Accreditation Clinical Case Report, Case Type III: Tooth Replacement With a Fixed Partial Bridge (Failed Case)

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Introduction

It is common for patients to be missing a tooth or teeth in their upper anterior quadrant. However, correcting this deficiency while creating a high level of esthetics, along with biological soundness, presents many challenges for the practitioner. Treatment options such as implant therapy or a fixed partial denture (i.e., bridge) must be considered, in addition to addressing the associated gingival architecture. Failure to create harmony between these two entities—the tissue and the prosthetic tooth structure—will ultimately lead to an esthetic failure. Therefore, it is essential for the clinician to thoroughly review the treatment options with the patient so that he or she can make an informed decision about the method utilized to replace the missing tooth or teeth. Once a treatment has been selected, it is critical for the clinician to engage in a proper protocol of smile design and diagnosis, including a wax-up; followed by a meticulous sequence of tooth preparation, provisional restorations, laboratory communication, and ceramic cementation. If the diagnostic part of this case had been more thorough, I would have realized that lack of bone in the pontic area would cause unpredictable papilla heights.

Implant therapy was discussed, but the patient elected to proceed with bridge replacement.

Clinical History and Complaint

The patient, a 32-year-old female, presented in good general health. With the exception of her upper anterior teeth, her dental condition was healthy and stable. The patient was unhappy with the esthetics of her upper front teeth, due to previously placed dental restorations. She stated that she had lost her front tooth many years earlier due to a car accident and that the existing bridge

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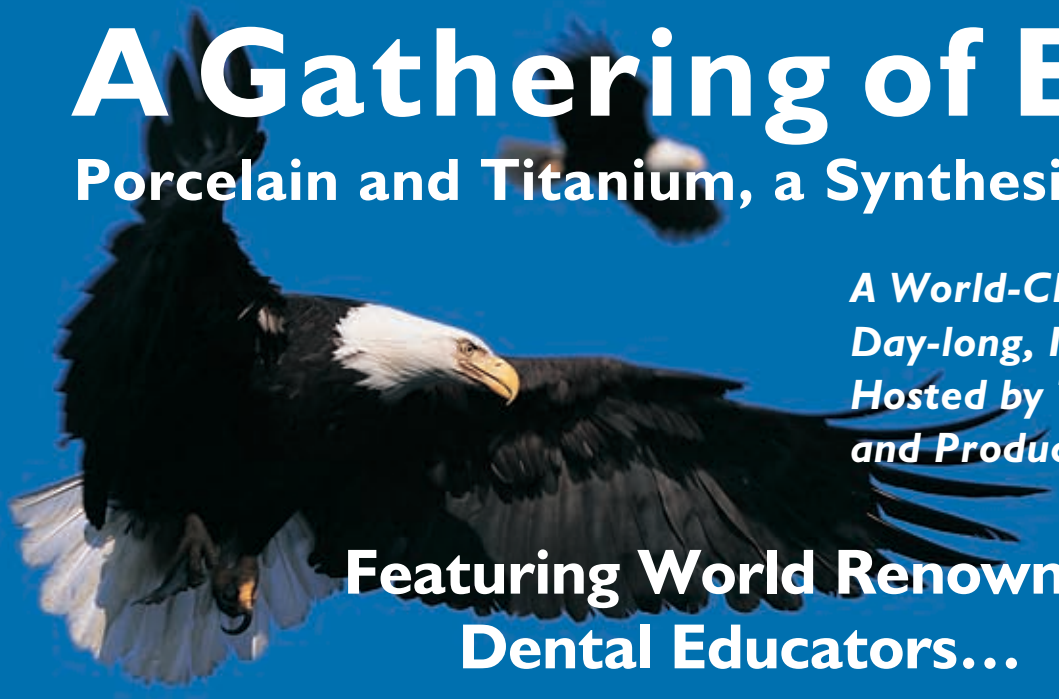

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Figure 1: Before; unsightly bridge, asymmetrical teeth, and shade discrepancies. After; symmetrical restorations, resulting in a natural appearance.

and the veneer were more than 10 years old (Fig 1).

She wanted a dental therapy that would produce a natural and long-lasting smile, utilizing as conservative an approach as possible.

Clinical Evaluation and Treatment Plan

Upon clinical examination, it was noted that the patient had a three-unit bridge (##8–10) replacing #9, and a porcelain veneer on #7. There were numerous esthetic deficiencies associated with these teeth (Fig 2):

- There was a total color mismatch between the restorations themselves and the adjacent natural dentition.
- The proportions of her upper anterior teeth were highly unesthetic, as their width-to-height ratio was approaching 50:60.
- As a result of #9 being absent, there was gingival collapse with the ridge, both buccal and lingual, above this tooth.
- The color of the natural dentition was unacceptable to the patient.
- The lower anterior teeth were slightly worn incisally and moderately crooked.

The patient stated that other than lightening the lower teeth, she did not want therapy in this area. She was, however, amenable to undergoing whatever therapy would correct the deficiencies in her upper dentition.

The treatment plan that was ultimately chosen incorporated periodontal therapy, bleaching of the lower dentition, and veneer placement, as well as replacement of the three-unit bridge. Implant therapy was discussed, but the patient elected to proceed with bridge replacement.

Treatment

Preparation

A full-face digital photograph was submitted to an outsourced company (Virtual Smiles, Anaheim, CA) that creates computer-simulated dental imaging. The patient examined the resulting image of the proposed esthetic result. She stated that if her final result could closely match the simulation, then she wanted to proceed with the treatment.

A duplicate set of study models was made. The teeth to be treated were prepared and sent to the laboratory to be mounted and waxed up to meet the desired shape depicted in the computer simulation. A home-bleaching stent was manufactured. A surgical stent based on the diagnostic wax-up was also manufactured, to aid the periodontist's surgical procedure

During this time the patient proceeded with periodontal therapy, which included crown lengthening of the upper eight anterior teeth in order to create a more symmetrical and harmonious gingival architecture. In addition, teeth #8 and #9 underwent osteoplasty and ostectomy, plus augmentation of the edentulous ridge with AlloDerm (LifeCell Corp.; Branchburg, NJ) to fill out the deficient contour. Unfortunately, the augmentation decreased in height during the healing phase.

Following a healing phase of approximately seven weeks, the patient returned to have a provisional bridge placed in order to develop the pontic site. At this time, pressure was

Figure 2: Before; unsightly bridge, asymmetrical teeth, and shade discrepancies. After; symmetrical restorations resulting in a natural appearance (other than asymmetrical papillae).

Figure 3: Before; pontic is obvious, along with poor ceramic optics and design. After; all the ceramics (##5–12), including the pontic, appear natural and blend with the surrounding dentition. However, laterals are asymmetrical due to surrounding tissue.

placed on the tissue to push the papillae apically; however, the change in the papillae was not adequate.

After three months of healing, the patient was examined by the periodontist and was released to proceed with her final restorations.

FINAL RESTORATIONS

Local anesthesia was administered utilizing CompuDent (Milestone Scientific; Livingston, NJ) with 2% lidocaine introduced palatally. This application allowed for complete anesthesia of the upper anterior dentition without numbing the facial gingiva and upper lip. This was extremely important, as it allowed for an accurate smile evaluation following the placement of the provisionals.

Teeth ##5–7, #11, and #12 were prepared for porcelain veneers and ##8–10 were prepared for a three-unit porcelain-fused-to-metal bridge. For esthetic purposes, this bridge would have a facial cutback in order to utilize the optical benefits of porcelain, without being hindered by the optics of the metal substructure. In addition, full-porcelain margins would also be fabricated.

Provisional veneers and bridge were manufactured using a putty stent made from the diagnostic wax-up. Protemp 3 A1 and Filtek Flow A2 (3M ESPE; St. Paul, MN) were used. The provisional was confirmed for the correct shape and form; models were made and photographs were taken and sent to the laboratory. A shade that would be harmonious with the patient's natural dentition was selected for the permanent restorations, and the patient was asked to return once the final restorations were completed.

The finished veneers were tried in individually and dry to confirm fit. They were then tried in collectively with water to optically "con-

Figure 4: Before; tissue appears inflamed; and the bridge, as well as the veneer on #7, is unnatural in appearance. After; healthy tissue and natural ceramic optics for teeth ##7–10 create beautiful esthetics. However, papillae heights are variable.

nect" the veneers to the underlying tooth structure. Once it was determined that the veneers were ready to be placed permanently, they were bonded to the teeth using a 37% phosphoric acid, an adhesive layer of SingleBond (3M ESPE), followed by a translucent veneer cement (Rely X, 3M ESPE). Once the veneers were completely cured, excess cement was removed using tungsten carbide carvers and a #12 Bard-Parker scalpel (Franklin Lakes, NJ). The bridge was tried in to confirm that it matched the adjacent veneered teeth and was then cemented (Unicem, 3M ESPE). Excess cement was removed and necessary bite adjustments were made.

The patient was dismissed and was scheduled to return several weeks later—allowing the gingival tissue to settle and heal—for final photography (Figs 1–4, "After" images).

Summary

The patient was thrilled with the results, and said that she was more self-confident as a result of her new smile.

A natural and long-lasting result was created by following a proper protocol of smile design, diagnostic wax-up, custom provisional restorations, and thorough communication with the laboratory and other disciplines involved. In addition, the precise application and finishing of the porcelain restorations (Figs 1 & 2, "After" images), helped to exceed the patient's expectations. However, in hindsight, the periodontist and I could have predicted papillae loss if we had studied the bone loss on the x-rays.

Why the Case Failed Accreditation

After receiving the examiners' evaluation as to why this case failed, it became evident to me that there were fundamental issues that I had not addressed at the Accreditation level. When I reviewed my photographs, I saw the obvious papilla asymmetries, the far-from-ideal height-to-width ratios of the ceramics, and the excessively long pontic connectors (Fig 3). The gingival tissue also appeared a little immature (patience on my part in allowing the tissue to heal completely before submitting the case would have eliminated this major fault).

Importance of Case Selection

The most important lesson I learned from this experience is that attention to case selection is absolutely critical. My not realizing from the outset that I would not be able to achieve predictable papillae heights and contours (Fig. 4, "After" image) eventually led to the case's failure. This ultimately was a case that could not be restored to meet the specific standards required for Accreditation. Rather than trying to fix the observed deficiencies, however, I decided to look for a new case.

My second attempt at Case Type III utilized an implant-supported restoration. A thorough evaluation of the bone and tissue position through radiographs and consultations with a periodontist prior to treatment confirmed the fact that a predictable result could be achieved (as long as the laboratory technician, the periodontist, and I employed meticulous therapeutic modalities). Much to my joy and relief, this case met the standards for Accreditation.

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Examiners' Perspective for Jack Ringer, D.D.S. (Failed Case)

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Dr. Jack Ringer, with a true teacher's heart, has shared with us his failed Case Type III, Tooth Replacement. The road to Accreditation is not always smooth, even for an accomplished clinician like Dr. Ringer, himself an educator in restorative dentistry. For those with real passion for our art, the journey is a labor of love that sets egos aside in favor of a spirit of sharing, learning, teaching, and camaraderie. That is what makes the AACD and its members so special.

Case Type III, Tooth Replacement, tests a candidate's ability to develop soft tissue contours for natural esthetics while utilizing a fixed bridge or an implant-supported crown to replace a missing tooth. Developing the soft tissue in the edentulous site so that the pontic or the implant-supported crown can emerge naturally from the tissue and achieve symmetrical gingival architecture, including symmetrical papillae heights, is the challenge with this case type. It necessitates meticulous treatment planning and, often, a close working relationship with a periodontist.

This case, even though it was a vast esthetic improvement for the patient, had too many issues that prevented it from being a successful Accreditation case. In regard to smile design, examiners felt that the smile line was too straight across and not in harmony with the superior border of the lower lip. Directly related to this was the width-to-length ratio of the central incisors, which was greater than the 75 to 80% range that is considered esthetically pleasing. Most examiners felt the centrals should have been longer, which would also have improved the smile line.

The major issue with this case was tissue contour. Although periodontal crown lengthening was done and the edentulous ridge augmented, these fell short of the intended objectives to achieve gingival symmetry. Firstly, the cervical gingival heights of the lateral incisors were uneven, which created an asymmetrical gingival architecture that was not in harmony with the smile design. This escalated into the creation of lateral incisors that were not

even in cervical/incisal tooth length. Secondly, the gingival papillae were blunted on both sides of the edentulous space, which leads to both asymmetrical papillae heights and long connectors in the porcelain work.

Although the porcelain restorations were beautiful optically, the problematic tissue contours could not be overcome. This is why case selection is so critical for success in this case type. Dr. Ringer's case selection for his successful Case Type III was ideal.

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