Case Study

A Sequential Approach to Complex Restorative Rehabilitation

John B. Tague, DMD & Lonnie Lee, CDT

Laboratory Esthetics

by Barbara Wojdan, CDT

Knight Dental Group

3659 Tampa Rd., Oldsmar, FL 34677 • 800-359-2043

www.knightdentalgroup.com

Winner

Florida Academy of Cosmetic Dentistry
Members Choice
&
Gold Medal

A Sequential Approach to Complex Restorative Rehabilitation

John B. Tague, DMD & Lonnie Lee, CDT

Introduction:

The average American patient has greater expectations on what modern dentistry can provide and these expectations most certainly raise the bar for our performance as a restorative team. Since the vast majority of dental teams deal primarily with average Americans, for many of us, the pressures of delivering what these patients demand can, at times, be quite overwhelming and somewhat stressful.

Given the stepped-up activity and pace of dental research and development, there comes an almost certainty that the technologies we embrace and utilize today, along with their associated applications, will at some point give way, to newer… easier… faster… more accurate and predictable means of addressing the functional esthetic needs of the dental consumer-patient. Additionally, the "re-invention" of current successful technologies and skills is perceived by many as paramount to addressing these ever-changing consumer needs and desires.

Thus we can assess that although *need fuels innovation* so too does *innovation create more need*. Either way, it seems the patient… and the dental team… stands to win. As contemporary clinicians and technologists who remain keenly focused on personal and business growth, serious consideration for *how we do what we do* must always parallel each and every change in the dental marketplace.

One particular point, though, remains constant. Through all the advancements and changes in the ways we do what we do, the often-emotional, human element of dentistry may be the beacon that guides many of us to our ultimate destination. We can… and do… change peoples' lives and this is one very major reason *why we do what we do*.

This article and case study is intended to offer a step-by-step, systematic, sequential team approach to dealing with the more complex restorative case. Also, it should serve as a reminder, and hopefully as a motivator, to embrace technology and change and even more importantly perhaps, to embrace the advancement and refinement of the knowledge, understanding and skills necessary to achieve the well-documented results of a well-planned and well-executed service…performed by people… for people.

1 … The Initial Interview:

In this particular case study, a dental "situation" exists, apparent to the patient and obvious to the clinician, the complexities of which are undocumented. Whether the patient is one of record, a referral (such as the case presented here) or a "walk-in," the primary goal of this process of discovery is to establish mutual understanding and agreement. It can be the foundation for building the essential trust and confidence necessary for a successful Doctor-patient relationship.

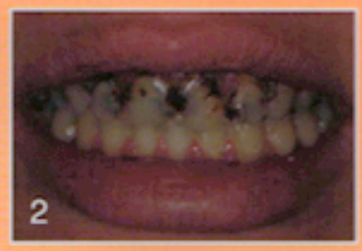
While it is certainly important to record and document details of the patient's history and condition along with their realistic needs, desires and expectations, it is equally important to determine and document:

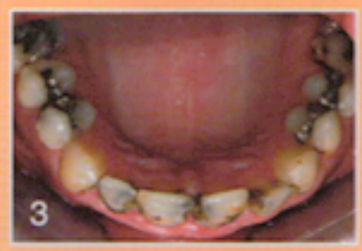
1. *that the patient assumes complete responsibility for their current condition*

2. *that the patient is mentally, physically, emotionally and financially ready, willing and able for any/all related treatment*
3. *that patient can visualize themselves in your care*
4. *that the patient already has/will gain the necessary trust and confidence to proceed to the next process… The Comprehensive Examination*

Note: *For building trust and confidence and to better enable the patient to visualize themselves in your care, remember that there are basically four types of patient assessments: those who do know what they need and want; those who know what they need but not what they want; those who don't know what they need but do know what they want; those who don't know what they need or want. It is very helpful to determine which type and to be prepared to discuss and present "similar case" scenarios and visual support materials (i.e., digital presentations, image portfolios, recent cosmetic-oriented dentistry articles, scientific studies) for each type.*

Patient Situation:





The female patient, a referral in her late twenties, presented with highly visible, severe decay on her maxillary anterior teeth (*images 1, 2, 3*). The Initial Interview indicated that she had not visited a dentist in many years due to a previous painful experience and as a result, early indications of problems were left unaddressed. Additionally, a poor dental hygiene regimen was a major factor in her current tooth and soft tissue condition and she was experiencing moderate pain and discomfort.

As a result of her condition, she consciously resisted smiling and had become quite withdrawn socially. In an attempt to hide the embarrassment caused by her teeth, she had developed a habit of covering her teeth with her lips and further, covering her mouth with her hand when she came into personal contact with other people. This acquired habit had the unfortunate consequence of changing her entire smile and thus, her perceived personality. Although she was able to maintain meaningful employment, she was concerned that her dental condition was a detriment to possible career advancement, as well as personal growth.

She wanted her circumstances to change. After having seen the positive changes that comprehensive dentistry made in the appearance and demeanor of her co-worker, she decided to explore possibilities for her own situation. She wanted to have "pretty teeth" and a "natural–looking smile." She, admittedly, was aware that she was responsible for the current state of her dental condition and was ready, willing and able to devote the time and financial resources necessary to complete the case. Additionally, she made the commitment to assume full responsibility for the routine, at-home hygiene program that would be required during the forthcoming clinical procedures and to continue such after case completion and delivery.

2 … The Comprehensive Examination:

Immediately following the Initial Interview, and typically scheduled during the same appointment, the Comprehensive Examination should take place. The patient should now be at ease and mutually engaged in finding a solution. Prior to beginning any clinical procedure, a thorough clinical diagnosis and documentation-of-fact is absolutely necessary. In as much as the Initial Interview was a discovery process of the person, the Comprehensive Examination is the clinical discovery process. It indeed sets the stage for both case planning and scheduling.

Again, gathering accurate information and facts is the primary goal and the requirements, while seemingly routine, are extremely crucial for accurate diagnosis and case documentation for both medical and legal reasons. Further, it provides justification and understanding for the patient of the existing condition and to the what/when/why of probable upcoming procedures.

Equally important, it establishes a clear review of the functional, clinical and esthetic concerns for preliminary communications and subsequent, upcoming case-relevant diagnostic planning, sequencing and scheduling with the laboratory and (if necessary) clinical specialist.

These minimal requirements include:

Full-mouth series of X-rays
Tooth Charting
Periodontal Charting
Soft tissue/oral cancer screening
2 sets of full arch impressions for study models
Centric Relation bite registrations
High resolution digital images (following AACD guidelines)

In this case study, the Comprehensive Examination revealed that all severe decay was isolated within the maxillary arch. The severity of decay on tooth numbers 7,8,9,10 would necessitate endodontic treatment. Her periodontal condition, although needing immediate attention, was not considered as severe. Further examination and evaluation confirmed that her existing anterior function appeared to be somewhat sound and her posterior occlusion quite stable, and thus, would be strictly maintained and consequently re-verified throughout the restorative process. A full series of high resolution images were taken based on current AACD guidelines

and maxillary and mandibular full-arch impressions were acquired for the laboratory to begin a preliminary diagnostic model evaluation and subsequent functional esthetic wax-up.

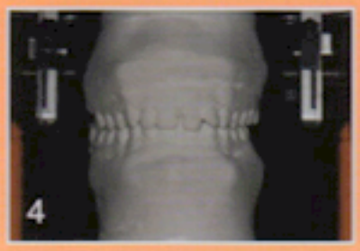
3 … The Laboratory Evaluation and Case Planning

It has often been stated by the vast majority of leading clinicians that the results of any restorative case are only as great as the mutual commitment, understanding, communication and application between the dentist and laboratory technologist. This holds particularly true in the Evaluation and Case Planning phase.

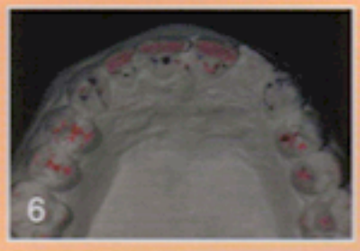
The primary goal is to "begin with the end in mind." Not only does this phase provide a clearly defined, highly detailed roadmap for preparation requirements and restorative material selection, but equally important, it will provide the first realistic test, *prior to tooth preparation*, for the potential of meeting the preliminary functional and esthetic case requirements.

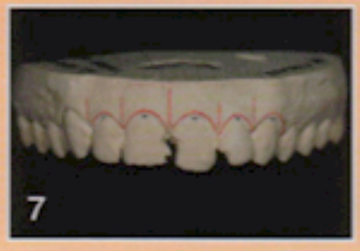
This phase, conducted with a highly skilled, experienced laboratory can provide tremendous insight and input into the planning of even the most comprehensive cases. It is comprised of three, equally important communication components that will precisely dictate how each, necessary element of function and esthetics will be incorporated into the diagnostic review and wax-up, which ultimately sets the entire stage for every subsequent clinical procedure.

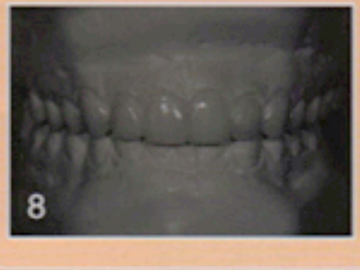
Prior to beginning these communications, information acquired during the Comprehensive Examination is forwarded to the laboratory, which include digital images, x-rays, impressions and bite registrations, for pouring and mounting on a semi-adjustable articulator with a notation on the diagnostic Rx to "call when ready to proceed." (*image 4*)


4


5


6


7


8

Component One…Preliminary Verbal Dialogue:

This component is the "brainstorming session". It is the first opportunity to properly introduce the patient and their situation to the technician. Since the laboratory rarely sees the patient, particularly at this point, the digital images and the accurately mounted study models provide an accurate format to allow them to visually and physically review and understand the patient situation. It allows them to gain a better insight into the patient as a person… rather than simply the person's teeth.

Together with the technician, a review of the Rx and mounted study models is made along with specific patient desires and how they are related to the case's potential to realistically match them with functional esthetics through interfacing with specialists, tooth preparation and material selection along with their related guidelines. A thorough written record of this communication is recorded by the technician via a Diagnostic Case Planning Form (*image 5*). Detailed discussion and notes are made of the functional and esthetic goals and any foreseen challenges are met with the mutual solicitation of ideas that offer the best opportunities to overcome them.

Component Two…The Functional Esthetic Wax-up:

The second component, the diagnostic wax-up, is indeed the "realization" phase in that it will provide the first, uniquely realistic, physical representation and preview of the final restorations for further review, verification and modification by both the team and the patient. Every element discussed and noted in the Verbal Dialogue must have been incorporated here.
(*images 6, 7, 8*)

Component Three…The Diagnostic Review

Since the accuracy of the wax-up is so crucial to the upcoming clinical procedures, a very thorough evaluation and Diagnostic Review will determine that all case goals have been met, as typically follows:

Overall Functional Design as it affects/is affected by the opposing arch
- *Posterior Occlusion*
- *Anterior Function*
- *Cuspid Guidance/Posterior Disclussion*
- *Maximum Intercuspation*
- *Horizontal/Occlusal Plane*
- *Frontal Plane*
- *Functional Interferences (noted & marked)*

Overall Esthetic Design related to patient desires
- *Arch Form*
- *Midline Position*
- *Tooth Long Axis Positions*
- *Tooth Length (central incisors, lateral incisors, cuspids)*
- *Tooth-tissue Symmetry and Relationship*
- *Tooth-lip Relationship*
- *Tooth Form/shape/dimension*

- *Incisal/gingival Embrasures*
- *Buccal Corridor*

Preparation Design
- *Additive Vs. Reductive Requirements*
- *Full Coverage Crown*
- *Labial Veneer*
- *¾ Crown*
- *Root Form & Proximal Eminence*
- *Margin Placement*

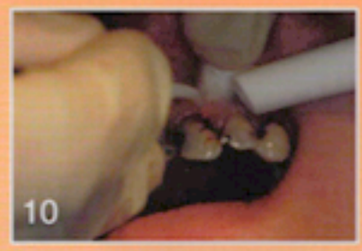
It should be noted that the most ideal time to make changes in either the overall case design, function or esthetics is during this phase… prior to the preparation appointment. In fact, if everything up to this point has been properly accomplished, approximately 80% of the case should now be complete…prior to tooth preparation.

Additionally, the laboratory can provide important tools, such as provisional indexes, preparation guides and stents that can be utilized during preparation and provisionalization procedures by the clinician or by referred specialists to accurately move this highly detailed functional esthetic information forward.

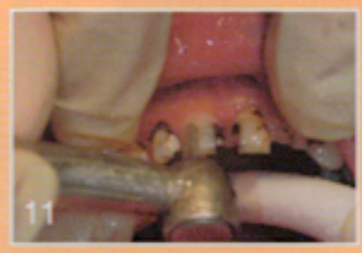
In this case study, a detailed case plan was outlined and coordinated with the laboratory utilizing the x-rays, images and study models acquired during the Comprehensive Exam. The final, completed functional esthetic wax-ups are ready for patient review. (*image 9*)

4 … The Presentation to the Patient

This phase of the process should be quite relaxed and uneventful… and the patient should feel somewhat excited to proceed with the upcoming clinical procedures. The final treatment plan, along with the wax-up, is presented for review and discussion. Financial arrangements are finalized and the treatment sequence and timeframe is established. Any questions or concerns regarding the treatment plan or fees should be addressed at this time.



In this case, prior to the tooth preparation appointment, a thorough hygiene plan was initiated with strict follow-up and regimen and an appointment was scheduled with a referred endodontist for the necessary endo treatment on teeth 7,8,9,10.

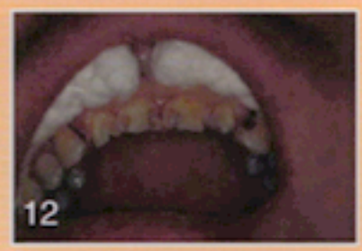


Additionally, at-home bleaching was prescribed to meet the patient's esthetic requirements for the mandibular teeth.

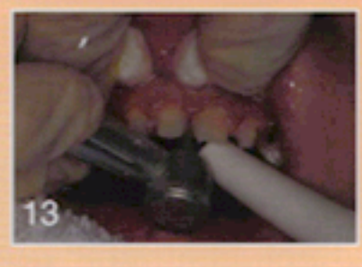
Finally, the first clinical appointment is scheduled.

5 … Clinical Appointment #1

Tooth preparation time! The case plan and treatment sequence is well established by now and the entire staff is properly prepared for the related procedures. Every detail should be clear and evident…right down to the final preparation design for each tooth and the timing and sequence of each step.

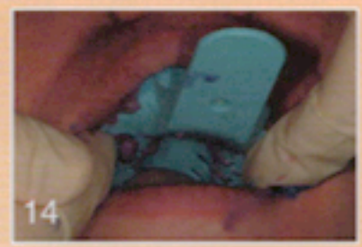


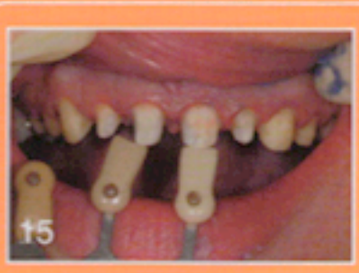
Through the previous Case Planning phase, preparation reduction and margin guidelines should already have been well established that were dictated by the material selection, as well as function and esthetics as they are related to the *particular case*. Common wisdom suggests that the amount of reduction required is ultimately dictated by function versus the potential for material failure, so it's always safer to follow material manufacturer guidelines if there are ever questions or concerns. As a general rule, as little reduction as possible but as much as necessary to meet all esthetic case goals and provide ideal conditions for the restorations to achieve and maintain strength and wear characteristics necessary for long-term clinical success. Most importantly, know these guidelines in advance and mentally practice them, prior to the appointment, so that when "show-time" arrives, each tooth preparation is automatic.

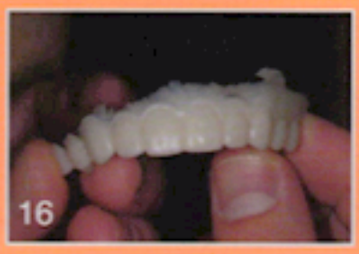


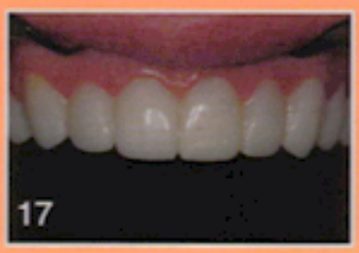
In this case study, the following preparation treatment sequence was followed:

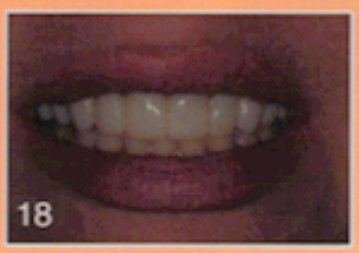
1. *Anesthesia administered*
2. *Soft tissue modification with diode laser* (*image 10*)
3. *Excavate decay and prepare teeth for planned restorative material* (*image 11*)
4. *Fiber post and esthetic core buildup* (*image 12*)
5. *Finalize/refine preparations and margins* (*image 13*)
6. *Verify preps for proper clearance/space with lab provided stent (refine if necessary)*
7. *Soft tissue management/hemostasis*
8. *Full arch impressions and prep-to-opposing bite registrations* (*image 14*)
9. *Acquire prep images for color detail* (*image 15*)

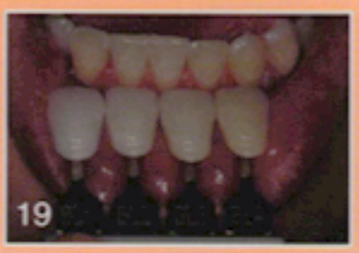



15


16


17


18


19


20

10. *Fabricate provisional restorations from lab provided index of wax-up (image 16)*
11. *Place provisionals and verify gingival embrasures/tissue response (modify if necessary) (images 17, 18)*
12. *Adjust/refine occlusion and function (enamoplasty on opposing arch where marked on the diagnostic model*
13. *Solicit patient feedback for function and esthetics verification (modify if necessary)*
14. *Full arch impression of approved provisionals, opposing arch and MI bite registrations (if modifications were made from wax-up)*
15. *Clean up*
16. *Acquire images of approved provisionals and final shade/color requirements (images 19, 20)*

Continued evidence of *accurate information moving accurately forward* is supported through the provisional restorations that were created from the esthetic wax-up. As a result of the Case Planning efforts, further, crucial elements of function, esthetic tooth form/shape and soft tissue control were completely verified and modified according to the natural, intra-oral environment and arch-to-arch relationship and as well as patient/clinician preference. Information on even the slightest changes, provided from the new images of the provisional in place and approved provisional model, will move accurately forward into fabrication of the final restorations.

6 … Clinical Appointment # 2

The post-prep "check-up" appointment is quite helpful and indeed necessary to further verify all previous phases and help establish/maintain the most ideal platform for upcoming procedures. Basically, this final review of the provisional is a preview of the final restorations, and serves as an opportunity to fine-tune function, esthetics and soft tissue relationship in the absence of body fluids and anesthesia.

Careful analysis of the patient's at-home hygiene care is very important to better establish an optimal tissue environment for upcoming placement procedures, particularly when resin bonding techniques will be used. Additionally, particular attention should be paid to gingival embrasures and the influence of the temps-to-tissue relationship.

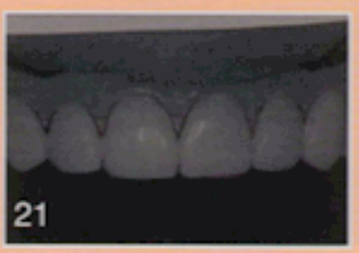
In this case study, it was determined that home care was good. Minor adjustments were made to the occlusion and slight refinements were made to the proximal areas of the provisionals. Since all modifications were very minor, it was not necessary to take a new impression of the approved provisional, however new images of these changes were acquired and sent to the laboratory. (*images 21, 22, 23*)

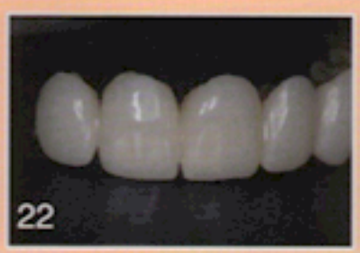
6 … Clinical Appointment # 3a

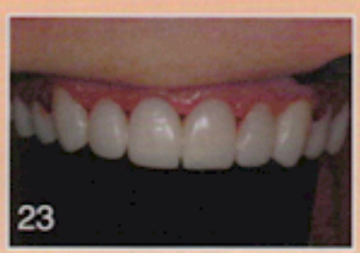
By now, the final restorations have been delivered from the laboratory and an on-the-model review has been made to determine that all functional esthetic goals have been met according to the Case Plan.

Certainly, there may be a high level of anticipation on the patient's behalf…this is after all, their first look at their "new" teeth. Everything that has been accomplished, up to this point, should create the "wow" effect necessary for final placement. Situations do occasionally present themselves, however, that may necessitate laboratory corrections, refinements or adjustments to final fit, marginal integrity, occlusion, shape or color. (*images 24, 25, 26)*

Quite simply stated, how this appointment is represented to the patient is extremely crucial, thus it is very important to portray this as a "trial test" for the final restorations and not as the final placement. Things happen and although the situations may vary as to the cause, the patient's view of the entire process hangs in the balance. The typical, best case scenario is that everything is great and final seating can occur…thereby surprising the patient on the up-side.


21


22


23

7 ... Clinical Appointment # 3b

Once it is determined that the restorations have met every objective intra-orally, the seating process should be uneventful and automatic. Whether final seating occurs during the "trial-seat" appointment or at another scheduled time, as determined by the Case Plan objectives being successfully met, is really not a major factor. Ideally, it would be quite convenient to try-in and seat the final restorations during the same appointment... and this should indeed be the goal... but once they are *permanently* placed there is no going back.

The patient must have the ultimate, final say in determining the timing of this event and it should be formally documented accordingly. If all Case Planning was accurately accomplished and all information was correctly understood and communicated properly throughout the entire process... success becomes both predictable and eminent.

In this case study, the restorations were tried in and evaluated, minor chair-side adjustments were made to the incisal embrasures and the IPS Empress Esthetic restorations were placed with total etch resin bonding techniques. (*images 27, 28, 29)*

8 ... Clinical Appointment # 4

The post-op appointment is the final check for patient comfort and satisfaction with the new restorations. It is also a time to proactively deal with any negative issues that may have arisen, make additional adjustments to the occlusion and reinforce the need and timing for additional procedures. Additionally, the next hygiene visit should be scheduled and the importance of at-home care readdressed.

Further, it is a great opportunity to make a "big deal out of a big thing." Final images should be acquired for use in the in-office portfolio for future presentations or photo additions to the "wall of smiles." The proverb "Images are worth ten thousand words" carries much meaning and influence for the entire team, and they should be shared with the laboratory for post-op accolades and wrap-up discussion. Most importantly, they will stand as a vital tool for learning... together... how well and why all the planning and communications worked and how to continue to refine and improve these processes as well as the application processes themselves. (*images 30, 31, 32)*

Conclusion:

Certainly, a case such as the one presented here must have met many key diagnosis, planning and implementation criteria to achieve the highest level of expectation. Thus, the most significant point to be remembered is: the more comprehensive the diagnosis... the more comprehensive the thinking... the more comprehensive the planning... the more comprehensive the activity.

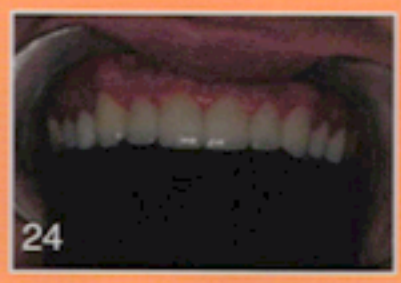
Beauty, confidence, vitality & health... these lifestyle qualities are all on the minds of today's dental patient-consumer when faced with deciding on even the simplest dental procedure.

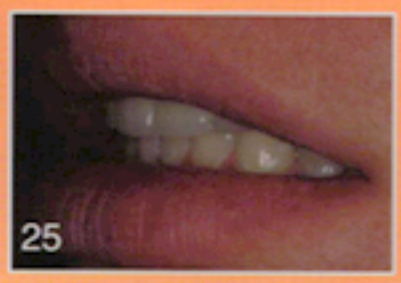
As providers of high quality dental care, often in contrast to these patient views, we must resist any tendency to focus solely on the "how to" issues related to technique and material predictability, longevity and reliability. The consequences of this thinking speak for themselves.

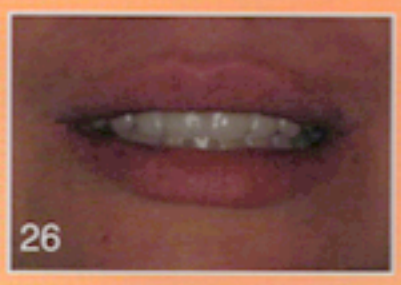
Conversely, *refined dental logic*, then, might suggest that the true essence of success in contemporary restorative dentistry may be in our own ability to understand the *perceived needs* of our dental market and to routinely, sequentially incorporate them, as an integral part of the *real need*, into the overall case plan.

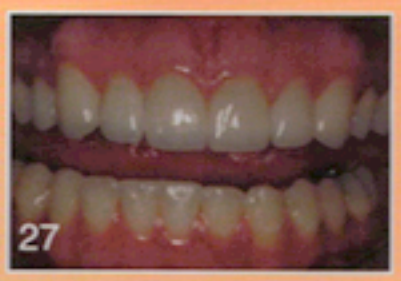
Materials Overview:

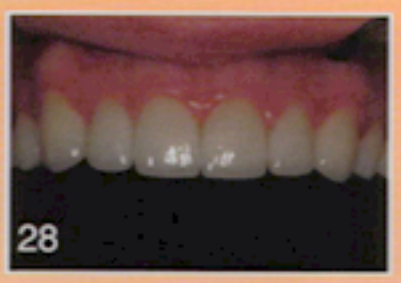
- Restorations: IPS Empress Esthetic (Ivoclar Vivadent, Inc.)
- Soft Tissue Contouring: Odyssey Laser (Ivoclar Vivadent, Inc.)
- Placement: Multilink Automix (Ivoclar Vivadent, Inc.)

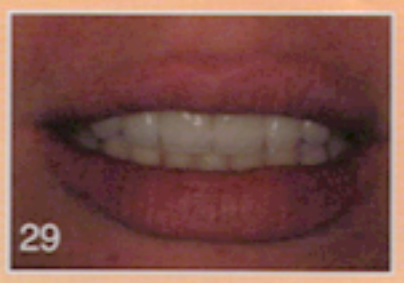

24


25

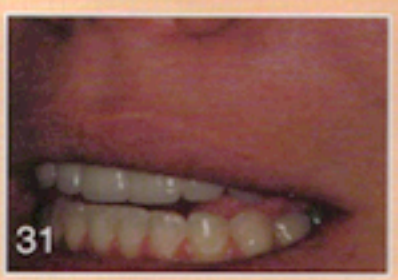

26


27

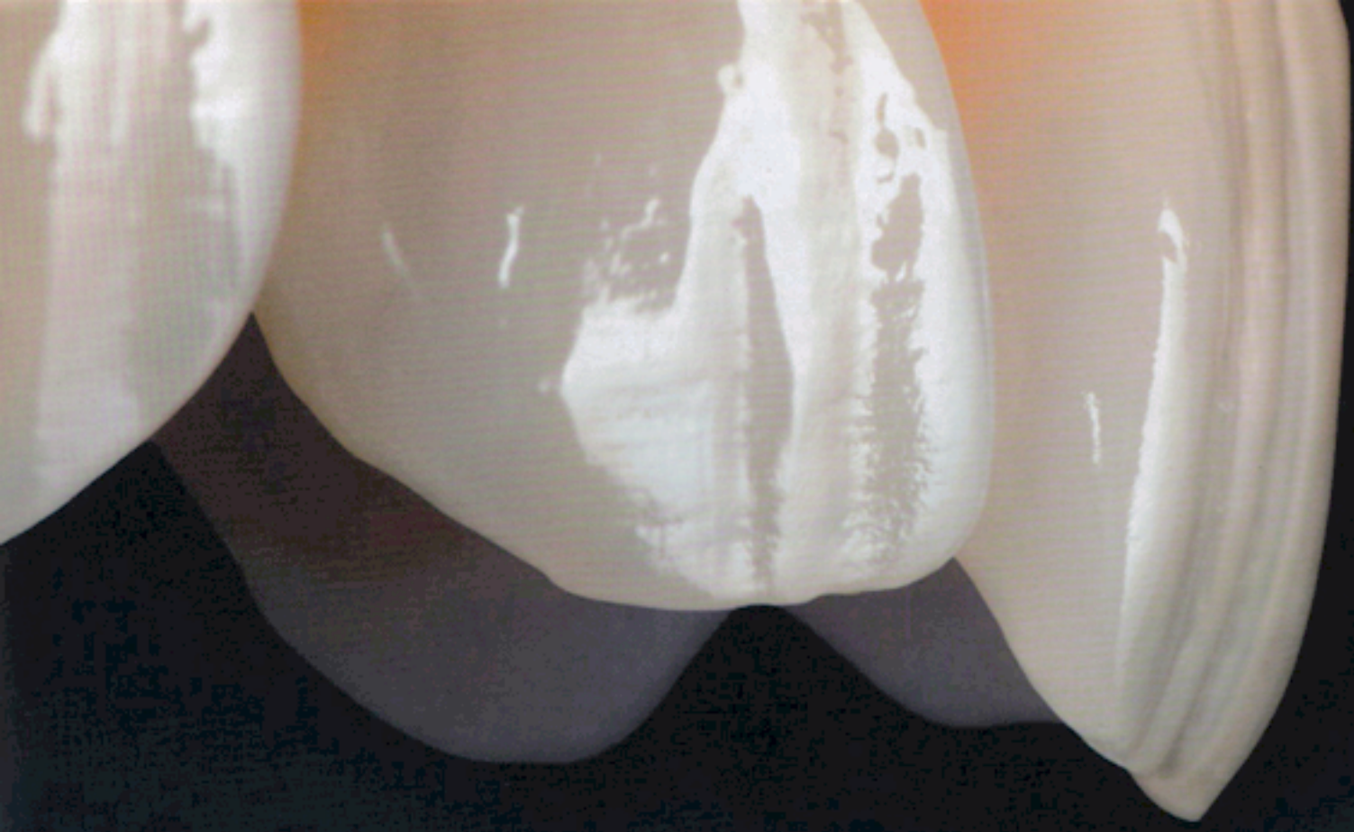

28


29


32


31

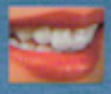

30



Confidence

Reliability

Esthetics



IPS Empress®

The world's leading all-ceramic

100% CUSTOMER SATISFACTION GUARANTEED!

www.ivoclarvivadent.us

Call us toll free at 1-800-533-6825 in the U.S., 1-800-263-8182 in Canada.

ivoclar vivadent:

passion vision innovation