

accreditation

case selection

SIX MAXILLARY
INDIRECT VENEERS



by
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INTRODUCTION

When the term "cosmetic dentistry" is mentioned, one often thinks of it being performed on younger individuals rather than senior citizens. Cosmetic dentistry is usually thought of as improving the way a person's teeth look as opposed to improving form and function. Many of our "cosmetic" dentistry clients are indeed people whose ages range from 20 to 50 years old. But since many people are living to an older age and are taking better care of themselves, more and more people over the age of 60 are opting to improve the way they feel about themselves by having cosmetic dentistry. Many of these individuals are also realizing that the numerous years of their lives, combined with the usage of their dentition, is resulting in more visible wear on their teeth with a significant loss of form and function. To some, this noticeable change in their appearance is reason enough to have dental care that will restore both the esthetics they want in addition to preventing further attrition of their teeth.

Since many people are living to an older age and are taking better care of themselves, more and more people over the age of 60 are opting to improve the way they feel about themselves by having cosmetic dentistry.

To satisfy patients' demands, the dental ceramics currently in use exhibit numerous desirable physical properties, including biocompatibility, esthetics, diminished plaque accumulation, low thermal conductivity, abrasion resistance, and color stability.¹ The increased vitality and "natural appearance" of these materials, combined with a more conservative tooth preparation, has dramatically improved the esthetic and functional result that is achievable with today's dental ceramics.²

In the majority of instances, all-porcelain, adhesive-bonded restorations are now the standard by which we restore the anterior, "esthetically-conscious" segment of

the mouth. The concern most often raised with these "bonded" restorations is their strength and long-term durability. The clinical strength of all-ceramic restorations is influenced by several factors, such as core material, the shape of the tooth preparation, and

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the method of luting.^{5,6} The Cerpress SL™ Porcelain System (Dillon Company, Inc., Cranston, RI) demonstrates outstanding life-like esthetics, high tensile strength, fracture resistance, and excellent marginal adaptation when compared with most other all-ceramic systems.^{6,7} The Cerpress SL™ System features a unique combination of strength and light transmission qualities (fluorescence, opalescence, translucency, iridescence) that resemble the characteristics of natural teeth.⁸ When utilized with new generation adhesive agents, combined with highly-filled resin luting cements, dentin bonding allows clinicians to "bond" all-ceramic restorations to tooth structure, creating an integral unit between the restoration and the natural tooth foundation.^{9,10} The bond between etched porcelain and the dentin surface, with the utilization of an adhesive agent and resin luting cement, provides high compressive strength and low microleakage.¹¹

The progress made in the realm of the all-ceramic restoration, along with advances in color matching and laboratory technician skills, has enabled



Figure 1: The patient showed very little of his maxillary anterior teeth when smiling due to extensive incisal edge attrition.



Figure 2: A much improved facial and dental appearance after completion of six indirect porcelain veneers. Note how much more of his incisal edges are now visible once the maxillary anterior teeth were lengthened and proper function restored.

the clinician to achieve an excellent result with this procedure. The "natural appearance" of an all-ceramic restoration, combined with more conservative tooth preparation, has significantly improved the esthetic outcome that can be achieved and has resulted in the increased public acceptance of the procedure.³

The following case successfully demonstrates the application of six

maxillary anterior Cerpress SL™ porcelain veneers to worn dentition to restore form, function, and esthetics.

HISTORY

The patient was a 72 year-old retired male who presented to our office for an initial dental prophylaxis and an examination. (Figures 1 and 2) He was in excellent physical health

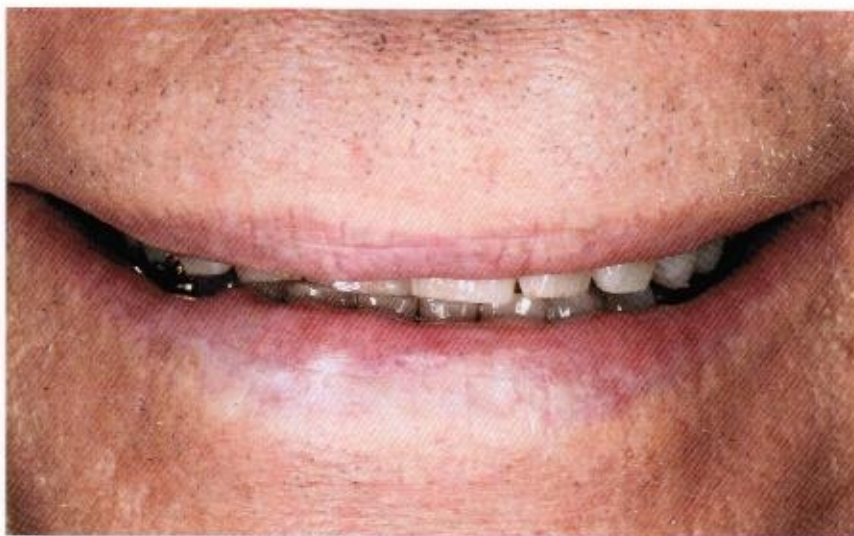


Figure 3: A close-up of his pre-treatment smile demonstrates the deficiency and lack of visible tooth structure negating his smile.



Figure 4: His new smile exhibits harmony, symmetry, and added incisal length. The smile design that was created is ideal for this 72 year-old gentleman!

and possessed good oral hygiene. He had previously been an emergency care patient prior to this visit and was seeking to become a "regular" patient of record. His wife was also a patient of record in this office, and he had been very happy with the level of care his wife received. He was looking for the same level of care as well. Both he and his wife were referred to this office by a local endodontist.

CLINICAL DATA

A complete clinical, radiographic, and periodontal examination was performed. The patient's periodontium was in excellent physical condition, uniform in gingival margin height from maxillary midline left to midline right, and there was no noted soft tissue, osseous, or radiographic pathology. He had a Class I occlusion, no TMJ problems, and bilateral group function due to anterior cuspid attrition.

He had numerous posterior gold onlay restorations and one posterior crown, all of which were clinically and radiographically stable. His remaining amalgam restorations on teeth #'s 2, 14, and 21 were all deteriorating due to age and were asymptomatic at that time.

An analysis of his smile showed noticeable incisal attrition of teeth #'s 6-11 and #'s 22-27 with very little maxillary anterior teeth displayed. (Figures 3 and 4) This was probably the result of years of wear. When seen with a retracted view, the patient's maxillary anterior teeth all exhibited inappropriate height-to-width ratios due to the extensive incisal attrition. (Figures 5, 6, 7, and 8) Overall, the patient was pleased with his smile and had no real concerns about his dental health.

DIAGNOSIS

Aside from a routine dental prophylaxis, the patient's dental condition warranting treatment consisted of placing indirect porcelain veneers on the maxillary and mandibular anterior six teeth to restore form, replace and strengthen the incisal attrition, and recreate bilateral cuspid guidance to prevent anterior and posterior wear

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during functionary movements. The defective amalgam restorations would be replaced with direct composite restorations.



Figure 5: The front retracted view shows the incisal attrition of the maxillary anterior six teeth with the ideal surrounding gingival architecture. The excellent health and symmetry of the patient's gingival tissues were an important factor in the final restorative outcome.



Figure 6: The final veneers illustrate the beauty of the Cerpress™ and Sensation™ SL porcelain system. Outstanding shade selection combined with ideal facial anatomy and surface texture highlights make this case indistinguishable from his surrounding dentition.

TREATMENT PLAN

After careful and thoughtful review of all clinical data, the above treatment plan which would optimize oral health was presented to the patient. After discussion with the patient, the decision was made to initially place six porcelain veneers on teeth #'s 6-11. The restoration of the mandibular

anterior teeth and replacement fillings would possibly be done after completion of the maxillary veneers. The material chosen for the veneers was the leucite reinforced Cerpress SL™ pressed core material with overlying Sensation SL™ low-fusing porcelain and stains. This material possesses wear resistance compatible against

natural enamel, kindness to opposing tooth structure, strength, and superior esthetics; thus, an ideal choice for all-porcelain restorations.⁶ An evaluation of the patient's dentition did not prevent the initiation of treatment nor reveal any occlusal disharmonies which would possibly jeopardize the long-term prognosis of the veneer restorations. The patient was scheduled to begin treatment.

TREATMENT ARMAMENTARIUM

1. Jeltrate Alginate (Caulk)
2. Snap Provisional Acrylic (Parkell)
3. Simply Perfect Bite Registration (Discus Dental)
4. Durelon Cement (ESPE)
5. Examix Impression Material (GC America)
6. Pumice
7. Heliomolar (Ivoclar)
8. Variolink II Try-In Pastes & Resin Luting Cement (Ivoclar)
9. Monobond-S (Ivoclar)
10. Heliobond (Ivoclar)
11. Optibond Fl Primer (Kerr)
12. Optibond Fl Adhesive (Kerr)
13. Gluma (Heraeus Kulzer)
14. UltraEtch (Ultradent)
15. Concepts Scrub (Ultradent)
16. DeOx (Ultradent)
17. Orascope 4.8 Magnification Scopes (Orascope)
18. Diamond Burs #6878, #6888 (Brasseler)
19. Finishing Burs #247F, 247UF, 247EF, H379UF (Brasseler)
20. Diamond Bur #285.5C (Premier)

21. Ceramiste Porcelain Polishing Points and Cups (Shofu)
22. Diamond Paste (Ultradent)
23. Finishing Burs #'s 7802, 7803, 9503 (Midwest)
24. OK Block Thick and Thin Articulating Paper (Block)
25. Acrylic Bur
26. Sof-lex Finishing Strips (3M)
27. Gum Stimulator (J.O. Butler)
28. Vita Shade Guide (Vident)
29. Arago 2 Laser (Premier)

LABORATORY COMPONENT

Initial shade selection was determined from intraoral slides and photographs taken prior to the actual preparation of the tooth. The laboratory technician then performed a custom shade selection in order to achieve all the intrinsic and extrinsic color patterns that the maxillary anterior teeth exhibited. Because of the natural aged color of his teeth, the final veneers would also incorporate "darker" shades appropriate for a patient 72 years old. Careful attention to the surface texture, more ideal height-to-width ratios, overall shape and size, as well as facial and lingual contours of the teeth to be restored were also noted in order to accurately create the ideal appearance of the teeth being treated. The dentin lobe patterns of all six teeth were diagrammed along with the "wrapping" effect of the incisal enamel as it extends down the facial line angles. Maverick incisal edge colors and surface staining areas were also noted on the lab prescription. Initial study models were also provided to the lab technician for reference details.



Figure 7: As seen from the right retracted view, the overall features of these veneers from incisal edge embrasure form to tooth shape form are incredible and truly blend in with his adjacent and opposing dentition.



Figure 8: As seen from the left retracted view, the shade transition from central and lateral incisors to the cuspid and premolar area makes it impossible to tell there are veneers on his teeth. Also note how proportional the light reflection is from the central incisor back to the premolars.

PREPARATION PROCEDURE

After anesthesia was obtained via infiltration, the teeth were prepared with consideration given to the following important factors: first, the minimum preparation/thickness requirements for all-ceramic veneer restora-

tions; and second, how the dentin lobe patterns and color might influence the final restorations. The teeth were then prepared according to veneer guidelines with at least 0.6 mm facial reduction at the cervical one-third and 0.8 mm to 1.0 mm at the incisal one-third for uniform preparation and

porcelain thickness.^{12,13} Incisal/occlusal edge reduction of at least 1.5-2.0 mm would allow adequate thickness for proper esthetics, strength, and wrapping onto the lingual surface.

The esthetic, natural, and vital appearance seen in the final restorations can be achieved by means of clinical and laboratory skills and the proper communication between these persons.

The interproximal contacts on all teeth were broken to hide any visible finish lines that may be seen facially to allow for more ideal contact placement, and all finish lines were connected for preparation continuity. Coverage of the incisal/occlusal edge is required in most veneer cases in order to achieve a natural-appearing translucent edge that offers improved longevity and strength. Preparation of the teeth without the incisal/occlusal edge can be achieved only in those maxillary restorations without parafunction, without the need for tooth lengthening, or with a thick incisal edge.⁵ This was not the case with this patient. Sharp internal line angles, edges, and undercuts should be avoided with all types of veneer restorations.

Since the patient had excellent gingival health, a supragingival shoulder preparation with a butt joint margin was also prepared for maximum strength of the porcelain and to mask any underlying internal darkness of the teeth. There was no need to hide or "bury" the cervical margin subgingivally since the transition zone between the natural tooth and the porcelain would only be visible to the clinician with magnification scopes or to the

patient if he ever suffered gingival recession. Placing the margins subgingival, though, would possibly jeopardize the gingival health if finishing of the veneers were not precise.

A final, full-arch impression was taken using a polyvinyl material. The impression was inspected for marginal accuracy before it was sent to the lab. An opposing, full-arch alginate impression was then taken. Bite registration was taken for accuracy to maintain the precise cusp-to-cusp occlusion. A provisional restoration was fabricated and trimmed for marginal adaptation and adjusted for opposing contact, protrusive, and laterotrusive movements. Approximately 0.5-1.0 mm of the provisional material was removed from the facial surface then overlaid and contoured with a micro-fill resin to maximize esthetics. The temporary restoration was finished and polished. The preparation was disinfected with Concepsis, air-dried, and the temporary restoration was cemented with a non-eugenol cement.¹⁴

TRY-IN STAGE

The try-in stage is critical for two reasons: first, to accurately determine the fit of the restoration, and second, to determine the final shade of the restoration. The fluoride releasing, micro-hybrid resin luting cement chosen for final cementation was Variolink II. With this system, try-in pastes are available which correctly match all shades of the final cement. The translucent try-in paste was selected for the best esthetic result. The internal surface of the veneers was cleaned and etched for 60 seconds with a 35% phosphoric acid. This process removes any surface contami-

nation and acidifies the porcelain surface, which increases the efficacy of a silane coupling agent.² The acid was then thoroughly rinsed off and the restorations were air-dried. A silane-coupling agent was then applied to the internal surface of all the restorations, left undisturbed for 60 seconds, then air-dried. Silane coupling agents have been shown to increase the bond strength between the porcelain and the resin cement and to decrease microleakage.^{15,16} An unfilled resin was then applied to the internal surface of all the restorations and thinned with air accordingly. The restorations were placed in a light-protective container to prevent the premature setting of the unfilled resin prior to final cementation.

FINAL CEMENTATION

Lip retractors were placed to obtain complete moisture control. The teeth preparations were cleaned with an antibacterial scrub containing chlorhexidine, rinsed, and dried. The 35% phosphoric acid etchant, noted previously, was then applied to the entire preparation on all teeth for 15 seconds, rinsed, and lightly air-dried, so as not to desiccate the teeth. Gluma was placed on the preparations for its antibacterial, cleansing, and rewetting properties. The preparations were lightly air-dried, then primed utilizing several applications. The teeth were lightly air-dried, then followed by the application of the light-cured adhesive resin. The usage of a light-cured adhesive vs a dual-cured adhesive in the multiple placement of veneers prevents the possible premature setting of the adhesive, and thus prevents incomplete seating of the restorations.



Figure 9: The front 1:1 view shows the degree of incisal attrition and the initial complex shading of his teeth as well as the health of his gingival tissues.

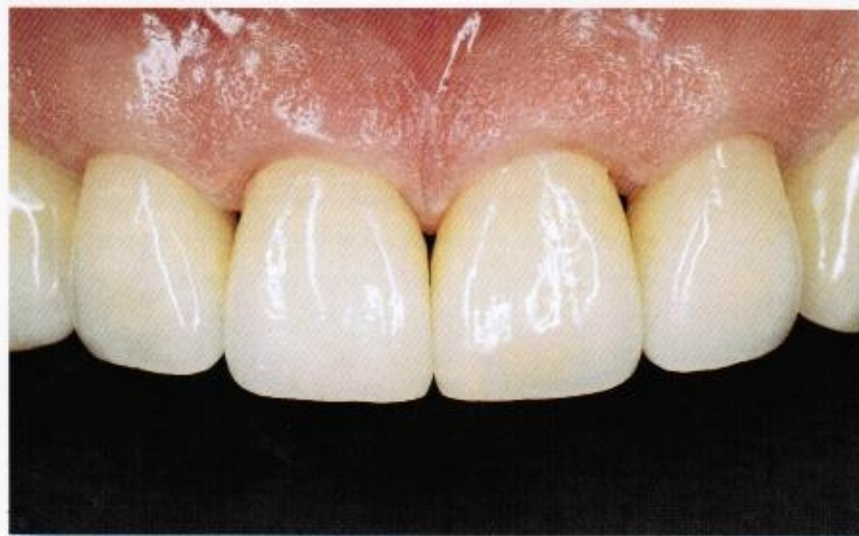


Figure 10: The final front 1:1 view shows off the excellent shading with numerous internal and surface "maverick" colors giving his veneers a natural and appropriate look (for a 72 year-old man). The facial anatomy, incisal edge form, and surface texture is clearly visualized and his gingival tissues remain in perfect health.

The veneers were filled with the corresponding translucent shade of luting cement and all the veneers were seated completely at one time to prevent the possibility of improper final place-

ment. Excess cement was removed first with a rubber tip instrument followed by a brush tip, then all veneers were spot-cured for three seconds each from both the facial and lingual sur-

faces with a 0.5 mm argon laser light fiber. Additional excess cement was then removed with care taken not to disrupt the gingival tissues. A de-oxygenating agent was applied to all margins and final curing was completed from both the facial and lingual aspects with a 12-mm argon laser light tip for 20 seconds on each tooth.

The occlusion, laterotrusive, and protrusive movements were checked and adjusted after the lip retractors were removed. Final finishing in the traditional manner was completed using fine carbide and diamond finishing burs, finishing strips, and polishing cups and points. The final veneers demonstrated outstanding esthetic harmony, excellent periodontal response, as well as uniform balance and symmetry. (Figures 9 and 10) The marginal integrity of the restorations was indistinguishable from the surrounding dentition. The patient was extremely pleased with the final result.


DISCUSSION

This case presented an unusual challenge: to be more concerned with restoring proper form and function rather than any esthetic demands by the patient (which there were none). The preparation design was also important in order to provide the proper amount of reduction for the ideal fabrication of the final restorations. An inspection of all contours and proportions of the existing anterior teeth from both gingival to incisal as well as facial to lingual was performed and carefully translated to all phases of the veneer development. The layered porcelain technique over a pressed core material was used to replicate the desired characteristics

within the teeth. Extrinsic stains were then added to mimic the aged appearance of his existing teeth. Utilizing all these factors, the final result demonstrates outstanding form and esthetics appropriate for this 72 year-old man.

CONCLUSION

Today's restorative challenges have become easier through the advances made in all-ceramic restorative materials. The esthetic, natural, and vital appearance seen in the final restorations can be achieved by means of clinical and laboratory skills and the proper communication between these persons. The strength, marginal adaptation, and vitality of the current porcelains available combined with state-of-the-art adhesive bonding techniques has provided dentists with the ability to easily replicate even the most difficult of restorative situations. High quality, life-like restorations that will give the patient many years of esthetic confidence and durable function are possible when all factors of the patient's restorative treatment are carefully analyzed prior to the initiation of treatment. Knowledge of the multitude of restorative materials and systems presently in the dental marketplace and their applications to specific dental situations is essential if the clinician is to provide his/her patient with

the best type of treatment. The ability to successfully manage any restorative situation, from simple to complex, as previously described, is the responsibility of all of us presently caring for and treating patients.¹⁷ The final outcome achieved in this case not only met and satisfied but exceeded the criteria desired by both the clinician and the patient.¹⁸ 

ACKNOWLEDGEMENTS

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REMINDER

Please take note of the following deadlines for future issues of the AACD Journal.
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Winter 2000 Issue due November 3, 1999

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