), I prefer placing 2 at a time, because in my experience, "passive fit" at try-in of porcelain veneers has not always guaranteed the same fit at cementation due to "micromovement" that occurs during try-in. Remember, the challenge that the dental technician has with baking porcelain is shrinkage of the material during the firing process. Therefore, the porcelain is overbuilt to compensate. Indirect composite materials shrink less than 3% when light-cured (on the lab bench and not in the tooth as with a direct composite) then are completely cured under heat and pressure with no shrinkage at all. The result is that a passive fit with an indirect composite is much easier to achieve for the dental technician than it is with porcelain. As a result of the fabrication process, I feel confident in placing all the restorations very accurately at one time, making the delivery process much less stressful and easier to perform.

After pumicing and copiously rinsing Caryn's teeth, they were etched with 37% phosphoric acid for 15 seconds, then thoroughly rinsed and air-dried (Figure 18). Figure 19 shows the "frosted" appearance of well-etched

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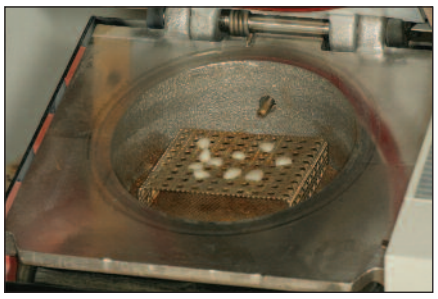

Figure 13. Veneers placed in heat and pressure oven (part of the Premise Indirect [Kerr Lab] trimodal curing system) for the final cure.

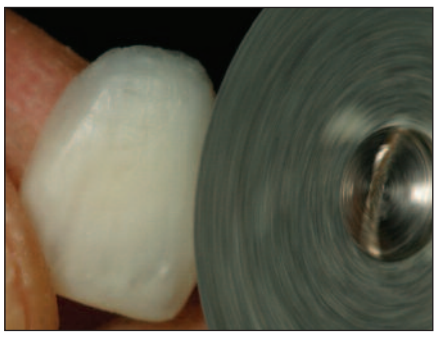

Figure 14. Fine pink rubber wheel (Kerr Lab) was used for smoothing the surface.

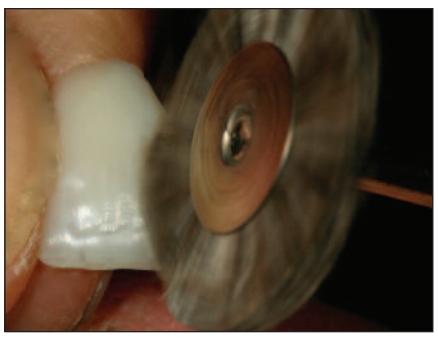

Figure 15. Diamond paste (Superfine polishing paste [Kerr]) with Robinson's bristle brush was used to create the final luster.

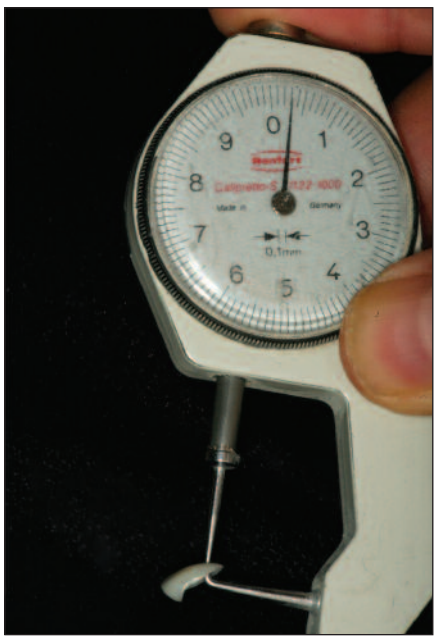

Figure 16. Veneer thickness measured an average of 0.3 mm.

Figure 17. Laminate veneer was completed and seated on solid model.

Figure 18. After the restorations were evaluated at the try-in stage, the teeth were then etched with 37% phosphoric acid for 15 seconds.

Figure 19. The "chalky" surfaces of the enamel, as they appeared after rinsing off the etchant and air-drying.

Figure 20. Large cotton pledgets were used to remove the excess resin cement (NX3 [Kerr]) around the seated restorations.

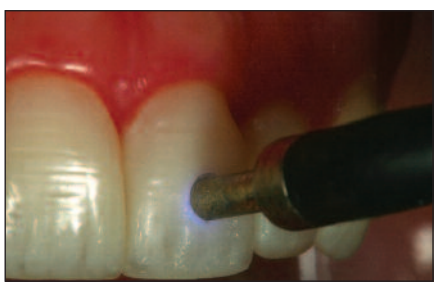

Figure 21. A tacking tip and LED curing light (Demi Plus [Kerr]) was used to tack the center of the restoration to place. This allowed for easy removal of the unset excess resin around the margins.

Figure 22. A sable brush was used to remove excess cement from the proximal areas prior to fully curing. (Floss can be used to clear the contacts of resin, as long as the restoration is stabilized with finger pressure during the process.)

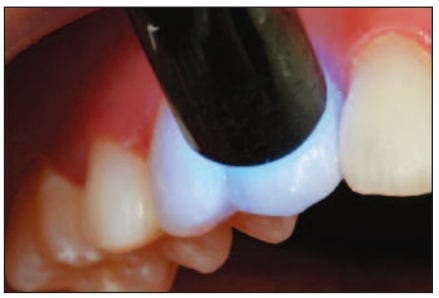

Figure 23. The resin cement was then fully cured (60 seconds) from all directions.

Figure 24. Smoothing the lingual marginal areas was done by first using an extra fine carbide finishing bur (H247F-009 small rounded taper [AXIS Dental]). These final margins can be smoother and more undetectable than porcelain in most cases.

Figure 25. Rubber abrasives (Jiffy Point [Ultradent Products]) were then used to gain the final polish of the restoration interface on the lingual aspect.

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enamel. It is important to emphasize that a 100% bond to enamel is achieved with these restorations. According to Dr. Gordon Christensen, this is "the best bond in dentistry!" Next, a clear shade of resin veneer cement (NX3 [Kerr]) was dispensed into the restorations and they were placed on the respective teeth extruding the excess around the sides of the restorations. Cotton pledgets were then used to remove the excess resin cement from around the facial and lingual aspects of the placed restorations (Figure 20). Next, a tacking tip on the LED Curing light (Demi Plus [Kerr]) was used to "tack" each restoration securely in place. The technique used here is very important! Place the tip in the center of the restoration on the facial aspect, *then* activate the light *for 2 to 3 seconds only* (Figure 21). This will ensure each veneer is secured and, at the same time, the remaining excess cement around the periphery and interproximal areas of the restorations will be unset making it easy to remove with a fine sable brush (No. 2 Keystone flat brush [Patterson] Dental) and Glide dental floss (Oral B) (Figure 22). The "wave" technique, which is often used to tack veneers in place, will set the cement around the periphery too early and make removal more difficult. Once all the excess resin cement was completely removed, the restorations received a full 60-second light-cure from all aspects (Figure 23).

The finishing and polishing of the restorations was then completed easily. A 30-fluted carbide composite finishing bur (TDF 3SF 30 fluted composite finishing bur [AXIS Dental]) was used to finish the restorative-tooth interface Figure 24. A rubber abrasive point (designed for composites) (Jiffy Point [Ultradent Products]) was used next to polish the margin which then looks like a natural extension of the enamel (Figure 25). It is important to mention that if these restorations should ever need repair, that this is easily accomplished with direct composite materials and results in a seamless repair when compared to porcelain that is repaired with the same direct composite materials.

Figures 26 to 28 and After Image show Caryn's completed smile immediately postoperatively. Note the beautiful aesthetic result that has been achieved as well as the health of the gingival tissues immediately after insertion. The delivery and finishing process for Caryn's case took about one hour to complete! So, the total chair time invested in this 10-unit smile makeover was less than 90 minutes, as compared to the average porcelain case which requires much more time to finish.

Figure 26. The completed ultra thin veneers. A little additional length, facial positional correction, and brightness were achieved within an overall thickness of 0.3 mm of restorative material.

Figure 27. Close-up view shows the beautiful, natural appearance of the restorations in detail. Note the healthy tissue, the surface luster (similar to natural enamel), the internal characterization, and the "lifelike" aesthetics that was achieved with these thin (0.3 mm) veneers.

Figure 28. This view shows the lack of excessive contours and how these veneers "disappear" into the natural tooth structure.

CLOSING COMMENTS

Many dental practices today are searching for the ultimate "gimmick" in attracting new patients. There are dental offices that offer hand massages, discounted coupons, free cleanings, virtual reality video glasses, and so on. While these methods may initially drive new patients to your practice, in truth, they do not sell dentistry. What most patients are really looking for is a way to get a beautiful new smile for less of their hard-earned money. Offering indirect composite laminate veneers, when indicated, does exactly that. Clinicians can offer patients a great new look at a cost that is significantly less than traditional treatments. In addition, this completely noninvasive procedure is much less intimidating to even the most timid of patients and will therefore help to increase patient case acceptance.✦

Acknowledgment

Pearlfect Laminate Veneers and Pearlfect Smile (Mizrachi Dental Lab) are proprietary names for thin biomimetic indirect composite veneers created by Moshe Mizrachi and his dental laboratory team using Kerr Indirect Composite technology.

References

1. Strassler HE. Minimally invasive porcelain veneers: indications for a conservative esthetic dentistry treatment modality. *Gen Dent*. 2007;55:686-694.
2. Malcmacher L. No-preparation porcelain veneers—back to the future! *Dent Today*. 2005;24:86, 88, 90-91.
3. Axel Mühlhäuser. Composite is Progress. *Dental Lab International*. 2007;3:1-14.
4. Mehl C, Scheibner S, Ludwig K, et al. Wear of composite resin veneering materials and enamel in a chewing simulator. *Dent Mater*. 2007;23:1382-1389.
5. Ho C. Composite artistry using Premise—the new breed of nanofiller. *Dental Practice*. 2004:138-142.
6. Leinfelder KF. Indirect posterior composite resins. *Compend Contin Educ Dent*. 2005;26:495-503.

Mr. Mizrachi graduated as a mechanical engineer in Israel, but later began his career in dental technology in 1976 in Columbus, Ohio. He holds a Fellowship from the Academy of Facial Esthetic and is a member of American Academy of Cosmetic Dentistry. He opened Mizrachi Dental Lab in 1980 and applied his knowledge of mechanical engineering in the pursuit of improving dental restorative materials to be compatible with natural enamel. As a result of his research and development in the field of restorative material, he has been a consultant to major dental manufacturers and was involved in several studies of dental material with CR Foundation and THE DENTAL ADVISOR. In 1998, he founded the Columbus Institute of Cosmetic Dentistry, which has been a leading center in providing continuing education courses for dentists from all over the world. For the past few years, Mr. Mizrachi has focused on developing a cosmetic solution to invasive dental procedures. As such, he has found new composite materials that perform as well as natural enamel in wearability, hardness, luster, and resisting stain. He has been extensively speaking on the topic of dental restorative materials internationally. He was a keynote speaker at the Israeli Dental Association yearly meeting. He was also a lecturer for third and fourth year dental students at The Ohio State University College of Dentistry on the topic of fibers and indirect composites as viable alternatives to ceramic. He can be reached at (888) 999-8560 or via e-mail at drmoshe@tcicd.com.

Disclosure: Mr. Mizrachi reports no disclosures.

Dr. Lowe graduated *magna cum laude* from Loyola University School of Dentistry in 1982 and served there as an assistant professor in operative dentistry until its closure in 1993. Since January 2000, he has been in private practice in Charlotte, NC. He lectures internationally and publishes on aesthetic and restorative dentistry and is a clinical evaluator of materials and products. Dr. Lowe received Fellowships in the AGD, ICD, ADI, and ACD and received the 2004 Gordon Christensen Outstanding Lecturers Award. In 2005, he was awarded Diplomate status on the American Board of Aesthetic Dentistry. He can be reached at (704) 364-4711 or at boblowedds@aol.com.

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Please contact Moshe Mizrachi, CDT, at (888) 999-8560 (tcicd.com); or Dr. Robert A. Lowe (704) 247-4030 (robertlowedds.com) to learn more about the Pearlfect Smile concept and for course information.

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