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vol. 27 issue 1
Journal of Cosmetic Dentistry

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Dr. Eric Van Dooren

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vol. 27 issue 1
Journal of Cosmetic Dentistry

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EDITORIAL MISSION

The mission of the *Journal of Cosmetic Dentistry* is to educate AACD members, as well as other professionals in the field, on the art and science of cosmetic dentistry. We will endeavor to do this by publishing well-researched, peer-reviewed articles accompanied by high-quality, comprehensive clinical imagery. The objective is to enhance readers' knowledge and skills while showcasing the latest cosmetic techniques and procedures. The *Journal of Cosmetic Dentistry* will strive to help readers become better clinicians, so they can offer their patients the best—and most responsible—treatment possible.

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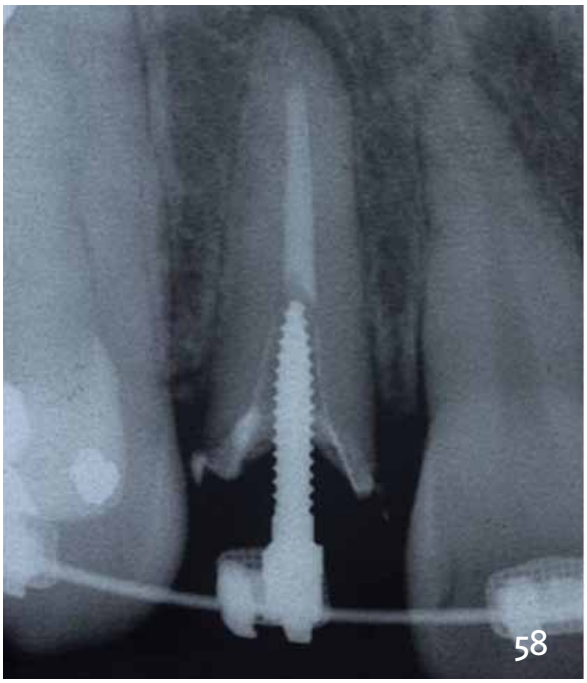
Features



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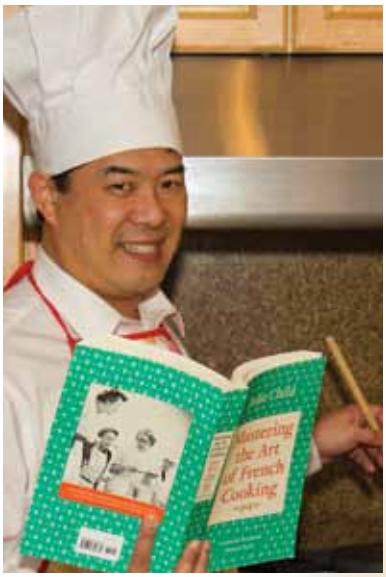

A number of components are essential in creating a gourmet meal…the finest and freshest ingredients, a variety of herbs and spices, meticulous preparation, precise execution, and exquisite presentation. We craft each issue of the *jCD* with the same elements and attention to detail.

Where has the time gone? It is hard to believe that this issue marks one year (four issues) since I have served as your "editor-in-chef." I thank the AACD for the opportunity and freedom to be creative. Additional thanks go to "sous-chef" Tracy Skenandore and her "culinary team" for bringing my vision of an exceptional publication to you, our members.

This issue of the *jCD*, in addition to featuring fine "local ingredients," also focuses on contributions from some of our esteemed international colleagues.

Editors of some healthcare publications are limited in their ability to make a difference…they are merely figureheads for the publisher. The *jCD* is different in that we publish our own journal and I am afforded the privilege of influencing and directing the final outcome.

This issue of the *jCD*, in addition to featuring fine "local ingredients," also focuses on contributions from some of our esteemed international colleagues.

Have a look at the spring menu, elegantly wrapped by Van Dooren (Belgium), and whet your appetite with a glass of Nathanson (U.S.), made with a splash of Heymann (U.S.) and topped with a slice of Mopper (U.S.). Be sure to try a skewer of Tsubaki (Japan)…it is excellent with a dash of Kwon (U.S./ Korea).

The main course consists of a nice Nakamura (Japan) marinated with a splash of Qureshi (U.K.), and garnished with a sprig of Hatkar (India).

Of "Kois" (U.S.) you cannot miss dessert, a confection that contains a shot of Khanna (U.K.) blended with a touch of Trinkner (U.S.), and topped off with a dollop of Weston (U.S.). Experience it á la mode with a scoop of Brambilla (Italy) and a drizzle of Ghezzi (Italy) on the side.

I hope you enjoy this issue as much as the editorial team and I have relished the opportunity to bring it to you. Bon appétit!

Edward Lowe

Edward Lowe, DMD, AAACD
Editor-in-Chief

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Reflections on the Evolution of Cosmetic Dentistry

Dan Nathanson, DMD, MSD

UP FRONT provides a guest editorial forum for influential leaders to share their opinions. In this issue, we welcome Dr. Dan Nathanson. Dr. Nathanson is a Professor and Chairman, Department of Restorative Sciences and Biomaterials at Boston University Henry M. Goldman School of Dental Medicine; and Immediate Past President of the International Federation of Esthetic Dentistry (IFED).
Disclosure: The author did not report any disclosures

The distinguished dental professor who invited me to lecture in his country owes me an apology. I had suggested the topic of esthetic dentistry but he dismissed it, stating that patients and dentists in his country were "not interested." It was 1985 and the concept was new, but by then the American Academy of Esthetic Dentistry (AAED) and the American Academy of Cosmetic Dentistry (AACD) had already been established. Similar organizations would soon form in Europe, Asia, and South America.

In the days before the Internet and Facebook, news about cosmetic dentistry had not traveled fast enough to reach my host. But what was not obvious to segments of our profession, the vast majority of dental patients knew all along—that seeing a better image of oneself in the mirror can boost self-esteem and well-being.

In the last 25 years dentistry has evolved at an unprecedented pace, with many innovations coming from Europe and Asia. Think of glass ionomer, modern implants, modern ceramics, and CAD-CAM. But the seed for cosmetic/esthetic dentistry procedures was planted in the U.S., with the crucial inventions of bonding, composites, and resin and ceramic veneers developed in succession since the 1950s. Actually, it started even earlier with Dr. Charles Pinkus, a pioneer in the esthetic arena, who provided cosmetic treatments in the early 1930s, fabricating acrylic "facings" to improve the appearance of Hollywood actors. Dr. Pinkus would attach the facings temporarily for the filming, then remove them and keep them for subsequent use.

...the seed for cosmetic/ esthetic dentistry procedures was planted in the U.S., with the crucial inventions of bonding, composites, and resin and ceramic veneers...

Seventeen years ago, the International Federation of Esthetic Dentistry (IFED) was established. The goal was to spread the esthetic/cosmetic dentistry philosophy around the world and help newer academies establish themselves. The Federation now comprises 30 member Academies from North and South America, Asia, Europe, Africa, and the Middle East. The three U.S. members are the AACD, the AAED, and the Society for Color and Appearance in Dentistry. One of the newest international members is the Mongolian Academy of Esthetic Dentistry. It is evident that the U.S. has done a great introductory job, but the esthetic dentistry philosophy has truly spread around the globe.

As a dental resident in the mid-1970s, I treated a number of teenage cystic fibrosis patients with badly discolored teeth, the result of tetracycline intake. The procedure was not needed to correct function; it was for the cosmetic effect only! In dental school I was led to believe that we do dentistry primarily to restore function and form, yet here I was, proud of my cosmetic efforts, restoring a smile and a life with each treatment.

After decades of treating pain and dysfunction, our profession has progressed to the level of making people smile and making their lives more pleasant. Patients are often eager to come to us for elective procedures, not just to eliminate pain. The esthetic dental evolution now seems to be a normal progression, but the philosophical distance from my days as a dental student to the present is revolutionary. And don't let anyone tell you that patients are not interested in dental esthetics—you know better!

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Dries was 18 years old when I first met him three years ago in my office in Antwerp. His dentist referred him to me for implant placement and prosthetic esthetic rehabilitation.

Dries wanted to replace the old Maryland bridge on the right lateral incisor and old composite on the left lateral incisor. Agenesia of the left lateral incisor and microdontia, with very conical tooth shape, were the origins of his esthetic problems. Orthodontic treatment was already completed at that time. As he was still growing, we decided to postpone the implant surgery for at least two years until radiological evaluation could confirm that maxillary growth had stopped.

We began the surgical treatment in 2010, when Dries was 20.

I chose this case for a few reasons in addition to those solely related to his dental treatment.

First of all, I rarely have a patient as special as Dries, always smiling and never complaining. He was willing to spend a lot of time in the chair to have the surgery and to enable the dental technician to finalize the work, even with attending law school and having exams to study for that week. The experience became even more special for me the day of final cementation, when Dries was accompanied by his father. Meeting his father for the first time, it was apparent that both father and son had almost the same tooth form and smile. The dental technician apparently chose the right tooth form for Dries, as only very talented dental technicians can adapt tooth forms to the face and create harmony and balance in the smile.

Secondly, I chose this case because, in our daily practice and especially with difficult cases, we strive for simplicity in our treatment planning and in our surgical and prosthetic solutions. Close cooperation and real teamwork between the clinician and the dental technician are necessary to achieve simplicity and esthetic outcomes. The clinical description of this case will explain some of our concepts, and demonstrates teamwork.

Thirdly, when we selected Dries' case to submit for the cover of the *Journal of Cosmetic Dentistry*, we were very fortunate to acquire the services of Karel Daems, one of the best photographers in Belgium. Dries adapted immediately to the camera and some nice shots were easily obtained. The photographer even suggested he could become a professional model.

I know we did our best to give Dries a nice smile. I am further certain that, in the future, Dries will become an excellent lawyer… or perhaps, a top model.

For information on the clinical aspects of this case, please turn to page 44.

Prosthetics and implant surgery: Eric Van Dooren, DDS (Antwerp, Belgium). Lab technician: Murilo Calgaro, CDT (Curitiba, Brazil), Composite work: Claudio Pinho, DDS (Brasilia, Brazil), Photographer: Karel Daems (Geel, Belgium).

Father and son.

Preoperative

Postoperative

Thoughts on No-Prep Veneers and the "Metal-Free" Practice

An Influential Lesson from Dr. Harald Heymann—Part 2

Gary M. Radz, DDS

Harald Heymann, DDS, MEd, Professor of Operative Dentistry at the University of North Carolina School of Dentistry, is a distinguished and well-respected educator. He is a past president of the American Academy of Esthetic Dentistry. In Part 2 of this interview (Part 1 appeared in the Winter 2011 issue of the *jCD*) he talks with one of his former students, PEC Co-chair Dr. Gary Radz, about no-prep veneers, "quick fix" dentistry, and the "metal-free" practice. Selected parts of the interview with Dr. Heymann will be available in audio format in the digital edition of the *jCD*.

Dr. Heymann will be presenting at the 27th Annual AACD Scientific Session in Boston, MA, May 18, 2011. Register today at www.AACDConference.com.

GR: Can you share with readers your opinion of, experiences with, and any research conducted regarding no-prep veneers?

HH: I welcome this renewed interest in a conservative approach. I think the overly aggressive preparation of teeth has done a lot of collective damage. As I mentioned in Part 1 of our interview, when we are trying to bond veneers to dentin, we are bonding to a substrate that inherently is going to fail over time. In my opinion, laboratories drove much of the overly aggressive approaches to veneer preparation in the past because, frankly, they saw an easier option in fabricating veneers with pressed ceramics than with incrementally built feldspathic porcelain veneers. The problem with those early versions of pressed ceramics (unlike materials such as today's eMax) was that they required reduction depths that often resulted in preparations in dentin.

As soon as you get into dentin with your veneer preparations you are going to experience an increased incidence of de-bonding, sensitivity, marginal interfacial staining and so on. *The key to success with veneers is very simple: maximize the amount of enamel to which you can bond.* It doesn't have to be 100% in enamel, but obviously the more enamel you have the better the prognosis for your veneers is going to be. One important feature of no-prep veneers is that you start out first and foremost with a substrate to which you can definitely bond, and that is enamel.

Now, my concerns with no-prep veneers are as follows:

1). If a tooth is of normal contour, there is no way to avoid over-contouring the tooth with a no-prep veneer. I think that no-prep veneers are best done on teeth that are under-sized or under-contoured. **2)**. The interproximal margins are more difficult to finish due to the relative inaccessibility of these margins and the lack of a preparation margin. So, I believe no-prep veneers are probably best used also in cases where there are interdental spaces, or open incisal embrasures to facilitate access to those interproximal margins so that they can be adequately finished and dressed. **3)**. If these veneers are actually made to the dimensions that laboratories are advertising—and some say they can make them as thin as three-tenths of a millimeter—good luck trying them in and bonding them. At three-tenths of

...in the hands of a good clinician, where indicated, no-prep veneers might be an option.

a millimeter they're incredibly fragile, and even if you are successful in placing the veneers, polymerization shrinkage effects easily could result in cracks in these veneers owing to the very high C-factor.

Case selection is the key; I believe that in selected cases no-prep veneers are not only indicated, but may even be desirable. Gary, you have generated some of the most beautiful cases of no-prep veneers that I've seen; your work is extremely conservative and obviously is done with a high degree of proficiency and expertise **(Figs 1 & 2)**. I still believe that in most cases some compensating reduction with an intra-enamel preparation, and some definition of marginal areas to facilitate seating and fit of the veneers is still the best approach. But I will admit that in the hands of a good clinician, where indicated, no-prep veneers might be an option.

GR: It's great to see the profession going back in this direction, because you and I have both seen what destruction can happen when we are trying to make a material fit the tooth.

HH: I agree 100%.

GR: In what ways have you seen dentistry re-embrace the ideals associated with comprehensive care—a more diligent treatment-planning process, managing the disease, dealing with the occlusal harmony, and interdisciplinary collaboration between general dentists and specialists?

Figure 1: Example of preoperative patient smile for no-prep veneer case by Dr. Gary Radz.

Figure 2: Example of postoperative patient smile with no-prep veneers by Dr. Gary Radz.

Interdisciplinary treatment is vital to proper treatment planning and to the rendering of appropriate care for our patients.

HH: First, I want to compliment our two academies—the American Academy of Cosmetic Dentistry (AACD) and the American Academy of Esthetic Dentistry (AAED) have both fostered principles that promote interdisciplinary treatment. In the realm of esthetics and cosmetics, probably the most significant advances have involved the use of interdisciplinary approaches. Unfortunately, due to TV shows and other media, consumers sometimes come to our practices thinking that they can get "quick fix" dentistry. There are also some dentists who, unfortunately, think they can provide that—for example, instant orthodontics. I vehemently disagree with the concept of cutting down teeth and placing veneers or bonding as a substitute for orthodontics except in some very rare cases, or where only minor tooth modification is required. Again, that doesn't mean that we can't address minor alterations in position and alignment in the context of bonding procedures; we most certainly can. But it should not be an alternative to orthodontics when you have major misalignment and positional problems. We need to first put teeth where teeth need to be, and put periodontal tissues where they need to be to facilitate an optimal restorative outcome. Interdisciplinary treatment is vital to proper treatment planning and to the rendering of appropriate care for our patients. Over the years, the heightened awareness—again, largely made possible by AACD and AAED—of the importance of interdisciplinary treatment has probably been the most significant advance that I've seen with regard to changes in our approaches to treatment.

GR: How do you feel about the concept of metal-free dental practices? Is there truly a way to practice metal-free? Would there even be an advantage to practicing that way?

HH: I'm going to step on some toes with this topic…but truthfully, if I am stepping on someone's toes, I hope it hurts! Frankly, I believe a metal-free practice is a brain-free practice. I actually wrote an editorial recently, "The Brain-Free Practice," which appeared in the *Journal of Esthetic and Restorative Dentistry*[1] (*JERD*), the official journal of the AAED, of which I am editor-in-chief. If you truly have a metal-free practice you are depriving your patients of some of the best restorative options available today. If you have a metal-free practice it means you are not providing patients the option of implants. I can't think of a more substantial development in dentistry in the last 30 years than implants. If you have a metal-free practice then by the strictest definition you are not providing implants.

I'll take it a step further—if you have a metal-free practice, it also means that you must not be providing any gold restorations or porcelain-fused-to-metal (PFM) restorations. I have an esthetically oriented practice, but if, for example, I have a patient who needs a crown on an upper second molar, I'm not going to place an all-ceramic crown or even routinely place a PFM crown. Studies show that a second molar experiences nine times greater occlusal stress than does a central incisor.[2] You're so close to the hinge axis that the prognosis for that porcelain crown is not nearly as favorable as it is for a gold crown. Because of the heightened potential for fracture, I believe gold is the better material when esthetics is not the primary concern. *JERD* published a classic retrospective study by Dr. Terry Donovan and colleagues regarding the long-term results of Dr. Richard Tucker's work, which looked at more than 1,300 restorations.[3] The results were amazing: the gold restorations that were over 40 years old experienced a 94.1% success rate! Show me any tooth-colored material that has a 90% success rate after 40 years! So again, if you have a metal-free practice it means that you are depriving patients of one of the finest restorative materials ever: gold. Now I'll be the first to admit gold is not esthetic, but I'm talking about using this material in non-esthetic areas.

Where esthetics is an issue, porcelain fused to metal remains the "gold standard," so to speak, for crowns involving molars. Very few studies affirm the efficacy of all-ceramic systems in molars to date.[4-6] There are a few, but again the long-term research is lacking.

Please don't get me wrong—I fully believe the future of prosthetic dentistry is with all-ceramic systems. We see major advances with materials like zirconia, and with various CAD/CAM systems. That, clearly, is the direction in which we're moving. I fully expect at some point in time we even will

no longer be routinely using traditional PFM crowns. Rapidly rising precious metal costs alone necessitate an eventual change.

But again, in the strictest definition, clinicians in a "metal-free" practice also aren't using zirconia, or alumina-based crowns, because, unless the periodic tables have changed, those are metals too! The fact is the "metal-free" practice is a marketing mantra, period. What it really means usually is an amalgam-free practice. That's a personal choice. But if you look at the research, the safety and efficacy of dental amalgam has been affirmed time and time again. Roughly 200 articles in the peer-reviewed literature exist to affirm this fact. One also needs only to go to the FDA's own Web site to find affirmation of the safety of dental amalgam in its report to consumers. If patients are concerned about mercury exposure, the truth is they will encounter more organic (methyl) mercury in a tuna sandwich than from their silver filling!

The irony in all this is that those who elect not to use dental amalgam are using composite materials, which lately have come under even more scrutiny with regards to potential estrogenicity and carcinogenicity concerns related to bisphenol A. But just as with mercury in amalgam, I believe these concerns involving composites are largely exaggerated. The truth is this: every material we use in dentistry has a risk-to-benefit ratio, and if you look at the evidence, dental amalgams and posterior composites are indeed both safe. The bottom line is that even though composites are our materials of choice for most restorations at the University of North Carolina, I still believe there is a place for dental amalgam, particularly in situations where you simply cannot isolate for composite or glass ionomer or resin-modified glass ionomers. I also believe from a public health standpoint a dental amalgam restoration is and still will be part of a contemporary practice. That is why we still teach its use in addition to posterior composites.

In summary, I believe the "metal-free" practice largely relates to those specifically not using amalgam. Again, that's a personal choice. But in the strictest sense of the word, if you consider all the restorative options forfeited (e.g., implants, gold, PFM, alumina, zirconia, and amalgam) a "metal-free" practice is indeed a brain-free practice, period.

GR: Thank you so much for giving us your time and for being part of our program in Boston. I know our members will benefit from your knowledge, experience, and research.

HH: Thank you so much for the opportunity to participate in this interview. Again, let me compliment the AACD—I believe it has made great strides in fostering better dental health for all patients.

References

1. Heymann HO. The brain-free practice. J Esthet Restor Dent. 2010;22(4):207-9.
2. Mansour RM, Reynik RJ. In vivo occlusal forces and movements. J Dent Res. 1976;54(1):114-9.
3. Donovan T, Simonsen RJ, Guertin G, Tucker RV. Retrospective clinical evaluation of 1314 cast gold restorations in service from 1-52 years. J Esthet Rest Dent. 2004;16(3):194-204.
4. Donovan TE, Cho GC. The role of all-ceramic crowns in contemporary restorative dentistry. J Calif Dent Assoc. 2003;31(7):565-9.
5. Goodacre C. Clinical complications in fixed prosthodontics. J Prosthet Dent. 2003;90(1):31-41.
6. Donovan TE. Factors essential for successful all-ceramic restorations. J Am Dent Assoc. 2008;139:14S-18S. **jCD**

If you truly have a metal-free practice you are depriving your patients of some of the best restorative options available today.

Dr. Heymann is a Professor of Operative Dentistry at the University of North Carolina.

Dr. Radz is an Associate Clinical Professor at the University of Colorado School of Dentistry. He has a private practice in Denver.

Disclosure: The authors did not report any disclosures.

Whitening Roundtable

Questions and Answers with Dr. So-Ran Kwon and Dr. Tomoyuki Tsubaki

Hugh Flax, DDS, AAACD, AACD President

Dr. So-Ran Kwon is an international authority on tooth whitening. Dr. Tomoyuki Tsubaki is a member of the Board of Directors of the Japan Academy of Esthetic Dentistry. Here, they discuss topics including the history of whitening and the effectiveness of in-office versus at-home whitening with AACD President Dr. Hugh Flax.

Drs. Kwon and Tsubaki will be presenting at the 27th Annual AACD Scientific Session in Boston, Massachusetts, May 18 and 20, 2011. It's not too late to register—you can register on-site in Boston at the AACD registration desk.

HF: What are some of the earliest examples of mankind changing the color of teeth?

SK: Interestingly, the color of teeth was changed either to the black or white side. Historical evidence of darkening tooth color dates back to the Mayan civilization, where darkening of teeth was performed as part of a ritual decoration during religious ceremonies.[1] Similarly, in ancient Japan a custom of decorative tooth-staining, called *ohaguro*, was performed by rubbing black ink onto the teeth.[2] The first so-called bleaching agent, called *nitrum*, was rubbed onto the teeth during the Roman Empire, 450 BC.[1]

TT: I think the earliest examples of changing the color of teeth are uniform and light cream yellow; also, the A or B family of the VITA shade guide. I believe the teeth of white races will become white faster than those of a Mongolian race. This is related to the thickness of tooth enamel and the color of dentin. Mongolian teeth become white only B1+ maximum, even if home whitening has been done for a long time, but the teeth of white people will become whiter.

HF: How has bleaching evolved over the last 10-15 years?

SK: Hydrogen peroxide still remains the most widely used active ingredient in whitening products. Noteworthy evolvement over the last 10-15 years has been the tremendous increase in the availability and sales of over-the-counter products and dentist-dispensed home whitening products, with different concentrations of hydrogen peroxide or carbamide peroxide and a variety of delivery systems, including gel in trays, paint-on gels, whitening strips, and sprays.

TT: It has been more than 20 years since the first bleaching agent (Omni White & Brite, 3M ESPE [St. Paul, MN]) was sold in the U.S. Since that time, the bleaching market has developed rapidly.

A new bleaching agent has been developed and approved in Japan under strict control, and the manufacture of inexpensive LED machines for in-office bleaching systems is increasing rapidly in Korea and China.

Now, the number of people in Japan with experience with whitening is approaching one million, compared to very few in 1995, when I opened my first private practice for just whitening.

HF: What is the current research on the effectiveness of in-office whitening versus home whitening?

Figure 1: Before; moderately tetracycline-stained teeth. Note also the white spots on the upper anterior teeth.

Figure 2: After; combined home and office whitening resulted in whitening of upper teeth and natural blending in of white spots.

SK: Research on the comparison of in-office whitening to home whitening has focused on the efficacy, side effects, and patients' acceptance of the two different techniques employed. Results vary depending on the whitening product, study design, application time and methods, and assessment of color employed. In a 2005 study,[3] the final outcome of interest was the number of days required for each treatment to achieve a six-tab difference on a Vita Classical shade guide. Home whitening with the use of 10% carbamide peroxide required seven days, whereas office whitening using a 15-minute application of 38% hydrogen peroxide required three days to achieve the final outcome of a six-tab difference, showing that in-office whitening provides color change more quickly. There was no difference in terms of gingival and tooth sensitivity between the two techniques. However, there was a slight preference for at-home whitening. A 2009 comparative clinical study of the effectiveness of three different bleaching methods[4] showed that home whitening with 10% carbamide peroxide for two weeks and in-office whitening with 15% hydrogen peroxide for 45 minutes, three times over three weeks, were equally efficient in whitening teeth and maintaining the results for up to three months. A 2010 study[5] demonstrated that five days of home whitening with 10% carbamide peroxide produced the same result as a single in-office treatment with 25% hydrogen peroxide. In their clinical study, subjects preferred home whitening to in-office whitening. A 2010 randomized clinical trial comparing at-home whitening employing 10% carbamide peroxide for 14 days and in-office whitening using 38% hydrogen peroxide[6] showed that at the nine-month recall visit, there was no significant difference in bleaching efficacy between the two techniques. No adverse events were experienced related to whitening. The bottom line on the current research on the efficacy of in-office whitening versus home whitening is that both techniques can provide satisfactory whitening outcomes without significant adverse effects in terms of tooth and gingival sensitivity **(Figs 1 & 2)**.

TT: Now I am trying to use many kinds of whitening systems. The recent trend of in-office whitening has higher effects by using high powered blue LED (380~420nm wavelength range) and the gel with a catalyst to fasten a whitening reaction. By using them, we will be able to whiten the teeth to B1 shade in about one visit if their teeth have an average color.

At-home whitening decreases the treatment time because it tends to increase concentration to 38% maximum in the U.S., but it needs more time to reach B1 shade than in-office whitening. On the other hand, home whitening can lighten the tooth more than office whitening, and can even whiten teeth discolored by tetracycline staining. Office whitening is superior to home whitening based on whitening speed, but inferior to it based on degree of whiteness.

HF: What are the cultural differences in what people expect when whitening their teeth?

SR: It is very difficult to talk about cultural differences without

knowledge of the vast variety of cultures in modern society. There will definitely be trends in terms of different cultures; however, the individual's personality and demand for beauty seems to be the most important factor in terms of expectations for whitening teeth.

TT: Many Japanese want to whiten their teeth naturally, but don't want to get super-white.

American people who receive whitening treatment will be unhappy with the dentist if their white teeth are not noticed by anyone. On the other hand, Japanese people will be unhappy with the dentist if their whiter teeth *are* noticed by everyone! However, the number of Japanese people who want "Hollywood white" teeth is gradually increasing.

HF: What are your feelings about cosmetic dentistry versus esthetic dentistry?

SK: The American Academy of Cosmetic Dentistry defined cosmetic dentistry as comprehensive oral care that combines art and science to optimally improve dental health, esthetics, and function. It has been stated that esthetic dentistry enhances the natural beauty of the mouth and face and that the term is used specifically to imply an improved relationship rather than a superficial one.[7] Personally, I believe that regardless of which term is used or preferred, they serve the same purpose in providing excellent care to our patients.

TT: Cosmetic dentistry makes beautiful, white teeth that conform to the basis of cosmetic dentistry. Esthetic dentistry makes natural, beautiful teeth in harmony with the other teeth; cosmetic dentistry with minimal intervention. I think that we should not judge as to which is better; we should choose the treatment based on our patients' wants. Both of them should not only make the patients look better, but also should give patients better function and better health.

References

1. Ring ME. Dentistry: an illustrated history. New York: Harry N. Abrams; 1992.

2. Goldstein RE. Esthetics in dentistry. 2nd ed. Philadelphia: BC Decker Inc; 1998.

3. Auschill TM, Hellwig E, Schmidale S, Sculean A, Arweiler NB. Efficacy, side-effects and patients' acceptance of different bleaching techniques (OTC, in-office, at-home). Oper Dent. 2005 Mar-Apr;30(2):156-63.

4. Bizhang M, Chun YH, Damerau K, Singh P, Raab WH, Zimmer S. Comparative clinical study of the effectiveness of three different bleaching methods. Oper Dent. 2009 Nov-Dec;34(6):635-41.

5. da Costa JB, McPharlin R. Comparison of at-home and in-office tooth whitening using a novel shade guide. Oper Dent. 2010 Jul-Aug;35(4):381-8.

6. Giachetti L, Bertini F, Bambi C, Nieri M, Russo DS. A randomized clinical trial comparing at-home and in-office tooth whitening techniques: a nine-month follow-up. J Am Dent Assoc. 2010 Nov;141(11):1357-64.

7. Nasedkin JN. Current perspectives on esthetic restorative dentistry. part I. porcelain laminates. J Can Dent Assoc. 1988 Apr;54(4):248-55. **jCD**

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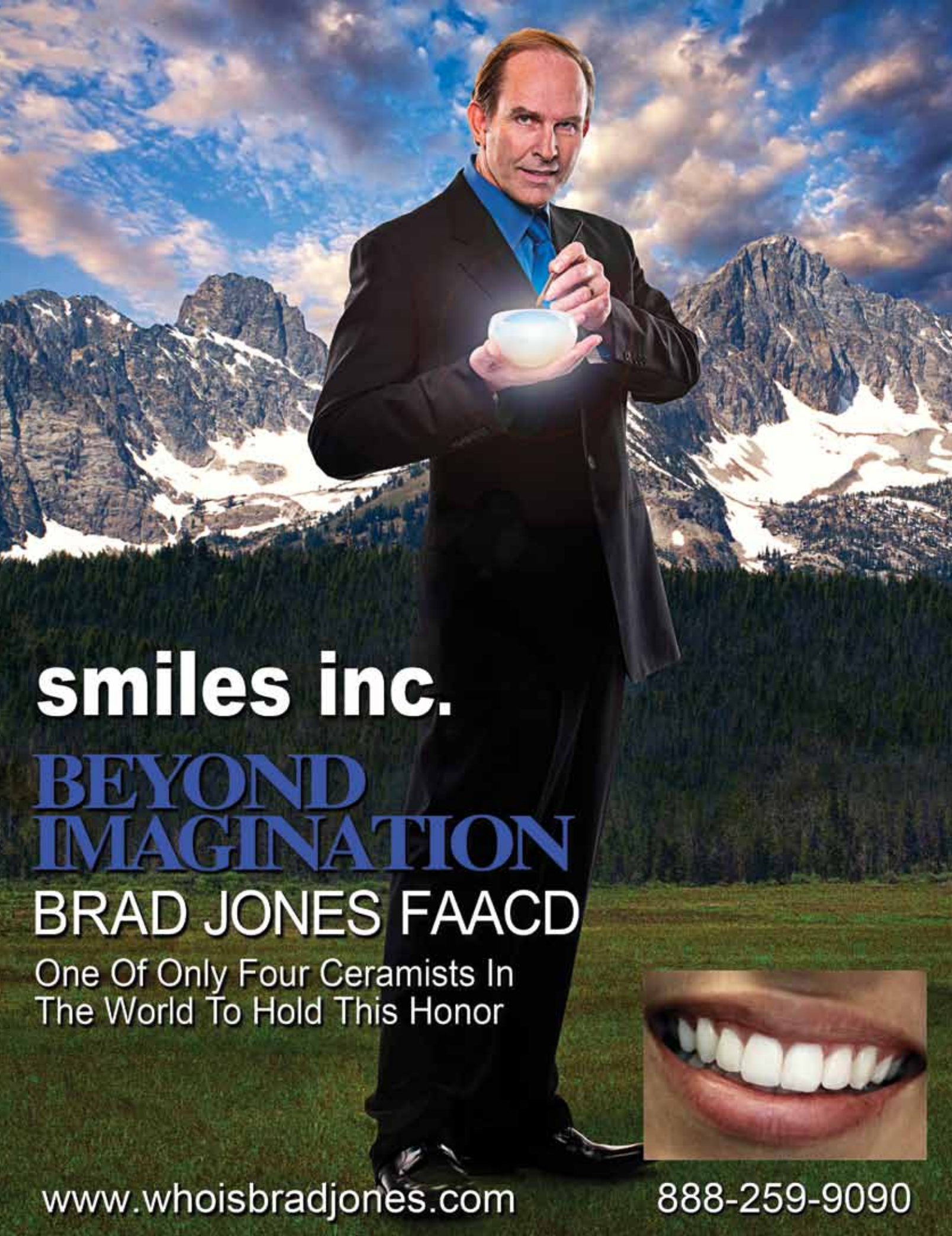
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My Turn to Give Back

A Great Smile is an Eye Opener

Buddy Mopper, DDS, MS, FAACD

Introduction

Over the years I have seen what great work the AACD's Charitable Foundation has done for survivors of domestic violence. Their Give Back a Smile™ (GBAS) program encourages AACD members nationwide to volunteer their time and "give back a smile" to survivors of domestic violence with missing or damaged teeth. The impact a smile can have on a person's appearance, confidence, and happiness is profound. Working with this patient reinforced how important a smile is to a person's overall appearance and well-being.

Patient History and Findings

"Diane" presented in early 2010 with a missing maxillary right central incisor, fractured left central incisor, fractured right lateral incisor, and a semi-closed eyelid where her eye had been replaced **(Figs 1-3)**.

Diane was violently attacked by her ex-boyfriend in 2000. The blows to her face were so vicious she lost her upper right central, fractured her right lateral and left central incisor, and suffered such severe damage to her eye it had to be removed.

After meeting Diane and hearing her story of domestic abuse, I was anxious to start treatment as soon as possible.

The impact a smile can have on a person's appearance, confidence, and happiness is profound.

Treatment Planning

When Diane came to my office she was a very sad woman, and understandably so. At the time of the consult I was able to show her, through the use of a direct composite mock-up (Renamel Nano, Cosmedent; Chicago, IL), what she would look like when she was finished. By the end of the mock-up she was so happy with her new smile she started to cry.

The treatment plan was as follows:

1. Repair both fractured incisors.
2. Add enough material to both incisors to allow for proper contouring, spacing, and complete symmetry of both central incisors.
3. Construct a resin retained bridge.
   a. Trough lingual surfaces of left central incisor and right lateral incisor to allow for the placement of dental fiber reinforcement (Ribbond; Seattle, WA) internally, which would help support the construction of the missing right central incisor.
   b. Cover exposed Ribbond and properly contour the lingual surfaces of both incisors with the use of nano-fill composite.
   c. Create a freehand matched right central incisor with proper bonding techniques.

In my opinion, this type of bridge is conservative and more predictable for longevity for the following reasons:

- Lower modulus of elasticity, which allows for the flex of natural dentition and therefore actually becomes less likely to break.
- When fabricating a restoration of this type, you will not see wear on the lower incisors.
- I have found composite resin to give a more predictable esthetic outcome than does porcelain. If the bridge should fracture at the connector site or any other place, it is far easier to repair.
- In my experience, this type of bridge has direct apposition of the composite to the tooth structure, therefore delamination is almost impossible.

Treatment

Both incisal edges were freshened with the use of a coarse FlexiDisc (Cosmedent). A long bevel was placed on the labial of the central and lateral and the lingual surface of each tooth was reduced five-tenths of a millimeter following the end of the long bevel. A chamfer was placed in the same vicinity on the lingual corresponding to the end of the long bevel on the labial. After etching (always etch beyond the long bevel), Cosmedent Complete bonding agent was placed and light-cured. To build up incisal edges and to give strength and opacity, Renamel Nano composite was sculpted to the leading edge of each long bevel and blended just slightly to the middle third of the bevel, which left room for the Renamel Microfill. Nano was also blended onto the lingual surface and sculpted to the lingual chamfered margin, creating a smooth intact lingual surface. Microfill was used for the final layer on the labial surface. It was sculpted past the long bevel and blended into the tooth surface and polymerized. The restorations were contoured, finished, and polished using the ET bur system (Brasseler USA; Savannah, GA) followed by FlexiDiscs, FlexiCups, FlexiPoints, FlexiStrips, Enamelize polishing paste, and felt FlexiBuffs (Cosmedent). This technique was completed prior to the Ribbond placement.[1-3]

Immediately following treatment, I informed the patient that the restoration might be slightly too light in the gingival third. At her next appointment, that assumption was confirmed **(Fig 4)**.

At the next appointment, I reduced the microfill layer slightly all the way to the middle third of the tooth.

Figure 1: Pre-treatment, full-face image of patient. Notice semi-closed right eye.

Figure 2: Pre-treatment, natural smile view showing damage from abuse.

Figure 3: Pre-treatment, retracted view.

Technique Steps

After the mock-up.

Ribbond cemented in place with Insure resin cement (Cosmedent) and overlaid with Renamel Nano (Cosmedent).

Teflon tape was placed over the gingival tissue to aid in the creation of a smooth gingival surface for the pontic.

Application of nano-fill composite over the Ribbond to form the dentin layer of the tooth surface.

Application and sculpting of lingual surface with nano-fill.

Addition of small amount of flowable Renamel Microfill.

Smoothing flowable Renamel Microfill with Cosmedent #3 brush.

Polymerized flowable creating the artist's canvas.

Creation of cervical chroma.

Gray tint applied to enhance incisal translucency.

Gray tint was added to the incisal third.

To create the enamel surface, Renamel Microfill was placed and sculpted to the exact proximal contour while at the same time slightly over-contouring from the facial.

Great attention was given to the proper formation of line angles and embrasures.

This technique of sculpting greatly simplifies the final technique of contouring, finishing, and polishing.

Prior to finishing, measurements were taken from the mesial of the lateral incisor to lateral incisor with a digital boley gauge and then divided by two, to determine the total width of space needed for both central incisors.

Symmetry is accomplished in the "eyes" of the dentist. Angulation and inclination have to be done by "eye-balling" it.

Completed restoration prior to polishing.

Polishing completed; notice lack of gingival chroma.

Notice moist cotton pellet on adjacent central to prevent dessication to achieve perfect color match.

More gingival tint was added to the cervical third prior to final microfill; notice the increased chroma.

What a difference a new smile can make!

Finished case, immediately postoperative.

Figure 4: Postoperative evaluation confirmed that the gingival chroma needed to be enhanced.

Figure 5: One year after treatment.

Figure 6: One year after treatment—a very happy patient!

I placed a thin moist cotton pellet on the adjacent tooth to keep it from desiccating, a great trick to help determine correct tooth color. Because the cotton pellet keeps the tooth moist it is easier to see the perfect color throughout the procedure. I added a little more tint to the gingival surface of the pontic in an attempt to create a perfect match.

Finishing was completed with the Brasseler ET contouring system and polishing was completed with Flex-discs, Flexi-points, Flexi-cups, Flexi-strips, Enamelize polishing paste and Felt Flexi-buffs.

Rewards

Immediately after treatment Diane said, "I now have a beautiful smile—it has lifted my self-esteem." One year later, Diane's self-esteem is at its highest. She says, "It feels good when you can smile and know that the world is smiling with you **(Fig 5)**. I smile all the time now, but for 10 years I couldn't. Whenever I looked in the mirror I saw a monster; today, I see a beautiful woman. The GBAS program and Dr. Mopper gave me my life back!"

Diane also recounts the difference having her smile back has made in her life. She now can go out in the world with her head held high, and she can look people in the eye without being embarrassed. Her new smile has had such an impact on her that she now wants to be a spokesperson against domestic violence.

Diane's newfound confidence and zest for life reaffirmed for me how much patients really do appreciate our work; a smile truly is contagious.

What a difference a smile can make. Now Diane smiles not just with her lips and teeth, she smiles with her whole face **(Fig 6)**!

Volunteering for the Give Back a Smile program was incredibly rewarding for my staff and me. Restoring Diane's smile reminded us of the significance of a smile in a person's life. If you are not currently volunteering with GBAS, I strongly encourage you to do so.

Acknowledgment

The author thanks his partner, Dr. Dennis Hartlieb, for his assistance with this case.

References

1. Radz G. Beyond the Maryland bridge. J Cosmetic Dent. 1996;12(1):18-22.

2. Benjamin G, Kurtzman GM. An indirect matrix technique for fabrication of fiber-reinforced direct bonded anterior bridges. Compend Contin Educ Dent. 2010;31(1):60-4.

3. Piovesan EM, Demarco FF, Piva E. Fiber-reinforced fixed partial dentures: a preliminary retrospective clinical study. J Appl Oral Sci. 2006;14(2):100-4. **jCD**

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A Conservative Treatment for Crown Fractures

Accreditation Clinical Case Report, Case Type II: One or Two Indirect Restorations

Prashant A. Hatkar, BDS, MDS, AAACD

Figures 1a & 1b: Preoperative; fractured right lateral incisor with a debonded composite restoration. Postoperative; restored tooth mimicking the contralateral incisor.

Introduction

Selecting a suitable restorative material can contribute to restorative success. However, a thorough treatment plan, along with a perfect clinical-technician synergy, is necessary to ensure an exceptional esthetic outcome. One major clinical challenge lies in matching indirect restorations with adjacent natural teeth. Reproducing a perfect blend of form, contour, color, value, texture, and translucency can be a colossal task. An amalgamation of proper soft tissue control, precise preparation design, accurate impression taking, great laboratory communication, and fine ceramic handling skills can help to guide the practitioner through such challenging situations.

Patient History

The patient was a 40-year-old male in good overall health. Eleven years earlier he had broken one of his front teeth in a sports accident. Twice in the past 11 years resin composite bonding was done to restore his broken tooth #7. He presented with a fractured composite restoration that had lasted just over four years **(Figs 1a & 1b)**. He now wanted something longer lasting and more esthetic.

Figures 2a & 2b: Preoperative; palatal extent of fracture and discolored margins of old composite. Postoperative; restored arch integrity with palatal margin placement on the low-stress area of the cingulum.

Bonded porcelain restorations allow tooth vitality to be maintained, despite considerable coronal breakdown.

Diagnosis

His oral hygiene and periodontal health were excellent. There was no pain or clicking in the temporomandibular joints. Surrounding soft and hard tissues were all within normal limits. Overjet and overbite were normal. Tooth #7 had a debonded composite restoration, which, according to the patient, was partly chipped and discolored before it came loose. A discolored composite margin was evident on the palatal surface of the tooth. Except for a composite restoration present on #5, his teeth were free of restorations or caries. Tooth #5 also had a chipped palatal cusp tip, but it was asymptomatic. Tooth #7 had extensive coronal loss of tooth structure. The fracture was horizontal from the facial side but extended obliquely onto the gingival third of the palatal surface **(Figs 2a & 2b)**. On clinical assessment, #7 revealed a vital pulp with no clinical pulp exposure. The radiographic findings were within normal limits.

The following pertinent issues for esthetic and functional improvement were discussed **(Figs 3a & 3b, 4a & 4b)**:

- fractured #7 with extensive tooth structure loss
- super-erupted #32 in premature contact with opposing #1, leading to posterior interference
- incisal wear on ##23-25
- proportions and symmetry of gingival zeniths of upper anterior teeth
- dark triangles between #8 and #9, and #9 and #10
- mild incisal edge wear of #9 and #10
- mild lower incisor crowding.

Treatment Plan

Bonded porcelain restorations (BPRs) allow tooth vitality to be maintained, despite considerable coronal breakdown. The defect on #7 fell into category III A (extensive coronal fracture) under a classification of indications for BPR.[1] A conservative leucite-reinforced pressed ceramic BPR on #7 would be fabricated. The patient's priority was to have only #7 restored; he was averse to other corrective modalities.

Before starting the restorative phase, the occlusion was analyzed on an articulator with well-mounted preoperative diagnostic casts. His excursive posterior interferences on #32 were marked on the models and subsequently eliminated by selective occlusal grinding to achieve an occlusal equilibration. It was confirmed that all anterior teeth had stable holding contacts in centric relation. This step would reduce or eliminate parafunctional habits and thus help prevent further lower incisor wear.[2]

Treatment

A preoperative diagnostic mock-up of #7 was planned. The form of the contralateral #10 to create bilateral symmetry and balance would be mimicked. Tooth #10 was characterized as having a typically notch-shaped form with a well-defined "halo" and high polychromicity, as well as subtle horizontal striae. On a study model, #7 was built to

Figures 3a & 3b: Preoperative; #7 showing extensive coronal tooth structure loss (category III A). Postoperative; successful esthetic outcome with a conservative veneer-type porcelain bonded restoration.

Figures 4a & 4b: Preoperative. Left; 1:1 view showing incisal wear of #9 and #10, making the left lateral incisor typically notch-shaped. Right; chair-side mock-up of #7 using composite to mirror the contralateral #10.

the planned contour using a chair-side light-cured composite[3] **(Figs 4a & 4b)**.

Two sets of a silicone putty index were fabricated: one as a stent for chair-side provisional fabrication, the other as a preparation guide.[4]

Preparation Rationale

Tooth preparation was similar to conventional porcelain veneer preparation except the palatal margin placement was below the palatal concavity on the low tensile stress area of the cingulum.[1] Different stress patterns are expected on the veneer palatal margin depending on the original level of the fracture line. A butt margin is recommended for minimum to moderate fractures where the conventional extension of a chamfer margin into the palatal concavity by a palatal wrap design generates harmful stresses on the restoration margins. However, for a severe crown fracture, the palatal margins are subjected to low tensile forces in the cingulum area. The restoration itself shows decreased stress in the palatal concavity due to stress redistribution in the bulk of porcelain. Thus, the extent of tooth substance loss significantly influences the location of the palatal finish line. The veneer-type BPRs with an extensive incisal edge span of freestanding ceramic material up to 5.5 mm are characterized by their "low-stress" design and increased crown stiffness when compared to intact teeth **(Figs 5 & 6)**.[5]

Preparation Technique

Tooth #7 was anesthetized and a plain #00 retraction cord (Ultradent Products; South Jordan, UT) was placed. The tooth was prepared using an 850-014 round-end tapered diamond (Brasseler USA; Savannah, GA) and the silicone

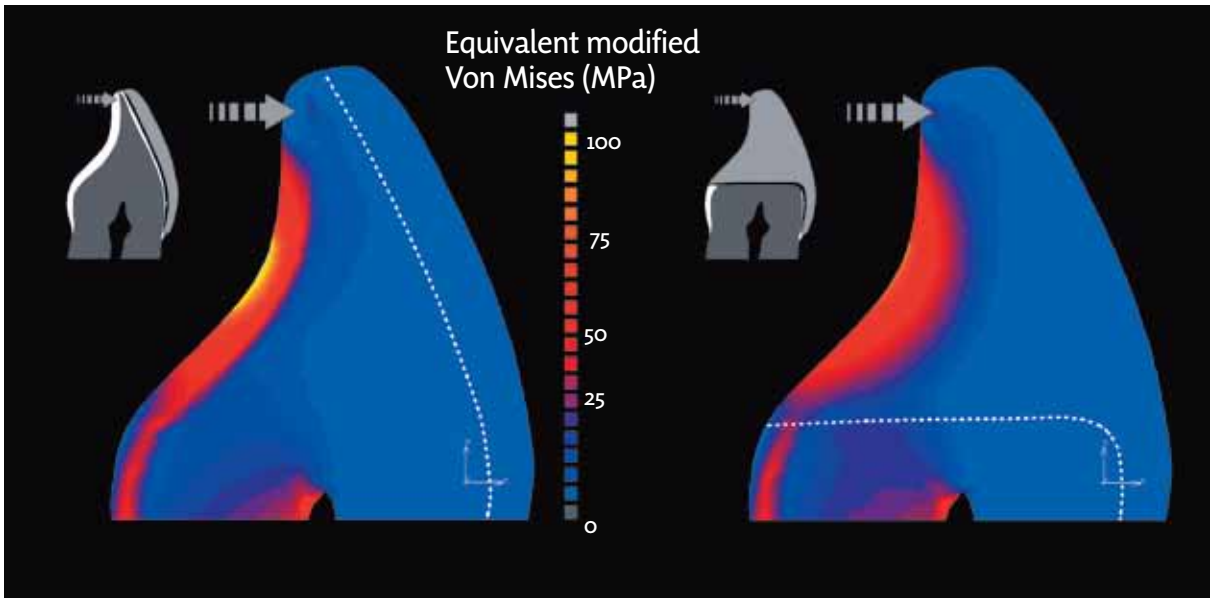

Figure 5

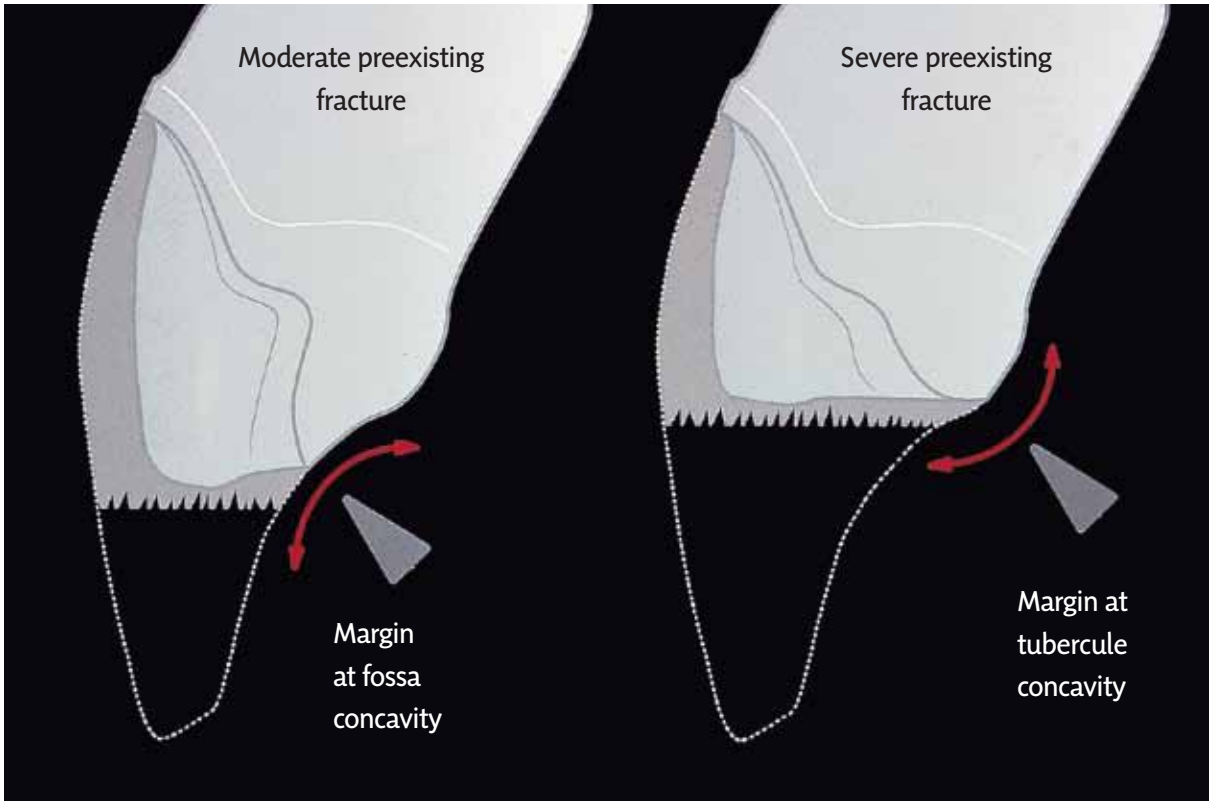

Figure 6

Figures 5 & 6: The veneer-type BPRs with an extensive incisal edge span of freestanding ceramic material up to 5.5 mm are characterized by their "low-stress" design and increased crown stiffness when compared to intact teeth.
(Figures reprinted from *Bonded Porcelain Restorations in the Anterior Dentition: A Biomimetic Approach* (pp. 155 and 253), by Pascal Magne and Urs Belser, Quintessence Publishing Co., 2002. Reprinted with permission from the publisher and authors.)

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it will still be beautiful.

He finally asked her out.
She wanted everything to be perfect.

She fussed with everything the afternoon before her date. Her hair, her makeup, her outfit ... she spent hours getting each detail right. Thanks to her dentist, the one thing she didn't worry about was her smile.

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Figures 7a & 7b: Left; tooth preparation on model with preparation guide in place. Right; 1:1 view showing final tooth preparation for the BPR.

Figures 8a & 8b: Preoperative images of contralateral incisor #10 taken at two different angles for reproduction of proper color, texture, and translucency.

index as a guide to axial reduction. An achieved uniform axial reduction of 0.5 to 0.7 mm was similar to a veneer preparation. An extended proximal preparation was then carried onto the palatal surface and terminated by a rounded butt finish line placed below the palatal concavity on the cingulum **(Figs 7a & 7b)**.

The preparation was finished using flexible pop-on discs (Sof-Lex, 3M ESPE; St. Paul, MN). The prepared tooth stump shade and adjacent and contralateral teeth shades were recorded. The basic shade selected for the planned BPR was 2L-2 (Vitapan 3-D master, Vita Zahnfabrik; Bad Säckingen, Germany). Photographs were taken of the contralateral incisor #10 from different angles to provide proper information about color, texture, and translucency **(Figs 8a & 8b)**.

Definitive Impressions

The previously placed retraction cord was removed and replaced with a #0 retraction cord impregnated with buffered aluminum chloride (Viscostat Clear, Ultradent) and left in place for five minutes. The retraction cord was then removed, and the tooth rinsed and dried. A final full-arch impression was made using Express XT polyvinyl siloxane (3M ESPE). A centric bite record was taken with arch form (Aluwax Dental Products Co.; Allendale, MI).

Provisionalization

A quick chair-side provisional was fabricated with Protemp 4 (3M ESPE) using the silicone index,[1] and shaped to achieve proper contours and margins to

Figure 9: Postoperative 1:1 frontal view showing a perfect blend of the BPR with the natural dentition.

evoke good gingival and papillary response. It was then polished with Astropol points (Ivoclar Vivadent; Schaan, Liechtenstein) and a high luster was achieved with Luxaglaze (DMG; Hamburg, Germany). The provisional was spot-bonded using Filtek flow (3M ESPE). With the provisional in place, an alginate impression was taken for communication with the laboratory.

Laboratory Instructions and Fabrication

The technician was instructed to fabricate a leucite-reinforced pressed ceramic BPR with a layering technique (Cergopress and Duceragold, Dentsply-Degudent; Hanau, Germany). The following items were included for laboratory transfer and communication:

- upper and lower full-arch polyvinyl silane impressions
- centric bite registration record
- upper cast with provisional in place
- stump and tooth shade selection
- color mapping and characterization instructions
- all required digital images on a compact disc.

Try In

The provisional restoration was removed. A translucent try-in paste (Prevue, Cosmedent; Chicago, IL) was placed in the restoration and was then placed on the tooth to evaluate contacts, marginal fit, form, and color. The internal effects were evaluated and subsequently compared with a white opaque shade Prevue paste. The translucent paste provided better optical depth and characterization in the restoration. The tooth form was a mirror image of the contralateral lateral incisor **(Fig 9)**. Clinically, the restoration was slightly higher in value and lower in chroma in the cervical third of the tooth. The provisional was then spot-bonded. Modifications such as improvement in cervical emergence profile and cervical staining to improve the chroma were prescribed.

Q&A

Dr. Hatkar shares his experiences with Case Type II.

Q: What were your case selection criteria for Case Type II?

A: I think the key issue for Case Type II is to have a flawless match of the value with the adjacent and contralateral teeth. A misstep here could certainly make or break the case. As with all Accreditation case types, case selection is an important criterion. My intention was to avoid any case with undue discoloration of the tooth to be restored. Dark coronal/radicular tooth structure has been, in my experience, the most challenging complicating factor for a single tooth restoration. If given the choice, I also feel it is an advantage to choose a case that involves a single lateral incisor rather than a single central incisor. A single central requires more attention to mirroring due to its proximity to the mid-line and prominence in the arch. Finally, having a preoperative healthy periodontal architecture with harmonious gingival zeniths of the restored tooth with its contralateral counterpart would be ideal to begin with.

Q: What were your initial concerns about the case and how did you address them?

A: My first concerns developed in the treatment-planning phase. A conventional approach may have hinted at endodontic therapy on tooth #7 followed by a composite fiber post-core buildup and then an all-ceramic full-coverage crown restoration on #7. However, considering the fact that I was restoring an asymptomatic vital tooth without any pulpal involvement, the more prudent choice was to conserve tooth structure, rather than intentionally devitalizing the tooth. Dr. Pascal Magne's biomimetic concept of restoring extensive coronal tooth loss with bonded porcelain restorations (BPRs) is well-supported in the literature.[1,2] This provided me with a more conservative alternative.

Q: What was the major challenge in achieving an optimal result?

A: The contralateral tooth #10 had a unique form with an incisal notch and a subtle stepping toward the distal incisal edge. The mesial transitional line angle was well demarcated with visible light reflection in 1:2 and 1:1 views. The major challenge was to first get the form of #7 to mimic that of the contralateral incisor. The freehand composite mock-up carried out preoperatively helped to create a prototype of the final desired result and served as a guide for the laboratory to visualize the correct form. The characterization of the tooth was another challenge; at the try-in stage, the special effects of #10 were carefully noted and then communicated to the laboratory.

Cementation

The provisional restoration was removed. The BPR was again tried in with a translucent try-in gel, found satisfactory, and decontaminated using 32% phosphoric acid gel (Uni-etch, Bisco; Schaumburg, IL). Tooth #7 was anesthetized and gingival retraction was carried out. The BPR was then treated with 9% hydrofluoric acid for two minutes (IPS Ceramic, Ivoclar Vivadent), rinsed, dried, and silanated using a two-component Bis-silane (Bisco). The tooth was then etched for 15 seconds using Uni-etch gel (Bisco) and thoroughly rinsed. Two coats of Single Bond (3M ESPE) were applied with a microbrush, air-thinned, and light-cured for 10 seconds. A translucent shade of Insure resin cement (Cosmedent) corresponding to the approved try-in paste was loaded into the BPR, then seated with apico-lingual pressure. After checking for proper placement using an explorer tip, the resin was cured for a five-second spot cure from both facial and palatal aspects. The slightly cured excess resin easily flaked off with apical pressure using a sharp hand scaler. De-ox gel (Ultradent) was applied to all BPR margins to prevent the formation of an oxygen inhibition layer. The restoration was cured for 20 seconds, first from the palatal side and then the labial.

Finishing

Any surface restoration excess resin was removed, as well as the margins, with a #12 Bard-Parker surgical blade (Becton Dickinson; Franklin Lakes, NJ). Metal FlexiStrips were used to clean interproximal resin and then checked with floss for smoothness. The occlusion was checked and the absence of any prematurities was confirmed. The BPR was finally polished to a high-gloss luster with Sparkle diamond polishing paste (Pulpdent; Watertown, MA) and rubber cup. Postoperative and oral hygiene instructions were given and the patient was scheduled for follow-up and postoperative photographs after two weeks **(Fig 9)**.

Summary

The novel-design Type III A BPRs are reliable and effective in restoring large parts of coronal volume and length in anterior teeth. The non-invasive nature of the treatment reduces the need for pre-prosthetic interventions such as root canal therapy, crown lengthening, and use of intra-radicular posts.[4] The patient was extremely pleased with the esthetic outcome. His expectations had been surpassed and his happy smile was our reward **(Figs 10a & 10b)**. Mimicking one or two natural teeth is a great challenge, but the satisfaction gained after a successful effort is immeasurable.

Acknowledgments

The author thanks ceramist Danesh Vazifdar (Ameretat Dental Laboratory; Mumbai, India) for his expertise and skill in fabricating excellent restorations; and Dr. Ali Tunkiwala (Mumbai, India) for his encouragement to pursue Accreditation.

Q: What is your opinion about the final outcome of your Case Type II?

A: The final result was optimal, having a good value match and customization. The subtle "halo" effect created in the incisal thirds added a lifelike appearance to the BPR. The form of the tooth was harmonious with that of the contralateral incisor. The patient's satisfaction with the esthetic result was the true test and the final endorsement of the result.

Q: What was your biggest influence in learning to deal with one or two indirect restorations?

A: At the 25th Anniversary AACD Scientific Session in 2009 we had an opportunity to attend a lecture given by Dr. Marty Zase, which was an eye-opener for any Accreditation candidate. Dr. Zase's presentation focused on every aspect of Accreditation Case Type II. He reviewed the goals and protocol, from case selection to execution, from common errors to handy tips, from materials to laboratory communication as well as photography. An article based on that lecture was published in the *jCD* Fall 2009 special issue; it is a must-read for all members in the Accreditation process.

Q: What has been your experience during the Accreditation process?

A: Going through Accreditation has been extremely beneficial to my personal and professional growth. The biggest change that I have experienced is a complete revitalization of my clinical approach. The Accreditation process demands that candidates work hard to develop their clinical and laboratory expertise. My sincere thanks to the AACD for providing the highest level of continuing education in cosmetic dentistry and helping me to achieve my potential. I feel proud to be a part of such a prestigious organization!

References

1. Magne P, Magne M. Treatment of extended anterior crown fracture using type III A bonded porcelain restorations. J Calif Dent Assoc. 2005 May;33(5):387-96.

2. Magne P, Belser U. Bonded porcelain restorations in the anterior dentition: a biomimetic approach. Hanover Park (IL): Quintessence; 2002-03. p. 174-5.

Figures 10a & 10b: Preoperative and postoperative full-face views, demonstrating the patient's satisfaction with his new smile.

References

1. Magne P, Belser U. Bonded porcelain restorations in the anterior dentition: a biomimetic approach. Hanover Park (IL): Quintessence; 2002.

2. Dawson PE. Functional occlusion: from TMJ to smile design. St. Louis: Mosby; 2007. p. 393-417.

3. Chiche GJ, Pinault A. Esthetics of anterior fixed prosthodontics. Hanover Park (IL): Quintessence; 1999. p. 121-3.

4. Magne P, Magne M: treatment of extended anterior crown fracture using type III A bonded porcelain restorations. J Calif Dent Assoc. 2005 May;33(5):387-96.

5. Magne P, Douglas WH. Optimization of resilience and stress distribution in porcelain veneers for the treatment of crown-fractured incisors. Int J Perio Rest Dent. 1999;19:543-53.

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Disclosure: The author did not report any disclosures.

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Examiners' Observations

Key Insights for Accreditation Case Type II

Scott Finlay, DDS, FAGD, FAACD
Illustrations by Dave Mazierski

The unique challenge that is being assessed in Case Type II is whether the candidate can indirectly restore one or two anterior teeth to a level of excellence that results in the restorations invisibly dissolving into the surrounding dentition. Placing emphasis on replicating nature requires great teamwork and communication between the restoring dentist and the ceramist. In this case type, the smile design-related criteria are limited to the local issues that influence the isolated restoration.

Achieving excellence is not accidental, as Dr. Hatkar demonstrated with this case. The key to a successful restoration is to carefully analyze the contours, shades, translucencies, and idiosyncrasies of the adjacent and contralateral teeth. By using diagnostic models and photographs, Dr. Hatkar was able to design a prototype stent that was created from his diagnostic wax-up. From this prototype, information relative to the desired contours could then be effectively communicated to the ceramist for the fabrication of a functionally esthetic result.[1] Using a contraster in the 1:1 images is a great help in visualizing the essential incisal effect details in teeth requiring restoration. Well-composed, clean photography of properly hydrated teeth and preparations helps the ceramist bring restorations to life.[2]

In this case type, the smile design-related criteria are limited to the local issues that influence the isolated restoration.

Dr. Hatkar's case selection enhanced his opportunity to succeed. Other than limited occlusal concerns, there were no distracting issues to compromise the success of this case. Tissue architecture was reasonably balanced and the unaffected teeth exhibited acceptable contours and esthetics.

The examiners unanimously passed Dr. Hatkar's case. The criteria faults identified were all judged to be minor.[3] They included the following:

- 53. *Is the color (hue, value, chroma) selection appropriate/natural, not monochromatic?* A slightly lower value was noted for #7 than for the adjacent and contralateral teeth, and the chroma in the mid-facial cervical of #7 was higher than in adjacent and contralateral teeth **(Fig 1)**.
- 61. *Is margin placement and design appropriate? Are the margins visible?* The examiners observed a visible margin on the mesial facial of #7.
- 87. *Are contralateral teeth in harmony in terms of size, shape, and position?* The examiners noted minor concerns relative to the length of #7 and the lack of balance with the contralateral tooth that also affected its visual proportions **(Fig 2)**.

As with all Accreditation case types, a deliberate purpose must be demonstrated and a level of excellence must be achieved. Each case type focuses on a particular subset of skills and knowledge. Dr. Hatkar has provided a fine example of the process to ensure natural, esthetic, predictable results for Case Type II. The hidden value in Accreditation is the repeated implementation of a proven protocol, which results in an enhanced level of predictability for every case.

Figure 1: Within the components of shade (hue, chroma, and value), managing value is the most critical criterion. An effective tool in accessing value is black-and-white photography, which reduces the visual field to the relative grayscale. In this example, the lower value displayed in tooth #9 is visually distinguished through the use of black-and-white imaging.

Figure 2: Balancing the proportions of contralateral teeth is an important criterion in managing those visual distractions that would indicate the presence of a restoration.

The key to a successful restoration is to carefully analyze the contours, shades, translucencies, and idiosyncrasies of the adjacent and contralateral teeth.

References

1. Dawson, PE. Functional occlusion: from TMJ to smile design. St. Louis: Mosby; 2007. p.173-5.

2. Terry DA, Snow SR, McLaren EA. Contemporary dental photography: selection and application. Compend Contin Educ Dent. 2008 Oct;29(8):432-6, 438, 440-2 passim; quiz 450, 462.

3. American Academy of Cosmetic Dentistry. Accreditation examination criteria. Madison (WI): The Academy; 2009. **jCD**

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The Challenge of Case Type II

And 11 Helpful Hints for Clinical Success

James H. Hastings, DDS, AAACD

The AACD's Accreditation Protocol for Dentists specifies five case types that are required to demonstrate excellence in cosmetic dentistry.

Case Type II is, One or Two Indirect Restorations (treating upper incisors; adjacent teeth must have no indirect restorations). Each Accreditation case type aims to emphasize a particular subset of skills in cosmetic dentistry. In Case Type II, examiners focus on the importance of laboratory communication, dental anatomy, and shade matching, with lesser emphasis on smile design elements since only a limited segment of the smile is under manipulation by the restorative dentist. Successful completion of Case Type II may present different challenges than other case types; however, attention to detail and carefully following the protocol is always necessary for success.

Following are suggestions/considerations for successful completion of Accreditation Case Type II:

- **STRIVE TO ESTABLISH** a relationship with a talented laboratory technician. A knowledgeable technician can be a great source of education. It's synergistic.[1] It is certainly an advantage if the laboratory technician is on the Accreditation track because communication and criteria issues are easier to discuss. There is a link on the AACD Web site that lists laboratory technicians who are on the path to Accreditation and are looking for a similar candidate on the clinical side to work with. You will find a listing of laboratory technicians, as well as dentists, who are participating in the Accreditation program in the Accreditation resources area on www.aacd.com, under "Case Participation Program."

- **BE ORGANIZED.** The Accreditation journey can be made less stressful if you construct a spreadsheet that contains relevant information on case types, potential patients, what must be done for each individual case, and case progress.

- **PRACTICE FLAWLESS PHOTOGRAPHY.** The American Board of Cosmetic Dentistry® (ABCD) presents a photographic and radiographic protocol to effectively and consistently evaluate a candidate's skill level relative to Accreditation. An outline of this protocol is presented in the *AACD Guide to Accreditation Photography*. The candidate has the best opportunity for success by presenting a case with clean, well-composed, adequately exposed images from consistent angles and magnifications as outlined in this protocol. Digital photography allows you to have immediate feedback and complete control over this important aspect of cosmetic dentistry.[2]

- **TAKE ADDITIONAL PHOTOGRAPHS;** don't limit yourself to the 12 AACD images. More views from different angles will offer you more information and will be helpful to your technician.[3]

- **DO A MOCK-UP.** With this case type, a mock-up may be less complicated, especially where only minor changes are contemplated, but it's important nonetheless. It is an excellent tool in communicating contours and idiosyncrasies of the intended shapes of teeth. Nearly every kind of anterior esthetics case can be better executed with a mock-up.[4]

- **EXPECT TO TRY** in your restoration(s) at least once for verification before cementing the final result. This is good practice in any Accreditation case. If changes are necessary, photographing the tried-in restoration(s) is essential in case you are working with a remote laboratory and your technician-colleague cannot be chairside at try-in.

- **KNOW THE ANATOMICAL** characteristics of the anterior teeth. If the form is correct, it is more likely to present an appealing view.

- **IT IS INCUMBENT ON** the clinician to manage all aspects of dentistry and to show mastery of the same in each and every case submitted. AACD Accreditation should be viewed as an ongoing educational process.

- **USE COMMON SENSE** and select a case that has a good chance of passing. If given the preference, choose a lateral incisor instead of a central. The proximity and prominence in the arch of a lateral provides a more favorable opportunity for comparison than adjacent central incisors. Matching a single central incisor will probably present more challenges than two restorations side-by-side or ones farther from the midline.

- **OPTIMUM TISSUE HEALTH** from the start is desirable. Candidates have the best opportunity for success when the periodontal architecture is resilient and healthy, providing a framework for an ideal result.

- **CONTACT A MENTOR.** Many of the stumbling blocks for Accreditation can be avoided through the use of a mentor. A list of calibrated examiners that serve as mentors can be found at www.aacd.com under "Accreditation," then click on "Volunteer Mentor Program."

References

1. Willes M. Searching for ways to improve teamwork between dentists and laboratory technicians. J Cosmetic Dent. 2008;24(3):75-7.

2. Lowe E. Digital photography: the AACD series—part one. J Cosmetic Dent. 2010;26(1):25-30.

3. Zase M. AACD Accreditation track Case Type II: one or two indirect restorations. J Cosmetic Dent. 2009;25(3):62-5.

4. Langchild T. Laboratory Accreditation workshop. J Cosmetic Dent. 2009;25(3):36-9. **jCD**

Dr. Hastings, of Placerville, California, has been an AACD member since 1994. He has served on several committees, as well as on the American Board of Cosmetic Dentistry® and the AACD's Board of Directors. Accredited in 1998, he is an Accreditation Examiner.

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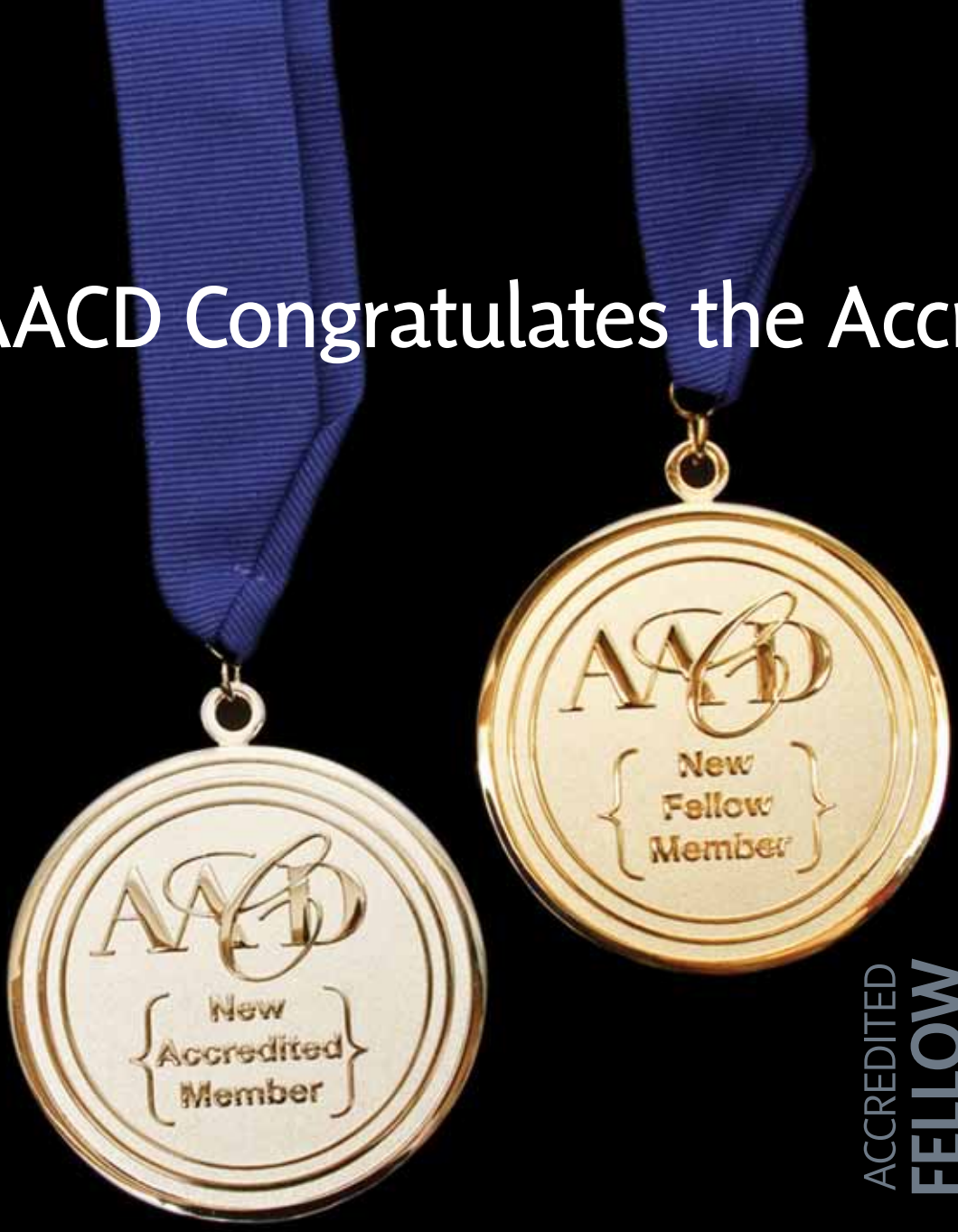

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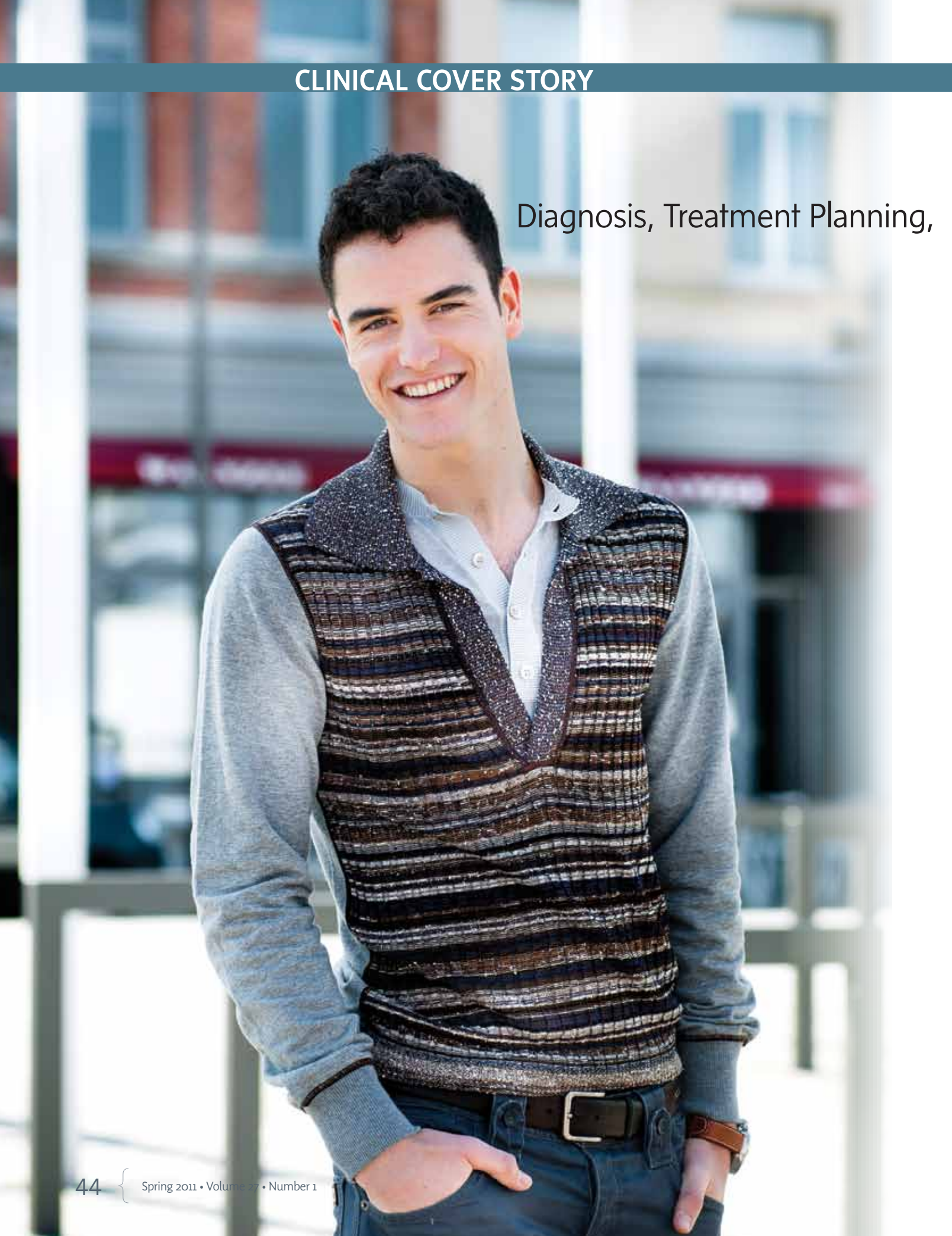


The Integration of Critical Steps

Workflow, and Teamwork in Anterior Restorations

Eric Van Dooren, DDS
Murilo Calgaro, CDT

Introduction

Case Presentation

The patient, a 20-year-old male, presented to our office, the goal being to correct the esthetic problems in the anterior region. Agenesia of the left lateral incisor and microdontia with very conical tooth shape covered with an old composite were at the root of the esthetic problems **(Figs 1a & 1b)**. A Maryland bridge for replacement of #7, with metal retainers on both central incisor and canine, was placed by the referring dentist after completion of the orthodontic treatment.

Soft tissue health and hygiene were acceptable, and no pockets were present. The patient presented a thin biotype with high scalloped gingival margins (which makes us more cautious for any surgical soft tissue procedure). A 1-mm overjet and a 1-mm overbite with a mandibular range of motion within normal limits were observed.

Figures 1a & 1b: Pretreatment retracted images.

Figure 1c: Pretreatment periapical x-ray.

The periapical x-ray exhibited enough space to place a narrow platform implant in the lateral right incisor position (Fig 1c). Silicone impressions were taken (Virtual, Ivoclar Vivadent; Schaan, Liechtenstein) and models were poured. A diagnostic wax-up was used to treatment plan the case. Diagnosis and proper treatment planning would ultimately be the guarantees for treatment success.

Esthetic/Functional Evaluation

Important Parameters

The main issue in treatment planning this case or cases with a similar diagnosis of space management is to predictably design with the diagnostic wax-up (and eventually mock-up) the following important parameters that will guide the surgical and prosthetic treatment:

- incisal edge position
- gingival position
- shape
- embrasure
- function (lateral and protrusive movements)
- need for respective or additive plastic periodontal procedures
- information related to eventual implant placement.

Some limitations became evident and needed to be addressed in the final treatment plan.

Issues To Be Addressed

After evaluation of the clinical photographs, models, and the diagnostic wax-up some limitations became evident and needed to be addressed in the final treatment plan:

- The spaces orthodontically created for both left and right lateral incisors were not ideal. In fact the space for #7 was 1 mm larger than that for #10.
- Because of the excessive incisal length of #7 on the provisional Maryland bridge, the right lower canine exhibited excessive incisal wear.
- Even after orthodontic treatment, there were some functional issues that needed to be addressed.
- Even if the tomography exhibited sufficient space and bone width for implant placement at #7, there was a soft tissue deficiency. This soft tissue deficiency needed to be addressed to avoid a problem with form, tooth axis, and gingival three-dimensional position of the future crown. Only the horizontal dimension of the defect needed to be addressed.
- Tooth axis discrepancy between #8 and #9 was evident.

Treatment Plan

After analyzing the wax-up, focusing on solutions for the limitations mentioned above, and integrating the functional and esthetic needs, the following treatment plan was established:

- placement of a narrow platform implant to replace #7
- connective tissue grafting for optimizing soft tissue contours
- removal of the old composite on #10 and fabrication and placement of a veneer
- mesial composite on #6 and all-ceramic implant restoration on #7 to optimize tooth forms and space management
- incisal composite for the lower right canine to restore the right canine guidance.

Clinical Treatment

Surgical Treatment

Simplicity and predictability in our surgical treatment, respecting biology, and trying to be minimally invasive should be the goals of any implant or plastic periodontal surgery.

The purpose should be to create an ideal prosthetic environment and allow the dental technician to create an implant restoration with ideal prosthetic soft tissue support and long-term stability.

A narrow-platform Branemark (Nobel Biocare, Göteborg, Sweden) implant was placed **(Fig 2a)** and a connective tissue graft was harvested from the maxillary tuberosity and placed in a buccal pouch **(Fig 2b)**. Grafts taken from the retromolar area are dense and fibrous, and exhibit long-term three-di-

Figure 2a: Implant placement.

Figure 2b: Connective tissue graft.

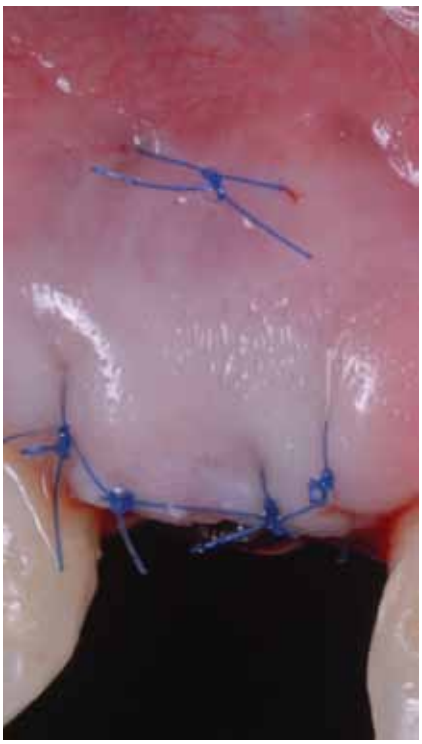


Figure 2c: Sutures placed.

Figure 2d: Healing abutment placed.

mensional stability with minimal long-term volumetric changes.

In most agenesia cases, there will be a 15-degree buccal implant angulation if we want to avoid any bone augmentation. This will automatically result in a cemented implant restoration, with the fabrication of an individualized abutment to compensate for the angulation.

The connective tissue graft will allow for the ideal gingival contour and thickness for the final restoration and will provide long-term soft tissue stability. In the author's opinion, all anterior implant sites should be enhanced and optimized with the placement of connective tissue grafts.

Care was taken to maximize soft tissue thickness around the implant. Seralene 6/0 sutures (American Dental Systems; Vaterstetten, Germany) were placed to secure the graft into position **(Fig 2c)**. A 3-mm NP healing abutment was placed at the day of surgery and healing was uneventful **(Fig 2d)**.

Prosthetic Treatment

After 10 weeks of healing, the left lateral incisor was prepared. The preparation was guided by a silocone index, and ultimately related or guided by the wax-up. Care was taken to maintain a minimally invasive approach and to achieve biologically compatible preparations and impressions. Since it was important to be able to close the interdental spaces, the distal and mesial preparations were subgingival. This would enable the dental technician to create normal interdental forms and contact points allowing for light compression of the tissue without violating the gingival biology. On the buccal aspect, the preparation outline was slightly supra-gingival.

A narrow-platform, open-tray impression coping was secured and a final impression (Virtual Light and Heavy Body, Ivoclar Vivadent) was taken **(Figs 3a & 3b)**.

Probably the most important step in trying to achieve optimal soft tissue esthetics is the concept of abut-

Figure 3a: Impression coping and retraction cord placed.

Figure 3b: Silicone key in place to evaluate preparation.

ment fabrication and final restoration. The dental technician must have a full understanding of ideal tooth diameters at the cemento-enamel junction and the need to leave the space (i.e., transmucosal buccal concave forms) for soft tissue thickness, (i.e., connective tissue fibers) at the interface. The combination of these two parameters is essential in obtaining long-term soft tissue stability. The concave abutment form will allow the clinician to have a thick connective fiber layer in the transmucosal zone. This critical zone will act like an O-ring and provide mechanical stability and long-term soft tissue stability. The use of biocompatible materials for the abutment is essential. Zirconia combines both biocompatibility and esthetics, and is the author's material of choice for implant abutments in the esthetic zone.

In this particular case the images explain our ideas and concepts on abutment design.

The most critical part in optimizing the soft tissue appearance around implant restorations is probably the concept of model-based soft tissue recontouring.

In most of our anterior delayed-loading implant restorations, no attempt is made to develop the ideal gingival contour with individualized healing abutments or impression copings **(Fig 4a)**. A high-quality full-contour esthetic and functional wax-up was made. It was important at that time to incorporate the ideal form and ideal three-dimensional gingival tooth position in the wax-up **(Fig 4b)**.

From this wax-up, a silicone index would be fabricated. This would allow us to have the ideal reference, especially of the gingival position of both teeth, at any given moment.

With a blue pencil, a line was drawn on the buccal aspect of the implant restoration following the gingival contour in the silicone index (i.e., a copy of the buccal contour of the wax). We transfer in this way the ideal bucco-gingival contour of the implant restoration. However, no attempt was made to meet exactly this ideal line. The concept is to stay, in all esthetic implant restorations, 0.5 mm away from this line **(Fig 5a)**. In fact, creating some kind of optical illusion is necessary. The positioning of the transitional line angles and playing with light reflection are very efficient tools in obtaining this optical illusion. The most common error in implant restorations is that, by trying to meet the ideal line or position, the gingival pressure of the prosthetic components is too great and will be followed by apical migration or recession of the marginal gingival tissue. This is why, in all anterior implant restorations, the dental technician should have to work with optical illusion.

The full contour of the transgingival space was then adapted from this line with a round diamond bur in the soft tissue mask **(Figs 5b & 6a)**.

From this point on it should be as if we are imitating a preparation of a natural tooth, with the abutment margin being positioned in the sulcus **(Fig 6b)**. The perfect implant restoration would be a restoration where the abutment occupies 90% of the transmucosal space and where the crown would only emerge in the last 1 mm or 10% of the transmucosal space **(Fig 7)**.

Zirconia CAD-CAM-designed abutments (Procera, Nobel Biocare) are the gold standard in the esthetic zone, especially for the external hex connections. The final zirconia abutment should

Figure 4a: Final model with soft tissue mask.

Figure 4b: Drawing the ideal buccal crown contour according to the wax-up.

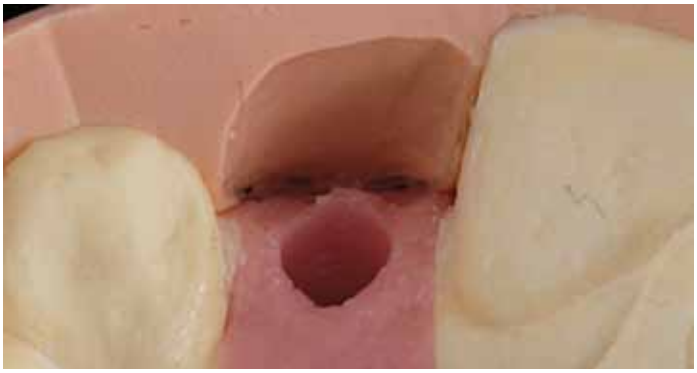


Figure 5a: The concept is to stay 0.5 mm away from the line drawn on the buccal aspect of the implant restoration.

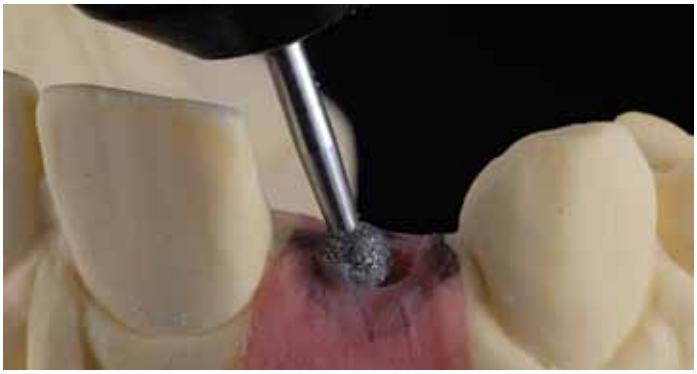
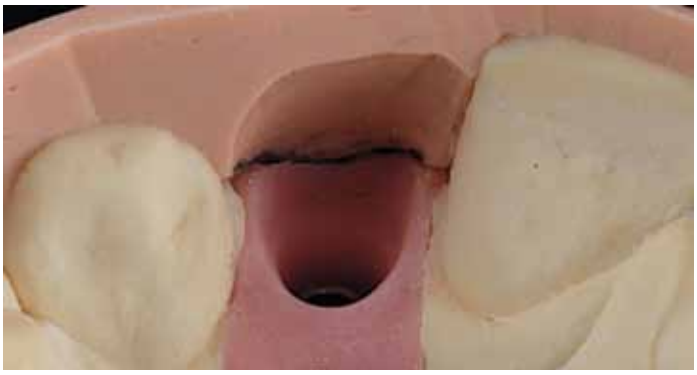


Figure 5b: A round, coarse diamond bur is used to reshape the transmucosal space.



Figures 6a: The final dimensions of the transmucosal space are related to the silicone index and wax-up.

Figure 6b: Abutment margin positioned in the sulcus.

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Figure 7: The perfect implant restoration would be a restoration where the abutment occupies 90% of the transmucosal space and where the crown would only emerge in the last 1 mm or 10% of the transmucosal space.

have a concave transmucosal form and should have the diameter of a lateral incisor at the marginal gingival level. The concavity will allow for connective tissue thickness and soft tissue stability at the perio-prosthetic interface.

It is the author's conviction that this will act as a mechanical barrier and seal off the bone from the external environment **(Figs 8a-8c)**.

An all-ceramic crown on #7 and a veneer on #10 (IPS e.max Press LT, Ivoclar Vivadent) were fabricated at this point. Care was taken to be very precise. Obtaining excellent biological, esthetic, and functional results are only possible when combined with high-precision finishing of the prosthetic components. The use of magnification both in the clinical and the laboratory environment are mandatory **(Figs 8d-8f)**.

At this stage the abutment and crown were tried in and minor modifications made. In most cases only very minor corrections are needed.

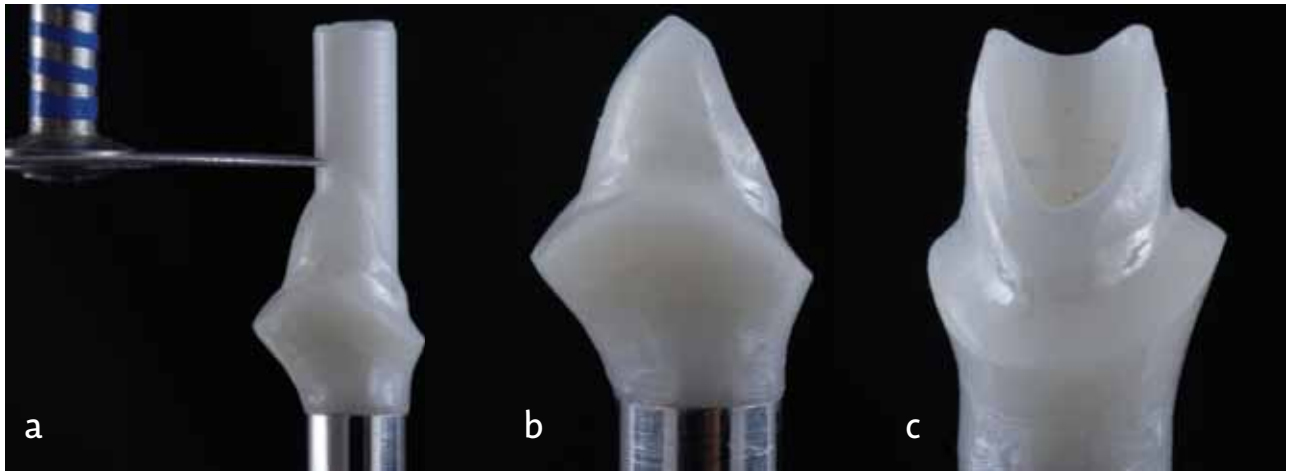
These minor modifications are necessary to improve color, form, and especially prosthetic soft tissue support. The final soft tissue profile and position around the implant restoration will depend on the amount of prosthetic pressure and the prosthetic contour.

In this particular case, trying in the second bake, it became apparent that the prosthetic soft tissue support was insufficient and, consequently, the gingival scallop was flat **(Figs 9a-9d)**.

Adding low-fusion porcelain during the last bake on the disto-gingival portion of the restoration allowed us to create a high scalloped gingival design, modify the zenith position, and relocate the gingival culminating point, allowing for a steeper distal angle and a softer mesial angle **(Figs 10a-10d)**.

Line angle position was evaluated (and can be modified to alter the visual perception of tooth width). The final color details were finalized using a low-fusion glaze paste on both natural tooth and crown and by applying stains intraorally. Intraoral photographs help the technician to evaluate the details on the computer screen and will help them to finish the details on the model.

The abutment was torqued at 32 Ncm. Teflon was used to close the screw access hole, and the crown and veneer were cemented with composite cement (Variolink veneer cement, Ivoclar Vivadent). To reestablish the canine guid-

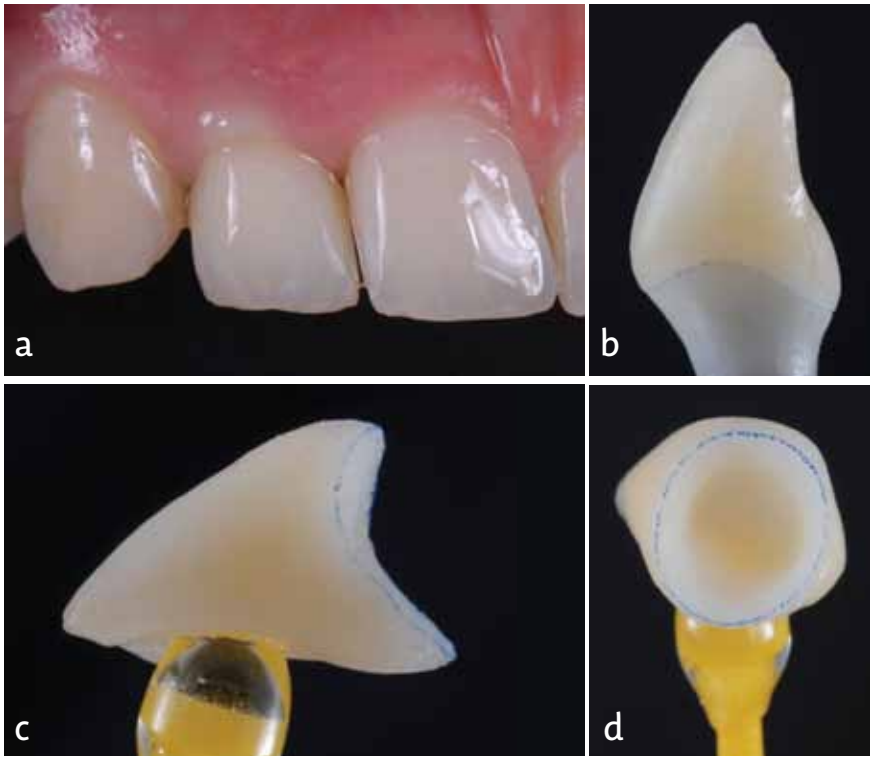


Figures 8a-8c: The abutment should have a concave transmucosal profile to allow for connective tissue thickness in this critical zone. This will act as a mechanical barrier and protect the bone from the oral environment.

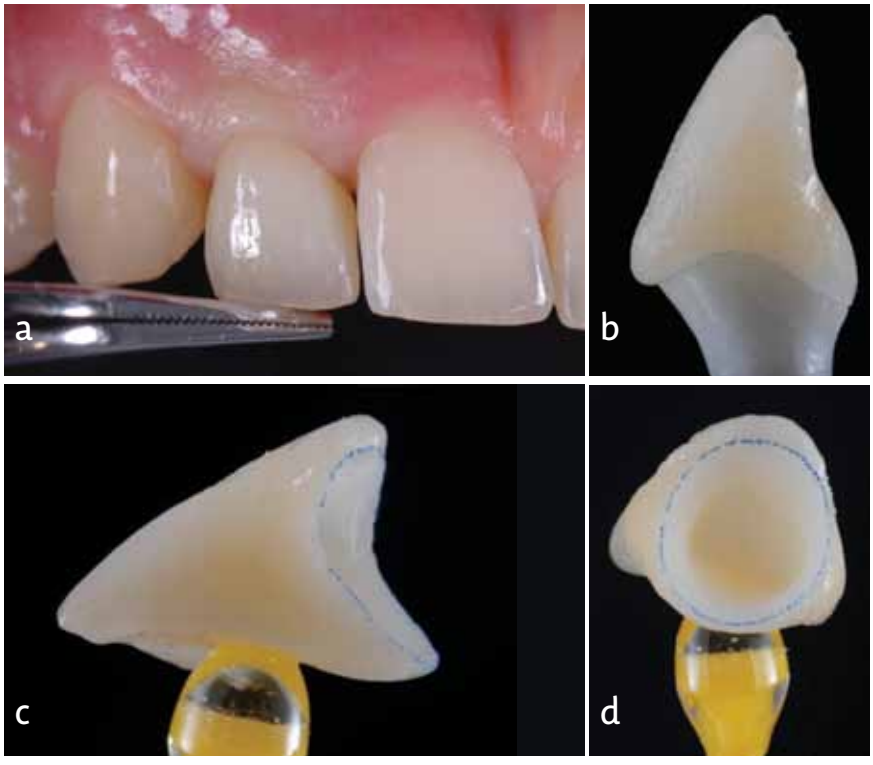
Probably the most important step in trying to achieve optimal soft tissue esthetics is the concept of abutment fabrication and final restoration.

Figures 8d-8e: Fabrication of a lithium disilicate coping (IPS e.max Press LT). The use of magnification both in the clinical and the laboratory environment are mandatory. Precision relates to biology and soft tissue health in a direct way.

Figure 8f: Layering of the porcelain (IPS e.max Ceram).



Figures 9a-9d: It became apparent that the prosthetic soft tissue support was insufficient and, consequently, the gingival scallop was flat.



Figures 10a-10d: Adding low-fusion porcelain during the last bake on the disto-gingival portion of the restoration allowed for a steeper distal angle and a softer mesial angle.

It became apparent that the prosthetic soft tissue support was insufficient and, consequently, the gingival scallop was flat.

ance on the right side and to protect the lateral incisor during excursive movements, a composite was made on the lower right canine. Also as planned with the wax-up, and to allow for optimal tooth forms, a mesial composite restoration was performed on #6 (courtesy of Dr. Claudio Pinho, Brasilia, Brazil). These functional adjustments are essential for long-term occlusal stability to avoid chipping of the porcelain on the new restorations **(Figs 11 & 12)**.

Occlusion and hygiene were checked. The patient was seen on a six-month recall program.

Conclusion

The 12-month postoperative x-ray revealed a satisfactory bone remodeling **(Fig 13)**. The final esthetic and functional result was satisfactory **(Figs 14 & 15)**. Both the implant restoration and the veneer exhibited excellent soft tissue integration and biological response.

Improving the perio-prosthetic interface with connective tissue grafting is one of the most efficient surgical treatments for obtaining long-term stability.

From a prosthetic standpoint, using soft tissue-friendly materials and designs, understanding the effect of gingival prosthetic contours, and implementing abutment designs that improve tissue thickness and stability are of equal importance.

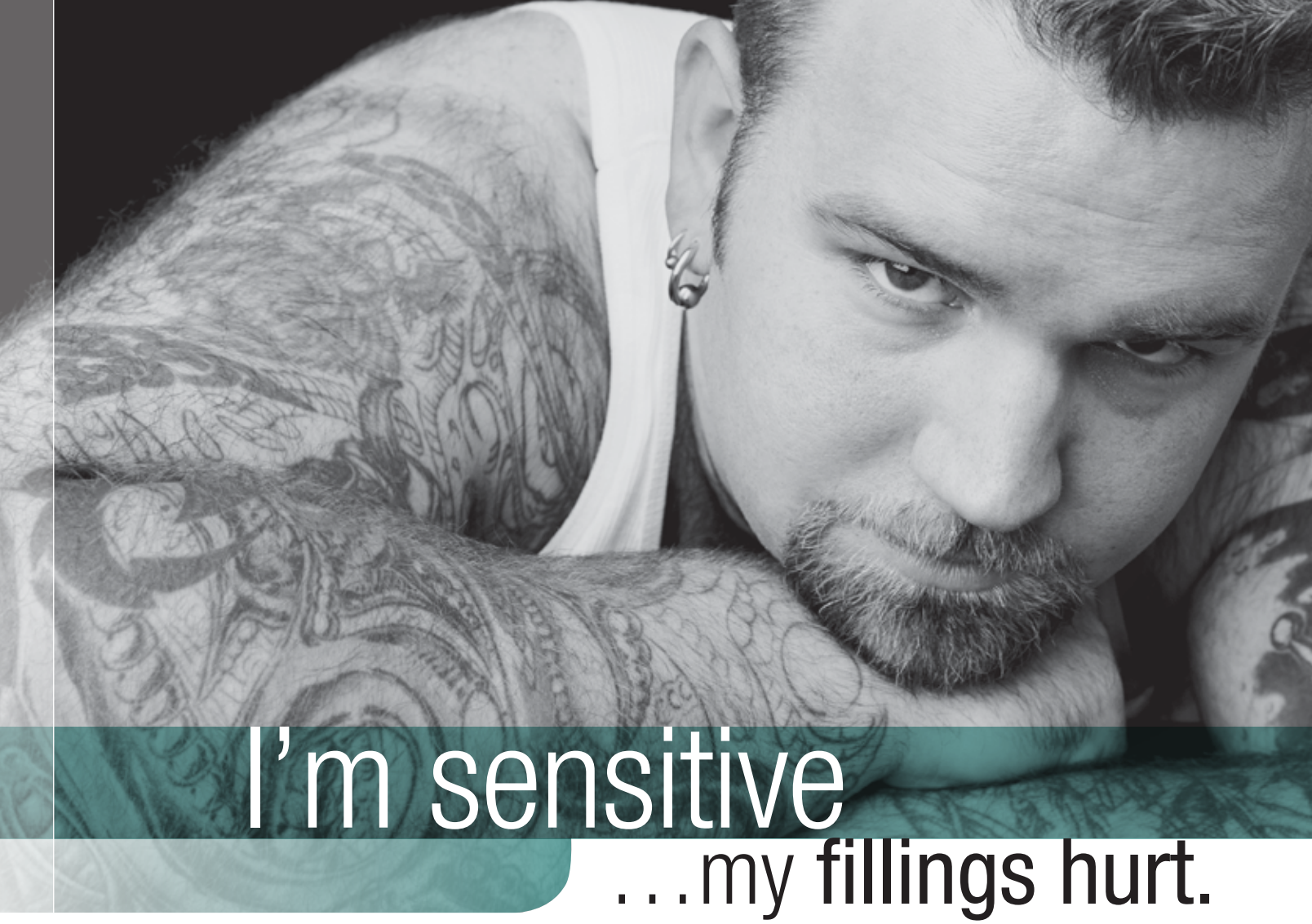
Sources

Allen EP. Surgical crown lengthening for function and esthetics. Dent Clin North Am. 1993;37:163-79.

Chiche GJ, Pinault A. Esthetics of anterior fixed prosthodontics. Hanover Park (IL): Quintessence; 1996.

Chu SJ. A biometric approach to predictable treatment of clinical crown discrepancies. Pract Proced Aesthet Dent. 2007;19:401-9.

Chu SJ, Tan JH, Stappert CF, Tarnow DP. Gingival zenith positions and levels of the maxillary anterior dentition. J Esthet Restor Dent. 2009;21:113-20.



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Figures 11 & 12: Functional adjustments. To restore the canine guidance, a composite was applied to the right upper and lower canines.

Figure 13: Twelve-month postoperative x-ray.

Figures 14 & 15: Final esthetic and functional results.

Culp L, McLaren EA. Lithium disilicate: the restorative material of multiple options. Compend Contin Educ Dent. 2010;31:716-25.

De Waal H, Castellucci G. The importance of restorative margin placement to the biologic width and periodontal health. part II. Int J Perio Rest Dent. 1994;14:70-83.

Deas DE, Moritz AJ, McDonnell HT, Powell CA, Mealey BL. Osseous surgery for crown lengthening: a 6-month clinical study. J Periodontol. 2004;75:1288-94.

Fagan MC, Owens H, Smaha J, Kao RT. Simultaneous hard and soft tissue augmentation for implants in the esthetic zone: report of 37 consecutive cases. J Periodontol. 2008 Sep;79(9):1782-8.

Fradeani M. Esthetic rehabilitation in fixed prosthodontics. vol 1: Esthetic analysis—a systematic approach to prosthetic treatment. Hanover Park (IL): Quintessence; 2004.

Goldstein RE. Esthetics in dentistry. Philadelphia: Lippincott; 1976.

Grunder U. Crestal ridge width changes when placing implants at the time of tooth extraction with and without soft tissue augmentation after a healing period of 6 months: report of 24 consecutive cases. Int J. Perio Rest Dent. 2011 Feb;31(1):9-17.

Hempton TJ, Esrason F. Crown lengthening to facilitate restorative treatment in the presence of incomplete passive eruption. J Calif Dent Assoc. 2000;28:290-8.

Ingber JS, Rose LF, Coslet JG. The "biologic width"—a concept in periodontics and restorative dentistry. Alpha Omegan. 1977 Dec;70:62-5.

Malik K, Tabiat-Pour S. The use of a diagnostic wax set-up in aesthetic cases involving crown lengthening—a case report. Dent Update. 2010;37:303-7.

Nozawa T, Tsurumaki S, Yamaguchi S, Enomoto H, Ito K. The concept of the interdental gingival midpoint line in cervical line management. Eur J Esthet Dent. 2009;4(1):46-68.

Pontoriero R, Carnevale G. Surgical crown lengthening: a 12-month clinical wound healing study. J Periodontol. 2001;72:841-8.

Rufenacht CR. Fundamentals of esthetics. Hanover Park (IL): Quintessence; 1990.

Ward DH. Proportional smile design using the recurring esthetic dental (red) proportion. Dent Clin North Am. 2001;45: 143-54.

Zanatta FB, Giacomelli BR, Dotto PP, Fontanella VR, Rosing CK. Comparison of different methods involved in the planning of clinical crown lengthening surgery. Braz Oral Res. 2010;24:443-8. **jCD**

Dr. Van Dooren is a private practitioner in Antwerp, Belgium.
Murilo Calgaro, CDT, is a dental technician in Curitiba, Brazil.
Disclosure: Dr. Van Dooren is a consultant for Nobel Biocare and Anaxdent, and he receives honoraria from Ivoclar Vivadent.

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Greetings to the members of the American Academy of Cosmetic Dentistry (AACD).

As you know, a sisterhood agreement was concluded between the AACD and the Japan Academy of Esthetic Dentistry (JAED) at a signing ceremony held during the 26th Annual AACD Scientific Session in Texas on April 30, 2010.

In late August 2010, we were pleased to welcome AACD President Dr. Hugh Flax, AACD CEO Mr. Ed Simeone, and Dr. Wynn Okuda to the 21st Annual Meeting of the JAED, as a way to kick off academic exchange. Dr. Okuda offered a special lecture, titled "Cosmetic and Esthetic Dentistry: Understanding the Differences and its Application." In addition, we had the great pleasure of accepting an article, "Class IV Direct Resin Restoration," written by AACD President-Elect Dr. John Sullivan. This article was published in the Shika shinbi *(JAED Academic Journal), Vol. 23 (1), 2010.*

The JAED is composed of members who represent various professions and occupations, such as dentists who practice at universities or research institutes or who are engaged in private practice; as well as dental technicians, dental hygienists, and researchers for manufacturers. We hold scientific sessions and seminars with offerings that are intended to appeal to the entire composition of our membership.

I understand that the AACD also holds annual scientific sessions in which many members participate, and that these sessions provide occasions for exchanging information about the latest clinical skills and dental treatments using advanced techniques.

I hope our friendship and academic exchange will thrive and grow, with the shared aim of improving esthetic dentistry treatment skills, taking advantage of the characteristics of each Academy.

Sincerely,

Toru Sato, DDS, PhD
President
Japan Academy of Esthetic Dentistry

Dr. Hugh Flax and Dr. Toru Sato

In the Spring of 2010, the American Academy of Cosmetic Dentistry (AACD) and the Japan Academy of Esthetic Dentistry (JAED) formed a "sister relationship" for the purpose of sharing educational information. At the JAED's scientific conference in August 2010, Dr. Wynn Okuda delivered a lecture on esthetics and cosmetics in dentistry. At the 27th Annual AACD Scientific Session in Boston in May, Dr. Tomoyuki Tsubaki will present a lecture focusing on a whitening technique currently used only in Japan. These cross-cultural lectures are part of the ongoing relationship between the two organizations.

An exchange of journal articles is also part of the relationship agreement. AACD President-Elect Dr. John Sullivan's article on Accreditation Case Type IV was featured in the Volume 23, Issue 1 2010 edition of the *Shika shinbi* (*Journal of Esthetic Dentistry*, published by the JAED); and an article by Drs. Morihiro Miyamae and Takashi Nakamura appears in this issue of the *jCD*.

The goal of this relationship is to feature different global perspectives and approaches to cosmetic dentistry. Additional relationships will be created that will ultimately offer *jCD* readers a more comprehensive resource from which to evaluate and improve their own clinical skills.

A Multidisciplinary Approach for Anterior Esthetic Trauma

Complex Esthetic Treatment for a Patient Injured in a Traffic Accident

Morihiro Miyamae, DDS
Takashi Nakamura, DDS, PhD

Abstract

When a person suffers facial trauma, he or she often experiences mastication problems or reduced dental esthetics. In such circumstances, a combination of treatments is required, including periodontal, orthodontic, and prosthetic procedures, to restore the lost function and esthetics. This article reports on the case of a person who received a combination of multidisciplinary treatments for an anterior esthetic problem caused by a traffic accident.

Figure 1: Pre-treatment, frontal view.

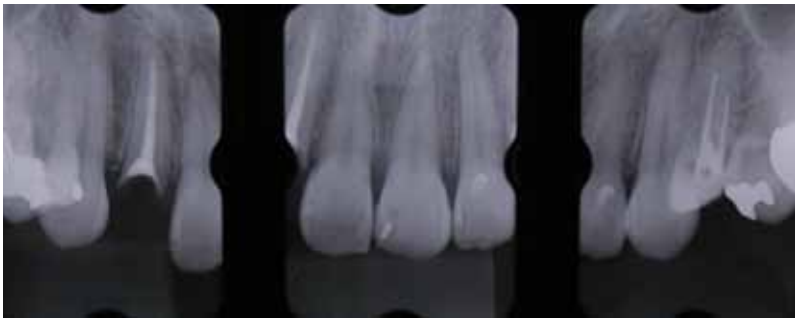

Figure 2: Pre-treatment, radiographs of the upper anterior region.

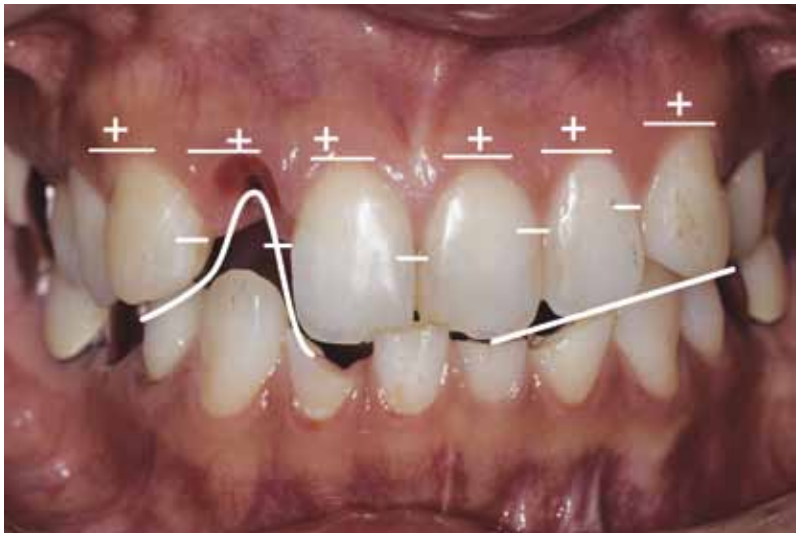

Figure 3: The gingival margin outline was asymmetric and had no parallelism. The zenith and papillae were misaligned.

Introduction

The parallelism, symmetry, zenith, and papillae of the gingival margin line are important considerations when attempting to restore the esthetics of periodontal tissue in the anterior region.[1] First, restoring parallelism requires that the incisal edge line connecting both canines and the central incisors be made parallel to the outline of the lower lip. Second, symmetry requires that the cervical position of the maxillary central incisors, lateral incisors, and canines are symmetrical, and that the cervical positions of the lateral incisors are more coronal than those of the adjacent teeth. Third, the zenith should optimally be a bit distal to the center of the dental axis. Lastly, the longest papilla should be between the central incisors.

Case Report

Findings

The patient, a 37-year-old female, presented complaining of an anterior esthetic problem caused by a traffic accident. The accident damaged her maxillary anterior teeth, forcing them into a slightly eccentric palatal position **(Figs 1 & 2)**. One month after receiving treatment at a hospital, she visited us because of dissatisfaction with her appearance and disturbed masticatory function.

In this case no parallelism was found in the gingival margin outline, there was considerable asymmetry, the zenith was misaligned, and so were the papillae **(Fig 3)**.

Other problems were found, such as irregular anterior couplings and invaded biologic width for the maxillary right lateral incisor. However, no periodontal problems, such as bone defects or deep pockets, were observed.

Treatment Plan

Taking into account the aforementioned problems, we made a treatment plan for the upper anterior region. After orthodontic extrusion, the esthetic treatment was performed by installing an all-ceramic crown and porcelain laminate veneers.

The treatment plan for the upper incisors was as follows:

- #12: root canal treatment
- ##13-23: orthodontics (#12: extrusion)
- #12: all-ceramic crown
- #11, #21, #22: porcelain laminate veneers.

No parallelism was found in the gingival margin outline, there was considerable asymmetry, the zenith was misaligned, and so were the papillae.

Treatment

Tooth realignment was performed. The cervical line was aligned with the orthodontic extrusion and the desired biologic width was obtained. An orthodontic extrusion is an effective procedure for obtaining biologic width **(Figs 4-6)**.

After the orthodontic treatment, the edge-to-edge occlusion caused by the traffic accident was repaired to restore normal tegmenta. Esthetic and functional anterior guidance was achieved **(Fig 7)**. The positions of the gingival tissues became symmetric both on the maxilla and the mandible. However, the teeth were not yet improved to present optimal shape and appearance **(Fig 8)**.

The shapes and positions of the teeth and gingival tissues were confirmed with a diagnostic wax-up **(Fig 9)** to lay the groundwork for an optimal definitive restoration. Since their incisal edges were fractured, we decided to restore three incisors with porcelain laminate veneers. When preparing laminate veneers, it is effective to make a jig from a diagnostic wax-up, using a silicone impression material **(Figs 10 & 11)**.

Figure 12 shows the definitive restoration of the anterior incisors. Approximately one week after bonding the laminate veneers, we matched the color tones of the porcelain laminate veneers and resin-cemented them to the natural teeth. Then, an all-ceramic crown was cemented on the maxillary right lateral incisor **(Fig 13)**. Harmony with the smile line was achieved **(Figs 14 & 15)**. The mandibular incisors were treated in the same way, using all-ceramic crowns.

After treatment, the occlusion was stabilized and satisfactory results were achieved regarding parallelism, symmetry, zenith, papillae, and tooth shapes **(Fig 16)**. This overall excellent result can be attributed to the combination of periodontal, orthodontic, and prosthodontic treatments.

Figure 4: A gingivectomy was conducted before orthodontic extrusion.

Figure 5: Orthodontic treatment of the upper teeth.

Figure 6: Radiographs before and after orthodontic extrusion.

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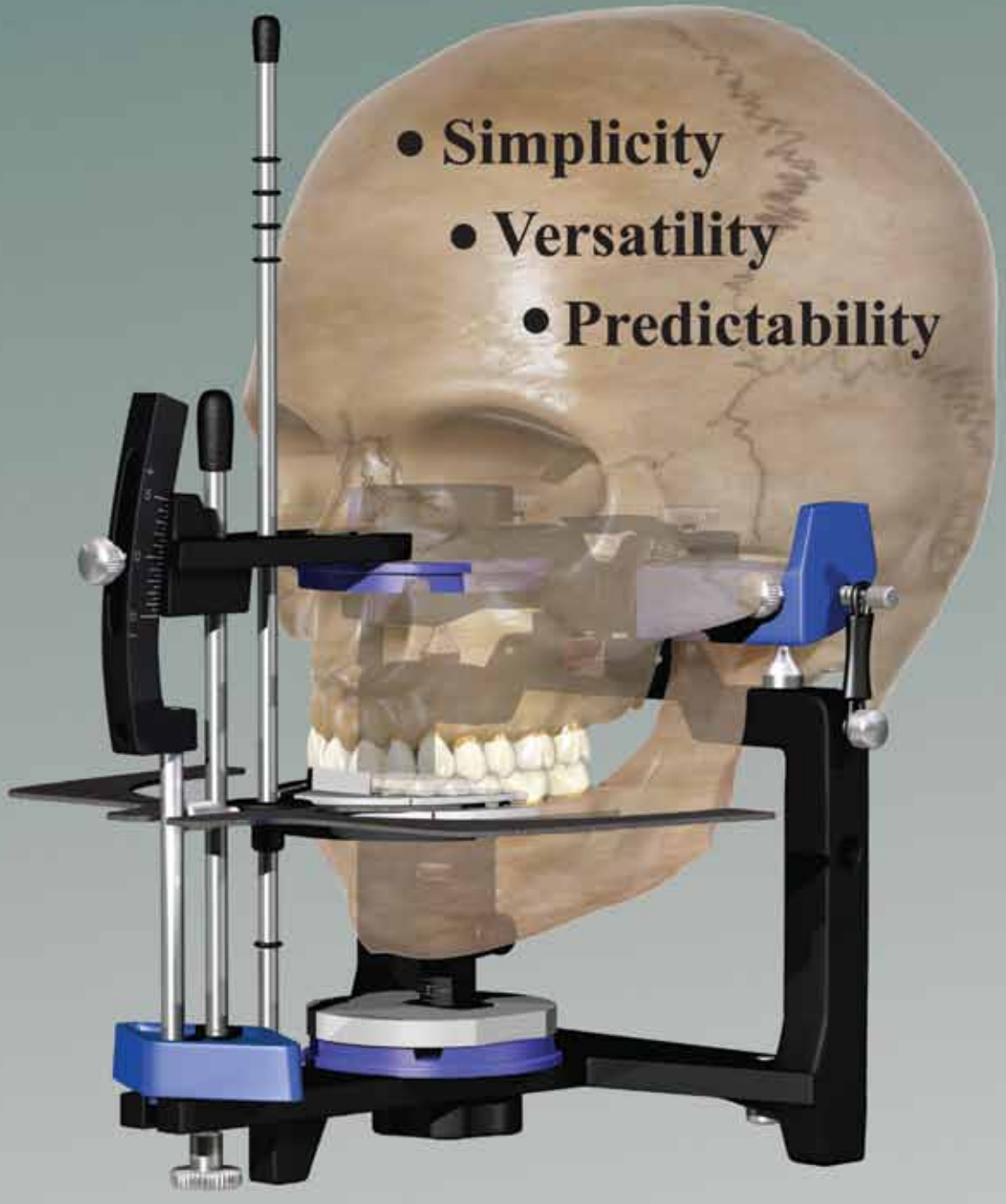

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Figure 7: Lateral views at the first visit and eight months after the start of orthodontic treatment.

Figure 8: Frontal view of the anterior region after orthodontic treatment.

Figure 9: A diagnostic wax-up was made.

Figure 10: A jig made using a silicone impression material is effective for preparation.

Figure 11: Porcelain laminate veneer preparation for three incisors.

Figure 12: Definitive restorations for the anterior incisors.

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Discussion

All-ceramic restorations have excellent biocompatibility and reproduce a visual appearance close to that of natural teeth. However, in an actual clinical setting, there arise cases for which all-ceramic restorations alone cannot sufficiently restore the function and esthetics of the teeth and mouth. The patient in this report had a distorted cervical line and rotated axes of anterior teeth due to a traffic accident, and needed orthodontic treatment prior to the prosthetic treatment. In addition, the patient had a damaged lateral incisor with a remaining root. This lateral incisor could have been extracted and treated with an implant. However, an orthodontic extrusion was selected instead of removing the lateral incisor, because a sufficient amount of sound tooth structure and a long root were still available.[2] The orthodontic extrusion made it possible to lift not only the tooth but also the bone. This choice also has the advantage that, if it needs to be extracted for any reason, the lateral incisor can be treated later with an implant.

All-ceramic restorations have excellent biocompatibility and reproduce a visual appearance close to that of natural teeth.

After orthodontic extrusion, the abutment was constructed for the lateral incisor using a fiber post, which is believed to prevent the creation of large stresses at the root that might cause tooth fracture.[3] After that, a glass ceramic crown was delivered. The other incisors were restored with porcelain laminate veneers. Laminate veneers have a thinner layer of tooth-colored porcelain material than crowns and thus offer limited color-matching ability. For this reason, each laminate veneer was first fitted in place. After the shade settled down, a crown with a shade matching the veneer was placed.

About three-and-a-half years have passed since the patient received the treatment, without any special problems arising **(Fig 17)**. This leads to the conclusion that multiple treatments using prosthodontic, orthodontic, and prosthetic procedures in combination can be effective in stabilizing mastication and restoring the functions and esthetics of badly traumatized mouths.

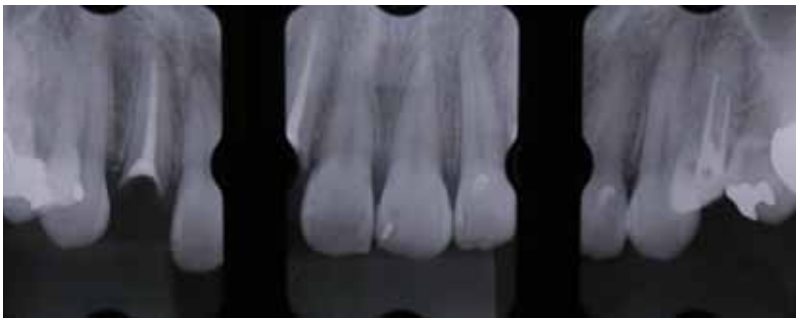

Figure 13: Post-treatment, radiographs of the upper anterior region.

Figure 14: Post-treatment, frontal view.

Figure 15: Post-treatment, lateral view.

References

1. Fradeani M. Esthetic rehabilitation in fixed prosthodontics: esthetic analysis: a systematic approach to prosthetic treatment. Hanover Park (IL): Quintessence; 2004.

2. Carvalho CV, Bauer FP, Romito GA, Pannuti CM, De Micheli G. Orthodontic extrusion with or without circumferential supracrestal fiberotomy and root planing. Int J Perio Rest Dent. 2006;26(1):87-93.

3. Nakamura T, Ohyama T, Waki T, Kinuta S, Wakabayashi K, Mutobe Y, Yatani H. Stress analysis of endodontically treated anterior teeth restored with different types of post material. Dent Mater J. 2006;25(1):145-50. **jCD**

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Disclosure: The authors did not report any disclosures.

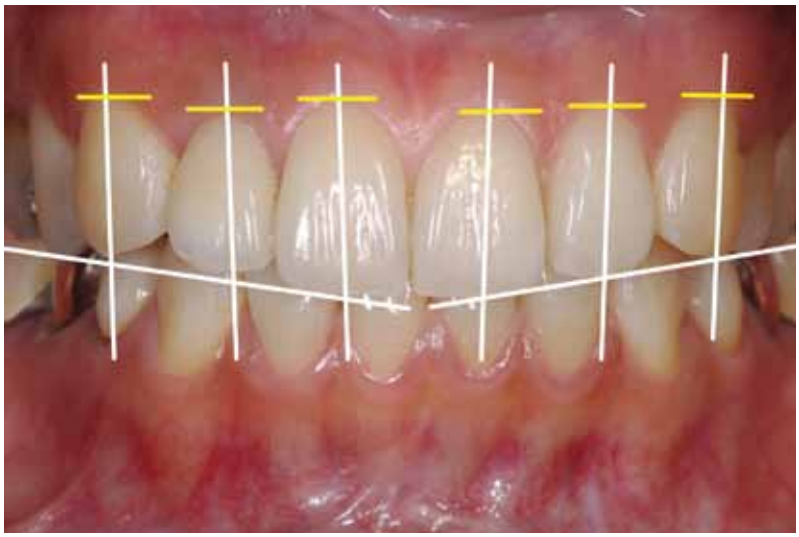

Figure 16: Parallelism, symmetry, zenith, and papillae of the gingival outline were considerably improved.

Figure 17: Frontal view three-and-a-half years after treatment.

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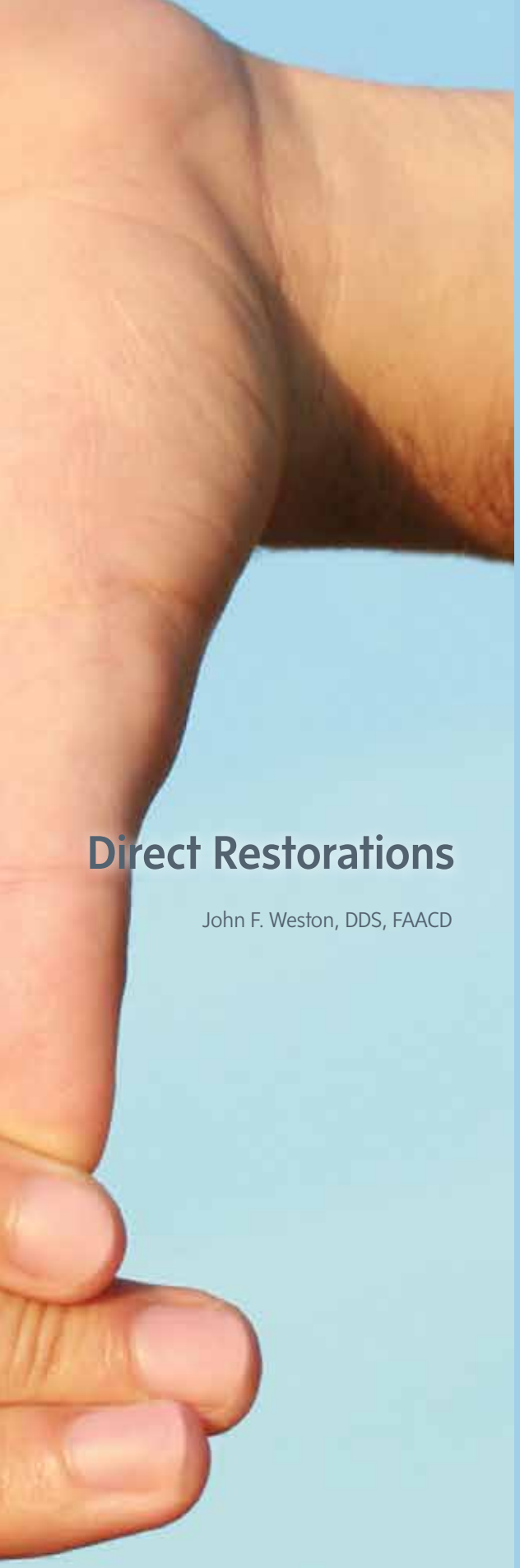

Direct Restorations

John F. Weston, DDS, FAACD

Abstract

This case demonstrates the use of a direct restorative to provide a patient with an affordable smile makeover. The nano-composite utilized in the case provides both high strength and high esthetics, so while the patient understands that retreatment with an indirect procedure will eventually be necessary, the restorations provided can be expected to serve for several years. While procedures like this require proper training, developing this clinical skill allows clinicians the ability to offer their patients a broader and more affordable variety of treatments.

Very often in dentistry, patients' economic means have a serious impact on their ability to accept treatment.

Table 1: Classifications of Composites[1]		
Microhybrid/Nano-hybrid	**Microfill**	**Nano-fill**
Properties		
• high strength • moderate to slight roughening with long-term wear	• lower flexural strength • retains smoothness long term	• high strength • retains smoothness long term
Products		
Filtek Z250 (3M ESPE; St. Paul, MN) Herculite Ultra (Kerr; Orange, CA) Esthet-X and Esthet-X HD (Dentsply Caulk; Milford, DE)	Durafill (Heraeus; South Bend, IN) Heliomolar (Ivoclar Vivadent; Amherst, NY) Renamel (Cosmedent; Chicago, IL)	Filtek Supreme Ultra (3M ESPE)

Table 1

Introduction

Very often in dentistry, patients' economic means have a serious impact on their ability to accept treatment. But limited means do not always have to result in delayed treatment or a less esthetic solution. The proper application of clinical skill and the right material create an excellent opportunity to help patients who are in transitional treatment or those with limited financial resources.

While often seen as a more expensive alternative to amalgam in the posterior areas, composite materials can also serve as a less costly alternative to anterior indirect restorations. This case demonstrates a situation in which a directly applied nano-composite material was an exceptional alternative to indirect restorative treatment, providing a very conservative treatment that will serve the patient well into the future.

When selecting a composite restorative material, it is important to understand its properties to determine its suitability for a case **(Table 1)**. Ideally, a material should demonstrate both wear resistance, polishability, and strength in order to provide maximum value to the patient.

Figure 1: The patient presented with discolored and decaying vintage composite restorations.

Figure 2: Retracted view of initial presentation.

When selecting a composite restorative material, it is important to understand its properties in order to determine its suitability for a case.

How Nano-Composites are Formulated

Nano-composites have seen recent advances in both wear properties and polishability that make them especially suitable for esthetic work. But it is necessary to understand the various ways in which nano-particles can be incorporated into a composite to determine how each type can perform clinically. Many microhybrid composites are formulated with a blend of particles, including hybrid filler particles mixed with nano-particles or fumed silica.[1,2] This can result in the material losing polish over time, as the large filler particles in these materials can be plucked from the matrix as the composite wears. The composite still offers a high filler loading, giving it suitable strength; however, esthetics are compromised due to low polish retention.

Combining individual nano-particles with clusters of nano-particles, as done in the Filtek Supreme restoratives (3M ESPE; St. Paul, MN) presents a unique way to circumvent this problem. This restorative is the only composite made entirely of nano-sized particles. The nano-clusters used in the material are lightly sintered before being blended into the composite. This sintering allows the particles to break apart during the wear process. Since no large particles break away (as happens with other nano-filled composites such as microhybrids and nano-hybrids), this line of restoratives has the ability to hold a strong polish over time and still exhibit good strength.

As an alternative to hybrid composites, microfills are often discussed for their high polish and better wear properties. However, the drawback with these materials comes in their strength, which is affected by the weak bond between the microfill's resin matrix and the "organic filler" matrix, which is prepolymerized. Evidence shows that microfill composites often fracture on lines between these particles when under stress and fatigue.[3,4] Data have also demonstrated that microfills are more prone to marginal breakdown under occlusal loading.[5]

Prepolymerized fillers are not used in nano-composites, however. Due to the fact that the material's nano-clusters function as a single piece, they also enable a high filler loading. This property gives a nano-composite higher strength than a microfill.[6] With good strength and the ability to maintain a high polish over time, the nano-composite used in this case offers the potential for years of service.

Figure 3: The canines had moved into the position of the missing lateral incisors.

Case Report

Findings

The patient, a 46-year-old male, first visited the office in September 2009. He had lost his job due to the economy, and was concerned about his smile because he was actively seeking a new job and going on interviews. As research shows that someone exhibiting a pleasing smile is more likely to get hired,[7] he was searching for a fast and economic solution to gain an edge in a competitive market.

The patient had significant crowding of the teeth, as well as decay and discoloration of vintage composite restorations in the front of the mouth **(Figs 1 & 2)**. He also had congenitally missing lateral incisors, and the canines had moved into a more mesial position, creating a narrow smile and flat or reversed smile line **(Fig 3)**.

Treatment Plan

Due to the patient's economic limitations, as well as his desire to see the work completed quickly, it was determined that restoring the upper anterior teeth with composite would be the most appropriate solution. An obvious alternative treatment would have been orthodontic realignment followed by indirect restorations, but time limitations, due to a pending job interview and limited finances, made this option not a realistic one.

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Treatment

The teeth were dried and a lip retractor was placed for the smile design and intraoral mock-up. During this step, Filtek Supreme Ultra Universal Restorative was applied directly to the facial surfaces and edges of the teeth. Basic contouring was completed so the patient could view and approve the new facial contours, buccal corridor and smile line **(Figs 4 & 5)**. Reduction guides were then created with Blu-Mousse (Parkell, Inc.; Edgewood, NY) to record the incisal edge position and facial contours **(Fig 6)**. The goal was to both modify the canines to appear like lateral incisors and shape the premolars into a canine-like appearance, therefore, the mock-up and smile design were important steps to visualize how this would happen.

Local anesthesia was then placed, the old composite was removed, and the teeth were prepared for restorative material clearance. Particular attention was paid to reduction of the facial surface of the canines in order to create enough space to make them appear like lateral incisors **(Fig 7)**. The teeth were etched **(Fig 8)** and missing tooth structure replaced with a dentin shade of Filtek Supreme Ultra Universal Restorative using Adper Single Bond Plus Adhesive (3M ESPE) **(Fig 9)**. Next, the incisal guide was used with white enamel (3M ESPE) to create a framework of the intended incisal edge design **(Fig 10)**. The goal was to keep the case as simple as possible using a single layer of composite while concentrating on contours and surface luster. A clear matrix was placed around each tooth in turn and A1 enamel shade (3M ESPE) was applied to the front four teeth. A2 enamel (3M ESPE) was used for the "new" canines to complete the illusion by creating the higher chroma that is normally seen on canines **(Figs 11 & 12)**.

Figure 4: A smile mock-up was performed with flowable composite and basic contouring.

Figure 5: The facials of the canines were reduced, and the lower incisors were marked for reduction.

Figure 6: Polyvinyl silane material was used to create a reduction guide.

Figure 7: Conservative preparations showing proper material clearance.

Figure 8: Completed conservative preparations after etching prior to bonding procedures.

Figure 9: A dentin opaque shade is placed in the areas where tooth structure is missing.

Figure 10: White enamel composite material was used to create a framework at the edges.

Figure 11: A1 enamel shade was applied on top of the dentin shade.

Figure 12: The restorative was smoothed and cured on each tooth.

Figure 13: A flame-shaped diamond bur was used to contour the restorations.

Figure 14: The incisal edges of #8 and #9 were leveled with an emery board.

Figure 15: A diamond disk was used to create incisal embrasures.

Once the composite application was complete, a flame-shaped diamond (Brasseler USA; Savannah, GA) was used to contour shape and refine the facial surfaces **(Fig 13)**. The author has found a simple technique to accurately level the incisal edges using a nail file emery board. The nail file should be wide enough to cover the incisal dimensions of both incisors. By gently dragging the file over the surfaces of #8 and #9, one creates a perfect match in length. In this case, a 180-grit salon-type nail file was used to even out the incisal edges and ensure that the laterals were a half-millimeter shorter than the centrals **(Fig 14)**. Finishing and polishing were completed using a medium-grit Sof-Lex extra-thin finishing disk (3M ESPE), then flour pumice with a rubber cup, followed by Enamelize (Cosmedent; Chicago, IL) and felt wheel. Incisal embrasures were shaped with a diamond disk (Brasseler USA). Interproximal refinement was completed using an extra-fine perforated diamond finishing strip (Brasseler USA) **(Fig 15)**.

The final result was a much more natural and esthetic smile line. The existing canines were shaped to create the illusion of lateral incisors **(Fig 16)**. The composite used allowed for a very high-quality luster and surface polish, and the restorations blended well with the existing dentition **(Figs 17 & 18)**.

The results were dramatic for the patient, and he was exceptionally pleased with the improved smile line and overall design.

Discussion

The results were dramatic for the patient, and he was exceptionally pleased with the improved smile line and overall design. Use of the composite material in this case allowed us to cost-effectively and efficiently treat this patient during his life transition. The patient was in-

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Figure 16: The final results show the existing canines were shaped to create the illusion of lateral incisors.

Figure 17: The restorations created a more natural smile line with a very high-quality surface luster.

Figure 18: The incisal embrasures were opened to create natural contours that blended with the existing dentition.

The unique properties of the new-generation composite material were particularly useful in this case.

formed that the restorations cannot be expected to last forever and that veneer or crown treatment may be necessary in the future, but in these circumstances he was quite pleased to have a direct treatment available that will provide him with durability, strength, high polish, and better function. In dentistry's continuing move to more minimally invasive treatment options, conservative techniques such as the one shown here will grow in importance for practitioners.

The unique properties of the new-generation composite material were particularly useful in this case. The material's polish retention with each of the opacities enables it to be used effectively, even in single-shade restorations. In the past, clinicians became accustomed to placing Filtek Supreme Plus Universal Restorative Translucent or a microfill composite to acquire a very high-luster surface. One had to be careful not to polish through this layer while finishing the restoration, as this would result in a noticeable difference in shine on the surface of the restoration. With this new material, however, polishing through any layer does not affect the restoration's shine or luster and when used, the translucent materials' handling has been improved overall.

Conclusion

This case demonstrates how effective use of direct materials can result in highly esthetic and affordable restorations. While the patient understands that maintenance and or re-treatment might be necessary in the future, his chief complaint was successfully addressed. The confidence one gains from

having a great smile is something that shows in any personal interaction and will be particularly helpful for this patient during future job interviews.

References

1. Christensen J. Categories of resin-based composite and respective brands. Gordon J. Christensen Clinicians Report. 2009 Jul;2(7):2-3.

2. Fortin D, Vargas M. The spectrum of composites: new techniques and materials. J Am Dent Assoc. 2000131(1):26S-30S.

3. Lambrechts P, Vanherle G. Structural evidences of the microfilled composites. J Bio Mat Res. 1983;17:249-60.

4. Drummond JL. Cyclic fatigue of composite restorative materials. J Oral Rehab. 1989;16;509-20.

5. Ferracane JL, Condon JR. In vitro evaluation of the marginal degradation of dental composites under simulated occlusal loading. Dent Mat. 1999;15,:262-7.

6. Mitra SB, Wu D, Holmes BN. An application of nanotechnology in advanced dental materials. J Am Dent Assoc. 2003;134:1382-90.

7. American Academy of Cosmetic Dentistry [Internet]. Madison (WI): The Academy; c2010 Can a new smile make you appear more successful and intelligent? Available from: http://www.aacd.com/index.php?module=cms&page=75. **jCD**

Dr. Weston earned his DDS degree in 1989 from the University of Oklahoma. An Accredited Fellow member of the AACD, he is the owner of Scripps Center for Dental Care in La Jolla, California.

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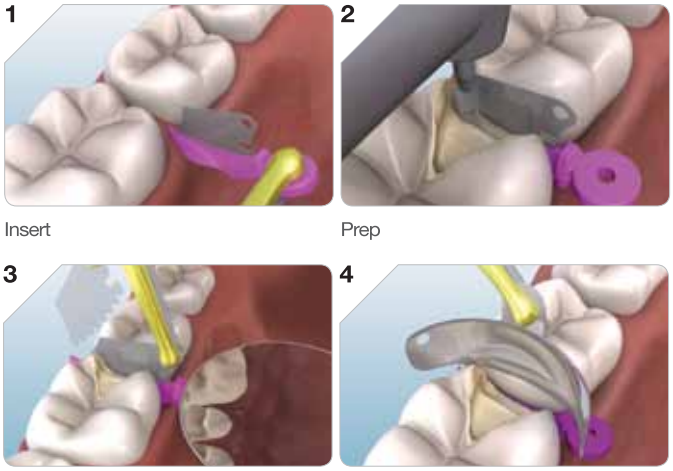

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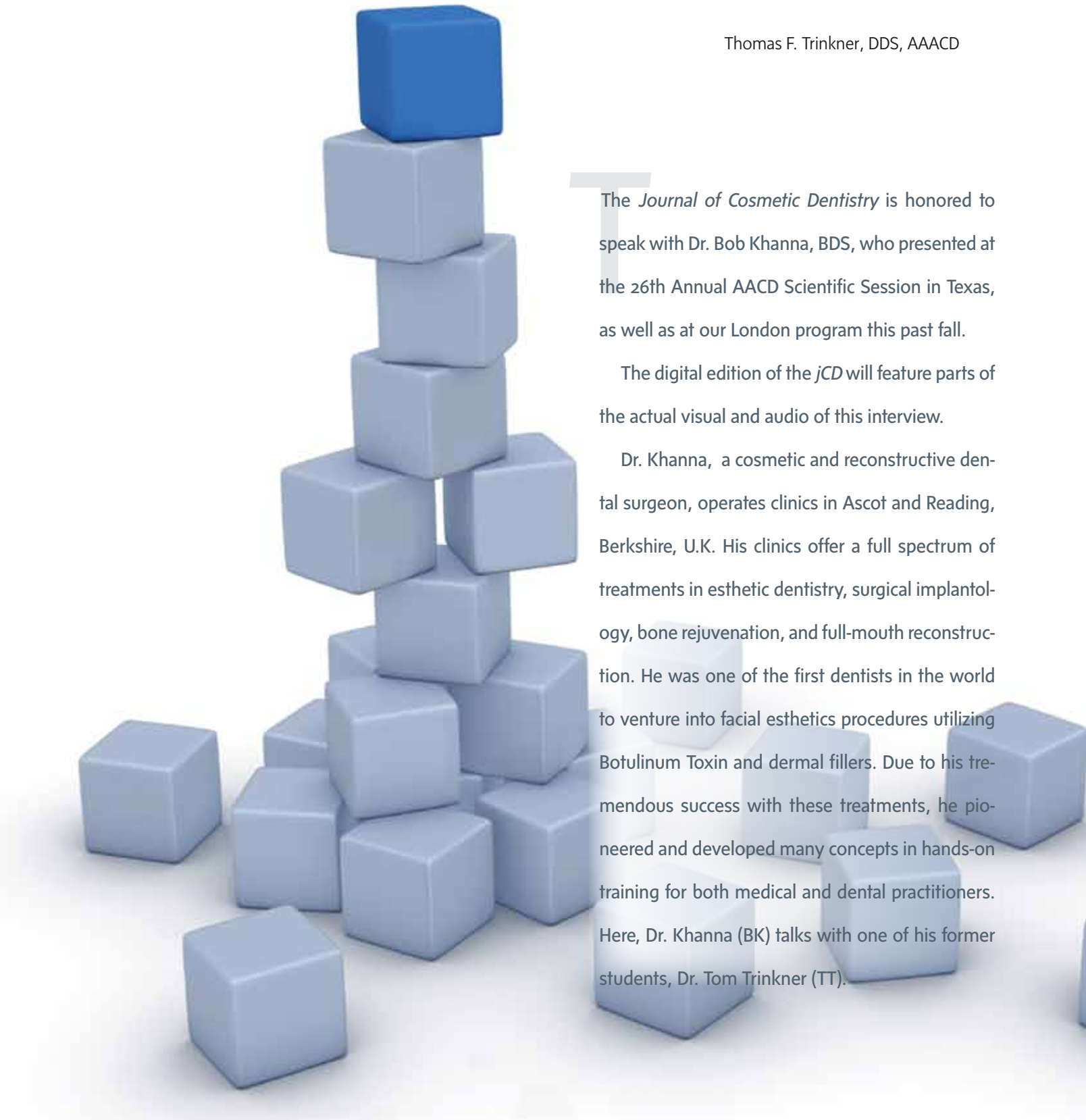
The **Role** and **Future** of Botulinum Toxin in Dentistry

Interview with Dr. Bob Khanna

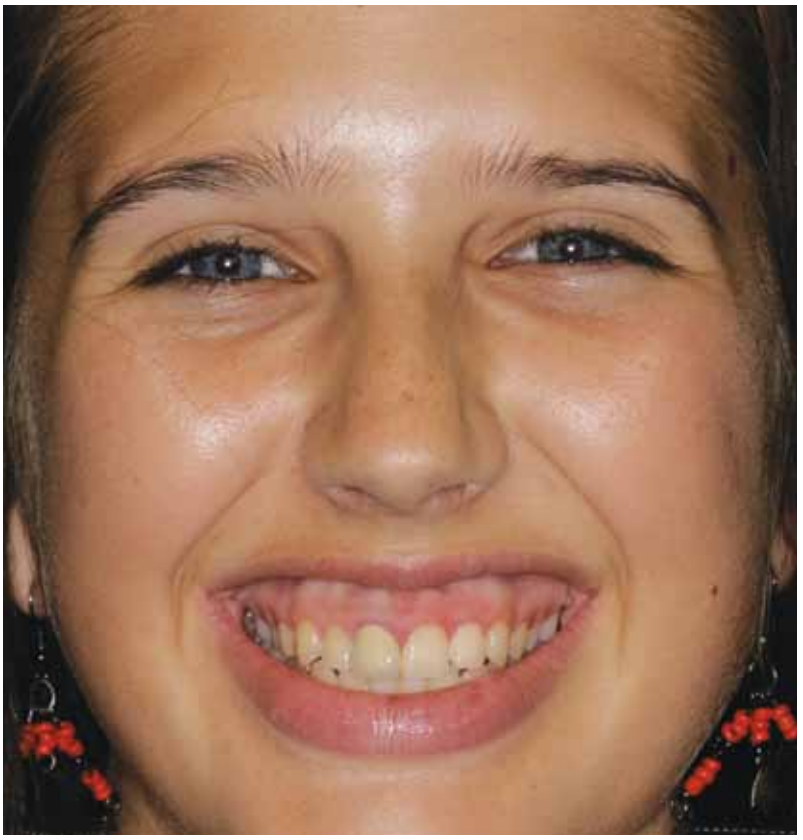
Thomas F. Trinkner, DDS, AAACD



The *Journal of Cosmetic Dentistry* is honored to speak with Dr. Bob Khanna, BDS, who presented at the 26th Annual AACD Scientific Session in Texas, as well as at our London program this past fall.

The digital edition of the *jCD* will feature parts of the actual visual and audio of this interview.

Dr. Khanna, a cosmetic and reconstructive dental surgeon, operates clinics in Ascot and Reading, Berkshire, U.K. His clinics offer a full spectrum of treatments in esthetic dentistry, surgical implantology, bone rejuvenation, and full-mouth reconstruction. He was one of the first dentists in the world to venture into facial esthetics procedures utilizing Botulinum Toxin and dermal fillers. Due to his tremendous success with these treatments, he pioneered and developed many concepts in hands-on training for both medical and dental practitioners. Here, Dr. Khanna (BK) talks with one of his former students, Dr. Tom Trinkner (TT).



Gummy smile; hypermobile upper lip case treated with Botulinum Toxin.

TT: Why did you begin to perform nonsurgical facial treatments such as Botulinum Toxin?

BK: I consider nonsurgical facial esthetics to be an extension of esthetic dentistry and vice versa. Thinking outside the box, when you are involved in esthetics you slowly start to realize that it's not just about the teeth. It's also about the smile and the framework, the lips and then, the face. It's about a harmonious approach; I like to "marry" the two disciplines to get the best for my patients.

TT: I think many struggle to gain the confidence to perform such treatments.

BK: I understand that there will be hesitation among other dentists in regards to performing nonsurgical facial treatments with Botulinum Toxin and dermal fillers. That's natural, since it is outside their comfort zone. Most dentists have training only within the oral cavity. I believe the skills we have to perform beautiful and responsible esthetic dentistry will not only transfer into these types of procedures, but will also be easier for a dentist, as they are so finely skilled in managing the smallest details. That is why I believe that dental surgeons make some of the best esthetic professionals regarding the face, because they have the unique skills.

TT: When did you begin teaching these procedures to other dentists, and what inspires you?

BK: I got involved in facial esthetics 14 years ago and I've been teaching for 12 years. When you are passionate about something you want to share it and teach it. I love teaching, sharing my techniques and knowledge with dental and medical colleagues.

When you teach, you are ultra-critical about everything you do, because you are educating many people. You start questioning everything you do and, therefore, you become better at what you do. It's a great way to improve professionally.

TT: How much clinic time do you give to facial esthetics? Does your day intermingle both dentistry and facial esthetics, or do you dedicate certain days for each?

Botulinum Toxin used to thin the face and lift the lower face.

BK: I used to dedicate certain days to facial esthetics and to dentistry. However, in the real world, that means you'll have Mrs. Jones coming in on a dental day and asking, "Can I have my facial esthetics today?" It's not appropriate to answer, "Actually this is a dental day and I can't see you for a couple of days." So my days are now mixed with all aspects of dentistry and facial esthetics and it works fine.

TT: How did you integrate these nonsurgical facial treatments into cosmetic dental practice? How, from a marketing perspective, do you inform your patients?

BK: Every new patient in my practice has to visit my treatment coordinator. This way they are fully informed and educated about what is available at the clinic. For existing patients, it's an easier transition because of the trust element. It is a natural progression to offer these services. Most people want to keep looking youthful for as long as possible. I find it is not an issue to discuss something that they already want to have.

Approaching patients that are coming for dentistry has to be handled correctly. Practice managers, nurses, and treatment coordinators must be appropriately trained about the advantages of the facial esthetics that you provide.

I have never been challenged by anyone as to why I am involved in facial esthetics when I "should be focusing on teeth." I truly believe it's a natural progression and the future of our industry.

TT: The challenges may not necessarily be from your patients but perhaps from your peers. Can you discuss your experiences with "turf wars"?

BK: In the past, when I attended medical conferences on anti-aging issues, to say I got a few raised eyebrows would be an understatement. There were attempts to keep me from attending these educational events. But in the last five or six years I have been a presenter, a guest, and a keynote speaker at those same conferences. That indicates the change in perspective. Naturally, gaining respect can take time and hard work. When they see that you are skilled at what you do, it speaks volumes. As I stated earlier, I'm passionate about dentists being involved in this be-

> I consider nonsurgical facial esthetics to be an extension of esthetic dentistry and vice versa.

cause we already are very skilled in treating our patients' facial appearance. Once our medical counterparts actually see this, it silences them.

TT: AACD members are well versed in photography and, frankly, I have not seen many medical Botulinum Toxin practitioners that are as skilled at taking good photos. So one of our advantages is the detail in which we can document and present ourselves.

BK: As dentists, we work in a very small area. Therefore it's natural that we are going to be very detailed, including the photography.

TT: How have procedures changed in the last five years? Have they become more accepted by your patients?

BK: Yes. The range of applications has increased dramatically. Before, Botulinum Toxin was seen as a way to eliminate facial lines; now it's being used in almost all muscles in the body not just for cosmetic reasons, but also for therapeutic reasons. I am passionate about improving certain common conditions such as gummy smiles and facial asymmetries. In the last five years I've seen massive growth in this area as well as in the range of applications, especially for gummy smiles. The interesting thing is that dentists are probably the only people who are going to comfortably diagnosis individuals with gummy smiles. So there's a huge group of patients that are appropriate candidates for such treatments.

TT: It is frustrating to do beautiful cosmetic dentistry only to have it fail later, because the musculature still wins. Certainly splint therapy can help but the idea of using Botulinum Toxin to help is fascinating.

BK: Yes, it is a vast area for opportunity because splint therapy is dependent on compliance. As we know, compliance rates are pretty poor; but I am not suggesting that we treat every single patient with Botulinum Toxin for such conditions; rather, I look at it as adjunctive therapy. By alleviating the contraction force of the musculature involved what we are essentially doing is reducing the forces on the teeth and, therefore, the force transference to the joints. So we are naturally going to protect our restorations and our teeth for the long term.

TT: Treatment for a gummy smile can include orthognathic surgery, orthodontics, possibly crown lengthening, both osseous and soft tissue. I've heard about the potential for Botulinum Toxin to help decrease that hyper mobility of the upper lip. Can you discuss how you have developed some techniques using Botulinum Toxin to control that?

BK: Many times excessive gingival display or a gummy smile is due to hyper mobility of the upper lip. It's not the only reason for gingival excess and we see orthognathic issues, short clinical crowns and the like. Often we will find hyper mobility of the lip is a habit the patient has developed over time. By very carefully isolating the overactive muscles, we can apply or inject Botulinum Toxin into certain muscle groups. It is then possible to change the inherent dynamic activity to a more positive one. Therefore the corners of the mouth are lifting more than the central aspect of the upper lip. So without getting too technical, if I block out certain muscle activity, I am preventing the upper lip from lifting as well. That would then give preference to the corner lifters. This gives an attractive crescent shape—a nice Mona Lisa-type smile. So, essentially, you are reducing the upper lip of the gummy smile.

The question is, how predictable can we be? A number of years ago I set up a three-year clinical study to try to ascertain a dose-related response. I was able to come up with dose-related responses, which gave me great predictability and control so I know that if I inject a certain number of units at certain depths and sites in those muscles that we talked about, I can get a certain response, a certain reduction in overall gingival display. We are essentially applying science to the artistry, which is exactly what we need in that very technically demanding area.

> I'm passionate about dentists being involved in this because we already are very skilled in treating our patients' facial appearance.

TT: I believe dentists have to develop a comfort level so as to effectively marry dentistry and other facial esthetic treatments. How can we convince our boards of dentistry and other medical peers to give us that opportunity?

BK: First, everyone needs to be unified. Also, hold local conferences on the integration of facial esthetics with dentistry. Invite your licensure board committee members and show them your competency level. Involve your medical counterparts. Make sure they are aware of your high skill level.

Twelve years ago I had the medical fraternities trying to shut me down, so I am not saying it is easy. But when I showed them my skill level in live demos, even the Royal College of Surgeons, one of the oldest medical fraternities in the U.K., asked me to set up training courses for them. If I can do it in the U.K., I believe you can do it in the U.S.

TT: How has this part of your work changed your life? Could you ever go back to being just a dentist?

BK: I could never go back to just being a dentist, because I've seen the difference facial esthetics has made in my patients. In fact, I believe my journey into facial esthetics is what has made me a better dentist because it allowed me to see things in a different way. When I look at smiles, for example, I'm individualizing that smile to that patient's face and you can only do that when you have an appreciation of facial esthetics and facial form.

TT: Tell us about teaching in the U.S.

BK: I've been welcomed here with open arms. I love how my American colleagues inherently think outside the box and are not scared of taking risks.

Since I lectured for the AACD last April in Texas, I have been teaching in New York, Los Angeles, and Las Vegas. This year I am teaching in Miami, Los Angeles, New York, and Las Vegas. The attendance rates have been phenomenal for our hands-on programs.

I feel it is only a matter of time before the medical profession starts to realize that dentists are among the best people to perform nonsurgical facial esthetics.

TT: Is there anything else on the horizon for you?

BK: I will tenaciously continue to try and change global thinking about facial esthetics in dentistry. The best way to gain approval is to get the academic institutions involved. As I mentioned, I was asked by the Dean of King's College in London, one of the most prestigious institutions in the world, to set up a program in medical and facial esthetics. I will select the faculty, develop the curriculum and, of course, teach. So I'm busy right now coordinating with international experts in plastic surgery, dermatology, and dentistry.

TT: Thank you for giving *jCD* readers so much of your time. You have certainly given me and my colleagues something to think about. Your energy is phenomenal.

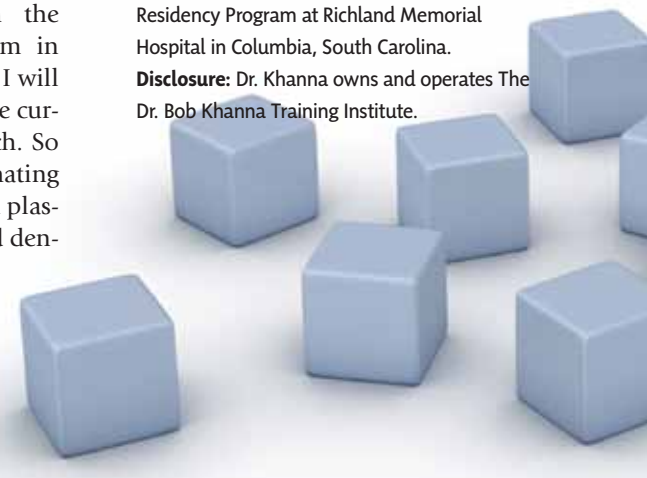
BK: Thank you for interviewing me. The energy and passion from AACD members is quite overwhelming and I feel at home. It was a pleasure to share my experiences. **jCD**

Disclaimer: This information is for exposition only. Readers should research their own state or provincial laws regarding scope of practice relating to dental professionals injecting Botulinum Toxin or dermal fillers.

Dr. Khanna is a cosmetic and reconstructive dental surgeon. He operates clinics in Ascot and Reading, Berkshire, U.K. He has been appointed lead clinical tutor in facial aesthetics at the Royal College of Surgeons, London, and is a regular clinical director at IMCAS (International Master Course on Aging Skin) internationally.

Dr. Trinkner is an AACD Accredited member and a clinical instructor at New York University. He is also a clinical instructor for the General Residency Program at Richland Memorial Hospital in Columbia, South Carolina.

Disclosure: Dr. Khanna owns and operates The Dr. Bob Khanna Training Institute.



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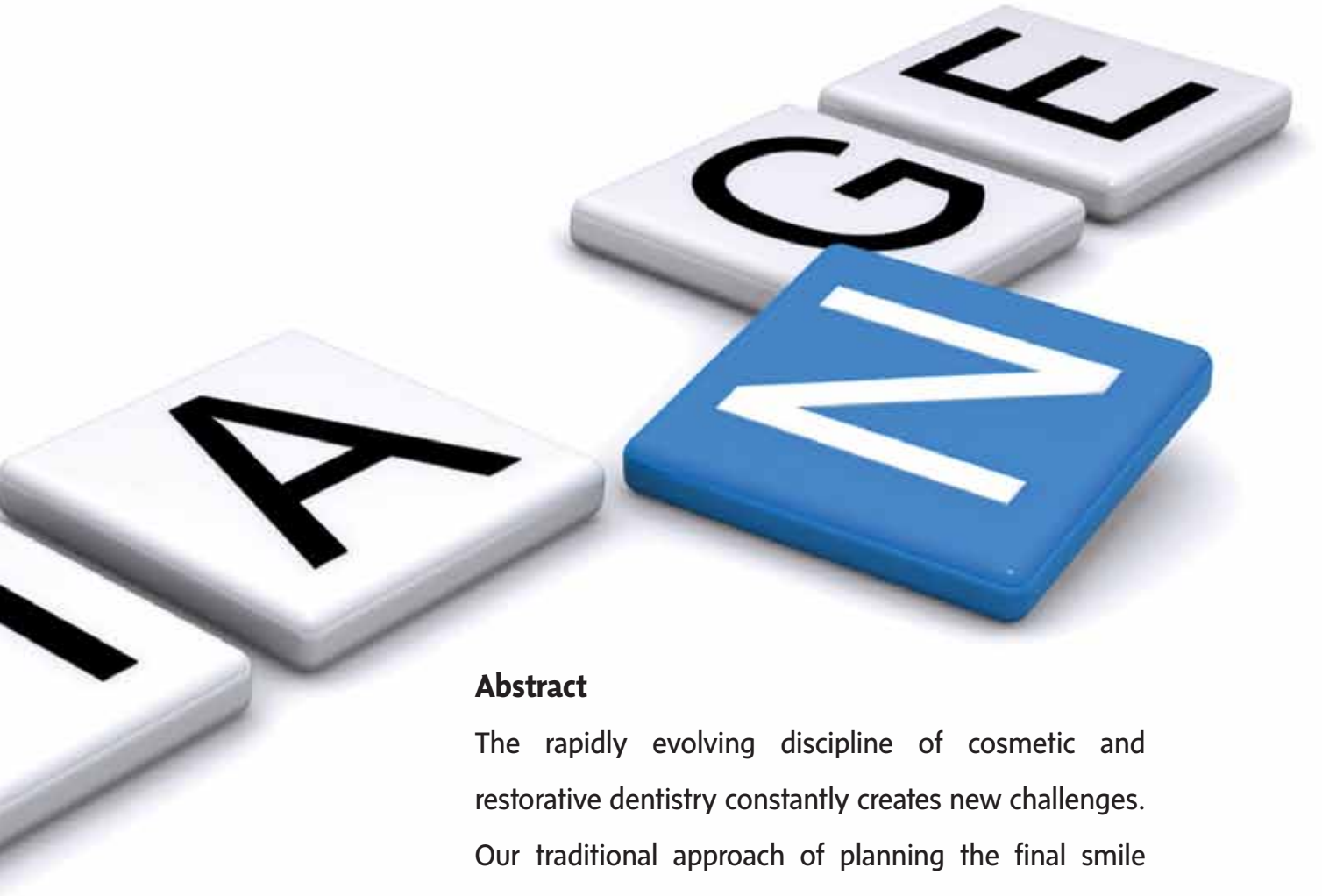
Challenging the Diagnostic Sequence

Rethinking the Order of Smile Design Presents Alternate Treatment Options

Atif Qureshi, BDS



Abstract

The rapidly evolving discipline of cosmetic and restorative dentistry constantly creates new challenges. Our traditional approach of planning the final smile design outcome at the consultation stage perhaps should be reviewed, because we need to appreciate that the patient's perception of their complaint or concern may well change if they align or bleach their teeth first. This article discusses a case where a patient had previously wanted a veneer makeover. As she could see her smile improve with alignment and whitening, her perception and desires changed dramatically.

Figure 1: Pre-treatment.

Figure 2: Pre-treatment close-up view before in cross bite.

Figure 3: Pre-treatment occlusal view.

Introduction

Often the patient's awareness of their unesthetic smile is built on several factors that they might not fully appreciate at the outset. It is easy to lump color, shape, surface anatomy, and alignment into one problem and assume that there is therefore one solution. Our beliefs about the principles of smile design often short-cut the potential alternatives that are available, because many teachers in cosmetic dentistry have told us that "patients don't really know what they want"; therefore, follow the guide, make golden proportion correct, get the buccal width out, get the gingival heights symmetrical, make the embrasures progressive, get the line angles correct.

There is nothing wrong with any of these suggestions. All together they produce a beautiful smile, but in the process of deciding to use ceramic veneers to change a smile and achieve all of this rapidly, there is not any option or time for a patient to look at these improvements in stages and see if they meet their expectations.

This has happened many times in the author's practice. Patients who present wanting a smile makeover due to color, alignment, and tooth shape issues often quickly change their minds about using veneers once their teeth are aligned and whitened. As soon as line angles start to correct and light reflections balance out and become more symmetrical, it becomes very apparent that the incisal outline becomes the main visual focus.

After alignment, this could not be simpler, as it can be done with virtually no preparation or local anesthesia required. If the teeth have been whitened, it is easier to match the shade, too, with simple composite bonding.

Case Study

Chief Complaint and Findings

The patient presented with what she described as a "crooked smile" **(Fig 1)**. She had been to another dentist, who had offered an 8-to-10-veneer smile makeover, so she already understood some of the aims of smile design. That treatment plan had involved placing veneers and some crown lengthening to reduce her gummy smile.

However, after studying her teeth, it was clear that there might be some potential to pre-align. Her upper laterals were mesially rotated by about 30 degrees and the upper left lateral was palatally positioned and in cross bite **(Fig 2)**.

Trauma to her upper central tooth four years earlier, caused by a sports injury, had never been corrected; the patient had simply gotten used to hiding her smile. Upon seeing the occlusal view **(Fig 3)**, the patient became aware

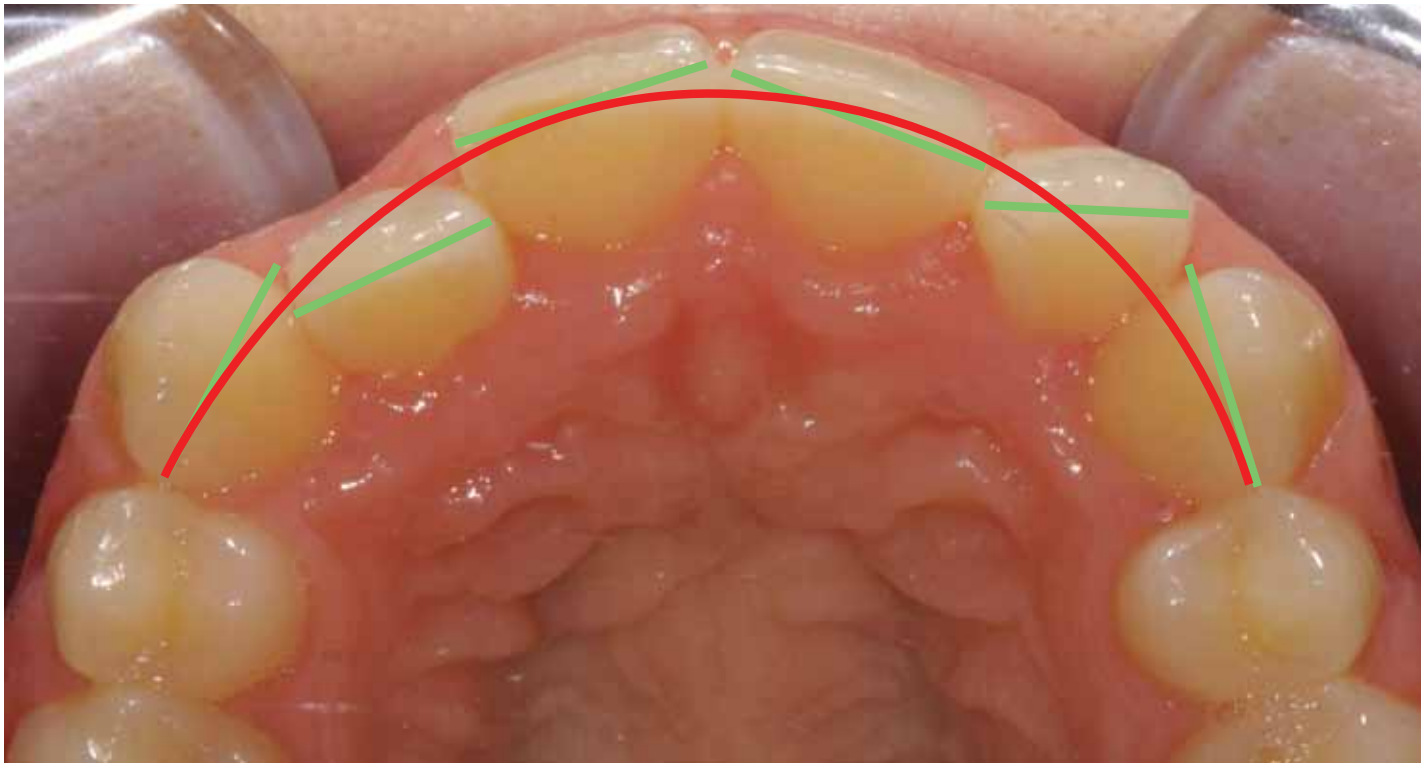


Figure 4: Trace for arch evaluation. The red line denotes the available space, the green lines show the mesio-distal widths of the teeth being moved, and the total sum equals the required space.

exactly how much aggressive tooth preparation would be required to place veneers, especially on the laterals.

She understood that she should have her teeth aligned first, before deciding on the next step in design. All options were considered, but because the patient wanted speed and the ability to whiten simultaneously, an Inman Aligner (Inman Orthodontic; Coral Springs, FL) was used.

Alternatives

This patient was very eager for a removable solution. If she had accepted fixed brackets, a short-term orthodontic tray system could have been used; however, simultaneous bleaching is not as simple.

Other removable systems such as Invisalign (Align Technology; Santa Clara, CA) or ClearCorrect (Houston, TX) can also be used to move teeth but they are very different in terms of force delivery, wear time, and length of treatment. In this case, the shorter treatment time and fewer hours of daily wear were factors in the patient's decision making.

Treatment

Space calculations were made using a digital space calculator. This uses Hancher's technique to calculate the dif-

Figure 5: Aligner in position.

Often the patient's awareness of their unesthetic smile is built on several factors that they might not fully appreciate at the outset.

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Figure 6: Occlusal view after use of aligner.

Figure 7: After aligner and whitening (11 weeks).

The amount of crowding equals the available space subtracted from the required space.

ference between available space and required space[1] (1.4 mm of crowding was present **(Fig 4)**. Hancher showed how the ideal arch form is measured by hanging a jeweler's chain from the distal of each canine and letting it align with the most ideal arch form after orthodontic correction. This is described as the available space **(Fig 3)** and is measured by placing the length of chain against a millimeter ruler.[1] The required space is simply the sum of the mesial-distal widths of the teeth being moved and is measured with digital calipers. The amount of crowding equals the available space subtracted from the required space.

An Inman Aligner was used over a period of 11 weeks to de-rotate the laterals and to treat the cross bite **(Fig 5)**.

Progressive interproximal reduction (IPR) was used to create space.[2-9] This meant that no more than 0.13 mm of IPR was performed at each contact at each appointment. Strategic IPR was employed; this means that care is taken in areas where teeth are rotated, because the real contact points are often not actually touching. Instead, IPR is performed distally to the incisors, mesially and distally on the canines. The squeeze effect of the Inman Aligner induces a "domino effect," which can create extra space when needed.

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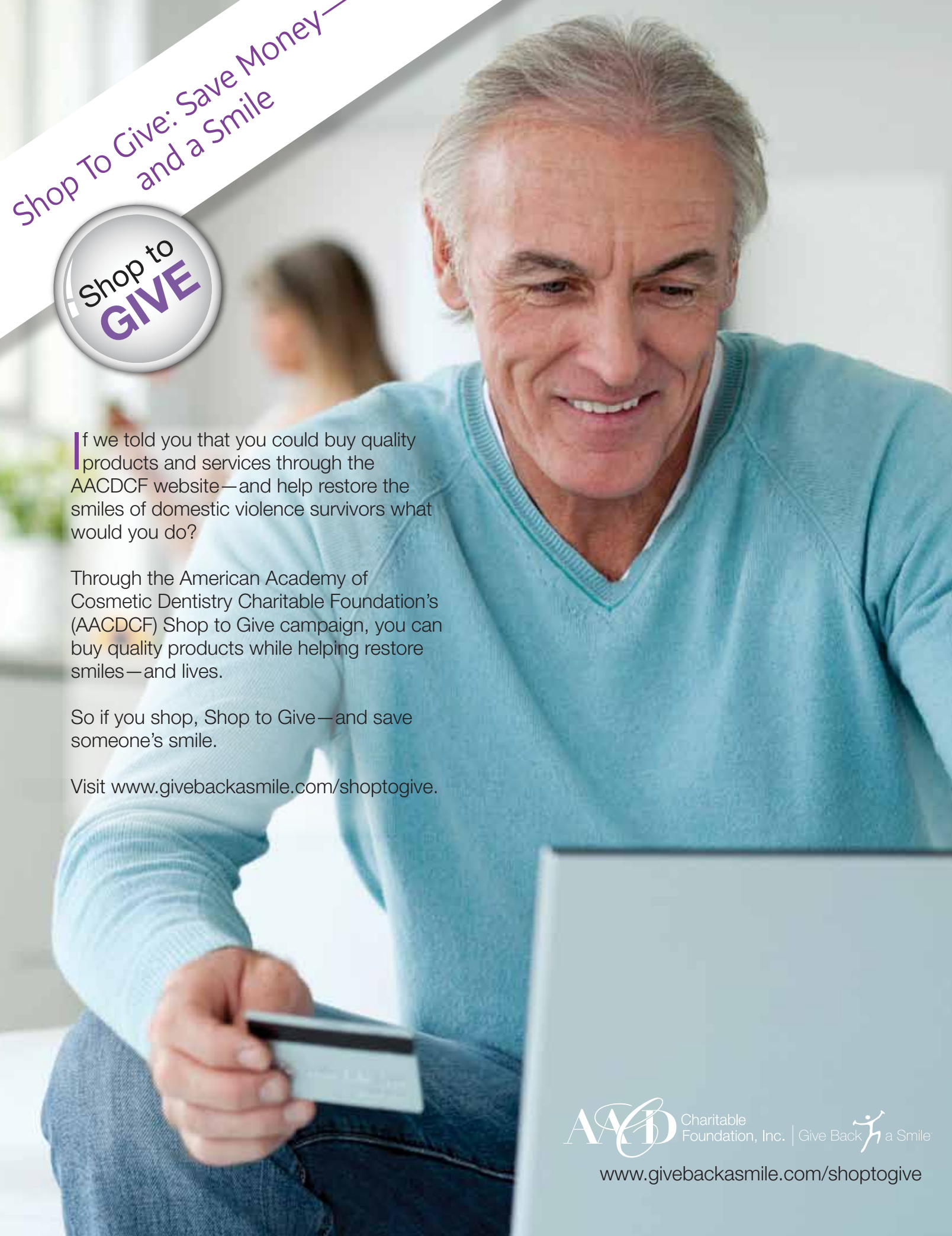

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The patient was instructed to wear the Inman Aligner for 18 hours a day.[10,11] At week 8 of alignment, bleaching was started using hydrogen peroxide gel for 35-45 minutes daily. Simultaneous whitening is a very attractive part of aligner treatment, as, in the author's experience, it dramatically helps patient motivation. Patients tend to be particularly compliant as they are already used to the routine of aligner wear.

After alignment and whitening and a total of 11 weeks' treatment **(Fig 6)**, the case was re-examined. The patient could suddenly see that her problem was now more about edge shape.

The edge shape after alignment was actually worse because there had been differential wear as well as trauma. It was now very clear to the patient that only the incisal edges needed building—suddenly, she no longer wanted veneers. She did not even want the crown-lengthening surgery **(Fig 7)**.

For placement of the incisal edges at week 12, no local anesthesia was administered. There was no preparation other than slight roughening of the worn incisal edges of the upper left central and lateral incisors. Empress Direct composite (Ivoclar Vivadent; Amherst, NY) was built up freehand on the incisal edge and palatal surface to match the outline of the other central. Dentin and enamel shades of B1 and BL (Empress Direct) were used. The composite was polished vertically using rubber polishing points to try to blend in surface anatomy to mask the join. The process was repeated on the lateral **(Figs 8 & 9)**.

The patient continued to wear the aligner as a retainer and an impression was taken for a wire retainer to be fitted two weeks later.[12-15]

Figure 8: Close-up view immediately after bonding.

Figure 9: Smile after alignment, bleaching, and bonding.

Discussion

It was especially nice to retain the natural esthetic characterization of this patient. Ceramic work, as beautiful as it can be, would certainly have changed her appearance more. Some may say for the better, but that was not what the patient wanted.

The patient told us that what we had produced with her own teeth, and some minimal composite, was more than she had hoped for. **Figures 10-14** show the stages of alignment, combined bleaching, and then bonding.

There are natural imperfections, but the route to this result was arguably far more patient-centric and in line with responsible ethics than a result that might have used multiple ceramic veneers. It is an interesting case in that it poses the question: What is preferable—esthetic perfection at the cost of heavy tooth preparation, or minor esthetic imperfection with patient consent and no invasive treatment whatsoever **(Figs 15-19)**.

It might seem controversial to challenge the ideals of smile design, but this change in the diagnostic order of priorities is vital if we wish to give our patients what they actually want.

Figure 10: Pre-treatment, right side smile.

Figure 11: Post-treatment, right side smile.

Figure 12: Pre-treatment, left side.

Figure 13: Left side after aligner and bleaching.

Figure 14: After bonding.

Figure 15: Pre-treatment, close-up left side.

Figure 16: Post-treatment, close-up left side.

Figure 17: Pre-treatment, right side retracted view.

Figure 18: Post-treatment, right side retracted after alignment, bleaching, and bonding.

Figure 19: Post-treatment close-up view.

Figure 20: Portrait.

Conclusion

It might seem controversial to challenge the ideals of smile design, but this change in the diagnostic order of priorities is vital if we wish to give our patients what they actually want. Pre-whitening is a way of giving our patients an alternative view and perception of their teeth. Now, and far more significantly, with alignment techniques patients can see their teeth change and improve far more dramatically. This means they can make their own decisions and dentists can drastically reduce treatment risks by breaking down the process of a smile makeover into stages and reassessing at each point. Now it is possible to align, whiten, and incisally bond a case in less than 12 weeks **(Fig 20)**. Previously, a case like this might have required 8-10 veneers, cost four times as much, and necessitated significant tooth preparation. A dramatic contrast in pathways has been created.

Acknowledgments

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References

1. Hancher PJ. Orthodontics for esthetic dentistry: the use of orthodontics to facilitate the restoration of anterior teeth. J Cosmetic Dent. 2005;20(4):74-80.

2. Sheridan JJ. Air-rotor stripping update. J Clin Orthod. 1987;21(11):781-8.

3. Sheridan JJ, Ledoux PM. Air-rotor stripping and proximal sealants: an SEM evaluation. J Clin Orthod. 1989;23:790-4.

4. Crain G, Sheridan JJ. Susceptibility to caries and periodontal disease after posterior air-rotor stripping. J Clin Orthod. 1990;24:84-85.

5. Sheridan JJ, Hastings J. Air-rotor stripping and lower incisor extraction treatment. J Clin Orthod. 1992;26:18-22.

6. El-Mangoury NH, Moussa MM, Mostafa YA, Girgis AS. In-vivo remineralization after air-rotor stripping. J Clin Orthod. 1991;25(2):75-8.

7. Radlanski R.(1991) Morphology of interdentally stripped enamel one year after treatment. J Clin Orthod. 1991;23(11)748-50.

8. Heins PJ. The relationship of interradicular width and bone loss. J Periodont. 1988;59(2):73-9.

9. Tal H. relationship between the interproximal distance of roots and the prevalence on intrabony pockets. J Periodont. 1984;55(10):604-7.

10. Kameyama T, Matsumoto Y, Warita H, Soma K. Inactivated periods of constant orthodontic movement forces related to desirable tooth movement in rats. J Orthodont. 2003;30(1):31-7.

11. Linge BO, Linge L. Apical root resorption in upper anterior teeth. Eur J Ortho. 19835(3):173-83.

12. Case CS. Principles of retention in orthodontia. Am J Orthod Dentofac Orthop. 2003;124(4):352-61.

13. Little RM, Reidel RA, Artun J. An evaluation of changes in mandibular anterior alignment from 10 to 20 years post retention. Am J Orthod Dentofac Orthop. 1988;95(1):37-41.

14. Blake M, Bibby K. Retention and relapse: a review of the literature. Am J Orthod Dentofac Orthop. 1998;114:299-306.

15. Becker A, Goultschin J. The multistrand retainer and splint. Am J Orthod. 1984;85:470-4. **jCD**

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Disclosure: Dr. Qureshi runs hands-on courses with Dr. James Russell and Dr. Tim Bradstock-Smith and lectures on the Inman Aligner worldwide.

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Bio-Plan: Esthetic Biologic Treatment Planning—A Case Report

Gregory P.M. Brambilla, DDS
Carlo Ghezzi, DDS

Abstract

Esthetics has become a major topic in dentistry, as patients want the most attractive smile possible. This has led to treatments that are sometimes too aggressive. The "bio-plan" is based on biologic respect for the patient: the goal is to treat and not to harm. This approach is explained and exemplified with a case report detailing the least aggressive treatment possible, compatible with the situation and desires of the patient.

Introduction

Esthetics is the main concern of many patients and the reason many of them go to the dentist.[1,2] In the past 10 to 15 years, this trend has been so strong that sometimes patients even ask to have the same smile as a specific celebrity.

Following these requests (often derived from stereotypes in the media), dental treatments have sometimes been too aggressive, with only the justification of esthetic effect.[3] This is why very aggressive treatments are performed daily by many practitioners: implants to replace teeth that might have been saved with conventional perio-prosthetic treatments, full veneers when teeth might have just been bleached, etc.

The questions that should be asked are: Why that particular treatment plan? What will that treatment cost the patient biologically? Fortunately, in the past few years this trend has been changing; the goal now is to achieve beautiful smiles with minimally invasive dentistry.

The goal of improved esthetics can be reached without harming sound tissues, and preserving healthy structures as much as possible.

Figure 1: Close-up view showing fracture of right central incisor, bucco-version, and extrusion of right lateral incisor.

Figure 2: X-ray image of right lateral incisor. The periodontal defect is evident, with severe bone resorption.

The "bio-plan" is based on the notion that "the less done, the better."

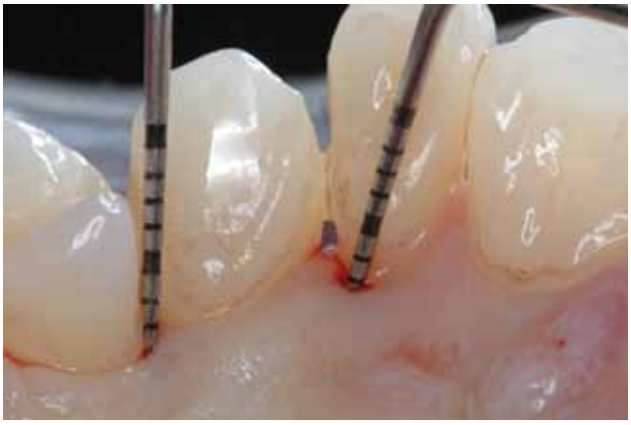
The "Bio-Plan"

The "bio-plan" is based on the notion that "the less done, the better." The first consideration is the patient: the practitioner should spend time to understand the needs, desires, and expectations of each patient to know if a certain therapy is needed and how it should be started. With this clear, all the subsequent steps can be approached.

The basis of all dental (medical) treatments is consideration of the patient's biologic value. This is measured on a scale of 0 to 100 (0 means an edentulous patient with severe lack of bone; 100 indicates a perfectly healthy patient who does not need any dental treatment, apart from hygiene).

Whenever we talk about treatment planning, we should consider that we are deciding to treat that patient in a way that will have consequences. These consequences include:

- Time for the dentist to do the treatment and to let nature heal (in the case of surgery), and also the amount of time that the patient can spare for a certain treatment considering the demands on their time.
- Financial costs for the patient and also biologic costs whenever the dentist has to sacrifice intact structures.



Figures 3 & 4: Periodontal probing: problems distally on canine and palatally on lateral incisor are evident, confirming the image in the x-ray.

The principle is to evaluate the biologic value of the patient, in addition to the requested treatment and the reasons for it.

A full evaluation of the patient is needed, with x-rays, periodontal chart, photographs, and stone models—only with these tools is it possible to analyze the specific case.

It is then possible to decide with the patient the treatment plan that satisfies their needs and expectations.

Case Report

Findings

The patient, a 31-year-old male, was unhappy with his smile and asked for a veneer to restore the small fracture of the distal incisal edge of tooth 1.1 (#8) (Class A sec. Spinas and Altana)[4] and to realign tooth 1.2 (#7) **(Fig 1)**.

After x-rays and periodontal probing **(Figs 2-4)**, periodontal defects were seen on 1.2 (#7) and 1.3 (#6).

The defect on 1.3 (#6) might have been related to food impaction in the interproximal area because of the lack of contact between the cuspid and the first bicuspid. The lateral incisor had a localized defect (mainly palatal) associated with an incisal and buccal migration.

Treatment Options

To satisfy the esthetic desires of the patient, many different treatments could have been performed. One option was to extract the lateral incisor and insert an implant after bone grafting. A second option could have been to extract the tooth and perform a "conventional" porcelain bridge. A third option, the most conservative, could have been to solve the periodontal defect with guided tissue regeneration (GTR) and then to align the lateral incisor with orthodontics, along with minor conservative treatment to change the form of the canine in order to avoid any more food impaction.

These treatments are predictable both for the duration of the functional result and for esthetics (in particular, considering the low lip line of the patient). A fourth option was chosen, to be as conservative as possible for the patient and to satisfy his desire not to have any orthodontics: endodontic treatment of 1.2 (#7), periodontal treatment (GTR with a minimally invasive surgical technique) of the defects **(Figs 5 & 6)**, porcelain veneers for 1.2 (#7) (to align the tooth) and for 1.3 (#6) (to close the gap between 1.3 [#6] and 1.4 [#5] and change the form of the cuspid), and a simple direct composite on 1.1 (#8) (to restore the fracture) (Enamel Plus HR*i* UE,[2] Micerium S.p.A.; Avegno, Italy).

Treatment

In the pre-surgical phase, the patient underwent causal therapy, a complete periodontal examination, and several sessions of scaling and root planing. He also received oral hygiene instructions.

Regenerative Surgery

One month after completion of the initial preparation, the patient was reevaluated and shown to have a full mouth plaque score and a full mouth bleeding score of less than 25%. The regenerative surgery was performed with enamel matrix protein (EMD, Straumann; Basel, Switzerland) alone.[5]

A minimally invasive surgical technique[6,7] was used, so a full-thickness flap was raised to allow an adequate visualization of the site to be treated without apical incisions. After cleaning, the site was filled with EMD, and a com-

Figure 5: Intraoperative clinical view of the defects, mainly on palatal side of tooth 1.2 (#7).

Figure 6: Sutures at the time of intervention (surgery performed by Dr. Ghezzi).

Figure 7: X-ray at control. The tooth had been endodontically treated for prosthetic reasons (owing to the excessive buccal migration). No apical suffering is present and the bone quality seems improved around the root.

bination of horizontal mattress sutures and single points was used for complete primary closure.

The patient took antibiotics (Augmentin, SmithKline Beecham; Milan, Italy), three grams a day for six days. He rinsed twice a day for 15 days with chlorhexidine 0.2% and then with chlorhexidine 0.12% for two additional weeks.

The sutures were removed between the first and the second week and the patient was placed on a monthly recall program for hygiene and motivation.

Reduction

Six months after surgery **(Fig 7)**, the teeth were prepared and veneered. For the tooth preparation, a silicone guide was designed from a wax-up. The use of the silicone guide was necessary to control the amount of tooth to be reduced: a first reduction of 1.5 mm of the incisal edge was performed with a butt margin.[8,9] The choice of the butt margin enabled a horizontal axis of insertion of the veneer, avoiding undercuts.

The first buccal reduction was performed freehand to allow the silicone mask to sit completely on the surface of the tooth **(Figs 8 & 9)**.

As the lateral incisor had to be reduced and directed more toward the lingual side, the final profile was much less buccal; this did not allow the silicone guide to fit on the tooth. The first freehand reduction was performed lightly and respecting the form suggested by the mask. At this point, the "real" reduction for the veneering was performed with a 0.6-mm round bur. A reduction of about 0.3 mm was used for the cervical area, to keep as much enamel as possible on the canine.[10,11] For the lateral it was impossible to keep the cervical

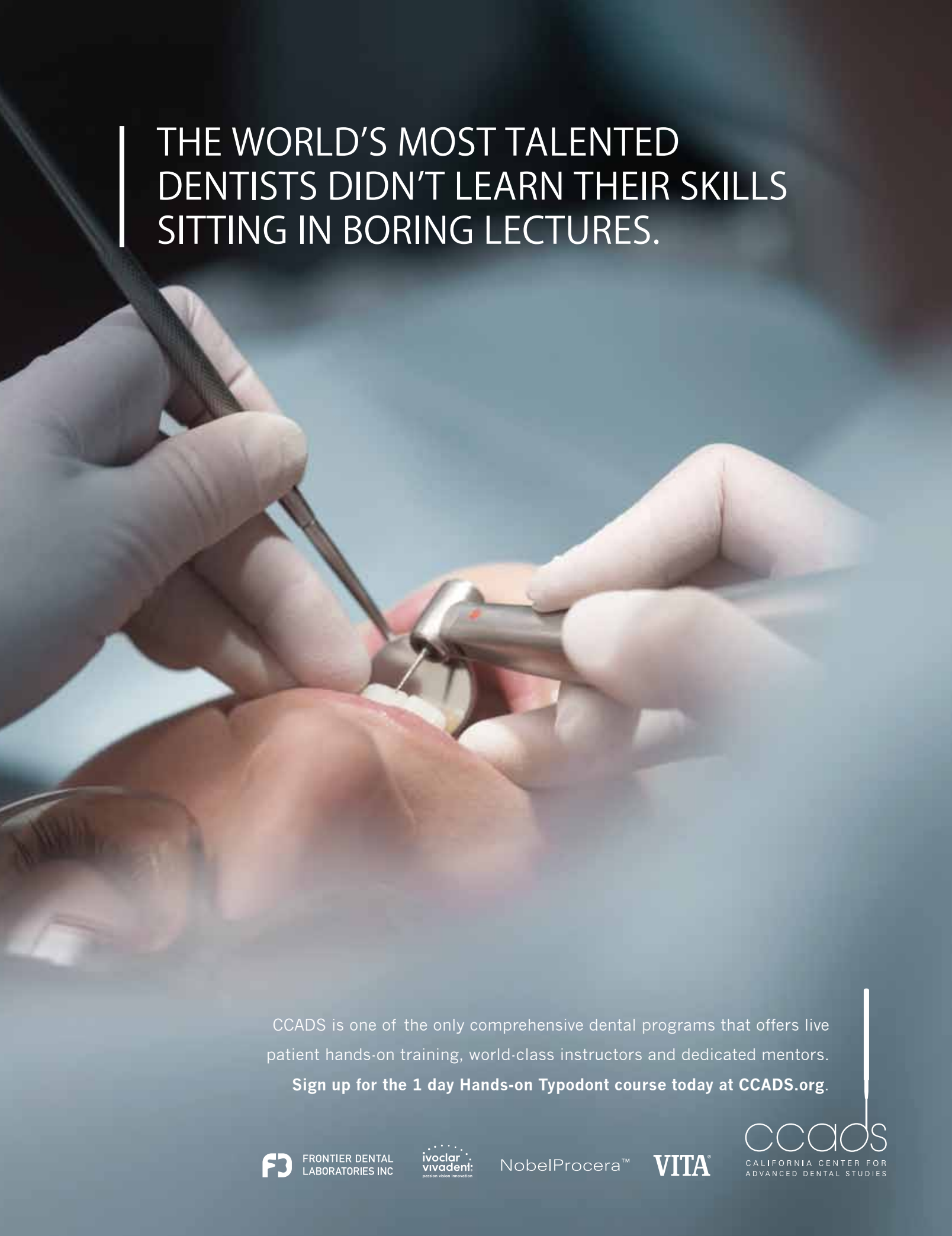

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Figure 8: First buccal freehand reduction. After incisal butt margin preparation, the buccal part of the tooth is reduced to let the silicone guide fit on teeth surfaces.

Figure 9: After the first freehand preparation, the silicone guide fits the buccal surfaces of the teeth; now the guide can be used for the final preparation to give the ceramist the correct space for the veneer.

Figure 10: The juxta-gingival preparation of the teeth was done six months after surgery, as there was no need for a color change.

The main principle of the "bio-plan" is related in great part to the age of the patient.

margins on enamel because of migration of the tooth. Complete interdental preparations were done to allow the ceramist to fully close the interdental areas.

Round burs instead of conventional "depth burs" were chosen because a round bur is easier to control to produce the depth of preparation at each part of the tooth according to the profile of the wax-up. This gave the ceramist the exact and even space for the correct ceramic thickness. Furthermore, with depth burs there is a much higher risk of dentin exposure (50.1% remaining enamel) than with a dimple technique (77.5% remaining enamel).[12]

Impression

For the impression, a single non-imbibed retraction chord was used (Ultrapak, Ultradent Products; Milan, Italy). The cervical preparation was supra-sulcular rather than intra-sulcular as there was no need to change the teeth color. That was also the reason for finalizing the case a few months after surgery **(Fig 10)**. The advantage is that there are no risks of harming a tissue that is not completely mature, even if normal and without signs of inflammation. The final restoration will not interfere with subsequent creeping of the gingival graft.

The impression was taken with a polyether material (Permadyne, 3M ESPE; Milan, Italy). On delivery, the fit of the feldspathic porcelain veneers (Creation, Klema; Meiningen, Austria) was checked for form, contact points, and color **(Figs 11 & 12)**. This technique allows the color of the composite under the veneers to be checked and the shade before cementation to be adjusted. As the color of try-in pastes is not always reliable, this method provides less chance or error in the choice of shade for cementation.

Ceramics were treated with hydrofluoric acid at 9.7% for 90 seconds, cleaned with phosphoric acid for two minutes and then

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Figure 11: The feldspathic ceramic veneers at delivery. The ceramic has been layered and baked on refractory dies.

Figure 12: Try in of the veneers; composite was used and was subsequently cleaned with chloroform.

Figure 13: After the rubber dam is in place, teeth are sandblasted to clean the surface and leave a better surface for adhesion.

Figure 14: The adhesive layer on the preparation. To avoid contamination on neighboring teeth, Teflon tape is used to isolate them.

Figure 15: The first veneer is cemented in. Direct composite has been used as cement, after preheating.

Figure 16: The veneers in place after rubber dam removal. Even if the tissue is not perfect owing to retraction of the metal clamps, it has not been harmed by the polishing procedures.

with an ultrasonic bath for five minutes in alcohol. After this, a silane agent was applied to the surface. This treatment cleans perfectly the etched ceramic surface and achieves a mean micro-tensile bond strength of 46.3 MPa.[13]

When the rubber dam was in place and the isolation was correct, the teeth were treated for adhesion by sandblasting with 50 µ aluminum-oxide powder **(Fig 13)** and application of phosphoric acid on enamel for 15 seconds, rinsing with tap water for 15 seconds. The teeth were then washed with chlorhexidine 0.2% to inhibit the action of matrix metallo-proteinases; this prevents the degradation of the collagen matrix in the hybrid layer.[14,15]

Adhesive Layer

The adhesive layer (Clearfil Se Bond, Kuraray; Milan, Italy) was then applied to the tooth **(Fig 14)**. Following the timing suggested by the manufacturer, the solvent was evaporated with a gentle air-drying for 10 seconds to enhance bond strength.[16]

The choice of cement was a direct composite material (Enamel Plus HR*i*) that was pre-heated to 50° C to give both a lower viscosity of the material (which helps in precise positioning of the veneer and the flow of composite excesses) and a better ratio of monomer conversion **(Fig 15)**.[17,18] Excesses were first cleaned with a scalpel and then polished with rubber burs. The dam offers a perfect field for adhesion and a good protection for tissues during cleaning and polishing. Veneers were cemented one at a time to permit total control of the cementation procedure.

Polymerization

For polymerization of the composite, a third-generation light-emitting diode (LED) device was used. The main reason for choosing a new LED system was to have a double-peak system with larger bandwidths of light and the correct wavelength of light for correct polymerization,[19] together with the high power that LED devices can offer. The power is intended to counteract the loss of power due to the thickness of the ceramic that the light has to penetrate before reaching the composite resin. Both sides were cured simultaneously for 60 seconds to prevent undesired thickness of the adhesive layer.[20]

Final polishing was performed twice: first at the time of delivery **(Fig 16)**, and a second time after one week when the patient was recalled for a second check and, possibly, for the resin to be polished in the post-polymerization period. Function was controlled, as veneers act just like teeth and have to play an active role in the incisal guidance.

Discussion

The case presented here is an example of the application of the "bio-plan," the treatment plan driven by a biologic respect of healthy structures. As previously mentioned, other solutions could have been chosen to achieve the final esthetic result requested by the patient.

The treatment plan suggested for this case depended mainly on respect for the biologic value of the patient: his age (31) and the great number of structures that were healthy. The main principle of the "bio-plan" is related in great part to the age of the patient. Since the effect of almost all treatments is of limited duration, the practitioner should consider that the patient will need another intervention at some point. This is why the less is done, the better; it is hoped that all the structures preserved today will be present when further treatment is needed.

In the case discussed, an implantologic option might have given a better guarantee of long-term success than veneering the lateral incisor. There were problems with that tooth, including periodontal loss of structure, endodontic treatment (necessary to make the buccal reduction), loss of buccal enamel due to the tooth preparation, adhesion on dentin and risk of marginal micro-leakage in the future. But, from a biologic point of view, the treatment chosen was much less aggressive; should there be a future problem, there will always be the possibility of performing implantology.

The overall esthetic result was acceptable to the patient **(Figs 17-20)**, even if not "perfect" when compared with other treatment options. Mainly, the tissues are healthy and without inflammation (we should consider that tissue "creeping" has been reported to be even, more than one year after surgery), function was reestablished, and the esthetics of the patient's smile were improved. The patient's needs, desires, and expectations were respected.

Conclusion

The "bio-plan" proposed here is based on maximum respect for sound structures. When treating younger patients, the primary goal should be to respect all that is present in order to do as little harm as possible. The secondary goal is to leave the patient as many options as possible, considering that further treatment likely will be needed.

Often there is no "ideal" treatment—only an option that combines biological respect and the patient's desires and needs. Combining different options (e.g., periodontal treatment together with endodontics and conservative, prosthetics) can give the practitioner the correct tool to reach the final goal in different ways and fulfill the patient's esthetic expectations.

A minimally invasive treatment approach should always be followed, even if the final esthetic result sometimes is not quite perfect.

Acknowledgment

The authors thank dental technician Mr. Roberto Brambilla for the ceramic work in this case.

Figure 17: Veneers and direct restoration one month after cementation. The color is correct and the gingiva shows no signs of inflammation. Tissue is "creeping," as demonstrated by the interdental closures by the papillae.

Figure 18: At probing, a pathologic periodontal defect after the guided tissue regeneration is no longer present. The palatal view shows the precise fit of the ceramics on the teeth.

Figure 19: X-ray at control. The precision of the ceramics can be seen by the thinness of the composite layer for cementation. The quality of the bone appears improved by the treatment; healing was confirmed by the probing.

Figure 20: One year after surgery; the esthetic defect has been corrected. The patient's wishes and expectations were fulfilled. Tissues were still not completely mature at the time this photograph was taken (restorative dentistry and veneering performed by Dr. Brambilla).

Often there is no "ideal" treatment— only an option that combines biological respect and a patient's desires and needs.

References

1. Sujak SL Abdul Kadir R, Dom TN. Esthetic perception and psychosocial impact of developmental enamel defects among Malaysian adolescents. J Oral Sci. 2004;46(4):221-6.

2. Beall AE. Can a new smile make you look more intelligent and successful? Dent Clin N. Am. 2007;51(2):289-97.

3. Simonsen RJ. Commerce versus care: troubling trends in the ethics of esthetic dentistry. Dent Clin N Am. 2007;51(2):281-7.

4. Reis A, Loguercio AD, Kraul A, Matson E. Reattachment of fractured teeth: a review of literature regarding techniques and materials. Op Dent. 2004;29(2):226-33.

5. Esposito M, Grusovin MG, Papanikolaou N, Coulthard P, Worthington HV. Enamel matrix derivative (Emdogain) for periodontal tissue regeneration in intrabony defects. A Cochrane systematic review. Eur J Oral Implantol. 2009;2(4):247-66.

6. Cortellini P, Tonetti MS. Minimally invasive surgical technique and enamel matrix derivative in intrabony defects. I: clinical outcomes and morbidity. J Clin Periodontol. 2007;34(12):1082-8. Epub 2007 Oct 22.

7. Cortellini P, Tonetti MS. A minimally invasive surgical technique with an enamel matrix derivative in the regenerative treatment of intrabony defects: a novel approach to limit morbidity. J Clin Periodontol. 2007;34(1):87-93.

8. Magne P, Douglas WH. Design optimization and evolution of bonded ceramics for the anterior dentition: a finite-element analysis. Quintessence Int. 1999;30(10):661-72.

9. Castelnuovo J, Tjan AH, Phillips K, Nicholls JI, Kois JC. Fracture load and mode of failure of ceramic veneers with different preparations. J Prosthet Dent. 2000;83(2):171-80.

10. Atsu SS, Aka PS, Kucukesmen HC, Kilicarslan MA, Atakan C. Age-related changes in tooth enamel as measured by electron microscopy: implications for porcelain laminate veneers. J Prosthet Dent. 2005;94(4):336-41.

11. Ferrari M, Patroni S, Balleri P. Measurement of enamel thickness in relation to reduction for etched laminate veneers. Int J Period Rest Dent. 1992;12(5):407-13.

12. Cherukara GP, Davis GR, Seymour KG, Zou L, Samarawickrama DY. Dentin exposure in tooth preparations for porcelain veneers: a pilot study. J Prosthet Dent. 2005;94(5):414-20.

13. Magne P, Cascione D. Influence of post-etching cleaning and connecting porcelain on the microtensile bond strength of composite resin to feldspathic porcelain. J Prosthet Dent. 2006;96(5):354-61.

14. Pashley DH, Tay FR, Yiu C, Hashimoto M, Breschi L, Carvalho RM, Ito S. Collagen degradation by host-derived enzymes during aging. J Dent Res. 2004;83(3):216-21.

15. Hebling J, Pashley DH, Tjäderhane L, Tay FR. Chlorexidine arrests subclinical degradation of dentin hybrid layers in vivo. J Dent Res. 2005;84(8):741-6.

16. Ikeda T, De Munck J, Shirai K, Hikita K, Inoue S, Sano H, Lambrechts P, Van Meerbeek B. Effect of air-drying and solvent evaporation on the strength of HEMA-rich versus HEMA-free one-step adhesives. Dent Mater. 2008;24(10):1316-23.

17. Daronch M, Rueggeberg FA, De Goes MF. Monomer conversion of pre-heated composite. J Dent Res. 2005;85(7):663-7.

18. Lohbauer U, Zinelis S, Rahiotis C, Petschelt A, Eliades G. The effect of resin composite pre-heating on monomer conversion and polymerization shrinkage. Dent Mater. 2009;25(4):514-9.

19. Price RBT, Felix CA. Effect of delivering light in specific narrow bandwidths from 394 to 515 nm on the micro-hardness of resin composites. Dent Mater. 2009;25(7):899-908.

20. Rueggeberg FA, Caughman WF, Curtis JW Jr. Effect of light intensity and exposure duration on cure resin composite. Op Dent. 1994:19(1):26-32. **jCD**

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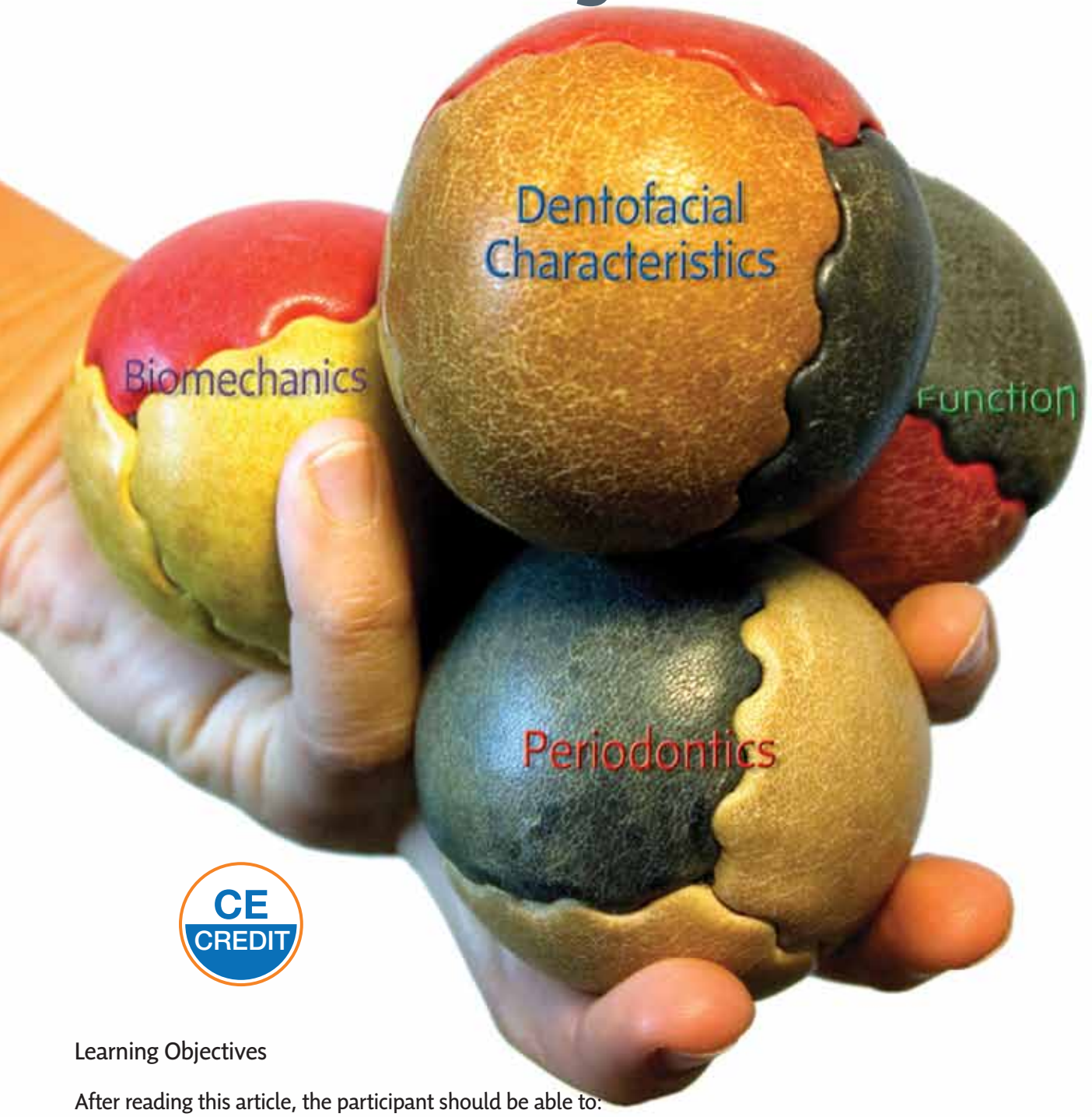

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Learning Objectives

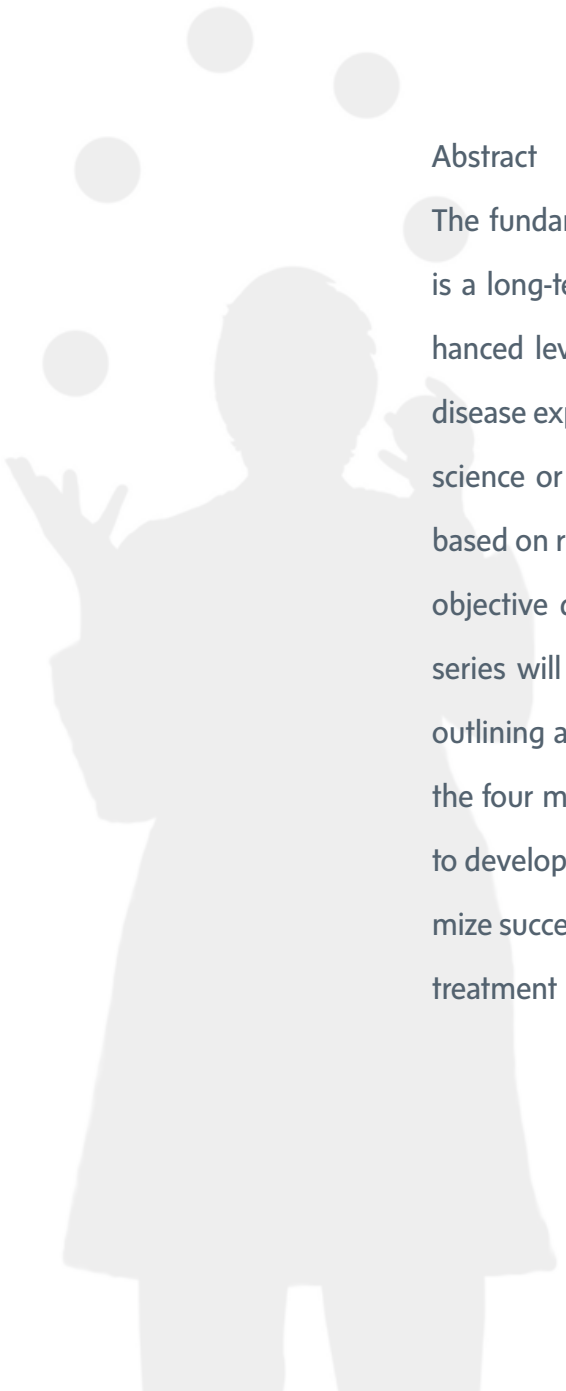
After reading this article, the participant should be able to:

1. Develop a systematic approach for treatment planning every patient.
2. Focus on the four most important diagnostic categories.
3. Develop and utilize critical risk parameters to minimize failure and maximize successful treatment-planning strategies.

Planning—Part 2

Incorporating the Fundamentals of Patient Risk Assessment

John C. Kois, DMD, MSD



Abstract

The fundamental rationale for a comprehensive treatment approach is a long-term strategy for dental health commensurate with an enhanced level of wellness for patients. Understanding parameters of disease expression can be confusing due to inaccurately implemented science or patient adaptation. Formulating specific treatment needs based on risk assessment of an individual can be challenging without objective data and better metrics. This second article in a two-part series will help to eliminate confusion in the diagnostic process by outlining a systematic approach for treatment planning by reviewing the four most important diagnostic categories, and by detailing how to develop critical risk parameters that can minimize failure and maximize successful outcomes. Strategies that can be implemented during treatment planning will also be reviewed.

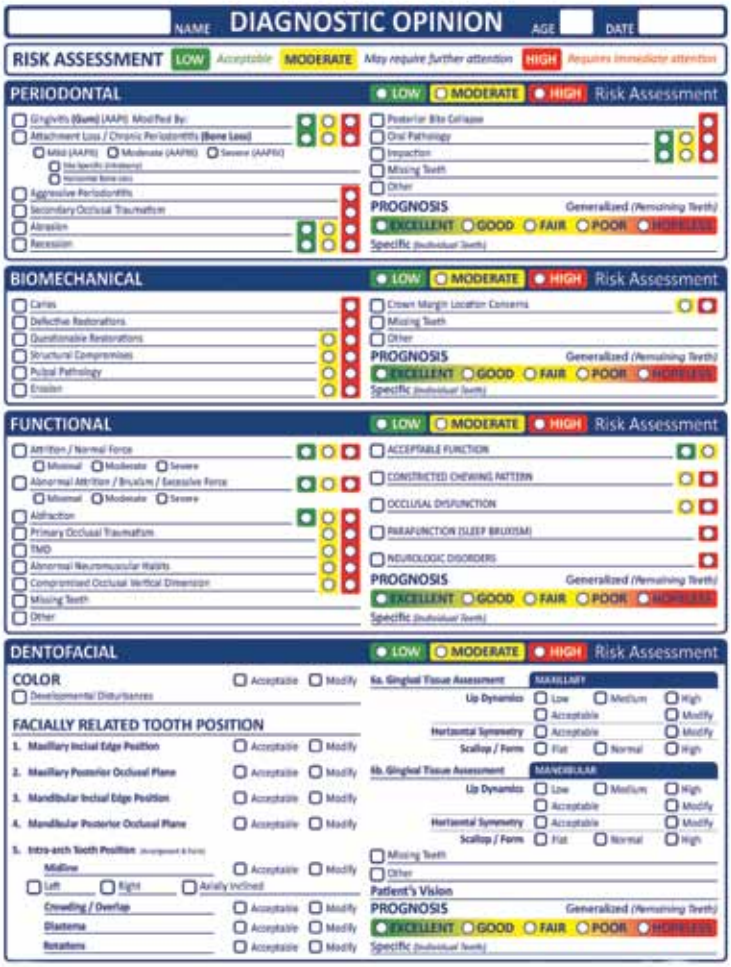


Figure 1: Diagnostic Opinion checklist outlining the dentist's critical risk assessment of the four primary oral parameters (i.e., periodontal, biomechanical, functional, and dentofacial) in terms of low, moderate, and high risk, as well as prognosis (i.e., excellent, good, fair, poor, or hopeless).

Periodontics, biomechanics, function, and dentofacial characteristics are parameters that must be assessed during the patient examination to ensure that existing and potential risks are identified.

Introduction

When patients present to the dental office seeking treatment, ensuring the long-term function and stability of the dentition or restorations associated with treatment is predicated on recognizing, understanding, and managing four categories of risk that affect oral health. Periodontics, biomechanics, function, and dentofacial characteristics are parameters that must be assessed during the patient examination to ensure that existing and potential risks are identified, and then reduced and/or eliminated within the most appropriate and cost-effective treatment plan.

Risk Assessment

Risk assessment begins by determining each patient's risk for future disease within each of these four main categories, even before they may have expressed signs or symptoms. Risk can be described as the likelihood that injury, damage, or loss will occur. Assessing patient risk can be accomplished by analyzing the conditions with which an individual presents and assessing the potential implications of those conditions based on the doctor's knowledge and scientific evidence.[1-3] Risk in any given category can be classified as low (i.e., acceptable), moderate (i.e., may require further attention), and high (i.e., requires immediate attention).

Risk assessment is inherently associated with the prognosis of a patient's condition and prospective longevity of any planned treatment. Prognosis needs to be described as predicting disease outcomes without treatment, in any given category, and can be classified as excellent, good, fair, poor, or hopeless.

Subsequently, risk/prognosis evaluations of possible treatment options need to focus on risk reduction or prognosis improvement to decide which alternatives are best. These evaluations are essential components of the Diagnostic Opinion **(Fig 1)** and critical to determining the most appropriate treatment plan. The value of these evaluations is essential despite the fact that there may be multiple available treatment options for lowering the risk.

It is imperative that all four categories of risk be considered when determining risk and prognosis. Neither the risk categories, nor the contributing factors within each category, influence oral health exclusively or in isolation of the others. By reducing risk across all of these parameters (i.e., periodontal, biomechanical, functional, dentofacial), dentists can lower the burden to the oral environment, improve treatment prognosis, and enhance long-term predictability. Therefore, by systematically assessing patient risk, dentists also avoid consideration of treatments that might other-

wise add risk to the overall oral health of their patients and are not supported by scientific evidence.[1-3]

Assessing Periodontal Risk

Assessing periodontal risk involves assessing an individual patient's gingival health, attachment loss or chronic periodontitis (bone loss), aggressive periodontitis, secondary occlusal traumatism, abrasion, recession, posterior bite collapse, oral pathology, impaction, and missing teeth due to bone loss. Establishing the periodontal risk of the patient's presenting situation provides value for predicting future outcomes. An understanding of how each diagnostic factor is affecting the patient's overall oral health guides the development of an effective treatment plan for reducing or eliminating disease and preventing future risk.

In combination with biofilm management and patient-specific responses, periodontal risk factors impact the severity of the disease, how it manifests, and how the patient will respond to treatment.[4,5] Therefore, factors such as genetics, diabetes, smoking, mobility at the tooth level, and infra-bony components at the site level are important indicators of disease and risk and among the contributors to periodontal risk that should be assessed during the patient evaluation.[6]

Therefore, individual patients and even specific tooth sites vary in terms of disease susceptibility, making it necessary to collect periodontal data through a variety of scientifically based methods. To date, these include assessments based on probing depths, calculus, plaque levels, bleeding on probing, current state of inflammation, occlusion, periodontal pathogens, biomarkers, and systemic risk factors.

Typically, periodontal low-risk patients are those with minimal bone loss consistent with the American Academy of Periodontology (AAP) 0, I, or II classification. Periodontal moderate-risk patients present with 2 to 4 mm of horizontal bone loss and/or isolated infra-bony defects; they would be classified as AAP III. Periodontal high-risk patients exhibit severe bone loss greater than 4 mm, an AAP IV classification **(Figs 2a & 2b)**.

Assessing Biomechanical Risk

Biomechanical risk assessment incorporates evaluation of caries, defective restorations, questionable restorations, structural compromises, pulpal pathology, erosion, crown margin location concerns, and missing teeth. Essentially, the biomechanical risk assessment examines tooth structure loss from two primary causes: caries, a biofilm-mediated disease; and erosion, a chemical-mediated disease.

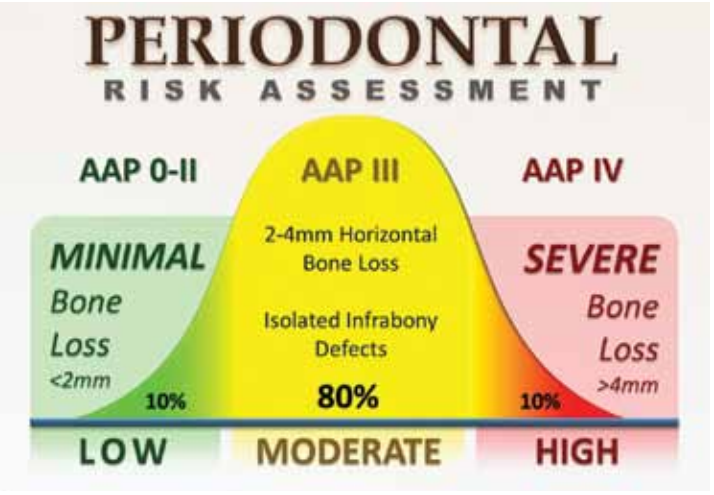


Figure 2a: Periodontal risk assessment—distribution of periodontal health and disease.

Figure 2b: Clinical example of high periodontal risk.

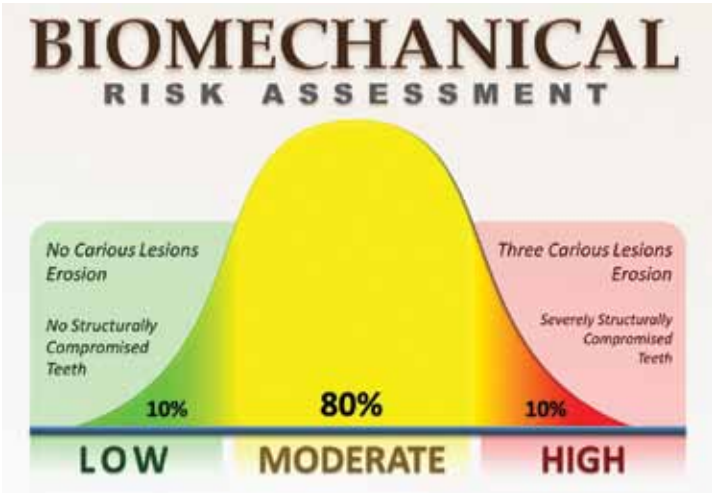


Figure 3a: Biomechanical risk assessment—distribution of biomechanical health and disease.

Figure 3b: Clinical example of high biomechanical risk.

Biofilms are a common denominator among characteristics in both periodontal and biomechanical risk categories. The organisms contained within biofilms can promote a healthy oral environment, produce by-products that destroy oral hard and soft tissues, and/or alter the pH of the oral cavity, resulting in increased susceptibility to decay and erosion.[5,7] Saliva, which neutralizes oral pH, is also significant to caries risk assessment and control. Creating an ecologic shift in the biofilm from acidic to an alkaline environment would reduce caries risk.[8,9] Biomechanical low-risk patients present no carious lesions or erosions and no structurally compromised teeth. Biomechanical high-risk patients present with at least three carious lesions, moderate to severe erosion, or severely structurally compromised teeth. Patients at moderate biomechanical risk demonstrate signs and symptoms that fall in between **(Figs 3a & 3b)**.

When clinicians can identify high caries risk patients versus low caries risk patients, those at high risk can be treated with protocols to lower their risk, such as dietary counseling, sealants, fluoride application[10] and alkaline rinses to train the biofilm to shift to an alkaline environment. Assuming extensive restorative treatment is also required in patients at high risk for caries, those restorations should be designed in ways to better ensure a successful long-term prognosis, rather than be susceptible to the ongoing challenge of recurrent caries and structural breakdown.

Recurrent caries is a leading cause of crown and bridge failure. However, the cause is very significant. Caries apical to the margin of the restoration is caused by caries susceptibility, but caries inside the restoration may be caused by cement fatigue, which is an occlusal etiology or a structural compromised tooth preparation that has too much flexure.

In the context of biomechanical risk/prognosis, it is incumbent upon dentists to inform patients of the impact their oral hygiene habits and occlusal management can have on the longevity of the restorations.

Many acid-related issues can present with similar symptoms. Therefore, different contributing factors require consideration. For example, the acid erosion associated with bulimia is accompanied by projectile vomiting and tongue striking that is extremely erosive to enamel and dentin and creates a smooth look to the back of the teeth.[11,12] On the other hand, if the enamel is perforated first and the dentin is damaged, bulimia is not likely the underlying cause; excessive consumption of fruit juice or modern beverages ("power drinks") might be to blame.[13-15]

Pre-existing enamel damage complicates risk assessment, diagnosis, and prognosis. The use of technology could help to quantify the problem sufficiently to ensure patient understanding of the issues

involved. This would open the door for advanced treatment planning and possible solutions to erosion problems.[16]

Assessing Functional Risk

Assessing functional risk involves evaluating an individual patient's attrition, abfraction, primary occlusal traumatism, temporomandibular disease, abnormal neuromuscular habits, and compromised occlusal vertical dimension. It is important to realize the static relationship of the teeth does not provide comprehensive insight into the influences functional forces have on the teeth because they do not completely explain how the teeth are being used.[7,18] Inefficient chewing systems can place frictional contact on the teeth that cause wear with acceptable levels of force. The most important treatment decision is whether the patient has current or previous disease activity. The patient may have adapted to the current situation and breakdown is no longer occurring or is occurring at a much reduced rate. In other words, the visual perception of the disease may be worse than the actual disease. In addition, a morphologic malocclusion is not the same as a functional malocclusion.

Patients with low functional risk demonstrate an acceptable function. However, those with moderate functional risks demonstrate some problem in their occlusion (i.e., dysfunction or constricted envelope of function). Those with higher functional risk, on the other hand, experience more brain-mediated problems (i.e., parafunction and/or neurological disorders) **(Figs 4a & 4b)**.

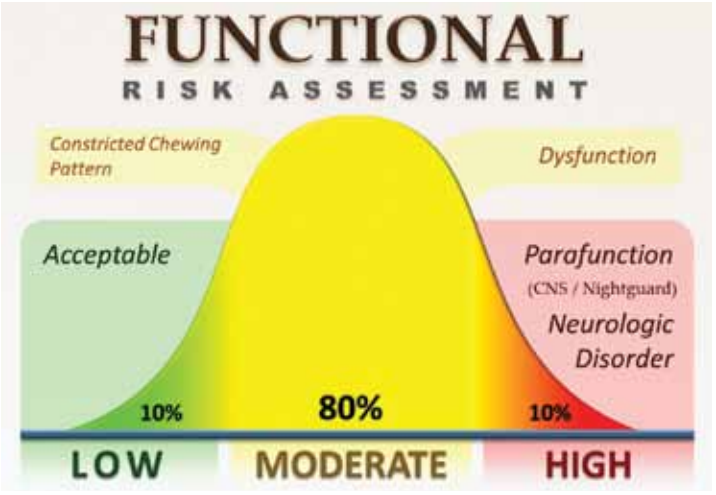


Figure 4a: Functional risk assessment chart—distribution of functional health and disease.

Figure 4b: Clinical example of high functional risk.

Assessing Dentofacial Risk

Dentofacial risk assessment incorporates evaluation of color, facially related tooth position, and maxillary and mandibular gingival symmetry, scallop/form, and reveal. When dealing with dentofacial aspects of treatment, it is important to consider where the teeth should be positioned in the face, where the tissue should display, and how much the lip should move.[19-21]

Patients find symmetry, whiter teeth, and overall harmony within their mouth pleasing.[22-24] Medium lip dynamics and full-tooth display are necessary to achieve this appearance.

Patients with low dentofacial risk demonstrate minimum tooth display and no tissue display, while those with moderate dentofacial risk demonstrate the ideal tooth position. High dentofacial risk patients present with maximum tooth display and maximum tissue display **(Figs 5a & 5b)**.

Figure 5a: Dentofacial risk assessment chart—distribution of dentofacial health and disease.

Figure 5b: Clinical example of high dentofacial risk.

Risk assessment is inherently associated with the prognosis of a patient's condition and prospective longevity of any planned treatment.

Case Study

Findings

A 30-year-old non-smoking woman presented with no bone loss, no mobility, no history of diabetes, and no other shared risk factors for the progression of periodontal disease **(Figs 6-8)**. Therefore, the risk for progression of periodontal disease was low and the prognosis was good. The treatment selected to maintain periodontal health was six-month continuous care and gingival management with oral hygiene products.

The patient did, however, present with three carious legions, erosion, and structural compromises. For someone her age, she had excessive restorative dentistry, and many teeth that had been previously restored were structurally compromised **(Figs 9 & 10)**. The biomechanical risk was determined to be high and therefore required restorative dentistry to reduce the progression of existing disease, and a caries management protocol to reduce risk of future disease.

Functional disorders also caused some of the patient's problems **(Figs 11 & 12)**. Her front teeth were getting shorter, and the patient found she was squeezing to make the teeth fit together **(Fig 13)**. After determining that the problems were not caused by parafunction or a neurological disorder, the condition was attributed to dysfunction with an associated moderate functional risk. This would require occlusal treatment to lower the risk, which, in this case, involved equilibration and the establishment of the occlusal parameters to ensure stability.

With lip movement, the patient exhibited excessive gingival tissue display. The degree of tooth and gingival display categorized the patient as high-risk dentofacially.

Treatment Options

Three treatment options were presented to the patient. The first option incorporated anterior veneers to make the teeth appear longer. Anterior veneers, with posterior full-coverage restorations, and an occlusal equilibration would have limited the structural compromises. The compromise would be in the dentofacial result **(Fig 14)**.

The second option included crown lengthening to move the teeth up within the framework of the facial structures, and full-coverage crowns. The patient was informed that exposure of the root surfaces with crown lengthening would dictate the need for full-coverage crowns throughout the maxillary arch. In addition, the desire to raise the maxillary occlusal plane would further increase the need for tooth reduction and the scenario would increase the probability of future endodontic therapy **(Fig 15)**.

The third option involved orthognathic surgery to impact the maxilla within the framework of the face, anterior veneers, and posterior full-coverage restorations. The

Figure 6: The patient, before treatment.

Figure 7: There was no bone loss, no lip mobility, no history of diabetes, and no other shared risk factors for the progression of periodontal disease.

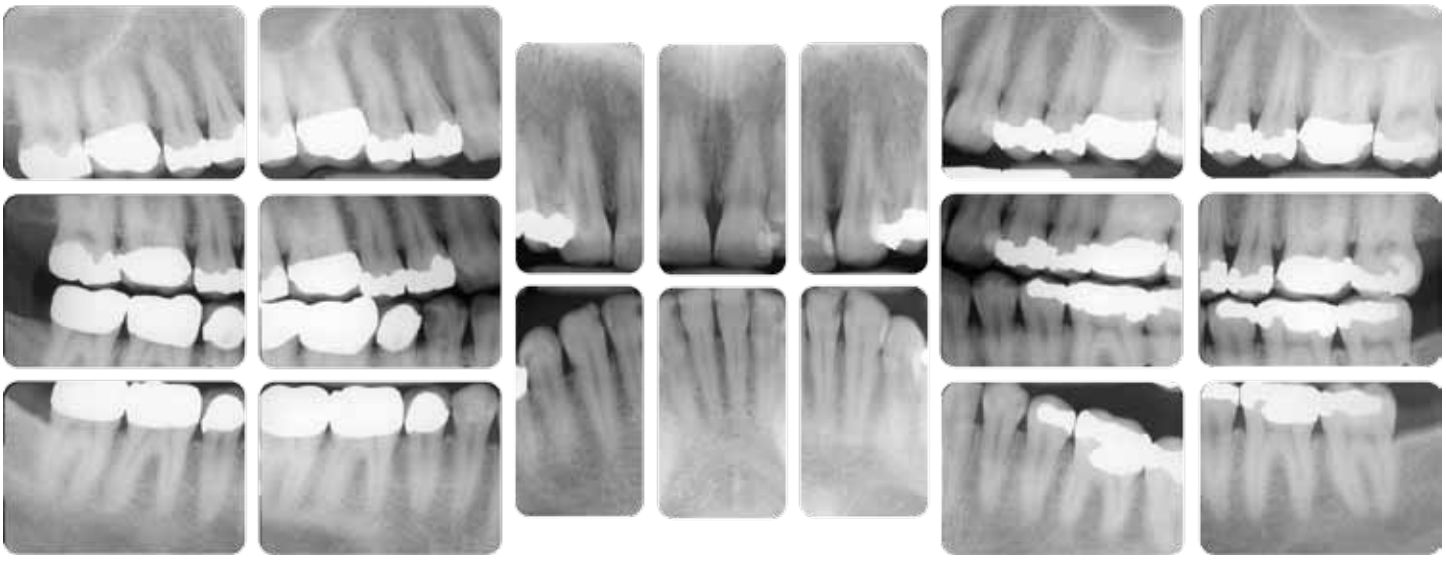


Figure 8: The risk for progression of periodontal disease was low and the prognosis good.

The new treatment philosophy is not about "rescuing," but rather about managing the conditions with which a patient presents.

Figure 9: Clinical exam revealed three carious legions, erosion, and structural compromises.

Figure 10: For someone her age, the patient had excessive restorative dentistry, and many teeth that had been previously restored were structurally compromised.

Figure 11: Functional influences were contributing to the patient's problems.

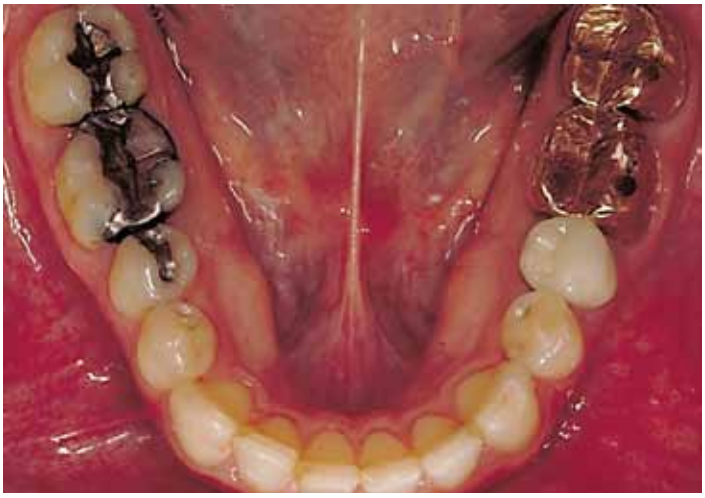


Figure 12: The diagnosis of dysfunction established moderate functional risk.

Figure 13: The front teeth were getting shorter, and the patient found she was squeezing to make the teeth fit together.

Figure 14: The first treatment option involved equilibration, anterior veneers to add length without reducing the teeth, and posterior full-coverage restorations.

Figure 15: The second treatment option was maxillary arch crown lengthening (exposes root surfaces and contraindicates veneer option), decreased vertical dimension, and anterior and posterior full-coverage restorations.

Figure 16: The third treatment option called for orthognathic surgery to impact the maxillary arch, increase vertical dimension of occlusion, anterior veneers to add length to ideal incisal edge position, and posterior full-coverage restorations.

Figure 17: Final smile utilizing the first treatment option.

third option carried the risks and associated morbidities of the surgery but would provide the best dentofacial option and reduce biomechanical compromises to the teeth **(Fig 16)**.

All three options could achieve health in terms of periodontal, biomechanical, and functional considerations but they would not look the same dentofacially **(Figs 14-16)**. Each option requires different areas of treatment periodontally, biomechanically, and functionally, and some areas require more invasive treatment than others and therefore increase risk.

After weighing the prognosis with no treatment and the associated risks and potential outcomes of the various treatment options, the patient opted to proceed with the first option (equilibration to treat the dysfunction, anterior veneers to lengthen the anterior teeth, and posterior full-coverage restorations to treat the biomechanically compromised posterior teeth) **(Figs 17-19)**.

Proper risk assessment/prognosis, diagnostics, and treatment planning contributed to a treatment that corrected the patient's functional disorders and achieved pleasing, although not ideal, esthetics.

Conclusion

Based on a greater understanding of the risk categories coming to bear on a patient's overall oral health, dentists may now focus their treatment planning on how to achieve predictable outcomes and reduce the risk of future disease.[22-24] The new treatment philosophy is not about "rescuing," but rather about managing the conditions with which a patient presents.[22-24] Ultimately, the patient's presenting situation provides prognostic value and treatment plans can be designed to reduce risk before the consequences of the disease processes become a major problem.

As demonstrated in **Figures 2a, 3a, 4a, and 5a**, a Gaussian bell curve represents the distribution of disease/risk (i.e., periodontal, biomechanical, functional, dentofacial) in our patients. Using periodontics as an example, low-risk patients (green) require re-care every six months; moderate-risk patients (yellow) require re-care every four months; and high-risk patients (red) will likely develop or have already developed periodontitis and require re-care every three months.

As a matter of good practice, it is best for dentists to do all they can to maintain their patients in the low-risk (green) zone, or just into the moderate-risk (yellow) zone. In situations where a patient's risk is attributable to their susceptibility to disease, it may not be possible to reduce the risk without sacrificing the teeth and it may be necessary to consider implant-supported restorations. When risk cannot be effectively reduced, our efforts are focused on improving prognosis by minimizing the contributing

Figure 18: Final maximum intercuspation position utilizing the first treatment option.

Figure 19: The first treatment option corrected the patient's functional disorders and achieved pleasing, although not ideal, esthetics.

When risk cannot be effectively reduced, our efforts are focused on improving prognosis by minimizing the contributing factors of disease that can be managed.

factors of disease that can be managed. Instead of allowing further breakdown that necessitates the need for constant treatments, treatment outcomes can be designed for predictability and affordability and can provide patients with predictable solutions.[25]

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References

1. Sackett DL, Rosenberg WM, Muir Gray JA, Haynes RB, Richardson WS. Evidence based medicine: what it is and what it isn't. BMJ. 1996;312:71-2.

2. Tonelli MR. The philosophical limits of evidence-based medicine. Acad Med. 1998;73(12):1234-40.

3. Ismail AL, Bader JD, Kamerow DB. Systematic reviews and the practice evidence-based dentistry: professional and policy implications. J Am Col Dent. 1999;66(1):5-12.

4. Gadhia K, Karir N, Milward M. Management of periodontal disease in general practice. Dent Update. 2010;37(5):310-2, 314-6, 319-20.

5. Qi F, Kreth J. Characterization of anti-competitor activities produced by oral bacteria. Methods Mol Biol. 2010;666:151-66.

6. Strassler HE. Tooth stabilization improves periodontal prognosis: a case report. Dent Today. 2009;28(9):88-92; quiz 93, 86.

7. Fayyad MA, al-Rafee MA. Failure of dental bridges. ii. prevalence of failure and its relation to place of construction. J Oral Rehabil. 1996;23(6):438-40.

8. Li LN, Guo LH, Lux R, Eckert R, Yarbrough D, He J, Anderson M, Shi WY. Targeted antimicrobial therapy against streptococcus mutans establishes protective non-cariogenic oral biofilms and reduces subsequent infection. Int J Oral Sci. 2010;2(2):66-73.

9. Takenaka S, Trivedi HM, Corbin A, Pitts B, Stewart PS. Direct visualization of spatial and temporal patterns of antimicrobial action within model oral biofilms. Appl Environ Microbiol. 2008;74(6):1869-75. Epub 2008 Jan 25.

10. Karlinsey RL, Mackey AC, Stookey GK. In vitro remineralization efficacy of NaF systems containing unique forms of calcium. Am J Dent. 2009;22(3):185-8.

11. Christensen GJ. Oral care for patients with bulimia. J Am Dent Assoc. 2002;133(12):1689-91.

12. Paszynska E, Limanowska-Shaw H, Slopien A, Rajewski A. Evaluation of oral health in bulimia nervosa. Psychiatr Pol. 2006;40(1):109-18.

13. Machado C, Lacefield W, Catledge A. Human enamel nanohardness, elastic modulus and surface integrity after beverage contact. Braz Dent J. 2008;19(1):68-72.

14. Ren YF, Amin A, Malmstrom H. Effects of tooth whitening and orange juice on the surface properties of dental enamel. J Dent. 2009;37(6):424-31. Epub 2009 Feb 23.

15. Magalhaes AC, Moraes SM, Rios D, Wiegand A, Buzalaf MA. The erosive potential of 1% citric acid supplemented by different mineral: an in vitro study. Oral Health Prev Dent. 2010;8(1):41-5.

16. Holbrook WP, Ganss C. Is diagnosing exposed dentine a suitable tool for grading erosive loss? Clin Oral Investig. 2008;12 Suppl 1:S33-9. Epub 2008 Jan 29.

17. Greene CS. Management of patients with tmds: a new "standard of care". Int J Prosthodont. 2010;23(3):190-1.

18. Brosnihan J. Updating tmj and occlusal philosophies. Dent Today. 2010;29(6):10, 12-3.

19. Misch CE. Clinical indications for altering vertical dimension of occlusion. objective vs. subjective methods for determining vertical dimension of occlusion. Quintessence Int. 2000;31(4):280-2.

20. Misch CE, Silc JT. Using implant positions: treatments planning canine and first molar rules. Dent Today. 2009;28(8):66, 68, 70-1.

21. Bitter RN. The periodontal factor in esthetic smile design—altering gingival display. Gen Dent. 2007;55(7):616-22.

22. Michelotti A, Iodice G. The role of orthodontics in temporomandibular disorders. J Oral Rehabil. 2010;37(6):411-29.

23. Fontenelle A. Dento-facial orthopedics. role of the orthodontist. Chir Dent Fr. 1981;51(113):33-50.

24. Levant BA. What dentists should know about dento-facial deformity. Aust Dent J 198833(4):273-9.

25. MacRobert M. A leadership focus on evidence-based practice: tools for successful implementation. Prof Case Manag. 2008;13(2):97-101. **jCD**

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The self-instruction exam comprises 10 multiple-choice questions. To receive course credit, AACD members must complete and submit the exam and answer at least 70% of the questions correctly. Participants will receive tests results immediately after taking the examination online and can only take each exam once. The exam is scored automatically by the AACD's online testing component. The deadline for completed exams is one calendar year from the publication date of the issue in which the exam appeared. The exam is available online at www.aacd.com. A current web browser is necessary to complete the exam; no special software is needed.

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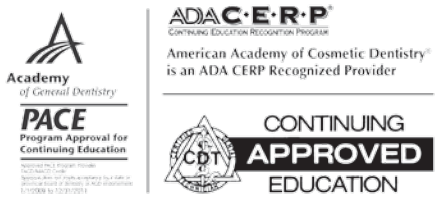
Disclaimer

AACD's self-instruction exams may not provide enough comprehensive information for participants to implement into practice. It is recommended that participants seek additional information as required. The AACD Self-Instruction Program adheres to the guidelines set forth by the American Dental Association Continuing Education Recognition Program (CERP), and the AGD Program Approval for Continuing Education (PACE).

Questions and Feedback

For questions regarding a specific course, information regarding your CE credits, or to give feedback on a CE self-instruction exam, please contact the AACD Executive Office by e-mailing meetings@aacd.com or by calling 800.543.9220 or 608.222.8583.



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(CE) Exercise No. JCD03

Treatment Planning/Oral Medicine, Diagnosis, Pathology

AGD Subject Code: 735

The 10 multiple-choice questions for this Continuing Education (CE) self-instruction exam are based on the article, "New Challenges in Treatment Planning—Part 2: Incorporating the Fundamentals of Patient Risk Assessment," by John Kois, DMD, MSD. This article appears on pages 110-121.

The examination is free of charge and available to AACD members only. AACD members must log onto www.aacd.com to take the exam. **Note that only Questions 1 through 5 appear here in the printed version of the *jCD*; they are for readers' information only.** The complete, official self-instruction exam is available online only—completed exams submitted any other way will not be accepted or processed. A current web browser is necessary to complete the exam; no special software is needed. The AACD is a recognized credit provider for the Academy of General Dentistry, American Dental Association, and National Association of Dental Laboratories. For any questions regarding this self-instruction exam, call the AACD at 800.543.9220 or 608.222.9540.

1. **Which of the following can be an expected outcome from systematically assessing patient risk?**

   a Lowered stress in the oral environment with a compromise in long-term predictability
   b. An improved treatment prognosis by lowering risk in the oral environment
   c. An enhanced long-term predictability without regard to stress in the oral environment
   d. A better treatment prognosis with a compromise in long-term predictability

2. **Periodontal risk factors that should be assessed during patient evaluation include:**

   a genetics, diabetes, and TMJ.
   b. TMJ, smoking, and extra-bony components.
   c. extra-bony components, genetics, and mobility at the tooth level.
   d. genetics, acquired environmental factors, mobility at the tooth level, and infra-bony components.

3. **Biomechanical risk assessment examines tooth structure loss from:**

   a. caries not associated with biofilm and trauma.
   b. nonchemical-mediated erosion and periodontal health.
   c. biofilm-mediated caries, chemical-mediated erosion, and structural compromise.
   d. periodontal health issues and occlusal trauma.

4. **Organisms in our biofilm can:**

   a. promote health of the dentition by shifting our pH from alkaline to acidic.
   b. produce destructive byproducts by increasing alkalinity of the oral environment.
   c. decrease to harmless levels in a dry oral environment.
   d. promote a healthy oral environment or alter the pH of the oral cavity.

5. **An important treatment decision in assessing functional risk is:**

   a. realizing the static relationship of teeth provides a comprehensive insight to the etiology of disease.
   b. understanding whether the patient has current ongoing disease activity or previously existing disease activity.
   c. knowing that inefficient chewing systems cannot cause wear due to frictional contact.
   d. accepting that morphologic malocclusion is the same as functional malocclusion.

To see and take the complete exam, log onto www.aacd.com.

jCD
vol. 27 issue 1
Journal of Cosmetic Dentistry

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 *jCD* and will not be reprinted without written consent from the publisher.

The *Journal of Cosmetic Dentistry* is aimed primarily at practicing cosmetic dentists and laboratory technicians. Clinical, clinical research, and case study 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 *jCD's* Editorial Review Board through a double-blind review process.

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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.

Text

Please follow these guidelines:

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- Organize manuscripts in a manner that best fits the specific goals of the article.
- Use standard headings in preparing clinical manuscripts—abstract, introduction case report, diagnosis, treatment plan, discussion, and conclusion.
- Include an abstract of approximately 100 words summarizing the article.
- Refer to past issues of *jCD* for examples of proper text format.

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Authors are responsible for ensuring the accuracy of all information in their references.

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If accepted for publication:

- Send your images on a CD to the address below.
- Include the author's name(s), address(es), telephone and fax numbers, and e-mail address on a cover sheet.
- An image of the author must be submitted. A minimum resolution of 300 ppi is required.

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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Advertiser Index

3M ESPE	www.3MESPE.com	32, 54
AACD	www.aacd.com	92, 104
Americus Dental Services/DSG	www.dentalservices.net	11
Aurum Ceramic Dental Laboratories	www.aurumgroup.com	96, 109
Brad Jones, Smiles Inc.	www.whoisbradjones.com	21
CCADS	www.ccads.org	102
Cosmedent	www.cosmedent.com	67
Envision A Smile	www.EnvisionASmile.com	57
Heraeus Kulzer	www.heraeusdentalusa.com	64
Inman Aligner	www.inmanaligner.com	37
Ivoclar Vivadent	www.ivoclarvivadent.com	IFC, IBC
Knight Dental Group	www.knightdentalgroup.com	72
LK Dental Studios	www.lkdentalstudio.com	9
MAC, by Dental Technologies Inc.	www.macveneers.com	BC
Micerium S.p.A.	www.micerium.it	85
NewBeauty Magazine	www.newbeauty.com	90
Panadent	www.panadent.com	62
Patient News	www.patientnews.com	5
RateYourSmile.com	www.RateYourSmile.com	50
Rosemont Media	www.rosemontmedia.com	76
Septodont	www.septodont.com	7
Springstone Patient Financing	www.springstoneplan.com	97
Triodent Corporation	www.triodent.com	79
Westlund Dental Studio	www.westlunddental.com	27

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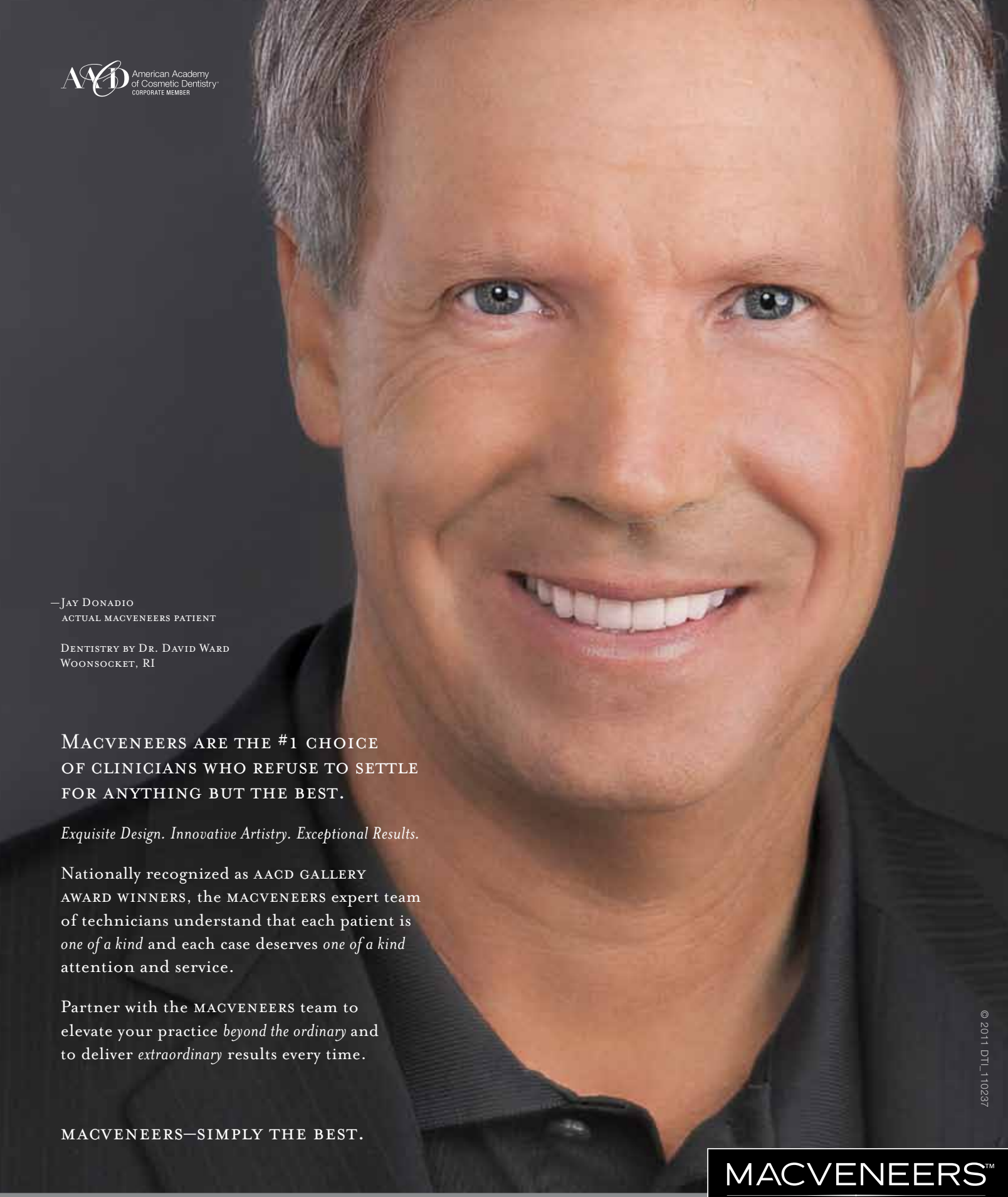

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