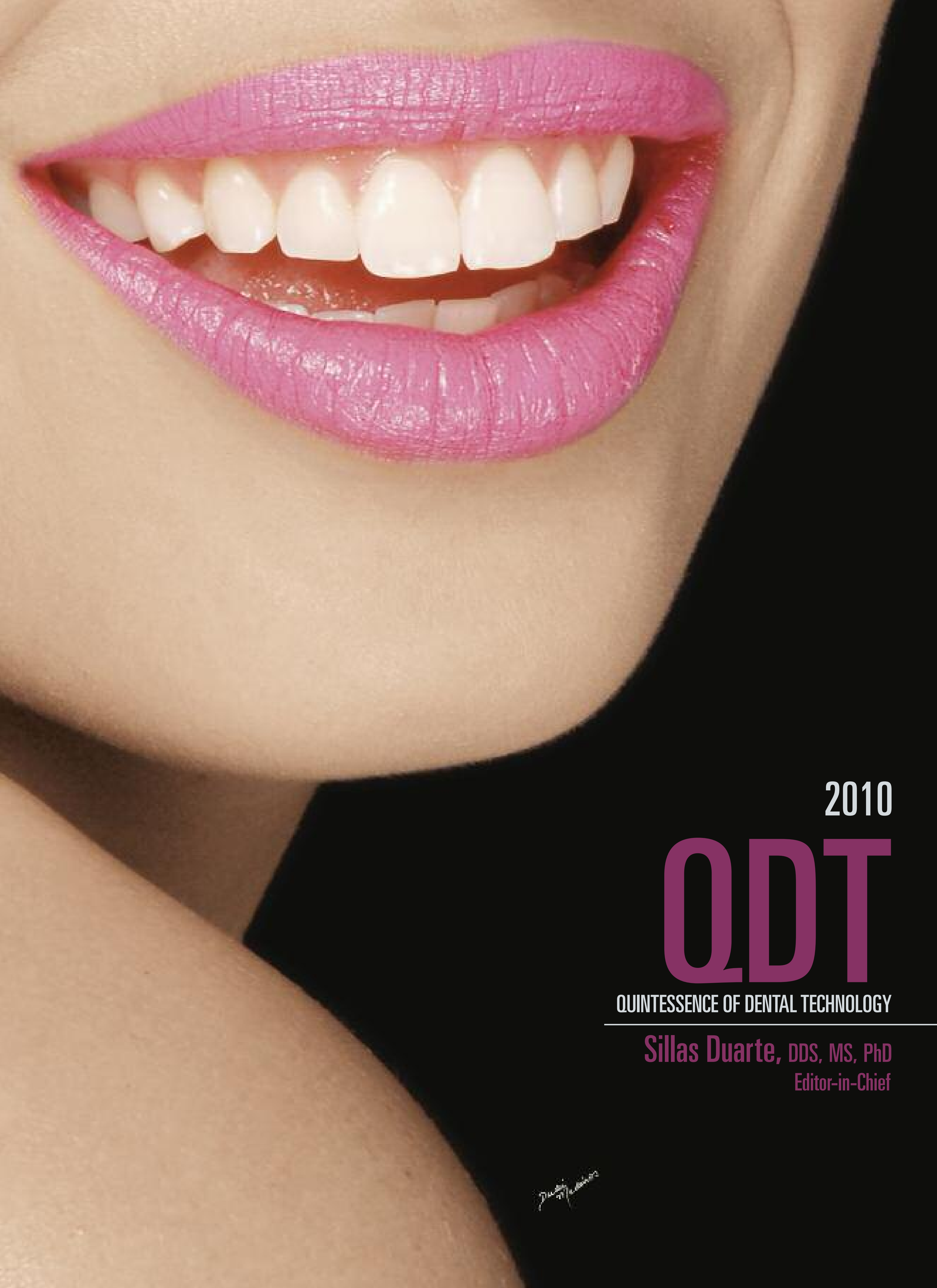

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Sillas Duarte, DDS, MS, PhD
Editor-in-Chief

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Editorial

The Art, the Science, and the Patient

A clear definition of *art* is quite complex. It is said that art is the method of deliberately arranging elements in a way that appeals to the senses or emotions. The meaning of art is explored in the branch of philosophy known as esthetics, which deals with new ways of seeing and perceiving the world. However, to produce art and define a standard of esthetics, it is necessary to understand the nature, behavior, and performance of the elements that compose a particular piece of art. The systematic knowledge that is capable of predicting outcomes is *science*.

This issue of *Quintessence of Dental Technology* attempts to balance art and science with the addition of two new sections to our regular article line-up: "State of the Art" and "Biomaterials Update." The state-of-the-art section focuses on innovation of laboratory and clinical techniques by novel approaches. The biomaterials update section provides a scientific review that discusses new aspects, properties (physical, mechanical, optical, bonding), as well as advantages and limitations of upcoming restorative materials. Both sections are presented to inform and inspire clinicians and technicians to a new level of exceptional service for their patients.

Ultraconservative oral rehabilitation is clearly the ultimate goal of esthetic restorations. The opportunity to preserve and protect oral tissues by using enhanced biomaterials—with their capacity to bond any type of surface, promote faster osseointegration, or mechanically and optically restore oral tissues, at the same time being biocompatible—yielded a new era in dentistry. Ideally, any clinical situation can be conservatively or minimally invasively treated. The more we can preserve dental tissues in their pristine condition, the better. But are there any limitations on how conservatively a treatment can be performed? The answer to this question truly depends on numerous factors, some of which are beyond the clinicians' control. The degree of salivary flow, risk of caries, periodontal involvement, age, compliance, among other factors must be assessed before initiating a minimally invasive treatment plan. Perhaps the most important consideration is that our patients understand and want a comprehensive, but conservative, treatment plan. It is exciting that we are now able to offer a wide assortment of dental treatments ranging from conservative to invasive. It all depends on the patient's needs. Stress and lack of compliance are still the main causes of restorative failures, more so than anything inherent in dental restorative materials themselves.

Fortunately, the future of restorative dentistry is bright. Upcoming technologies as well as "smart materials" will help us to identify the benefits and limitations of a given treatment, and all boundaries will be expanded. The aforementioned technologies combined with art will permit superb esthetic oral rehabilitations. But one aspect will never change: The patient is the one who will judge the success of the treatment. Therefore, esthetic restorations must still be patient-driven, not materials-driven.

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Endosseous Implant Rehabilitation of Edentulism Using High-Strength Ceramics and Component Prosthesis Design

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Albano R. Flores, DDS[1]
Francisco Zarate Rivera, DDS, CDT[2]
Thomas J. Salinas, DDS[3]

A 59-year-old male presented to the clinic with maxillary and mandibular edentulism and inability to wear conventional prosthetics (Fig 1). His chief complaint was difficulty in chewing. He requested a long-term solution with functional and esthetic prostheses. His medical history was noncontributory with the exception of hypertension.

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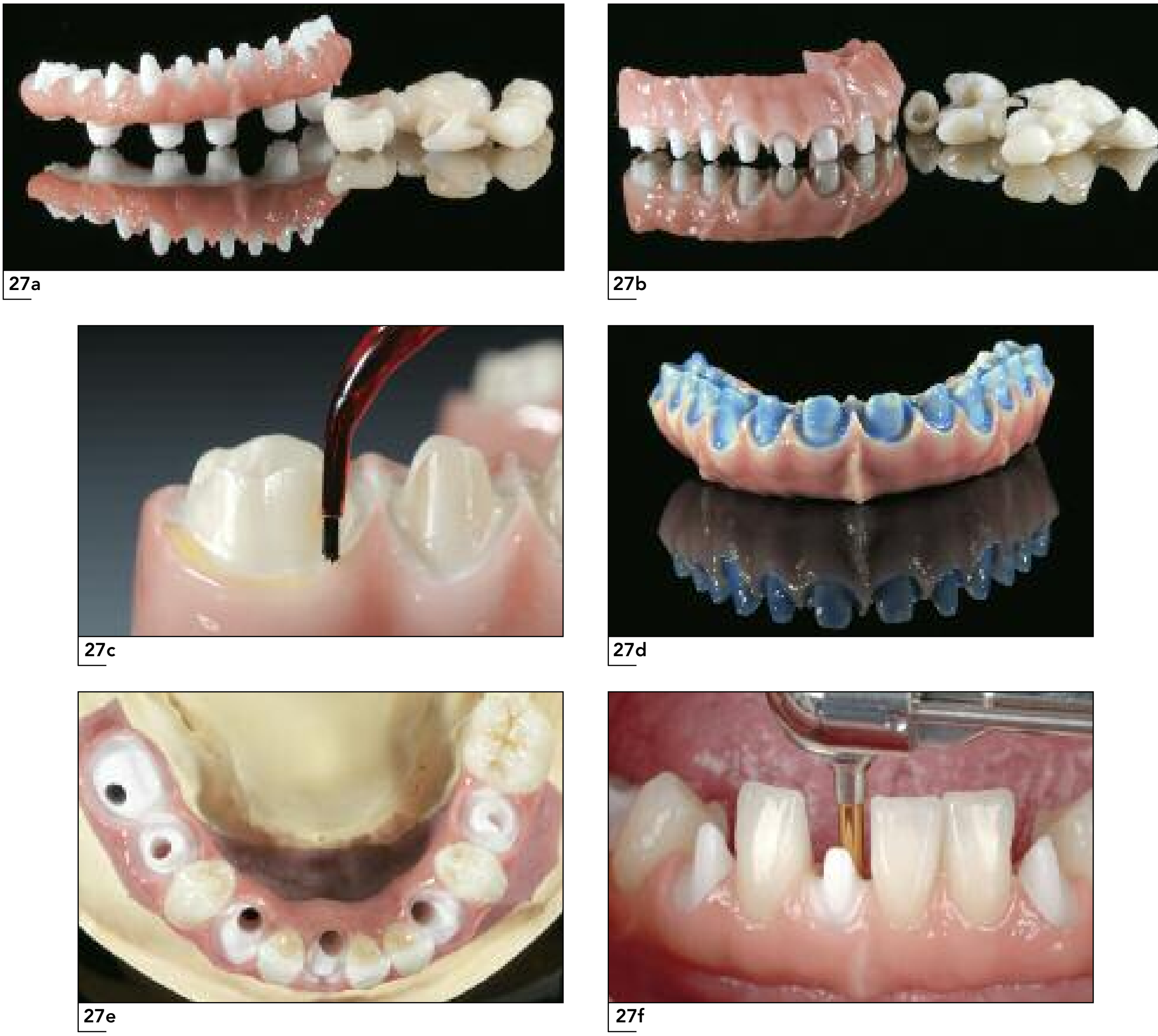
CLINICAL PLANNING PHASE

Clinical examination revealed that both arches exhibited atrophy with mobile tissue and limited vestibular form. Further analysis revealed compromised support as a result of extensive residual ridge resorption of both arches.

A panoramic radiograph revealed an edentulous atrophic maxilla with pneumatized posterior segments and an edentulous mandible with a limited amount of supracanal bone height in the posterior areas (Fig 2).

Study casts were mounted on a SAM 3 (SAM, Münich, Germany) fully adjustable articulator, and the interarch distance was determined. A diagnostic set of maxillary and mandibular complete dentures were completed with a trial tooth arrangement (Fig 3). Based on the patient's edentulous situation and medical history, several treatment plans were composed. The patient



27a 27b 27c 27d 27e 27f

Figs 27a to 27f *(a and b)* Components of maxillary and mandibular prostheses prior to assembly. *(c)* Hydrofluoric acid etching of gingival ceramic. *(d)* Phosphoric acid cleaning of zirconia surfaces. *(e)* Cementation of pontics in the laboratory. *(f)* Securing abutment screws with torque application.

The restorations were prepared for cementation by steam cleaning. To effectively seal the cementation margins, the recipient cementation sites were prepared by hydrofluoric acid etching of the gingival ceramic for 30 seconds. The entire zirconia surface was etched with phosphoric acid for cleaning. For the mandibular prostheses, all restorations not covering access openings were cemented extraorally (Figs 27a to 27f). The crown restorations were prepared by chairside treatment with CoJet (3M ESPE).[19,20] Resin cement (Unicem, 3M ESPE) was used to bond the restorations to the framework. The rest of the mandibular restorations were cemented after securing the mandibular prosthesis with abutment screws to the manufacturer's suggested torque. After torque application was completed, closure of the accesses was accomplished using compacted polytetrafluoroethylene tape, and a bis-GMA zirconium silicate–filled gingiva-colored composite resin (Ceramage Gingival Shade, Shofu, Tokyo, Japan). For maximum microleakage protection and resistance, the rest of the restorations were then bonded using resin cement.[21]


28a


28b


28c


28d


28e


29

Figs 28a to 28e *(a)* Light-cured urethane dimethacrylate placement jig on master cast. *(b)* Transfering of abutment to mouth with placement jig and securing with torque application. *(c)* Computer-aided design/computer-assisted manufacture–generated zirconia abutments ready for sequential luting. *(d and e)* Intaglio and occlusal surfaces of the maxillary restoration prior to sequential luting.

Fig 29 Zirconia custom abutment with anodized titanium insert. The abutment is bonded to the prosthesis with the sequential luting technique while the insert facilitates positioning and remains detachable.

INTRAORAL SEQUENTIAL LUTING OF THE MAXILLARY PROSTHESIS

For the maxillary restoration, all abutments were transferred to the mouth and secured using an abutment placement jig after radiographic verification (Figs 28a to 28e).

Cementation and bonding of each maxillary crown was likewise accomplished using CoJet and Unicem cement. Intentional crimping of the metallic insert of each abutment facilitated retrieval of the framework without impedance of each insert's relative divergence angle after sequential cementation (Fig 29).

ESTHETIC WAX-UP

Tyler P. Lasseigne, DDS, CDT[1]

Mimicking the tooth's natural morphology and internal characterization is challenging. It becomes even more difficult when color is added to the equation. An accurate esthetic wax-up not only serves as a diagnostic tool, but it can also be used to inform and even impress the patient.

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Esthetic Wax-up

Figs 37 to 39 Final esthetic wax-up.

Final Ceramics

Figs 40 and 41 Ceramics by Hiro Tokutomi, MDT.