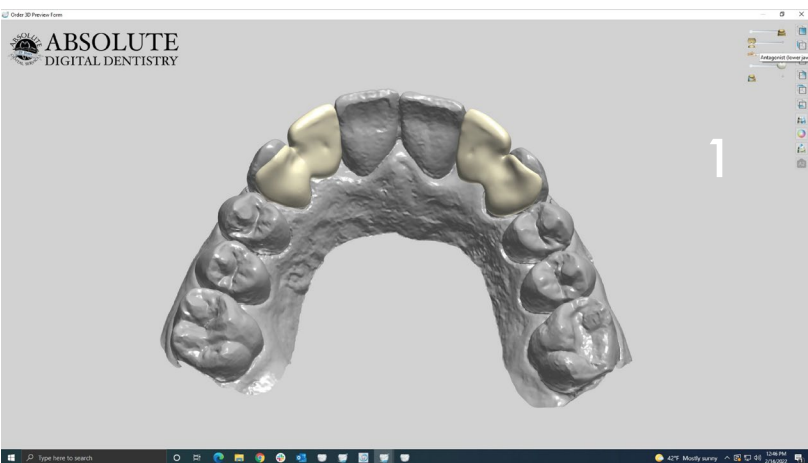


# SINGLE-WINGED MARYLAND BRIDGES

**MARYLAND BRIDGES**, perhaps the most controversial restorative option in the history of our industry, is still being prescribed today, more than 50 years after the concept was initially described!<sup>1</sup> In the mid-2000's, materials have evolved from alloy supported PFMs to modern-day lithium disilicate solutions. Unfortunately, because of strength issues in lithium disilicate, the basic design and unneeded invasiveness of the preparations stayed mostly unchanged through many decades of use. That was true until zirconia became a more esthetically acceptable anterior solution within the last decade. The inherent strength of modern-day zirconia allows for less invasive preparations and therefore thinner and more functional designs.



**Figure 1**  
Digital case design from intra-oral scan ready for review and milling.



**Figure 2**  
High translucency zirconia monolithic single-winged Maryland. Requires no layering ceramics for esthetics.

To fuel the controversy surrounding the use of Maryland bridges even further, some technicians and clinicians started prescribing and fabricating single-winged resin bonded bridges instead of the traditional dual-winged designs.

This article has its origin in social media posts that Absolute Dental Laboratory published in the spring of 2022. These case-study posts showed a few of these successfully delivered single-winged bridges. Responses from technicians and clinicians alike were either overwhelmingly in favor or scathingly against the concept. When evaluating controversial, and sometimes emotionally charged restorative options like these, it is too easy to dismiss the option based on opinion rather than fact. To mediate in a case like this, it is necessary to turn to published literature on the subject to provide some better guidance.

## THE RESEARCH

In 2020, Carlos Alberto and his team closely followed a single retainer resin bonded bridge for a two-year period and reported their findings in *Restorative Dentistry and Endodontics*, published in May 2020. They reported that this single-winged retained bridge displayed satisfactory function and esthetics over a 24-month period.<sup>2</sup> Even though a two-year survival rate is not generally seen as a successful restoration, the article suggests that design shortcomings and/or bonding issues would have manifested itself in failure within that studied period.



Looking back to 2018, Bilal Mourshed et al. published a review on single-winged resin bonded bridges in the *Journal of Prosthodontics*. In this article, they documented a five-year survival rate of around 92 percent. What made this article even more relevant to this discussion was the fact that in this study, they compared the single-unit bridge to its more traditional double-winged counterparts. They found a higher prosthesis survival rate and showed a noteworthy lower debonding rate in single-winged bridges over dual-winged designs.<sup>3</sup>

In evaluating some more practical opinions, Dr. Lee Ann Brady (Glendale, Arizona) reports that she regularly prescribes single-winged bridges and has documented a much higher success rate when compared to the more traditional designs. In her article she writes, “When I first heard about this, it sounded counterintuitive until you think about the physics. When you use only one wing, the pontic can move with the abutment under load. With two wings, especially around a curve, the forces are directed differently and the movement of one tooth causes the bond to be flexed causing a bond failure over time.”<sup>4</sup>

To further support her views, Dr. Julian Holmes, president of the International Association of Healthcare and Dentistry, reports that he has been using and teaching this restorative technique for more than a decade. He reports that after doing some research of his own, he quickly realized the problem with dual-winged designs was the fact that they suffered from rigidity. Although a rigid design is often associated with strength, in the case of resin bonded bridges it has the opposite effect. This rigidity does not allow for natural tooth movement and therefore, a two-winged design will usually de-bond at one end, causing a hidden opening where lingual demineralization and decay begins. Dr. Holmes admits that this concept initially sounds counterintuitive, but it is not until the actual physics and stresses involved are considered that the true advantage of a single-winged Maryland bridge becomes evident.



## BONDING TO ZIRCONIA

Zirconia, with its superior strength and exceptional monolithic esthetics, is widely seen as the best option for Maryland bridges. Unfortunately, material strength and natural aesthetics are worthless properties without a dependable way to securely bond the prosthesis to the tooth structure. In some circles, it is still believed that zirconia cannot be bonded effectively, and therefore, this material is simply not suitable for this application.

Dr. Markus Blatz and his team wrote an exceptional research piece on bonding zirconia in the October 2016 issue of *Compendium* magazine. They coined the term “APC” to describe their technique of bonding zirconia.<sup>5</sup> This technique teaches three very practical steps. Below is a short summary pulled from their article describing the APC process:

### A – Air particle abrasion

*After restoration cleaning, zirconia should be air-particle abraded (APC-Step A) with alumina or silica-coated alumina particles; some call this procedure sandblasting or microetching. A chair-side microetcher using small particles (50 μm to 60 μm) at a low pressure (below 2 bar) is sufficient.*

**Figure 3**

Monolithic zirconia color customized by applying MiYO liquid ceramics.

**Figure 4**

Digital design is verified and finalized on analog printed model from IO scan. Fabrication can be fully modelless.

**Figure 5**

Retracted anterior view. Day of delivery.

**Figure 6**

Material strength reduces required lingual coverage of retainers.



**Figure 7**

Final smile



### *P – Zirconia primer*

The subsequent step includes application of a special ceramic primer (APC-Step P), which typically contains special adhesive phosphate monomers, onto the zirconia bonding surfaces.

### *C – Adhesive composite resin*

Dual- or self-cure composites (APC-Step C) should be used to ensure adequate polymerization/conversion beneath the zirconia restoration, which reduces light transmission.


This above quoted article is an exceptional resource and offers a detailed and in-depth look into zirconia bonding techniques. The Absolute Lab team regularly refers to and supplies their customers with this information when questions arise regarding bonding of zirconia.

## CASE STUDY

The article photos feature a case study that shows the life-like esthetic and highly functional results achievable with this full digital workflow. This case was processed by Jack Marrano and the Absolute Dental Lab ART team. This was processed in collaboration with Dr. Keri Chen, Graduate Prosthodontic Clinic, University of Illinois Chicago.

## CONCLUSION

It is generally agreed that an implant retained prosthesis is a more predictable restorative solution than a Maryland bridge. There are, however, cases where a resin bonded bridge offers the patient a good alternative in lieu of a more invasive, three-unit bridge option.

After restoring multiple patients with single-winged bridges, it has become evident that, although counterintuitive, a single winged-bridge does offer a better chance at success than a traditional dual-winged bridge! 

## ABOUT THE AUTHORS

Conrad J. Rensburg, N.H & N.H.D is the CEO and owner of Absolute Dental Laboratory and leads the implant and NavaGation Precision Guidance® surgical divisions. Jack Marrano, CDT is Director of the Signature Prosthetics team and leads the Absolute Dental ART Team (Advanced Restorative Team). They are authors of multiple peer-reviewed articles and have presented at, and are members of, the Academy of Osseointegration, the American College of Prosthodontists, the PEERS prosthodontic association and many other societies. They continue to play an integral part in the research and development of many of today's restorative materials and development of digital clinical workflows. Supported by their exceptional Absolute and NavaGation teams, they offer comprehensive, high quality, prosthetic, and surgical solutions to clinicians across the United States. Conrad and Jack can be reached at [www.absolutedentallab.com](http://www.absolutedentallab.com).



## REFERENCES

1. Rochette AL. Attachment of a splint to enamel of lower anterior teeth. *J Prosthet Dent.* 1973;30:418–423.
2. Carlos Alberto Jurado,1 Akimasa Tsujimoto. Chair-side CAD/CAM fabrication of a single-retainer resin bonded fixed dental prosthesis: a case report. *Restor Dent Endod.* 2020 May; 45(2): e15.  
Published online 2020 Feb 6. doi: 10.5395/rde.2020.45.e15
3. Mourshed B, Samran A, Alfagih A, Samran A, Abdulrab S, Kern M. Anterior cantilever resin-bonded fixed dental prostheses: a review of the literature. *J Prosthodont.* 2018;27:266–275.
4. <https://leeannbrady.com/esthetic-dentistry/resin-bonded-bridge-one>  
[https://pubmed.ncbi.nlm.nih.gov/27700128/wing-or-two?](https://pubmed.ncbi.nlm.nih.gov/27700128/wing-or-two/)
5. Markus B Blatz 1, Marcela Alvarez 2, Kimiyo Sawyer 3, Marco Brindis . How to Bond Zirconia: The APC Concept. *Compendium Contin Educ Dent.* 2016 Oct; 37(9):611-617; quiz 618.