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# JOURNAL of Cosmetic Dentistry

VOLUME 24 • NUMBER 3
FALL 2008

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*Li Y, Lee SS, Zheng M, Forde CA, Carino CM. Effect of Light Treatment on in vitro Tooth Bleaching Efficacy. Journal of Dental Research 86 (Special Issue A): 0275, 2007
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***Sabiha M. Bunek, DDS; John M. Powers, PhD; John W. Farah, DDS, Phd; Lori K. Brown, DDS; Santine E. Anderson, DDS; William T. Stevenson, DDS; Robert J. Stevenson, DDS. Effect of Zoom! Advanced Power Lamp on Whitening. Dental Advisor Research Report (Dental Consultants, Inc.), 2008

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# The Journal of Cosmetic Dentistry




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# CELEBRATING EXCELLENCE IN COSMETIC DENTISTRY 2008, NEW ORLEANS

**JOURNAL OF COSMETIC DENTISTRY • VOLUME 24 NUMBER 3 • FALL 2008 SPECIAL ISSUE**



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# THE SECRET INGREDIENT

How often do you find yourself searching for something, that special ingredient that will solve your problem or take you to the "next" place in life? Maybe you need help resolving an unexpected dilemma or maybe it is something that has been nagging you for months. Maybe it is not even a problem, but rather something that you have wanted: A vacation home in Cabo, or a golfing holiday in Ireland. You keep holding off until…something else happens. You have great intentions and do not mean to procrastinate; it just happens because you justify waiting for a sequence of events to fall in line before you can finally reach your "destination."

There is a line from the popular movie "Kung Fu Panda," an idea that I have shared with you in the past, because it has such deceptively simple depth of meaning that can be applied to many situations. In the movie, Sensei Master Oogway speaks of the "gift" that today brings us: "*Yesterday is history. Tomorrow is a mystery. Today is a gift! That's why they call it the present!*"

Simply being grateful for what we are doing or have today with a plan for tomorrow may be all that we really need to find that secret ingredient.

Ah, the "super-special secret ingredient." You see it or hear it all around you. Maybe not exactly in those terms, but you know McDonald's Big Mac would not be the same without the "special sauce" and KFC's chicken would not be quite as tasty without Colonel Sander's Original Secret Recipe. In order for us to believe their recipes are better than the rest there must be a "special" ingredient that makes it so.

Returning to "Kung Fu Panda," the movie has two great lessons regarding the secret ingredients of life. The first lesson was about the Panda's family recipe for dumplings. Their special dumplings did not actually include a super-secret ingredient. Rather, it was creating an anticipation of something special and making their customers believe that it was the best that actually made their dumplings the best! Likewise, it is our perception that makes getting to that "next" place in life so challenging or unreachable in our mind. All we really have to do, though, is have faith that we can accomplish whatever we desire to make that something special attainable.

The second lesson was about the Kung Fu Master's secret scroll, which contained secret information and was only shown to those who had achieved the coveted status of Kung Fu Master. If you think about it, though, what more does a master need to know if you are really "the Master?" So, what did the scroll contain? Nothing! The scroll was only a reflection; a mirror showing the viewer, the Master, the special ingredient. It is you! You already possess it; everyone does. Do not keep waiting for your success, putting things on hold until you finally reach that point of the journey or until you find that pot of gold at the end of the rainbow.

We too often overestimate what we can accomplish in the short term and underestimate our potential in the long term. You all have the special ingredient, and waiting for tomorrow is only delaying the success that you can have today. You simply have to believe that today is the day you stop waiting for tomorrow, for something to change to start making today your best day ever.

In all that you do, in all that you accomplish or wish to accomplish, there is one common denominator—you! You are the "super-special secret ingredient."

**********

We invite you to experience the energy and highlights of the educational content from the 24th Annual AACD Scientific Session, Excellence in Cosmetic Dentistry 2008, through the 2008 Fall Special Issue of the *Journal of Cosmetic Dentistry*

The AACD continually designs education that opens minds and spirits; reinvigorates passion for cosmetic dentistry; and challenges dentists, laboratory technicians, and team members to explore and expand their skill sets. There are educational opportunities for every learning style. The AACD energy is contagious. Enjoy the inspiration in the pages ahead!

Michael

***Michael J. Koczarski, DDS, Editor***

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# I Just Like to Run

Running, like dentistry, has been my passion for over 30 years. I have spent many early mornings running with my friends from the American Academy of Cosmetic Dentistry (AACD), discussing dentistry and Academy business. During an AACD advance team meeting in Hawaii last year, I met a remarkable man purely by chance. I stopped Tom Knoll because of his T-shirt, which said "The 1975 Honolulu Ironman Triathlon." Tom ran marathons in most states in the U.S. and was preparing to run across the country. After a fall resulting in 25 stitches and some vision loss; through a tornado in Kansas; and 20 to 30 miles a day of running, Tom, age 75, had raised over $750,000 for charity, and he hoped to exceed $1,000,000.

Why does Tom continue to run? I suspect the answer is that he just likes to run; running and giving bring him joy.

Our Academy presents members with many opportunities to fulfill themselves in a similar way. The AACD Charitable Foundation's (AACDCF) Give Back A Smile™ (GBAS) program is dedicated to restoring not just the smiles, but also the lives of survivors of domestic violence. These survivors have had their lives broken and hearts crushed, but GBAS allows AACD members to make a significant difference in the life of another person. When you volunteer for GBAS, you find out firsthand how rewarding the experience can be for you and your team. If you are like other members who have already made this commitment, you will want to do it again. This process will transform you. I encourage you to contact the AACDCF today at 800.543.9220 to request a patient and to help begin to heal a life.

Some may feel that Accreditation in our Academy is primarily about recognition. I strongly believe Accreditation is really about achievement. The growth you experience throughout the Accreditation process will give you the tools to provide a higher quality of care to your patients. If you have not started on your journey toward Accreditation, start now. If you have begun but have not yet completed the process, now is the time to renew your commitment.

In both of these endeavors—Give Back A Smile and AACD Accreditation—I hope that you will remember Tom Knoll. He just likes to run, and running gives him joy. You, too, will like giving back a smile, and doing so will give you joy. You also will enjoy being Accredited and that, too, will give you joy. No matter what your age or stage of practice, it may be time to take on a new challenge. Busy as you are and difficult as it may sound, surely you can find the time and the desire to improve a life or complete the required cases and submit them for Accreditation. I invite you to take on your own "run" in either or both of these arenas. You will make us all very proud.

The pleasure and camaraderie we find in our AACD family is what keeps us coming back year after year. I have found the same joy and friendship in my "AACD running family." I look forward to seeing more of you during that special time—on those chilly, misty, wonderful mornings—usually long before the sun peaks over the horizon, sharing stories of difficult dental cases, our families, and upcoming long and challenging runs that we are committed to completing.

As it was last year, this year's special Fall issue of the *Journal of Cosmetic Dentistry* will also be mailed to our colleagues who are members of the Academy of General Dentistry. We hope you enjoy the AACD brand of cosmetic dental education and that it enables you to build skills that ultimately serve your patients better.

***Mickey Bernstein, DDS,***
***President, AACD Accredited Member, GBAS Volunteer***

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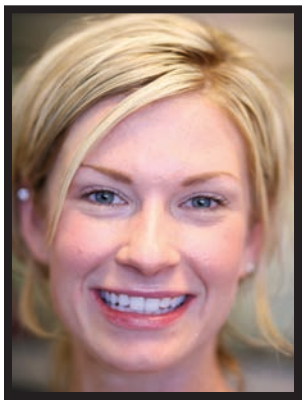


*Full face, before.*

*by* Wade M. Pilling, DMD

Having competed in and won numerous beauty pageants, Melissa definitely had an eye for perfection, and felt that her smile was not perfect. I knew that I had my work cut out for me, especially as Melissa was a dental professional herself. Her main complaint was that her tooth proportions and gingival heights were unnatural; she also was displeased with the existing bonding. My initial reaction was that I could not help her. She already had what I considered pretty teeth, with good color (although perhaps with some proportions outside the norm). Because she was a perfectionist, a beauty queen, and a dental hygienist, I knew expectations were high. Taking an already nice smile and making it better can be challenging, and I wanted to make sure she understood that the benefits needed to outweigh the risks (or, as I like to tell my patients, "The juice has got to be worth the squeeze").

After consultation and further examination, I could better appreciate her concerns. She was congenitally missing laterals, and as a child she had had orthodontics to move canines into the lateral position; this had left her with poor tooth proportions, uneven gingival heights, and lack of central dominance. These issues had bothered her ever since childhood and she was finally in a situation where she felt comfortable proceeding with treatment. Melissa was well aware of the importance of the AACD when selecting a dentist to perform her restorations. She was very upfront about her expectations of having a better smile without the use of orthodontics. Typically in these situations I want to have the orthodontist leave space for laterals, but we were far past that. (See page 20 for a clinical article about this case.)

Melissa had brought in numerous photographs of smiles from magazines showing us the type of smile she desired. She also had given us a deadline by which treatment needed to be completed, because she was competing in the Miss Idaho pageant. Because of her high expectations and desire to be fully involved every step of the way, we had her meet in person with the laboratory technician, Brad Jones from Professional Dental Arts. He had multiple visits with her to create the wax-up that she approved. After doing a mock-up in the mouth, she accepted treatment and was ready to begin. She was referred to a periodontist for crown lengthening on the bicuspids to give them better gingival symmetry and flow as the teeth transitioned from anterior to posterior. Minor root reshaping was also done to the canines to give them a more lateral-looking emergence profile. Canines typically have a large cervical area, which makes a canine difficult to disguise as a lateral. After a healing period, minor gingival reshaping and touch-ups were completed with a diode laser. Preparations were done using oral conscious sedation and Melissa was placed in temporaries to verify esthetics and function. The delivery appointment went very smoothly, with minimal adjustments needed because proper protocol had been followed from records to final restorations. Melissa immediately loved her teeth. She had wanted them to be as white as possible while still looking natural, and I believe we accomplished that. She came in First Runner-Up in the pageant and has since signed a modeling contract. Melissa has always lived life to the fullest, and now she does it with an even bigger smile.

***Before***

***After***

## About the Photo Shoot

*by* Bradley L. Jones, AAACD

To achieve even the possibility of having a photograph chosen for the cover of the *Journal of Cosmetic Dentistry* (*JCD*), it is necessary to take a minimum of 400 shots. These photographs need to be in RAW format with impeccable focus on the patient's teeth. You will need to have some space over the patient's head, which will be needed for the *JCD*'s title. A photograph that tells a story has a much better chance of being selected than one that simply duplicates a previous *JCD* cover. I hired a photographer, Chad Transtrum, for $300 and we each shot over 300 photographs of the patient for this purpose. We both used a Canon D5 digital camera. (Canon USA; Lake Success, NY) This cover was shot with a Canon Zoom Lens EF 24-105 L series. A university campus was chosen for the backdrop. Dr. Pilling acquired the necessary releases for the photographs from the patient, the other photographer, as well as myself, and sent them in to the American Academy of Cosmetic Dentistry (AACD) along with the photographs for the cover submission. I recommend that you contact the AACD Publications Team for front cover guidelines and hire a professional photographer. Then, watch and learn.

Dentistry: Wade A. Pilling, DMD, Meridian, ID. Ceramist: Brad Jones, Boise, ID. Cover Photographer: Chad Transtrum, Boise, ID.

❖

MELISSA HAS ALWAYS LIVED LIFE TO THE FULLEST, AND NOW SHE DOES IT WITH AN EVEN BIGGER SMILE.

*by* Sandra R. Roth
Contributing Editor, *Journal of Cosmetic Dentistry*
Brooksville, FL
sandy@prosynergy.com

# SHARING YOUR WEALTH: WRITING FOR THE *JOURNAL OF COSMETIC DENTISTRY*—AN INVITATION TO CONTRIBUTE

## INTRODUCTION

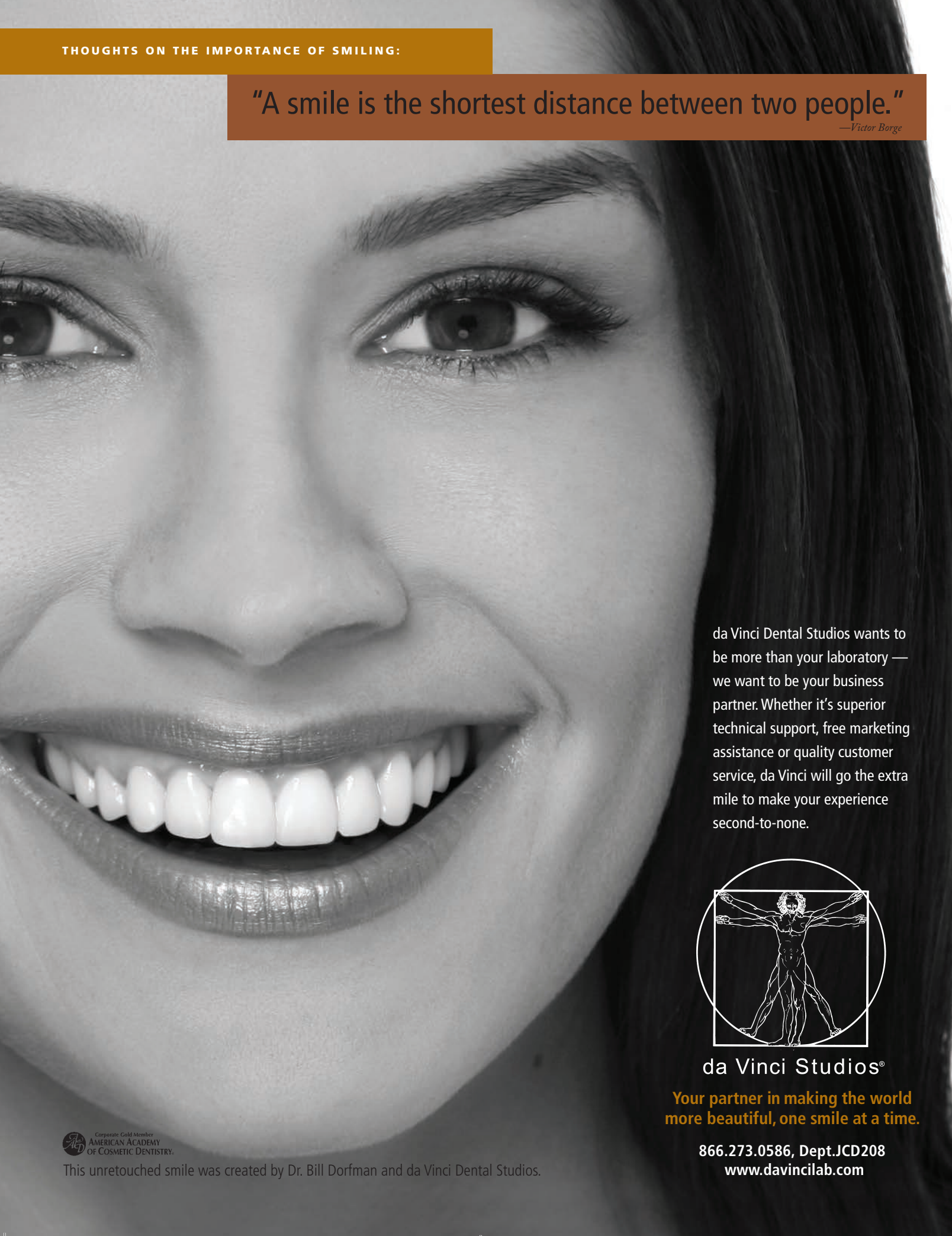
*"And that," said Sandy, the professional writing coach, whose sole mission in life was to rid the dental literature of dangling participles, incomplete ideas and, most of all, unsubstantiated facts not to mention overly complex ideas that never fully develop—or is it never develop fully–"is the perfect example of how not to write an introductory sentence."*

For the last six years at our annual scientific session, we have offered an excellent opportunity for our members to attend a hands-on writing workshop. Our goal has been to encourage members to submit clinical cases, reviews, new information, and other articles of interest to readers of the *Journal of Cosmetic Dentistry* (*JCD*). The course is designed for a small number of attendees—usually 15 or fewer—and we take each person through the process of "building an article from the ground up." Each aspiring author chooses a topic of interest and we begin working through the steps of creating a great article. Because we have only three hours for our course, we focus on nonclinical articles, which are written in a different way than are clinical case submissions. The general types of articles are defined as follows:

## TYPES OF ARTICLES

### CLINICAL CASE REPORT

In this type of article, the writer is presenting a clinical case study with narrative and graphic documentation. The case should have been conducted by the author himself or herself and is often (although not always) an article about a case that might have been submitted for Accreditation. The *JCD* has estab-



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*—Victor Borge*

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lished "Guidelines for Submitting a Manuscript," which outline how to prepare your manuscript, text, references, etc.

#### CLINICAL RESEARCH

The purpose of this type of article is to report on a methodology, material, or procedure. It is documented with research in secondary sources, all of which are cited. It might be a review or critique. The *JCD*'s "Guidelines for Submitting a Manuscript" provides a significant amount of help in preparing clinical content reports for publication.

#### NONCLINICAL "CONCEPT" REPORT

A nonclinical concept report might be a review of the data in a specific nonclinical area (e.g., cosmetic procedure utilization rates, insurance reimbursement patterns, fee analysis). The report would be documented with data cited from primary sources.

#### OPINION PIECE

An opinion piece is written by someone who has expertise and is therefore entitled to an opinion in the area about which he or she is writing. It is understood that the article reflects the opinion of the author, and it may or may not be accompanied by research or secondary source cited data.

As the guidelines for writing clinical articles are well set, the focus of the workshop is on writing nonclinical concept reports and opinion pieces. Here are the steps involved in writing a nonclinical article.

## STEPS TO BUILD YOUR ARTICLE

#### STEP 1. CHOOSE YOUR TOPIC

While this may not sound like such a daunting task, many writers have difficulty selecting a topic that will appeal to readers. Here are a few questions to help you select your topic:

- Who is your target audience? Be as specific as you can in defining your audience: Dentists and/or teams? New members of the Academy? Members of the Board of Directors? The audience for whom you are writing the article will determine the structure of the piece, the verbiage you will choose, and the message you will deliver.
- What is the goal of the article? If the goal is to inform, the article will be written differently than if the article is intended to be a call to action. If the article is intended to instruct, you will require more detail than if it is designed to simply provide a general overview of a concept.

#### STEP 2. DETERMINE YOUR TAKE-HOME MESSAGE

After reading the article, what do you want your reader to retain? The more specific the take-home message, the more likely you are to achieve your goal.

#### STEP 3. CHOOSE A TITLE

Choosing a title is very important because a title can determine whether your article is read at all. Titles must be enticing and yet not misrepresent the main point of the article. Keep the title short and punchy.

#### STEP 4. SELECT YOUR SUBPOINTS

The subpoints must all relate to and advance the goal of the article. Much like 2 + 2 = 4, subpoint 1, plus subpoint 2, plus subpoint 3, must add up to the take-home message you determined for your article. Many writers include too many extraneous messages that take readers too far afield and do not draw them back to the reason the article was written in the first place.

#### STEP 5. CHOOSE A STORY OR ILLUSTRATION FOR EACH SUBPOINT

The best writers make their concepts come alive with real examples that convey the message or make the point. Because many of your readers might not easily be able to apply your message, you can help them (and thereby make your article more effective) with frequent illustrations. Your stories or illustrations must be short, to-the-point, and strong rather than barely relevant.

#### STEP 6. WRITE YOUR INTRODUCTION

Other than the title, the first paragraph must be the most compelling part of your article, because it sets the stage for what follows. There are several ways to ensure that your introductory paragraph entices readers to go further:

- Pose a question of likely interest to the target audience.
- Convey a story or situation that leads into the message.
- Open with a quote that sets the stage for your points.
- Relate a discussion (real or imagined) between two people.

You must avoid simply jumping into the content of your message in the first paragraph. If it is too abrupt it will leave readers without a context in which to continue your article.

#### STEP 7. PUT "MEAT ON THE BONES"

Now it is time to go back to your subpoints and expand the general concept through the written word. In many cases, you will want to ex-

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pand each subpoint to several paragraphs, including your stories or examples.

### Step 8. Choose Transitions Where Appropriate

In some cases, you will want to help readers move from one point to another by creating transitions. A transition can be constructed in several ways, as follows:

- a transitory paragraph bridging one point to the next
- headlines introducing the next point
- an example or story to segue to the next point.

### Step 9. Write Your Concluding Paragraph

The main purpose of the concluding paragraph is to bring the article to closure without leaving readers adrift. It is wise to leave readers with a summary of your points, to help reinforce your take-home message.

### Step 10. Read your article six times from start to finish

Each time you read the article you should focus on a different variable to ensure that you do not get lost in your own words and forget something important. Here are the themes for each reading:

- Does the article flow well?
- Have you made each of the subpoints?
- Do the subpoints add up to the main point?
- Are the stories and examples concise and punchy?
- Is the grammar correct?
- Is there anything that does not fit and should be left out?

### Step 11. Give Your Article to Two People for Review

After you have worked so hard on your piece, it will become difficult for you to be objective in proofreading or editing your own writing. This is when it makes sense to enlist the help of someone who represents the target audience you have chosen for your piece. Ask them to read it through with a critical eye. They should focus first on the take-home message and how the article flows. While the way in which the article is written is important, a review of those aspects must follow the actual content and whether you have been successful in achieving what you set out to do.

### Pitfalls to Avoid

The following are things you should avoid when writing your article. The more sophisticated the writer, the less he or she has to rely on mechanisms that are over-used or do not work.

### Talking About Yourself

Your article will be received best when it focuses on a concept or a set of principles. Do not use your piece as an autobiography or self-aggrandizing essay unless you use your own learning process or foibles as inspiration for the reader.

### Using the Article to Promote a Product, Yourself, or Your Services

Your article should deliver a worthy message on its own and should never be an "advertisement." If your message is compelling enough, people will want to know more about you and your work.

### Plagiarizing

It may be hard to write your own material, but you must not *ever* copy the work of others. Plagiarism is a legal violation of copyright laws and *JCD* as well as the author can be held accountable for the theft of someone else's material. Do not do it.

### Using Someone Else's Best-Selling Book as Your Format

While you may have enjoyed a management guru's latest tome, you should not rely on their work as the skeleton for your writing. Let the readers of the original work figure out how the "seven habits" apply to dentistry and leadership or how "emotional intelligence" fits into the dental team. Your work must be a reflection of your own thinking, not simply the reworking of someone else's thoughts. It can be tempting to borrow the strong concepts of others, but it is wrong.

### Over-Using Metaphors

Please, no more sports metaphors! Basketball and other team examples and applications have lost their impact because they have been over-used. If you use a metaphor, be creative and use your own thinking to come up with one that applies yet does not cause readers to groan.

### Using Others' Stories

Do not tell Jerry Seinfeld's jokes or repeat the stories you have heard others convey, even with attribution. You must create your own stories and examples, and it is best when you do so from your own experiences. That way, they will be your signature stories and no one else will be able to claim them.

### Using Trite Verbiage or Over-Used Concepts

Stop depending on concepts such as "The Wow Factor!" "Getting people to Yes!" or "Ritz-Carlton service." Be original; readers will remember your article—and your message—better.

### CONSTRUCTING OVERLY COMPLEX SENTENCES

Using sentences that are excessive and complicated does not make you sound more intelligent to your audience. People relate to people who relate well to them.

### TIPS TO HELP YOU WRITE A STRONGER ARTICLE

The following suggestions will help you write a stronger article:

- Write your headings using strong verbs and specific nouns.
- Use your spell-checker.
- Write in plain English.
- Use active verbs rather than passive verbs.
- Keep your average sentence between 10 and 20 words.
- Edit wordy phrases.
- Avoid jargon and keep technical terms to a minimum.

## SUMMARY

Over the past few years, some of the articles that have appeared in the *Journal of Cosmetic Dentistry* were contributed by attendees of the writing workshop. In some cases, the initial draft was actually begun in the course. Many of these authors never thought they could write an article of this caliber.

Are you next? You are invited to attend the Writing Workshop the next time it is offered at our scientific session. In the meantime, these guidelines will help you get started in putting together your article. For further help, feel free to contact me at sandy@prosynergy.com.

❖

# Collaboration, Communication, and Conservative Protocol for Predictable Veneers

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## Introduction

Porcelain restorations are usually the ultimate solution for most cosmetic dentistry patients. The ability to change the dimensions, color, contour, function, and characteristics of a patient's smile is unmatched by any other material. Porcelain restorations may be provided conservatively and still retain their strength and beauty[1]. By following the proper protocol, the dentist can remain in complete control throughout the entire process and be assured of the final outcome.

*By following the proper protocol, the dentist can remain in complete control throughout the entire process and be assured of the final outcome.*

Doing so is especially important today, when the use of the Internet means that patients have become far savvier than in the past. They are starting to realize that achieving the world's most beautiful smile requires a great team of two professionals: The clinician and the ceramist whose artistic skills fabricate the restorations.

Diagnosis and pre-planning are the most important steps to enable the clinician and the ceramist to visualize and determine the final results before a bur even touches the tooth. This is critical in preventing the well-known "prep and pray" technique.

## Case Presentation

A 25-year-old female—a dental hygienist and Miss Idaho USA pageant contestant—presented with no significant findings and in excellent health (Figs 1 & 2). She had congenitally missing maxillary lateral incisors and

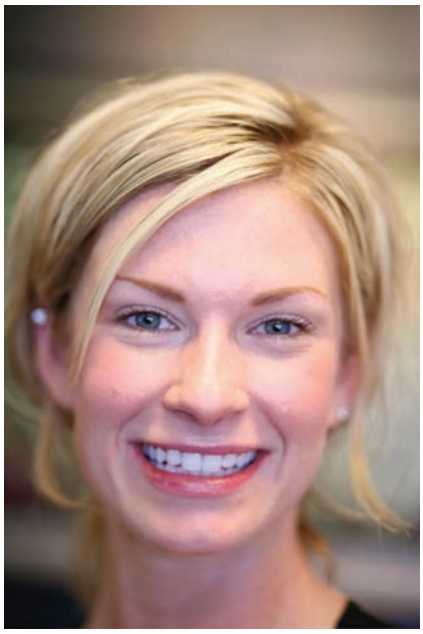

*Figure 1: Preoperative full-facial view of the patient's natural smile.*

had undergone orthodontics as a child to mesialize the canines and close the spaces.

Diagnostic records were taken and a comprehensive oral examination was completed. Records gathered included a panoramic radiograph with bitewings and selected periapicals. Also included were photographs, polyvinyl siloxane (PVS) impressions, facebow, and stickbite.[2]

### Clinical Findings

Clinical evaluation revealed excellent periodontal health, which was expected. No decay was evident upon oral and radiographic examination. She presented with a few minor occlusal fillings and no pathological wear. She also presented with some previous contouring and composite bonding on her canines to make them appear more like laterals. She demonstrated a Class I molar relationship, but lacked canine relationship due to her mesialized canines. She also lacked immediate canine rise due to the premolars being in the canine position; this resulted in poor coupling due to their anatomy. The temporomandibular joint had no pain upon examination and no history of pain or sounds.[3]

*The patient's esthetic examination revealed tooth size discrepancies due to malposition.*

### Esthetic Findings

The patient's esthetic examination revealed tooth size discrepancies due to malposition. Her tooth color was good, but she wanted veneers that would be even whiter. Due to her mesialized canines, she lacked central dominance. Her canines had a large cervical bulge that created a look of wide canines and thinner centrals. She exhibited uneven gingival heights such that the gingival margins sharply moved incisally as her smile transitioned from anterior to posterior (Fig 3).[4]

### Treatment Plan

The treatment goals included providing the patient with a bigger smile, one with more pleasing tooth proportions and more ideal gingival heights. Another goal was to provide canine-protected occlusion. The treatment would include crown lengthening on the bicuspids to create better proportions, followed by some touch-ups using a diode laser. After a period of healing, eight indirect porcelain veneers would be placed to address the issues of tooth proportion and display.[5]

Before any treatment was initiated, PVS impressions were taken and the models mounted on an articulator. They were then waxed using an additive/reductive technique.

Because the patient was a hygienist and pageant contestant, she had certain expectations of how her new smile should look. The patient visited the laboratory multiple times to ensure that the restorations looked the way she wanted before any prep-

*Figure 2: Preoperative 1:2 view of the patient's smile. Note the appearance of wide canines and narrow centrals.*

*Figure 3: Preoperative retracted view showing the uneven gingival architecture.*

*Figure 4: Following crown lengthening on the bicuspids, the patient demonstrated a new gingival architecture.*

*Figure 5: Occlusal view of the preparations on teeth ##4-13.*

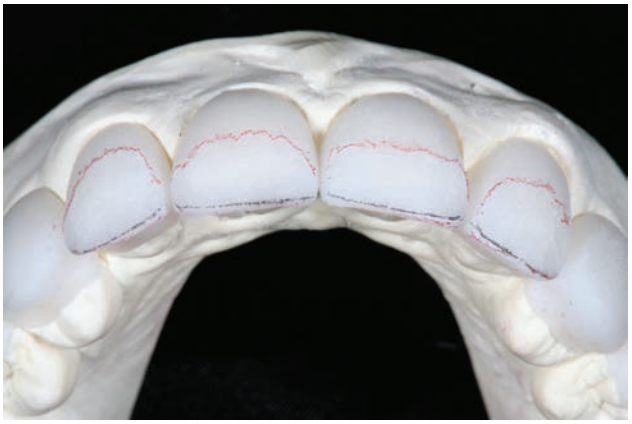

*Figure 6: View of the initial .5-mm facial bevel back.*

*Figure 7: A tapered diamond was used to undercut under the halo.*

*Figure 8: Effects were brushed in, and halo material was placed on the facial incisal edge.*

*Figure 9: Enamel material was placed over the fired effects to full contour.*

arations were initiated. She desired the bleach shade of Ivoclar Vivadent 020 (Amherst, NY) to match her adjacent bleached dentition. An integral part of the process, the patient communicated her desires about tooth shapes and contours, which she was later able to approve in the form of her provisionals.

A silicone putty matrix of the diagnostic wax-up was used to create the temporary restorations. A model and putty stent of the wax-up were made, which was used to create a mock-up in the patient's mouth so she could preview her new smile. After approval from her and verification from us, she was scheduled for her treatment appointment.

### Armamentarium

- 4.3X magnification loupes (Designs for Vision; Ronkonkoma, NY)
- EOS Digital Rebel Camera (Canon USA; Lake Success, NY)
- Penta Quick Position PVS impression material (3M ESPE; St. Paul, MN)
- yellow stone
- facebow (Panadent; Grand Terrace, CA)
- semi-adjustable articulator (Panadent)
- AccuFilm articulating paper (Parkell; Edgewood, NY)
- Sil-Tech putty impression material (Ivoclar Vivadent; Amherst, NY)
- Imprint II and Imprint III impression material (3M ESPE)
- Optragate cheek and lip retractor (Ivoclar Vivadent)
- Protemp temporary material (3M ESPE)
- Luxa Glaze (Zenith/DMG; Englewood, NJ)
- Septocaine with 1:100,000 epinephrine (Septodont; New Castle, DE)
- Navagator diode laser (Ivoclar Vivadent)
- Diamond burs, Hornbrook Group Anterior Preparation Kit (Brasseler USA; Savannah, GA)
- Dialite ceramic polishers, Hornbrook Group Anterior Finishing Kit (Brasseler)
- Vita 3D master shade guide (Vident; Brea, CA)
- Superoxol hydrogen peroxide (EPR Industries Chemists; Pennsauken, NJ)
- Viscostat clear hemostatic agent (Ultradent Products; South Jordan, UT)
- Flexi Discs (3M ESPE)
- Consepsis chlorhexidine rinse (Ultradent)
- micro etcher (Danville Engineering; San Ramon, CA)
- Ultra-Etch 35% phosphoric Acid ( Ultradent)
- Silane (3M ESPE)
- Single bond (3M ESPE)
- Solo bond (3M ESPE)
- Curing light light-emitting diode (LED) (3M ESPE)
- RelyX veneer cement, translucent shade (3M ESPE)
- #12 Bard Parker blade (Becton Dickinson; Franklin Lakes, NJ)
- DeOx oxygen-barrier gel (Ultradent)
- Ceri Saw (Den-Mat Corp; Santa Maria, CA)
- Glide Floss (Gore; Flagstaff, AZ)

## Treatment

### Surgery

The patient was referred to a periodontist for clinical crown lengthen-

*Figure 10: View of the bisque bake with surface morphology.*

*Figure 11: Retraced postoperative view demonstrating the enhanced look of the patient's smile.*

ing of the bicuspids and some minor recontouring of the canine roots in order make their emergence profile mimic that of a lateral incisor (Fig 4).[6] After eight weeks of healing, minor recontouring was completed using a diode laser. A probe was used to sound the bone so as not to invade the biological width. Another four weeks was allowed before initiating the preparations.

### Preparation

Using the putty matrix made from the additive/reductive model, the mock-up was again reproduced intraorally. This matrix was trimmed and verified again and used as a guide for depth cuts so that the teeth were prepared with the final result in mind.

The patient was anesthetized with lidocaine with 1:100,000 epinephrine. A cheek and lip retractor was used during preparation. Depth cuts of 0.5 mm were placed on the facial of teeth ##4-13 (Fig 5).[7] The preparations were finished using diamond burs, and reduction was verified with a clear matrix. Impressions were taken using PVS impression material. Facebow and stickbite records were also taken. Temporary veneers were placed using the shrink-to-fit technique, the putty stent, and temporary material in a bleach shade. After about three minutes of curing, the stent was removed, after which the excess flash was removed. Margins were then polished and the bite adjusted.[8]

*The treatment goals included providing the patient with a bigger smile, one with more pleasing tooth proportions and more ideal gingival heights.*

### Follow-Up

The patient was seen 48 hours later to evaluate the temporaries. After some minor adjustments and receiving her final approval, PVS impressions were taken of the temporaries to communicate to the laboratory the desired final results. Photographs were taken of the patient in temporaries to help convey her expectations.

### Laboratory Fabrication

Wax was injected through a matrix made from the cast of the approved provisionals onto the lubricated and separated (but not trimmed) master dies. After the waxed restorations were finalized, they were separated and removed from the dies. The master dies then were trimmed so that the wax restorations' margins could be sealed.

Pressable ceramic (Pulse B00+, Jensen Industries; North Haven, CT) was used and, through the lost wax process, a natural 020 shade was achieved. These pressed-to-full contour restorations were then cut back and layered (Figs 6-10).[9]

### Delivery

The patient arrived for delivery of the definitive restorations two weeks later. Each restoration was inspected on the model for esthetics, fit, and form. The patient was then lightly anesthetized with lidocaine with epinephrine 1:100,000. The temporaries were removed with hemostats, and the preparations were

*Figure 12: Postoperative right lateral view of the patient's new smile.*

then cleaned using an antimicrobial scrub and 30% hydrogen peroxide.

Each veneer was tried in separately to inspect fit, and then all together to evaluate contacts. They were then tried in with translucent try-in paste. At this point the patient again evaluated the restorations and gave her approval.

The veneers were then removed and cleaned, etched, and silanated. The teeth were also cleaned again and isolated using a split rubber dam. After the veneers were cleaned they were each treated with bonding agent and veneer cement and placed in a light safe box. The teeth then were etched using 37% phosphoric acid and bonded.

The veneers then were placed and fully seated using the tack-and-wave technique. Excess cement was cleaned and polished; margins were covered with oxygen-barrier gel and received a final light-cure. The occlusion was verified and adjusted.

The patient was seen 24 hours later for evaluation. Final photographs were taken two weeks later (Figs 11 & 12).

## CONCLUSION

The patient loves her new smile and teeth and feels they fit her personality and idea of perfection. In delivering porcelain veneers in this case, we were able to correct all of the patient's concerns and achieve a great cosmetic result. Additionally, by following the proper protocol, the process was smooth and predictable.

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### *Acknowledgments*

*The authors thank their families and staff for their support; the patient, Melissa, for her confidence in their care; and Dr. Mike Davis for his periodontal surgery treatment. They also acknowledge Chad Transtrum, the photographer hired to take the cover photograph. Finally, they thank the Hornbrook Group for sharing the skills, knowledge, and training necessary to perform this kind of dentistry.*[10]

### *AACD Acknowledgment*

The American Academy of Cosmetic Dentistry recognizes Bradley L. Jones as an AACD Accredited Member who has donated laboratory cases to restore the smiles of Give Back A Smile™ survivors.


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*by* Hugh D. Flax, DDS, AAACD
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Atlanta, GA
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# A Taste of New Orleans—Excellence In Cosmetic Dentistry 2008

As an introduction to this special issue of the *Journal of Cosmetic Dentistry*, I'd like to share a glimpse of our original blueprint for New Orleans and a scorecard of our results.

Developing an educational event like the annual AACD scientific session is a true responsibility. Each year, our annual scientific session continues to build new layers of talents and skills, making it the premier event in cosmetic dentistry, if not in the entire profession. How do we keep it fresh and reflect the ever-increasing knowledge and technology that we face so that everyone benefits every single year?

As always, the AACD's cutting-edge continuing education program took center stage. But with the rebirth of The Big Easy as our backdrop and the French Quarter at our doorstep, this was one annual AACD scientific session that many attendees found to be memorable.

For several years, we searched for new educational opportunities that our members have been asking for on the post-conference surveys. Here are some highlights of the program that we put together:

- a dedicated esthetic implant track featuring world class speakers
- an interdisciplinary track that highlighted esthetic orthodontics, plastic surgery, as well as dentist-ceramist teams including a special synergy summit that shared an "insider's look" into building a successful team
- restorative presentations that "WOW"ed, including a full day of Dr. Newton Fahl, and a special esthetic removable lecture from Dr. Joseph Massad
- team-focused presentations on customer service, conflict resolution, case presentation, and an Academy first, digital photography for staff
- lifestyle and business courses that looked "outside the box"
- ceramist and hygiene classes galore
- panels on occlusion, lasers, hygiene, marketing, leadership, case acceptance, and a women's panel on boundaries, balance, and business (open to all)
- Accreditation courses on each case type, a members pearls' program, and photography workshops for clinical and portrait
- general session speakers Dave Barry and Kevin Carroll, who were definitely focused on amusing and inspiring attendees
- the flavor of New Orleans music to start off each day.
- a special showing of "Hurricane on the Bayou" which portrayed the human and environmental effects of the disappearing wetlands and Hurricane Katrina and was personalized with a standing-ovation performance by 17-year-old recording artist Amanda Shaw, who was featured in the movie.

With just over 300 responses, our post-conference survey of those who attended the scientific session found the following:

- 89% agreed that we provided a diverse selection of courses and topics
- 88% felt that the scientific session content contributed to their professional and personal objectives
- 90% were very pleased with the customer service of the AACD staff in all phases of the meeting.

Although these results are extremely positive, the Professional Education Committee is striving to improve on our attendees' experience before, during, and after the annual scientific sessions, as well as our many other educational programs. During the next few months, the Conference Advisory Council will be helping to provide feedback for future educational offerings, creating learning opportunities that build long-term value. It is exciting to see our scientific sessions continue their evolution and maintain their high standard of technology and progressive education.

❖

# Excellence in Cosmetic Dentistry
# AACD 24th Annual Scientific Session

2008

We invite you to experience the energy and highlights of the educational content from the 24th Annual AACD Scientific Session, *Excellence in Cosmetic Dentistry 2008*, through the 2008 Special Issue of the *Journal of Cosmetic Dentistry*.

The AACD continually designs education that opens minds and spirits; reinvigorates passion for cosmetic dentistry; and challenges dentists, laboratory technicians, and team members to explore and expand their skill sets. There are educational opportunities for every learning style.

The AACD energy is contagious. Enjoy the inspiration in the pages ahead!

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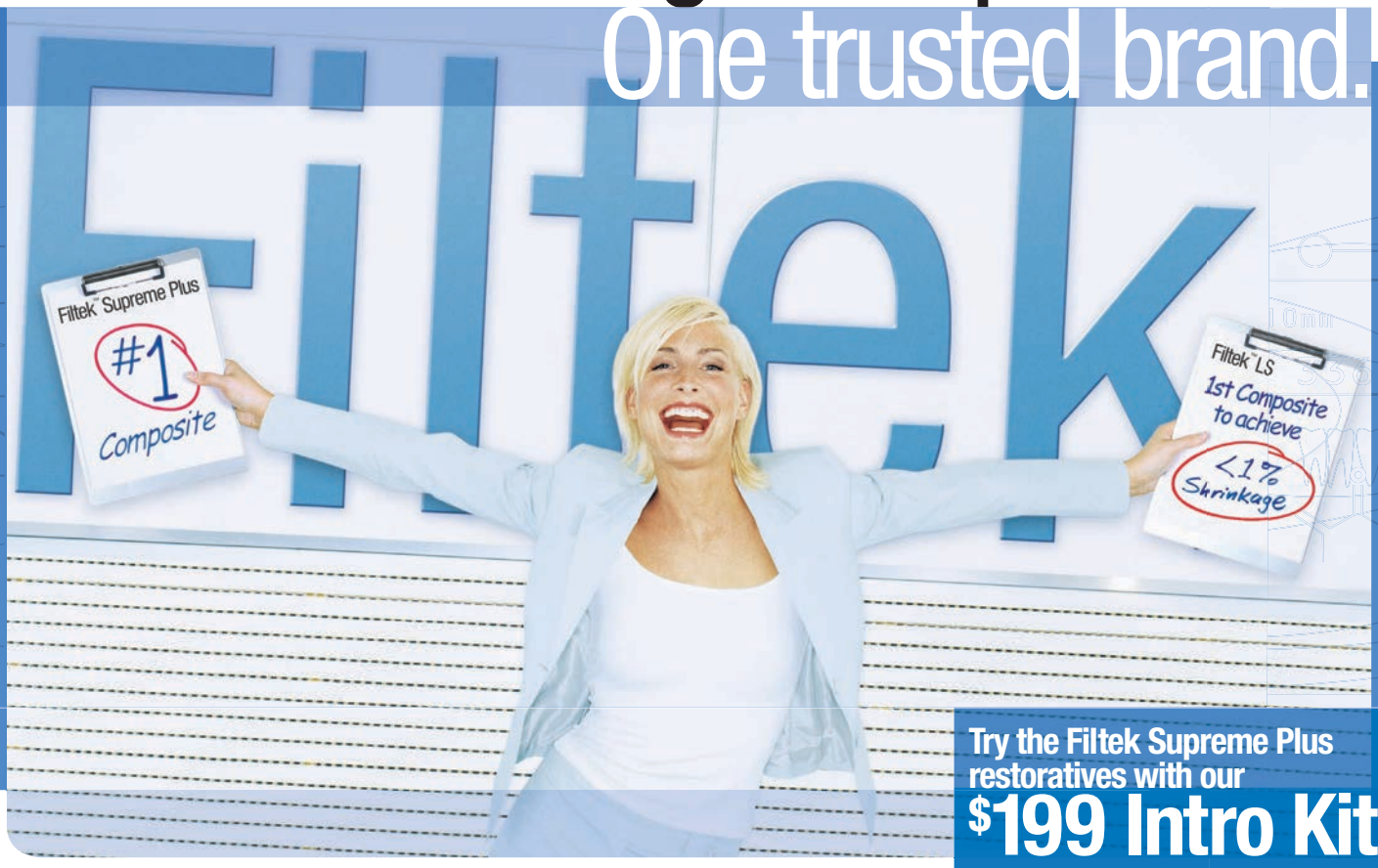


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[1] Results using bonded-disc method. Source: 3M ESPE internal data

"I wanted to be the best I could be in cosmetic dentistry. Accreditation gave me the motivation and direction to get there."

~ AACD Accredited Member
Dr. Michael Sesemann, Omaha, Nebraska

# ACCREDITATION ESSENTIALS

## IN THIS SECTION:

# Introduction To Accreditation Essentials

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Accreditation is a life-changing journey and, for many, AACD Accreditation Case Type V: Six or More Direct Veneers teaches us the most. In order to pass this case, the dentist must master the art of composite bonding, which includes smile design, material choices, sculpting, polishing techniques, and more. Most Accredited members agree that this case was their greatest challenge during their Accreditation journey.

The first step is smile design along with occlusal planning. This process requires knowledge of smile design and occlusal principles, which can be designed orally, and on diagnostic casts on an articulator. The design includes many elements of the case, such as the length and width of the teeth, incisal edge position, and facial contours. This design can be transferred to the mouth, using a matrix, to aid in composite placement.

When making material choices, the clinician must consider strength and durability in the areas that will be loaded occlusally, such as the incisal edges; and the clinician must also be mindful of the composite's polishability in the highly esthetic zones, which are the facial surfaces. Other material selection factors include the polychromicity of each individual tooth as well as the group of teeth. In addition, layering and shaping body shades, with more translucent composites, creates the incisal translucency. Consequently, a variety of composites is utilized for each tooth in Case Type V.

Once the most desirable composites have been applied using a layering process, the clinician's next challenge is to sculpt the teeth, creating line angles that are harmonious and slightly mesially inclined. When the line angles are properly developed, the interproximal embrasures also become lifelike when

observed from an incisal view. In addition, the sculpting process includes the gingival and incisal embrasures, along with the facial anatomy. There are also critically important occlusal factors that must be addressed during the sculpting process, such as centric stops, anterior guidance, cross over, and anterior coupling. Therefore, the final contours include both artistic and engineering knowledge and skill.

The final clinical challenge is to achieve a polish and shine that mimics the natural dentition and is stain-resistant without altering the line angles and final contours. Along with enhancing esthetics, the polish must be smooth interproximally and at the gingival margins in order to be cleanable. The final polish requires high-powered magnification and finesse.

In this issue, Dr. James Peyton and Dr. J. Fred Arnold III have provided an article containing outstanding information about the design, layering technique, and finishing of Accreditation Case Type V. Also, Dr. Scott Finlay has risen to all these challenges and more to create a beautiful example of an AACD Accreditation Case Type V: Six or More Direct Veneers. The natural appearance is a result of his skill and knowledge in all of the facets of the artistry of composite bonding. Also be sure to read the excerpt from the *Introductory Guide to Accreditation*, which immediately follows on page 32.

***AACD Acknowledgment***

*The American Academy of Cosmetic Dentistry recognizes Dr. Susan Hollar as an AACD Accredited Member, Accreditation Examiner, and Give Back A Smile™ volunteer who has restored the smiles of two GBAS survivors.*

The following is excerpted from the *Introductory Guide to Accreditation*.

*The AACD Accreditation testing process comprises three parts:*

- A ***Written Examination***, which tests foundational knowledge in cosmetic dentistry. The exam is administered at the Annual AACD Scientific Session each year. Passing the written examination starts the clock for the five-year time frame given to fulfill the additional requirements.
- ***Clinical Case Examinations*** (five cases for dentists and three cases for laboratory technicians) and reports, which form the heart of the testing process. Each case is documented with specific preoperative and postoperative photographic documentation. The cases must meet the standard of excellence as set forth by the American Board of Cosmetic Dentistry and encompass a broad range of specified cosmetic treatment solutions.
- An ***Oral Examination***, which allows each candidate to present his or her cases to a team of examiners, answer clinical case questions, and treatment plan a presented clinical case.

For those practitioners with an interest in advancing their education and skills in cosmetic dentistry, the American Academy of Cosmetic Dentistry's Accreditation process has proven time and time again to be the PIVOTAL GROWTH EXPERIENCE OF THEIR CAREER.

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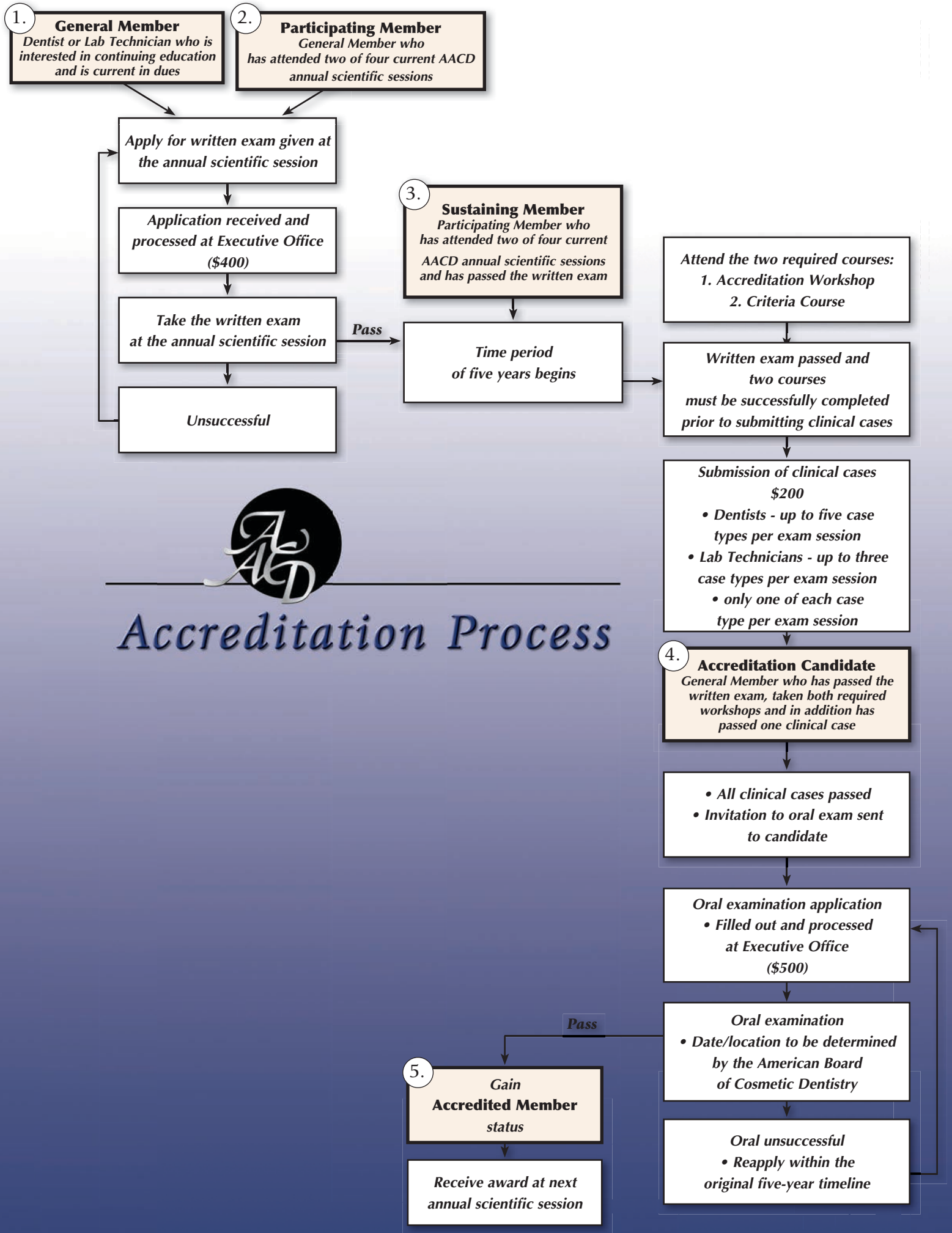
1.
General Member
Dentist or Lab Technician who is interested in continuing education and is current in dues
2.
Participating Member
General Member who has attended two of four current AACD annual scientific sessions
Apply for written exam given at the annual scientific session
Application received and processed at Executive Office ($400)
Take the written exam at the annual scientific session
Pass
Unsuccessful
3.
Sustaining Member
Participating Member who has attended two of four current AACD annual scientific sessions and has passed the written exam
Time period of five years begins
Attend the two required courses:
1. Accreditation Workshop
2. Criteria Course
Written exam passed and two courses must be successfully completed prior to submitting clinical cases
Submission of clinical cases
$200
• Dentists - up to five case types per exam session
• Lab Technicians - up to three case types per exam session
• only one of each case type per exam session
4.
Accreditation Candidate
General Member who has passed the written exam, taken both required workshops and in addition has passed one clinical case
• All clinical cases passed
• Invitation to oral exam sent to candidate
Oral examination application
• Filled out and processed at Executive Office
($500)
Oral examination
• Date/location to be determined by the American Board of Cosmetic Dentistry
Pass
Oral unsuccessful
• Reapply within the original five-year timeline
5.
Gain
Accredited Member
status
Receive award at next annual scientific session
Accreditation Process

# Case Type I– Six or More Indirect Restorations

Case Type I requires six or more laboratory-fabricated restorations within the maxillary arch, treating at a minimum the cuspids and incisors. If the case would benefit from additional restorations to comprehensively address smile design criteria, this is encouraged.

This case type is highly relevant to Accreditation for a number of reasons. It requires that the clinician have the ability to create an open, working, and successful rapport with the laboratory technician, and vice versa. Smile design elements weigh heavily with this case type.

The case shown here, because of the extensive decay and severe breakdown, is a more extreme example of this case type. However, all the fundamentals noted above enabled this case to clearly meet the criteria for Accreditation success. Bonded all-ceramic crowns were utilized to achieve the dramatic and beautiful result. ✦

# Case Type II– One or Two Indirect Restorations

This case involves one or two indirect restorations in the maxillary anterior region treating incisors. The adjacent teeth must have no indirect restorations. Case Type II challenges the clinician and the technician's ability to match the restorations to the natural dentition, a situation frequently encountered in daily practice. It also tests the dentist and the technician's ability to work together to successfully communicate the various micro-esthetic issues such as shade, incisal translucency, and surface texture. It is critical for the team to deliver a natural-looking result that adheres to predetermined esthetic parameters.

The accompanying photographs demonstrate treatment of the two lateral incisors with porcelain veneers. The right lateral incisor had previously been treated endodontically following trauma and the incisal edge had fractured. Restoring the two teeth achieved a proper esthetic balance to the smile, as it achieved a better balance of color, size, and proportion. ✦

# Case Type III–Tooth Replacement

In this presentation, the clinician or technician must demonstrate the ability to deliver esthetic results via a fixed bridge OR implant-supported restoration. The prosthetic replacement must be a maxillary incisor or canine. This case provides the examiners with an impression of the candidate's ability to establish soft tissue esthetics within the edentulous space.

## Tooth Replacement with a Fixed Bridge

One option for Case Type III is to place a fixed bridge. Additional teeth may be treated if appropriate. Options for treatment can include full-coverage bridges or adhesively bonded bridges. Smile design considerations become more relevant as greater numbers of teeth are treated.

This case tests the candidate's ability to handle soft tissues in regard to pontic site development. Proper development of the edentulous site through socket preservation techniques or subsequent ridge augmentation is essential in order to achieve an ideal result.

Shown here is a case with conservative tooth replacement of the left central incisor with a bonded Maryland bridge. Pontic site development, with soft tissue ridge augmentation, is critical to achieve proper contours for an ovate pontic. Proper preparation design of the Maryland bridge provided both adequate retention and an excellent esthetic result. ✦

***OR***

## Tooth Replacement with an Implant

The second option for Case Type III involves replacement of a missing tooth with an implant. Additional teeth may be treated if appropriate.

This case type tests the candidate's ability to handle the soft tissues so that the final restoration is indistinguishable from a natural tooth. Because a specialist frequently is involved in the placement of the implant, interdisciplinary communication is vital for the case to be successful.

The example of this case type shows replacement of the retained primary right lateral incisor with an implant and an all-ceramic crown. In addition, porcelain veneers were placed on the two central incisors and the left lateral incisor, which was an undersized peg lateral. The final result created more natural gingival contours and a more appropriate height-to-width ratio of the implant-supported restoration and better symmetry of the two lateral incisors. ✦

# Case Type IV– Restoration with Anterior Direct Resin

This case type consists of an anterior direct resin (Class IV or diastema closure) restoration, in which the candidate's ability to blend composite resin with the natural dentition is tested. In cases demonstrating diastema closure, the space should measure approximately 1 mm or greater, and two adjacent teeth (i.e., maxillary incisors or canines) must be treated. Class IV restorations must be demonstrated in situations that replace a minimum of 10% of the tooth structure on the facial surface of one or more maxillary incisors.

Because the focus of this case type is to evaluate the candidate's skill in matching the natural dentition in shape, size, and shade, the overall smile design may be less critical. The ability to adequately contour and finish the restoration so that it blends indistinguishably with the natural tooth structure is essential. The use of tints and opaquers often is necessary to achieve a level of excellence in the final result.

Shown is a case in which a fractured central incisor was restored with direct composite. With such a large percentage of the tooth being replaced, matching the opacity of the restoration to the remaining tooth was critical. ✦

# Case Type V– Six or More Direct Resin Veneers

This case involves six or more direct resin veneers, treating at least the maxillary incisors and canines. Additional teeth may be treated, if it positively affects the outcome. Case Type V tests the candidate's ability to create an optimal esthetic result using direct composite resin materials. The emphasis of evaluation is on smile design and tooth morphology. Care must be taken to develop a functional and esthetic result using a direct technique with composite resin.

In the accompanying case, teeth ##4-13 were treated with direct composite bonding to address generalized hypocalcification, some incisal chipping, and stained and failing composite restorations. The final result demonstrates the clinician's ability to achieve a very nice incisal translucency, a highly polished surface, and an overall beautiful result in a conservative manner. ✦


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# Six or More Direct Resin Veneers Case for Accreditation: Hands-on Typodont Exercise

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## Introduction

Many candidates going through Accreditation find Case Type V, Six or More Direct Resin Veneers, to be the most challenging of the five case types. Case Type V tests a candidate's ability not only to handle resin well, but also to master smile design principles. The key to achieving success handling direct resin veneers is two-fold. First, a systematic layering technique is needed to create lifelike, polychromatic restorations. Second, one must learn the necessary finishing and polishing steps to achieve proper primary, secondary, and tertiary tooth anatomy. When these techniques are mastered, direct resin bonding will become a predictable treatment modality not only for achieving Accreditation success, but also for expanding your skill set for your patients' benefit. These direct-bonded restorations are long-lasting and are now considered first-line restorations, especially in adolescents and young adults because of their conservative nature.[1-3] Direct bonding can be a very enjoyable and rewarding procedure; having complete control, the restorative dentist can let his or her artistic abilities shine.

*Remember dark teeth cases are the most complex to restore and should not be chosen for Accreditation*

Learning these techniques requires direct hands-on practice. We have found that a good beginning is an AACD-sponsored workshop. The challenge for us as examiners and educators is to be able to give everyone the experience that they need in such a limited time as a half-day, or even a full-day workshop. As with anything artistic, you cannot do it once and master the techniques. It takes many hours of practice and for most of us, other outside comprehensive hands-on courses have proven useful.

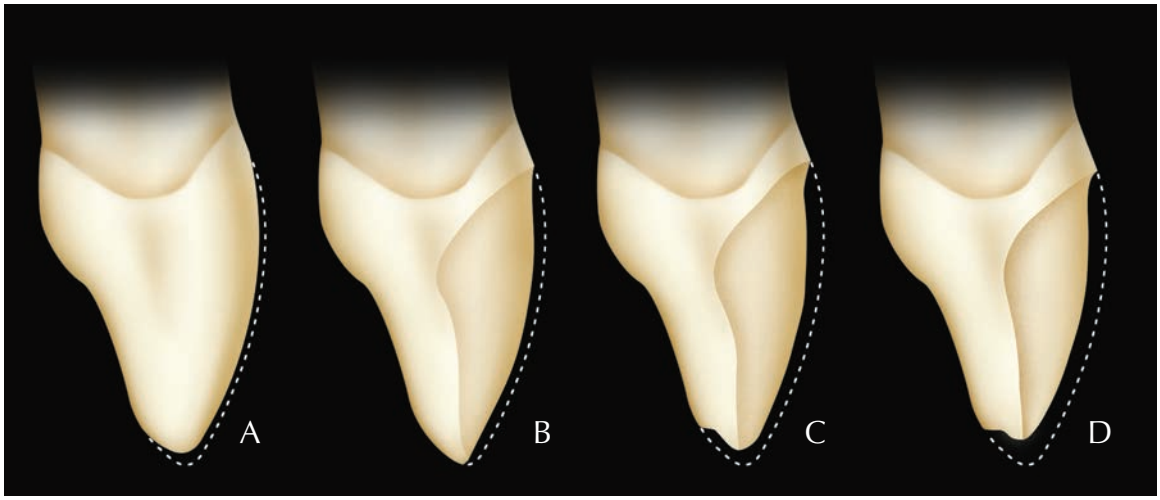


*Figure 1: Side view of veneer preparations: A. No preparation, incisal edge buildup. B. Minimum preparation, no incisal buildup. C. Minimum preparation, incisal buildup. D. Major color change, incisal buildup.*
Illustration © Dave Mazierski

## Case Selection

As in all Accreditation case types, case selection is very important. Keep in mind that there are no bonus points for taking a very complex case and turning it into a successful Accreditation case. Rather, success is based entirely on the final results meeting the Accreditation criteria. Increase your odds for success by selecting an ideal case: Are the teeth properly aligned, with good vertical and horizontal symmetry. Is only a slight color change necessary? Are the gingivae healthy, with good architecture and good papillae heights? When the patient smiles, are his or her lips symmetrical, so as to form a beautiful frame for the teeth? It is also advantageous to select a patient who is very cooperative and can come back to see you time and again to do touch-ups and make corrections.

## Incisal Edge Position and Smile Line

One of the most important factors in the case of direct resin veneers, as in any smile design case, is to determine the incisal edge position and smile line.[4] This is done clinically and needs to be determined prior to doing any type of diagnostic wax-up. There are some good references in the literature on this.[5] With this knowledge and using the principles of proportion and central dominance,[5] a decision is made on the incisal edge position. It is then necessary to increase, decrease, or leave the incisal edge position as it is. To increase the incisal edge length, the veneers would be made longer incisally. To increase the length of the teeth without changing the incisal edge, crown lengthening would be needed. This knowledge can now be translated to the stone model to perform the diagnostic wax-up. From the wax-up, a putty matrix can be made to index the incisal edge and the lingual anatomy. The wax-up will also be used to measure and compare the lengths and widths of the teeth using a digital caliper. The diagnostic wax-up will be used as your "blueprint for success"![6]

## Six or More Direct Resin Veneers

For the typodont case, prepare the direct resin veneers ##6-11 (Fig 1). To practice building up the dentin lobes and creating incisal translucency, reduce about 1 mm to 1.5 mm off the incisal edge. (Please note that incisal edge reduction here is used to simulate the case of worn incisal edges and that it is not always necessary to reduce the incisal edge.) To simulate the case of dark teeth that will be lightened several shades, we will prepare the facial surfaces. Remember dark teeth cases are the most complex to restore and should


*Figure 2: Proportion of centrals.*
Illustration © Dave Mazierski

*Figure 3: The lingual wall and the incisal edge are shaped by the putty matrix.*

*Figure 4: A milky-white semi-translucent enamel shade is used to create the lingual shelf of composite.*

*Figure 5: The dentin lobes are created with an opaque shade of hybrid composite.*

not be chosen for Accreditation; but for this exercise, they provide the maximum practice for handling and layering composite. Mastering this case will make the ideal Accreditation case seem easy.

### Enamel Thickness

It is always important when doing adhesive dentistry to keep your preparation in enamel. The enamel thickness for maxillary anterior teeth is .3 mm to .4 mm on the facial gingival third, .8 mm to .9 mm on the facial middle third, and .9 mm to 1.0 mm on the facial incisal third.[7] Often, clinically, teeth require little or no preparation for direct veneers, depending on the additive nature of the wax-up. Remember that the less tooth structure that has to be replaced with composite layers, the more natural metamerism is possible. It is always advantageous to preserve as much natural tooth structure as possible. Make sure the putty matrix that was made from the diagnostic wax-up fits the actual teeth before beginning the adhesive procedures.

### Maxillary Central Incisors

The maxillary central incisors should always be restored first. The central incisors must be made to look like mirror images of each other (Fig 2). There should be no midline cant or dark triangle cervically. Restore central incisors one at a time to primary anatomy for best results. One must check the contours with the putty matrix and also refer back to the diagnostic wax-up. Creating the first central incisor is always the most difficult and time-consuming part. Once this is achieved correctly, the rest of the composite addition just follows the same sequence of composite layering and basic tooth form.

*Figure 6: Adding tint.*

*Figure 7: A very thin layer of dentin shade composite is added.*

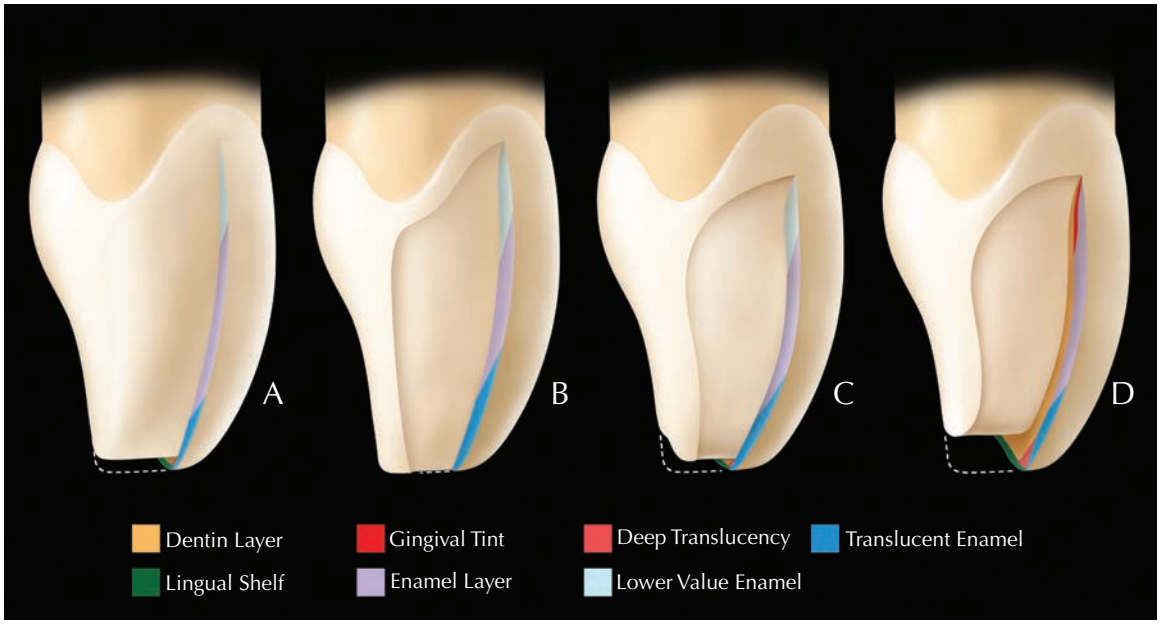


*Figure 8: Side view of composite layers: A. Simple layering, no preparation. B. Simple layering, minimal preparation. C. Simple layering, incisal buildup. D. Complex layering for dark teeth.*

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## Layering

In the case described in this article, tooth #9 will be restored first. In the clinical case, acid-etch the preparation (skip this step for the typodont tooth). Bonding agent is applied to the preparation, being careful to keep off the adjacent teeth (protect with a matrix strip or plumber's tape). Light-cure the bonding agent. A milky-white, semi-translucent enamel shade of hybrid composite (e.g., WE Filtek Supreme [3M ESPE; St. Paul, MN] or Renamel Occlusal White [Cosmedent, Chicago, IL]) is used for the lingual shelf layer, which is sculpted thinly against the palatal aspect of the matrix from the facial-incisal line angle to the lingual chamfer on the tooth (Figs 3 & 4). The incisal portion is slightly thicker, to form an opalescent halo. This layer is very thin, and establishes the lingual of the restoration, as well as the incisal edge. Used properly, there should be very little occlusal adjustment at the end of the appointment. After light-curing, this layer should be almost translucent. If the layer is too thick or the material selected is too opaque, then there will be no incisal translucency. If this happens, take off the layer

*Figure 9: Adding deep translucence.*

*Figure 10: The body enamel shade is spread out to final contour and thinned out in the incisal one-third area.*

*Figure 11: A brush is helpful to smooth the final layer of composite.*

*Figure 12: A coarse disc is used to uniformly reduce the facial surface.*

and do it again. Tints can be used to achieve incisal translucency, but it is best to do this with the composite material itself when possible.

To establish the dentin lobes, use an artificial dentin or opaque shade of hybrid composite (e.g., A2-O Esthet-X [Dentsply/Caulk; Milford, DE]). This dentin shade will be added to the incisal one-third and will be further segmented into three lobes with a Hollenbeck carver. These three lobes will be made to look slightly irregular to give it a more natural appearance (Fig 5). A little ochre tint can be placed with a No. 1 sable brush at the tips of the incisal most aspect of the dentin lobes to give it a little more chroma (Fig 6). Note that when you use tints, less is always better. If you can easily see the tint, then you have used too much.

Since we are simulating restoring a dark tooth, we will carry the opaque artificial dentin from the lobes, sculpting it evenly over the facial surface (Fig 7). In the case of an extremely dark endodontically treated tooth, it would be necessary to place a layer of opaquer (e.g., Creative Color opaquer, Cosmedent) as the initial layer before this artificial dentin layer. Remember, in an ideal Accreditation case where a large color change is not being made, these layers of artificial dentin and opaquer would not be needed. This would allow minimum or no preparation, with only artificial enamel layers needed (Fig 8).

Once the dentin shade had been added to the facial and the incisal lobes have been created, then add a thin layer of "clear enamel" (e.g., CT, Filtek Supreme; or Renamel Occlusal Clear) between the lobes and under the incisal edge to optically lock in the dentin lobes and form a deep internal incisal translucency (Fig 9). Be careful to leave room for

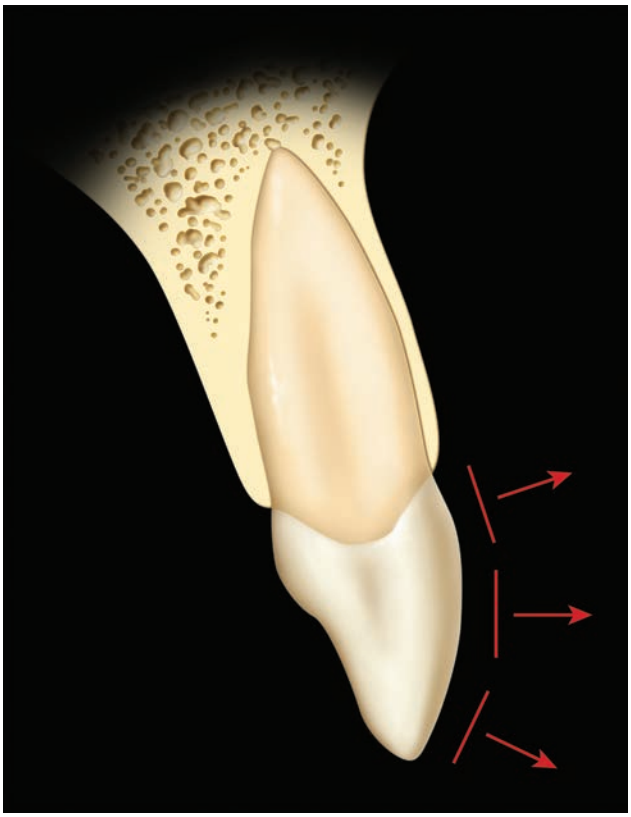

***Figure 13: The three planes of facial contour.***

Illustration © Dave Mazierski

the subsequent layers of composite. A little violet or gray tint can also be used to create incisal translucency. This is especially helpful when there is no change in incisal edge length, and the tooth itself is too opaque in the incisal one-third.

The body artificial enamel is the final layer to be created (Fig 10). There are many choices of materials for this artificial enamel layer. It is always important to match the surface texture and luster of the natural teeth with the restored teeth. If the natural teeth have a high surface luster and polish, then the material of choice would be a microfill composite such as Renamel microfill (Cosmedent) or Durafill VS (Hereaus Kulzer; Armonk, NY). The Renamel microfill is more opaque than the Durafill VS, so it would be the ideal choice when covering dark teeth; whereas the Durafill VS, being more translucent, is ideal if there is not going to be a shade change. If the natural teeth have a lower surface luster, then one of the many microhybrids or even a nanohybrid (e.g., Filtek Supreme) would be a good choice. An added benefit would be the higher strengths compared to the microfills.

Most natural teeth have more chroma and less value at the cervical. To achieve this with composite, it can be helpful to add a little tint (e.g., Creative Color light brown) to increase the cervical chroma.[8] Tints are always used subsurface underneath the artificial enamel. Another method is to add a shade of body enamel that is one chroma higher at the gingival one-third than that which is added to the middle one-third. An incisal translucent enamel shade is then added to the incisal one-third.

For this exercise, the cervical tint is placed with a thin #1 sable brush and light-cured. A highly sculptable body enamel (e.g., A-1 Renamel microfill) is then placed. Roll a ball of the composite material with powder-free gloves and place slightly more than is necessary on the facial of tooth #9. Spread out the material evenly, being careful not to leave voids. A gold Almore instrument (Almore International; Beaverton, OR) works extremely well to spread out the material and feather it into the incisal one-third of the tooth. A

*Figure 14: The primary anatomy of #9 has been achieved.*

*Figure 15: The basic shape of teeth #8 and #9 is completed.*

*Figure 16: Measure the width of tooth #8 and compare with tooth #9.*

*Figure 17: Incisal facial line angles.*

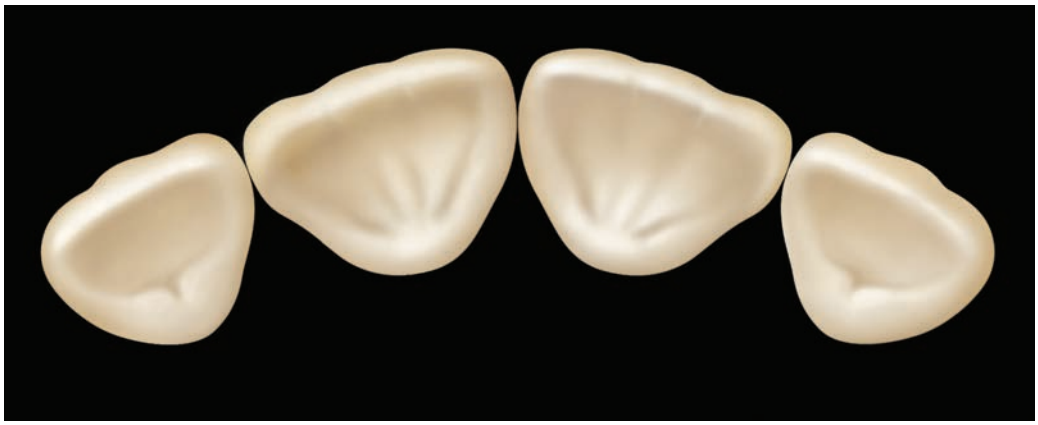

*Figure 18: Incisal edge position and facial contours.*

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*Figure 19: Red disc shaping incisal embrasures.*

*Figure 20: The small red disc is used to contour the facial and incisal embrasures.*

*Figure 21: Use the flame-tip carbide to develop the facial depressions.*

#3 sable brush works well to smooth out the surface of the uncured composite (slightly wet with unfilled resin) (Fig 11). The thin interproximal carver works well to sculpt interproximally and to contour the gingival margin. This is light-cured. Place the final layer of a translucent artificial enamel (e.g., Renamel Incisal Light microfill) at the incisal one-third and carefully sculpt this to bring out the final contour from the incisal edge, feathering it into the body enamel layer, and smooth it with a sable brush.

## Contouring

At this point there should be a slight excess of material interproximally and facially. A pencil line is drawn along the facial-incisal line angle of the incisal edge as a reference, and remains untouched, since it was defined accurately by the putty matrix. If there is a gross excess of material on the facial, a high-speed rotary bur (diamond or carbide) can be used to reduce the mass of composite. When close to the final contour, it is best to use a disc to contour (e.g., red Sof-Lex-XT, 3M ESPE) (Fig 12). The disc can allow an even reduction of material to achieve the basic contour (primary anatomy). The cervical, middle, and incisal profiles of the facial surface are obtained in three planes, along with the transitional line angles (Fig 13). A caliper is used to check on the width and length of the new veneer compared to the diagnostic wax-up. The putty matrix is also helpful to verify the length as well as the overall contour. It is also necessary that the putty matrix fit back precisely or the subsequent veneers will be out of alignment.

*Figure 22: The final step is to obtain a high polish.*

*Figure 23: Facial view of completed restorations on teeth ##6-11.*

*Figure 24: Incisal view of completed restorations.*

Make sure the midline is straight up and down; at this point it would be the mesial contour of tooth #9. In the clinical case one would want the midline to parallel the midline of the face. When the basic or primary anatomy of tooth #9 has been established, the tooth should have the correct width, length, incisal edge position, transitional line angles, and correct mesial contour (Fig 14). The mesial proximal surface of #9 is finished completely with a succession of finishing discs (e.g., FlexiDisc, Cosmedent) and strips (e.g., Epitex, GC America; Alsip, IL) so that the adjacent proximal surface of tooth #8 can be built directly against it.

### Repeat the Steps

Now repeat the same steps that were used to create the direct veneer of #9 to create the direct veneer of #8. The putty matrix is once again used to create the lingual-incisal aspect of #8 using a milky white enamel shade. Be careful to leave a small space between this material and tooth #9. The dentin lobes are created using a dentin shade. The clear translucent enamel shade is used in between the dentin lobes. Look at the composite layer from an incisal view to make sure there is room for the next layer. The body enamel shade is used next. When this layer is added, it is nice to use a thin plastic strip interproximally to pull the material through to the lingual. This is called the mylar or plastic matrix pull-through technique.[9] The lingual shelf of composite will prevent the bulk of the body shade of composite from just pulling out with the plastic matrix. The composite material from tooth #8 is now lying directly against the mesial

*Figure 25: Preoperative view. Major color change and incisal edge buildup.*

*Figure 26: Postoperative view of actual Accreditation case.*

*Figure 27: Preoperative view. No major color change and slight incisal edge buildup.*

*Figure 28: Postoperative view of actual Accreditation case.*

surface of tooth #9. Make sure there is not a large excess of material interproximally. It is helpful to once again use the thin interproximal carvers. Light-cure this layer.

The last layer is the incisal enamel layer. Smooth this layer out, being careful not to trap air pockets or create voids of material. Fully cure this final layer. A blade such as a #12 Bard-Parker (Becton Dickinson; Franklin Lakes, NJ) is helpful to open up the facial embrasure. The teeth can be separated using the small end of the gold Almore instrument at the gingival area and slightly torquing apart. Mark the incisal edge of both #8 and #9 and measure with the caliper and check with the putty matrix. The main objective now is to get tooth #8 and tooth #9 to be mirror images of each other. Teeth #8 and #9 should have the same width, length, cervical emergence, and incisal embrasure profiles. When completed, make sure the distal surfaces of teeth #8 and #9 are smooth and highly polished (Figs 15 & 16).

Following the same steps as in the central incisors, teeth #7 and #10 can be restored at the same time, followed by #6 and #11. Remember that the lateral incisors only have two irregular lobes. The cuspids should have very little incisal translucency and should be lower in value, compared to the incisors. This is easily accomplished by using a more prominent dentin lobe, very little or no deep internal translucent enamel, and a lower shade of body enamel and incisal translucent enamel.

### ENSURING PROPER PRIMARY ANATOMY

It is now important to ensure proper primary anatomy of all the restored teeth. Again, using a pencil, mark the facial-incisal line angles (Fig 17). Look at the teeth from all

angles, especially the incisal view and ensure that the facial contours are similar (Fig 18). The incisors should have three planes of facial contour.[10] Where one area is overcontoured, mark that area in pencil and contour with a red Sof-Lex disc. Next, finish the incisal embrasures with discs (e.g., Vision Flex discs [Brasseler USA; Savannah, GA] and red Sof-Lex discs) (Fig 19). Open the incisal embrasures, making sure there is a natural progression of the embrasures, becoming wider from the centrals to the cuspids. A succession of diamond strips or Epitex strips is then used interproximally. Draw the facial proximal line angles and refine the line angles with discs to create the desired virtual widths and ensure symmetry of the line angles.[11] Open up the facial embrasures to the proximal line angles with a disc (Fig 20). The central incisors should now be mirror images of each other. A succession of fine finishing discs is now used on all surfaces.[12,13] With the primary anatomy now complete, this is the ideal time to end the first appointment. It is very helpful to take photographs and impressions in order to properly evaluate your work and create a plan for the final finishing and polishing.

### Finishing and Polishing

Examiners often find that candidates over-finish and polish their cases. A systematic approach to achieving proper primary anatomy will prevent over-finishing and help achieve great cosmetic and functional results, which will greatly increase your chances of passing Accreditation.

On the second appointment, the secondary and tertiary anatomy is more easily created. The secondary anatomy is created by starting off with the proper primary anatomy and flat surfaces on the incisors. On teeth #8 and #9, draw the proximal line angles and then draw a line down the center of the tooth. The developmental depressions are created with a flame-tip diamond or carbide (e.g., 7901 carbide) (Fig 21). This is done by carefully contouring a shallow depression area between these lines. Many dentists make the mistake of making this depression very sharp and deep, which will look false. The use of blue and pink rubber cups (e.g., Cosmedent) creates a nice smooth surface on all the veneers. For a little surface texture, use a diamond bur at very low speed and carefully trace it across the facial surface in a back-and-forth horizontal manner.[14] Once this is done, all the teeth can receive a high-gloss polish with discs and polishing paste (e.g., FlexiBuff and Enamelize [Cosmedent]) (Fig 22). This is done on a slow-speed mandrel, using a fast speed and light pressure (Figs 23 & 24).

This completes the six direct resin veneer exercise. Now take this knowledge and apply the concepts to an actual clinical case for Accreditation (Figs 25 - 28)!

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### *AACD Acknowledgments*

*The American Academy of Cosmetic Dentistry (AACD) recognizes Dr. James Peyton as an AACD Accredited Fellow and Accreditation Examiner who has restored the smile of a Give Back A Smile™ survivor. The AACD recognizes Dr. J. Fred Arnold, III, as an AACD Accredited Fellow, Fellowship Examiner, and Accreditation Examiner.*

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# Accreditation Clinical Case Report, Case Type V: Six or More Direct Resin Veneers

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## Introduction

Direct resin veneers are the ultimate challenge for the restorative dentist as a clinician and artist. The culminating result measures the dentist's abilities in patient management, smile design, and understanding of the mechanical and physical properties of dental resins. Chairside, the dentist "morphs" into the laboratory technician. Resins, opaquers, and tints are layered as a ceramic artist would with porcelain. Today, there is no single direct restorative material that fulfills all the prerequisites for a predictable result—function, esthetics and biocompatibility—but the combination of materials and techniques can produce a beautiful synergistic result.[1]

*Today, there is no single direct restorative material that fulfills all the prerequisites for a predictable result.*

## Patient History

A 21-year-old male presented with the chief complaint that his teeth were yellow, spotted, and chipping (Fig 1). He wanted a whiter, more esthetic appearance with natural contours that did not make his teeth look worn and aged. He liked the general contours of his teeth, but did not like the deterioration of their surface. The patient was in excellent health and was a junior in college, where he played lacrosse.

## Clinical Examination and Findings

The patient presented with a complete dentition with the exception of the third molars, which had been removed when he was younger. He had had orthodontics as a teenager. Residual surface blemishes may have been the result of surface decalcification during periods of inadequate homecare during the orthodontic treatment. He also had had "a la carte" repair of isolated areas of caries with both direct and indirect restorations. Radio-

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*Figure 1: Preoperative full-face image.*

graphic and clinical examination determined that the patient was free of active caries. Margins on existing restorations were well sealed and contiguous. Relative to the number of restored surfaces and location, caries risk assessment was slightly higher than average due to dietary and home care issues.

Inter-digitation of the teeth revealed a Class I occlusion with mild occlusal and incisal wear. The patient's temporomandibular joint was symptom-free. The joint hinged freely with light bimanual manipulation. He exhibited a full range of excursive movements. Anterior guidance was adequate, providing disclusion of posterior teeth on excursive movements from centric relation (CR). There was no clinical slide from CR to maximal interocclusal position (MI). Model analysis revealed a stable occlusal relationship with centric holding contacts on each tooth, and mild forensic evidence of parafunctional activity.[2]

Esthetic evaluation[3] (Fig 2) revealed the following findings:

- The incisal display was in an acceptable range at full smile and repose.
- Tooth #9 was chipped on the incisal edge.
- There was spacing between all teeth in the anterior segment.
- Generous incisal embrasures existed, which were uniform throughout the smile.
- The cuspid contours were bulbous relative to other teeth, which generally exhibited rather flat facial contours and embrasures.
- The teeth presented with acceptable proportions to each other. The centrals displayed appropriate dominance, without the laterals competing for attention as may be desired in a youthful smile.[4]
- Gingival zeniths of the six anterior teeth displayed a "gull wing" appearance that was consistent with our esthetic parameters.
- The tooth base shade was A3/2M3 as measured visually and verified with the Vita Easyshade spectrophotometer (Vident; Brea, CA). Incisal translucency was more noticeable on the centrals than the laterals, with moderate translucency and volume.
- Labial surfaces showed significant discoloration from enamel hypocalcification. Failing interproximal composite restorations exhibited marginal leakage, staining, and surface discoloration.
- Posterior teeth adequately filled the buccal corridor and the smile zone preoperatively included teeth ##3-14.

## Treatment Plan

The patient had two primary options to improve the appearance of the surface of his teeth: Direct resin veneers or indirect laminate veneers. Direct resin veneers were chosen because of the conservative nature of the technique. With appropriate management of the occlusion and an understanding of the physical properties of selected resins, this material can be used predictably for restorations to enhance a patient's smile.[5] Therefore the treatment plan was developed as follows:

- periodontal tissue management
- model analysis and diagnostic wax-up

*Figure 2: Before and after full smile; the patient shows an appropriate incisal display with a smile line that mimics the curvature of the lower lip.*

- equilibration
- dental whitening
- direct bonded resin veneers ##5-12, with enamelplasty of #3, #4, #13, and #14
- occlusal appliance.

### Armamentarium

- D100 digital camera (Nikon USA; Melville, NY)
- SAM 3 articulator (Great Lakes Orthodontics; Tonawanda, NY)
- Sil-Tech polyvinyl siloxane putty (Great Lakes Orthodontics)
- 15% Opalescence PF (Ultradent Products; South Jordan, UT)
- Vita Easyshade spectrophotometer (Vident; Brea, CA)
- 2.5x magnification loupes (Designs for Vision; Ronkonkoma, NY)
- T-Scan II (Tek Scan; Boston, Mass.)
- Douglas Terry Esthetic Composite Finishing Kit, (Brasseler USA; Savannah, GA)
- preparation diamond LVS3 (Brasseler USA)
- Jeltrate alginate (Dentsply Caulk; Milford, DE)
- AccuFilm articulating paper (Parkell; Edgewood, NY)
- Elipar Freelight 2 curing light (3M ESPE; St. Paul, MN)
- Clearfil Photo Bond bonding agent (Kuraray USA; New York, NY)
- Micro Prime desensitizer (Danville Materials; San Ramon, CA)
- Microbrush micro applicator (Microbrush International; Grafton, WI)
- 32% BAC Uni-Etch (Bisco; Schaumburg, IL)
- Filtek Supreme Plus composite (3M ESPE)
- OptraGate retractor (Ivoclar Vivadent; Amherst, NY)
- FlexiStrip finishing and polishing strips (Cosmedent; Chicago, IL)
- diamond polish (Ultradent)
- brush #3 (Cosmedent)
- Titanium Composite Instrument Kit (Cosmedent)
- Creative Color tints and opaque shades (Cosmedent)
- Renamel microfill composite (Cosmedent)

## Treatment Description

### Oral Hygiene

An enhanced oral hygiene regime was immediately implemented to ensure a stable and healthy periodontal condition. A dental prophylaxis was completed. Oral hygiene education included the use of a water irrigating device and a mechanical toothbrush. The patient's tissue improved remarkably from a 25% bleeding index to a 5% bleeding index. The patient was counseled about the effects of high soda and energy drink consumption over protracted periods of time. He was prescribed PreviDent 5000 (Colgate; New York, NY) to combat acids and aid in the re-mineralization of his enamel.[6]

### Diagnostic Exam

A diagnostic exam was completed with a full radiographic series. Duplicate sets of diagnostic-quality

*Figure 3: The initial preparation of the four incisors was accomplished to a minimal depth of .5 mm but extended in areas where necessary to eliminate the deeper blemishes and previous restorations.*

*Figure 4: The first layers of composite were applied using a hybrid interproximally and on the incisal edge to replace missing tooth structure, and a body shade microfill was applied in the gingival third.*

models were then mounted on an articulator with a CR record. There was no significant discrepancy noted either clinically or on the models from CR to MI. Excursive movements revealed adequate disclusion of posterior teeth facilitated by the existing anterior guidance. The models were equilibrated to detail stable holding contacts and a diagnostic wax-up was completed to restore the missing incisal aspects primarily on ##9-11. The enhanced anterior contours allowed for all teeth to contact in centric occlusion (CO), but disclude all posterior teeth in excursive function.

### Whitening

Dental whitening was completed utilizing a tray system.[7] Custom-fabricated vacuum-formed stents were created for both arches with small reservoirs on the facial aspects of the teeth. A 15% carbamide peroxide with potassium nitrate and .11% fluoride ion was utilized. Pre-whitening, the shade was documented as A3/2M3 visually with a shade guide and spectrophotometer. The patient applied the whitening agent for 14 consecutive days for a minimum of four hours each day. The result was that the incisor shade lightened to an A1. The patient was very pleased. However, dispersed on the surface, there remained the blotchiness of the hypo-calcified areas and residual staining of the existing composite restorations.

*Model analysis revealed a stable occlusal relationship with centric holding contacts on each tooth, and mild forensic evidence of parafunctional activity.*

### Diagnostic Mock-Up

Prior to the preparation of the teeth, a mock-up was used to confirm the recipe for the layering technique. The intention was to use a base in the deeper interproximal repairs and in areas of planned extension on the incisal areas, which was a hybrid composite. A nanocomposite was selected because of its strength, wear resistance, and optical properties, which are similar to dentin. Layered over this was a microfill. In the gingival third of the tooth, the body shade A1 was used, and in the incisal area Medium Incisal was applied. The microfill was selected due to its consistent color, polishability, and resulting natural appearance. The intention was to keep the thickness of the restoration to a minimum. Tints and opaquers were not utilized because the desired result could be accomplished without them. This mock-up gave us the confidence that we were headed in the right direction.[8]

### Preparation and Layering

Next, occlusal detailing via an equilibration process was completed. Preoperatively, CR coincided with CO. Minor detailing refined the stable holding contacts in CO. All excursive movements were verified to be free of any posterior interference. Initial preparation began with teeth ##7-10 and continued until the initial contours were layered with resin before beginning the adjacent teeth. The cuspids and bicuspids were managed in a similar fashion at a separate visit. Preparation involved the use of a tapered

*Figure 5: A final veneering layer of a medium translucent, medium-value microfill was applied and sculpted to the approximate tooth contours.*

*Figure 6: All teeth that were to be restored were built up prior to the development of the final labial contours.*

diamond bur to the initial depth of approximately .5 mm to .7 mm (Fig 3). In many areas the surface discolorations disappeared at this point, but in several areas they remained visually present. These areas were prepared additionally. It was important to ensure that the cavosurface of the restoration blended onto solid, well-organized enamel. The preparations on the balance of the teeth thinned to less than .5 mm in the gingival areas. Interproximally, there were several pre-existing restorations that were removed to ensure a sealed and well-bonded restoration to sound tooth structure.

Teeth were managed on an individual basis and built up to full contour before final contouring and polishing was initiated as a group. Each tooth was conditioned with 35% phosphoric acid for 15 seconds, then washed for 30 seconds, with only the excess moisture removed, being careful not to dehydrate the tooth and collapse the unsupported collagen network of the hybrid layer.[9] Three coats of a primer were then applied to the exposed dentin, mostly in the interproximal areas, until shiny and evaporated between each coat with the vacuum. Next, multiple coats of an unfilled resin were applied to the entire surface of the tooth and air-thinned prior to being cured.

The hybrid composite shade B2B was then applied to the interproximal areas (if required due to pre-existing interproximal restorations that required restoration) and leveled to the collateral prepared surface areas (Fig 4). This was cured and additional hybrid was added to the incisal areas of ##9-11, individually, with the assistance of a putty matrix fabricated from the diagnostic wax-up. This allowed for functional areas to have the added benefit of support from the hybrid composite.

Layering of the microfill composite then proceeded (Fig 5). The gingival third was layered with shade A1B, thinning to the mid portion of the tooth. Composite was applied to the intended tooth contours, and smoothed with a flat-end sable brush. Medium Incisal was then applied from the incisal edge, reciprocally feathering into the gingival area.[10] This stratification method of layering composite was completed on all teeth before detailing of final contours was initiated (Fig 6).

The essentials of esthetic tooth contour were developed with a tapering fine diamond. The intention was to create a natural appearance. Preoperatively, the patient had presented with generous incisal embrasures with minimal spacing that he liked. The incisal embrasure design was maintained to harmonize with the remaining dentition (Figs 7 & 8). Final contours were detailed through a multi-step process involving chairside visualization, photography, and diagnostic models.

## Contouring and Polishing

Detailing contours of multiple anterior direct restorations can be a relentless pursuit. The three most common challenges are typically contour, polish, and tissue response (Fig 9). A critical eye can always reveal additional areas to enhance. In this case, limiting the time spent chairside at each appointment and

*Figure 7: Before and after retracted 2:1 view. The incisal translucency of the newly restored teeth harmonizes with the balance of the smile. The unique incisal edge contours enhance the natural appearance as the direct composites blend into the surrounding natural teeth.*

*Figure 8: Before and after right lateral retracted 2:1 view. The incisal embrasures gradate toward the posterior. Enhancement of the labial anatomy and facial embrasures in the final restorations creates a balanced and natural appearance.*

to detailing the case over several appointments was most effective. At the end of each visit, diagnostic impressions were taken to create models that could then be evaluated prior to the patient's next visit. This greatly aided in visualization and in designing naturally balanced contours that harmonized with the rest of the patient's teeth.

Nature, although esthetically symmetrical, is not identically mirrored from side to side. Direct layering of resin can approach wonderful depth of color and the appearance of natural tooth structure; however, our greatest illusions can come from contour. Specifically, in this case, the goal was to develop unique incisal effects in contour and light refraction. I used incisal contours that were uniquely symmetrical and not necessarily perfectly mirrored to create a natural look (Fig 10). Translucency was beautifully managed with the selection of appropriate composite materials. In nature, an incisal halo is created by the refraction of light at the incisal edge through the enamel. In this case, it was subtly created by the bevel at the incisal edge of composite and the interaction of either natural tooth or hybrid composite to alter the reflection of light through this area.

This patient's smile zone displayed teeth from #4 to #13. After whitening, a majority of the hypocalcified areas had diminished in the bicuspid region. Enamelplasty was all that was needed to successfully remove those surface blemishes that remained on #4 and #13. This was accomplished with fine diamond burs.

Finishing and polishing were initiated with ultra-fine diamonds and carbides. Silicon and diamond impregnated discs and cups were then

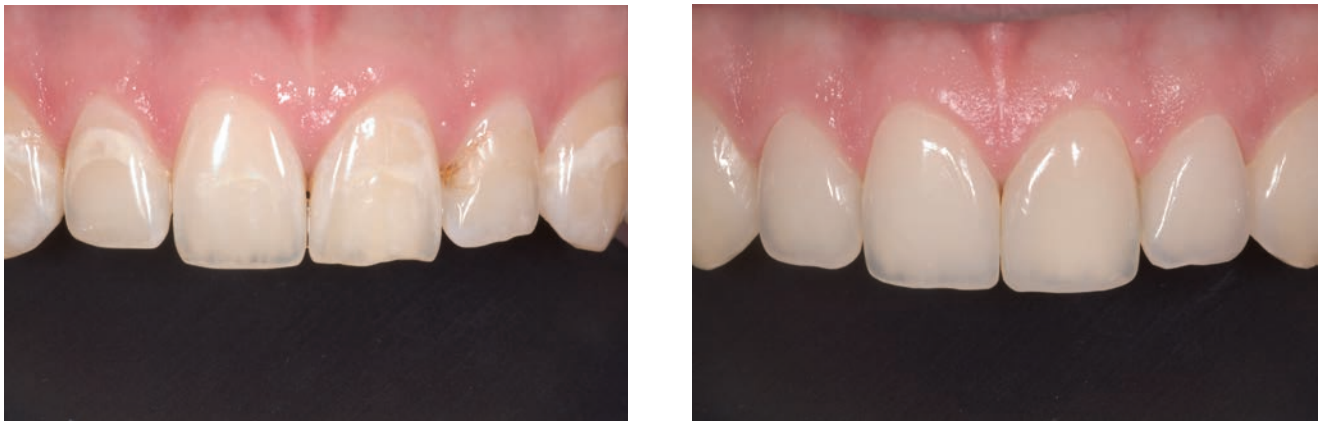

*Figure 9: Before and after retracted 1:1 view. Optimal periodontal tissue health is supported and the gingival zeniths are positioned just distal of center, creating a converging axial inclination. Central incisors reveal symmetrical contours and balanced reflective surfaces in the final result.*

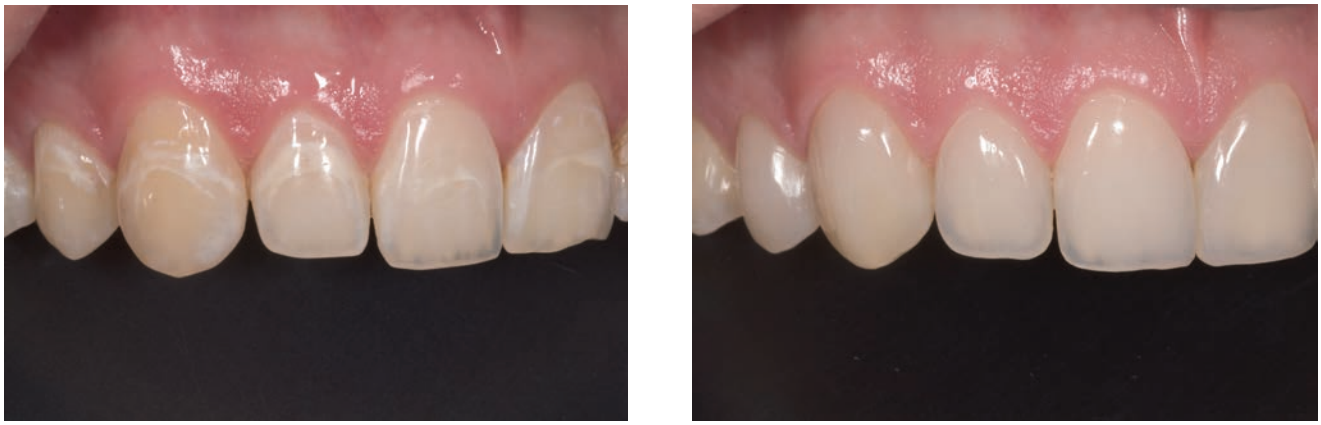

*Figure 10: Before and after right lateral 1:1 view. Incisal translucencies and halo effect create a lifelike appearance due to the refractive properties in the composite material selection.*

used, followed by a composite silicon polishing brush. The final luster was created with diamond polishing paste and a goat hair wheel. Patience and technique were critical to ensure a beautiful result. Care was taken not to abuse adjacent tissue, alter contours, or over-heat the composite causing visible damage at the margins.

Respecting the active lifestyle of our patient, both an athletic soft guard and an occlusal appliance were fabricated to help ensure the long-term success of his restorations.

## Summary and Conclusion

The impact that a smile enhancement has on an individual can be easily demonstrated by the effect it has on the "smile zone." A broader and more confident smile is certainly a reflection of how this patient perceives himself. Direct resin veneers can be a very conservative treatment modality to enhance the smile and restore the confidence of our patients. With an understanding of occlusal concepts and material selection, a predictable result and a happy patient is a validating experience for the dentist (Fig 11).

***Disclaimer: Although Dr. Finlay submitted an armamentarium within his report for this particular clinical case submission, current Accreditation protocol (dated June 1, 2008) does not allow for the submission of armamentariums within clinical case reports for Accreditation.***

*AACD Acknowledgment*

*The American Academy of Cosmetic Dentistry recognizes Dr. Scott Finlay as an AACD Accredited Member.*

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*Figure 11: The happy, satisfied patient.*

# Examiners' Perspective for Scott W. Finlay, DDS, AAACD

*by* J. Fred Arnold, III, DMD, AFAACD
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The ability to handle composite resin well while applying smile design principles are the key skills needed to pass Case Type V, Six or More Direct Resin Veneers,. For dentists, this is the only case type in which technique photographic views are required. Members in the Accreditation process can have fun with this case, showing off their artistic skills to the examiners, as they layer and finish composite to replicate nature.

Dr. Scott Finlay certainly impressed examiners with his skills with Case Type V. His case selection was excellent, choosing a classic post-orthodontic decalcification case. His patient presented with moderate decalcified areas, minor incisal chips, good tooth alignment, healthy gingivae with symmetrical architecture, and teeth that did not require much of a value change—all ideal conditions for conservative direct resin veneers for Accreditation.

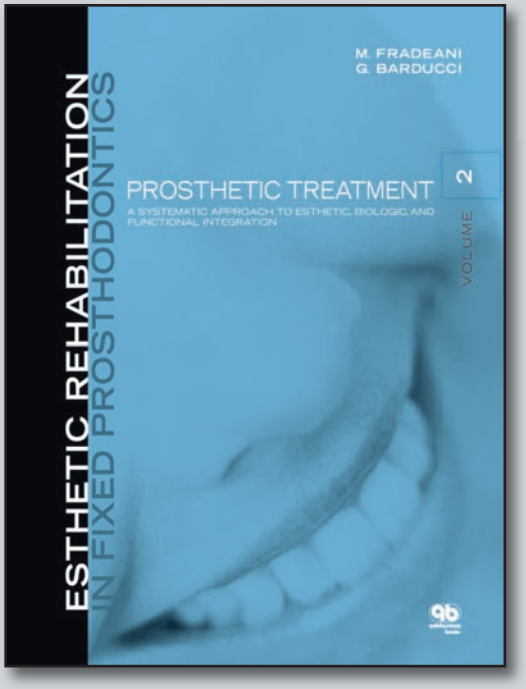
Dr. Finlay achieved a beautiful polychromatic result with realistic incisal halos and deep translucencies that highlighted the internal lobe development with a depth of color that rivaled nature. Dr. Finlay was also able to finish and polish the veneers to achieve excellent dental anatomy and a surface luster that matched the natural dentition.

This case passed unanimously, with only minor faults. Common faults noted included the open contact between teeth #9 and #10. Examiners also noted the minor value difference between the central incisors. The cuspids were slightly bulky with poor line angle development on the distal, as noted from the occlusal view.

Accreditation clinical cases are scored on a fault system, based on the dentistry meeting the Accreditation Examination Criteria. Faults are minor (-2 points), major (-4 points), or catastrophic (-8 points), with any score that adds up to a -8 or more being a failure. It is possible to get a bonus +1 for a positive overall look of the case. This is usually given if in the portrait view the dentistry is undetectable and natural-looking, with a pleasing, attractive smile. Three examiners did give Dr. Finlay's case a +1 for the overall look of the case. Note that if there is a catastrophic fault, it is an automatic failure and a +1 may not be granted. It is very important to remember that Accreditation success is not about perfection. It is about excellence!

Dr. Finlay should be very proud of his direct resin veneer case. His passion for excellence is what Accreditation is all about.

# ESTHETIC REHABILITATION IN FIXED PROSTHODONTICS

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# Interdisciplinary Dentistry

## In This Section:

# Dentist-Technician Synergy = Predictable Results

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## Introduction

Every case, no matter how complex or simple, revolves around the synergy between the three parties involved: The dentist, technician, and patient. Figure 1 illustrates how synergy and other components combine to result in a predictably excellent restoration.

*We communicate constantly about cases via telephone and especially online.*

Laboratory technician Mike Bellerino and I have a relationship going back more than 20 years and share more than just a desire for excellent dental restorations. We communicate constantly about cases via telephone and especially online. When together at dental meetings and when lecturing together we often discuss cases and lecture development while running, usually in the early morning hours. Of course, we also share a common interest in completing complex dental reconstructions, usually with predictably excellent results, both esthetically and functionally.

## Goals

Before starting on a complex restorative case we believe that goals for the completion of the case must be spelled out in advance. The priority is to identify the patient's needs and desires by completing a very comprehensive examination that starts with a preclinical interview. In addition, our goal for every case is to create a natural smile that is not a distraction to the eye, while preserving as much tooth structure as possible. We also spend time to select materials and use techniques that will ensure longevity of the completed restoration.

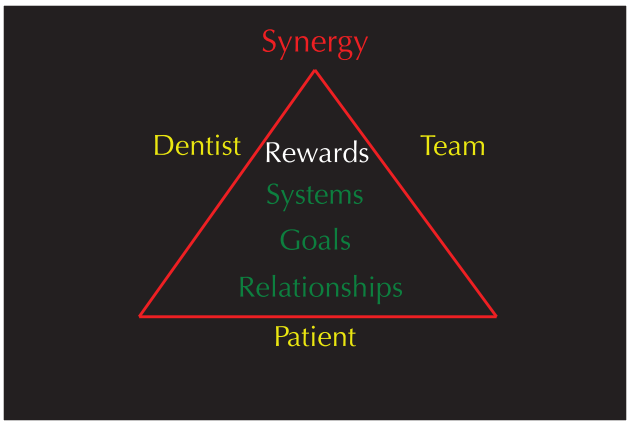


*Figure 1: Synergy pyramid for predictable results in reconstructive dentistry.*

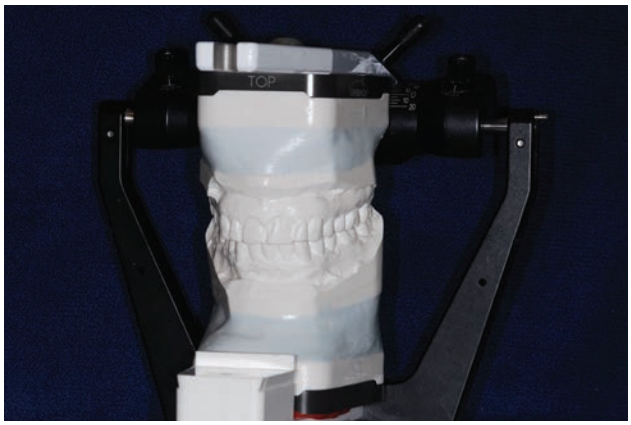

*Figure 2: Mounted models for diagnosis.*

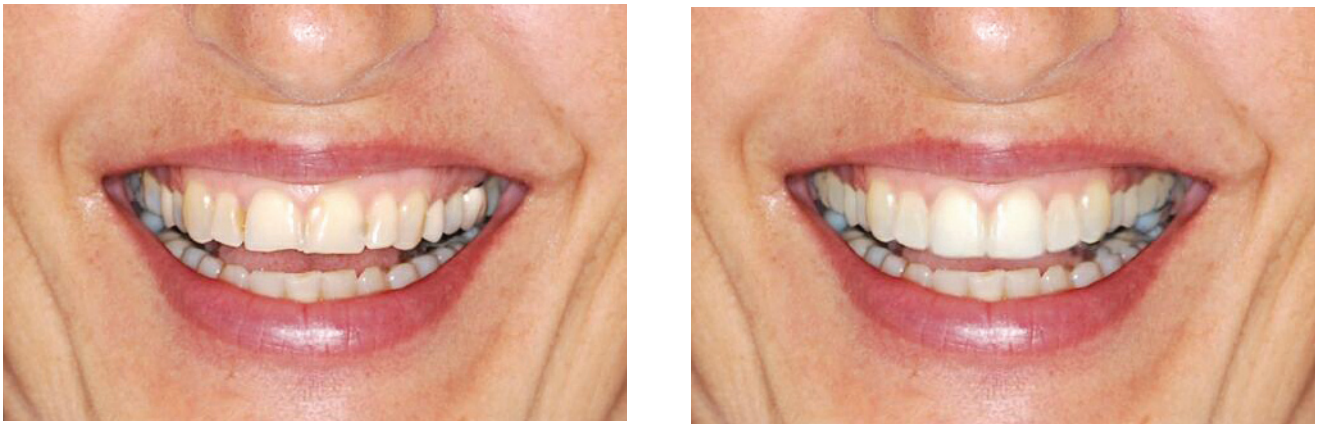

*Figure 3: Smile design is aided with computer imaging (right). From Europe, this patient wanted a natural-looking smile, not "American white."*

## Steps

### Systems

Probably the most important step in the Synergy Pyramid is the Systems step. Mr. Bellerino and I have developed systems for virtually every step of the dental restoration process. The key for consistently predictable results is to leave nothing to chance. Every step of the entire process is planned so that either the dentist or the technician is accountable for the final result of that step. If there is ever a problem or misstep in the process, either he or I will accept responsibility and make the correction.

### Comprehensive Diagnostic Examination

The first step in every case is the comprehensive diagnostic examination. Every case is evaluated with study models mounted in centric relation (CR) (Fig 2), along with a complete series of diagnostic radiographs and photographs. After determining that the patient's goals and the completed treatment plan are congruent, the patient is scheduled for the smile design appointment. Using computer imaging (Fig 3), direct composite mock-up, or both, the patient participates in and accepts the final goal for the smile design.

### Wax-Up

I then complete the "Esthetic Wax-up Check List," which gives Mr. Bellerino all the information he needs (along with equilibrated, mounted study models, photographs, and computer imaging) to complete an ideal wax-up of the desired final result, functionally and esthetically (Fig 4). He then e-mails me digital

*Figure 4: Completed wax-up.*

*Figure 5: Maxillary initial preparation.*

photographs to confirm that the wax-up satisfies all requirements before mailing the case back to complete the prototype templates.

### Preparation

Before the patient arrives for the preparation phase, my dental assistant will use the waxed models to fabricate very accurate templates so that the patient's prototype restorations will be an exact replica of the waxed models. Preparation templates are also constructed from the waxed models to allow precise tooth preparation with minimal tooth reduction. I typically use a rubber dam to isolate an entire arch for removing all old restorations and bases before building up where necessary with dentin-colored hybrid composite resin (Fig 5).

### Impressions

The preparations are completed (Fig 6) and multiple impressions are taken with syringeable hydrocolloid and water-cooled hydrocolloid material. At least four impressions are taken for every case, but usually five or six full-arch impressions are taken. The first impression is poured immediately with snap stone, so by the time all impressions are completed a model is available for making the Radica (Dentsply Ceramco; York, PA) prototypes.

The provisional restorations are called prototypes because every effort is made to ensure that the prototypes match the desired outcome for the final restorations. Radica is a relatively new provisional material that I have been using for complex cases for about 1 ½ years. It is extremely durable and can be layered to achieve an esthetic result that rivals the final porcelain restoration (Fig 7).

All of the prototypes except for one central incisor are cemented

*Figure 6: Maxillary buildups and final preparation for anterior veneers and posterior zirconium crowns.*

*Figure 7: Prototypes fabricated indirectly.*

*Figure 8: Prototypes at one week for patient approval.*

or spot-bonded in place. Another final impression is then taken for the trial unit model, then the last central is placed and the patient is dismissed. After about one week the patient returns to reevaluate the prototypes (Fig 8). Changes are made to the prototypes as necessary to satisfy both the patient and me. When the patient accepts the prototypes, he or she will sign a prototype approval form to begin the fabrication process. The prototypes are photographed and accurate impressions and bite records are taken.

### Fabrication

Using bite records taken in CR at the predetermined vertical relation, the sectioned and trimmed die models and prototype models are all mounted on a semi-adjustable articulator. All models are approved and mounted in my office and I

*Figure 9: Patient accepts trial unit.*

*Figure 10: Case completed.*

verify the accuracy of the mounting before the case is sent to the laboratory. Three sets of models are sent for every case: Mounted sectioned die models, solid die models, and mounted prototype models. I also write a detailed prescription detailing the esthetics, occlusion, materials, etc. Mr. Bellerino now has everything he needs to fabricate an ideal finished case.

The trial unit model is used to fabricate a trial unit of a single central with the desired shade, texture, translucency and shape. The patient returns for the trial unit appointment. I remove the provisional for the single central and place the trial unit with try-in gel for patient approval (Fig 9). After the patient accepts the trial unit, he or she signs a trial unit acceptance form. This trial unit is not used in the final case, but the case can now be completed with assurance that the patient will not change their mind and reject the case because of the shade.

Mr. Bellerino completes the restoration using the prototype models as a guide. Nothing is left to chance. Mr. Bellerino also uses the solid models to confirm the fit and interproximal contacts of each unit. If there are any questions, he will use digital photography and e-mail to communicate with me for resolution.

*Every step of the entire process is planned so that either the dentist or the technician is accountable for the final result of that step.*

When the case is returned to my office, I confirm the accuracy with another unused solid model that was retained in the patient's case pan (hold back model). I also confirm that the occlusion and anatomy are ideal before scheduling the patient for the insertion. When each of these steps is completed, it is extremely rare that the case is not cemented at the insertion appointment. The occlusion is perfected, the porcelain polished, and a hard acrylic nightguard is fabricated for every case.

The final step in the complex restoration process is the reward. In addition to the financial remuneration that comes with many hours of hard work, Mr. Bellerino and I both take great pride in knowing that we have collaborated in a complicated series of steps resulting in a ceramic reconstruction that will serve our patient for many years to come (Fig 10).

***AACD Acknowledgments***

*The American Academy of Cosmetic Dentistry (AACD) recognizes Dr. Mike Malone as an AACD Accredited Member and past president, who has completed two Give Back A Smile™ cases. The AACD recognizes Mr. Michael Bellerino, CDT, as an AACD Accredited Member, owner of Trinident Dental Laboratory, which has donated the smiles of a number of GBAS survivors.*

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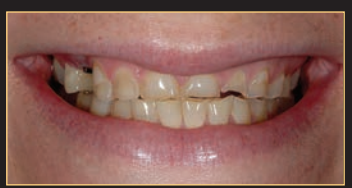

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# Accreditation: A Model for Successful Communication and Teamwork

*by* Michael T. Morris, CDT, AFAACD
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## Introduction

Accreditation is much more than a credential; it is a journey to cosmetic excellence. The elements acquired on the journey provide the basis for a successful model of dental teamwork and communication. The AACD 12 photographic views,[1] along with the *Guide to Accreditation Criteria*,[2] comprise the common language between the dental chair and laboratory bench. They are the tools by which treatment is communicated, as well as the measure of excellence.

*Continuing education is the aid to technique and skill improvement for reaching the zone of excellence in Accreditation-level work.*

The *Guide to Accreditation Criteria* addresses all the areas and terms needed for uniting team members in case discussion.[2] As an instrument for diagnosis and treatment planning, it identifies obstacles and deficiencies that would hinder the best possible outcome. When used for completed case evaluation, it is an indispensable device to pinpoint areas that need alteration and facts to guide team and individual improvement. Continuing education is the aid to technique and skill improvement for reaching the zone of excellence in Accreditation-level work.

*Figure 1: Patient with natural smile.*

*Figure 2: Magnification showing detail of incisal wear.*

The AACD 12 photographic views (the standard views for patient assessment in cosmetic dentistry) are found in the *Guide to Accreditation Photography*, along with guidance and explanations.[1] More than anything, the digital age has supported capturing, sharing, and the study of dental photography. Digital capture permits the highest value of visual information, with the ability to review the patient in static images. Additional reference photography of prototype temporaries and shades bridges the gap between dialog and written directions for the treatment plan. The joint role of the clinician and technician is to then communicate using the terms from the AACD criteria guide, which outlines ideal health and harmony in the patient's dentition, through the sharing of digital photography.

Treatment planning and evaluation protocol can be the same for every case, beginning with clinical examination, photography, and records. Considerations for all treatment are then held to the AACD criteria guide as the standard of excellence. Hence communication is simplified by connecting the dental chair and laboratory bench with aligned expectations and a single shared understanding that the mutual desire is to follow the principles of Accreditation criteria, resulting in optimal treatment.

## Case Study 1

Clinical findings showed excessive anterior wear with slight posterior interferences, and otherwise good general health. When using the criteria as a model guide for diagnosis, it was determined that the patient showed deficient incisal and buccal corridor display, lacked central dominance, and had poor axial inclinations of the lateral incisors. Tissue architecture was higher than ideal in the lateral positions (Fig 1 & 2).

The treatment plan included 10 feldspathic porcelain veneers, occlusal equilibration, and a nighttime biteguard. It was decided that the tissue position of the laterals would remain, based on the patient's low lip line and desire to avoid orthodontics. Diagnostic waxing was performed to create records for preparation guidance and prototype fabrication (Fig 3). Preparation guidance records ultimately serve to verify the form of the prepared teeth, as related to the final form of the restorations (Fig 4). Open availability for consultation at every phase of case development is key for success. Progress momentum is maintained when problems are promptly identified and solved. However, quality records and a single-minded approach will minimize issues and the need for lengthy discussion.

Clinical records were received, which assisted case completion using the refractory technique for feldspathic porcelain. Preoperative and prototype photography were used for constant reference during fabrication. Several images were manipulated between color and sepia tone to reveal value, contrast, character, and translucency (Fig 5). The restorations were hand-polished for final surface luster, using low-exposure character pictures (Figs 6-9). The completed veneers were photographed and studied during the try-in phase to confirm smile design and patient expectations prior to final placement (Figs 10-12).

## Case Study 2

A young patient presented as a candidate for SILKS no-prep porcelain veneers (Morris and Arnold;

*Figure 3: Smile design completed in wax.*

*Figure 4: Verification of ideal even volume for restorations.*

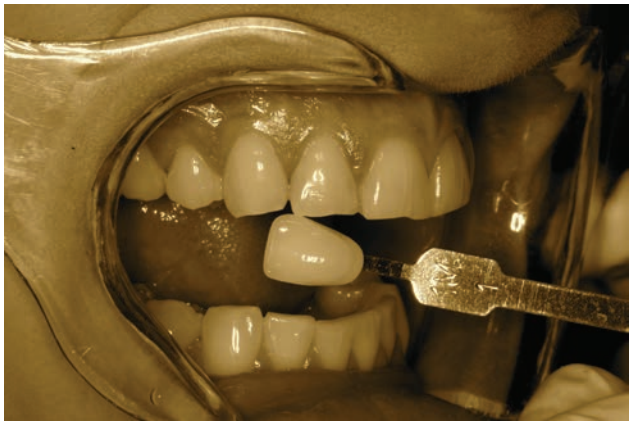

*Figure 5: Image converted to sepia tone.*

*Figure 6: Decreased exposure image for character reference.*

*Figure 7: Pumice application for luster control.*

*Figure 8: Final polish procedure with diamond paste.*

*Figure 9: Restorations seated on solid model.*

*Figure 10: Instant case evaluation prior to final placement.*

*Figure 11: Close-up reveal of smile design.*

*Figure 12: Patient's new incisal form and full buccal corridors.*

*Figure 13: Preoperative patient portrait.*

*Figure 14: Patient's display of excess tissue in full smile.*

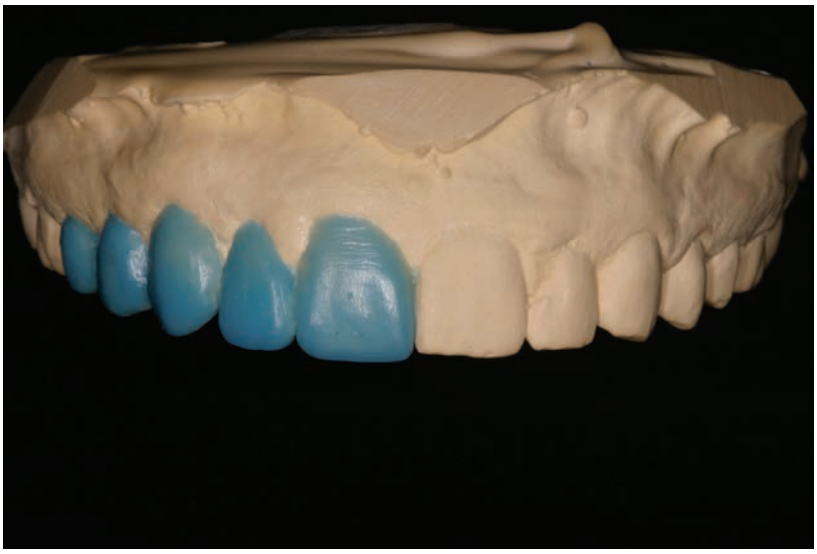

*Figure 15: Partial completion of additive wax-up.*

*Figure 16: Porcelain buildup guided by putty matrix.*

*Figure 17: Completed veneers on solid model.*

*Figure 18: No-preparation veneers.*

*Figure 19: Design of posterior progression of color and form.*

*Figure 20: Smile showing profile contours.*

*Figure 21: Thrilled patient.*

Lexington, KY). Clinical examination revealed excellent health, as expected. Additional findings were bonded peg laterals, incisal wear, negative buccal space, gummy smile, and less than ideal incisal display (Figs 13 & 14). Using the AACD Accreditation criteria model for diagnosis and treatment guidance, it was determined that the patient would receive 12 of the no-preparation porcelain veneers, tissue recontouring, and tray bleaching. A diagnostic waxing was created to assist in tissue recontouring and prototype construction (Fig 15). Feldspathic veneers were fabricated using the refractory technique, with the zone of excellence as the aim, managed by adherence to color, design, and surface finishing principles (Figs 16 & 17).

The completed veneers were photographed and studied during the try-in phase to reapply the checklist of smile design and treatment evaluation outlined in the AACD criteria guide. Upon verification and patient approval, the veneers were permanently placed (Figs 18-21).

## Discussion

Patients' increasing awareness of conservative prepless dentistry has pushed the envelope in terms of technique and materials. Regardless of direct or indirect restorations, and preparation (or lack thereof) of dentition to receive treatment, the zone of excellence remains as a constant goal. Although this approach to treatment, using the Accreditation model, does not mean that every result will fall into the range of excellence (because of unusual and sometimes impossible preoperative conditions), it does enable the dental team to share protocols under the same mindset.

Having photographic and written models for team communication does not necessitate a "one size fits all" smile design. Rather, Accreditation criteria-driven diagnosis and treatment planning help to diagram a zone of excellence for measurement of harmony and oral health that allows dental teams to create lifelike variations. A commitment to achieve AACD Accreditation is the first step in connecting the dental chair and laboratory bench through the language of the criteria checklist and photography protocol. The fusion of language and perception is accomplished through the application of the Accreditation model of diagnosis and treatment evaluation into the practice of cosmetic dentistry.

### *Acknowledgment*

*Mr. Morris thanks Dr. J. Fred Arnold, III, for his clinical work and photography.*

### *AACD Acknowledgment*

*The American Academy of Cosmetic Dentistry recognizes Mr. Morris as an AACD Accredited Fellow, Fellowship Examiner, and Accreditation Examiner.*

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# Searching for Ways to Improve Teamwork Between Dentists and Laboratory Technicians

*by* Mark Willes
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Dr. Dennis Wells and I were honored to speak at this year's AACD annual scientific session in New Orleans and felt humbled by the task of sharing some tips on what has made ours a successful partnership.

First I would like to say that a successful partnership is never "made"; rather, it is always a work in progress. That is certainly how we feel about our relationship.

## Elements of a Successful Partnership

Whether we are looking at Paul McCartney and John Lennon of the Beatles or Peyton Manning and Marvin Harrison of the Indianapolis Colts, we see a chemistry that seems almost magical at first glance. Only when we look behind the scenes do we realize how they are able to accomplish extraordinary things. The famous boxer Joe Frazer once said, "Champions are not made in the ring, they are only recognized there." So it is with life and dentistry—the real "magic" happens behind the scenes when no one is watching. What the rest of the world sees is not magic at all, but the natural result of careful planning, attention to detail, and intense training.

Here are a few points to consider:

- In a good partnership, the phrase" no one has ever done it that way" does not end a discussion; it starts it.
- A good partner is the other partner's biggest support, and, at times, his or her severest critic.

*Figure 1: In this preoperative image, the patient is unhappy with her lingualized teeth and color discrepancies.*

*Figure 2: Hand-sculpted provisionals created by Dr. Dennis Wells show correct tooth position, contour, and general color guidelines for the laboratory.*

*Figure 3: Final veneers postoperative. All of the patient's objectives were met following Dr. Wells' guide, and the patient was ecstatic that we did not have to prep her teeth.*

- Partners do not just share credit; they increase the amount of credit to be shared.
- A good partner does not just make the other partner look better. A good partner makes the other partner *be* better.
- In a good partnership, all partners look to the future…but not exactly in the same places.
- Good partners must share a common philosophy.

## The "Triple Threat"

Each of us should be establishing a partnership with someone who is a "triple threat," as well as working on becoming a "triple threat" ourselves. What is a "triple threat?" A "triple" in dentistry is someone who has a significant grasp on three different aspects of dentistry: Artistic skills, functional skills, and business skills. There are numerous programs around the country for both dentists and laboratory technicians that specialize in each of these areas. We all need coaches and mentors that can guide us in our development of these skills, so seek them out and find a way to implement them into your practice.

## Importance of the Hand-off

One specific tool that has helped us provide better, more predictable dentistry to our patients is the custom prototype mock-up. This is a skill that, if developed and used

properly, will not only provide you with more predictable results from your laboratory but also higher case acceptance from potential patients. This also becomes the number one tool used in the dentist/ceramist hand-off. Accurate impressions, high-quality photographs, bite registrations, detailed laboratory script, etc., comprise the rest of the information in the hand-off (Figs 1-3).

The doctor/ceramist hand-off is the transfer of impressions, guides, and information that the laboratory will use to fabricate the final restorations. How well this hand-off is done will determine the success of the final case. If the hand-off is incomplete or late, the final result will be compromised. In football, the receiver may be in position but if the quarterback throws the ball short, the pass will not be complete. If the running back is not in position to receive the ball, the play will be compromised and ultimately the game could be lost. Each team member plays a key role in the success of every game and in every dental case.

We are constantly in search of a better, more predictable way to "wow" our patients and to grow as professionals. We are grateful to organizations like the AACD that provide an open forum for education. We are excited about the progress we have made and continue searching for ways to improve. We are certain that as we get to know more of the exceptional members of the AACD that we will learn much from you. Thank you for your dedication to excellence. A special thanks goes to my good friend and mentor Dennis Wells.

❖

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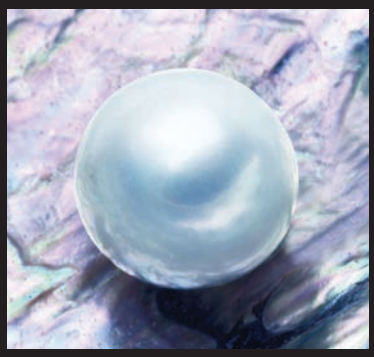

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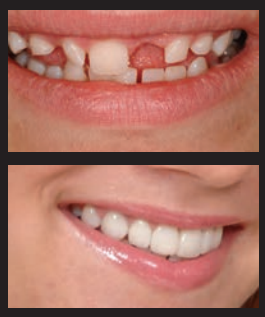

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# Lab Technicians' Techniques

## In This Section:

# Foundations for Success

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## Introduction

The quest for a restoration that embodies the elusive qualities of natural dentition has long challenged the dental profession. Fortunately, the recent advances that have been made in dental ceramics incorporate the optical properties of fluorescence and opalescence, allowing the ceramist to create illusions of reality in porcelain. The continual developments being made in the dental industry have brought an abundance of exciting new products to market and facilitated an ability to maximize the esthetic qualities that consumers and professionals are seeking.

*All clinical procedures must be supplemented by communication among the clinician, the patient, and the ceramist to ensure predictable esthetics.*

Among the new products are all-ceramic systems that have made quality esthetics more attainable than before. Today's all-ceramic products exhibit better strength, opalescent and fluorescent qualities and, in some cases, more tolerable wear patterns against the opposing natural dentition. Although exciting, these developments can raise many questions about which product to use for which type of case. Despite all of the technological advances, the over-abundance of inadequate restorations glares at us from the smiles of passers by.

The fact is that all clinical procedures must be supplemented by communication among the clinician, the patient, and the ceramist to ensure predictable esthetics. All three parties need an absolute vision of the desired end result in order to satisfy the elements of the smile design, as well as to determine what product to use and when. Esthetics also are the product of restorative dentistry, periodontics, orthodontics, and implantology, as well as the skills of the ceramist. Each professional involved in the process brings to the case his or her

*Figure 1: A trial smile is a removable mock-up that enables the patient to see and feel what the new smile will be like.*

*Figure 2: Cross-sectional view of the intricate internal structure of a natural tooth.*

perspective of what is or is not esthetically appealing. For example, if the soft tissue of the restorative site is higher than the rest of the dentition, an orthodontist, after taking the necessary steps to ensure health of the teeth, could erupt the tooth, bringing both the soft tissue and the bone incisally. Another option for uneven tissue form is possibly doing a crown-lengthening procedure for symmetry in the soft tissue. The laboratory should be involved in making a diagnostic wax-up and a trial smile or a mock-up. After seeing these diagnostic tools, a decision can then be made to achieve maximum esthetics.

## Tools For Communication

Esthetics are very individual in nature. Preconceived ideas about what is esthetic are plentiful and include concepts of central dominance, the golden proportion, and tooth shades and characterization. The first step toward success is clarifying these visions and bringing them to life prior to fabricating the final outcome. To increase the likelihood of predictability, transitional or interim devices such as a diagnostic wax-up, the "trial smile" (Fig 1), and/or provisional restorations are the ultimate "blueprint for success." These tools serve as mechanisms for communication and platforms for discussions about smile preferences that are fundamental for success. In particular, a trial smile is a removable mock-up or blueprint of the proposed smile changes that enables a patient to experience all aspects of the modifications (e.g., color, shape, length, effect on phonetics).

## Selecting Materials For Single Units

Proper ceramic selection, when accompanied by the skills of the ceramist, can consistently contribute to the illusion of reality, even with a single crown. The focus of any ceramist is "macro esthetics," the minute details and characterizations of tooth structure that impart its lifelike appearance. A ceramist's eyes are trained to see the internal structure of natural teeth, which have many different characterizations. Some are more intense, as seen in Figure 2. With a single restoration, the blueprint to follow is already there, making its fabrication a simple yet somewhat time-consuming and more expensive task.

An old crown that did not match the adjacent central incisor to the patient's liking is shown in Figure 3. The crown was very opaque and monochromatic, lacking depth and translucency as well as internal characterizations that were present in his adjacent teeth. The shape did not match the adjacent central incisor

*Figure 3: View of an old crown that did not match the adjacent central incisor.*

*Figure 4: View of a single fabricated crown.*

*Figure 5: Postoperative view of the definitive crown restoration in place.*

*Figure 6: Preoperative view of a nonvital central incisor (tooth #8) and the adjacent tooth #9 with a large compromised composite restoration on the mesial aspect.*

in both form and surface texture. A new crown for the single central incisor was fabricated using Vita In-Ceram Spinel with Vita Dur Alpha porcelain (Vident; Brea, CA) (Fig 4). The blend was harmonious with the existing central incisor (Fig 5).

## Challenges With Combination Cases

However, fabricating combination cases of veneers and crowns (Fig 6) is different in that it is critical to know the color of the tooth preparation, and the same type of ceramic system must be used for both restorations. This helps to ensure that a predictable blend in colors between the two different restorations is achieved. This particular case (Figs 7 & 8) was fabricated with porcelain-fused-to-metal (PFM) restorations using Creation porcelain (Jensen Industries; North Haven, CT). When fabricating crowns and veneers, it is essential to build the initial crown coping using the same color as the prepared tooth for the veneer. The initial crown coping must bake separately so that it will shrink and become the size of the prepared tooth for the veneer. Once the backgrounds are established, concurrent application of ceramic can be completed on both the crown and veneer using the same layering technique. This achieves a harmonious blend, as shown in the close-up in Figure 7 and the smile in Figure 8.

## Blending Ceramic With Natural Dentition

In another combination case, the patient presented with a PFM crown on tooth #8 and a nonvital tooth #9 (Fig 9). This case was submitted

*Figure 7: Close-up view of the completed combination case that was restored using metal and porcelain.*

*Figure 8: Final postoperative retracted view of the smile.*

*Figure 9: Preoperative view of a combination case involving an old PFM crown on tooth #8 and a nonvital tooth #9.*

*Figure 10: View of the full-contour wax-up prior to investing.*

for the American Academy of Cosmetic Dentistry Accreditation process and passed. The decision was made to use a material for this case (Authentic pressable system, Jensen) that contained a pressable core. The color of the core was stable and would not change regardless of how many times it was baked, providing that the correct temperature was maintained. Additionally, the metal oxides that normally form when using metal would not develop. With pressable ceramics, only the incisal color, opacity levels, and internal characterizations are overlaid as needed to match the adjacent natural tooth. Minimal tooth reduction is required, the tooth color underneath can be used if it is acceptable, and the final crown can be etched internally and then bonded into place.

The ingots should be waxed to full contour (Fig 10). Tooth #8 was pressed with a high-opacity ingot (A0++) and tooth #9 with a more translucent ingot (A0+), after which they were evaluated in the patient's mouth (Fig 11) to see what influence there was from the tooth substructure. Based on this analysis, the type of layering required was determined and then overlaid on the ceramic cores. The dentin was then cut back to allow room for the enamel layer and special effects.

An application of opacious dentin (A1) was placed on the cervical third (Fig 12). Opacious dentin, rather than dentin, was used because the opacious dentin in this system is not as intense as most opacious dentins from other systems. Note that it is of utmost importance to know the contents of the ceramic bottles you are using and how they behave optically.

*Figure 11: View of the pressed ingots being evaluated in the patient's mouth to determine what influence there was from the tooth substructure.*

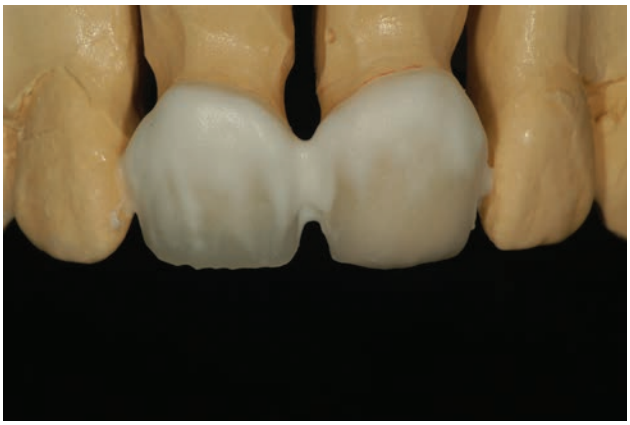

*Figure 12: An application of opacious dentin (A1) was placed on the cervical third.*

*Figure 13: The incremental buildup of the incisal frame was accomplished using enamel 58 on the distal and mesial.*

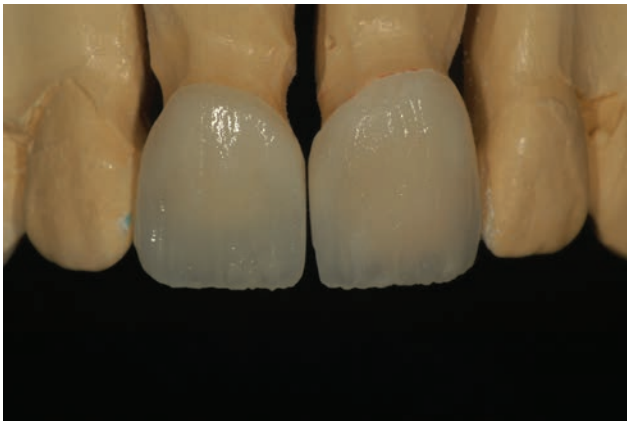

*Figure 14: The applied effects cannot be seen after baking until the units are wet with glaze liquid.*

*Figure 15: View of the restorations after completing the second bake.*

*Figure 16: Note the variation in size and color between the preparations of the two teeth.*

*Figure 17: The restorations were tried in prior to glazing to verify tissue support, shape, alignment, bite, and interproximal embrasures of the restorations.*

*Figure 18: The glazed and polished crown and veneer were tried onto a solid model.*

An incremental buildup of the incisal frame was then developed using enamel 58 on the distal and mesial. Enamel mixed with 50% blue opal translucent was alternated with straight 59 as part of the segmental buildup (Fig 13). After the incisal frame was built to the desired length, intense opacious dentin was mixed with dentin and used to create mammelon effects, after which the units were fired according to the manufacturer's specifications.

Following the first bake, the units were adjusted on the model and sandblasted with 50-µ aluminum oxide to roughen the surface. At this point, the crown was a smaller version of the desired final restoration. Characterization was completed using fluorescing stains, and the units were fired at a low temperature to set them and further enhance the internal effects. The effects cannot be seen after baking until the units are wet with glaze liquid (Fig 14).

To complete the restorations to full contour, a second application of porcelain in A1 opacious dentin was placed along the interproximal and cervical areas, and enamel 59+T opal was overlaid on the incisal to complete the full contour. A1 opacious dentin was applied along the incisal edge to create a halo effect (Fig 15). The restorations were then baked at 10° lower than the first bake and, after cooling, they were shaped and texturized using diamond burs.

*Each of us in the restorative process needs others to help us achieve the ultimate in dentistry.*

The retracted view in Figure 16 shows the different sizes and colors of the prepared teeth. The restorations were tried in prior to glazing to verify tissue support, shape, alignment, bite, and interproximal embrasures (Fig 17). Once the patient approved the size, shape, and form of the restorations, the crown and veneer were glazed and manually polished with fine pumice at a slow speed to achieve the proper texture and luster. Figure 18 highlights the glazed and polished crown and veneer on a solid model. Figure 19 focuses on the restorations on a black background, revealing various levels of translucency that result from the different ceramic thicknesses. The veneer is 0.8 mm thick and the crown is 1.3 mm in thickness.

The units were then sandblasted internally and etched (Super Etch, Mirage Dental Systems; Kansas City; KS) for 90 seconds. In order to evaluate the marginal integrity and contact points of the restorations, both the crown and veneer were tried in individually and then collectively. The porcelain veneer, fabricated with ingot A0+, was then bonded in place using a translucent dual-cured cement. After removing the excess cement from the veneer, the crown was tried in again and also cemented using the translucent dual-cured cement. The final restorations demonstrated a congruent blend with the adjacent teeth (Figs 20-23). The subtle internal effects imparted in the restorations created an illusion of reality.

## Conclusion

There is no panacea in dentistry. There is not one product or system that can solve all restorative problems and work well on all cases. Therefore, clinicians must consider the type of foundation that is used in order to achieve the optimal end result. As restorative materials continue to progress, technicians will

*Figure 19: This view of the restorations on a black background shows the different levels of translucency that result from their different thicknesses.*

*Figure 20: View of the final smile following cementation of the definitive restorations.*

*Figure 21: Close-up retracted postoperative view of the crown and veneer restorations.*

*Figure 22: Right lateral view showing a congruent blend with the adjacent natural teeth.*

be able to create improved harmony that will directly increase overall patient satisfaction with the definitive result. We must be appreciative, open-minded, and knowledgeable about the new products that are available to us today, remembering that there is always room for improvement.

As I say at the end of most of my presentations, no man is an island. Each of us in the restorative process needs others to help us achieve the ultimate in dentistry. Although product selection is critical to esthetic and restorative success, the dentist, ceramist, and patient must know they are each working with the right team of professionals, and communication can facilitate this relationship. No facet of dentistry can survive this esthetic "rush" if we think we can do it on our own. We must learn to communicate better and, most of all, to respect the professional expertise of our colleagues.

***Acknowledgments***

*The author thanks Dr. Cathy Schwartz (Atlanta, GA), for providing the dentistry in Figures 1 through 4; Dr. David Garber (Atlanta, GA), for providing the dentistry in Figures 5 through 8; and Dr. Angela Gribble-Hedlund (Atlanta, GA), for providing the dentistry in Figures 9 through 23.*

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*Figure 23: Left lateral view showing a congruent blend with the adjacent natural teeth.*

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# Lifestyle

## In This Section:

# Economic Independence: Having your money work as hard for you as you worked for it!

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## Introduction

Abraham Lincoln once said: *"How long should a person's legs be? They should be long enough to reach the stirrups."* Certainly, this is akin to the current subject of economic independence and how much money is needed so that it—your money—works as hard for you as you did for it. Economic independence is also the point at which you do not have to continue working all the days of your life.

*Without having an appropriate plan in place for what needs to be done in order to achieve financial objectives, the dentist may feel a sense of hopelessness that affects how he or she treats team and patients alike.*

The goal of achieving economic independence is the ignored driving force for many dentists and, therefore, the reason behind decisions made in the practice. However, without having an appropriate plan in place for what needs to be done in order to achieve financial objectives, the dentist may feel a sense of hopelessness that affects how he or she treats team and patients alike. Decisions within the practice may be made randomly and, hence, ineffectively in terms of tracking production, goal setting, and monitoring production/collection and relating it to the dentist's personal finances.

The two are connected, and setting objectives for personal economic independence helps to establish what needs to be done in the practice so that the dentist can best determine his or her "net tracking" goals. It also helps to establish clear expectations for all members of the dental team and create a more positive environment for team and patients. The question that must be asked and answered is: "How much money is enough?" Setting objectives without knowing the answer to this question is risky. Dentists risk being simultaneously old and poor or, worse yet, passing the station (retirement years) and not knowing why you are still on the train (working).

## Start With A Plan

Going back to work when you run out of money is no fun, either. The strange thing is that without a plan, most of us spend what we have and run out of means at some point. Studies by the American Dental Association have shown that 5% of dentists are independent at age 65; 95% of dentists must continue their labors, but not by choice.

Keep in mind, however, that having a plan is no guarantee of success, especially if you say: "Whew, got that done," and put the plan away. In such instances the plan will become like so many good patient charts: Forgotten.

However, working toward the perfect, end-all, be-all plan is prohibitive, but the most ideal and comprehensive plan may be sacrificed in the name of brevity and getting something done. A poor plan is better than no plan at all. Therefore, if you do not have a plan, be advised that you need one. The book *What Got You Here Won't Get You There* is a good starting reference for developing your own plan.

## Know What You Need to Net

When will your independence day be? How much is enough? As explained earlier, economic independence occurs when you have enough money working for you as hard as you worked for it, so that you need not continue working at all. In other words, independence day is when you have a "battery" that is "charged" enough for you to live comfortably without working for the rest of your days.

The task is to know what you must *net* per unit time and for how long in order to pay taxes, live comfortably, eliminate debt, and charge that battery. Once the objectives of how much is needed and by when are chosen, *net tracking* is the way to achieve the objectives.

*Setting objectives for personal economic independence helps to establish what needs to be done in the practice.*

Within the context of the dental practice environment, changing your practice overhead habit may matter, but it is not the primary focus of this article or planning model. Appropriately reducing, monitoring, and analyzing practice overhead is the responsibility of the dentist and his or her practice management coach or consultant. The results or objectives of overhead containment can or may reduce some of the anxiety regarding the dentist's retirement years, but it will not eliminate it.

## The Net Tracking Model

Keep in mind that this is an initial model that may be sufficient planning for some individuals. You may finish this initial model and note that you are on track and on time enough to postpone formal and more detailed planning. Although this is not likely, it is a possibility.

Additionally, while having a plan is no guarantee for success, it is also important to note that this model does not account for individual differences in character and behavior, personal choices within the practice, goal funding for family education or care, or desired pre- and post-"retirement" acquisitions and expenses—all of which are important, relevant, and necessary but that are *not* addressed in these examples. It is likely that after completing a simple model like this, more detailed planning will be necessary. If you work with a coach or financial management company, more efficient decisions can be made based on your initial information and the current inventoried net position.

If you feel overwhelmed by this concept, seek assistance.

## Understanding The Variables That Affect The Model

In order to objectively calculate what you must net, some exact figures must be selected, and this information must be used for these calculations. While some variables exist (e.g., whether you live to be 80 or 90 years old), concrete information such as how old you are now, whether you will work until you are 60 (e.g., 15 years from now), and an estimated date of when you will "shuffle off this mortal coil" (e.g., age of 95) must be selected. This will enable the model to calculate a specific calendared target date for economic independence.

### Life Expectancy

When determining your life expectancy, consider adding two years to the plan if you have a significant other who is two years younger than you are. You can use the age of 95 just for planning, since the current life expectancy is not that high for either gender. Naturally, you can plan for any terminal age, but keep a few things in mind:

1. Life expectancy was once much lower than it is now, and advances in medicine and science most likely will continue.
2. It is better to have and not need than to need and not have.
3. Since 1963, when this model was first introduced to dentistry, it has been our observation that it is seldom that the objectives

| The Effects of Inflation at 3.50% | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Age | Year | Budget $ | Age | Year | Budget $ |
| 50 | 2008 | 100,000.00 | 70 | 2028 | 201,170.20 |
| 51 | 2009 | 103,556.70 | 71 | 2029 | 208,325.21 |
| 52 | 2010 | 107,239.89 | 72 | 2030 | 215,734.71 |
| 53 | 2011 | 111,054.09 | 73 | 2031 | 223,407.73 |
| 54 | 2012 | 115,003.94 | 74 | 2032 | 231,353.67 |
| 55 | 2013 | 119,094.28 | 75 | 2033 | 239,582.21 |
| 56 | 2014 | 123,330.10 | 76 | 2034 | 248,103.42 |
| 57 | 2015 | 127,716.58 | 77 | 2035 | 256,927.70 |
| 58 | 2016 | 132,259.07 | 78 | 2036 | 266,065.84 |
| 59 | 2017 | 136,963.12 | 79 | 2037 | 275,528.99 |
| 60 | 2018 | 141,834.48 | 80 | 2038 | 285,328.72 |
| 61 | 2019 | 146,879.10 | 81 | 2039 | 295,476.99 |
| 62 | 2020 | 152,103.14 | 82 | 2040 | 305,986.21 |
| 63 | 2021 | 157,512.99 | 83 | 2041 | 316,869.20 |
| 64 | 2022 | 163,115.25 | 84 | 2042 | 328,139.27 |
| 65 | 2023 | 168,916.76 | 85 | 2043 | 339,810.19 |
| 66 | 2024 | 174,924.61 | 86 | 2044 | 351,896.20 |
| 67 | 2025 | 181,146.15 | 87 | 2045 | 364,412.08 |
| 68 | 2026 | 187,588.97 | 88 | 2046 | 377,373.10 |
| 69 | 2027 | 194,260.93 | 89 | 2047 | 390,795.12 |

*Table 1: The effects of inflation at 3.50% on a $100,000 budget.*

we set have not been hit by the calculator. Therein lies the fix.

4. Your life looks better if you die with money as opposed to penniless.

### Current Savings

A much more detailed evaluation of your assets and their individual growth rate can be prepared by a financial planner. Several years and/or dollars can be knocked off by doing this, and it is highly recommended. For this initial model, assume that all assets currently in place and all those to be sold to create economic independence are lumped in as one, and this may include the current value of the practice.

### Inflation

Many theories exist but the current ones could be used. Since 1900, the average inflation rate has been about 3.5%.

### Interest

A good planner would at least list the assets, their individual growth rate, and establish a weighted average growth rate. If you already have a personal financial plan, that rate can be used. If not, make a conservative assumption.

### Taxes

These could go up or down based upon who is elected, whether you live tax-wisely, and how you report. Here again, this is an initial model and an assumption or past averages will do.

### Life Budget

Now comes the tough part. A guess, plus a couple thousand dollars, might do for some. Accuracy is better, since it forces you to think about the way you live. A suggested minimum of expense categories to sum up includes the following:

| The Effects of Inflation at 3.50% | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Age | Year | Budget $ | Age | Year | Budget $ |
| 50 | 2008 | 500,000.00 | 70 | 2028 | 1,005,851.02 |
| 51 | 2009 | 517,783.48 | 71 | 2029 | 1,041,626.07 |
| 52 | 2010 | 536,199.46 | 72 | 2030 | 1,078,673.54 |
| 53 | 2011 | 555,270.44 | 73 | 2031 | 1,117,038.67 |
| 54 | 2012 | 575,019.72 | 74 | 2032 | 1,156,768.33 |
| 55 | 2013 | 595,471.41 | 75 | 2033 | 1,197,911.06 |
| 56 | 2014 | 616,650.52 | 76 | 2034 | 1,240,517.10 |
| 57 | 2015 | 638,582.90 | 77 | 2035 | 1,284,638.52 |
| 58 | 2016 | 661,295.35 | 78 | 2036 | 1,330,329.19 |
| 59 | 2017 | 684,815.61 | 79 | 2037 | 1,377,644.95 |
| 60 | 2018 | 709,172.41 | 80 | 2038 | 1,426,643.58 |
| 61 | 2019 | 734,395.51 | 81 | 2039 | 1,477,384.95 |
| 62 | 2020 | 760,515.72 | 82 | 2040 | 1,529,931.03 |
| 63 | 2021 | 787,564.95 | 83 | 2041 | 1,584,346.01 |
| 64 | 2022 | 815,576.24 | 84 | 2042 | 1,640,696.37 |
| 65 | 2023 | 844,583.80 | 85 | 2043 | 1,699,050.94 |
| 66 | 2024 | 874,623.07 | 86 | 2044 | 1,759,481.01 |
| 67 | 2025 | 905,730.75 | 87 | 2045 | 1,822,060.39 |
| 68 | 2026 | 937,944.83 | 88 | 2046 | 1,886,865.52 |
| 69 | 2027 | 971,304.67 | 89 | 2047 | 1,953,975.58 |

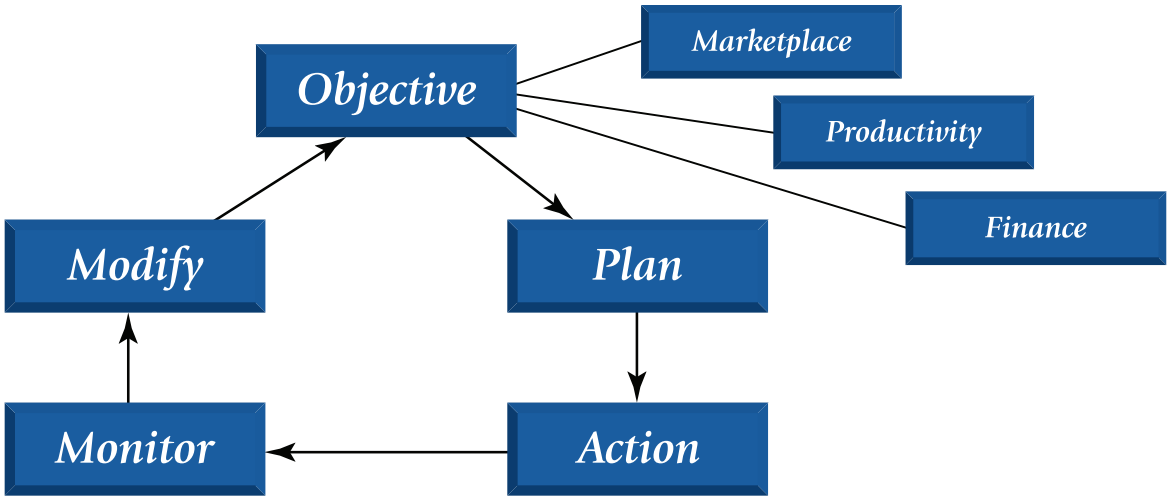
*Table 2: The effects of inflation at 3.50% on a $500,000 budget.*

- mortgage
- other debt service habits
- electricity, water and waste, and other utilities
- TV/cable, telephone, and computer
- life insurance
- health maintenance and insurance
- home maintenance and insurance
- auto (loan, lease, repair, and insurance)
- child care (or parental care)
- pool
- yard
- groceries
- entertainment (restaurants, etc.)
- vacations
- sundries

## What Models Say About Goal Setting

Most people seem to think in terms of a fixed income, but inflation is bound to have an effect, as can be seen in Table 1 and Table 2. A person who is 50 now and has a budget of $100,000 will have a budget or cost of living (and this is without goal funding) of $390,795.12 at age 89. That does not seem so bad.

However, most of you should (remember, I said *should*) have a take-home pay in excess of $500,000 (see Table 2). In this case, the budget goes up to $1,953,975.58. The difference between the two Tables is what needs to be highlighted first, since it illustrates a couple of considerations. First, going back to work at 80 is a drag if you have run out of money. Secondly, earning $500,000 at age 50, which inflates to $1,426,643.58 at age 80, is even worse! It would be best to have a "battery" in place, or at least a plan to charge one.




*Diagram*

Imagine how much better you will feel when you know that you are on track and on time, or that you are close and know how to make up the difference. Chances are you will not need a study to tell you that the same good feeling is derived from knowing your progress as is realized when you arrive where you want to go. In fact, you have the ability and freedom to recalculate, to push arrival back (at retirement). There are some who so enjoy the journey that they may, in fact, choose not to focus on the arrival.

## Knowing Your Financial Status and Getting on Track

The desired effect of knowing your financial position is to create a feeling of being a whole person in this broken world. Current speech scripting and "psychobabble" say that a happier, better-adjusted individual sells better and enjoys better relationships with the dental team and the patients who come for care.

"Fake it 'til you make it" may be one of the tools you use during this "conversion experience" from a probable to a preferred future. Now that you know what you need to net, you can take appropriate actions to achieve your objectives. However, some additional criteria will be required based upon other successful model-building experiences.

First, choose an objective (market place, productivity, and finance). Second, look ahead to your selected date for achieving economic independence and move back in time so that you can assemble your plan. Third, develop a performance criterion for various points in time along the plan and monitor performance against it. Combined, these three factors create an indomitable force for achieving your objectives.

Finally, a fourth discipline is called "plantrolling." This action is controlled by the planner and is a brilliant, simplistic fail-safe. With this information about what you will need ready, always at hand, and in focus, you can grow, change, and learn as you go. You are free to modify the objective, plan, action, and even how you measure or monitor your progress (see Diagram). A suggested reading is *The Power of Impossible Thinking*.

## Conclusion

Hopefully this article is sufficient motivation for you to seek more detailed information about financial planning. This simple model, now available to you, can be calculated and used as a map. It may be sufficient for some. However, it is hoped that working through this model stimulates a desire for more detailed examinations of future goals that serve as a wake-up call about what needs to be done to achieve them. You will end up better informed, and that is the point. For more information, go to empathllc.com, Calculator Models, and choose Economic Target – Short Model. Happy journey!

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*Dr. Bill Blatchford*

# Financial Freedom… The Attainable Future

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## Introduction

The dental profession is far different from what it was 25 years ago. Today, there are a multitude of reasons to be excited to be a dentist: Innovative esthetic techniques, progressive technology, increased patient demand for cosmetic procedures, enterprising marketing strategies, and groundbreaking materials. These elements are positively affecting every dimension within the profession. The "business of dentistry" has hit its apex, yet dentists are not working smarter, but harder; and, as a result, are missing out on the critically important opportunity to establish financial freedom.

*To this day, the majority of dental professionals are still retiring with very little to show for their years of service.*

In the last two decades, the dental profession has observed a significant paradigm shift surrounding many of the techniques practiced, technology available, and materials utilized. Many dynamic dentists have seized the opportunity within their practices to embrace these elements, catapulting them into the 21st century without even a glance back. If properly utilized, these innovations can create tremendous financial freedom while treating the patient and their dental needs. On the other hand, there are those more conservative individuals who have "watched things happen," and even those who have wondered . . . "*What* happened?" as they feel they are missing out on the gratification of dentistry that many of their colleagues seem to be enjoying.

For years, the dental vocation afforded its professionals an unpretentious income, social credibility and respect, and reasonable expectations of a modestly comfortable retirement. Unfortunately, very few enjoyed the profession and most did not poise themselves to retire when they had expected. To this day, the majority of dental professionals are still retiring with very little to show for their years of service, and are not positioned well in the event that unforeseen financial hurdles arise. Regrettably, many dentists rely on "loading" their profit-sharing plan or 401K, and the eventual sale of their practices to fund their retirement. Those strategies are not enough. With the shortage of dentists looming, retiring dentists will be fortunate to receive a fraction of what their practices are worth in an acquisition, let alone the potential reality

of not being able to sell the practice at all. In addition, 401k's and profit-sharing plans are not as wonderful as most people think. Consider the following:

- We are presently enjoying one of the lowest ordinary income tax rates during the history of U.S. income taxes.
- – When John F. Kennedy became president, the highest rate was 90%. He reduced the rate to 70%.
- – Ronald Reagan later reduced the rate to 28%.
- – The rate has since been raised to 35%.
- With more and more Baby Boomers turning 60 every day and fewer wage earners in the marketplace, do you think taxes are likely to increase or decrease in your future? They most likely will increase!
- – It is likely that most of us will be in the higher tax bracket as we enter our retirement years.
- – Does it make sense to defer today at 35% and pay later at 40%, 50%, or more?

## Retirement Plans From a Different Perspective

Let's assume that you are 30 years old, and I come to you with an offer: I'll loan you $1,800 per year for the next 35 years. When you turn 65, you will begin to pay me back the $63,000 I loaned you. Over the next 20 years, you'll pay me a total of $460,000. And after you die, your children will pay me another $300,000 on top of what you already paid.

*Outside of profit-sharing plans, the key to establishing financial freedom is diversifying one's assets and creating cash flow from within the dental practice, as well as outside of the dental business.*

Simply put, a loan of $63,000 will mean that you and your children will pay back $760,000. Does that sound like a good deal to you? Obviously not. But the sad news is that what was just described is the scenario millions of Americans have made with the IRS when one begins putting money in a traditional retirement plan. The only difference is that I didn't loan you the money, the IRS did, in the form of a tax break on your investment.

The typical IRA at age 65 is worth $300,000 and creates over $1,000,000 of taxable distributions. At today's maximum tax rate of 35%, the tax on that amount comes to $350,000. In all probability, taxes will go up in the future. If they top out at 50%, the tax on a $300,000 IRA will be $500,000. If they top out at 70%, as they did in the 1970s, the tax will be as high as $700,000. That is the tax, meaning one only leaves with $300,000 on a $1,000,000 retirement.

Basically, for professional people and successful business owners, traditional plans do not make sense, yet most practitioners partake in the notion that it is the correct way to save for retirement. We can reduce taxable income several different ways, invest the money and have it grow tax-deferred and access the money potentially tax-free; or, in a worse-case scenario, take the money out at the much lower capital gains rate. There are now programs designed to put away for retirement on a pretax basis, grow the investment tax-deferred, and ultimately access the cash on a tax-free basis. Simply put, you can earn it, grow it, and then distribute/access it tax-free.

The forward-looking dental professional can properly plan to incorporate financial freedom into their future…if they choose.

Outside of profit-sharing plans, the key to establishing financial freedom is diversifying one's assets and creating cash flow from within the dental practice, as well as outside of the dental business. Consider the fact that most dentists earn income only when they are within the walls of the practice. (There are exceptions to this, including employee associates, subletting specialists, group practice[s], extended hours, etc. These factors are not within the scope of the article but can provide an additional income if implemented correctly.)

If the doctor is not producing, then the practice is not generating an income, and this can limit cash flow tremendously. Cash flow is paramount to allow for more progressive use of monies outside of dentistry, so that will be considered first.

## Maximizing Profits

There are a few areas within a practice that can help maximize profits, but one must hold true to overhead and not be lured by the latest dental devices that diligent manufacturers place within arms reach. These items may very well be necessary but one should do a thorough analysis of all purchased technology, avoid buying on emotion, and establish its viable return

on investment. Here are some items within a practice to consider (a one million dollar practice will be considered for illustrative purposes).

### Team Salaries

A dental practice needs a team to make a practice work, but a team's total overhead should never exceed 20%. If it is more, then there are efficiency issues and retooling the number of team members should be considered. On a million dollar-producing office, just a 5% reduction in team compensation overhead would be $50,000.

### Dental Supplies

A practice's total should not exceed 5%, yet many practices hover around 6% to 7%. A 3% reduction would yield an additional $30,000. This is not difficult if it is monitored and regulated. In addition, use of inexpensive materials for some procedures (e.g., polyvinyl, dry goods, gloves, etc) can have a significant savings spread out over multiple materials.

### Dental Laboratories

12% should be the absolute cap here, but higher-esthetic practices may very well exceed this number. An approach to trim this number is to use the esthetic laboratory for higher-end cases but "shop" for posterior laboratories where the cost per unit is far less; this can reduce overhead by as much as 2%, or $20,000.

### Loans and Premises

When factoring in these two items they should not exceed 10% total (roughly 5% apiece). If loans are exceeding this amount, again there are inefficiencies factored into the overhead and marketing, systems, and protocols need to be examined. This number is much healthier at 3%. There are parallels with loan amounts and with the premises expense in that 5% should be the maximum for rent/maintenance/insurance/etc. Often between these two overhead expenses, 2% should be reduced, or $20,000.

### Office Supplies

This includes all administrative items. Such things as printing toner, food, coffee, team lunches, etc., comprise an area that can be a hidden overhead leak if not properly monitored. This number should not exceed 1% but many offices exceed 4% to 5%. Keep the team under control in this area and hold them accountable for any excesses. Reducing just 1.5% is an additional $15,000 for many offices.

These few examples, collectively, are about 48% of overhead but they are the larger overhead expenses facing most practices. If just simple monitoring of practice overhead is adhered to, then the resulting effect can be that of over $135,000 in cash flow, or over $11,250 (using the example of the one million dollar practice) per month additional cash flow to the practice.

As one can see, diversifying use of additional cash flow can create in excess of $2,000,000 additional assets after 10 years, using the additionally created $135,000 per year.

## Building Wealth

Savvy use of the additional cash flow can be utilized to build wealth. Here are a few things to consider with increased cash flow:

### Real Estate

The great majority of millionaires made their money in real estate. A dental office would be a strong purchase, as the mortgage can be expensed as a rental through the dental office. In addition, purchase of real estate in a "buyers' market" can yield incredible residual returns over time; real estate should be considered as a long-term investment. Real estate can be in the form of rental properties, development properties, or resale properties.

### Stock Market

If one learns about and understands the stock market, risk can be heavily reduced. Learning candlestick charting (www.candlestick-course.com) as well as utilizing tools like E*Trade (www.etrade.com) and InvestTools (www.investtools.com) can solidify your understanding of the stock market.

### Continuing Education

A portion of the increased cash flow can be devoted to additional education to increase the profitability of the practice, and potentially increase the cash flow further.

## Summary

Building financial freedom takes an in-depth look at one's own practice, its profitability, and its utilization of additional cash flow created. Questioning current philosophies and minimizing financial risk are also important factors in building personal financial freedom.

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# Members' Pearls

## In This Section:

# Digital Technology: A Necessity for Increased Case Acceptance and Patient Satisfaction

by Lorin F. Berland, DDS, AFAACD
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Many of my patients walk into the office unsure of what they want, insecure about their dental appearance, and definitely unaware of the possibilities available to them. My philosophy—regardless of a patient's confidence level—is, "People forget what you say; people forget what you do; but people never forget the way that you make them feel." In addition to surrounding patients with a caring and compassionate staff, upgrading the technology in my office has increased case acceptance (and, most importantly, patient satisfaction) by expanding patients' understanding of their own dentition through the amazing capabilities of my digital radiography system.

Although some people worry that the cost of initiating a digital system might put a strain on the budget, studies have shown that the initial costs of setting up a digital system are probably less than those of a standard film-based system. In addition, the ongoing costs are far greater with film than with digital radiography.[1]

*Studies have shown that the initial costs of setting up a digital system are probably less than those of a standard film-based system.*

Regardless of the initial costs, switching to a non-film-based system will actually improve the budget over time. In a *Dentaltown* survey, 94% of practices found that digital radiography had improved their profitability, and increased case acceptance is a big part of that picture.[2]

## Advantages of a Digital System

The following are just some of the things that digital radiography can help you do to increase case acceptance and patient satisfaction.

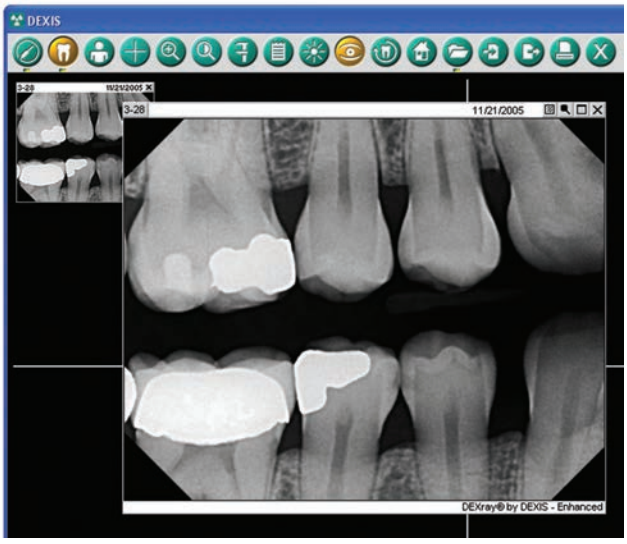


*Figure 1: Enhanced and enlarged images make for better diagnosis.*

### "Shine a Spotlight"

Image enhancement functions such as magnification, brightness control, and heightened contrast shine a spotlight on tiny fractures and imperfections that can be missed on the much smaller traditional x-ray film (Fig 1). This is especially important to cosmetic dentists, who rely on great attention to detail to plan the best treatment for patients.

### Give them the "Big Picture"

Digital images on a large computer screen give patients a view of their teeth that is impossible to see on a postage stamp-sized film x-ray. With computer technology, you can zoom in on trouble spots or provide extra contrast to improve understanding of possible treatments (Fig 2). Patients can actually see their teeth as others will.

### E-magine the Possibilities

Digital images and imaging programs allow the dentist to provide cosmetically enhanced "before" images, allowing patients to "try on" a smile so that they can visualize the possibilities (Fig 3) and gain confidence in you. The old adage "a picture is worth a thousand words" rings so true here. No matter how eloquent or detailed your words, the patient will understand far better what you can do for them as a result of this digital feature.

*With computer technology, you can zoom in on trouble spots or provide extra contrast to improve understanding of possible treatments.*

### Keep in Touch

When your imaging is stored on a computer, it is easy to keep your proposed treatment fresh in patients' minds. After the consultation visit, send them an e-mail with their "before" photograph and their "trial smile," so that they—and their friends—can see how much better they will look after treatment (Fig 4). (Helpful hint: Sent as PDF files, these images are easily opened. Also be sure to send them in a small file size so that they will not clog e-mail inboxes. Another option: Images sent in medium-sized JPEG format can be opened in most standard software programs.)

### Give Them Something to Take Home

Print photographs in a digital template and give patients a copy when they leave the office. This will make it easier for them to continue to consider the proposed treatment, as well as the smile you give them (Fig 5).

### Communicate (With Referring Dentists)

Using a digital system that incorporates a "hub" saves money, avoids frustration, and shows the patient that you can be in touch instantly with their referring doctors (Fig 6). Being able to combine x-rays, photographs, and the treatment plan on one file makes life easier for both


*Figure 2: Large images make for a big impression.*

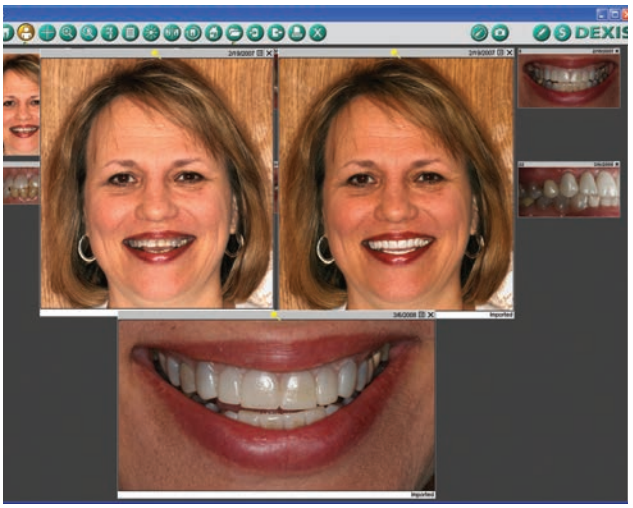


*Figure 3: Make it easy for patients to visualize the possibilities.*

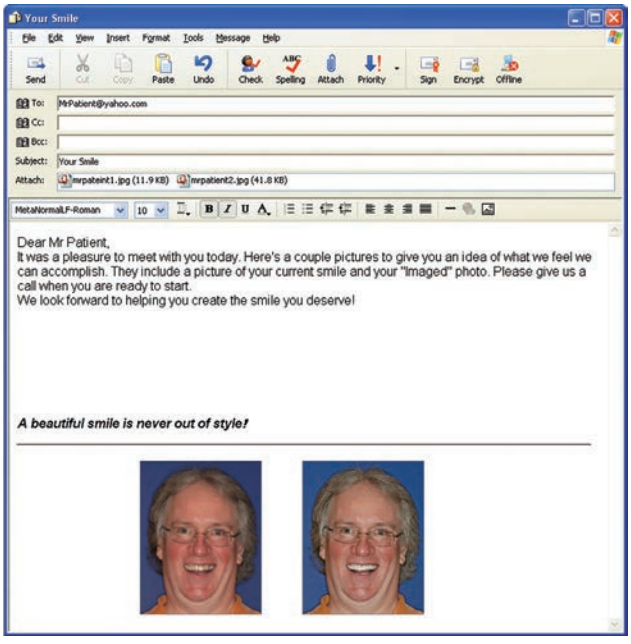


*Figure 4: Keep patients focused on your treatment plan.*


*Figure 5: Make sure patients have something to take home.*

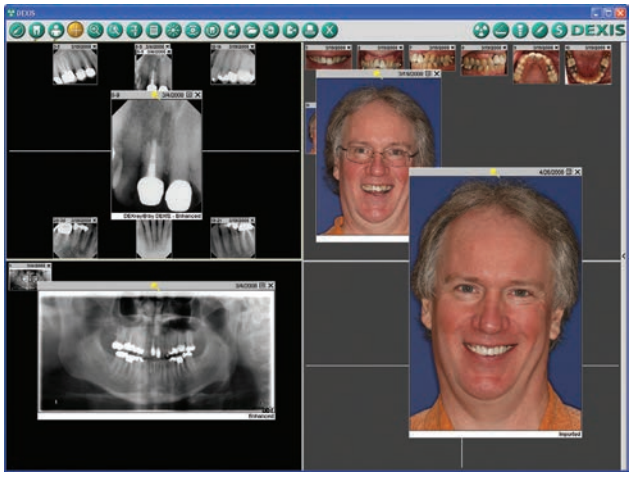


*Figure 6: Keep all images in one place and readily available.*


*Figure 7: More and more people will see your work.*

you and your colleagues. Film x-rays can be misplaced in the office or lost in the mail. Even if everything is perfect, time is still lost. The information from your hub, however, is received immediately, filed in their computer, and ready for viewing at the click of a mouse. The patient will not experience the waiting or hassles that are involved with traditional x-rays.

### Handle Insurance Issues Easily

When all of their information is sent on a secure connection over the Web, patients will not have to spend their time on the phone fighting with the insurance company.

### Let Patients Help You Spread the Word

After treatment, be sure to e-mail "before," "in-treatment," and "after" photographs, along with the message that you and your staff appreciate their business (Fig 7). In this format, patients can feel free to forward the e-mail to their friends and relatives, who may then want to embark on their own cosmetic dental improvements with you.

## Summary

Besides lowering your everyday operating costs and streamlining your imaging needs, going digital will increase case acceptance by introducing the "Wow!" factor into your practice. In today's economy, convincing patients to choose one practice over another is complicated enough. With digital technology, your patients will be busy and happy deciding amongst the many choices for their treatment, and not spending time thinking about going to a more technology-savvy dentist.

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# The "Trial Smile" Experience

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## Introduction

When new patients who are seeking esthetic dental enhancement walk through the front door of a prospective dental office, they begin a discriminating evaluation in order to select the dental practice that will best fulfill their needs and desires. They are on a mission to find the dental team that will meet their expectations, which include a caring and trusting relationship as well as competency. Once the clinician has carefully listened to the patient's concerns and desires and explained their dental conditions, he or she can demonstrate options and solutions through the "trial smile experience."

There are two main advantages of performing a trial smile during the diagnostic phase of comprehensive restorative dentistry. The first and more technical benefit is to obtain a *confirmed* outline form of the final restorations in the patient's mouth, utilizing the lips in order to guide the diagnostic wax-up. The second is to build value and educate the patient during the experience. This article discusses both of these benefits, as well as techniques for achieving the trial smile experience, both technically and behaviorally.

*The first step in the trial smile experience is to understand the patient's story, which includes their concerns and desires.*

## The Technique

The first step in the trial smile experience is to understand the patient's story, which includes their concerns and desires. Active listening is critical in building trust and in understanding the degree of importance of the patient's perceived problems.[1]

The next step is co-discovery of esthetic and dental health issues, which can be enhanced by utilizing digital photography. I use 16 views displayed on a chairside monitor to aid in the co-discovery process: Full-face, frontal and profile, 1:2 frontal and lateral smile, 1:2 retracted frontal and lateral, and upper and lower occlusal shots.

After listening to the patient's concerns, followed by co-discovery, the clinician informs the patient that the trial smile is a communication tool that enables both parties to envision the end result, and to understand the options available to achieve the desired outcome. During the trial smile, the clinician

*Figure 1: When viewing the smile, create a mental image of the results using smile design principles.*

*Figure 2: This trial smile consists of composite placed on teeth ##7-11, adding fullness and length; and on the tissue above #7 and #8.*

temporarily places composite resin on unprepared teeth, then photographs and impresses the composite in the mouth so as to fabricate a trial smile model of the confirmed contours and incisal edge position. The trial smile experience also educates the patient about smile design as well as dental health and occlusal concepts, increasing their appreciation and desire for esthetic and functional dentistry. I use the following guidelines for a successful trial smile.

### Trial Smile Guidelines

- Take preoperative digital photographs.
- Discuss with the patient his or her esthetic concerns and pertinent dental health issues that are visible in the photographs; explain the concept of the trial smile. It is important to note the relationship of the incisal edges to the lower lip in the lateral smile and profile views in order to determine if the patient can tolerate addition fullness. If the patient is already too full and protrusive, a computer-generated image may be more effective. Case selection is the key to success.
- View the digital images and create a mental image of the desired results using macroesthetic smile design principles.[2] (Figs 1 & 2).
- Dry the patient's teeth completely and apply the composite, beginning with the central incisors. Do not etch or bond the teeth. Place composite over tissue in areas that will require gingival recontouring or crown lengthening.
- Shape, then cure and sculpt the cured composite using discs and finishing burs. Magnification is helpful to ensure that the underlying tooth structure is not affected during this finishing process.
- Confirm that the incisal edges touch inside of the dry line on the patient's lower lip (Fig 3) in repose and smiling positions; check the patient's comfort, speech, and protrusive guidance.
- Measure the central incisors with a Boley gauge; most teeth will measure 10 mm to 12 mm in height. Check the length in both smiling and repose positions with digital photography to confirm appropriateness. In addition, an average width of the central incisors is 8 mm to 9 mm. During the measurement process, I explain to the patient that in the most attractive smiles, the central incisors are 1/16th the height and the width of the face; consequently, smile design includes harmonious proportions.
- Once the centrals are proportional and the incisal edges fit comfortably within the lower lip, add composite to the canines to fit them within the frame of the smile (using the lips as your guide), and to create cuspid-protected occlusion if desired.
- Fill in the lateral incisors to create esthetic line angles, and fill out the buccal corridors as necessary.
- Remove any excess composite from the lingual aspect to achieve complete intercuspation so that it feels normal and natural to the patient.

*Figure 3: Establish the ideal incisal edge position and length for the centrals before proceeding to the other teeth.*

*Figure 4: Use a flat plane to assist in leveling the incisal line.*

- Recheck the incisal plane in relation to the lower lip during speech, repose, and smiling. The flat plane aids in leveling the smile (Fig 4). However, the lips are the main guide; I ask the patient to smile and count several times during the trial smile fabrication in order to harmonize the incisal edges with the lower lip.
- View the patient from a frontal perspective, then take postoperative digital images to show to the patient on a chairside monitor. At this point, the results can be confirmed or refined. The results are then photographed again. The full-face photograph is superior to a mirror because the patient can view the smile enhancement within the context of the entire face. (Figs 5 & 6)
- Print preoperative and postoperative photographs for the patient to take home.
- Take a bite registration and an impression in order to incorporate the trial smile into diagnostic records (Fig 7).
- Discuss treatment options with the patient.
- Remove the composite with a scaler.

*The trial smile is a communication tool that enables both parties to envision the end result, and to understand the options available to achieve the desired outcome.*

## The Technical Advantages

Because the relationship of the lips and the teeth is affected by the posture of the mandible during speech and when smiling, diagnostic wax-ups preformed on articulated casts using digital photography as a guide are a hypothesis of the most advantageous incisal edge position. On the other hand, the trial smile model has been confirmed in the patient's mouth during speech, smiling, and repose. The following parameters of the lips reveal the most accurate and esthetic incisal edge position and facial contours:

- During speech, especially "F" sounds, the incisal edge should not contact the dry zone of the lip and should feel comfortable to the patient.
- In repose, the incisal edge position affects the lower lip position, which is best viewed in a profile (lips in repose) view. Also, the upper lip is affected by the facial contours, which are also best viewed from the profile; in addition, lip competency can be observed.
- The smiling position varies with mandibular posturing. Because of this, the patient is the best judge of how the incisal edges feel during smiling and laughing.

By confirming facial contours and incisal edge position in the mouth *before* the teeth are prepared, the clinician can confidently conserve tooth structure using a preparation guide created on the refined trial smile model (Fig 8). Because bonding to enamel is the most superior technique,[3] preserving enamel is ideal, and the optimal incisal edge position becomes a crucial factor.

In addition, the gingival line can be altered during the trial smile by placing the composite on the tissue or by using pink composite to add tissue. Digital images can then confirm the optimal tissue height, using the upper lip as a guide. A sur-

***Figures 5 and 6: It is more effective for the patient to view the full-face before and after images on a chairside monitor than with a hand mirror, because then he or she can see the smile enhancement in the context of the entire face.***

gical guide can then be fabricated from the trial smile model to aid the surgeon during crown lengthening, if surgery is determined to be necessary. Measuring the height of the composite that is applied over the tissue and sounding the bone gives the clinician vital information needed to determine the need for crown lengthening and/or tissue augmentation.

## The Behavioral Advantage

With postoperative explanation about the areas in which the composite has been placed and sculpted, the patient will begin to understand such things as height-to-width ratios, negative space, occlusal plane, gingival line, lip support, and anterior guidance. This hands-on process also creates trust and confidence and eliminates the fear of the unknown.

In many cases, once the patient has seen the enhanced smile, hope is instilled, and the patient perceives the dentist as a facilitator to achieving his or her desired goal. Clinicians must be prepared for the patient to ask such questions as, *"How long will it take? How much will it cost? When can we start?"* Providing answers to these questions helps the patient acquire the additional information necessary in making his or her decision to proceed with the treatment. In other words, the dental team can address the patient's concerns, build value, and summarize benefits before quoting fees.

Another advantage of the trial smile experience is that it gives the clinician and team valuable insight as to the patient's expectations. Since some patients have preconceived ideas about the esthetic characteristics of their teeth and smile, the trial smile experience allows the clinician to understand the patient's expectations and discuss limitations more clearly before treatment.

## Helpful Suggestions

The following steps are helpful when introducing the trial smile experience into a busy practice:

- Allow plenty of time to first understand the patient's needs and desires.
- Practice using composite on stone models.
- Practice performing the trial smile on team and family members, mastering smile design principles and reading the lips.
- Use digital photography and an impression to record and confirm the trial smile
- Allow time afterwards to answer the patient's questions about treatment.

## Summary

The trial smile experience has become an invaluable tool in my practice from both technical and behavioral aspects. Patients and the

*Figure 7: The trial smile model mounted on an articulator in order to finalize the functional plan.*

*Figure 8: This matrix, which was fabricated on the trial smile model, allows the clinician to visualize the final contours before preparing the teeth. In this case, the matrix indicated that no preparation was needed.*

*Figure 9: The final restorations in this case were fabricated with no tooth preparations, as indicated by the trial smile matrix in Figure 8.*

team describe it as a bonding experience that creates trust and confidence and eliminates fear. In addition, it confirms the outline form for the diagnostic wax-up that has been confirmed in the mouth, and is consequently more accurate and reliable than the hypothesis wax-up that is not confirmed in the mouth. The difference can be critical when preparing the teeth to preserve enamel (Fig 9). After preparation and/or temporization, the provisionals should be further confirmed over time and customized functionally and esthetically.[4] The trial smile experience is an educational opportunity for the patient, the clinician, and the team, and builds value for the patient while ensuring a more successful outcome.

**Editor's Note:** For more information, log on to www.aacd.com and go to the eLearning section to watch Dr. Hollar perform a trial smile.

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*The American Academy of Cosmetic Dentistry recognizes Dr. Susan Hollar as an AACD Accredited Member, Accreditation Examiner, and Give Back A Smile™ volunteer who has restored the smiles of two GBAS survivors.*

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# DENTISTRY IN THE DIGITAL WORLD: ENHANCING THE CONTEMPORARY ESTHETIC PRACTICE WITH DIGITAL PHOTOGRAPHY AND PRESENTATIONS

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## INTRODUCTION

Every industry and profession continually seeks out avenues to increase productivity and efficiency, along with lowering overhead cost and time. Developments and advances in digital technology have, and continue to create the tools, techniques, and equipment to improve the performance, quality of life, and enjoyment of the consumer. Obvious examples of this would be the cell phone, personal computers, and the Internet. As a result, digital technology has become interwoven into virtually every sector of society, and the contemporary esthetic dental practice is no exception.

There are many facets of the dental practice where digital technology has been incorporated, and as a result dentists are able to create highly esthetic restorations more efficiently and accurately. Digital cameras, computers, and various software applications, digital scanners, Internet functions, and printing options are examples of digital technology that are, and should be, utilized by the contemporary esthetic dental practice. However, it is imperative to understand the basic concepts and functions of this technology before incorporating it into one's practice. Otherwise the optimal benefits of the technology will either be lacking, or frustration from being intimidated or uneducated in this area will result in these devices being incorrectly utilized… or not utilized at all.

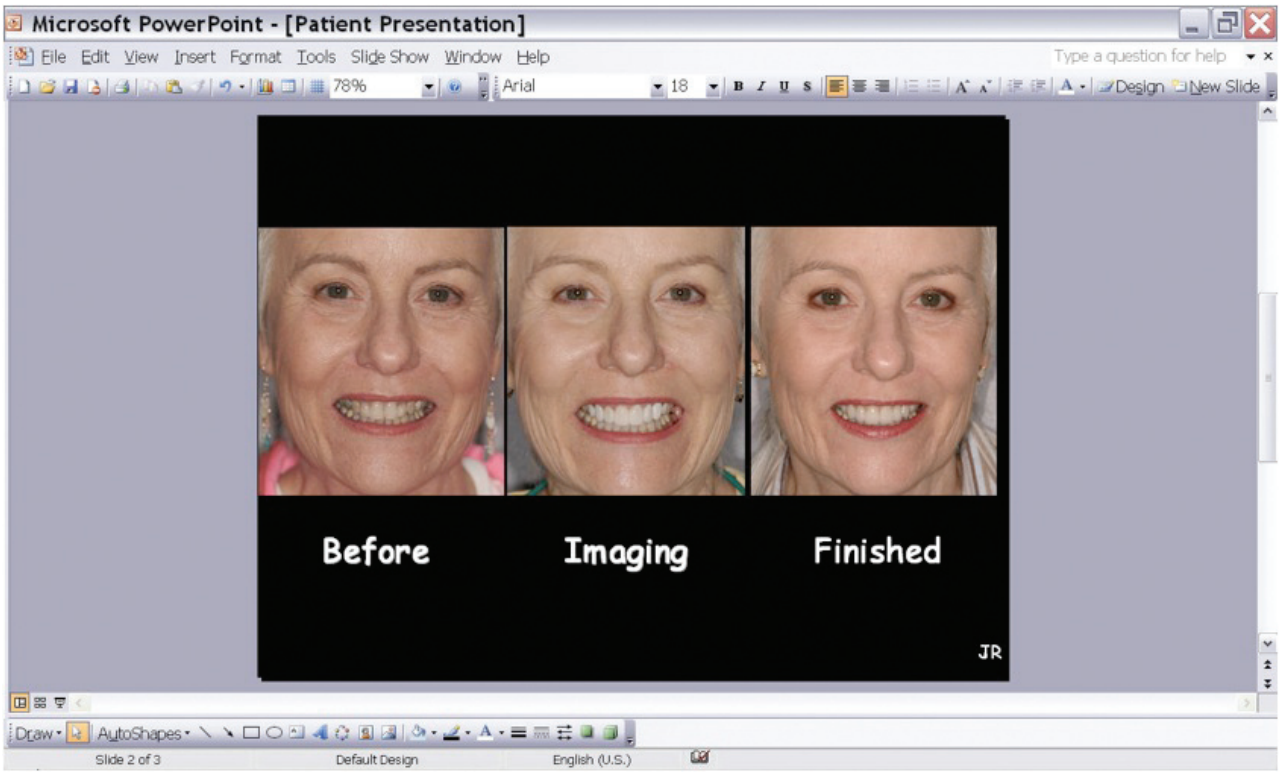


*Figure 1: Digital photography for marketing.*

One of the most important of these tools is the digital camera. However, the first question to ask is, "Why should one understand and use dental digital photography?" The answer to that is actually quite simple.

Because esthetic dentistry is a visual art form, therefore displaying, communicating, and educating about the process accurately, efficiently, and professionally is essential for success. What better tool to accomplish this than the digital camera?

There are general, "specialized," marketing, and personal uses where the digital camera can be employed in the contemporary esthetic dental practice. General uses include photography for doctor/patient communication, doctor/laboratory communication, and communication with insurance companies along with medical/legal record keeping. Specialized uses include photography for AACD Accreditation submission, image manipulations (i.e., computer simulations), case presentations, patient education, and for use in lecturing.) Marketing uses include photography for advertising in different media, office, website designs, and for the display of performed treatment (Figs 1 & 2). Personal uses include family and vacation photography, record keeping and artistic design for photography hobbyists. This article focuses primarily on the dental "specialized" uses for digital photography.

Once one has identified the needs and wants for incorporating digital photography into their practice, there are five important questions that must be asked and answered:

- How do we choose the right digital camera and peripherals (i.e. software, printers, etc?
- How do we take or capture our digital photographs correctly?
- How do we save, store, and manage our captured images?
- How do we adjust or manipulate our digital images?
- How do we view, display, or present our images?

Before one can decide which digital camera to get, an understanding about the different types of digital cameras is necessary. There are two types of digital cameras available today for taking dental digital photography:

- Single lens reflex (SLR) digital cameras

| SLR | Point-and-Shoot |
|---|---|
| actual image viewed is what is captured | image captured is "computer"- generated |
| larger charge-couple device (CCD) or complimentary metal-oxide semiconductor (CMOS) chip, resulting in a more true-to-life-size image (i.e., "you see what you see") | smaller CCD or CMOS chip, therefore the image is "computer"-extrapolated |
| interchangeable lenses | fixed lens |
| automatic and manual control | limited manual control |
| more expensive | less expensive |
| depth of field easily controlled | limited depth of field control |
| ideal for all views of dental photography | limited views captured, therefore images must be digitally enhanced (e.g., cropping) |
| dental photography requires ring/point flash | dental photography requires "special" modifications (i.e., lens adapters and flash diffusers) |
| steeper learning curve | relatively simple to use |
| suitable for AACD Accreditation submission | not suitable for Accreditation submission |

***Table 1***

- point-and-shoot digital cameras.

Both types have their advantages and disadvantages that need to be evaluated; but the main disadvantage they both have in common is that neither was manufactured for the sole purpose of taking dental digital photography. Dental photography comprises a great deal of close-up pictures (i.e. macro shots), and in order to capture these types of images accurately, specific lenses and flashes are required to be incorporated into either of these systems. Table 1 illustrates the advantages and disadvantages of these two systems (Figs 3 & 4).

Based on the above criteria, one can see that a point-and-shoot camera is adequate for basic recreational photography and general dental photography. However, if one needs to take photographs for AACD Accreditation or wants to be able to have more manual control over their digital photographs, then a SLR camera would be the camera of choice. For either system, there are a variety of manufacturers to choose from, including Nikon (Melville, NY) or Canon (Lake Success, NY). Once the images are captured using either camera system (this article is not designed to discuss the actual mechanics of capturing the digital images), it now becomes necessary to save, store, and manage the images. It is incumbent on the dentist to transfer and organize the images from the digital camera to a computer in a systematic fashion, i.e. create organized and labeled folders, otherwise accessing these images later can be tedious or the possibility of losing the images becomes an issue. Whether the images are stored on a personal laptop computer or on a central server in the office, it is vital for there to be a remote location back up system in place in order to protect against catastrophic loss or damage of the original images.

At this point the dentist needs to evaluate the images and to decide if any adjustments or manipulations to the optical or format properties of these images are necessary. Optical adjustments may include altering color, contrast, and brightness; whereas format adjustments would entail altering the actual file size of the image. That is, lowering the number of pixels or changing the actual file type (e.g., RAW to Jpeg adjustments to the image would involve actual modifications to the image itself for example, changing the shape of a tooth.) In order to perform


*Figure 2: Digital photography for marketing.*


*Figure 3: SLR system.*


*Figure 4: Point-and-shoot system.*

any one of these tasks, an image manipulation software application is necessary, for example, Adobe® Photoshop®. The latter of these adjustments is commonly referred to as computer simulation and can be an extremely beneficial tool for the cosmetic dentist as a properly created simulation can not only provide a preview of the proposed therapy for the patient, but also for the dentist and laboratory who will actually manufacture the restorations (Fig. 5). However, adjustments are prohibited for photographs taken for AACD Accreditation (Fig. 6). Yet it is necessary to know how to modify the image file type of images taken for Accreditation, as AACD Accreditation requires that each photograph must be submitted in its RAW format along with a Jpeg format. Some professional SLR cameras have the ability to take both these file types simultaneously, but for those where this is not possible, it becomes necessary to create a Jpeg

*Figure 5: Restorations.*

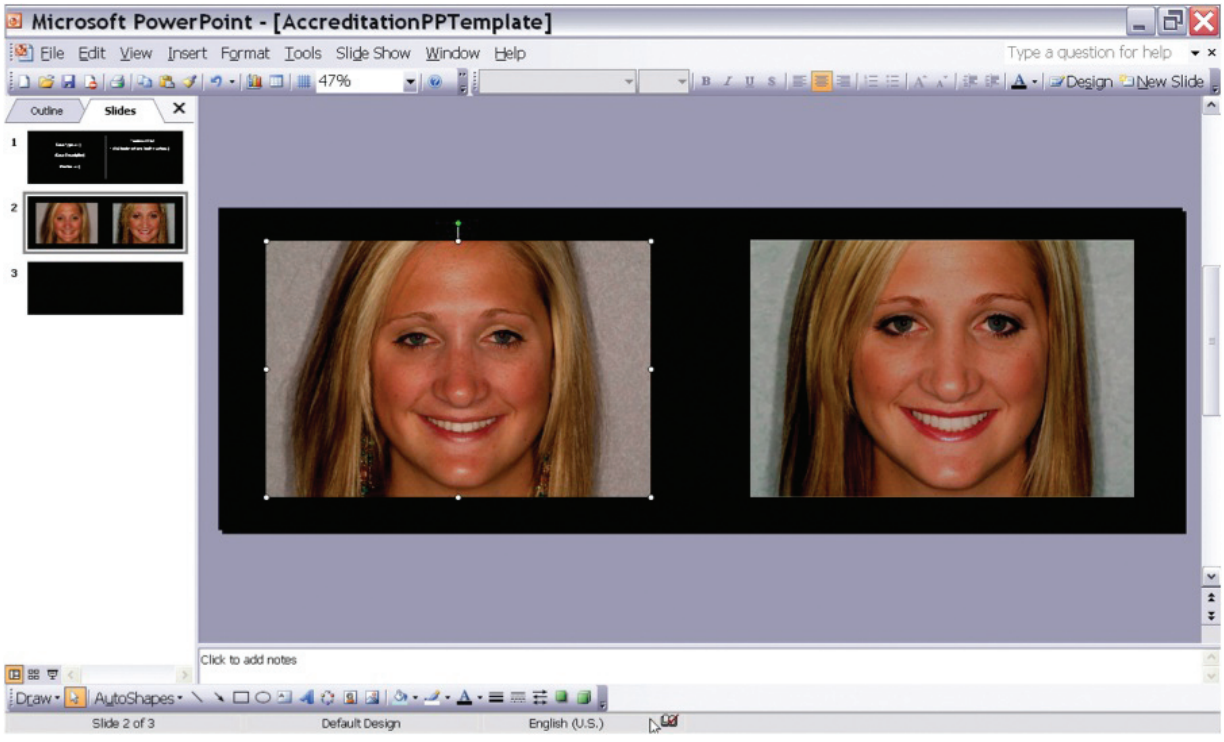


*Figure 6: Photographs for Accreditation.*

copy image from the original RAW format typically using Adobe Photoshop.

Once the dentist has successfully downloaded, organized, and adjusted all the images onto their computer, it now must be decided on how to present or display these images. Either printing out images, e-mailing, placing images on compact discs (CDs) or flash drives, or finally creating computer presentations can achieve this. The more creative one is in displaying or presenting their images, the more of a dramatic effect it will have. This can be a huge benefit when developing a case presentation for either a patient or an audience when lecturing. The most common software utilized for this is Microsoft® PowerPoint® due to its versatility and user friendliness (Figs 7 & 8). AACD Accreditation requires consistent, accurate and untouched photographs for submission and, therefore, creativity

*Figure 7: Photograph for Accreditation.*

*Figure 8: Photographs for Accreditation.*

is not an issue. However, one must be comfortable organizing and managing their images along with transferring them onto a CD. PowerPoint is utilized in the mentoring process when one is going through the AACD Accreditation process and a PowerPoint template specifically designed for this purpose can be downloaded from www.AACD.com along with any other Accreditation protocol material.

Today's most successful contemporary esthetic dentists are ones who not only have mastered the fundamentals of performing high quality esthetic dentistry, but also the ones that have mastered the art of taking quality digital images, managing them efficiently and finally presenting them in an orderly and creative method.

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# Restorative Dentistry

## In This Section:

# The Art of a Beautiful Smile

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## Introduction

In much the same way an artist uses brushes and paint to create his or her art, we too must approach what we do, using the face and its features along with our instruments (e.g., handpiece, laser, imaging systems) to do the same. However, to approach esthetic dentistry successfully, one must understand the distinction between "craft" and "art." *Craft* is the mechanics (the step-by-step protocols and procedural methodology that we have learned through years of experience) of what we do, and *art* is the quality of what we do. The ability to create art must first include a thorough understanding of the craft. The art or quality of what we do cannot be reduced to a mere formula or procedure. It is the intangible that is acquired only through observing and doing. One must observe the masters, just as an aspiring artist must watch and learn from the masters of his craft. It is the skill acquired with the development of a discerning eye that differentiates the mechanic from the artist. When the discerning and learned eye is combined with a foundation of mechanics, the functionally beautiful smile is created. As with all constructive endeavors, predicting a successful end result is impossible without a blueprint to follow. It would be the same for the portrait artist whose desire is to accurately depict the beauty of his model by creating accurate proportions, yet has no references to accomplish that. And, it is like the esthetic/restorative dentist who expects incomparable esthetics and function by picking up the handpiece and starts to cut without any perspective or defined vision of the end result.

*As with all constructive endeavors, predicting a successful end result is impossible without a blueprint to follow.*

The two main objectives in dental esthetics are 1) to create teeth of pleasing inherent proportion and proportion to each other; 2) to create a pleasing

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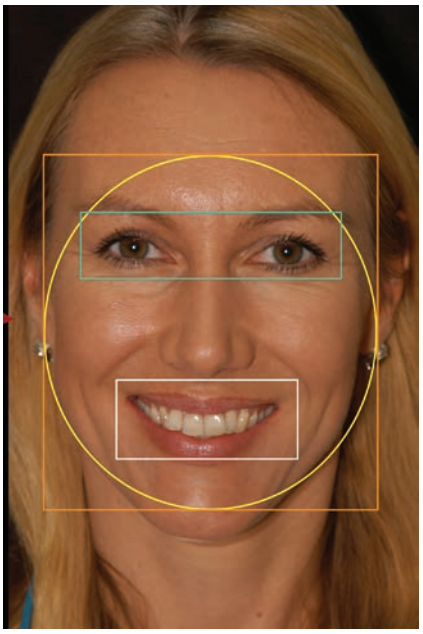

*Figure 1A: Frames and subframes within the context of the face.*

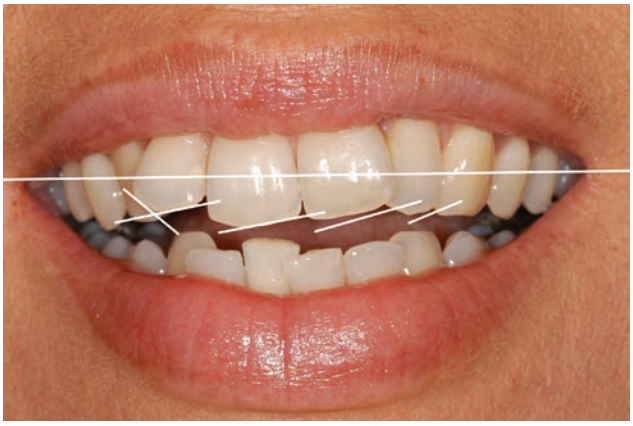

*Figure 1B: Note disharmony between incisal edges and commissural reference line.*

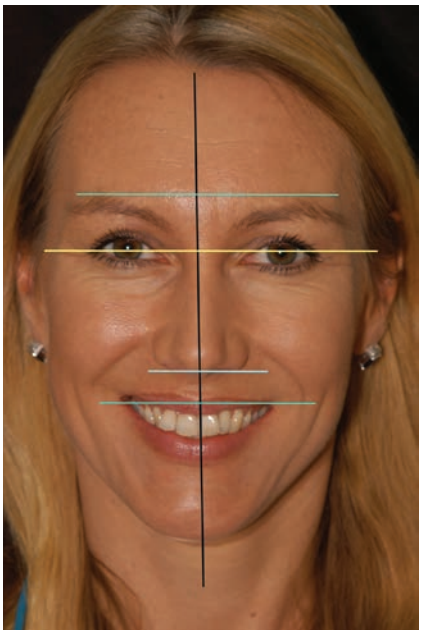

*Figure 2: Horizontal and vertical reference lines on the face. From top: Ophriac line, bipupillary line, alar line, commissural line.*

tooth arrangement in harmony with the patient's lips, gingiva, and face.[1] The esthetic/restorative dentist must clearly realize the inter-relationship between these components to effectively create an esthetically functional smile. As the portrait artist works within certain frames and references to create a visually pleasing result, the esthetic restorative dentist, too, must utilize these frames of reference to establish the smile's proportion, symmetry, and balance. Use of these references are an integral part in the accurate design of facial esthetic reconstruction, of which the smile is of paramount importance (Figs 1A & 1B).

## Extraoral Features Affecting Smile Design

These references include—but are not limited to—horizontal and vertical lines drawn between anatomical landmarks of the face. A comparative analysis serves to provide us with information as to the harmony or visual tension that exists between them and the dentition we strive to reconstruct and enhance.

### Horizontal Lines of Reference

The most commonly used horizontal reference line is the bipupillary line[1] (the line drawn between the pupils of the eyes). This line's lack of parallelism to the gingival margins of the central incisors and incisal/occlusal plane often signals need of correction to attain visual harmony in the smile. Other horizontal lines of reference would be the ophriac (eyebrow), intra-alar, and commissural (corners of the mouth) lines (Fig 2).

### Vertical Lines of Reference

The midfacial or skeletal midline enables the visual orientation of the midline of the face relative to the midline of the dentition.[1] This highlights the coincidence (or lack thereof) between the two, giving the clinician a perspective on medio-lateral discrepancies of the dental midline location, left-to-right symmetry, and what changes from a vertical standpoint would be necessary to attain optimum esthetic results of the smile. Additionally, it can provide

*Figure 3: Preoperative images showing excessive gingival display and buccal corridor deficiency (1:2 frontal and full-face views).*

*Figure 4: Postoperative images (frontal and full-face views) showing correction of esthetic deficiencies.*

*Figure 5: Preoperative view showing deficient incisal edge length, and postoperative view showing elongation of incisal edges following the curvature of the lower lip line.*

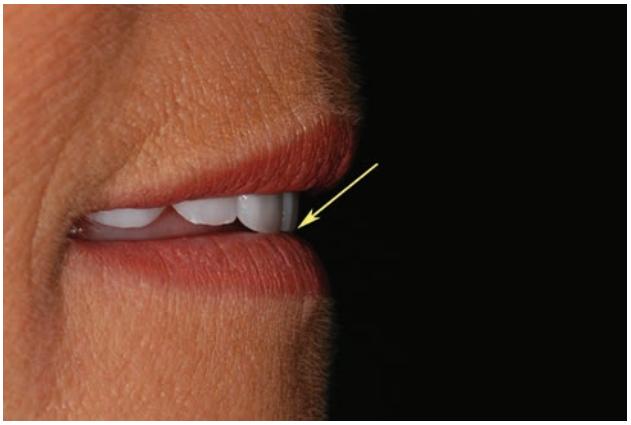

*Figure 6: Incisal edge position (determined by phonetics, function, and esthetics).*

*Figure 7: Parallelism of incisal edge and gingival margin.*

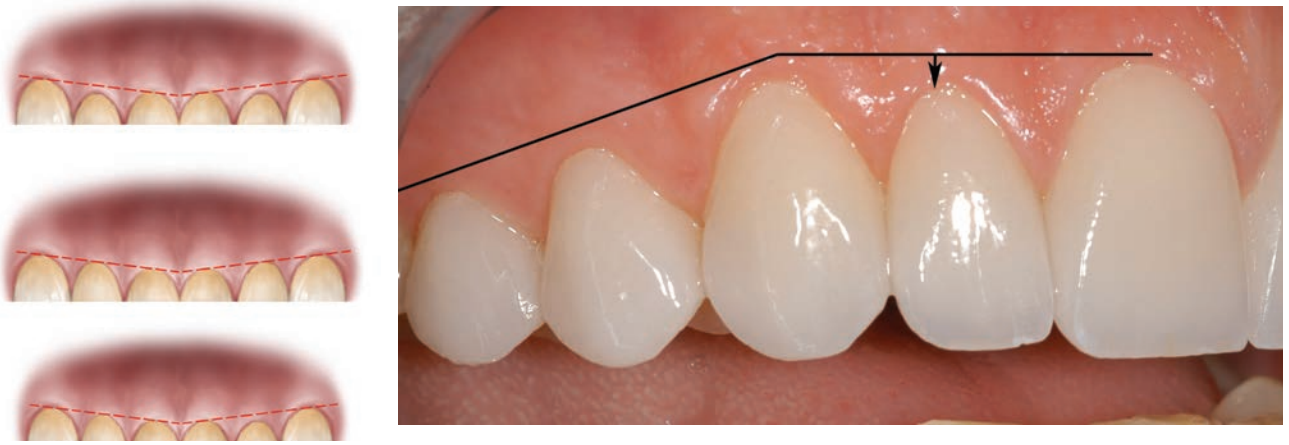

*Figure 8: Esthetic gingival architectural design from central incisor to cuspid to premolars.*

a visual cue as to the degree of the teeth's axial inclination (Fig 2).

### Lip Lines

Position of the upper lip can affect the amount of tooth displayed during the act of smiling and at rest. Additionally, the movement of the upper lip determines the extent of exposure of the teeth and gingival margins during smiling. This is of particular help to the clinician in evaluating the need for esthetic gingival contouring or crown lengthening in the anterior region and in the buccal corridor area (Figs 3 & 4).

The incisal edge of the maxillary central incisors is the single most important determinant in functionally esthetic smile design, and it is the lower lip line that contributes to its positional design. The curvature of the lower lip also serves as a reference to the incisal plane/smile line (Figs 5 & 6).[1]

## Intraoral Features Affecting Smile Design

### Gingival Architecture

As much as extraoral references are important in designing a smile, intraoral features contribute significantly to the smile's overall artistic value. Most important are the gingival tissues surrounding the dentition.

Gingival architecture differs from one patient to the next. What is consistent in the esthetic gingival patterns is the location of the gingival margins being parallel to the bipupillary line, with the lateral incisor zenith being at or below the line drawn between the central incisor and the canine (Figs 7-9).[2] When gingival asymmetry or imbalance occurs, balance must be created through either simple (laser con-

*Figure 9: Parallel relationship of gingival margins of central incisors, incisors, incisal edge, and bipupillary line.*

*Figure 10: Axial inclinations of teeth from the frontal view.*

touring) or more involved surgical means.

### TOOTH DESIGN

Within the context of tooth design there are many points to consider, any of which can dramatically affect the artistic look for which we strive. The axial inclinations, incisal embrasure form, contact areas, tooth dimensions, characterizations, and color are all factors that we can alter and define, enabling us to attain the desired esthetic result.

**Axial inclinations:** When viewed from the frontal perspective, the tooth axis of the central incisor is located just distal to the vertical midline of the tooth. The laterals exhibit a more distal inclination to the vertical midline, and the cuspids even more so (Fig 10).

**Incisal embrasure form:** Depending upon the depth and angulations of the embrasure (Fig 11), incisal embrasure form can create the illusion of a more mature esthetic design or a more youthful one.

**Contact areas:** The interdental contact areas are simply those areas where the teeth touch each other interproximally. The length of these contact areas in the esthetic smile shortens as you move posteriorly, with the longest contact between the central incisors. The length of the contact area between the central incisors ideally is 50% of the length of the central incisor. The contact area between the central and lateral is 40% of the length of the central incisor, and between the lateral and cuspid it is 30% of the length of the central incisor (Fig 12).[2,3]

**Characterizations:** The characteristics of teeth differ with age. Young teeth are brighter owing to greater amounts of enamel; older teeth are darker due to the loss of enamel and the show-through of the underlying

*Figure 11: Esthetic incisal embrasure form, showing increasing depth from centrals posteriorly.*


*Figure 12: Preoperative view of contact relationship of teeth and postoperative view of proper contact relationship of teeth.*

dentin. Younger teeth have more texture, resulting in a more reflective surface and brighter appearance. All of these characterizations can be artistically designed into the ceramic restoration, depending upon the effect we wish to create in our smile design (Fig 13).

## Proportion

The most dramatic artistic effect is the creation of proper proportion. All of the above factors pale in importance to proportion and its overall effect on the smile.

We know that the most influential factors in a harmonious anterior dentition are the size, shape, and position of the maxillary central incisors. They are the most important factor in the design of a functionally esthetic smile. The design of the central incisors begins with the establishment of the proper incisal edge position, which is determined not only by esthetics, but also by function and phonetics.[4] Many of the esthetic concerns we see are a result of disproportion of the central incisors to each other and to the surrounding dentition. Often there is the need to elongate the incisal edge to correct wear, limited tooth display, or unesthetic tooth/crown proportion. The location of the incisal edge obviously affects the esthetic design. The length and width ratios of the central incisors can vary because of this, and the formula of the "golden proportion" may not be followed.

*The most commonly used horizontal reference line is the bipupillary line.*

### Golden Proportion

*Golden proportion* is a term often heard in relation to dental esthet-

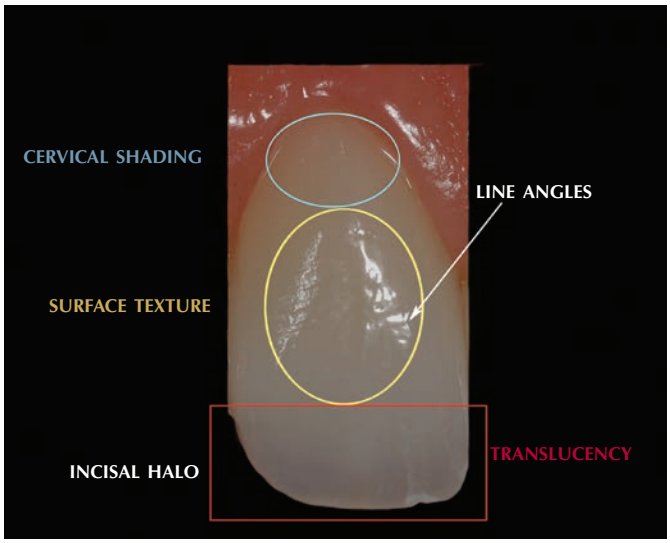


*Figure 13: Designed surface characterizations.*

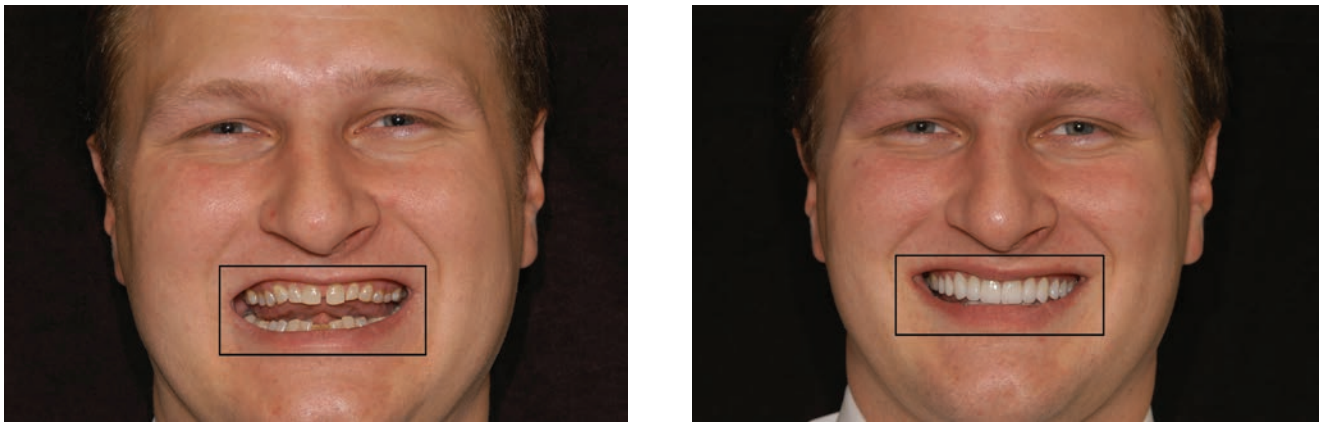

*Figure 14: The importance of dental and facial proportion relationship.*

ics. However, its consideration in true esthetic and artistic form can be over-emphasized. At most, it should be considered a tool and not a rule. The golden proportion as it relates to dentistry states that if the apparent size of each tooth (as observed from the frontal view) is 60% of the size of the tooth anterior to it, the relationship is considered to be artistically pleasing.[2,5] Although this may be generally true, studies have shown that the majority of beautiful smiles evaluated do not coincide with the exact golden proportion formula, and that there are distinct differences between male and females, with females' canines displaying a larger width than males'.[6] In his book, *The Science and Art of Porcelain Laminate Veneers*, Dr. Galip Gurel states,

"If the original definition of the Golden Proportion is applied to dentistry then we would assume that all anterior teeth would display a relationship that is uniform and perfect for everyone…reality tells us that this is questionable because everyone does not possess the same facial morphology, lips and proportions and dental arch design."[6]

What more accurately aids us in our smile design efforts is the concept of "recurring esthetic proportion," which advocates using a proportion of your own choice, as long as it remains constant as it moves posteriorly.[7] This idea individualizes smile design based on the anatomical features specific to that patient. Although it may differ from the golden proportion formula, the esthetic results are often superior to what we can achieve through strict adherence to predefined mathematical ratios (Fig 14).

*Figure 15: Preoperative treatment view of patient to be imaged.*

*Figure 16: Computer-imaged view of patient.*

*Figure 17: Final postoperative treatment view.*

## Computer-Generated Imaging to Aid Smile Design

Anatomically correct computer-generated imaging is a tremendous aid, not only in educating the prospective cosmetic patient, but also in enabling the doctor to evaluate proper length, width, proportion, and even shade issues before treatment is implemented within the context of the patient's extraoral features. It is equally important in providing a clear line of communication to the laboratory technician as to what is esthetically desired in the ceramic design. The patient, dentist, and laboratory technician all can view the case preoperatively from frontal (Figs 15-17), lateral, and full-face perspectives (Envision A Smile imaging software [Envision A Smile; Indianapolis, IN]).

## Conclusion

When a portrait is painted, the artist first creates an oval on which vertical and horizontal lines are then drawn as references. These references enable the artist to create symmetry and balance for the anatomical features that will be drawn within it. When a cosmetic surgeon prepares for a case, measurements, reference points, formulas, and calculations are used, enabling that surgeon to more predictably gain the result intended. Before an instrument is even lifted, a clear path of intent has been established. The blueprint is in order. There should be no difference in the approach we take to artistically create a smile. The principles of artistic design are as much a part of esthetic dentistry as they are for the portrait artist or the cosmetic surgeon. When followed with a solid foundation of craft (mechanics), they result in a functionally correct and highly esthetic smile.

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**Editor's Note:** Dr. Kirtley is the developer of the Envision A Smile software that is mentioned in this article.

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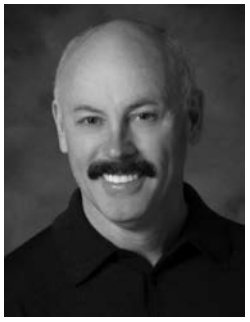
# Achieving the Epitome of Composite Art: Creating Natural Tooth Esthetics, Texture, and Anatomy Using Appropriate Preparation and Layering Techniques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## Abstract

This article will be valuable to Accreditation Case Type V (Six or More Direct Resin Veneers) candidates by facilitating understanding of the layering techniques required to produce natural esthetics and accurately create natural-looking texture and anatomy in direct resin restorations. By engaging the reader in a total esthetic concept—one that progresses from the micro, minute portions of the tooth (e.g., different thicknesses of enamel, translucency, and surface texture) into the macro (e.g., smile line, midline, and axial inclinations)—realism can be imparted to a Case Type V so that an ultimately better-looking smile can be achieved. Additionally, this article reviews concepts for pre-planning the restorative process, utilizing an esthetically enhanced study model, and incorporating a putty matrix into the clinical protocol.

*Three-dimensional restorations with realistic depth of color can be achieved only by combining anatomically correct form with creative use of the artist's palette.*

## Introduction

Three-dimensional restorations with realistic depth of color can be achieved only by combining anatomically correct form with creative use of the artist's palette. Morphologically correct composite restorations are built up according to a logical method of carefully selected composite shades, tints, and opaquers that incorporate differing optical properties. When properly combined, they create the illusion of the different translucencies and opacities that are visible in natural tooth structure.[1]

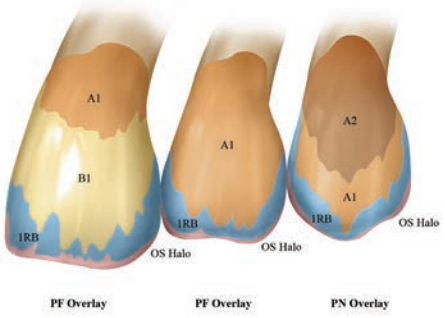


*Figure 1: Perform color mapping of teeth while they are well-hydrated to determine depth of color for replacing dentin and the filtering effects of enamel.*

Illustration © Zach Turner

*Figure 2: Preoperative view of a typodont model. In a clinical scenario, a diagnostic mock-up would be analyzed to plan the case.*

The build-up or layering technique itself is one reflective of ceramist's principles. These use materials to interplay with light and recreate the hues, chromas, and values of color inherent to the tooth structure being replaced.[2] The direct composite build-up steps represent a process for completing a layered restoration similar to one fabricated with ceramic to replace dentin, enamel, dentin lobes, and characteristic colors. Mastery of these techniques forms the basic foundation for creating lifelike restorations, the quality of which is limited only by the imagination.

Imagination is key to the process and the manner in which a clinician's eye is trained to "see and observe" the natural tooth and match it in composite resin. This involves paying close attention to incisal effects (e.g., a halo), scalloping of the edges, heights of contour, surface texture, and light reflecting and deflecting zones. However, imagining what is possible requires an understanding of how natural tooth structure and its components—dentin and enamel and adjacent teeth themselves—interact with each other to create visual effects.[3]

For example, dentin has high points and low points to help light reflect differently. In natural teeth, there will be areas where a translucent layer will be thicker, so the dentin is deeper into the tooth. There will also be other areas where the translucent layer will be thinner, so the dentin will be closer to the surface of the tooth. The latter area is usually at the gingival half. Therefore, clinicians layering direct composite resin will want to ensure that they reestablish that dentin area using a dentin composite, being sure to bring it closer to the surface to create a lifelike restoration. Using too much translucent composite to "fill in" what was removed during preparation could result in a restoration that appears too low in value, too translucent, and not lifelike.

Also, consider that the teeth themselves demonstrate specific characteristics. Central incisors will have much more elaborate incisal characteristics and exhibit much more detail in terms of dentinal lobes. Any "blue" appearing in the central incisors might be stronger, whereas in the lateral incisors, it might appear more subtle or softer. The canines, on the other hand, will demonstrate higher chroma and stronger color when compared from the laterals to the central. In terms of shape, by observing the axial inclinations of teeth, emergence profiles, and line angles, clinicians can realize the ways in which teeth differ among themselves.

Accreditation Case Type V tests the candidate's ability to create excellence with direct resin in minimally invasive ways[4] and comprehend smile design principles, as well as knowledge of tooth morphology.[5] Smile design principles include those related to lip line and midline placement; axial inclination and incisal embrasures of the teeth; principles of proportion and central dominance; the buccal corridor; and the contour, shape, and position of the gingival tissue.[6,7]

## Know the Anticipated Outcome of the Case

Key to successful esthetic outcomes in esthetic restorative dentistry is envisioning the restorations prior to initiating treatment. Therefore, esthetically enhanced study models and wax-ups,[8] and a very solid shade diagram for each tooth showing how

*Figure 3: Facial view of teeth ##6-11, demonstrating an aggressive preparation on a typodont.*

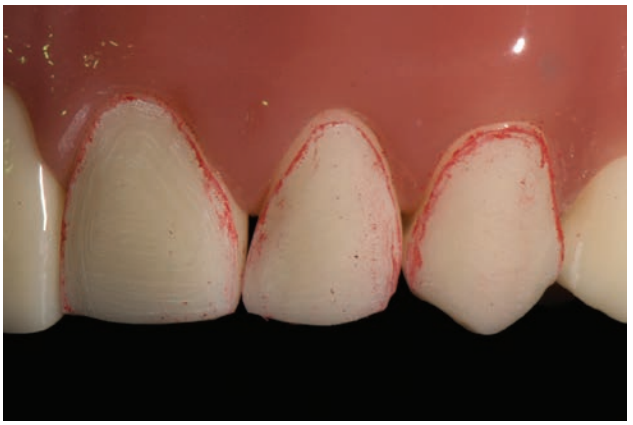

*Figure 4: When minimal color change or contour change is needed, a less invasive or aggressive preparation is appropriate for Case Type V restorations.*

the shades vary within the tooth itself (Fig 1), should be developed. Essentially, the restoration first must be created in the mind before it can be created in the patient's mouth. Diagnostic study models (Fig 2) and mock-ups facilitate understanding of how much material will be needed and how much enhancement or augmentation to the tooth structure will be required. Their use also enables clinicians to understand the contours of the teeth.

## Create Matrices and Reduction Guides

Preparation is of paramount importance when creating direct resin restorations. Too often, aggressive preparations are seen for composite veneers that could otherwise be completed with only slight removal of tooth structure or a conservative form of enamelplasty (Fig 3). It is discouraging to see too much tooth structure sacrificed unnecessarily for the sake of esthetics, especially when more conservative preparations can be completed with the use of a reduction guide (Fig 4). Polyvinyl siloxane (PVS) matrices will demonstrate the placement limits in terms of volume of composite material three-dimensionally.[9] These can be used as adjuncts to help clinicians maintain the proper incisal length and edge thickness, as well as control midlines, as in cases involving diastemas and complex bonding (Figs 5-7).

*Imagining what is possible requires an understanding of how natural tooth structure and its components… interact with each other to create visual effects.*

## Understand What Part of the Tooth is Missing for Material Selection

Performing color analysis of the tooth/teeth—commonly known as shade mapping—can help in material selection and placement.[10] Shade mapping is, quite simply, a drawing of the tooth that indicates specific shade names in the zones of the tooth where they are observed. To confirm that the shade mapping is correct, small increments of composite should be placed preoperatively on the teeth and light-cured. This will allow both the clinician and the patient to actually envision and observe the material and determine if it is the right choice, as opposed to preparing the tooth, applying the material, and not knowing whether that is the right color.

## Handle the Composite Properly

The manner in which composite materials are handled—whether it is on the facial surface, interproximally, or around the gingival tissues—affects the appearance of the restorations. In order to handle the materials properly, it is important not to incorporate air voids into the composite increments that are being placed. Additionally, placing smaller increments predictably versus trying to control too much material at one time helps to ensure control of the material.

## Use a Composite Layering Technique to Build in Polychromicity

For Case Type V, begin with the central incisors (teeth #8 and #9). Place an initial dentin replacement layer of the highest chroma shaded composite for that tooth (e.g., Vit-l-escence cervical shade A1, Ultradent

*Figure 5: A PVS matrix must include the facial-incisal line angle to aid in the fabrication of the designed incisal edge plane and contour.*

*Figure 6: Incisal view of the reduction guide that will be used to confirm appropriate and uniform reduction and appropriate and harmonious contours in the final restorations.*

*Figure 7: Close-up view of the reduction matrix after preparation confirms that the desired reduction was achieved.*

*Figure 8: The initial dentin replacement layer (shade A1) was placed in the gingival half of the central incisors and extended partially into the incisal half.*

Products; South Jordan, UT) in the gingival half of the tooth, almost to full contour. Extend this composite layer partially into the incisal half and light-cure as directed by the manufacturer (Fig 8).

Then place a second layer of dentin replacement composite—now a body shade (e.g., Vit-l-escence body shade B1)—in the middle half of the tooth and extend this layer into the incisal third to start the development of the dentinal lobes. Be sure that there is still sufficient room on the facial aspect for the application of the enamel layer and then light-cure this increment (Fig 9).

To recreate the remaining lingual contour and incisal plane of the central incisors, apply an opaque (e.g., Vit-l-escence Opaque Snow) composite, using the matrix as a guide (Fig 10). Be careful not to fill between the dentinal lobe development, and ensure that sufficient room remains for application of the enamel layer.

## Impart Incisal Effects

Two different techniques can be employed to create incisal effects. The first technique (demonstrated on tooth #8) uses inherently tinted/colored composites (e.g., Vit-l-escence Iridescent Blue). The second technique (demonstrated on tooth #9) requires the use of tints (e.g., Vital color tints, Ultradent) and a mixture of unfilled resin. Reviewers have commented that an ability to use various tints, opaquers, and translucent enamel shades contributes to the convincing use of composite resin for AACD Case Type V restorations.[11]

### Tinted Composite Technique

Apply the tinted composite (Iridescent Blue) primarily between the dentinal lobes that were previ-

*Figure 9: A second dentin replacement layer in shade B1 was placed in the middle half of the central incisors and extended to begin dentinal lobe development.*

*Figure 10: The remaining lingual contour and incisal plane was recreated by applying Opaque Snow composite, with the matrix as a guide.*

*Figure 11: Iridescent Blue composite was applied to tooth #8 primarily between the previously formed dentinal lobes to create incisal translucency.*

*Figure 12: A mixture of Vital blue 30% and 70% clear tints was applied to the incisal zone to establish the appropriate incisal translucency.*

ously formed. This will create incisal translucency (Fig 11). Light-cure as directed. Be sure not to fill the lobes completely.

### Mixture Technique

Mix 30% blue tint (Vital blue) and 70% clear unfilled resin and apply the mixture to the incisal areas—including the transition zones on the mesial and distal aspects—to establish the appropriate incisal translucency (Fig 12), as noted in the color mapping. Light-cure as directed.

Once the appropriate incisal effects have been created, complete the restorations of the central incisors by replacing the enamel layer with a final enamel shade of composite (e.g., Vit-l-escence Pearl Frost) (Fig 13). This enamel layer will provide a translucent effect and properly disperse light. Light-cure as directed.

## Ensure Isolation

Ensure proper isolation among the teeth to be restored and from oral fluids using rubber dam isolation, a dead soft matrix, or plumber Teflon tape. A sectional matrix may also be employed.

## Assess

When developing direct composite resin restorations for AACD Accreditation Case Type V, it is imperative that the restorations be assessed in progress. It is recommended that the central incisors be developed first, followed by the lateral incisors, then the canines. That being said, when the central incisors have been developed to approximately 80% to 90% of full contour, they should be assessed in terms of width and length symmetry, line angles, and harmonious balance (Fig 14). Calipers can facilitate this process. Once harmony and balance are

*Figure 13: A final enamel layer in composite shade Pearl Frost was applied. Proper isolation with a dead soft matrix facilitates this process.*

*Figure 14: Calipers were used to measure the widths of the newly fabricated restorations in three areas—gingival, middle, and incisal—to ensure harmony and balance.*

*Figure 15: The initial dentin replacement layer (cervical/body A1 composite) was applied to teeth #7 and #10 in the gingival half almost to full contour.*

*Figure 16: The remaining lingual contour and incisal plane of teeth #7 and #10 was recreated by applying Opaque Snow composite.*

confirmed, the restorative layering process can proceed to the lateral incisors (Figs 15-19). Similarly, when those restorations have reached approximately 80% to 90% of their full contour, they too should be assessed (Fig 20). Finally, the cuspids can then be restored with a layering technique (Figs 21-26) and, upon reaching 80% to 90% of full contour, they too can be assessed (Fig 27).

## Confirm Gross Contours

Once the restorations have been successfully layered and anatomically constructed, clinicians should ensure that they have achieved a similar harmony and balanced width and length across the centrals, as well as balance with the laterals and cuspids. Using the flap door facial matrix, the clinician can confirm that the restorations have the initial designed facial contour (Fig 28).

## Impart Texture and Refine Anatomy

After the overall gross contours of the restorations have been confirmed, clinicians must ensure their realism by imparting texture and fine-tuning the tertiary anatomy. Note that using the matrix and carefully applying the composite helps to ensure accurate and precise placement, thereby simplifying the finishing process.[12] It is at this stage that the line angles should become more well-defined (e.g., secondary anatomy, tertiary anatomy) (Figs 29 & 30). To this end, it is important for clinicians to have a logical, sequential, and predictable method of finishing and polishing (e.g., UCLA LeSage Anterior Aesthetic Restorative System, Brasseler USA [Savannah, GA]; Jiffy [Ultradent]) that ultimately leads to a restoration surface that is ready to accept and

*Figure 17: Iridescent Blue composite was applied to tooth #7 to create incisal translucency.*

*Figure 18: A mixture of Vital blue 30% and 70% clear tints was applied to the incisal zone of tooth #10.*

*Figure 19: The final enamel layer of teeth #7 and #10 was applied in composite shade Pearl Frost.*

*Figure 20: The widths of the newly fabricated restorations were assessed in three areas—gingival, middle, and incisal—to ensure harmony and balance.*

*Figure 21: The initial dentin replacement layer (cervical shade A2) was placed in the gingival half of teeth #6 and #11 and extended partially into the incisal half.*

*Figure 22: A second dentin replacement layer (body shade A1) was placed in the middle half of teeth #6 and #11 and extended to begin dentinal lobe development.*

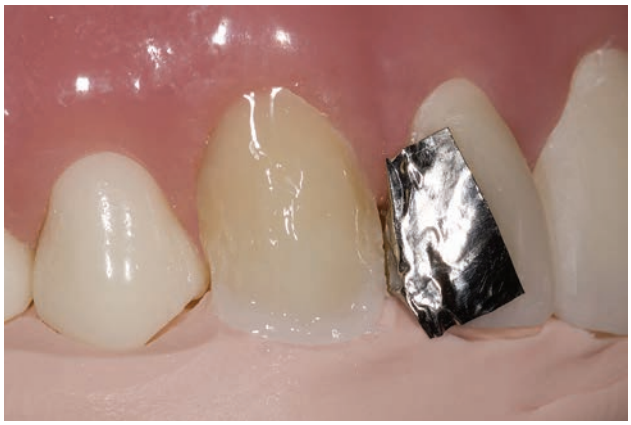

*Figure 23: The remaining lingual contour and incisal plane was recreated by applying Incisal Edge Opaque Snow composite to teeth #6 and #11.*

*Figure 24: Cuspids tend to have less incisal translucency effect. On tooth #6, Iridescent Blue composite was applied to create incisal translucency*

*Figure 25: On tooth #11, a mixture of Vital blue 30% and 70% clear tints was applied to the incisal zone to create incisal translucency.*

*Figure 26: The final enamel layer of teeth #6 and #11 was created by applying Final Enamel Shade Pearl Neutral composite.*

reflect light, not one full of voids and defects, stains, and pits. For example, a green striped diamond (#6856L-020) in a slow-speed, air-driven handpiece (NSK, Brasseler) can be used to incorporate secondary and tertiary anatomy.

## Polish; Verify Occlusion

To achieve the appropriate luster and polish, a good polishing system that includes polishing paste, points, cups, and wheels (e.g., Jiffy) is recommended for esthetic direct composite restorations (Figs 31 & 32). The final luster and polish can be obtained using a goat hair chamois brush (Brasseler) or a regular chamois brush with polishing paste, starting wet and then dry (Fig 33). When the restorations have been finished and polished, the occlusion should be verified.

## Conclusion

As clinicians prepare to elevate their skills in providing their patients with direct composite restorations, it is important for them to know the principles of nature and to correlate them with their restorative materials. What is required for esthetic and functional excellence during this time of minimally invasive dentistry is an evolution of skills based on an understanding of what polychromicity is; the different thicknesses of dentin and enamel in different parts of the tooth; and how to vary the hue, chroma, and value of the composite restorations that are systematically layered. The keys to success are observation and strategic control, and careful selection and manipulation of the desired composite material. Additionally, on an AACD Accreditation Case Type V, it is essential to use a comprehensive restorative system that provides all the requi-

*Figure 27: Since the PVS matrix was used for development of the incisal edges, note that a true fit was confirmed during assessment of the restorations.*

*Figure 28: Incisal view of the polyvinyl siloxane matrix. Note the proximity of the matrix and the facial contour of the final restorations in the gingival half.*

*Figure 29: Faint red lines scribed on the composite outline the transition line angles. Texture can be carried to and beyond the line angles to simulate nature.*

*Figure 30: Incisal view of the final restorations. Clinicians should see well-demarcated line angles and a similar amount of facial surfaces and anatomy on contralateral restorations.*

site shade opacities, translucencies, and dentin and enamel colors and tints (e.g., Vit-l-escence; Premise, Kerr [Orange, CA]; 4 Seasons, Ivoclar Vivadent [Amherst, NY]; Filtek Supreme, 3M ESPE [St. Paul, MN]; Esthet•X, Dentsply Caulk, [Milford, DE]).[13] Having an array of composite shades and opacities is ideal when developing Case Type V.

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*Figure 31: Using rubber points, cups and wheels, a disc system, and a silicone impregnated brush, clinicians can attain a luster and polish appropriate for individual cases.*

*Figure 32: Note the gradation of color using the parameters of value and chroma moving from the central to the lateral to the cuspid.*

*Figure 33: Use goat hair brushes and chamois wheels with wet and dry composite polishing paste; as seen on the right side of the typodont, a high polish is attainable.*

*Journal of Cosmetic Dentistry* 23(3):29, 2007.

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# Exploring the Cosmetic Dental Applications of Soft Tissue Diode Lasers

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## Abstract

This article focuses on soft tissue diode laser technology and its applications in the field of cosmetic dentistry. It specifically defines the term *laser*, provides an overview of one particular soft tissue diode laser system (Odyssey, Ivoclar Vivadent; Amherst, NY), and outlines a few of the procedures that can be accomplished using this tool during the course of providing quality cosmetic dentistry treatment.

*The soft tissue diode laser has become familiar to many cosmetic dental practices because it is not only more efficient, but it also is an innovative, gentle, less traumatic, and more precise technology.*

## Introduction

The incorporation of soft tissue lasers into the cosmetic dental practice opens a new frontier in the treatment of conditions that were once considered impossible.[1] In fact, the soft tissue diode laser has become familiar to many cosmetic dental practices because it is not only more efficient, but it also is an innovative, gentle, less traumatic, and more precise technology. For example, compared to a conventional scalpel—a sharp steel tool that cuts with pressure and mechanical friction—a soft tissue diode laser uses precise laser energy and photo-thermal effects to cut and seal via vaporization and coagulation. The result is that patients can often receive restorative and soft tissue procedures in the same appointment.

*Figure 1: Preoperative 1:2 view of teeth with chemical erosion and delayed passive eruption.*

*Figure 2: Preoperative 1:1 view of teeth with chemical erosion and delayed passive eruption.*

## What is a laser?

*LASER* is an acronym for light amplification by stimulated emission of radiation. The various properties of laser light enable it to be monochromatic (i.e., one color or wavelength). The fact that laser energy can be collimated enables its light to be precisely directed and focused in a straight line, ensuring that it affects only the tissue (hard or soft) that is intended. Furthermore, a laser's coherent property contains light waves in phases, which are more concentrated.

Coherence is one of the unique properties of laser light, arising from the stimulated emission process that provides amplification. Since a common stimulus triggers the emission events that provide the amplified light, the emitted photons are "in step" and have a definite phase relation to each other. Ordinary light is not coherent because it comes from independent atoms that emit on time scales of about 10^-8 seconds. There is a degree of coherence in sources like the mercury green line and some other useful spectral sources, but their coherence does not approach that of a laser.

*The major component of a soft tissue diode laser is a semiconductor chip or crystal.*

## Laser Components

The components of a laser include the external energy source, flash lamp, optical cavity, active medium, reflective mirror, lens, optical resonator, and a partially transmissive mirror. The active medium varies among lasers and contains the photons to react and create light. The major component of a soft tissue diode laser is a semiconductor chip or crystal. The diode in the Odyssey family of soft tissue lasers consists of aluminum, gallium, and arsenide, commonly referred to as AIGaAs. The Odyssey diode laser operates at a wavelength of 810+/-20 nanometers, which is ideal for soft tissue applications.

What makes different lasers ideal for some applications rather than others depends upon different thermal effects on the dental tissues, which are themselves associated with the different wavelengths of light energy and the temperatures that lasers can produce.[1,2] Between the temperatures of 37° to 50° C, the thermal effect on the tissue results in hyperthermia. Temperatures of 60° C and above indicate coagulation. The technique of welding results from a thermal effect on tissue from temperatures between 70° and 90° C. With temperatures between 100° to 150° C, tissue vaporization occurs. Carbonization and charring occur with laser temperatures of 200° C and higher. These specific thermal effects depend upon power density, cooling, duration of exposure, specific wavelengths, emission modes (continuous wave or pulsed), and tissue characteristics.[2]

It is important for dental professionals to understand the physical characteristics of different laser wavelengths and their interaction with biological tissues.[1] This will ensure that lasers—including soft tissue diode lasers—are used safely and beneficially.[3]

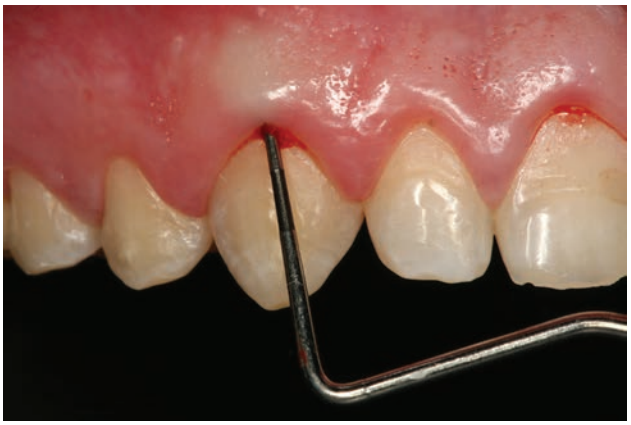

*Figure 3: Periodontal probing of the pocket depth was performed to determine the free gingival margin.*

*Figure 4: The depth of the pocket was determined to be approximately 6 mm.*

*Figure 5: A bleeding point was placed to demarcate the height of the new gingival margin.*

*Figure 6: A soft tissue diode laser was set at 1.0 W in order to scribe the new free gingival margin.*

## Soft Tissue Diode lasers

A diode laser has become ideal for soft tissue procedures because it possesses an affinity for both gingival pigment and hemoglobin.[3,4] As a result, soft tissue diode lasers can separate (cut) soft tissues precisely, seal blood vessels, and sanitize the treated area,[5,6] all while being gentle, resulting in very little postoperative swelling.

Today's soft tissue diode lasers offer dentists and their staff such added benefits as portability, affordability, and ease of use. In particular, the Odyssey diode laser offers a variety of key features, such as battery operation using a lithium polymer, a wireless foot pedal, and convenient procedure programs, making it truly portable and facilitating flexible use throughout operatories in the cosmetic practice. Furthermore, Odyssey Navigator's highly condensed power provides a minimum of 45 minutes of continuous lasing, making it an ideal treatment tool for more involved soft tissue procedures.

The unit-dose fiber tips are precleaved and stripped. The ergonomic handpiece is designed for more comfort and less fatigue. For easy sterilization, detachable sleeves are included. This cordless and user-friendly device has a simplified control panel with a touch screen that displays the mode, power setting (Watts), and time (in seconds).

*Figure 7: Immediate postoperative view of the gingival recontouring that was completed using the diode laser.*

*Figure 8: One-week postoperative 1:2 view of the gingival tissue and teeth following restoration with composite bonding.*

*Figure 9: One-week postoperative 1:1 view of the gingival tissue and teeth following restoration with composite bonding.*

*Figure 10: Preoperative 1:1 view of an implant at the #9 site, complete with provisional crown and a prefabricated zirconium abutment.*

## Clinical Procedures Ideal For Soft tissue Diode Lasers

In an estimated 90% of cosmetic dentistry cases, cosmetic gingival contouring is most desirable and successfully performed using a soft tissue diode laser. Additionally, the concept of a laser procedure has become favored by patients. The soft tissue diode laser helps to establish the state of hemostasis and facilitates gingival troughing (margin exposure)[7] and gingival recontouring. Additionally, the diode laser is useful for performing frenectomies[3] and gingivectomies and, in some cases, these procedures can be performed without the need for local anesthetic injections.

*Today's soft tissue diode lasers offer dentists and their staff such added benefits as portability, affordability, and ease of use.*

### Crown Lengthening/Gingival Contouring

The use of a soft tissue diode laser enables complete control over the outcomes of cases in terms of the height, symmetry, contour, and zenith of the gingiva surrounding anticipated esthetic restorations. Procedures can be performed immediately, without collateral damage, using a soft tissue laser. However, key considerations include ensuring that there is sufficient biologic width available, identifying the amount by which the gingival margin should be raised, and marking the location of the zenith. To use a soft tissue diode laser for this purpose, the initiated fiber tip is used in contact with the

*Figure 11: After removal of the provisional crown, hyperplastic growth of the gingival tissue was observed.*

*Figure 12: A soft tissue diode laser set at 1.0 W was used to remove the excess tissue from around the implant abutment.*

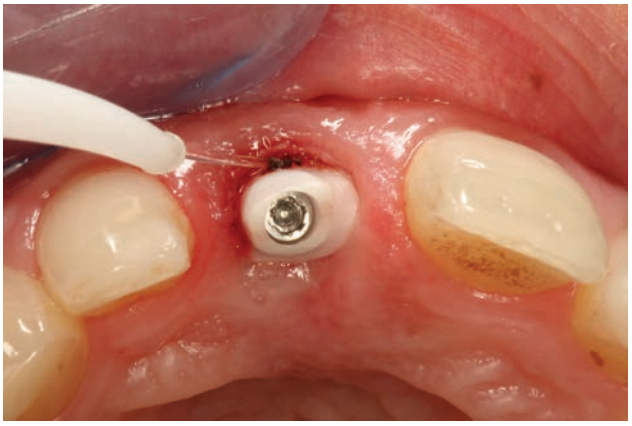

*Figure 13: Occlusal view of the implant abutment as excess gingival tissue is removed using the soft tissue diode laser.*

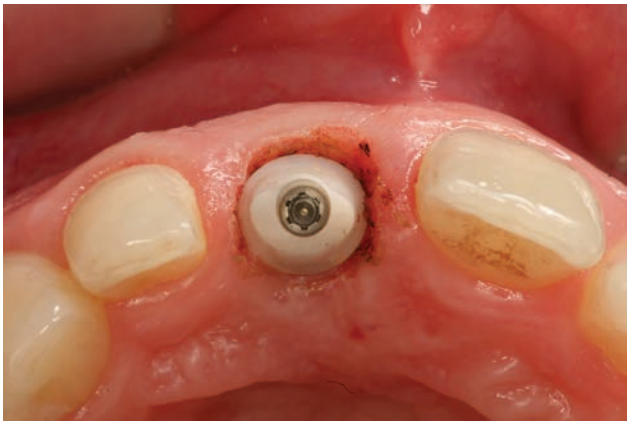

*Figure 14: The zirconium abutment is completely free circumferentially of gingival tissue, and the margins are clearly visible.*

*Figure 15: View of the final restoration placed at the #9 site.*

*Figure 16: Preoperative view of an amalgam restoration on tooth #30.*

*Figure 17: The gingival margin of tooth #30 was covered by excess gingival tissue, which hindered composite/core buildup and accurate impression taking.*

*Figure 18: A soft tissue diode laser was set at 1.0 W for use in troughing prior to core/composite buildup and exposing the cervical margin of tooth #30.*

*Figure 19: View of the completed tooth preparation following composite core buildup.*

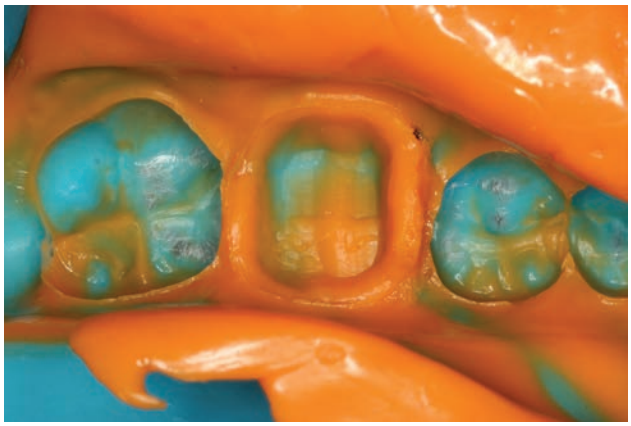

*Figure 20: View of the accurate and detailed impression of tooth #30 showing well-defined margins.*

tissue to make an incision in continuous wave mode, beginning at 0.8 W.

Here, a 16-year-old boy presented requiring gingival contouring and crown lengthening (Figs 1-9). The soft tissue diode laser procedure was performed to help re-establish his pre-orthodontic crown length prior to the placement of composite bonding to correct chemical erosion of the anterior incisors and enhance the esthetic appearance of his smile.

### Exposing Implant Abutments

Using a soft tissue diode laser to expose implant abutments that are surrounded by tissue overgrowth can prove to be an efficient and minimally invasive technique (Figs 10 through 15).[8] After immediate placement of an implant in the #9 site and a zirconium abutment with a provisional acrylic crown, the patient returned with excess tissue that threatened the quality of the final impression. In such cases, the laser is used in continuous wave mode at 1.0 W of power, with the fiber optic tip angled away from the implant abutment. With the tissue cleared, a final impression was taken and a definitive restoration made and inserted one week later.

### Gingival Troughing For Impressions

By using a soft tissue diode laser to trough the tissue around a subgingival preparation, clinicians eliminate the need to place a cord. This laser procedure is simple and easy and facilitates hemostasis[7], allowing dentists to take an impression without the adverse effects of blood. The

*Figure 21: View of the final pressed-ceramic crown restoration (IPS Empress, Ivoclar Vivadent; Amherst, NY) on tooth #30 and composite restoration on tooth #31.*

*Figure 22: Preoperative retracted view of the patient with congenitally missing lateral incisors.*

*Figure 23: Occlusal view demonstrating a lack of facial tissue in the edentulous sites. Note the presence of denture stomatitis.*

*Figure 24: A football-shaped coarse diamond was used initially to develop the ovate pontic sites. The patient had a connective tissue graft to augment the width of the ridge.*

*Figure 25: A soft tissue diode laser was used to define the shape of the ovate pontic sites and to facilitate hemostasis.*

*Figure 26: Retracted view of the completed ovate pontic sites following use of the soft tissue diode laser.*

*Figure 27: Immediate postoperative occlusal view of the ovate pontic sites.*

*Figure 28: Two-week postoperative view of the ovate pontic sites.*

*Figure 29: Facial view of the pontic sites.*

*Figure 30: Retracted postoperative view of the completed zirconium bridge restorations.*

result is a clean, accurate, and nicely fitting final restoration.

In this case, a female patient in her mid-20s presented with a large mesial-occlusal-distal/buccal-lingual amalgam restoration on tooth #30. An Odyssey soft tissue laser was used to remove the excess interproximal gingival tissue and expose the preparation margin (Figs 16-21). Troughing using a soft tissue diode laser was initiated in the continuous wave mode, and contact with the fiber optic tip was made, beginning with 0.8 W. The fiber was angled against the tooth, and light pressure was used while lasing. The patient was provided with a provisional restoration and, ultimately, a pressed porcelain crown that demonstrated the proper fit and marginal integrity.

### Creating Ovate Pontic Sites

When using a soft tissue diode laser to create ovate pontics, it is important to first assess the ridge for adequate tissue height and buccal-lingual width. Sound to the osseous crest with a periodontal probe. There must be a minimum of 2 mm of soft tissue covering a healed extraction site. When making the ovate pontic site, the socket should be made 0.5 mm to 1 mm deep, starting with a coarse high-speed football-shaped or round diamond bur and finishing with the soft tissue diode laser fiber to shape and cauterize the gingival tissue. The provisional restoration should lightly blanch the tissues. Two weeks should be allowed for healing prior to proceeding to final impression taking.[9]

Here, a 21-year-old female patient presented with congenitally missing upper left and right lateral incisors (i.e., teeth #7 and #10), but

there was inadequate inter-tooth space at those sites for implant treatment. The treatment plan included the creation of ovate pontics at the #7 and #10 sites using soft tissue diode laser techniques (Figs 22-30) and the placement of full-coverage three-unit zirconium-based bridges for teeth ##9-11 and ##6-8.

## Conclusion

Soft tissue diode lasers such as Odyssey allow cosmetic dentists to perform current clinical procedures in a more efficient and less traumatic and invasive manner.[10] Such technological innovations present opportunities to provide flexible treatment options to patients while simultaneously enabling clinicians to expand their skill level in cosmetic dentistry, particularly where soft-tissue techniques are concerned. Furthermore, these procedures can be performed with minimal postoperative challenges.

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*The American Academy of Cosmetic Dentistry recognizes Dr. Edward Lowe as an AACD Accredited Member.*

**Editor's Note:** This article was based on a corporate workshop by Ivoclar Vivadent, presented at the AACD's Excellence in Cosmetic Dentistry 2008, in New Orleans, Louisiana.


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# RSVP
## (Rapid Simplified Veneer Provisional System)

*by* Robert C. Margeas, DDS
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### Introduction

Provisionalization of porcelain veneers has always posed a problem for the restorative dentist. They could be time-consuming, overcontoured, causing gingival irritation, and sometimes difficult to retain. Over the years, numerous techniques have been described on how to fabricate them efficiently. Some used plastic stents, while others advocated putty matrices. Some were fabricated directly in the mouth, and never removed until final placement. Some dentists suggested a "shrink-wrap" technique using bis-acryl materials such as Protemp (3M ESPE; St. Paul, MN) or Luxatemp (Zenith/DMG; Englewood, NJ.

Provisionals protect the underlying tooth structure, keep the teeth from drifting or super-erupting, maintain gingival health, and serve as a guide for the shape and form of the final restoration. An astute practitioner can often use a provisional restoration to provide a significant amount of diagnostic, functional, and esthetic information about the patient, benefiting both parties.

*An astute practitioner can often use a provisional restoration to provide a significant amount of diagnostic, functional, and esthetic information about the patient, benefiting both parties.*

While porcelain laminate preparations were traditionally more conservative and usually confined to the enamel, some pressable ceramics require greater reduction, involving dentin. If left uncovered, such preparations will likely result in sensitivity. Therefore, a well-made provisional that minimizes tooth sensitivity is absolutely essential. Newer materials have made fabricating provisionals a routine procedure for dentists. RSVP by Cosmedent, Inc. (Chicago, IL) has taken much of the difficulty out of fabricating provisionals for porcelain laminates.

This hands-on workshop provided models of an ideal treatment case and prepared models of six anterior veneers. The participants were able to fabricate the clear impression stent and provisionals utilizing the RSVP technique.

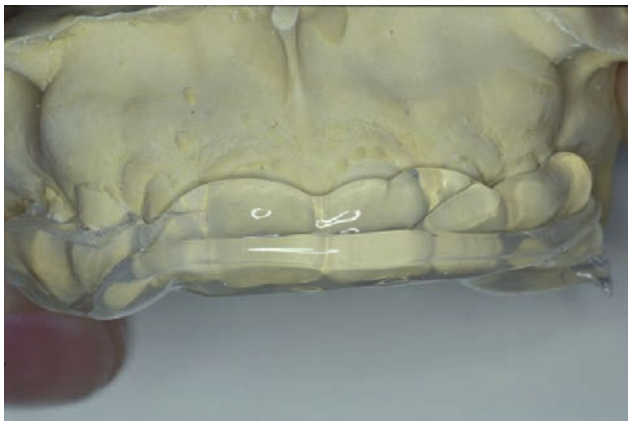

*Figure 1: Impression material is injected over the study model.*

*Figure 2: The shell of each tooth in the modified matrix, corresponding to a prepared tooth, was filled to three quarters with incisal composite resin.*

*Figure 3: Desensitizer is placed to prevent any sensitivity.*

*Figures 4 and 5: An unfilled resin is brushed onto the prepared teeth and light-cured.*

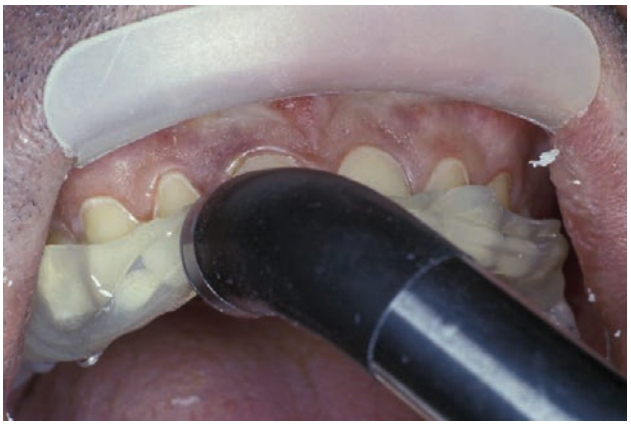

*Figure 6: Light-curing for three seconds per tooth.*

*Figure 7: Well-contoured provisional veneers on all prepared tooth surfaces.*

*Figure 8: The ideal configuration, sculpted.*

*Figure 9: Provisional veneers.*

## Provisional Fabrication

Utilizing a clear tray, or fabricating the stent directly on the study model, RSVP clear polyvinyl siloxane impression material is injected over the study model (Fig 1). This is allowed to set for approximately three minutes. The material will adhere to the study model, which will aid in trimming the tray. The key to the technique is trimming the clear material properly. The tray is modified to control the adaption of the cervical one-third of the provisional veneers. This modification helps avoid gingival irritation or destruction of the veneer finish line in the area. The area of the interproximal papilla must be easily accessed. The cervical one-third of the matrix can be modified with a #15 Bard-Parker scalpel blade (Becton Dickinson; Franklin Lakes, NJ).

The shell of each tooth in the modified matrix, corresponding to a prepared tooth, was filled to three quarters with RSVP incisal composite resin (Fig 2). Unlike conventional flowable composites, which display excessive flowability, the RSVP composite resin undergoes no displacement, while easily adapting to all matrices.

Prior to seating the matrix over the prepared teeth, Super Seal (Phoenix Dental; Fenton, MI) is placed to prevent any sensitivity (Fig 3). The prepared teeth are not acid-etched unless maximum retention is needed. An unfilled resin is brushed onto the prepared teeth and light-cured (Figs 4 & 5). The retention of the composite material and the slight adhesion created between the bonding adhesive and the unetched tooth surface usually make spot-etching unnecessary. The tray is placed in the mouth and once the gingival margin has been cleared of excess material, light-curing for three seconds per tooth is done (Fig 6). Virtually all of the RSVP incisal resin coalesces in the cervical one-

third of the facial surface of the prepared teeth and can be delicately removed with an interproximal carver or brush. The tray is then removed from the mouth, revealing well-contoured provisional veneers on all prepared tooth surfaces (Fig 7). Generally, the only flash present will be at the cervical-most border of the cured RSVP provisionals. This usually occurs because of the extremely precise adaption of the RSVP matrix, and can be easily removed with a fine diamond or with multi-fluted carbide burs.

With the design of the matrix altered to expose the cervical one-third of the facial surface, this critical zone could now be "free-hand" sculpted to ideal emergence contour, exact finish line transition, and case-specific height of contours. RSVP heavy viscosity, formulated for sculptability and ease of handling, was carefully shaped into the ideal configuration, sculpted (Fig 8), and light-cured. Floss threaders were placed to allow the patient to floss between the solid veneer provisional.

The resultant provisional veneers (Fig 9), formulated by means of this technique, were fabricated quickly, eliminated overcontouring, and prevented preparation damage.

**Editor's Note:** Robert Margeas, DDS, and Robert Nixon, DMD, are the developers of the RSVP system for Cosmedent, Inc. and receive royalties for the sale of the product.

This article was based on a corporate workshop supported by Cosmedent, Inc., that was presented at AACD's Excellence in Cosmetic Dentistry 2008 in New Orleans, Louisiana.

# Chairside CAD/CAM: Not If, But Which and When

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## Abstract

Chairside computer-aided design/computer-aided manufacturing (CAD/CAM) now has two systems available in the marketplace. Aesthetic excellence as well as functional strength and durability are routinely achievable. The process of creating posterior and anterior chairside CAD/CAM restorations is explored and explained in this article. The range of applications, preparation styles, material selections, characterizations, and cementations are discussed in relation to my FAST (Functional Aesthetic Simplified Treatment) System©.

*Patient demand for the convenience of single-visit, long-term restorative care is increasing.*

## Introduction

Chairside computer-aided design/computer-aided manufacturing (CAD/CAM) has been evolving into a mainstream method of delivering durable, quality, aesthetic dental restorative care, and has been well studied.[1-4] It has been 21 years since the introduction of the first chairside system, the CEREC 1 (Sirona Dental Systems; Charlotte, NC). There has been only one equipment choice for this method in those 21 years. During that time, CEREC evolved from the CEREC 1 with only diamond disk-based milling; to the CEREC 2 with disk-and-bur-based milling; to CEREC 3 and 3D, which incorporate dual-bur-based milling and Windows™-based three-dimensional (3D) software (Fig 1). The long-anticipated arrival of a competitor has finally been realized in the market and incorporates similar dual-bur milling

*Figure 1: CEREC 3 with MCXL milling chamber.*

*Figure 2: E4D Design Center and milling unit.*

and Windows-based 3D software. The E4 Dentist System (D4D Technologies; Richardson, TX) (Fig 2) has now joined the CEREC 3D system to provide the means to deliver direct chairside ceramic restorations that have been shown to have long-term durability.[5,6]

## Patient's Perspective

Patient demand for the convenience of single-visit, long-term restorative care is increasing. There are many aspects of the patient experience that can be enhanced through the use of chairside CAD/CAM. Patients do not like

- needles
- impressions
- discomfort or pain.

They also do not want more dental visits than necessary, nor do they want to wait weeks for their treatment to be finished

It behooves us to take heed of these patient concerns and explore additional options and remedies for their sake. The real benefits of CAD/CAM to the patient include positive solutions to these concerns, as well as less time away from work, decreased anxiety, potentially more conservation of tooth structure, improved periodontal health, chairside aesthetic customization, more quality time with the provider, and instant gratification with the end result. Many procedural and financial benefits also accrue to the provider and the office when chairside CAD/CAM is introduced.

*A mandatory aspect of the chairside delivery of CAD/CAM restorations is simplifying the overall process.*

## Chairside CAD/CAM Applications

The process of creating and delivering these restorations is relatively straightforward once understood and practiced. As with most dental techniques, education, practice, and commitment are required. The clinician must value the technology and what it can provide for the practice and the patient in order to commit to its use. Value is the "aiming device" that we use to determine our levels of commitment. We sometimes make decisions based upon emotion, but justify the decision with logic. This article presents a logical approach to the chairside CAD/CAM process through the FAST (Functional, Aesthetic Simplified Treatment) System© that I developed and teach.

There are many different approaches to the chairside delivery of CAD/CAM restorations. These vary according to the needs and desires of the provider, as well as to the provider's skill levels. There are many misconceptions about chairside CAD/CAM and CEREC, including the following: "It takes too long," "They don't fit well," "They don't look good," and "The technology is very expensive." These issues, while possibly true in the past, are no longer serious concerns.[7]

The CEREC and E4D devices have an extremely wide range of pos-


*Figure 3: D4D design screen.*

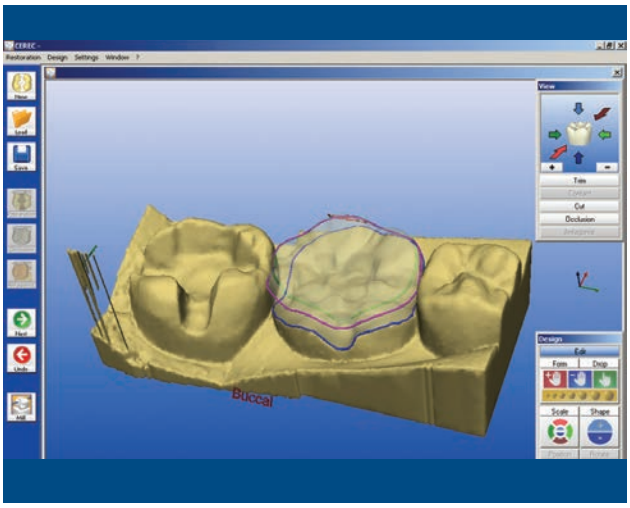


*Figure 4: CEREC 3D design screen.*

*Figure 5: Preparations—#30 onlay and #31 inlay.*

sibilities, including inlays, onlays, crowns, and veneers, both posterior and anterior. The most routine restorations are posterior crowns followed by inlays and onlays. More adventurous users will provide anterior restorations, but these typically require higher levels of characterization to achieve acceptable aesthetics.[8] The specific steps for any of the restorative options vary depending upon the system employed, the major differences being the need for opaqueing to capture the optical impression, and the design software employed. CEREC requires full opaquing accomplished through the application of a powder or spray, whereas E4D requires select application of a translucent reflecting agent with certain preparation styles. Each system has its own unique graphical user interface, design tools, and methods (Figs 3 & 4), but in general

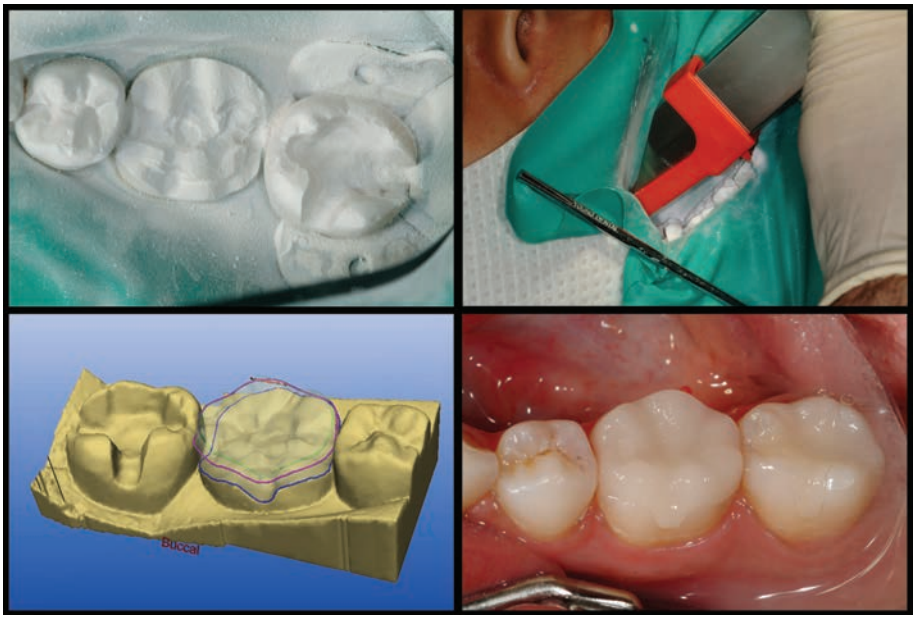


*Figure 6: Optical impression with design, and try in of Vita Mark II shade 3M1 blocks #30 & #31.*


*Figure 7: Vita Triluxe Forte blocks.*

they use the same clinical process and reach the same result: A milled restoration.

### F is for Functional

The first step is to create functionally sound preparations that adhere to important guidelines. Ceramic thickness is a critical factor for the long-term success of adhesively placed restorations. Specific minimum baseline parameters are recommended to achieve optimum strength. The generally accepted axial reduction is 1.5 mm, with a width of 1.2 mm at a 90° to 120° internally rounded shoulder. Occlusal reduction should be 1.5 mm and isthmus width should be 2.5 mm to 3 mm, with axial walls that are from a 10° taper to undercut with rounded axiopulpal line angles (Fig 5). Veneer reduction can be as little as 0.5 mm with a chamfered margin.

Various types of preparation styles can be created, using the above guidelines to ensure strength and durability. All teeth in the arch are prospects for chairside CAD/CAM and, once prepared, are cap-


*Figure 8: Empress CAD multi blocks.*


*Figure 9: e.max CAD blue blocks.*

*Figure 10: IPS e.max blue block process, replacing failed crown over an endo post-core buildup.*

tured with designed, milled, and trial-fitted (Fig 6).

### A is for Aesthetic

One of the common misconceptions about CAD/CAM is that the restorations do not have the level of aesthetics that cosmetic dentists demand. Although the milled restoration typically has a very monochromatic appearance, three materials are available that partially overcome this objection. Vita (Vident; Brea, CA) Mark II materials are feldspathic ceramic offered in both Vita Classic shades and the more intuitive Master 3D shade system. Two gradient blanks, Triluxe and Triluxe Forte (Vident) provide a smooth chroma transition from the gingival to incisal (Fig 7). The same chroma transition is available in the leucite-reinforced Empress CAD Multi blocks (Ivoclar Vivadent; Amherst, NY) (Fig 8) and the gradient block (Sirona Dental Systems). Each system has a wide range of shade offerings, with standard and gradient blocks to meet virtually every clinical situation. A resin-based block, Paradigm MZ-100 (3M ESPE; St. Paul, MN) is available. The e.max CAD block (Ivoclar Vivadent) (Fig 9) is available for special applications, such as high-stress situations over implant abutments and endodontic post and core buildups. These blocks require special handling and vacuum firing for crystallization and color change from "blue" to the desired shade (Fig 10).

However, many aesthetic challenges are not resolved without the addition of stains and spot or "maverick" colors. These kinds of characterizations can be readily accomplished chairside through some

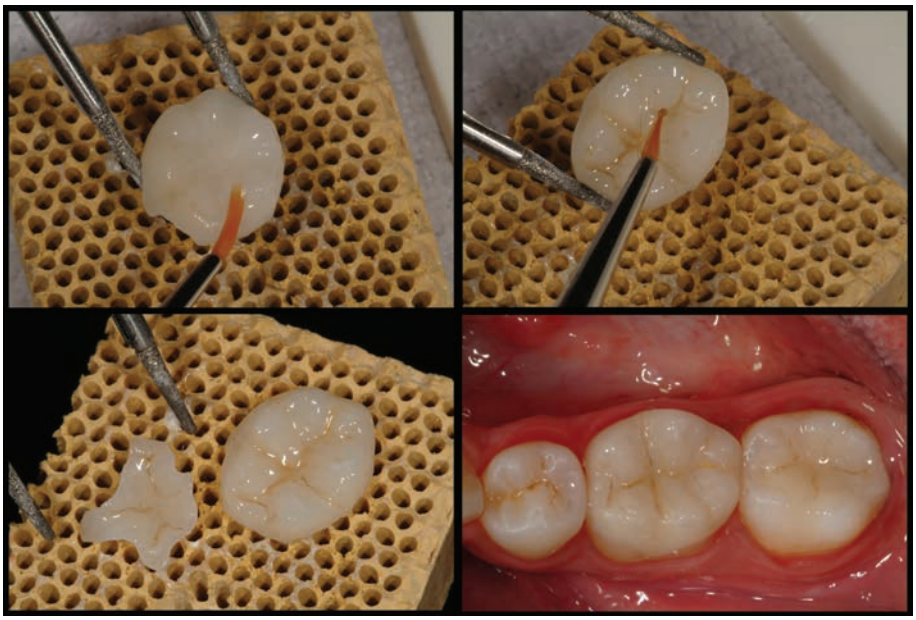

*Figure 11: Characterization of #30 and #31 Vita Mark II with Vita Akzent stains and glaze, and completion.*

easily mastered techniques. Both the IPS Style (Ivoclar Vivadent) and Akzent (Vident) stain and glaze systems help the operator achieve superior aesthetic results with their respective block systems.

The case shown in Figure 5, a disto-occluso-buccal inlay at #31 and a full-coverage onlay at #30, demonstrates the characterization capabilities of VITA Mark II and the Akzent system. The try-in stage helps the operator determine the fit (Fig 6) and the level of characterization required. The base block shade is 3M1 and the application of glaze and stains from the Vita Akzent kit lowers the value and increases the chroma of the occlusal surface. Subsequent application of a deeper chroma stain highlights the fissures and creates dimensionality in the final restoration. Once the stains and glazes have been applied, an air-fire cycle with a porcelain furnace is accomplished. The restorations are cooled and then cementation is completed (Fig 11).

## Material Applications

Most clinical situations can be restored with confidence using the standard block materials available from the various manufacturers. The compressive strength of these ceramic materials is approximately 130 MPa, with exceptional wear characteristics. The compressive strength numbers are based on the material alone and do not bring into account the strength added by the adhesive process. Some practitioners tend to shy away from second molar applications, citing material failures. It is my opinion, after treating thousands of teeth over 18 years with CEREC, that material failures are really symptomatic of preparation and/or adhesive failures. This experience leads to the conclusion that infringements upon ceramic thickness minimums due to preparation inconsistencies, or use of luting agents that do not have high bond strengths generally lead to these types of failures. A complete understanding of preparation details and their interaction with the milling and design process tends to ensure long-term success.

The CRA Foundation reported the results of a seven-year study comparing Ivoclar ProCAD (Empress), 3M Paradigm MZ100, and Vita Mark II manufactured with CEREC.[9] The study concluded that 55% of the Paradigm, 71% of the ProCAD, and 94% of the Mark II restorations were without flaws at seven years; and that 30% of the Paradigm, 21% of the ProCAD, and only 6% of the Mark II restorations required replacement by seven years.[9] To date, I have experienced a lower failure rate, approximately 2% to 3%, except with endodontically treated teeth requiring post placement with full-core resin buildups and restoration of implant abutments.

*Figure 12: Melissa, before, full-face view.*

*Figure 13: Smile, before.*

These situations present the need to have higher performance from the CAD/CAM materials. The Ivoclar e.max CAD blue blocks appear to be ideal in these situations. I have been placing these materials in these two clinical situations for approximately nine months at the time of this writing with no failures noted. The material has a compressive strength of approximately 360 MPa, enhancing the performance. The major drawback of the e.max CAD block is the time required to create the restoration. Milling times with CEREC are increased approximately 30% to 40%, and the material requires a vacuum-firing cycle of approximately 30 minutes. Sometimes additional firing is required to achieve proper aesthetics (Fig 10).

### ST is for Simplified Treatment

A mandatory aspect of the chairside delivery of CAD/CAM restorations is simplifying the overall process. Simplification can be defined in as many ways as there are practitioners; however, some basic, key elements are necessary:

- understanding of preparation details
- a clear understanding of the end result
- standardization of procedures
- understanding of software procedures (depends upon the platform)
- delegation of certain procedures
- acquisition of characterization skills
- streamlining cementation.

Ironically, it is the simplification process that requires the most training and education. The goal is to make use of the CAD/CAM device the least of the appointment's challenges so that ample time is made available for fitting, characterization, cementation, and occlusal refinement.

## Case Study—Anterior Application

Mastery of posterior restorative care is essential to anterior excellence. Virtually all of the principles that create posterior excellence are applied to anterior restorations. The addition of higher levels of efficiency and characterization skills is generally required for satisfactory anterior performance. Crowns and all types of veneer preparations are possible with CAD/CAM; however, a clear understanding of preparation details is even more important than with posteriors from the standpoint of aesthetic results. Planning for the case is most critical when single-visit preparation and delivery is desired.[8] Time is short and stress can increase if adequate planning is not done.

### Patient History and Diagnosis

Melissa is a classic example of the incredible value of chairside CAD/CAM capability for anterior dentistry. I had treated this 35-year-old patient with 14 months of Invisalign (Align Technology; Santa Clara, CA) two years earlier (Fig 12). She had relocated to another city but had returned to have her teeth cleaned on a Wednesday in preparation for her wedding two days later. Her main concerns were the deteriorating resin on #8, irregular incisal length, and wear on the incisals of ##6-11 (Fig 13). She wanted to eliminate the yellow resin and even the incisal edges of #8 and #9 (Fig 14).

Upon discussion and smile analysis, it was determined that her

*Figure 14: Before, retracted view.*

*Figure 15: Mock-up, ##6-11.*

*Figure 16: Incisal halo developed with VM9 porcelain layering.*

*Figure 17: All preparations.*

tooth length and size was not appropriate for her facial structure. Lateral disclusion was lost due to wear of the incisal edges of #6 and #11 (Fig 14). Corrections were tried with a bonded composite resin mock-up on teeth ##6-11 following her cleaning, allowing for evaluation and approval by the patient (Fig 15).

### Preparation and Placement

Melissa was pleased with the mock-up and wished to have six veneers placed the next day. Her only caveat was that she had to be finished by 2 p.m. so that she could attend her wedding rehearsal later that afternoon. The patient wore the mock-up home and received comments from many family and friends who had arrived for the rehearsal. She returned at 7 a.m. Thursday, satisfied with the general aesthetics and ready to commence treatment. Final aesthetic discussion revolved around the degree of translucency, shade, and potential for maverick characterization. Melissa's fiancé offered his smile as an example that displayed significant incisal halo with slight incisal maverick color on his left lateral incisor. Melissa's desire to "match" her fiancé gave rise to the yellowish tint on the incisal edge of her #10 (Fig 16).

All six teeth were prepared and veneers fabricated with CEREC 3D from Vita Mark II 1M1C feldspathic ceramic to allow for application of incisal translucencies (Fig 17). Various preparation styles are possible and depend upon the operator's (ceramist's) preference. Veneers can be successfully prepared as thin as 0.5 mm or as aggressive as required due to previous restorations, decay, or fractured tooth structure. Value and chroma control vary depending

*Figure 18: Placing surface texture.*

*Figure 19: After, retracted view.*

*Figure 20: Smile, after.*

upon the thickness of the veneer, as well as the ability to add surface texture and incisal effects. Teeth ##7-10 were cut back and layered with Vita VM9 EC4 effect yellow chroma porcelain for #10, and Window porcelain for ##7-10 to create the translucent halo. The degree of halo is under the control of the operator and should be discussed with the patient to determine the appropriate amount. Surface texture was placed (Fig 18) and all six veneers were characterized using the Vita Akzent stain and glaze system. The restorations were placed using Excite and Variolink Veneer (Ivoclar Vivadent) shade "+3" (Fig 19). The incisal halo is clearly visible (although it appears slightly more intense than in a natural setting due to the black background), enhancing the lifelike appearance of the veneers (Fig 16). The case was completed by 2 p.m, and the bride had a wonderful wedding the following day. Figures 20 and 21 show a very happy Melissa two days after treatment.

## Conclusion

As demonstrated in the case highlighted here, chairside CAD/CAM gives clinicians many possibilities for restorations with excellent aesthetics. Many of the objections and challenges that patients have and face with dental treatment are lessened with single-visit care with no loss of durability or beauty. Temporary restorations are avoided, as are numerous visits to the clinician's office, while still providing patients with beautiful, aesthetics in a single visit. Application of the FAST System© helps to ensure results that create excellence in CAD/CAM dentistry.

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### *AACD Acknowledgment*

*The American Academy of Cosmetic Dentistry recognizes Dr. Richard Masek as an AACD Accredited Member.*

***Figure 21: A very happy patient.***

# Facial Changes Through Dental Temporization

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At the AACD's scientific sessions in Atlanta and New Orleans, Zenith Dental sponsored hands-on courses demonstrating artistic dental temporization and the ability to create facial changes through esthetic dentistry. The response to these programs was extremely positive; this article will review the concepts that were presented.

*Esthetic dentistry not only has the ability to alter a person's appearance, but can affect their personality as well.*

Esthetic dentistry not only has the ability to alter a person's appearance, but can affect their personality as well. By modifying the length, form, and position of the teeth, we can reduce years from a person's appearance and/or give them facial traits that they desire. Usually a dental makeover will lead to other forms of beautification, often beginning with a new hairstyle. Although some patients proceed to have plastic surgeries, most do not care or need to go to such extremes. Esthetic dental changes, a new hairstyle, new ways of applying make-up, and a new wardrobe can result in a dramatic boost to one's self confidence.

## The Role of the Provisional Restoration

The ability to create and modify provisional restorations simply and quickly has opened the door to predictable esthetic dental changes. As opposed to other plastic surgeries, dental temporization can give the patient a chance to preview his or her new smile, live with it for a while, show it to family and friends, and alter it as necessary.

*Figure 1: The first patient desired longer teeth and a fuller smile to counteract her round facial form.*

*Figure 2: The second patient desired a wider smile with very white teeth.*

A putty template is created from a diagnostic wax-up or mock-up created directly on the patient's teeth; this is later filled with an injectable bis-acryl material and placed over the patient's prepared teeth. These provisionals can then be trimmed, modified, and glazed to give a lifelike realism. Participants in the hands-on course were provided with Luxatemp Fluorescence (Zenith/DMG, Englewood, NJ). Its patented 10:1 base:catalyst ratio provides the right blend of strength, esthetics, accuracy, and fast set time. It can be easily added to and modified using Luxaflow (Zenith/DMG) or any microfill composite, and then glazed with Luxaglaze (Zenith/DMG), which not only gives it polish but also adds to its strength.

*Dental temporization can give the patient a chance to preview his or her new smile, live with it for a while, show it to family and friends, and alter it as necessary.*

A well-made provisional is the key to an esthetic restoration. It provides the laboratory technician with a blueprint for tooth length, width, thickness, arch form, midline cant, incisal edge position, and occlusal scheme. Once the patient has approved the form of the provisional, the technician replicates all the parameters in porcelain using silicone templates fabricated from a plaster model of the temporary. You cannot go wrong!

## Patients 1 and 2

Participants in the hands-on program were shown photographs of and told the background of two different patients desiring esthetic dentistry. (Figs 1 & 2) After assessing the dentition and desires of the pa-


*Figure 3: Template for the first patient.*


*Figure 4: Template and wax-up for the second patient.*

*Figure 5: The first patient loved her new look.*

*Figure 6: The second patient returned saying that she did not like her smile at all… She dreamed of having a big, wide, toothy grin.*

*Figure 7: The first patient, with slightly longer teeth with sharper corners.*

tients, diagnostic wax-ups were created using the information gathered to achieve their esthetic goals.

The first patient desired longer teeth and a fuller smile to counteract her round facial form. She said that she felt "tired and old." The second patient desired a wider smile with very white teeth. She had existing 10-year-old porcelain veneers that she felt were overcontoured and too dark. Each of the course participants was instructed to fabricate a Luxatemp provisional restoration using a putty template created from the wax-up. (Figs 3 & 4)

The temporary restoration is the first and most dramatic factor in creating a major esthetic change. After the participants temporized the patients, they were shown photographs of the way the patients looked with their new provisionals. We then removed the photos from the screen as if the patients had left our offices and gone home. The patients were told to live with their new smiles for a few weeks and assess any changes they wanted to make. We then placed their photos back on the screen as if they were returning for their follow-up visit, and the course participants learned what each patient liked and did not like. (Figs 5 & 6)

The first patient loved her new look; she felt "sexy, alive and exciting." She had even changed her hairstyle. When asked if she wanted even "sexier teeth," she responded with an emphatic "*Yes!*" We decided to not drastically change the look of the provisional, as the patient loved it, but to only sharpen the corners and lengthen it slightly to give the smile a more exciting edge.

The second patient returned saying that she did not like her smile at all—it just wasn't her. When

*Figure 8: The wider smile that the second patient desired.*

questioned further, she stated that people always said that she reminded them of Julia Roberts. She dreamed of having a big, wide, toothy grin *"just like Julia's!"* Although to many of the participants the initial temporization looked beautiful, they were instructed to take the "customer is always right" approach and provide the patient with exactly what she wanted. They were instructed to modify the provisional by widening it as much as possible while still respecting the position of the underlying teeth. The participants then modified the temporaries with flowable and microfill composite resin, sandpaper disks, diamond finishing burs, and LuxaGlaze until the two patients were totally satisfied and signed consent forms that they accepted the shape of the proposed restoration (Figs 7 & 8). Using this technique, the patients were able to visualize exactly what they would be getting, therefore eliminating guesswork by both the dentist and laboratory technician. Every person has their own idea of how they want to look; beauty truly is in the eye of the beholder.

## Conclusion

"Redo-a-dontics" is very frustrating, time-consuming, and expensive for the dentist, the laboratory technician, and the patient. Sending a case to a dental laboratory without a definitive plan results in guesswork, leaving responsibility for the smile design to the dental technician. It is time-consuming, uncomfortable, and risky to anesthetize, remove dental temporaries, retemporize, and return a case to the laboratory for modifications. This often involves even more guesswork. Nobody wins!

By taking extra time, even if it involves a few extra visits—and by creating a provisional restoration satisfying the esthetic needs of the patient—the dentist can communicate what is required to the lab technician, who can create a template from this blueprint to enable him or her to create a porcelain restoration and virtually eliminate the guesswork. This prototype restoration can accurately convey the tooth length, incisal edge position, labial and lingual contour, midline position, contour and position of the line angles, emergence profile, and incisal and gingival embrasure architecture. Detailed lab prescriptions no longer become necessary. A photo, plaster model, and instruction to the technician to copy the provisionals are all that are needed.

The "magic combination" of meticulous treatment planning, communication, and special chemistry between patient, dental team, and laboratory technician usually exists in our most successful cases. By mastering creative dental temporization and working hand in hand with our lab technicians, dentists can get it right the first time.

**Editor's Note:** This article was based on a corporate workshop by Zenith Dental, presented at the AACD's Excellence in Cosmetic Dentistry 2008, in New Orleans, Louisiana.

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# Extreme Class IV Composites: The Next Best Thing to Cloning

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## Abstract

The restoration of a large Class IV fracture or the replacement of defective composites in the anterior dentition can be extremely challenging. Direct resin restorations are often the treatment of choice for patients who are more conscious of the conservation of tooth structure and are seeking alternatives to porcelain veneers and full-coverage crowns. Single-shade restorations will not adequately match the natural tooth structure and adjacent dentition and, therefore, will not satisfy most patient expectations. The replication of natural polychromicity is the key to restoring natural esthetics and harmony. It is the clinician's responsibility to become familiar with and skilled in the use of multilayered and multi-chromatic resin restorations. An array of resin systems exists today that enable the clinician to achieve long-term, natural-looking esthetic results while maintaining the natural tooth structure.

*It is the clinician's responsibility to become familiar with and skilled in the use of multilayered and multi-chromatic resin restorations.*

## Introduction

### Clinical Advantages

Patient demand for improved esthetics, coupled with the desire for conservative treatment, has driven clinicians to improve their skills with direct resin. Over-preparation of anterior teeth and overuse of indirect restorations, particularly in the anterior dentition, has come under question by a segment of our profession. Conservation of tooth structure is one of the most important clinical advantages that direct resin restorations have over indirect composite or porcelain restorations.[1] Direct resin restorations are inherently

*Figure 1: The patient desired improved esthetics of his upper left central incisor. Note that the width of the centrals was measured for symmetry.*

*Figure 2: Contours viewed from the incisal aspect reveal that the existing restoration had asymmetrical contours on the buccal and lingual that contributed to deficient esthetics.*

conservative in nature and do not follow the historic GV Black preparation designs.

Direct resin restorations require the removal of only the current restoration and any carious tissue, and the placement of an appropriate bevel or finish line. Less invasive than indirect alternatives, direct resin treatment requires limited to no reduction of healthy tooth structure. "Direct resin restorations are made to fit the requirements of the tooth, instead of the tooth made to fit the requirements of the restoration."[2]

Renewability is a unique advantage of direct resin restorations compared to indirect alternatives.[3] Porcelain materials are difficult to repair predictably unless the entire restoration is removed. Small resin fractures or incipient lesions can be repaired or restored conservatively and predictably. Should a tooth require endodontic treatment after placement of a resin restoration, the access opening and core buildup can be completed with resin, also.

The high-gloss finish that may be lost over time from resins, particularly hybrids, can be readily polished and resealed when necessary. Of all the materials available today for the restoration of the anterior dentition, resin exhibits wear rates closest to those of enamel[4] and results in minimal abrasion of opposing dentition, particularly when compared with the abrasion caused by feldspathic porcelain.

From a clinician's standpoint, another benefit of direct resin restorations is the artistic satisfaction derived from the recreation of natural beauty. The successful combination of restorative and artistic skills results in a restoration that is highly esthetic and functionally sound. Unlike laboratory-fabricated restorations, the final outcome of direct composite restorations is entirely controlled by the clinician, who may choose from a palette of resin colors. Drawing on personal experience and technique, the skills of the individual clinician are revealed in the ultimate artistic expression in dentistry. Fortunately, a variety of excellent direct resin systems is available to enable dentists to predictably create simple and complex multi-chromatic restorations while maintaining current natural tooth structure. Manufacturers have developed new generations of products that can mimic the diverse anatomical, optical, and polychromatic properties of the natural dentition.[5] The physical properties of direct resin materials also have been enhanced to increase strength, durability, and long-term function.

## Materials

Among the direct resin materials available to enable clinicians to achieve predictable and esthetic results are Aelite Esthetic Composite (Bisco; Schaumburg, IL); Filtek Supreme Plus (3M ESPE; St. Paul, MN); Esthet•X (Dentsply Caulk; Milford, DE); Four Seasons (Ivoclar Vivadent; Amherst, NY); and Gradia Direct (GC America; Alsip, IL). These products can be used for anterior and posterior restorations and demonstrate various enhancements in handling characteristics, shade matching, optical properties, polishability, and overall esthetics, according to the respective manufacturer's data.

This article details the clinical restoration of a fractured maxillary central incisor using a combination of esthetic restorative systems. In addition, two complex Class IV restorative cases are briefly reviewed.

## Case 1

A 32-year-old male presented with a discolored maxillary left central incisor that he desired to have esthetically enhanced. The patient had had the same restoration replaced multiple times previously (Fig 1). Complete and thorough clinical, radiographic, and photographic examinations were performed.

The patient's age, the amount of tooth structure missing, the adjacent dentition, the polychromicity of the area to be restored, and the intricate facial anatomy were all factors considered during treatment planning. Digital photographs in color and black-and-white were reviewed with the patient. After discussing all treatment alternatives, a direct resin restoration was chosen to rejuvenate the maxillary central incisor.[6] The patient was informed that there would be a reevaluation two weeks after the tooth was restored, at which time any discrepancies in color or anatomy could be adjusted and corrected.

### Occlusal and Gingival contours

The patient presented with a Class I occlusion, with no overjet or overbite in the area of teeth #9, #23, and #24. In order to provide improved occlusion and proper tooth length, teeth #23 and #24 were orthodontically moved lingually. A lower Hawley retainer was fabricated and adjusted over a three-month period to move the mandibular teeth into the proper position.

The gingival architecture of tooth #8 was not symmetrical to that of tooth #9. Root angulation asymmetry and thinner gingival tissue caused the margin to migrate slightly apically on tooth #8 compared to tooth #9. A diode laser was used to recontour the gingival tissue of tooth #9 to bring it into harmony with tooth #8 prior to the operative appointment. The patient was given written and oral postoperative instructions for the care of the recontoured site. Over the subsequent four weeks, the gingival health was not maintained around the site, and the tissue migrated incisally.

*Of all the materials available today for the restoration of the anterior dentition, resin exhibits wear rates closest to those of enamel.*

### Development of Esthetics

There are three methods for restoring the lingual contours, incisal edge position, and occlusion of a fractured central incisor.[7] The clinician can visually estimate the correct contours and thickness of the resin layers, and a gloved finger can be employed as a lingual stop for the first increment of composite. This method is initially the fastest and easiest for clinicians who are uncomfortable using diagnostic wax-ups. However, it is difficult to correctly estimate the proper contours, which affect not only occlusion but also esthetics.

The second method is to create a diagnostic wax-up on mounted models from the alginate taken at the initial appointment. This provides the clinician with additional time to carefully examine the case and design the exact contours and incisal edge position using a putty stent that is fabricated from the wax-up.

The third method is to fabricate a composite mock-up directly in the mouth. A putty matrix or quick-set polyvinyl siloxane impression can be fabricated from the mock-up to create a stent for restorative guidance. This method was chosen for this case.

Using this intraoral mock-up method, the occlusion can be adjusted, and the basic shade and contour determined. When viewed from the lingual, it was apparent that the contours of the previous composite restoration were over-contoured on the lingual and under-contoured on the buccal aspects (Fig 2). An egg-shaped carbide polishing bur was used to reduce the excess resin on the lingual of tooth #9. Flowable composite was added to the incisal edges and the facial to create the correct length and contour (Fig 3). Medium finishing discs (Sof-Lex, 3M ESPE) were used to shape the facial and interproximal embrasures. A putty matrix was fabricated intraorally from the mock-up to facilitate and guide the completion of the final restoration.

### Esthetic Assessment

The foundation for the replication of natural esthetics is accurate color mapping of the existing dentition. This provides a road map and guidance for the accurate restoration of harmonious form. While the teeth were wet, the value, hue, chroma, opalescence, translucency, incisal halo, and maverick colors were noted and mapped. A custom shade guide was fabricated with individual shades of different manufacturers' composites and used to select the value first. Hue, chroma, and other characteristics were subsequently chosen and noted. The teeth were then dried, and the intricate facial anatomy examined and noted. Digital photographs of the wet and dry stages were taken and placed on a large monitor as reference points during composite placement.

*Figure 3: A mock-up was completed using flowable composite to establish the incisal length and contours prior to fabrication of the putty matrix.*

*Figure 4: Retraction cord was placed to retract the gingival tissue and prevent infiltration of the adhesive subgingivally and onto the root surface.*

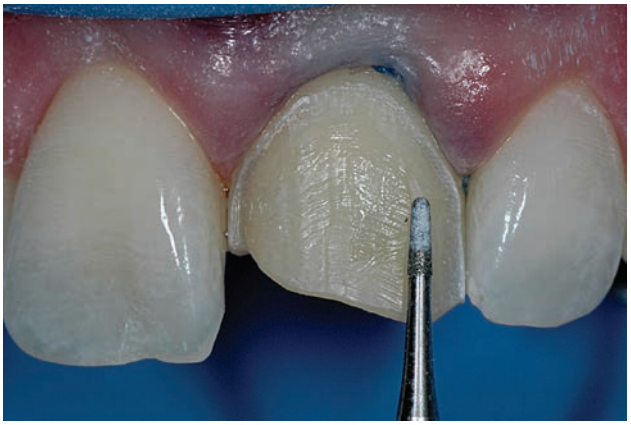

*Figure 5: The existing restoration was removed and the preparation smoothed with a fine diamond. A 45° bevel was placed at the fracture line.*

*Figure 6: Plumber's tape was used to protect the adjacent enamel. After etching and rinsing, a single component adhesive was placed in two coats.*

### Preparation Design

The patient was anesthetized and a modified rubber dam isolation was established. The teeth were cleaned with pumice and thoroughly rinsed. A single #00 cord (UltraPack Cord, Ultradent Products; South Jordan, UT) was placed subgingivally to retract and protect the gingival margin (Fig 4). Placement of cord prior to adhesive procedures also can prevent the migration of adhesive resin onto the subgingival root surfaces. Light-cured adhesives on the root surfaces can cause subsequent gingival irritation and inflammation.

Proper preparation of this Class IV restoration required removal of the previous large resin restoration. A light and rounded finish line was created using a fine diamond bur (F888-012, Axis Dental; Coppell, TX) to blend the resin restorative margin with the existing tooth structure (Fig 5). The conservative preparation allowed for reflection and deflection of light, which imparted a chameleon effect to the restorative margin.[8] A 45° bevel was placed along the primary fracture line. This allowed sufficient bulk of resin for strength and as a means to prevent show-through of the fracture line when the restoration was complete. The lingual area of the fractured tooth was lightly dusted with a fine round diamond bur on high dry to allow for maximum visibility. The lingual enamel margins were then conservatively prepared with the same diamond with water spray.

Plumber's tape was placed on the adjacent teeth to protect the exposed enamel from etchant. The final preparation was etched with 37% phosphoric acid (UltraEtch, Ultradent) for 20 seconds and rinsed thoroughly. Excess water was removed with a high-speed evacuation until the dentin was damp/moist. A single-

*Figure 7: The adhesive was light-cured from the buccal and lingual aspects for 40 seconds each.*

*Figure 8: A thin layer of milky white composite was placed in the putty stent to form the lingual enamel shelf and light-cured.*

*Figure 9: A high-value white composite was added to the incisal edge to create an incisal halo at the predetermined length.*

*Figure 10: The dentin layers were placed to replicate the lost dentin tooth structure. Mammelons were formed using a sharp instrument.*

component bonding agent (One Step, Bisco) was applied with a microbrush (Microbrush; Grafton, WI) in multiple coats using a light scrubbing motion (Fig 6). The area was thoroughly air-dried until all excess adhesive and solvent were removed. The adhesive was light-cured for 40 seconds (Fig 7) with an UltraLum curing light (Ultradent).

### Polychromatic Buildup

Anterior direct resin restorations can be fabricated using an anatomical or shaded technique.[9] The putty matrix was seated over the rubber dam to examine the accuracy of preparation for the anatomical buildup.[10] A small increment of milky white resin (e.g., Aelite WE enamel; Filtek Supreme Plus white enamel; Esthet•X WE; Gradia Direct WT; Four Seasons enamel bleach light) was placed in the lingual area of the putty matrix approximately 1 mm short of the incisal edge and light-cured for 10 seconds (Fig 8). This layer replicated the fractured and missing lingual enamel.[11] The putty stent was removed, since the lingual contour had been established. The incisal halo effect was created with a thin bead of opaque white resin (e.g., Aelite B1 Body; Filtek Supreme Plus extra white body; Esthet•X W-O; Gradia Direct BW; Four Seasons enamel white effect). A thin blade composite instrument was used to place the effect along the incisal edge and mesial incisal margin (Fig 9). After verifying the incisal edge position with the putty matrix, the increment was light-cured for five seconds. Glass Connector (Micerium; Genoa-Avegno, Italy) was placed over the lingual enamel layer before the placement of the first dentin layer in order to enhance the optical properties. This material mimics the natural protein layer that exists between dentin and

*Figure 11: After clear composite was placed in between the mammelons and cured, an enamel layer of high-value composite was placed and slightly under-contoured.*

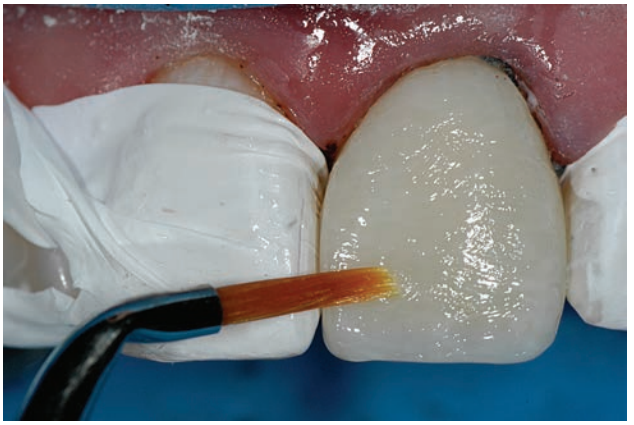

*Figure 12: White tint was placed with an artist's brush and then streaked with an endo file to create internal areas of hyper-calcification and characterization.*

enamel and is responsible for light scattering in the natural dentition.[12]

The dentin shade noted on the color map (e.g., Aelite A2 enamel; Filtek Supreme Plus A2D; Esthet-X A2; Gradia Direct A2; Four Seasons A2 dentin) was placed over the lingual enameled shell. Irregularities in the dentinal lobes were created and sculpted to create internal dentin mammelons (Fig 10). Care was taken not to over-contour the material in order to provide clearance for the remaining facial layer. The resin was light-cured for five seconds. Clear incisal resin (e.g., Aelite Incisal clear; Filtek Supreme Plus translucent grey; Esthet-X GE; Gradia Direct CT; Four Seasons enamel translucent clear) was placed between the mammelons and the opaque incisal edge to create the illusion of incisal translucency. If necessary, additional translucency can be created in specific areas using the appropriate tints and special effects resins. The translucent resin layer was light-cured for five seconds. Glass Connector (Micerium) was placed over the dentin layers, again before placing of the final enamel layers.

The remaining facial enamel was replicated using a layer of high-value enamel composite (e.g., Aelite WE enamel; Filtek Supreme Plus white body; Esthet-X W; Gradia direct WT; Four Seasons enamel value high). Artists' brushes were used to smooth the facial surfaces to the desired final contours (Fig 11). The resin was feathered out over the scalloped preparation margins and light-cured for 10 seconds. The facial surface was slightly under-contoured using a medium high-speed diamond at medium torque in an electric handpiece.

Replication of the white characterization color that was mapped preoperatively in the adjacent tooth was accomplished with white tint. After etching the composite surface with 37% phosphoric acid and rinsing, a non-hema bonding resin (Porcelain Bonding Resin, Bisco) was applied, air-thinned, and light-cured.

White tint (Creative Color, Kerr; Orange, CA) was added horizontally to the resin surface and streaked with a dry brush tip or endodontic file (Fig 12). Small white clouds or irregularities were created with the brush tip as well. The tint was light-cured for 10 seconds. A thin layer of clear enamel resin (e.g., Aelite Incisal clear; Filtek Supreme Plus translucent grey; Esthet-X GE; Gradia Direct CT; Four Seasons enamel translucent clear) was placed to cover the tints and create the final facial contours (Fig 13).

### Finishing and Polishing

Restorations built to correct anatomical contour require minimal finishing and polishing. Initial finishing was achieved by marking the line angles and facial contours with a red or graphite pencil (Fig 14) and using a medium Sof-Lex disc to blend the composite margins seamlessly with the natural enamel surfaces (Fig 15). Removal of any excess resin from the interproximal areas was achieved using a 12B scalpel and fine diamond finishing strips. Developmental contours and primary facial anatomy were created using a superfine diamond bur (SF859-014, Axis Dental) at the low range of a high-speed electric handpiece. The short light strokes were done initially with water spray and then on high dry for maximum visibility.

Secondary anatomy can be similarly placed using a medium dia-

*Figure 13: A thin layer of clear enamel composite was placed and slightly over-contoured to allow for finishing.*

*Figure 14: Line angles and contours mimicking the adjacent central incisor were marked with a red pencil.*

*Figure 15: Initial finishing was accomplished using coarse and medium finishing discs to create gross incisal, interproximal, and facial contours.*

*Figure 16: A Jiffy brush with water was used at low speeds to polish the restoration after fine diamonds, rubber cups, and points had been used.*

mond to impart horizontal scratches and contours. Care was taken to replicate the facial surface of the adjacent teeth and the original anatomy presented. Optimum visualization of the reflective and deflecting zones ideally can be achieved by placing gray artist's glitter over the facial surfaces. The glitter accentuates the minute changes in light refraction and allows for slight corrections in contour.

The polished facial surface was produced with medium and fine silicone cups and points and a Jiffy brush (Ultradent) on slow speed with a light intermittent touch (Fig 16). Excessive pressure on the brush can remove facial anatomy and degrade the resin surface by overheating it. The final luster was achieved with a fine diamond polishing paste on a Flexibuff (Cosmedent; Chicago, IL) polishing disc. Excess paste was thoroughly rinsed, and the restoration was examined for overall esthetics.

The rubber dam was removed and the occlusion adjusted. The lingual surface was finished and polished using polishing cups (Enhance, Dentsply Caulk) and a Jiffy brush. The restoration was then fully light-cured for 40 seconds each from the facial and lingual surfaces.

The patient was re-examined two weeks later to verify functional and esthetic harmony, and any minor occlusal or color adjustments were made at that time. Final digital photographs were taken to verify natural esthetics (Fig 17). One photograph was converted to black and white to verify value. The final restorative results were acceptable esthetically and functionally (Fig 18).

*Figure 17: The final restoration demonstrated acceptable esthetics and correct protrusive function with the orthodontically corrected lower incisors.*

*Figure 18: The patient's final esthetic restoration was in harmony with his natural smile.*

## Case 2

A 17-year-old girl fractured her maxillary right and left central incisors during a sporting event. They were originally restored with a single shade of composite, but after less than two years, they had become discolored and rough (Fig 19). The patient's mother was definitively opposed to any type of porcelain restorations, based upon previous family experiences and her knowledge of conservative alternatives. Direct Class IV resin restorations were recommended as the most conservative treatment modality. Removal of the previous restorations revealed a large Class IV fracture and composite veneer on tooth #8 and an incisal fracture on tooth #9 (Fig 20).

The incisal edges of both teeth were highly polychromatic, with white, blue, gray, and amber areas of translucency and opalescence. The treatment protocol for an indirect wax-up, putty stent, conservative preparation, anatomical buildup, and finishing were followed to restore the incisors to proper form and function (Figs 21 & 22).

## Case 3

An 8-year-old girl presented with a fractured maxillary right central incisor that she had suffered in a bathtub accident at home (Fig 23). Complete and thorough clinical, radiographic, and photographic examinations were performed. The pulp chamber was not directly involved, but a pinkish hue was visible on the lingual aspect of the fractured area. The tooth had no mobility and was not thermally sensitive. The parent was informed that although root canal therapy was not necessary at this time, it might be required at any time in the future as a result of the trauma to the pulpal tissues. When treatment was complete, the patient would be monitored and reevaluated at three-month intervals for any pulpal changes for the first year.

To prevent bacterial invasion of the pulpal tissues and decrease the opportunity for thermal sensitivity between the examination and operative appointments, a self-etching primer (OptiBond SE, Kerr) was placed according to the manufacturer's specifications and light-cured. Alginate impressions were taken for the fabrication of a diagnostic wax-up and putty stent. At the operative appointment, the tooth was restored using an anatomical build-up technique. The highly characterized areas of white on the facial surface were replicated using two separate

*Figure 19: The patient desired improvement of the color and surface roughness of the existing composite resin restorations on her central incisors.*

*Figure 20: Removal of the existing composites revealed a large Class IV fracture extending near the gingival margin on the right central incisor.*

*Figure 21: After whitening all her teeth, the final restorations were esthetically pleasing and exhibited characterization and polychromicity near the incisal edges.*

*Figure 22: The patient was very pleased with the final results and the overall enhancement of her smile.*

*Figure 23: The right central incisor was fractured horizontally in an accident but retained vitality.*

*Figure 24: The conservative Class IV composite restoration did not require the removal of any additional tooth structure and was esthetically acceptable.*

*Figure 25: The patient was happy with her "new tooth" and pleased to smile naturally again.*

layers of white tints. The final restoration was an acceptable replication of both the form and function of the natural central incisor (Figs 24 & 25).

## Conclusion

The restoration of the anterior dentition requires knowledge of both indirect and direct restorative materials. In the case of a single, highly polychromatic anterior tooth, color matching and overall esthetic outcomes may be superior using a direct resin restorative method. The development of new anterior composites allows restorations to be more accurate and predictable, while simultaneously enabling natural tooth structure to be rejuvenated in a manner that is conservative and highly esthetic.

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# CONSERVATIVE PORCELAIN VENEER TECHNIQUES GUIDED BY THREE DIFFERENT PREPARATION STENTS

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## ABSTRACT

The ultimate goal for an esthetic rehabilitation is the restoration of health, beauty, and function to the patient. This article illustrates a predictable system to guide the clinician with tooth preparations for porcelain veneer restorations based upon the additive diagnostic wax-up. This system promotes a preparation technique using a series of guides that direct the clinician to reduce only the enamel necessary to create enough volume for the ceramist to produce a conservative porcelain veneer restoration.

*Research has shown that porcelain veneer preparations remove significantly less volume of tooth structure by weight than full-crown preparations.*

## INTRODUCTION

### STUDIES IN THE LITERATURE

When the patient's desire is to have an esthetic rehabilitation, it is important to consider options in the treatment-planning stage that will promote the most conservative approach. Research has shown that porcelain veneer preparations remove significantly less volume of tooth structure by weight than full-crown preparations.[1] This study found that a full-crown preparation reduced the weight of the clinical crown by 63% to 72% and a porcelain veneer preparation only reduced 3% to 30% of the total unprepared crown weight.[1]

It is important to consider and select the most conservative restorations that will provide the patient with the desired esthetic, biomechanical, and functional results. Porcelain veneers often are the restoration of choice to provide the patient with a conservative outcome. In many cases, the patient would also benefit from an interdisciplinary approach that would include orthodontics when treatment planning the case. This is especially true if the existing teeth have moderate crowding or rotations that would require ex-

*Figure 1: The patient's initial presentation. Note the mandibular crowding and the labial position of #7.*

cessive preparation of healthy tooth structure and cause mutilation of the teeth or even endodontic problems for the patient.[2] In these cases, the patient is best served by completing the orthodontic treatment prior to the restorative phase of therapy.

The traditional approach for a porcelain veneer preparation is to use a depth-cutting diamond on the existing tooth surface and remove a fixed amount of tooth structure.[3] This technique leads to an excessive removal of sound enamel with unnecessary dentin exposure, especially for patients who already have wear or thinning of the enamel surface.[3,4] A number of retrospective studies that look at porcelain veneer longevity have also found that patients will have more predictable long-term success if the restoration is bonded primarily to enamel.[5,6] This is especially true at the facial-axial region of the tooth preparations; care should be taken not to remove excessive enamel at this critical region.[7] The traditional veneer preparation method has been replaced by newer techniques that attempt to relate the tooth preparation to the desired final outcome, as represented by the additive diagnostic wax-up.[8] A variety of techniques have been developed that aid the clinician in relating the diagnostic wax-up to the tooth preparations. This article demonstrates a simplified technique to prepare teeth for porcelain veneers with the aid of three different guides created from the diagnostic wax-up.

## Case Presentation

### Findings

The patient, a 30-year-old male, presented with moderate anterior crowding and a central diastema that had previously been restored with composite resin bonding (Figs 1-3). The patient was not happy with the crowding or the triangular tooth shape, or with the open gingival embrasure between the central incisors. The initial examination revealed that he had moderate mandibular anterior crowding and a labially positioned lateral incisor. The occlusal examination revealed no temporomandibular disease, muscle pain, or tooth mobility, and the periodontal examination revealed a healthy periodontal condition.

### Treatment Plan

The treatment plan consisted of Invisalign orthodontic therapy (Align Technology; Santa Clara, CA) to correct the mandibular crowding and position of the lateral incisor; followed by four feldspathic porcelain veneers on the maxillary incisors to lengthen the teeth, alter the tooth shape, and create a more pleasing smile. Invisalign therapy was considered an essential part of the treatment plan because the lateral incisor (#7) would have required excessive preparation and dentin exposure to bring it into alignment with the other incisors. The lower incisors would also have presented a challenge and needed excessive reshaping to create a smooth anterior guidance with the new veneer restorations if the patient did not include orthodontics as part of the treatment plan. When presented with these facts, the patient undertook the orthodontic recommendation as an essential initial phase of an optimal treatment plan for his case.

## Stent Fabrication and Tooth Preparation

Three types of stents were used to guide the tooth preparations for this case: The incisal putty stent, the depth gauge stent, and the vertical putty stent. The diagnostic wax-up was developed after the completion

*Figure 2: Smile after completion of orthodontic therapy with Invisalign aligners. Note the more favorable position of #7.*

*Figure 3: Macro view of the maxillary incisors. Note the open gingival embrasure between the central incisors.*

*Figure 4: The incisal putty stent in place prior to the veneer preparations.*

*Figure 5: The depth gauge stent in place during the veneer preparations. Note that the periodontal probe is resting directly on the tooth surface to ensure that the depth evaluation is accurate.*

of the orthodontic treatment using a new set of study models that were mounted with the Kois dento-facial analyzer (Panadent; Grand Terrace, CA) on a Sam 3 articulator (Great Lakes Orthodontics; Tonawanda, NY). The diagnostic wax-up was completed using an additive technique that was designed to preserve the existing enamel and add wax to build up the new tooth form. The additive diagnostic wax-up is a critical step in the biomimetic approach for the preservation of enamel and the clinician must be able to accurately relate this to the final tooth preparations.[9]

## INCISAL REDUCTION

Placing the incisal putty stent on the teeth and evaluating the position of the pretreatment incisal edge compared to the desired incisal edge initiated the preparations (Fig 4). The palatal stent was created on the diagnostic wax-up by placing the putty material over the palatal surfaces and extending it to the facial incisal edge of the teeth to be restored. In this case, the patient wanted his teeth lengthened slightly, so the putty stent reflected these changes. The incisal edge of the preparations should be reduced, 1.5 mm to 2.0 mm, based upon the desired final incisal edge, not the existing incisal edge of the teeth. The preparations were initiated with the KS7 diamond (Axis Dental; Coppell, TX), which reduces the incisal edge and creates the butt joint finish line that is desirable for porcelain veneers. Studies have demonstrated that a concentration of tensile stresses are found on the palatal concavity of incisors and a chamfer finish line in the palatal incisal area is not as strong as the butt joint design.[10,11]

## PREPARATION DESIGN

With the completion of the incisal reduction, the facial prepara-

*Figure 6: Lateral view of the tooth preparations after the removal of the provisional restorations. Note the healthy gingival tissue.*

*Figure 7: Lateral view of the tooth preparations after the removal of the provisional restorations.*

*Figure 8: The final veneer preparations with the retraction cords in place*

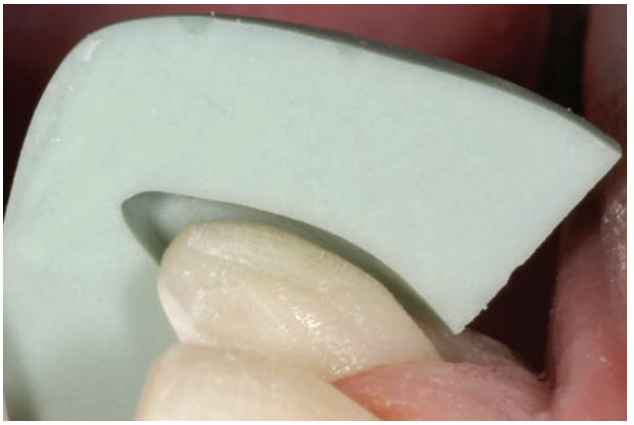

*Figure 9: The vertical putty stent in place intra-orally to evaluate the veneer preparation depth.*

tion was then initiated and guided by the depth gauge stent (Fig 5). In this case, the depth gauge stent was created from a duplicate die stone model of the diagnostic wax-up using a 1.5-mm Copyplast material and a Biostar vacuum-forming machine (both Great Lakes Orthodontics). This stent was designed with depth holes drilled into specific locations on the facial and incisal areas that map out the preparation surface at the incisal, body, and cervical zones in the middle and line angles of each tooth. I prefer a preparation design that leaves the interdental contact areas intact and finalizes the preparations just short of the contact (Figs 6 & 7). I believe that this design leads to a more simplified preparation technique and a preservation of healthy tooth structure.

With this patient, the contact areas were left intact everywhere except between the central incisors, which had a pre-existing diastema, and an open gingival embrasure that the patient wished to have closed. It is important, when completing the preparation design and margin placement in cases that have a diastema, to locate the interdental margin slightly subgingivally so that the ceramist has the opportunity to fully close the gingival embrasure and push slightly on the gingival tissue from below to create the desirable triangular tissue shape (Fig 8). The preparations are quickly developed by creating approximately 0.3 mm to 0.5 mm of space, using the depth gauge stent to approximate the final dimensions and design of the porcelain veneers.

### Sectioning the Putty

The preparations were then finalized with the vertical putty stent to help ensure that the ceramist had the appropriate amount of space for

*Figure 10: The vertical putty stent in place on the duplicate model of the diagnostic wax-up.*

*Figure 11: The vertical putty stent with one section cut for tooth #7 and the other for #8.*

*Figure 12: The vertical putty stent sectioned again to evaluate tooth #9.*

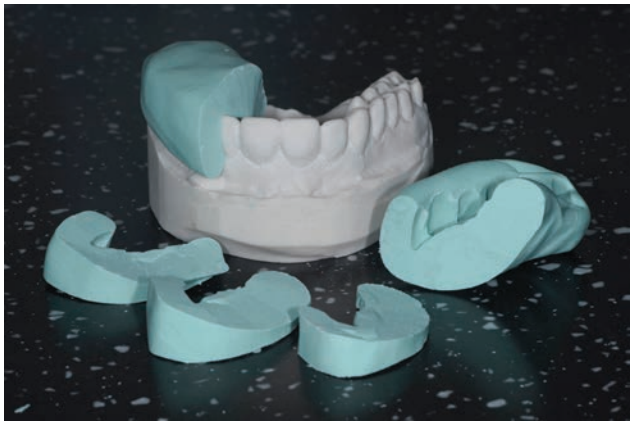

*Figure 13: The vertical putty stent sectioned again for the evaluation of tooth #10.*

the porcelain (Fig 9). The vertical putty stent was created by carefully molding the silicone putty over the diagnostic wax-up model to cover the entire surface of the teeth to be prepared, including three teeth on either side (Fig 10). The putty could then be sectioned prior to the preparation appointment.

The putty was sectioned by cutting the two most distal teeth to be prepared on one side midfacially with a 12b scalpel blade. The small piece of putty between these two teeth was then discarded and the two large sections were used to evaluate the preparations (Fig 11). In this case, teeth #7 and #8 were evaluated initially with these vertically sectioned putty guides, and any areas where the tooth preparations were too close to the putty surface (which represents the final porcelain veneer surface) were reduced to create a more ideal veneer thickness. With the evaluation of #7 and #8 completed, the putty guide could be sectioned midfacially on tooth #9 and the large section of putty could be used to evaluate the preparation depth of this tooth (Fig 12). Once this was completed and the preparation space was confirmed to be correct, the putty could be sectioned a final time in the midfacial of tooth #10, and the larger remaining section could be used to evaluate the preparation depth of this tooth (Fig 13).

### Finalizing the Margins

With the confirmation of the preparation depths, the first retraction cord was placed and the margins were finalized. In this case, the first retraction cord was a black #000 Ultrapack cord (Ultradent Products; South Jordan, UT) that was treated in Hemodent (Premier; Plymouth Meeting, PA). The margins were then finalized using a KS1 diamond bur (Axis Dental) in an electric handpiece at a reduced speed of 80,000 rpm operated dry. This


*Figure 14: The final preparations with the shade tab.*

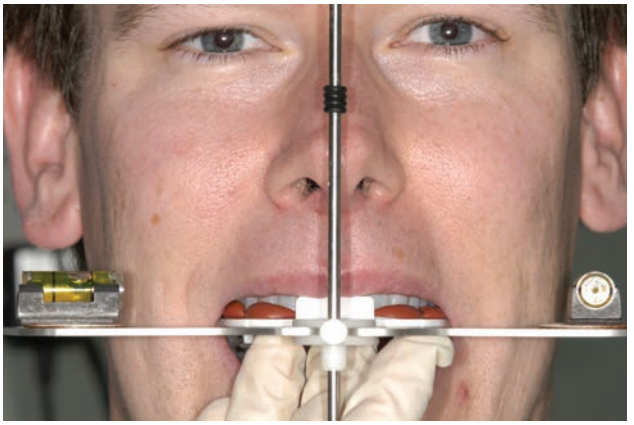

*Figure 15: The Kois dento-facial analyzer in place with the provisional restorations.*


*Figure 16: The shade photograph with the provisional restorations.*


*Figure 17: The shade photograph with the provisional restorations converted to grayscale.*

margination was completed with 8x to 10x magnification using the PROergo dental microscope (Carl Zeiss Meditec; Dublin, CA). The retraction was then enhanced with a single piece of purple #0 Ultrapack cord that was packed into the four tooth preparations and left for five minutes before the impression procedures (Fig 8). The second cord was removed and the impression was taken with Permadyne impression material (3M ESPE; St. Paul, MN) followed by a Blue Mousse bite registration (Parkell; Edgewood, NY). The preparation shade was recorded and photographed to communicate this information to the ceramist (Fig 14).

### Provisional Restoration

The provisional restoration was created using a duplicate Copyplast stent of the diagnostic wax-up, with an A1 shade of Protemp3 Garant (3M ESPE). Particular attention was given to the embrasure form, especially in the cervical embrasures, so that a small space was created for the tissue and papillae to rebound after the preparation, retraction, and impression procedures. The provisional was spot-etched and luted into place with Neo-Temp resin cement (Waterpik; Ft. Collins, CO). It was evaluated a few days after the preparation appointment, and a new Kois dento-facial analyzer was created (Fig 15). The upper provisional model was mounted on the Sam 3 articulator, the remaining models were cross-mounted to the upper provisional model, and the case was sent to the dental ceramist.

## Laboratory Communication

The appropriate shade and surface characterizations of the surrounding natural dentition were photographed with a Nikon D2X camera (Nikon USA; Melville, NY) and sent to the ceramist, along with

*Figure 18: Definitive porcelain veneer restorations on the solid cast.*

*Figure 19: Direct view of the tooth preparations after the removal of the provisional restorations.*

*Figure 20: Final esthetic and biomimetic rehabilitation for the patient with conservative porcelain veneers.*

*Figure 21: Macro view of the final restorations. Note the closure of the gingival embrasure between the central incisors.*

*Figure 22: Lateral view of the final restorations.*

*Figure 23: Three-year post-treatment smile view.*

the provisional model and bite record. The shade tab photographs were also converted to grayscale so that the ceramist could view the value in order to effectively match the porcelain veneers to the adjacent natural teeth (Figs 16 & 17).

## Adhesive Luting and Finishing of the Case

The case was received from the ceramist and inspected on the solid and die models (Fig 18). The provisional restorations were removed and the tooth preparations were pumiced and cleaned (Figs 6, 7, & 19). The restorations were tried in individually to inspect the fit and then were tried in collectively to evaluate the contact points. The veneers were tried in with Prevue try-in gel (Cosmedent; Chicago, IL) and the patient approved the esthetics of the case. The veneers were then luted into place two at a time using the standard bonding protocol with Optibond FL adhesive (a fourth-generation, two-step total etch adhesive system) (Kerr; Orange, CA) and Insure resin cement (Cosmedent). The veneers were polished and the occlusion was checked and adjusted using red and black AccuFilm articulating paper (Parkell). I find that the AccuFilm paper marks porcelain the best if a small amount of petroleum jelly is coated over the surface prior to use intra-orally.

The patient returned a few weeks after the veneers were seated and the margins were carefully inspected at high magnification using the PROergo microscope to confirm complete tissue healing. (Figs 20-24)

## Conclusion

The ultimate goals for an esthetic rehabilitation are the biomimetic recovery of the tooth, as well as the esthetic enhancement of the smile. When the original tooth has a thinned-out or a worn enamel surface and is to be restored to its original volume with porcelain veneers, studies have found that the tooth recovers much of its original structural, optical, and biomechanical properties[9]. Following a minimally invasive preparation protocol guided by the various stents created from the diagnostic wax-up can enhance these goals and create a conservative result for the patient. The tooth preparations can also be made more conservative by following an interdisciplinary approach to treatment planning, using orthodontics to correct any crowding or tooth rotations prior to the restorative phase of treatment.

**Editor's Note:** For video footage of the case described in this article, log on to www.phelandentalseminars.com

*Acknowledgment*

*Dr. Phelan thanks Harald Heindl, MDT, for the excellent porcelain veneer restorations that were used in this case.*

*AACD Acknowledgment*

*The American Academy of Cosmetic Dentistry recognizes Dr. Stephen Phelan as an AACD Accredited Member.*

***Figure 24: Facial view of the completed esthetic rehabilitation.***

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# Team Training

## In This Section:

# The Public Opinion Survey on Dentistry—Are you offering what patients are really looking for today?

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## Abstract

A 2007 public opinion survey on patient perceptions of dentistry indicates that there are clear areas where dentists and dental teams need to improve their clinical and patient communication protocols. This article addresses these patient perceptions and what dentists can do to be more in step with their patients' wants and needs.

*There are clear areas where dentists and dental teams need to improve their clinical and patient communication protocols.*

## Introduction

What patients want and expect today may not be what many dentists are delivering. The findings presented here may change the way you see your patients, how you present treatment, and how you handle some of the basic, routine aspects of your patient visits.

## Background

In one of the most significant public opinion studies that has been done in dentistry, the Center for Social Development and Education (CSDE) and the Center for Survey Research (CSR) at the University of Massachusetts at Boston conducted a national study on the public's perceptions of dental health and the role dentists play in providing dental health services.[1] One thousand adults representing all regions of the United States were surveyed. The sample was 48% male and 52% female; 82% of the sample indicated that they were Caucasian. The median age of respondents was 54.5 years, which is significantly higher than the National Census Estimate of 43 years. To correct for this discrepancy, statistical analyses on both weighted and unweighted data were performed.

Some interesting conclusions emerged that have important implications for every dentist and dental practice. A few things that merit attention and serious consideration for the future of your practice are presented here.

## Patients' Wants

### *"Tell Me More About Oral Cancer"*

A large majority of survey respondents (83%) indicated that it was important to them that their dentist check for oral cancer. At the same time, only 51% of survey respondents indicated that the dentist they were seeing actually did so. That means that 32%, nearly one-third of those surveyed, were expecting something from their dentist that they were not getting—a discussion about oral cancer and a thorough oral cancer exam.

Most patients are not aware that someone dies of oral cancer in the United States at the rate of nearly one per hour. Or that the survival rate of an oral cancer victim is only 52% over five years, but that the survival rate rises to 80% if oral cancer is detected early. Unfortunately, only 35% of oral cancer is diagnosed early.[2]

As the facts become more publicized and available to the public, more patients will ask why oral cancer does not get more attention in the dentist's chair. The facts prove that oral cancer is prevalent and deadly. "*So,*" the astute patient might ask, "*why isn't my dentist talking more about it*?" The untold story here is how many dentists may have checked but did not tell their patients that they were checking! As far as perception is concerned, not telling the patient what is being done is not much better than not doing it at all.

For example, how many of the 32% that expect a dentist to do an oral cancer exam and do not perceive that one is being done, are going to make a decision at some point to change dentists in order to find someone who meets their expectations? If something is important clinically to a patient, but he or she does not perceive that the dentist is addressing it, how long is the patient going to stay with the practice just because the dentist is "nice"?

Here are some important questions to consider:

- What is your oral cancer detection protocol, and why?
- Have you incorporated the newer detection technologies, such as ViziLite (Zila Pharmaceuticals; Phoenix, AZ) or VELscope (LED Dental; White Rock, British Columbia, Canada) into your clinical protocol? If so, why? If not, why not?
- What verbal skills are you using with your patients to discuss oral cancer detection, and have you practiced those skills as a team? Because the survey results indicate that there is a patient perception issue, it may be time to focus on how this important issue is being discussed with your patients.

Take the time today to decide what your oral cancer detection philosophy and protocol are. Put them in writing and make sure your team knows how you feel. Never allow any confusion on your team or with your patients as to where you stand. Then involve your team by giving them the verbal skills they will need to have the conversation with the patient. Remember, it is important to your patients.

### *"Tell Me More About Periodontal Disease"*

When survey respondents were asked to rate the importance of different dental procedures, 85% said that checking for periodontal disease was important. Only one other procedure out-ranked checking for gum disease in patients' minds, and that was checking for cavities (88%).

Perhaps because of the media attention over the last 10 years that has focused on the systemic link between periodontal disease and other health problems (e.g., heart disease, diabetes, high blood pressure, and premature low birth-weight babies), the public is coming to realize that what happens in our mouths is important and cannot be ignored. Dentistry seemed to score higher in this area when it comes to addressing and treating periodontal disease, as roughly 85% of patients indicated that their dentist was checking and treating periodontal disease. At least that is the perception. Keep in mind that a survey is only as accurate as the way questions are asked. In this case, patients were asked if their dentist "poked their gums," and "scraped their teeth." The survey did not address the degree to which periodontal disease is really being treated. But, the good news is that patients seem to be increasingly interested and open-minded about discussing periodontal disease. Here are some questions for discussion and action with your team:

- First, how much are you really diagnosing and treating periodontal disease in your practice? For example, how many units of scaling and root planing did your hygiene team really do in the last 30 days? How many perio maintenance appointments did your practice

have in the last 30 days? How does that compare to the number of cleanings you are doing? Then, when you look at those numbers, how do you know if that is reasonable, and what those ratios should really be?

Dr. W. Edwards Deming, the father of the quality movement, wrote,

*"How many dentists do magnificent work? The question is impossible to answer…And because inferior dental work may not be discovered until years after it is performed, patients are seldom in a position to make informed decisions."*[1]

How do you measure clinical quality in your practice? It starts with defining what *clinical quality* is. For example, what is your periodontal protocol? How do you diagnose and classify the different levels of disease, and what is your treatment protocol at each level? If you are clear on the answer to that question, is it in writing? Have you had a discussion with your entire team about your clinical philosophy in the area of periodontal disease and why identifying it and treating it *is* so important?

Once you have your periodontal protocol defined, how do you know if it is really being followed? How do you really measure adherence to what you believe in clinically? One dentist who recently started measuring his perio treatment results was amazed at the difference in the results his two hygienists were getting. By working together to clarify clinical protocols and establish a uniform system in their practice, results improved for both hygienists. Hence, the patients benefited from better quality care and the practice benefited as well.

How are you educating about, presenting, and discussing periodontal disease in your practice? Is everyone on your team using a uniform way to communicate with your patients, using verbal skills that you have trained and retrained on a regular basis? How your patients perceive what is going on depends on how it is communicated.

Periodontal disease was ranked as one of the topics of most importance by patients in the survey. How you diagnose it, communicate about it, and treat it is one of today's highest priorities.

*As far as perception is concerned, not telling the patient what is being done is not much better than not doing it at all.*

## Initial Conclusion

More and more patients now realize that what is going on in their mouth can and is affecting their overall health. They also realize that what is going on with their overall health can show up in what is going on in their mouth.

Consider this: 78% of survey respondents view their dental health as part of their overall health. In other words, it is very unlikely for people to consider themselves in great physical health if they think that their dental health is poor. If one is bad, the other is bad; they are inseparable.

Unfortunately, only half the survey respondents indicated that their dentist is addressing the connection between oral health and overall health. Patients want you to address the big picture. The two most obvious areas to start with are with oral cancer and periodontal disease, which have clear holistic health implications. Start today by discussing how these two issues can have a dramatic affect on your patients' overall health and that is why it is so important to check for them, discuss them, and encourage your patients to be aware of them. Then consider other related issues, as well.

### *"Don't Tell Me To Floss"*

While patients say they want more information about periodontal disease, they also say they do not want to be told to floss. When patients are asked to rank, in order of priority, the most important oral health tasks, there is a strong correlation between the ease of the task and how high it is ranked (the easier it is, the higher it is on the list). That may be a way to relieve some guilt, but the fact remains—if it is harder to do, we avoid doing it, even to the point of trying to convince ourselves that it just is not that important.

Next, consider that only 56% of survey respondents said that taking x-rays was important. Of all the dental procedures listed, x-rays ranked at the bottom of the list in importance to patients.

Here is the interesting dichotomy: While patients want you to address their whole health, they are not particularly interested in having you do a procedure that is essential for diagnosis and they do not want to talk about having to do something that will keep them healthy! While that may seem like a conflicting message, there is a lesson to be learned.

Because information on virtually any subject is available to anyone with just a few simple clicks on the computer, we are no longer bound by what any one expert or authority tells us. We can look it up, compare, and find out for ourselves. We have become more skeptical, questioning, and informed. As a result, we are less likely today to take anyone's word for anything. We are less will-

ing to be told *what* to do without understanding *why*.

For too many years, we have simply told patients what to do or what we are going to do without question. Today, patients are telling us that they are not willing to just follow along without being told why. "*You want to take x-rays? You better tell me why! You want me to floss? You better give me some good reasons why*." Patients want us to help them understand the connection between what we are telling them to do and what they really want. As 78% of the survey respondents said they want us to address the connection between oral health and their overall health, then we, as dental professionals, need to explain why flossing is essential to their overall health. Again, patients *want* to know *why*.

## A New Perspective

In an effort to put these findings into action so that you can get better results in your practice, here are some suggested "new beliefs" and actions to review and discuss with your team.

### New Belief #1

*We are members of the total healthcare team*. As the physician of the mouth, you need to start acting more like a "doctor." Your patients expect you to address whole health issues that might be symptomatic in the mouth (or things that you might be aware of that they have not identified yet).

### New Action

Start paying more attention to the health history form that the patient fills out. Are you really discussing the responses with the patient, or just skimming over it? Do you really know how to talk to patients about their whole health, or just their dental health? Do you know the signs that show up in the mouth that are symptoms of whole health issues? Patients know there is a body attached to their teeth! Are you treating them accordingly?

### New Belief #2

*Tell patients more about what they want to know*. Patients today know that oral cancer and periodontal disease affect their overall health. They want you to address that fact, as well as anything else going on in their mouth that might affect their overall health. So are you going to talk to them about what *you* want to talk about, or are you going to talk about what *they* want to talk about? Common sense says that if you start by discussing what your patients want to talk about, they will be more open to everything you have to say.

### New Action

Develop your oral cancer and periodontal protocols, along with the verbal skills for each. Work with your team on how to initiate the discussion with your patients in these two areas. Measure your results and then go back and fine-tune your approach.

### New Belief #3

*Tell them why*. Patients are becoming increasingly informed on their own through the media and the Internet. They no longer are willing to be blindly obedient by just taking your word for it and doing what you tell them to do; they want to know why. They want to know why they should floss every day. They need to know why x-rays are good for their health and well being. Perio patients have to know why it is essential they come back regularly for the perio maintenance appointment. If you want your patient to act, you must give them the "why" to do, not just the "what" to do.

### New Action

Print out in large type and post in your lunch room a sign that says, "Tell me why!" as a reminder to everyone on the team that you must give your patients emotionally compelling reasons for the actions you are asking them to take. Then start reworking your verbal skills together to include the why's of x-rays, flossing, perio maintenance, and other issues that require your patients' cooperation.

## Summary

The above are just a few new beliefs with corresponding actions. The survey revealed many other important patient perceptions that are worth serious consideration. These are just the start. Consider them, discuss them with your team, and see how you can improve your clinical protocols and patient communication accordingly. The market is changing. Patients are becoming more informed. It is important that you and your team stay ahead of the game so that patient perceptions of you and your work are as good as the quality you are delivering.

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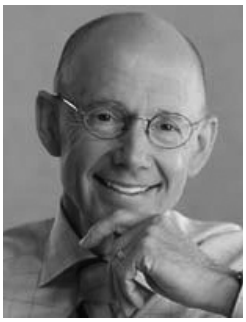
# Moving From "Staff" to "Team"



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## Introduction

Oh, for that magic when a group of people comes together for a common purpose, moving from individual concerns to the group effort. You can observe trust, great communication skills, purpose, and genuine pleasure in working together. It is "magic" and it can be recreated. It can also disappear very quickly.

*It all starts with the leader.*

A staff is a group of individuals who work hard at their own agendas. Sometimes it feels like everyone is going in a different direction. There is much wasted energy, inefficiency, and the result is the status quo with little movement accomplished.

What are the factors that allow the ordinary to become extraordinary, the factors that turn staff into a team? It all starts with the leader. Your job is one of discovery and introspection to find out who you are and why you do what you do. Contemplate these three questions:

- Who am I?
- What do I do?
- For whom do I do it?

## Behave Like a Leader

As the practice leader, you need to find the answers to these questions. With inspiration and communication, a staff can become a team based upon your clarity, direction, and sincerity. You must "walk the talk" and believe in the vision yourself. Team members must have the opportunity to see something larger then themselves. The leader sets the standards and the climate. Choose to behave like a leader.

Individuals then must choose to be on this bus or decide that this is not the right bus for them at this time. The answer is "yes" or "no"—there is no

"maybe." Your best players want something bigger to happen and if you continue to stall on leadership and staff decisions, your best players will eventually leave or sink to the lowest common denominator.

In this transition from individuals to team, the leader must stand firm and tall. If you continue to rescue with micro-managing or fail to delegate, the team will not form. They know you will continue in your same old way.

Continue to communicate your vision as new solid systems are implemented that will create better service, more efficiency, and greater results. We want team members to know and own the numbers and be able to make decisions to change trends.

One solid system, which must be implemented, is a fair and easy bonus plan. If they are truly to be a team and accountable for results, they need to know they will share in the profit from that courage and skill. Develop a solid booking system so a daily goal is reached and exceeded. One reward for efficiency is more time off with pay.

*A staff can become a team based upon your clarity, direction, and sincerity.*

### Be Positive

Leaders lead with a positive attitude of winning. You need to coach, encourage, and compliment. Challenge yourself and continue to create new opportunities for growth with your team. Great people like challenge, changes, and becoming better. Write team agreements and live by them. Be the first one to work and do not have a "favorite" on your team. Do not ask your "favorites" what you should do. Your failure to lead will be divisive and will turn a team into a staff again.

### Be a Decision Maker

Make your decisions based on your vision. Not everything needs a group vote. You become the leader your team has dreamed of by being decisive, not necessarily popular. Yes, leadership can be lonely, but good leadership has great rewards.

A leader can still have fun and show his or her personality. Yet, there are important distinctions. Earn team members' respect by making your vision clear and demonstrating commitment. Good people do not respect a lack of follow through, and will find another place to flourish.

Creating the magic of a team out of individual staff members is the leader's job. It is all in your hands. It is a choice, and your job is to dream of a "bigger picture" with clarity and communicate it to the team.

**Editor's Note:** This article was based on a corporate workshop by Blatchford Solutions, presented at the AACD's Excellence in Cosmetic Dentistry 2008, in New Orleans, Louisiana.

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# Why Customer Service is Not Enough

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## The Year of the Customer

What was your latest customer service slogan? "The customer is always right," "The customer comes first," or how about this one—"The Year of the Customer." I spoke recently at an event and that was the theme of the conference. Shouldn't *every* year be the year of the customer? Managers have read all the books (or at least bought the books). They have pledged faithfulness to the customer via slogans and speeches, yet their service remains mediocre at best. So what is going on?

*Shouldn't* every *year be the year of the customer?*

## Success Comes From Action

Most of the efforts create the right attitude yet no action seems to follow. Success comes from action, not from good intentions. The best go beyond talking about what they should do or what they are going to do; they just do it. It is that simple. Great customer service is not difficult. It is about delivering what you promise, being nice, creating systems so your people can deliver what is needed, and doing lots of little things right.

But here is the reality: I see three levels of service being delivered. Those three are *rude, indifferent*, and *exceptional*. Of those three, which do you mostly receive? Indifferent has my vote. Here is one of my recent experiences with indifference. While renting a car, the customer service agent folded the rental contract, told me how to find the car and the space number and then said, *"Thank you, sir."* Wrong, since I am a "ma'am." Better yet, why not say, *"Thank you, Ms. Ford."* The misstatement indicated indifferent, robotic service.

Most organizations are very good at processing customers; very few excel at serving and satisfying them. I am talking about salespeople as well as customer service. We get processed all the time. Go to the bank and think about the experience—you get what you want, you get what you need. However, did anything occur that left you with a positive impression that would keep you loyal? When is the last time you heard from your insurance agent just to check in and thank you for the last few years of prompt premium payments? I am still waiting for that call.

Now it is time to think about the experience your customers have when dealing with your practice. Do you merely process, or do you truly serve? What happens when a phone call is answered, a patient arrives for the appointment, the patient is called back for the appointment? Most practices pride themselves on great service but I think all service needs improvement.

## What Do Customers Want?

What do customers want? I am sure the list is quite extensive; however, here are my top four.

1. Customers want you to listen. Show them respect. Hear their unique needs (even though it sounds like the other 22 you have already heard today).
2. Customers want you to show you know them, personally and individually. When have you thanked them for doing business with your practice for the last six years?
3. Customers want you to pay attention to the details. Use their name, call back when promised, choose your language carefully, and create an experience because you are passionate about customer service!
4. Customers want you to remember it is their time and money. You are not doing them a favor. They are doing you one—don't forget it.

*Take a look at your practice and consider how you are going beyond talking about memorable service to actually delivering it.*

## The Right Team Members

As you know the key is having the right team members, who are excited about delivering great service. The staff is the front line of your practice, so they must be engaged. To make this happen, assign one of the leaders of the practice as the champion of service. Someone has to "own" the service efforts at the practice. Here are the processes the champion needs to own:

- Hire smart to start.
- Train according to your service standards.
- Reward great acts of service.
- Empower team members to do the right thing on behalf of the practice.
- Talk about service at team meetings.

The best practices are constantly looking at how to improve their service.

Become a student of the companies who are getting it right. Call GoDaddy.com and be amazed at the personalized, enthusiastic service (and all done by a real, live person who answers the phone). Find a colleague insured by USAA and ask about their service experiences. Take a field trip to a Four Seasons Hotel and be ready to take notes. The key is execution. You know most of this intellectually; now it is time to *do* it.

Exceptional service that leads to satisfaction is required to create loyal customers. Everyone is talking about creating a great customer experience. Take a look at your practice and consider how you are going beyond talking about memorable service to actually delivering it. The best ones get it by simply doing what it takes to create loyal customers. Customer service is *not* enough—customer satisfaction is the goal.

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# Empowering Your Dental Practice with Digital Photography

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## Introduction

### Disadvantages of Film

Before the age of the digital single lens reflex (SLR) camera, shooting film was a nightmare. I used to dread taking pictures of my patients with a film camera. I wanted to document my cases, but every attempt was an adventure. There is no margin of error with a macro lens, so I never knew whether my pictures were framed and focused properly, with the correct exposure. Too many times, I discovered my mistakes after the photo lab processed the film. Too many variables added up to a waste of my time, because no matter how skilled I was as a cosmetic dentist, I was at the mercy of my film camera.

In the early days of the AACD Accreditation process, we used slides to document our cases. We were shooting film—and fighting with slides—while trying to learn the protocol. We thought we had great images, but when we got the slides back, the results were often horrible. We had to ask the patients to come back, because we could not start a case until our slides met the proper standards required to document our cases. Happily, those days are in the "rearview mirror"; digital is now driving our practice of cosmetic dentistry. It is instant and powerful!

*The technology of digital cameras has become so simple that any novice can take amazing images with little or no training.*

## Getting Started With Digital

Nothing will make a bigger impact on your practice than mastering—and marketing through—the use of digital photography. There is no reason to be intimidated. The technology of digital cameras has become so simple that any novice can take amazing images with little or no training. The best way to start is to get a dental kit from a store or Web site that will answer all your questions and provide detailed customer support. Most kits include a Canon (Lake Success, NY) or Nikon (Melville, NY) digital SLR camera. Choose a brand

*Figure 1: Taking pictures in the operatory with a digital SLR camera.*


*Figure 2: Examples of the 12 required views for AACD Accreditation.*

*Figure 3: Using retractors to see all the required teeth.*

*Figure 4: Reviewing images during a patient consultation.*

*Figure 5: Building a digital smile on the computer.*

*Figure 6*

*Figure 7*

*Figure 8*

*Figure 9*

***Figures 6-9: Portraits create emotional connections with patients.***

*Figures 10 & 11: Before and after pictures of a full-mouth reconstruction.*

and model that fits your price range and comfort zone. The kit should also include a 100-mm macro lens, which gives the magnification needed for close-up dental photography. You will also need a special flash attachment. A ring flash is the most common because it provides shadow-free lighting, but many dentists prefer a twin flash because it provides more directional light. Never use point-and-shoot cameras, because they do not have manual focus, a critical feature for taking extreme close-ups of the mouth. You also cannot adjust the magnification ratio on point-and-shoot lenses. Additionally, the AACD Accreditation protocol requires that images must be submitted in RAW format. Most point-and-shoot cameras do not provide RAW capture files.

## Enhancing Communication

The number one reason why we use digital photography in our office is communication—with patients, dental laboratories, and insurance companies. Yes, there was a learning curve and yes, we did have to establish some new office procedures, but the rewards have been tremendous. The moment we capture an image with a digital camera (Fig 1), we can make instantaneous observations. Is the image in focus? Do we have the correct magnification ratio and the required AACD Accreditation views (Fig 2)? Is the exposure correct? Does the patient's smile look normal? Are all the teeth in focus? Is the retraction adequate to see all the required teeth (Fig 3)? Are the photographs accurate enough to communicate proper color to the laboratory? The advantages of using digital for instant feedback of our images places us light years ahead of the days of film cameras and processing images.

*Digital photography and imaging helps patients choose the type of dentistry that we love to do.*

## Closing Cases

Digital photography has made a significant financial impact on our practice, especially in consultations with current or prospective clients. Having the ability to take pictures and download them to the computer in two to three minutes, then use the images during the consultation is wonderful (Fig 4). Close-up shots always reinforce a patient's need or desire for cosmetic dentistry, but what will facilitate their acceptance of the case? With the use of imaging software, we can build a digital smile to show the patient what the final outcome of their case could look like (Fig 5). Before patients leave our office, we try to give them some tangible images or definite ideas about their prospective new smile; this encourages their thinking about cosmetic dentistry and is by far the strongest marketing tool in our practice. Digital photography and imaging helps patients choose the type of dentistry that we love to do.

## Creating Emotional Connections

The more I embraced digital imaging, the more I realized it had unlimited potential for creating emotional connections with patients. I had always admired portrait photography, so I decided to take a

workshop and provide this service to our patients after their cosmetic work had been completed (Figs 6-9). I thought this would really help our practice stand out, and provide us with a terrific marketing and public relations strategy. I never dreamed it would have such amazing results. I bought a collapsible background and a lighting kit, then entered the world of portrait photography. The patients were thrilled with their new smiles and their beautiful portraits. Now I always give them a few copies of their portrait and a compact disc with several more images. I also hang poster-size smile portraits on the biggest, most prominent wall in our office. To see all the smiling, satisfied patients on my "wall of fame" is heartwarming, and it sends a positive message to every patient who walks through the door.

## Summary

Going from film to digital has been a godsend in the ability to drive the emotional aspect of case acceptance. Now the amount of visual information we can share with our patients speeds their decision to commit to the process. The smiles and the photographs tell the story. I love the "Wow!" moment when a patient sees his or her new smile for the first time. I have seen faces and lives changed before my eyes (Figs 10 & 11), reinforcing why I love to practice cosmetic dentistry. We can all measure our success in many ways, but those expressions are golden to me. Nothing will bring more enjoyment or rewards to your practice than embracing digital photography. The easiest way to get started is to find a mentor, take an AACD workshop, or watch an instructional video. You can do it!

***Acknowledgment***

*Dr. Kemp thanks Calumet Photographic for their mentorship.*

***AACD Acknowledgment***

*The American Academy of Cosmetic Dentistry recognizes Dr. Philip Kemp as the Co-Chair for the 25th Anniversary AACD Scientific Session 2009 in Hawaii. He also serves on the AACD Board of Trustees, which oversees the Charitable Foundation and the Give Back A Smile™ Program, and has restored the smiles of two GBAS survivors.*

# Empowering the "Complete Care" Dental Assistant

*by* Shannon Pace Schmidt
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## Abstract

This article outlines how cosmetic dentists can enable dental assistants to elevate their competence in the procedures required to provide comprehensive esthetic care; their understanding of the technologies and materials used in practice today; and their familiarity with the principles of smile design. By broadening the scope of the dental assistant's day-to-day routine, the stressful issues of patient care, control of supplies, cleaning and sterilizing instrumentation, and communicating with the doctor become less pervasive in the context of a supportive, team-oriented practice environment.

*Cosmetic dental teams can deliver complete care by ensuring that the entire team understands what is involved with the treatments being performed.*

## Introduction

Dental assistants help dental operators (dentists or other treating dental auxiliaries) provide more efficient dental treatment. Dental operators therefore can focus more time on providing treatment when assistants oversee necessary but sometimes mundane tasks by effectively becoming the operator's extra hands.[1]

That is truly a simplistic definition, and I believe dental assistants can be much more valuable to the cosmetic dental practice than that description suggests. When asked recently to present a comprehensive lecture about the modern definition of dental assistants, I presented a course designed to enhance an assistant's understanding of the clinical aspects of what we do every day, as well as to motivate them with an education about the human side of dental assisting and team building.

### Integration of Leadership and Mentoring

Cosmetic dental practitioners can use the training concepts in this lecture to help their assisting staff better understand contemporary esthetic procedures. An excellent reference for this is the book, *Functional Occlusion: from TMJ to Smile Design*.[2] This understanding will enable members of the dental team

Pace Schmidt

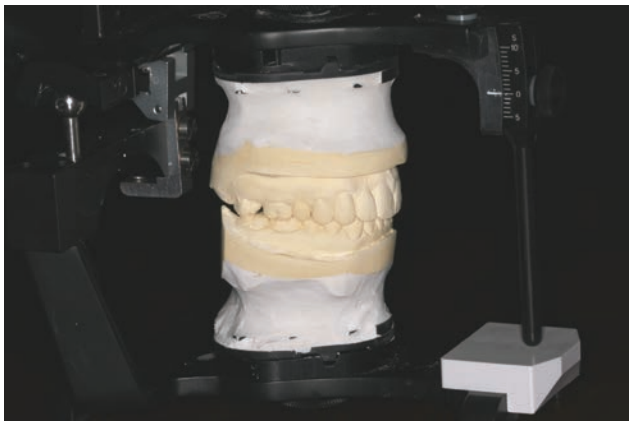

*Figure 1: View of mounted diagnostic study casts that are critical to the examination process.*

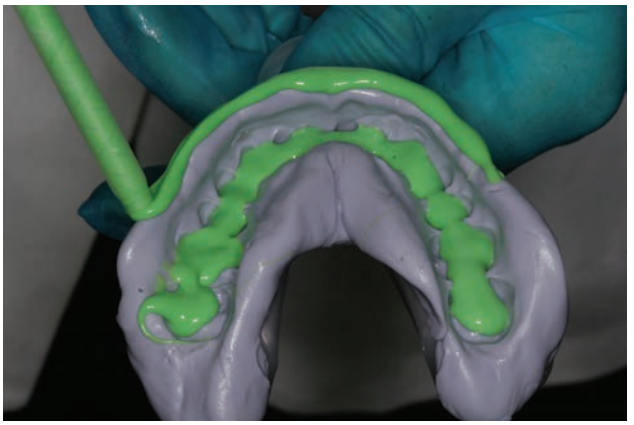

*Figure 2: Cosmetic dentists can emphasize the critical role assistants play in gathering key information, such as by taking accurate impressions.*

to provide their patients with beautiful, functionally correct dentistry and, along the way, achieve personal and professional growth. What will be required to achieve this objective is an integration of leadership and mentoring in the day-to-day processes. Cosmetic dental teams can deliver complete care by ensuring that the entire team understands what is involved with the treatments being performed. In addition to demonstrating the technical skills required, the team takes responsibility for key functions.

## Initiating Comprehensive Care

### Records Gathering

During the records gathering process, explain to your dental assistant what is being done, by whom, and why it is so important to providing complete restorative care. By elaborating on the fact that the complexity of today's treatment plans requires proper case planning, cosmetic dentists can help dental assistants accept more responsibility for their part of the process. After all, this phase is absolutely essential for a successful outcome. Dental assistants should know that during the records appointment, clinicians look for signs of instability, as well as visualize any necessary changes to the patient's dentition, either to help them attain a specific esthetic goal or to solve an underlying functional problem.

*It is very easy in the hustle and bustle of a busy dental practice to lose sight of what is being done and why.*

Since they will likely be handling them quite often, dental assistants should know that mounted diagnostic casts are critical to this examination process (Fig 1). Explain that by using properly mounted casts on an articulator, looking at digital photographs, reviewing a full series of radiographs, and assembling all other pertinent clinical information (Fig 2), the restorative dentist/assistant team has the clinical information necessary to properly work up, diagnose, and subsequently treat the patient.

## Empowering Your Assistant

Empower your dental assistant with the ability to determine what is needed for specific types of cases. For example, a full occlusal analysis, utilizing mounted diagnostic casts, is not required for every patient, but it is required for patients considering advanced restorative procedures, elective cosmetic/esthetic dentistry, or those with signs of instability (i.e., tooth wear, mobility, migration, tenderness to muscle palpation, or issues with the temporomandibular joint). Instruct your dental assistant about when this type of analysis will be necessary.

### Explaining the Diagnostic Wax-up Process

It is very easy in the hustle and bustle of a busy dental practice to lose sight of what is being done and why. It is validating for dental assistants to know that their work is an integral part of a complete care process. Therefore, to instill a sense of meaningful satisfaction, be sure the diagnostic wax-up process is understood. Explain that after the diagnostic casts are mounted, a duplicate set of models for a diagnostic wax-up will be needed. Elaborate that it will be from using the digital photographs and mounted casts that the functional and esthetic requirements can be visualized by the restorative team and transferred to the diagnostic wax-up. Make it your dental

*Figure 3: A well-trained and involved dental assistant will know that provisional restorations are finalized in the mouth for optimal functional and esthetic success.*

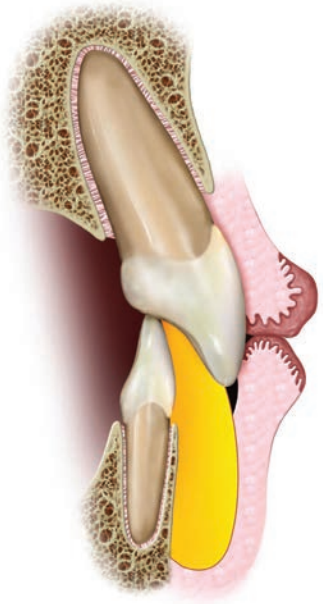

*Figure 4: The lip closure path described by Dawson allows the lower lip to comfortably close around the incisal third of the maxillary incisors.*

*Illustration ©Zach Turner*

assistant's responsibility to ask the patient to bring in a photograph of a smile they like, whether their own from earlier days or anyone else's. Explain that this will be the basis for visualizing the patient's expectations. Also, note that the diagnostic wax-up is the best estimate of the final outcome of the case, and that this approved esthetic mock-up will be used as a matrix for preparation guides and provisional fabrications. When your team members know what is happening and why in the sequence of clinical events, they are better equipped to anticipate your needs. For example, your dental assistant most likely will always know that you perform final contouring of the provisional restorations (Fig 3) in the mouth for optimal functional and esthetic success.

### Fabricating Provisional Restorations

As mentioned earlier, an astute dental assistant will be aware of where in the treatment process a case is and will anticipate your needs. Likewise, an informed and knowledgeable assistant understands that provisional restorations are a key component for predictability in the restorative process. The ability to adjust them for ideal esthetics, phonetics, and function is part of the protocol, as discussed. But does your dental assistant know the decisions that are made regarding the precise position of the maxillary incisors? Because there is a plethora of potentially confusing information about where the incisal edge should be, cosmetic dental practitioners should be the authority in educating their assistants about how these decisions are made. For example, explain that maxillary teeth should be far enough forward to provide proper lip support and have a proper two-plane contour to allow proper closure of the lips (Fig 4).[3]

### Writing the Laboratory Prescription

Writing the laboratory prescription should begin with identifying the patient's name, age, gender, and tooth numbers to be restored. Have you properly instructed your staff in how to complete your laboratory prescriptions to ensure clear and detailed communication? Are they aware that indicating the specific type of restoration and material choice(s) is also important?

To avoid any confusion or misunderstanding, provide your dental assistant with examples of crown, bridge, veneer, inlay/onlay, Maryland bridge, partial denture, and denture prescriptions. These should be precisely dictated, as in the following example:

Please fabricate zirconia restorations for teeth ##4-13 and ##20-29.

1) Mount model of temporaries with facebow and enclosed bite registration.

*Figure 5: Cosmetic dentists and their dental assistants will find digital cameras indispensable tools for treatment planning.*

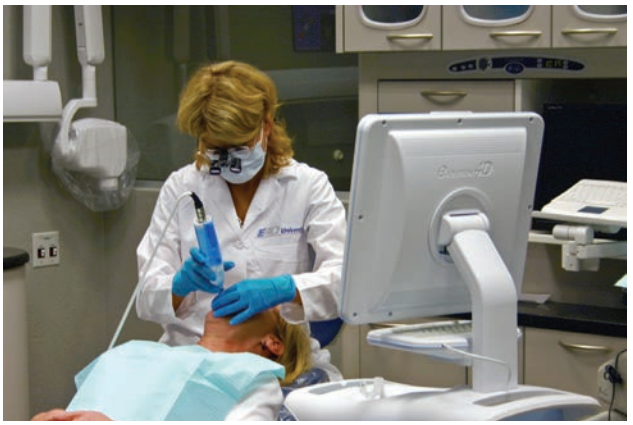

*Figure 6: To be used most efficiently, chairside CAD/CAM design processes can be completed by the dental assistant.*

2) Mount lower die model with record marked upper temps/ lower temps.

3) Mount upper die model with record marked upper preps/ lower preps.

4) Fabricate labial matrix and custom guide table.

5) See preoperative, preparation, and provisional photographs.

6) Use shade B1, with mild incisal translucency.

### Reinforcing the Principles of Smile Design

Again, in the midst of serving as a dental operator's "extra hands," it can be easy to lose sight of why certain protocols are being followed. The mentoring cosmetic dentist will ensure that his or her dental assistants understand how what they are doing relates to the principle of smile design. For example, pointing out that asymmetric facial features—such as the eyes in different planes—are not useful reference points in determining the smile line is a good opportunity to reinforce the need to use a facebow transfer to ensure proper and accurate alignment. Of course, sharing observations about the significance of the midline, how the appropriate gingival contour will be established and why, and the appearance of the patient's buccal corridor will help to familiarize your dental assistant with the objectives of the smile design plan.

However, to fully comprehend what is happening, as well as to have sincerity and empathy for patients, your dental assistant may need to experience the smile design process for herself or himself. Understanding the procedure and what the patient is going through not only gives dental assistants the ability to educate patients about the steps involved in the treatment plan, but it also gives them empathy for their patients. For example, I was in provisionals for several months. That experience taught me to truly appreciate my dental professional and the entire dental team, and it is a great experience to relate to patients.

### Applying Dental Technologies and Materials

Manufacturers and research organizations are trying to make it easier for all dental professionals to become more efficient, effective, productive, and profitable while simultaneously ensuring predictable clinical performance. Because dentistry is a science as well as an art, dental assistants should be familiar with the literature about clinical performance of the materials and equipment used in the cosmetic practice. However, the information that I have found to be most relevant to dental assistants includes evaluations about dispensing design, storage conditions, and simplicity of instructions.

Among the technologies that dental assistants should be trained to use are digital cameras. They are, in fact, becoming standard pieces of equipment in the modern dental office and part of comprehensive treatment planning (Fig 5). When your dental assistant has been trained on the use of a complete digital system, instead of simply describing the problem or issue at hand, you and the patient will be able to view intraoral images on a computer monitor at the same time.

Additionally, the introduction of a new chairside computer-aided design/computer-aided manufacturing (CAD/CAM) restorative system (e.g., E4D, D4D Technologies; Richardson, TX) has the potential to elevate the dental assistant's role to one of chairside dental designer (Fig 6). This system includes a graphic

interface that is logical and precise, allowing a faster learning curve and an intuitive process for scanning, designing, and milling a restoration.

## Conclusion

Talented team members yearn for a practice in which they can realize better opportunities for themselves, now and in the future. While the modern dental assistant has endless possibilities in and out of the dental practice for growth and achievement, helping to expand their vision, capabilities, and accomplishments chairside is a great way for cosmetic dentists to contribute to their dental assistants' overall growth. This growth will not be limited simply to technical skills development, but rather will expand into every area of their lives as they are empowered with greater utilization of their strengths. In this regard, cosmetic dentists can be leaders in their practices and inspire their dental assistants to be valuable and integral members of the comprehensive diagnostic and restorative team.

### *AACD Acknowledgment*

*The American Academy of Cosmetic Dentistry (AACD) recognizes Shannon Pace Schmidt as a member of the AACD Board of Directors.*

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# The Role of the Patient Coordinator

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## Introduction

One of the most amazing roles in the dental practice is that of Patient Coordinator, the person who oversees the ongoing relationship with patients. While the specifics of the position can vary widely from one practice to another, the goal remains the same: Ensure that patients are being heard, understood, and cared for in the most appropriate way.

*The role has developed into a key position that, in many cases, has taken the potential of the practice and turned it into reality.*

The role of patient care coordinator has evolved over the years, beginning as a hybrid position that connected the clinical and behavioral dimensions of the practice. What was needed, many people realized, was a gifted communicator who could focus exclusively on the patient's agenda and bridge the gap between what the patient wanted and what the practice had to offer. Since its initial conception in the early 1980s, the role has developed into a key position that, in many cases, has taken the potential of the practice and turned it into reality.

At a recent state dental meeting, I attended a session in which the speaker polled audience members about their specific roles in their practices. With more than 600 people in the room, only three—yes, three—defined themselves as a Patient Coordinator. Compare this number to the program presented at the AACD annual scientific session in New Orleans, "Making a Difference—The Role of the Patient Coordinator," which attracted a full house with a waiting list, and there is no wonder why the AACD program was in such demand.

I was honored to moderate this AACD panel program, which featured Corine Leach, Patient Coordinator for Dr. Tom Hedge (Cincinnati, OH); Deb Ham, Patient Coordinator for Dr. Dennis Wells (Nashville, TN); and Diane Bernstein, Patient Coordinator for AACD President Dr. Mickey Bernstein (Ger-

mantown, TN). These three women are superb examples of the breadth and depth of our Academy's expertise and innovation. Although their three practices are different in their approaches and style, they represent the finest in patient care and service. They also demonstrate how essential the role of Patient Coordinator is to patient care and practice success.

## PATIENT COORDINATORS: THE INTERMEDIARY BETWEEN FRONT OFFICE STAFF AND CLINICAL STAFF

When considering adding a Patient Coordinator to the practice, the following questions might be asked:

- What would help us be more successful?
- What would lead to greater profitability?

The answer to both questions is the same: A Patient Coordinator.

Most practices are still organized based on a structure that divides staff between the "front" and the "back." The "front staff," as they are generally labeled, are responsible for a seemingly endless and equally wide array of tasks, including the following:

- Greeting patients as they enter, either through the door or over the phone.
- Engaging in social interactions with patients, either upon entry or departure.
- All things related to the schedule, including making and confirming appointments and "filling holes."
- Exercising the wisdom of Solomon when determining where to put "emergencies."
- Making financial arrangements and collecting overdue account balances.
- Collecting fees "over the counter."
- Processing insurance submissions and follow-ups.
- Billing and responding to patients' billing inquiries.
- Completing data entry, reports, daysheets, deposits, filing, computer management, and handling patient complaints.

The clinical staff, on the other hand, are responsible for ensuring that the practice's clinical procedures flow smoothly, patients receive care comfortably, the facility is managed within appropriate OSHA guidelines, the dentist is supported properly when delivering care, supplies are ordered and stocked, and equipment is maintained.

## PATIENT COORDINATORS HELP KEEP PATIENTS—NOT JUST DENTISTRY—IN SIGHT

Without question, there are many tasks to be completed in a dental office. Historically, employees and their work have been organized primarily around the tasks that appear to be all-important for keeping the practice operating. While these tasks are very important, the emphasis on performing routine tasks begins to block the view. The trees loom large and the beauty of the forest is lost. It is important to remember why most of these tasks are being performed in the first place: To deliver dental care to patients who have trusted you to provide these services.

The manner in which you carry out this objective is a matter of individual purpose, the culture you choose, your community's expectations and standards, your style and preferences, and other variables unique to your practice. But even given these differences, most practices are operated by people who are so focused on the task at hand that they lose sight of how important it is to help more of their patients choose better dentistry sooner. It is the Patient Coordinator who helps keep the patient's expectations at the forefront of the practice's concern.

## THE NEED FOR PATIENT COORDINATION IS REAL

Sadly, in many practices, patients and their individual issues simply get in the way of the daily work. While many tasks and jobs are considered essential to the functioning of the dental practice, Patient Coordination or Facilitation has not yet been given that distinction. This role often may take a back seat to the more routine obligations of running the business, managing the systems, moving the papers and instruments, and maintaining the physical facility.

Staff typically fall into the following categories: Front desk, assistant, and hygienist. When the practice grows or becomes busy, additional staff members are added. When an additional assistant or front desk person is brought on board, the front desk staff usually is divided into two roles: Schedule and financial arrangements. Sometimes there is a "floater" in the back to handle instruments and clean up or help when it is busy; or a hygiene assistant who reviews the medical history, takes blood pressure and radiographs, charts the patient, and turns the room. Sometimes in larger practices there is an office manager or an insurance clerk.

Only rarely, as in the practices of Drs. Hedge, Wells, and Bernstein, is a person dedicated to patient facilitation in the way an assistant is dedicated to assisting or a hygienist is dedicated to providing hygiene services. In some cases, facilitation of patient care is blended with other jobs and not singled out as an area of primary focus for anyone. When combined with other responsibilities, it almost always gets the short shrift; the function gets done when there is time. Hygiene and oral hygiene instruction come first, but then it is time to turn the room and greet the next patient. There is rarely enough time to focus on the big picture and the patient's overall goals and issues. Filling the schedule, confirming appointments, opening the mail, entering the payments, and filing come first. Patient facilitation occurs only if the day's tasks are complete…and when are they ever complete?

## Understanding the Return on Investment of the Patient Coordinator Position

Adding a Patient Coordinator or Facilitator can increase staff size, realign working assignments of existing staff, perhaps—but not always—raise the payroll, require a private physical location, change the systems, refocus the practice's energy, and require new skills and different strategies. While this may sound like a significant amount of change, there is a tremendous amount to be gained. If nothing else, a Patient Coordinator is a significant producer for your practice. That's right...a *producer*.

While a dentist and hygienist (and in some states an assistant) may actually perform the dental procedures for which a fee is charged, the Patient Coordinator is responsible for what happens prior to the patient being seated in the chair for dental care. Of course, while many patients will get there on their own, Patient Coordinators ensure that more people get there sooner for more complete and better care. This is a major advantage to every practice, whether it is extremely busy or a little slow.

*A Patient Coordinator is a significant producer for your practice.*

Therefore, for most practices, the Patient Coordinator position is as essential as any other, not just a nicety to be added when all the other operations are working well. There are very few practices in which an effective facilitator would not directly have a positive impact on the amount of dental care selected, the timing of that care, the way accounts are handled and the promptness of payments, the likelihood that patients actually show up for the appointments they make, and ensuring that opportunities are not missed or delayed.

A Patient Coordinator spends her (or his) day focusing not on paper or instruments, the schedule or charts, or documents or insurance. Rather, this individual spends time on the patients who are coming to, are present, or have been in the practice for care. The coordinator or facilitator is always asking important questions that ensure that patients are really heard, understood, related to, and responded to. This person is responsible for creating a comfortable, "safe haven" environment in the practice so that patients will tell you the truth, rather than withhold important information or feel forced into dishonesty. While this person may have a private office and a desk, she (or he) doesn't have a chair affixed to the floor. Rather, this essential, personable individual roams around listening, checking in, observing, reviewing, and strategizing.

## Conclusion

It was amazing to hear the depth of passion for dentistry, support for their dentists and practices, and commitment to helping the patient in the most honorable and ethical way that was conveyed by the three presenters during the AACD panel program. I hope you are intrigued and inspired by this practice concept and want to learn more. A great introduction to the role of a Patient Coordinator is available by ordering and listening to the recording of the New Orleans session. You will hear each presenter describe the role she plays, the skills needed to become an effective Patient Coordinator, and the transition that must be planned in order to incorporate a Patient Coordinator into the practice. The audio recording is available at www.aacd.com.

***Acknowledgment***

*The author thanks Corine Leech, Deb Ham, and Diane Bernstein for their dedication to their practices and their contributions to this article.*

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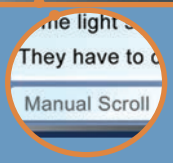


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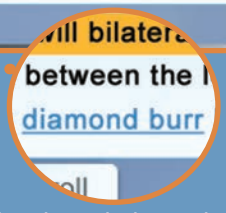


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# More.

# Give Back A Smile™

## In This Section:

# A MESSAGE FROM THE GIVE BACK A SMILE™ TEAM

*by* Lisa Fitch
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Chances are, you or someone you know has been affected by domestic violence, which could potentially range from controlling, abusive behavior to receiving severe physical injuries from an intimate partner. Intimate partner violence is a widespread social problem, and is not always a topic that is easily discussed. Your American Academy of Cosmetic Dentistry Charitable Foundation's (AACDCF) primary program, Give Back A Smile™, (GBAS) has been working for nine years to help survivors of domestic violence regain their devastated smiles and, along with them, their lives. To date, generous GBAS volunteer dentists and laboratory technicians have restored over 670 smiles for a value of over $6 million in donated services. The recipients of the program not only have their smiles restored, but they also can now look in the mirror without the daily reminder of their traumatic pasts. GBAS recipients often regain a sense of hope and self-worth, and feel closure, which extends far beyond replacing missing teeth. Smile by smile, we are making a difference by healing some of the dire effects of domestic violence. On behalf of the GBAS team, we extend our sincere gratitude to those who have donated their time and talents to restore a life.

*The GBAS team is here to support you during your volunteer experience.*

The GBAS program has achieved great triumphs and has experienced a great deal of growth in the last couple of years. We are reaching out to an increasing number of survivors of domestic violence in need of assistance, which reinforces daily this widespread social problem we are facing. We need your help. The program has experienced a rapid increase in the number of applications received. Sometimes, however, the number of doctors in a particular area who wish to participate in GBAS is greater than the number

of patients from that area who apply for the program. If you are ready to volunteer but we do not have a patient in your area, please consider participating in the Whitening Program. The Whitening Program is an easy way to get your office and patients involved in giving back, while raising significant funds. With the support of Discus Dental and Ultradent Products Inc., there are just three easy steps to follow in order to participate. For more details, contact the Charitable Foundation at the AACD Executive Office.

The GBAS team is here to support you during your volunteer experience. Please contact us if you are in need of a volunteer laboratory, or assistance with marketing your participation in the program. We are also here to provide insight as to how to better understand your GBAS patient, as each individual may be in a different place in their healing process. Please do not hesitate to contact us; we are here to support you, and we appreciate your generosity. If you are willing to treat a GBAS patient, you can contact the GBAS team by calling 800.543.9220, or via e-mail at givebackasmile@aacd.com.

In this issue, Dr. Lloyd H. Darby, Dr. Richard Hagstrom, Joe Wynne, and Dr. Richard L. Brown share their stories regarding their Give Back A Smile experiences and how they have changed not only their patients' lives, but also their own.

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## Are You Ready to Give Back?

The Give Back A Smile™ Program has reached another milestone by providing

OVER 6 MILLION DOLLARS IN SERVICES

to survivors of domestic violence!

Let us know your practice is ready for a Give Back A Smile™ case.

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# Give Back A Smile: Our Experience

*by* Lloyd H. Darby, DDS
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## Introduction

My experience as a Give Back A Smile™ (GBAS) volunteer was incredibly rewarding. There is a real, if not measurable, public relations reward, of course, and there is extraordinary satisfaction in seeing this patient's demeanor change as much if not more than we changed her smile. But, to me, the most rewarding thing of all was the personal growth opportunity that came with being essentially unshackled by financial considerations.

The likelihood of ever seeing another case as challenging as this is miniscule for my practice in rural Southeast Georgia. And then being able to leave financial considerations aside—being free to just do what was best—made this an immeasurably valuable experience.

I began my association with GBAS when I was elected to the AACD Board of Directors in1999. My first specific memory of my first Board meeting is of Dr. Wynn Okuda describing his passionate vision of this humanitarian outreach. The program had only recently been adopted by the AACD and was in its infancy. You couldn't listen to Wynn and not be moved to volunteer.

Volunteer I did. While I was aware that domestic violence is a problem in our community, I realized that the GBAS program was really unknown. I expected it would be a long time before I had an opportunity to treat a patient. I tried to publicize the program locally, providing information to a couple of organizations that assisted battered women. But their focus was protection and shelter, and not a single application was submitted. Instead I remained a volunteer without a patient for more six years before we met Susan.

## Patient's Story

The AACD notified me in October 2005 that I was the nearest volunteer (about 125 miles away) to a lady who needed help. I agreed to examine her and determine if I wished to treat her. Sensitive to the fact that there were emotional issues involved, we let one of our hygienists learn the horrific details of her story.


*Figure 1: Patient before treatment.*

I was surprised to learn that her qualifying incident had occurred 30 years ago—not that that made any difference. She had been raped and beaten by a family member. Battery acid was thrown into her face. She was tied to the rear bumper of a vehicle and dragged down asphalt pavement. In addition to losing several teeth, she lost an eye and much of her scalp She has been under the treatment by a plastic surgeon for several years. He is the referral source that suggested she contact GBAS.

She had undergone a great deal of treatment already. But she really needed a smile.

Someone had replaced her maxillary teeth with a fixed bridge that was now totally inadequate, with the pontics sitting 4 mm to 5 mm away from the maxillary ridge. The anterior maxilla was essentially gone. Three radiolucencies were noted on maxillary teeth. But the real problem was the mandible. She had only four lower teeth, three on the left, one on the right. There were no anterior teeth and there was no vestibule (Fig 1).

## Treatment

We began treatment in January 2006. We removed three maxillary teeth, and improved her periodontal status with scaling and root planing by our hygienists. We removed the five pontics (##6-10) from her existing bridge and made provisional partial dentures to maintain something of a smile, as well as to stabilize the occlusion. She was not happy with the removable partials, but understood that we had to do this.

I was able to recruit two outstanding specialists to provide their services pro bono: Endodontist Dr. Dale Miles treated the two abutment teeth remaining from that upper bridge. Oral and maxillofacial surgeon Dr. Rodrigo Uribe agreed to retrieve her mandible and place some implants. In addition, we received free services and materials from our local removable laboratory, Collins Dental Lab (Vidalia, GA), and the outstanding ceramists of Dental Laboratory Associates (Savannah, GA). All of the implant implements, including the milling, were donated by Biomet 3i (Palm Beach Gardens, FL). These individuals and businesses went above and beyond anything that was asked of them.

Following our stabilization efforts, Dr. Uribe performed a vestibuloplasty. The next step was to plan implant restoration of the mandible. Unfortunately, at this point we had to interrupt treatment because Susan's son needed a kidney transplant. Susan was a match, and donated her kidney. The transplant was done at the Mayo Clinic in Jacksonville, Florida. We were unable to perform further surgery until she was released by those doctors. During this period we continued her three-month periodontal maintenance until Dr. Uribe placed five implants in May, 2007.

Once the mandibular occlusal plane was defined, we restored the maxilla with a fixed-removable prostheses: the fixed portion consisting of six PFM crowns, four on the upper left, two on the upper right with #3 replaced with a cantilevered pontic. The anterior connector was a fixed bar with two Locator attachments in the position of the two laterals. The five anterior teeth were replaced with a removable segment that was retained by the Locators. There was no palatal coverage.

The mandibular teeth were restored with a milled titanium connector bar supported by the five implants (all from Biomet 3I). This bar, of course, holds denture teeth. The remaining lower teeth (#s 18, 19, 20, and 30) were restored with direct composite. All of this was seated in October 2007 (Fig 2). A week later, we sent Susan to a professional photographer, and the result of her new smile demonstrates how this lady's entire demeanor changed.

We do not get many chances to do something like this. For some, the reward is seeing the life of the patient change so dramatically. For some, the reward is the positive public relations that comes out of humanitarian outreach. For me, the real reward was to be able to do what I thought was absolutely best for this patient without having to consider time or money.

***Figure 2: Patient after treatment.***

***AACD Acknowledgment***

*The American Academy of Cosmetic Dentistry recognizes Dr. Lloyd Darby as a Give Back A Smile ™ (GBAS) volunteer who has restored one GBAS survivor's smile.*

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# Picking up the Pieces

*by* Richard Hagstrom, DDS
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## Introduction

"Monica" first came to my office in August of 2006. Two years prior to this initial consult, her then-husband had badly beaten Monica, who was eight months pregnant at the time. Her fear gripped her so tightly that, after she came to us, she waited even longer to proceed with the treatment.

## Case Report

As a result of the brutality, Monica had lost teeth #3, #11, and #13. The attack also had left teeth ##4-10 chipped, and she was missing other teeth from previous incidents. Her confidence was shattered. When speaking to my team and I she would frequently cover her mouth with her hand, and refused to smile. At the outset, she was very withdrawn and timid; her fear and hesitance to trust anyone were immediately apparent. The images in Figures 1 and 2 help to illustrate the physical damage. The emotional damage was something that could be perceived only in person and the memories of her fragile state stayed with me for quite some time.

### Diagnosis

It had been determined that there was a need for dental implants using a multidiscipline treatment plan. Oral surgeon Dr. Nicholas Gadler (El Cajon, CA) placed five implants (Astra Tech; Waltham, MA), which later greatly helped provide a sense of normalcy to Monica, as well as a means for providing retention for some of the teeth that were to be replaced by a partial denture.

### Treatment Plan

Through the help of Erik and Ryan Haupt (Haupt Dental Lab; Brea, CA), we were able to create a surgical stent for those implants and make an accurate diagnostic wax-up to form provisionals for the chipped teeth.

*Figure 1: The patient's preoperative condition, showing a number of teeth missing and anterior wear resulting in a collapsed bite.*

*Figure 2: The patient's preoperative condition. Her hesitancy to smile is visible in her facial expression.*

We restored Monica with four implant-borne porcelain-fused-to-gold (PFG) crowns and 10 PFG crowns. I performed six root canals and placed the restorations, as well as an implant-supported partial denture. The costs of the donated treatments were $39,500 for the dental treatment, $10,000 for implant services, and $5,000 in laboratory-fabricated restorations.

The images speak for themselves (Figs 3 & 4). Monica was extremely grateful. Each time she sees me, she greets me with "Genius!" and gives me a hug. The "Genius" label should be shared, because this patient's rejuvenated smile is the result of successful teamwork between Dr. Gadler, Haupt Dental Lab, and my team, who all progressed seamlessly through the treatment plan I had prepared for Monica.

## Discussion

It would not have been possible to successfully treat a case like this without the support of many people. Monica's mother moved to California from the Philippines to take care of her daughter. My compassionate assistants helped Monica to open up to others and to believe that it was okay to "pick up the pieces" of her broken life. Dr. Gadler and the people at Haupt Dental Lab donated their time and expertise. Each of these people contributed something special that allowed Monica to transform from a battered, emotionally scarred woman to someone who now radiates happiness (Fig 4).

Monica herself had to overcome many obstacles to obtain treatment, having to take three buses to make her appointments, frequently leaving her house at 4:00 or 5:00 a.m., and also making several trips up to Brea with me to allow the laboratory to fine-tune the partial and the shade of the crowns. All of these efforts by Monica and those involved allowed not just a smile to be remade, but also allowed each of us to help reassemble her life from the wreckage she had previously been wading through.

It is situations like this that make us grateful for the skills and talents we possess to transform people's lives. Each time Monica comes for a check-up, my team always comments on how her transformation is similar to that of a butterfly coming out of its cocoon. Her face just "beams" every time we make eye contact. She understands that her life has not only changed for the better, but also that a group of professionals truly care about her well-being, and I think that means more to all of us than any dental treatment! Now she is able to freely

*Figure 3: 1:2 image of the patient's restored smile after treatment.*

*Figure 4: Postoperative full-face image showing a restored vertical dimension exhibiting proper form and function.*

converse with my dental team and has regained her confidence, with a noticeable change to her stride when she walks. This newfound confidence allowed Monica to go out and attend job interviews. Her new job grants her the ability to continue to improve her life.

Even Monica's daughter, now six years old, has changed. They would both ride the bus, usually a five-hour trip, to our office. Monica's treatment was lengthy and her daughter would wait for her. We would entertain her but she really did not feel comfortable in the office. Following the completion of treatment I noticed the transformation in this little girl, as well—she was playing and laughing in our office, her "home away from home"!

## Conclusion

Monica's life has been forever altered, not only due to her courage in escaping domestic violence, but also thanks to the generosity of the AACD's Give Back A Smile™ (GBAS) program. So often, we forget that it is in giving of ourselves that we truly receive. I know that by participating in GBAS I have touched someone's life; and they, in turn, have touched mine. Each time I see Monica, it brightens my day to know that I have helped to restore her ability to trust and that through helping her, have also gained a fast friend. I urge each of you to do the same.

### *Acknowledgment*

*Dr. Hagstrom thanks Dr. Nicholas Gadler for the implants he placed for this case.*

### *AACD Acknowledgment*

*The American Academy of Cosmetic Dentistry extends appreciation to Dr. Richard Hagstrom for restoring this GBAS survivor's smile; and to Haupt Dental Lab, which has donated their services multiple times to restore GBAS survivors' smiles.*

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Dear Colleagues,

Over the past two decades, I have participated in many charitable dental programs and efforts, but perhaps none more rewarding than that of Give Back A Smile™ (GBAS). The program reaches a demographic that is often forgotten—survivors of domestic violence. It is managed in a way that rewards both the doctor and their staff, and since it is administered by the American Academy of Cosmetic Dentistry (AACD) its focus is exactly what the name of the program suggests—to give back a smile. As a healthcare provider in this great country, I suggest there is no better way to change a life than to restore someone's hope through their smile.

Domestic violence is a constant issue that confronts all aspects of our society. In the United States alone the Center for Disease Control suggests domestic violence affects about 32 million people (approximately 10% of the population). Domestic violence is a serious, preventable public health problem which is under-reported; the effects reach far beyond the act of violence, often for generations to come. One of the huge scars that is left by domestic violence are the injuries to the face and teeth.

The screening process by which a patient comes to our office is thorough and ensures, as much as possible, that the person is actually qualified for the program. The AACD works hard to support the dentist in his or her decisions on how to treat the patient and in no way interferes with the progress of treatment. Every patient is given a specific designation and it is by this that they are identified so that their identity and safety are protected. They develop relationships and many times become close to the people in the practice. These survivors are often just like you and me but have been unfortunately placed in situations and circumstances which have led to many problems.

The idea of giving a smile back is something we do every day in most of our offices in one way or another. Many of the reality shows on television have shown just how dramatic a smile change can make in one's appearance and, especially, attitude. I can explain this no better than by describing our last patient in Give Back A Smile. This young lady had been a victim for some time and because of this had lost almost all of her self-confidence and esteem. From the first interview you could tell it was there, but it had been so buried that it was hard to discern. In addition she had few teeth, no real smile, and not much hope of smiling again. She kept herself isolated from most people and felt that no one would hire her. Upon restoration of her smile, through multiple procedures and with laboratory assistance, things changed. You could see her open up more and more. Her confidence became evident and hope beamed in her words and actions. Some time after getting her smile back, she had an interview and was offered a job. The patient was engaged to be married and was shopping for a wedding dress at our last visit. She was so appreciative of her smile and the effort my staff took, that she asked if she could become a regular patient.

The lesson is really this—who do you not get to meet if you do not participate in this program? Whose life will remain without hope and what opportunity will you miss to change our world for the better? This program offers each of you the possibility to make a dent in the cycle of domestic violence and perhaps change your own world in the process. I urge you to "give back a smile" and, above all, hope that you each are doing your best to make this world a better place.

*Richard L. Brown, Jr. DDS, FAGD*

Tulsa, Oklahoma

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# EXCELLENCE IN COSMETIC DENTISTRY 2009

ADD A LITTLE *aloha* TO YOUR PRACTICE

# Celebrating 25 Years of Excellence

Registrations are at an all-time high for the 25th Anniversary AACD Scientific Session. Why is this, you might ask? We have come to the conclusion that there are a variety of reasons…

For 25 years, alongside invaluable partners and motivated and energized educators, the AACD has offered the most comprehensive cosmetic dental continuing education (CE) event for dental professionals on an annual basis. Throughout AACD's history each annual scientific session has been fine-tuned, always focusing on a dedication to the highest quality education possible.

The scientific program taking place in 2009 offers over 58 highly demanded hands-on workshops that will give you a "real" experience and an opportunity to practice your skills before taking them to your patients. The hottest lecturers on the circuit including: John Kois, DMD, Galip Gurel, DDS, and a variety of renowned international educators, will be available to you and your team. In addition, you can earn up to 27 CE credits in one week.

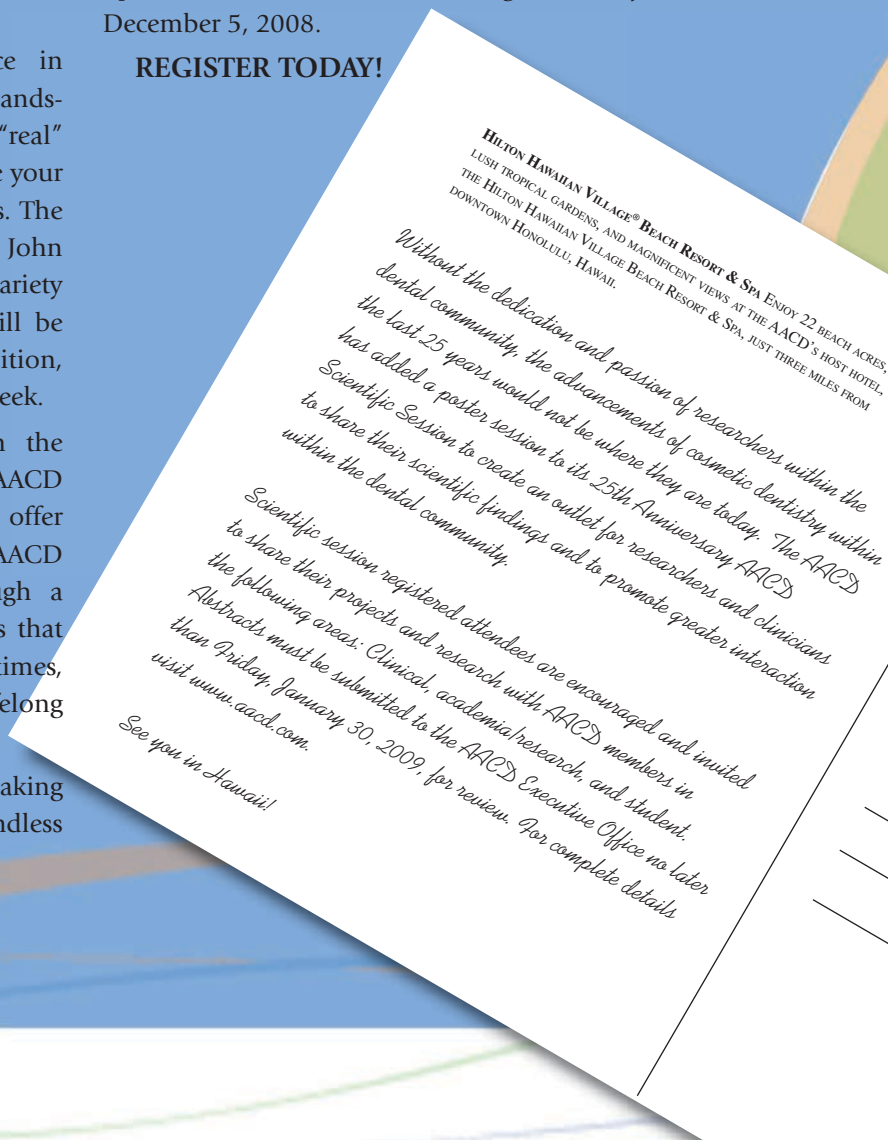
Legendary camaraderie exists within the Academy and that is not by chance. AACD believes like-minded dental professionals offer an invaluable resource: Knowledge. AACD fosters professional relationships through a plethora of social and networking events that are included with your tuition—many times, these professional relationships become lifelong friendships.

AACD's 25th Anniversary celebration is taking place in beautiful Honolulu, Hawaii. Endless sandy beaches, exotic rainforests, intriguing history, and fascinating culture—these are just a few of the pleasures that await you and your team.

Reinvigorate your practice or laboratory. Stay ahead of the game regarding cosmetic dental procedures. Experience the 25th Anniversary AACD Scientific Session in Honolulu, Hawaii, from Monday, April 27 – Friday, May 1, 2009.

To view the entire scientific program, log on to www.aacd.com or contact the AACD Executive Office. Registration is now open and course selection begins Friday, December 5, 2008.

**REGISTER TODAY!**



# Excellence in Cosmetic Dentistry 25th Anniversary AACD Scientific Session in Honolulu, Hawaii Monday, April 27-Friday, May 1

2009

## In This Section:

# Bring Your Team to Hawaii!

*by* Steven J. Hill, DMD, AAACD
Co-Chair, Professional Education Committee
Vancouver, BC
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The goal of this section is to provide insight into the thoughts and perspectives of premier educators, including executive coaches. In this issue, AACD Professional Education Committee (PEC) Co-Chair, Dr. Steven J. Hill (SH), interviews communication coach Ms. Sandy Roth (SR). Ms. Roth is scheduled to present at the 25th Anniversary AACD Scientific Session, *Excellence in Cosmetic Dentistry 2009*, which will take place in Honolulu, Hawaii, Monday, April 27 through Friday, May 1, 2009. For more information, log onto www.aacd.com.

You will definitely want to pack your bags and bring your team to the 25th Anniversary AACD Scientific Session in Honolulu next year. Yes, the destination is worth a trip in itself, but the real treat will be the team programming we have in store for your team members this year. Gilbert Young, CDT, who is coordinating the laboratory technician program, and Sandy Roth, who has assembled a superb line-up for our team program, have joined PEC Co-Chair Dr. Phillip A. Kemp and me in designing next year's continuing education program. I recently had a chance to speak with Ms. Roth about her plans for the program.

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*SH:* ***You have done a remarkable job in the short time since we invited you to join the PEC. How did you do it and who is in the line-up?***

SR: Thank you, but it was easy with so many superb speakers out there. It was simply a matter of calling and asking them to contribute to the 25th Anniversary AACD Scientific Session. The great news is that we have something for everyone, from first-time attendees to seasoned veterans. We have put together programs to cover eight distinct categories: Dental assistants, dental hygienists, administrative staff, management, patient coordina-

tion, team development, personal growth, and—for the first time ever—a spouse forum.

*SH:* ***Who are the presenters for the clinical team?***

SR: AACD Board of Directors member Shannon Pace Schmidt, who is always in demand for her outstanding programs for dental assistants, will be offering a two-part program, "The Esthetic Assistant," focusing on techniques and materials. I am also honored that we have been able to entice Casey Hein, RDH, MBA, to provide two programs specifically for our dental hygienist attendees—"Oral-Systemic Medicine" and "Preventive Cardiology"—two topics of timely interest to hygienists. These four clinical programs are exceptionally strong and I know assistant and hygienist attendees will not want to miss them.

*SH:* ***What about the programs specifically for the nonclinical staff?***

SR: I am very excited about these programs because administration and management have often been blended in the past, and the distinction has not always been clear. For newer team members and those wanting a broad survey course, Cathy Jameson of Jameson Management will be offering "On Target: Creating Your Model for Success." This program is suitable for all members of the team, as well as for the dentist. Her second program is more targeted and specifically designed for dentists and their practice managers together: "Dental CEO." As far as I can remember, this specific program for dentists and practice managers is a first for the AACD, and I am very excited about it.

Tim Twigg, President of Bent Ericksen and Associates, a recognized leader in the areas of human resources and compliance, will offer two management-training programs, "Successful Recruiting and Hiring" and "An Interactive Approach to Staff Management." These are not-to-be-missed programs for the management team. Lois Banta, an expert in dental insurance, will present "Goof-Proof Claims" for those team members who have oversight for this important area of administration; and "Getting the Dollar$ Off the Books and Into the Bank," a program to help team members design and implement effective collections systems. Finally, as a real change of pace, we have selected Susan Gunn to conduct a nuts-and-bolts training program, "QuickBooks™ Essentials." All of these offerings are designed to give team members real skills that they can use immediately upon return to their practices. Ms. Gunn's second program is designed exclusively for dentists and spouses and addresses a tough subject: Embezzlement.

*SH:* ***One of your considerable skills deals with communication training. Whom did you invite to cover this topic?***

SR: In the area of communication and team development we have Terry Goss, who has been working with dentists and teams for over 20 years, and is one of the most effective trainers and coaches I know. Ms. Goss will be offering two programs. The first, "Shared Leadership and Self-Managing Teams," will challenge even the most experienced group. While we encourage dentists to attend with their teams, the program is designed to help team members learn how to move into a role of greater personal responsibility and accountability. Her second program, "The Art of Facilitation for the Cosmetic Practice," is specifically designed for those special team members who work as patient coordinators. Our patient coordinators will not want to miss this training program!

*SH:* ***What do you have planned for the area of personal growth, which has been a popular subject at past scientific sessions? It seems like it would be appropriate for any member of the team.***

SR: It absolutely is—who is not a bit disorganized these days? We are very pleased to have Linda Chu, President of Out of Chaos, to rescue all of us from our clutter. In her first program, "Organizing your S.P.A.C.E.," Ms. Chu will help attendees get organized. Her second program, "G.O. System," will help participants learn how to prioritize and get their time under control. I am sure people will be able to apply Ms. Chu's concepts in both their practices and their personal lives.

On a totally different topic, and for the very first time, we are offering a financial plan-

ning program specifically for staff members. Brian Hufford will speak about "Becoming Financially Free: How to Become a Saver, Not a Spender." What a great service for attendees!

I am delighted that Katherine Eitel will be offering two of her excellent Lioness Training programs. The first, "How to Teach it so They Get it!" is designed to help team members learn how to support each other in learning and growing in the practice. Her second program, "Awaken the Instinctive Leader in You!" will provide team members with excellent leadership training.

*SH:* ***What are you going to be speaking about this year?***

SR: For the last few years, I have had a number of dental spouses ask me for a program of their own. We have so many amazing women—and an ever-increasing group of men—who work in their significant other's practice. Their roles are often unclear, and the blurring of lines can frequently impede the full impact of their efforts. So, this year, I will be moderating a Spouse Forum, "Neither Fish nor Fowl" and I encourage all dental spouses to join us. We believe we will have a room overflowing with talented dental partners. The second program I will be facilitating is called "The Smartest People in the Room." I am not going to say too much about it, other than that the smartest people in the room will be those sitting in the seats! It will be fun, rewarding, and validating for everyone who attends.



*SH:* ***I cannot thank you enough for all your hard work. You have brought so much energy to the PEC it has been hard to keep up with you at times! I know this is going to be an outstanding program for our team members. We even have an AACD hands-on workshop for assistants this year—a "first" for our annual scientific session.***

***When Dr. Kemp and I first started to conceptualize the team program for our 25th Anniversary AACD Scientific Session in Hawaii, we wanted to develop a "not-to-bemissed" program that would appeal to every member of the team. I am very pleased and excited that we have achieved our goal.***

*AACD Acknowledgment*

*The American Academy of Cosmetic Dentistry recognizes Dr. Steven Hill as an AACD Accredited Member.*

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# Guidelines for Submitting a Manuscript

The following guidelines have been provided to assist potential authors in writing and in submitting manuscripts to *The Journal of Cosmetic Dentistry* (*JCD*). Please follow these instructions to help ensure efficient processing of your manuscript.

Original manuscripts submitted to *JCD* are accepted subject to the understanding that they are submitted exclusively to the *Journal* and will not be reprinted without written consent from both the managing editor and author.

*The Journal of Cosmetic Dentistry* is aimed primarily at practicing cosmetic dentists and laboratory technicians. Clinical, practice development, and clinical research manuscripts are considered for publication. Material should be prepared with short sentences, simplicity of wording, and high-quality supporting visual material. Editorial alterations may be made to correct grammar, clarify meaning, and make the text consistent with the *Journal*'s style. All manuscripts are peer-reviewed by the *Journal*'s Editorial Review Board through a double-blind review process.

Please follow these guidelines for manuscript submission:

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- Include the author's name(s), address(es), telephone and fax numbers, and e-mail address on a cover sheet. Do not put the author's name on the manuscript itself; this will aid in keeping authorship anonymous when the editorial board reviews the manuscript.
- Authors may not have more than two articles published in the *Journal* within a 12-month period.
- If the paper was presented before any organized group, include the name of the organization and the date and place the paper was delivered.
- An image of the author must be submitted. A minimum resolution of 300 ppi is required.

## Manuscript Preparation

In preparing an article for submission, please follow these guidelines:

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**Spacing/Length:** All copy must be double-spaced and submitted on 8 $^1/_2$″ x 11″ paper. Manuscripts of 1,500 to 2,500 words will be considered for publication. Margins should be 1″ around the document.

**Paragraphs:** Indent at least five spaces or insert a tab to identify a paragraph.

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Please follow these guidelines:

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- Include an abstract of approximately 100 words summarizing the article.
- Refer to past issues of *JCD* for examples of proper text format.

## References

**Authors are responsible for ensuring the accuracy of all information in their references.**

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The quality of photographs submitted contributes directly to the quality of their reproduction in the *Journal*. The quality of images accompanying any article submitted to *The Journal of Cosmetic Dentistry* must meet the current AACD standards. If you have questions on what is acceptable, refer to the AACD's *Photographic Documentation and Evaluation in Cosmetic Dentistry: A Guide to Accreditation Photography* for the approved standards.

Digital images will be accepted for publication. Excellent print quality require images with a minimum of 300 ppi (high-resolution) with an appropriate output size (at least 3″ wide). Limit the number of images submitted to adequately illustrate the article (maximum of 25). When submitting **digital images**, please use JPEG format. Digital illustrations should not be altered.

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Keep the figures, charts, and graphs simple, with lettering large enough to read; a maximum of three per article. These must be professionally designed or computer-generated and ready for publication. Art must be in a vector format, a minimum of 300 ppi, and a minimum of 3″ wide.

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These requests for standardized submission of materials are necessary for ease and accuracy of publication. The Editorial Review Board looks forward to your submission. Communication regarding your expected date of submission would greatly help the publishing staff, as considerable long-range prepublication planning is necessary.

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# Advertising Index

| | | |
|---|---|---|
| AACD eLearning | www.aacd.com | 165, 211 |
| AACD Membership ad | www.aacd.com | 16 |
| AACD Scientific Session 2009 | www.aacd.com | 151, 222 |
| AACDCF | www.aacd.com | 117 |
| 3M ESPE | www.3MESPE.com | 28 |
| Aurum Ceramic Dental Laboratories | www.aurumgroup.com | 37 |
| Biolase | www.biolase.com | 88 |
| Bisco | www.bisco.com | 74 |
| Blatchford Solutions | www.blatchford.com | 95 |
| Calumet Photographic | www.calumetphoto.com/dental | 77 |
| Crest Whitestrips | www.dentalcare.com/supreme | 49 |
| D4D Technologies | www.d4dTech.com | 123 |
| da Vinci Studios | www.davincilab.com | 13 |
| Dental Care Cards | www.dentalcarecards.com | 227 |
| DentalWebsites.com | www.dentalwebsites.com | 7 |
| Dentistry by Design | www.mysmile.com | 150 |
| Discus Dental | www.discusdental.com | IFC |
| EnvisionASmile | www.EnvisionASmile.com | 195 |
| Golden Proportions Marketing | www.goldenproportions.com | 207 |
| Heraeus | www.heraeus-kulzer-us.com | 51 |
| Ivoclar Vivadent | www.ivoclarvivadent.com | 99, IBC |
| Jensen Industries | www.jensenindustries.com | 100 |
| MicroDental Laboratories | www.macveneers.com | BC |
| Pacific Challenge | www.SailingForSmiles.org | 15 |
| Patient News Publishing | www.patientnews.com | 9 |
| Protech | www.protechdentalstudio.com | 67 |
| Quintessence Publishing | www.quintpub.com | 60 |
| Valley Dental Arts | www.valleydentalarts.com | 78 |
| Wellness Hour | www.wellnesshour.com | 87 |
| Workflow One | www.workflowone.com | 202 |

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