

Bonding the gap between petralit and ceromers: with case reviews

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The search for a metal-free, aesthetic restoration with optimal strength, longevity, and comfort easily dates back to the 19th century. However, the popularity of adhesively retained restorations has reached an all-time high due to improvements in wear, post-op sensitivity, bond material and strength, and aesthetic quality. Targis/Vectris, a ceromer restorative material introduced in 1997 by Ivoclar-Williams, is a ceramic optimized polymer that produces a strong fiber-reinforced tooth-colored restoration. It allows the clinician to fabricate metal-free restorations without the fracture potential seen with ceramic materials. Long-term longitudinal studies of this restorative material will be the litmus test, but we now have 10-year studies that show very promising results. (Journal Indiana Dental Association, Vol. 79, No. 1, Spring 2000, pp. 12-15.)

retained restorations was met with much resistance. Simonsen's editorial "Why Crowns?"³ called it a disservice to aggressively crown a tooth when the same result could be achieved with a much more conservative bonded restoration. This viewpoint has forced restorative dentists around the country to reconsider when to perform surgery and how to restore compromised teeth back to health.

Background

Adhesively retained restorations have become more and more popular due to the tremendous success with their use.⁴⁻¹⁰ With the new fourth and fifth generation dental adhesives, these tooth-supported restorations bring the tooth back close to its original strength.¹¹⁻¹⁷ The indirect restorations not only wear well but will not significantly wear the opposing tooth structure.¹⁸⁻¹⁹ Add to this the fabulous aesthetics that can be achieved by using adhesive restorations, it is no wonder why dentists are glad to make them a part of their clinical armamentaria.

Development

The esthetic restorative dentist has a plethora of new restorative materials to choose from. One of these new materials (Targis/Vectris, Ivoclar-Williams) was introduced in 1997. The development of Targis/Vectris has created a new category of material called Ceromers, a name coined by Dr. Bernard Touati.²⁰ Ceromer is short for Ceramic Optimized Polymer. This material provides an extremely strong fiber reinforced tooth-colored restoration



Figure 2A. Large broken down alloy on #5 with recurrent decay noted radiographically on #4 and #3.



Figure 2B. Alloys and gold inlay removed and all decay and compromised tooth structure removed.

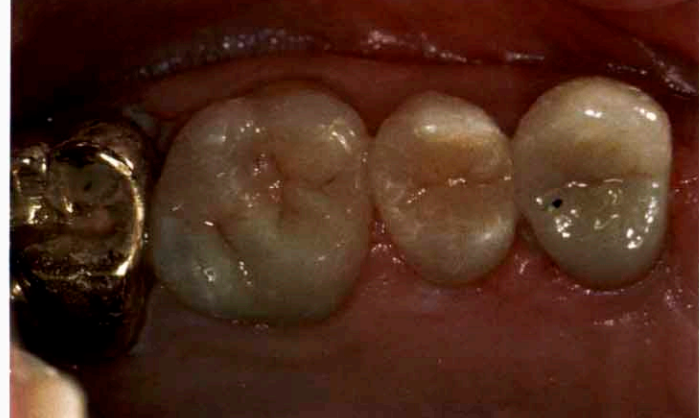


Figure 2C. Teeth restored to proper form, function, and esthetics.



Figure 4A. Occlusal alloy fracture and visible horizontal fracture running the length of the buccal cusp of tooth #20.



Figure 4B. Decay and compromised tooth structure removed.



Figure 4C. Teeth restored to proper form, function, and esthetics.

Conclusion

Dating back to as early as 1909, the use of a tooth-colored, strong, comfortable metal-free restoration was desirable. Shifting from mechanically to adhesively retained restorations has made the century-old dream of a tooth-colored, strong, aesthetic, metal-free restoration a reality. This major paradigm shift of adhesively retained restorations initially met much resistance, but the growing number of articles in the literature is beginning to show a more long-term restoration than initially thought by its major detractors. Long-term longitudinal studies will be the determining factor, but it currently appears like the dream has become a reality and the future looks bright. Just as Dr. G. V. Black was a legend in the mechanical age of operative dentistry, Dr. Takao Fusayama is the pioneer in this new and exciting adhesive age of restorative dentistry. As professor Takao Fusayama states so accurately, "The dream of dentists infinitely expands with adhesive restorative materials."²⁹

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14 JIDA • Spring 2000

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Introduction

In 1909, Premier Dental Products Co. distributed a posterior silicate restoration called Petralit developed several years earlier by Dental Fillings Ltd., London, England. One of the company's early technical pamphlets describes Petralit as making "durable aesthetic fillings and restorations that are more easily prepared and more comfortable to the patient than those of metal." The last page of the pamphlet states, "The versatility of Petralit, its retentiveness, strength and esthetic qualities permit its use for unusual restorations not included here." A package of four powders and two liquids cost \$11.¹

After reading this pamphlet, it is obvious that the cost of materials has changed, but the ultimate quest for a metal-free, aesthetic restoration with optimal strength, longevity, and comfort is not as new as we may think.

History

In the mid 1800s, Dr. Adelbert J. Volek introduced a tooth-colored filling material. "Porcelain inlays fashioned to fit prepared cavities precisely" were first marketed about 1880.² These esthetic restorations failed due to the severe limitations of the material itself and the inability to properly adhere the material to the tooth structure. G.V. Black's extension for prevention, which called for very aggressive tooth structure removal, was the standard of care for more than 90 years. The late 1980s and early 1990s brought about a major paradigm shift in the way we not only restored but repaired teeth. This shift from mechanically to adhesively



Figure 1A. Large broken alloys with decay noted interproximally on mesial of #2 and distal of #3.



Figure 1B. Alloys removed and all decay and compromised tooth structure removed.

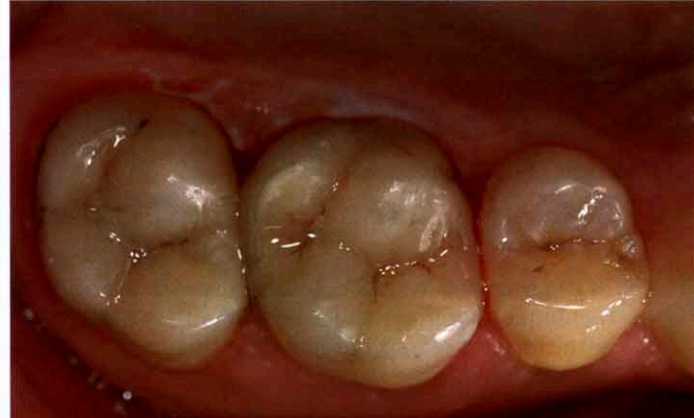


Figure 1C. Teeth restored to proper form, function, and esthetics.



Figure 3A. Large broken down alloy on #3 with recurrent decay noted.



Figure 3B. Alloy removed and all decay and compromised tooth structure removed.



Figure 3C. Tooth restored to proper form, function, and esthetics.

that allows the clinician to fabricate metal-free restorations without the fracture potential seen with ceramic materials.

Targis/Vectris is composed of two unique materials. This system differs from conventional ceramics and resins in that it is an 80 percent filled heat and light processed reinforced resin. Targis can then be placed over the Vectris framework for crowns, bridges, inlays, or onlays. This material has a very life-like translucency and a high degree of fluorescence. The wear rate of the Targis overlay is approximately one-third less than amalgam and very close to enamel. The Targis overlay's high flexural strength of approximately 150 mpa is much greater than both traditional ceramics and composites (80 mpa).

The Vectris component is composed of a glass fiber reinforced matrix which makes it possible to fabricate metal free restorations. This fiber reinforced material (FRM) is composed of several layers of fiber wafers as well as uniaxially oriented fiber bundles. This FRM has outstanding translucency and a high flexural strength. The flexural strength of the Vectris pontic is almost twice that of Inceram and 10 times that of feldspathic porcelain. This creates a Targis/Vectris restoration with a strength similar to conventional porcelain fused to metal restorations.²¹

Cases

All restorations are Targis/Vectris.

13 JIDA • Spring 2000



Figure 5A. Large broken down alloy with decay noted on distal of tooth #14.



Figure 5B. Alloy removed and all decay and compromised tooth structure removed.



Figure 5C. Tooth restored to proper form, function, and esthetics.



Figure 6A. Large broken down alloys on teeth #14 and #15 with recurrent decay.

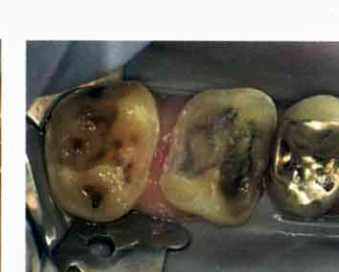


Figure 6B. Decay and compromised tooth structure removed.



Figure 6C. Teeth restored to proper form, function, and esthetics.

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