



by Duane P. Delaune, D.D.S.

Dr. Delaune graduated from the Louisiana State University School of Dentistry in 1988, after which he completed a General Practice Residency at the VA Medical Center of New Orleans. He has been in private practice in Metairie, Louisiana, for 17 years, focusing on preventive, cosmetic, and complex restorative dentistry. Dr. Delaune has completed the LSU School of Dentistry's postgraduate Continuum on Cosmetic Dentistry. He also has completed "The Concept of Complete Dentistry" Seminars I, II, and III; "Application One—Diagnosis and Treatment of Masticatory System Problems"; and "Application Two—Equilibration: Diagnosis & Treatment of Occlusal Problems," all at the Dawson Center for Advanced Dental Study. He is a Master of the Academy of General Dentistry, and has taken more than 1,600 hours of postgraduate training. A Sustaining Member of the AACD, Dr. Delaune is a past president of both the Louisiana Academy of General Dentistry and the Louisiana Academy of Cosmetic Dentistry (AACD affiliate). He enjoys water-skiing, backpacking, and photography. He and his wife, Teresa, have three children.

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

INTRODUCTION

The smile plays a significant role in how we perceive ourselves, as well as in the impression we make on other people.¹ Advances in dental technology and dental materials have enabled dentists and technicians to restore teeth and enhance smiles in ways once thought to be unattainable. As a result of these advances, what was once considered esthetic or acceptable has changed.² These advances have led to others, as the search to meet the demands of our profession continues. For instance, with the possibility of whiter natural teeth came the introduction of whiter ceramics. With the ability to restore teeth without metal came the introduction of stronger restorative materials and adhesives. Today the ability to restore teeth and enhance smiles in ways that truly replicate the natural, youthful appearance of teeth is often limited only by the dentist's and technician's abilities to properly prescribe and handle the available materials and techniques.

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HISTORY

The patient was a 15-year-old female in excellent health. She and her parents had a chief concern of a small, underdeveloped upper left front tooth and a space after orthodontic treatment. The patient had been under my care since she was four years old. Her early dental history included regular preventive care and routine restorative care. At the age of 13 she had a Class I molar relationship with a near-normal occlusion and moderate upper and lower anterior crowding. She had an upper left microdontic lateral incisor (#10). All other teeth were normal and healthy (Fig 1). The patient was referred to an orthodontist for correction of the anterior crowding and management of her occlusion, with the plan that #10 would be restored to its normal size and shape after orthodontic treatment.



Figure 1: Full-face smile before and after, 1:10. The "before" smile is youthful-looking, but has a microdontic left lateral incisor and darker teeth.

DIAGNOSIS

After orthodontic treatment and a period of orthodontic retention to ensure stability, diagnostic records were taken; these included diagnostic study models and 35-mm photographs to evaluate the occlusion and smile.³ A clinical evaluation of the shade was performed using the Vita shade guide (Vident; Brea, CA). Clinical evaluations of the joints, muscles, occlusion, and periodontium were also performed. The patient was then rescheduled for a treatment consultation with her parents to review the findings and discuss the treatment options.

Upon analysis of the diagnostic records and clinical findings, the patient's diagnosis consisted of the following elements:

- slight gingival inflammation with light bleeding upon probing
- Class I occlusion with low joint, muscle, and occlusal risk assessments⁴
- microdontic lateral incisor #10

- shade in the Vita A2 range with A2.5 cuspids (Fig 1)
- gingival hyperplasia with excessive gingival display and asymmetric gingival contours (Fig 2).

TREATMENT PLAN

The basic goal of treatment was to address the chief concern of an underdeveloped maxillary left lateral incisor (#10). However, upon evaluating the diagnostic records it became clear that there were other esthetic issues that needed to be discussed with the patient and her parents prior to proceeding. It was very important to discuss these issues before initiating treatment because once treatment was completed they would become more difficult and costly to address.

Upon completion of the treatment consultation, the following personalized cosmetic treatment plan was developed:

1. prophylaxis with oral hygiene instructions
2. gingival recontouring of teeth #4-13
3. home whitening of upper and lower teeth
4. ceramic crown on tooth #10.

DESCRIPTION OF TREATMENT

ARMAMENTARIUM

- 3.8x loupes (Orasoptic Research; Middleton, WI)
- Zeon illuminator (Orasoptic)
- radiosurgical instrument (Ellman International; Hewlett, NY)
- Vari-Tip #T118 bendable electrode (Ellman International)
- Peridex oral rinse (Zila Pharmaceuticals; Phoenix, AZ)
- Opalence PF 15% & 20% (Ultradent; South Jordan, UT)
- LC block-out resin (Ultradent)
- 1-mm round mouthguard material (Great Lakes Orthodontics; Tonawanda, NY)
- MiniSTAR (Great Lakes Orthodontics)



Figure 2: Close-up smile frontal view before and after, 1:2. The "before" smile better displays the microdontic lateral incisor and gingival hyperplasia, with excessive gingival display and asymmetric gingival contours.

- Vita shade guide (Vident; Brea, CA)
- Chromascop bleached shade guide (Ivoclar Vivadent; Amherst, NY)
- Jeltrate Plus fast-set alginate (Dentsply; Milford, DE)
- Ektachrome 100 Plus professional film (Eastman Kodak; Rochester, NY)
- Essix C clear stent material (Raintree Essix; Metairie, LA)
- Sil-Tech putty (Ivoclar Vivadent)
- Xylocaine 2% with epinephrine 1:100,000 (Cooke-Waite; North Chicago, IL)
- round-end tapered neo-diamond #1114.10C (Microcopy; Kennesaw, GA)
- stump shade guide (Ivoclar Vivadent)
- Triad VLC provisional material, Ivory Light (Dentsply)
- Ultrapak retraction cord #0 (Ultradent)
- Hemodent buffered hemostatic solution (Premier; Plymouth Meeting, PA)
- COE metal impression trays (GC America; Alsip, IL)
- Correct vinyl polysiloxane (VPS) heavy and light extra body impression material (Pentron; Wallingford, CT)
- Blu-Mousse bite registration material (Parkell; Edgewood, NY)
- coarse pumice (Whip Mix; Louisville, KY)
- Sure-Shine acrylic polishing bar (Keystone Industries; Cherry Hill, NJ)
- 4% chlorhexidine gluconate soap (Dial Corporation; Scottsdale, AZ)
- Tubulicid Red (Global Dental; North Bellmore, NY)
- Temp Bond Clear (Kerr; Orange, CA)
- Variolink II try-in paste (Ivoclar Vivadent)
- AccuFilm II (Parkell)
- Dialite polishing wheels x 3 (Brasseler; Savannah, GA)
- micro-etcher (Danville Engineering; San Ramon, CA)
- aluminum oxide 50-micron (Danville Engineering)
- Superoxol (EPR Industries Chemists; Pennsauken, NJ)
- Smartbrush-regular (Microbrush Products; Grafton, WI)
- Ultra-Etch 35% phosphoric acid (Ultradent)
- Silane-Monobond-S (Ivoclar Vivadent)
- Heliobond (Ivoclar Vivadent)
- Syntac primer (Ivoclar Vivadent)
- Syntac adhesive (Ivoclar Vivadent)
- Variolink II base-transparent (Ivoclar Vivadent)
- Variolink II catalyst-transparent-high viscosity (Ivoclar Vivadent)

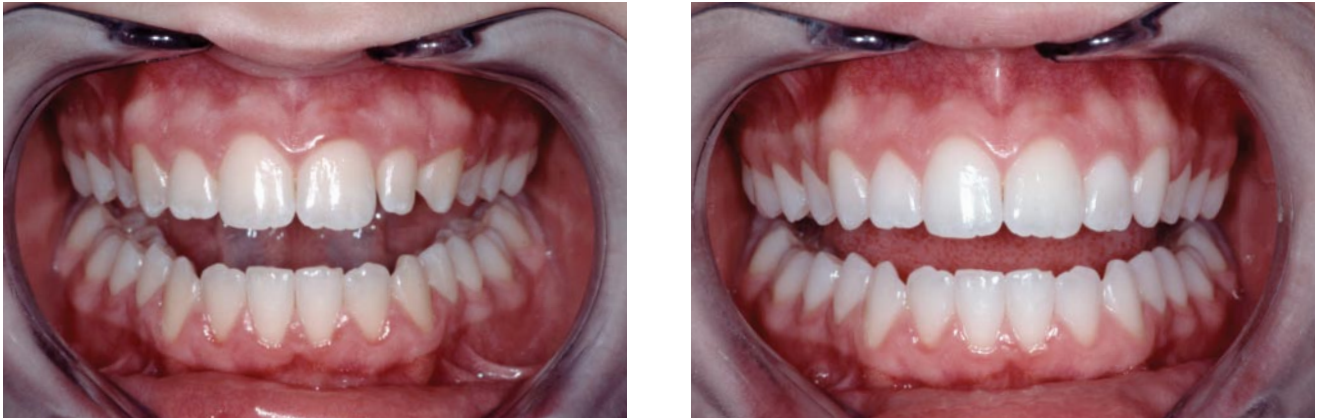


Figure 3: Retracted left lateral view before and after, 1:2. The “before” view fully reveals the microdontic lateral incisor in an ideal post-orthodontic position, to maximize the emergence profile of the final restoration.

- Optilux 401 curing light (Demetron Research Corp.; Danbury, CT)
- light guide, 2-mm curved (Demetron)
- light guide, 8-mm curved (Demetron)
- surgical blade #12b (Miltex, Inc.; York, PA)
- fine needle diamond bur #8392.31.016 (Brasseler)
- Dialite diamond impregnated polishing cups x 3 (Brasseler)
- Porcelize diamond polishing paste 1 micron (Cosmedent; Chicago, IL)

PREOPERATIVE TREATMENT

Working with the orthodontist, I ensured that tooth #10 was properly positioned to maximize the emergence profile of the final restoration (Figs 3 & 4). A dental prophylaxis was performed and the patient was given oral hygiene instructions to

improve plaque control and gingival health.

It became clear that there were other esthetic issues that needed to be discussed with the patient and her parents prior to proceeding.

Following healing and after pre-rinsing with chlorhexidine gluconate 0.12%, radiosurgery was used to recontour the gingival tissues of teeth #4–13 to achieve the following goals:

- remove hyperplastic gingival tissues
- expose more of the natural teeth to improve length-to-width ratios
- establish better gingival symmetry
- establish better gingival contours more in harmony with the smile (Fig 5).

After a two-week healing period, upper and lower alginate impressions were taken to fabricate custom home-bleaching trays. The patient was provided with the necessary products for home bleaching. Two weeks later, it was determined that the teeth had whitened lighter than B1 on the Vita shade tab to OM3 on the Vita bleached shade guide. The cuspids had whitened to A1. The patient was instructed to place the gel only on the cuspids for one additional week. Two weeks after bleaching was complete, the patient was seen for a preoperative visit, which included impressions for study models, final shade selection, and 35-mm photographs of various shade tabs next to the teeth to document and communicate custom shade instructions to the technician.

On the study model, tooth #10 was built to ideal contour using light-cured provisional material.⁵ A clear provisional stent was fabricated from this model to be used

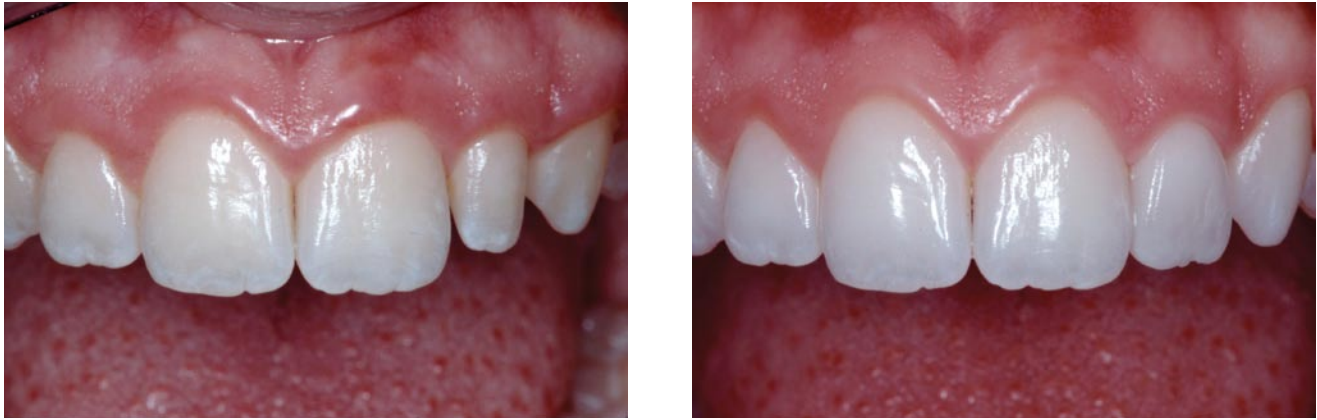


Figure 4: Retracted left lateral view before and after, 1:1. The "after" view reveals proper emergency profile of the final restoration, resulting in natural gingival tissue contours and health.

for the chairside fabrication of the provisional crown. Additionally, a silicone matrix to use as a chairside reduction guide was fabricated using the same study model.

An optimal treatment plan was developed that included a prophylaxis, oral hygiene instructions, gingival recontouring, home whitening, and an all-ceramic crown.

PREPARATION

After achieving anesthesia, tooth #10 was prepared using an 850-014 round-end tapered diamond. The preparation was minimal due to the undercontoured natural tooth. Adequate reduction was verified using the silicone matrix. The stump shade was documented using a stump shade guide. A chairside provisional crown was fabricated using the prefabricated clear stent and light-cured provisional material. Proper contours, margins, and occlusion were developed. Particular attention

was given to the gingival contours and margins of the provisional to develop and maintain natural gingival tissue contours and health (Fig 4). Retraction cord with a buffered hemostatic solution was placed and allowed to set for five minutes. The retraction cord was removed, the tooth rinsed and dried, and the final full-arch impression was taken using VPS impression material. A maximum intercuspation bite record was taken. The provisional was polished to a high luster in the laboratory on a lathe using coarse pumice and an acrylic-resin polish. The prepared tooth was cleansed with chlorhexidine gluconate 4% soap, rinsed, dried, and desensitized with a 1% sodium fluoride solution just prior to cementing the provisional. The provisional was cemented with light-cured clear provisional resin cement. The occlusion was checked. Postoperative photographs and an upper alginate impression with the provisional in place were taken. Written and verbal postoperative

instructions were given and the patient was scheduled for a try-in visit.

TECHNICIAN'S INSTRUCTIONS

A detailed written laboratory prescription was prepared and sent to the dental technician. The technician was instructed to fabricate a leucite-reinforced feldspathic pressed ceramic crown for tooth #10 that complemented the patient's natural dentition (including color, internal effects, translucency, incisal edge contours, surface anatomy, and texture) (Fig 6).⁶ The following items and additional information were included with the case:

- upper full-arch VPS final impression
- lower full-arch stone cast of opposing teeth
- maximum intercuspation bite record
- upper cast with provisional crown in place
- stump and tooth shades
- 35-mm slides (including preoperative views, shade tab)

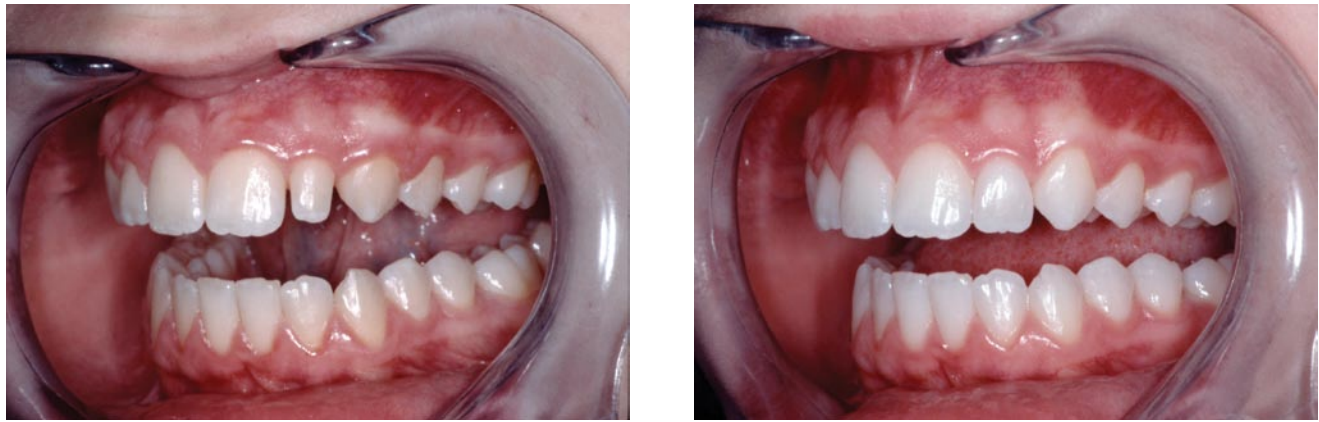


Figure 5: Retracted frontal view before and after, 1:2. The "after" smile is enhanced due to an oral hygiene regimen, gingival recontouring, home whitening, and a ceramic crown.

views, 2:1 magnification views for color and texture evaluation, and provisional crown views).

TRY IN

The provisional crown was removed and the tooth cleansed with chlorhexidine gluconate 4% soap, rinsed, and moistened with a desensitizing solution. No anesthesia was necessary. The crown was initially filled with the desensitizing solution and inserted to evaluate contacts and marginal fit. Translucent try-in paste was then placed in the crown and reinserted to evaluate form, texture, internal effects, and color (including hue, chroma, and value). Clinically, the crown appeared slightly low in value and lacking surface texture. Thirty-five-mm slides were taken to further evaluate the crown. To determine if alteration of the luting cement could adequately compensate for the low value, other shades of luting cement were tried in, evaluated, and photographed. The provisional crown was then recemented as previously described and the patient was rescheduled.

The case was sent back to the technician along with the try-in slides and instructions to make specific modifications to the crown. These included raising the value, improving contours, and increasing the surface texture to better complement the natural dentition.

CEMENTATION

On the day of cementation, the provisional crown was removed and the prepared tooth cleansed and desensitized as described above. No anesthesia was necessary. The crown was filled with transparent try-in paste, inserted, and evaluated once again as described above. Both the patient and I were pleased and the decision to cement the crown was made. The occlusion was checked with articulating paper and slightly adjusted with a fine diamond prior to cementation. Using diamond-impregnated polishing wheels, the adjusted porcelain was polished back to a high luster.

The crown was bonded into place using the total-etch technique and a

dual-cure luting resin as follows:⁷ The internal part of the ceramic crown was micro-etched with 50-micron aluminum oxide, rinsed with water, dried, and then etched with 35% phosphoric acid for 20 seconds. After rinsing and thoroughly air-drying, silane was placed inside the crown for one minute and thoroughly air-dried again. The internal surface of the crown was then coated with a bonding agent and the crown set aside under a light-protected cover while the prepared tooth was treated. The prepared tooth was cleansed with chlorhexidine gluconate 4% soap, rinsed, and air-dried. To prevent any unexpected bleeding during cementation, the gingival tissue along the margins was treated with 35% hydrogen peroxide on a micro-applicator for about 10 to 15 seconds and then rinsed thoroughly. After etching with 35% phosphoric acid for 20 seconds, the tooth was thoroughly rinsed, air-dried, re-wet with a desensitizer, and blotted dry with a cotton pellet. Using a transparent high-viscosity catalyst and

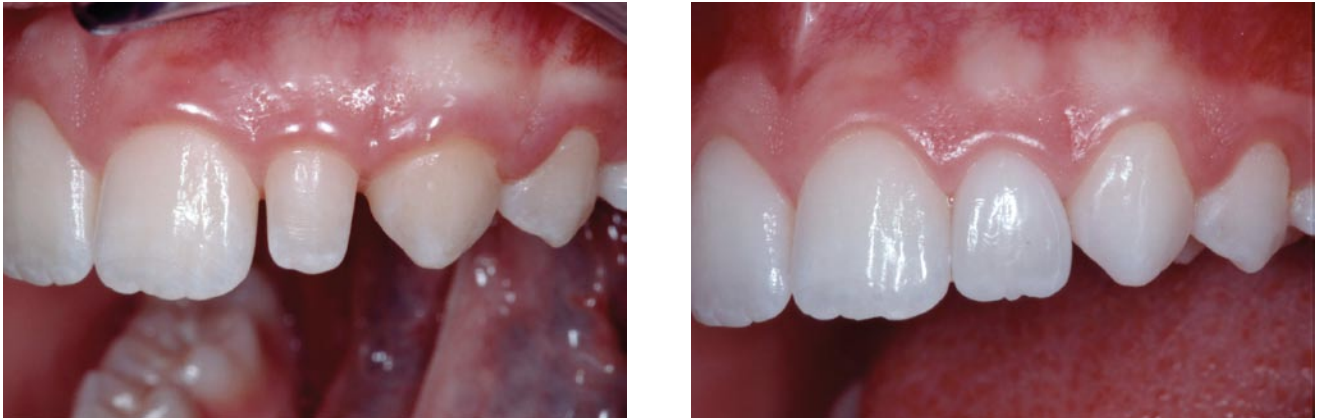


Figure 6: Retracted frontal view before and after, 1:1. The “after” view reveals a crown that complements the patient’s natural dentition, including color, internal effects, translucency, incisal edge contours, surface anatomy, and texture.

base, and following the manufacturer’s instructions, the crown was spot-cured into place with a 2-mm light guide. The excess luting resin was removed using a stiff brush and floss. Using the 8-mm curing tip, the crown was then cured for 60 seconds each on the facial and lingual surfaces.

FINISHING

Excess resin was removed from the crown and the margins with a 12B surgical blade. The occlusion was checked and the margins finished with a fine interproximal diamond bur (392.016) and diamond-impregnated polishing cups. The crown was then polished to a high luster with diamond polishing paste and a rubber cup.

Postoperative and oral hygiene instructions were given and the patient was scheduled for follow-up and postoperative photographs.

SUMMARY AND CONCLUSIONS

The patient’s smile was restored and enhanced beyond her and her

parents’ expectations. Her initial concern was her small, underdeveloped upper left lateral incisor. However, upon careful analysis of her smile, in addition to the microdontic lateral incisor, she was diagnosed with naturally yellow teeth, slight gingival inflammation, gingival hyperplasia, excessive gingival display, and asymmetric contours. An optimal treatment plan was developed that included a prophylaxis, oral hygiene instructions, gingival recontouring, home whitening, and an all-ceramic crown. Careful and meticulous execution of the treatment plan, along with excellent dentist-technician communication, resulted in a beautiful and appealing smile.

Acknowledgment

I am grateful to many people who helped me through my Accreditation journey. Special thanks go to Mike Bellerino, C.D.T., for his work on this case and for his support; and to Dr. Corky Willhite, who advised me during the Accreditation process. I am also grateful for the dedication and encouragement

of my staff; and the love and support of my family, especially my wife, Teresa.

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ACCREDITATION ESSENTIALS



Examiners' Perspective for Duane Delaune, D.D.S.

by Nils Olson, D.D.S., F.A.A.C.D., F.A.G.D.

Dr. Olson is a 1977 graduate of the University of Maryland, Baltimore, College of Dental Surgery. An Accredited member of the AACD since 1998, he recently attained Fellowship in the Academy. Dr. Olson also has achieved Fellowship in the Academy of General Dentistry and the American College of Dentists. He is a member of the AACD's Accreditation Committee and also serves as an Accreditation examiner.

Dr. Olson lives and practices cosmetic and restorative dentistry in Frederick, Maryland. He periodically lectures on cosmetic dentistry and has been an instructor for several esthetic clinical programs. The father of two daughters, he is an avid skier and golfer.

Dr. Delaune has submitted an excellent case for Accreditation Case Type II. The treatment plan of gingival recontouring, at-home whitening, and restoration of tooth #10 with a ceramic restoration was straightforward.

The key to success was in appropriately diagnosing the salient esthetic issues. Following orthodontic treatment, gingival recontouring clearly improved the length-to-width ratios of the teeth and created better gingival symmetry. Bleaching of the teeth unmistakably brightened the patient's smile. Lastly, restoring the peg lateral closed spaces also improved the length-to-width ratio of tooth #10.

Specifically regarding the esthetics of the ceramic restoration, Dr. Delaune developed very nice anatomy of the incisal edge to mimic the other incisors. Color and transparency were nicely handled as well.

One area of note was the distal contour of the restoration, which was quite convex. This was not strictly ideal and anatomic, but necessary to close the space on the distal. The overall outline form was not identical to the contralateral tooth, but this was more acceptable than if the teeth were adjacent, as in the case of central incisors.

Dr. Delaune is to be commended for presenting a very fine Accreditation Case Type II. *AO*

