esthetic & restorative dentistry

material selection & technique, *second edition*

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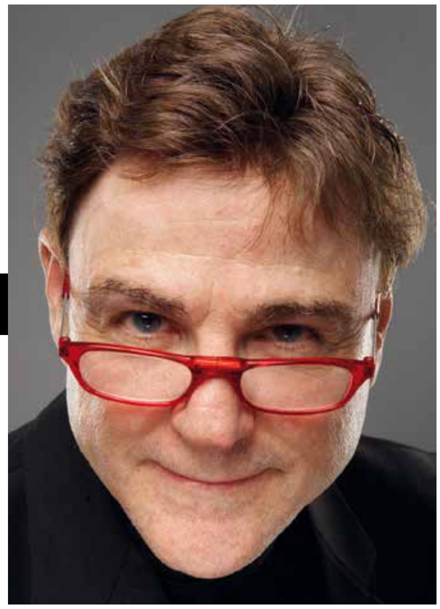

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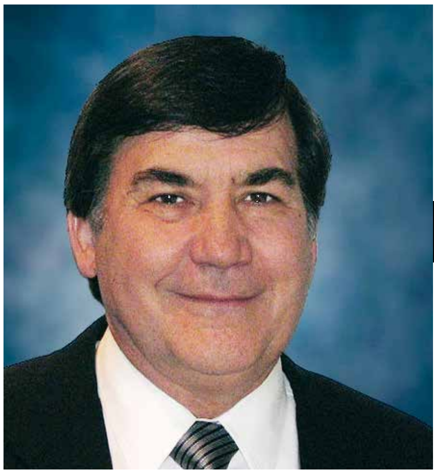

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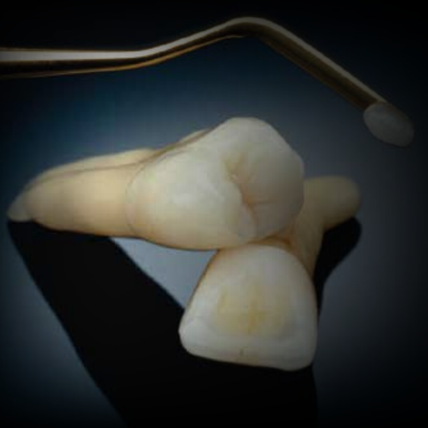

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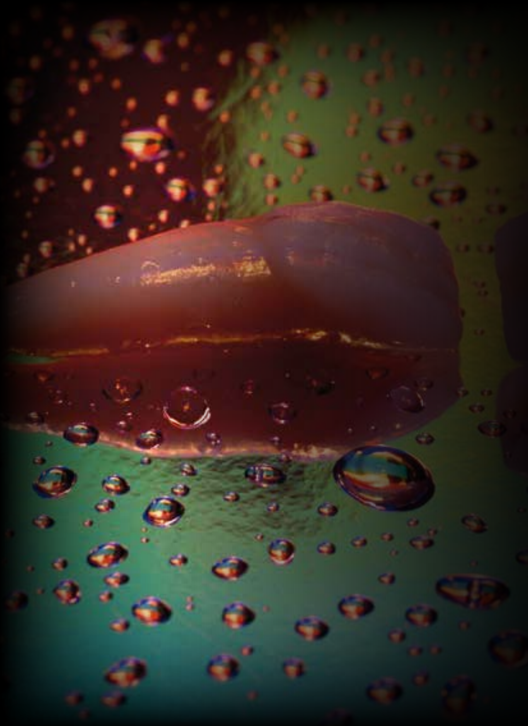

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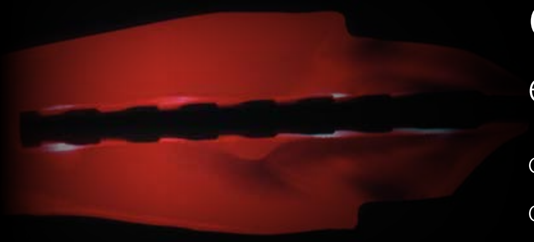

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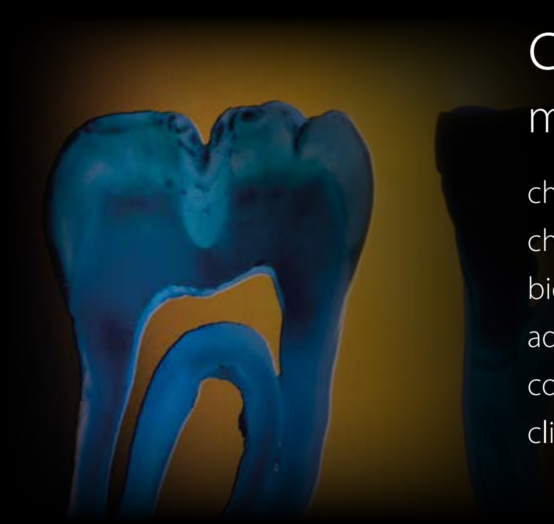

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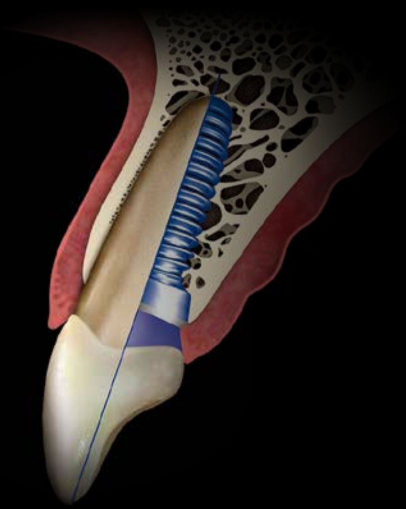

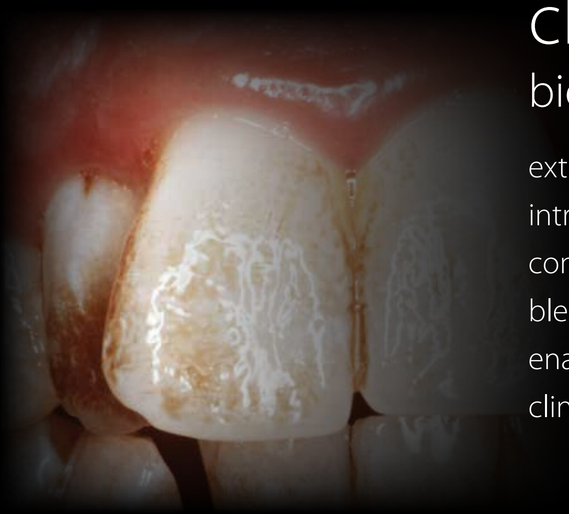

introduction

The dental profession has devoted most of its history to restoring the effects of dental disease. The last two decades have evidenced a paradigm shift in this philosophy that has been guided by a greater understanding of science. During this evolution, restorative dentistry has adopted a medical model for decision making in the treatment of dental disease that allows clinicians to individualize and evaluate all components of the process for a proper treatment strategy. This process also educates and involves the patient in treatment decisions, which results in acceptance of appropriate preventive and restorative strategies and improved compliance and oral health.

The public's interest in health and beauty has become an engine that continues to drive the demand for cosmetic dental procedures. In the past, achieving a beautiful smile required submission to extensive invasive procedures and expensive fixed dental prosthetic restorations. Advancements in restorative material formulations and adhesive technology have expanded the treatment possibilities for the clinician and technician. In addition, these advances have increased the myriad opportunities available to discriminating patients and have provided solutions to many of the restorative and esthetic challenges faced by clinicians. Also, this changing technology allows the clinician to treat many esthetic and restorative challenges through more simple, conservative, and economical methods. This evolution in philosophy and science has resulted in a change in the trend for dental treatment. There has been a shift from patients seeking disease-related treatment to elective cosmetic enhancement.

This edition of *Esthetic & Restorative Dentistry: Material Selection & Technique* was compiled to explain and teach esthetic dental procedures through illustrations of everyday clinical situations. It is not designed to advocate one restorative material as the best or prescribe to clinicians which materials to use. Instead, its purpose is to illustrate how a selected material and/or instrument should be used with a specific and thorough protocol to achieve the highest level of excellence for that material and clinical situation. The editorial team members were selected from different areas of the world for their scientific knowledge and clinical and laboratory expertise. This international group encompasses many facets of esthetic and restorative dentistry, including biomaterials, laboratory technology, operative, prosthetic, periodontal, and implant dentistry. This combination of input will provide clinicians, technicians, and auxiliaries with the proper information to make improvements in their work while maximizing their productivity and providing improved oral health care to their patients.

foreword

In this second edition, Dr Douglas Terry, a member of the faculty at the University of Texas Health Science Center, has gone to great lengths to assemble an international core of experts from quite diverse dental fields, where the prerequisite was to put together a sequential series of monographs addressing those very issues that we as clinical dentists encounter in our day-to-day practices. These range from the initial phase of diagnosis and communication through the essentials of different clinical procedures, such as the different forms of tooth preparations, through impression making, provisionalization, and the actual restorative modality.

A chapter is devoted toward the complex but all-important issue of cementation, be it for a veneer, partial denture, porcelain-fused-to-metal crown, or an all-ceramic restoration. He also includes a chapter on the all-too-often-neglected aspect of clinical documentation and photography, as well as some of the essentials on esthetic post systems, periodontal plastic procedures, and implant dentistry.

The esthetics-driven decade in dentistry requires an ever-increasing body of knowledge essential to the process of clinical decision making for beautiful smiles or esthetic restorations. Since the publication of the first edition of *Esthetic & Restorative Dentistry: Material Selection & Technique*, this international forum evolved, but it continues to provide global information from a multitude of different countries. The new editors for this second edition extend from Dr John Powers from Michigan and Dr John Burgess from Alabama to Dr Nitzan Bichacho from Israel. Updated clinical, laboratory, and scientific concepts were provided by Dr Jussara Bernardon and Dr Luiz Baratieri from Brazil; Dr Tetsuji Aoshima, Dr Yoshihiro Kida, and master technician Jungo Endo from Japan; master technician August Bruguera from Spain; and myself, the representative from South Africa. No corner of any continent was left unturned seeking out the most appropriate teachers for the task at hand.

preface

The last 50 years have witnessed an unimaginable amount of change in restorative dentistry. The evolution of materials and techniques has been so great that it has become virtually impossible for the clinician to keep abreast. Silicate cement and acrylic resin have been completely replaced by composite resins. Major improvements in physical and mechanical properties, particularly wear resistance, have permitted a general substitution of composite resins for silver amalgam in posterior teeth. Just a short time ago, the average annual wear rate of posterior composite resins was 100 microns. Today, this value has been decreased to approximately five microns. Furthermore, the development of adhesion techniques coupled with modified cavity preparations has gone a long way to reduce the potential for secondary caries.

The introduction of adhesive dentin bonding agents has reduced not only the need for mechanical retention but also the size of the cavity preparation. The traditional concept of "extension for prevention" has been modified to the point that commonly it is not a pressing issue. The buccal and lingual extensions of the Class II preparation into the proximal region, for example, need not be broadened beyond the proximal surfaces unless dictated by the presence of caries. The need for extending the proximal portion of the preparation to the limits recommended for amalgam is appreciably diminished due to a lowered caries rate as well as the potential for bonding to tooth structure.

Another area of major change has been the ceramic restoration. The first breakthrough came about with the introduction of the porcelain-fused-to-metal restoration. The ability to fire and fuse porcelain against gold alloy or base metals considerably extended the use of ceramic materials. Suddenly it was possible not only to generate single units of porcelain for anterior and posterior teeth but also to fabricate extended partial dentures. It is important to note that ceramic veneering of metal crowns or copings resulted in changes not only to the ceramic material but also to the casting alloys themselves. By using metal substrates with a higher casting temperature and a ceramic material with a lower fusion range, highly esthetic and durable restorations could be developed. This method of restoring missing teeth continues to play a very important role in the field of prosthodontics.

The concept of injection molding of glass ceramics such as IPS Empress contributed greatly to the generation of highly esthetic ceramic restorations for anterior teeth. Containing a higher concentration of leucite crystals, the restoration is more resistant to crack propagation and fracture. While highly accepted for use in the anterior region of the mouth, the injection-molded ceramic agent usually is not considered for use in the molar-premolar region.

Still another area of advancement in recent times has been the development of the aluminous core material. Essentially, the alumina core is a ceramic agent containing sufficient alumina to produce high strength and opacity when used as a single-unit restoration. The core is then veneered with the usual type of glass ceramic material. The concept of using alumina was further enhanced by the introduction of techniques that permitted the infiltration of glass into slightly sintered aluminous porcelain cores. As a result, the range of uses for prosthodontic purposes increased appreciably.

More recently, the sintered zirconia core has been introduced as a substitute for the alumina core. The zirconia material commonly exhibits twice the flexural strength compared with its counterpart, the alumina-based restoration. Interestingly, the zirconia offers another advantage: It readily stops the propagation of small cracks once initiated. Because of the high strength and excellent esthetics of veneered zirconia-based ceramic systems, they can be employed for essentially the same purposes as the traditional porcelain-fused-to-metal systems. Finally, a possible solution for the porcelain's potential for abrading antagonist tooth structure has been advanced. In "low-fusing" porcelains, the level of leucite formation is considerably lower than its high-fusing counterpart. The natural forming process of leucite from feldspar is reduced by using ceramic agents that fuse approximately 200°C lower than normal.

Cements have been part of clinical dentistry for well over a century. Zinc phosphate cement has been the material of choice for cementation of prosthetic restorations, as well as many other uses including orthodontics and the restoration of individual teeth. Although considered a minor player, it is still used by many clinicians for the cementation of crowns and partial dentures. The first adhesive luting agent was polycarboxylate, which was introduced in the late 1960s. It has been used interchangeably with zinc phosphate cement and is usually credited with exhibiting less postoperative sensitivity than zinc phosphate cement.

Throughout the last few decades, however, a number of other luting agents have been added to the clinician's list. These include composite resin, glass ionomers, resin-modified glass ionomers, and self-adhesive or self-etching cements. The introduction of composite resin cements brought about a major competition for their traditional predecessors. They provided a greater potential for shade matching, higher compressive strengths, and an appreciably enhanced resistance to fracture when used in conjunction with ceramic restorations. This characteristic was made possible by the ability of the luting agent to bond both to the surface of the restoration as well as to tooth structure itself. In addition, this class of cements was characterized by a significant reduction in solubility, improved marginal wear resistance, and less microleakage.

The glass-ionomer luting agents provided a physiochemical adhesion to tooth structure as well as to nonprecious alloys. In addition, they exhibited higher compressive strengths than either zinc phosphate or polycarboxylate cements. They also undergo a fluoride ion release with a potential for caries prevention, improved resistance to dissolution, and a coefficient of thermal expansion that is closer to tooth structure. The addition of a polymerizable resin component made it possible to enhance a number of its physical and mechanical properties. Furthermore, resin modification made it possible for the cement to cure at a considerably faster rate.

The most recent addition to the list of luting agents is the so-called user-friendly self-adhesive cement systems. This novel luting agent is easier and simpler to use because of a reduced number of bonding steps. Furthermore, it is capable of adhering to a wide variety of restorative agents, including gold and base metal alloys, resins, and ceramic materials as well. Generally, it combines the benefits of glass-ionomer and composite resin cements without any special treatment of the prepared tooth surfaces. These self-adhesive systems are appreciably different than conventional composite resin or glass-ionomer cements. Although the composition varies somewhat from one material to another, some of them do not contain Bis-GMA. They may, however, contain UDMA, 4-MET, and a fluoro-alumina-silicate glass. Their relatively low acidity causes a superficial elimination of the apatite crystal or mineral phase, which in turn creates the potential for hybridizing the tooth structure. It is probably for this reason that the postoperative sensitivity associated with its use is minimal to nonexistent. Finally, this class of material offers good radiopacity and a low film thickness.

Another restorative agent undergoing appreciable change is the endodontic post. In the past, it was assumed that a post with high flexural strength and modulus of elasticity resulted in the best clinical performance. Recent studies, however, have demonstrated that root fracture is considerably reduced by the use of posts that exhibit a modulus of elasticity closer to that of root structure. Currently, the glass-fiber post is creating an impressive acceptance by the clinician. While the elastic modulus of carbon-rod and glass-rod posts is similar, the carbon post is far less esthetic. Furthermore, because of a potential incompatibility between the dual-cured cement and the bonding agent, there is a trend toward the use of light-transmitting posts.

Currently, there are a number of publications that describe the relative physical and mechanical properties of the various restorative materials used by the clinician. Some information also is available about their relative clinical behavior. This publication is different and unique from others. It is based on the concept that optimum clinical results are best obtained through the proper utilization of a material. The use of each material and technique covered in this text is depicted in detail using high-quality photography. Furthermore, a materials science background is presented for each of the materials addressed clinically.

acknowledgments

The inspiration for writing and sharing our experiences in dentistry can be attributed to the stimulus of our colleagues and students around the world. The questions and suggestions shared in presentations, hands-on courses, letters, and emails indicated a desire for a medium to provide knowledge and illustration for the "wet-handed" dentist and technician. There were two basic underlying themes from the input of these colleagues that were identified as to which materials one uses for specific clinical situations and how to use them. These clinicians and technicians shared concern about how to achieve accuracy and consistent, predictable results and still maintain efficiency and profitability with dental procedures.

After reviewing numerous dental educational resources and their methods for selecting and utilizing restorative materials, it was decided that an international editorial team from different educational backgrounds would provide a better source for solutions to these questions. This editorial team was selected from private practice and university faculty around the world and includes biomaterial research scientists, technicians, general dentists, orthodontists, oral surgeons, prosthodontists, and periodontists. It was the consensus of our editorial team that selection of a restorative biomaterial would not involve rating a dental material or product but would show how to use any selected biomaterial so it achieves the most optimal result and longevity for a specific clinical situation. This concept was reflected in a statement I made several years ago: "It is not which biomaterial you use but how you use it that improves the esthetics and longevity of the material." This concept has become the catalyst to ignite this editorial project—*Esthetic & Restorative Dentistry: Material Selection & Technique*.

The initial spark began in the winter of 2002 in Zurich, Switzerland, when Willi Geller suggested that I organize a "special group" of colleagues from around the world and call them dTI—design Technique International. The group has evolved in the last 5 years to include master technicians, clinicians, and biomaterial scientists from every corner of the world. The members' participation in this project has included not only "words and techniques" but discussions, encouragement, critique, advice, inspiration, and most importantly, camaraderie and friendship.

Of special significance, the authors, editorial team, and members of dTI would like to express our gratitude to our families, friends, patients, staff, and colleagues for their patience, commitment, and time they have shared and not shared with us to allow this project to be completed.

Finally, of special significance is Sue Terry, who is not only my mother but has been adopted and given the name "mom" by our team. This project would not have been possible or as organized without her wisdom, inspiration, dedication, comforting conversations, ability to persuade patients to come back for photographs, and her fabulous midnight "culinary delights."

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3

closed sandwich technique

resin modified glass-ionomer/composite resin

Figure 1 shows the preoperative view of a wedge-shaped carious cervical lesion on the mandibular right second premolar. These lesions occur from tensile forces. The initial caries control procedure provided removal of the infected dentin and placement of a resin-modified glass ionomer to provide a seal of the lesion while remineralizing the affected dentin (Fig 2). A chamfer was placed along the occlusal margin (Fig 3). A 0.5-mm scalloped bevel was placed in enamel to interrupt the straight line of the chamfer and to reduce the potential for microleakage (Fig 4).

The preparation was cleaned with a premixed slurry of pumice and 2% chlorhexidine (Consepsis) (Fig 5). The preparation was rinsed and lightly air dried. A two-component self-etching system (UniFil Bond, GC America) was used. The self-etching primer was applied to the preparation and allowed to set for 20 seconds and dried gently for 5 seconds (Fig 6), and the bonding agent was applied to the enamel and dentin surfaces and light cured for 10 seconds (Figs 7 and 8). The initial enamel layer of opacious A4-shaded composite resin (Gradia Direct, GC America) was applied to the occlusal half of the preparation with a long-bladed composite instrument (Fig 9), contoured, and smoothed with a #2 sable brush (Fig 10). A second opacious increment was placed in the gingival half of the preparation (Fig 11), smoothed with a #2 sable brush, and light cured.


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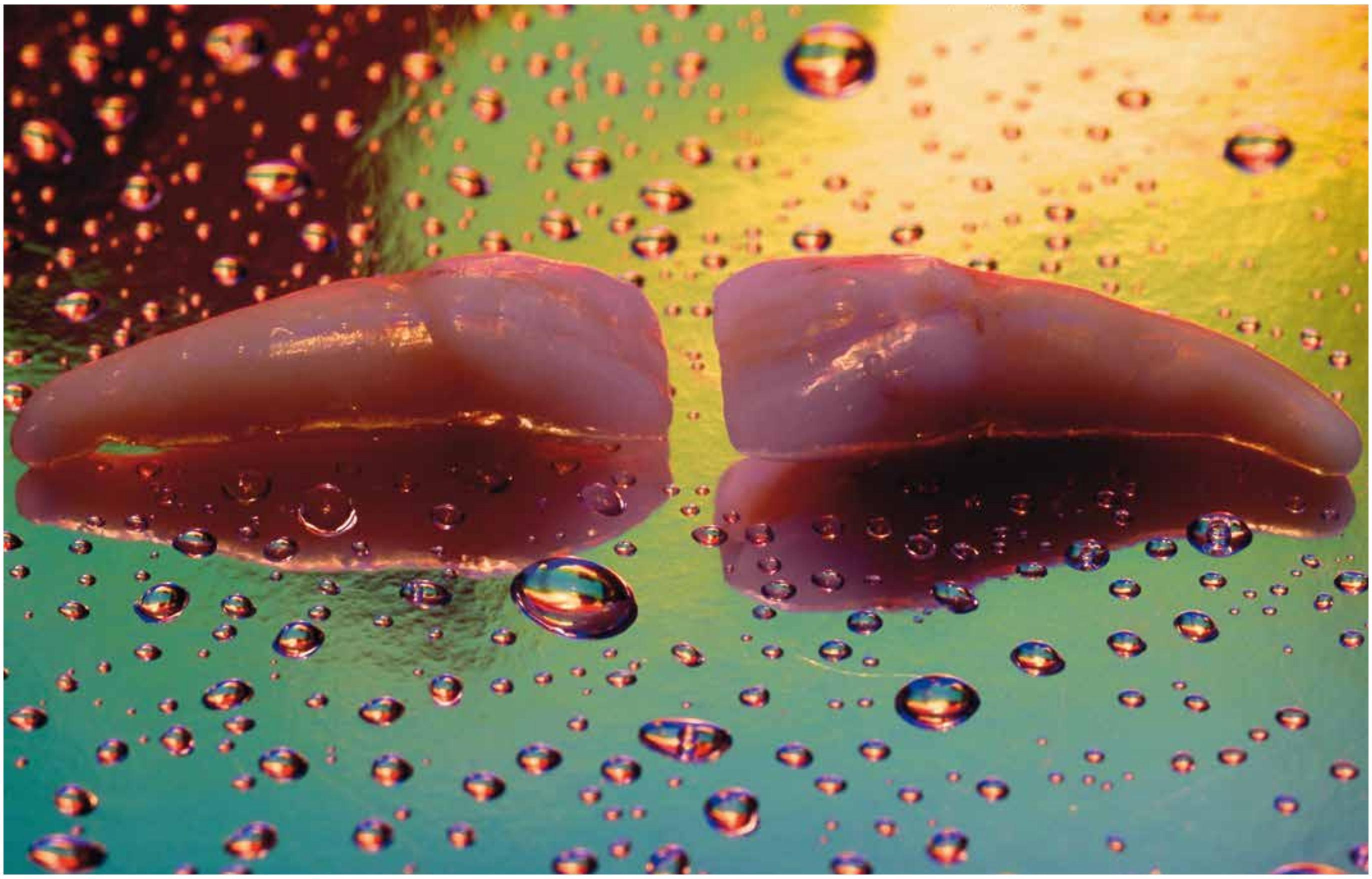
ceramic materials



Photography courtesy of Irfan Ahmad, BDS.

Ceramics, derived from the Greek word *keramos*, was the ancient art of fabricating pottery. This word may have originated from a Sanskrit term meaning burnt earth because the main constituents were clays excavated from the earth, which were heated to form pottery.[1,2] Although the methods of acquiring, purifying, and fabricating these raw materials into ceramic objects have significantly changed, some of the basic materials and techniques are still the same. Traditional ceramics uses clay as one of its primary components, in combination with other metal oxides including feldspar ($K_2O\ Al_2O_3\ 6SiO_2$), alumina (Al_2O_3), potash (K_2O), and soda (Na_2O). Ceramic objects are still fabricated by pulverizing these raw materials into fine particles and powders and adding water to help keep the particles together during sculpting and shaping. The "green" (unbaked) object is dried and placed into an oven (kiln) and heated to a specified temperature that allows the individual particles to coalesce into a solid mass. The process of coalescence of the particles is called *sintering*, and it usually results in shrinkage and strengthening of the solid mass. These traditional ceramics include stoneware (tile), earthenware (pottery), porcelain (tableware and china), electrical insulators, bricks, and sanitary ware (sinks and toilets).[3]

COMPOSITION OF DENTAL CERAMICS

Dental ceramics are chemical mixtures of nonmetallic and metallic elements that allow ionic and covalent bonding to form periodic crystalline structures. The most common dental ceramics are composed of metal oxides (SiO_2, Al_2O_3, K_2O) and other traditional ceramic materials. Most dental ceramics are semicrystalline, silicates, oxides, and derivative structures. The simple structures are usually bonded ionically, whereas the complex structures generally involve ionic and covalent bonding.[4]

In theory, the basic constituents for fabricating conventional dental ceramics are similar to those for traditional ceramics. These compounds include feldspar, silica, and kaolin (refined as clay). However, the major difference between the porcelain used in dental ceramics and other traditional ceramics is the proportion of the main ingredients. Dental ceramics are composed mainly of feldspar, while traditional ceramics are composed mainly of clay. Feldspar is a gray, crystalline material, and its chemical composition is potassium aluminum silicate ($K_2O\ Al_2O_3\ 6SiO_2$). Other constituents found in feldspar include mica and iron, and these are removed mechanically by splitting the feldspar rock and during later stages by using strong magnets. The pure feldspar pieces are ground and milled into a powder.[1]

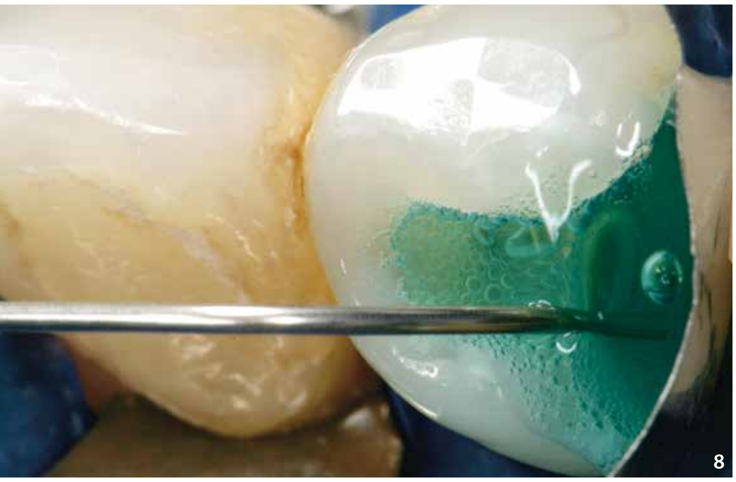
Quartz crystals are the main source of silica (SiO_2), and they are heated and quenched in cold water to split into smaller pieces. These smaller quartz pieces are ground and milled into a fine powder, and any iron impurities are removed with magnets. Dental porcelain is comprised of approximately 15% quartz powder.[1] The quartz powder is infusible at the firing temperature of porcelain and is surrounded by fusible ingredients. It is this crystalline layer of quartz that contributes to the dispersed phase and is surrounded by a continuous amorphous phase. This crystalline layer is responsible for the translucent optical properties of porcelain and limits shrinkage during firing.

Kaolin is a natural form of clay obtained from riverbeds. The clay is washed, dried, and screened into a pure, fine powder. In dental porcelains, kaolin is used in small concentrations (ie, 4%) as a particle binder. The kaolin coats the nonfusible particles and becomes sticky, holding the wet porcelain particles together. This allows the technician to control the form of the restoration by manipulating the powder-liquid mass.[1]

To render porcelain restorations tooth colored, small quantities of coloring agents are added to porcelain powders. These pigments are derived from metallic oxides that are ground and mixed with feldspar powder. This mixture is then fired, fused to glass, and then reground to a powder. These oxides include iron oxide for brown shading, copper oxide for green shading, titanium oxide for yellow shading, manganese oxide for purple shading, cobalt oxide for blue shading, and tin oxide for opaquing. Furthermore, rare earth elements can be added in small quantities to provide fluorescence.

HISTORICAL PERSPECTIVE

The evolution of ceramic materials in the last century has been a result of an interplay between function and esthetics. Historically, concerns for strength compromised



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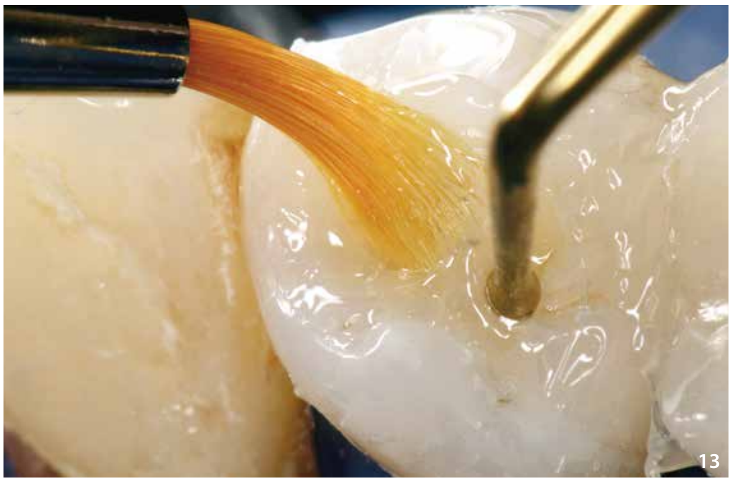

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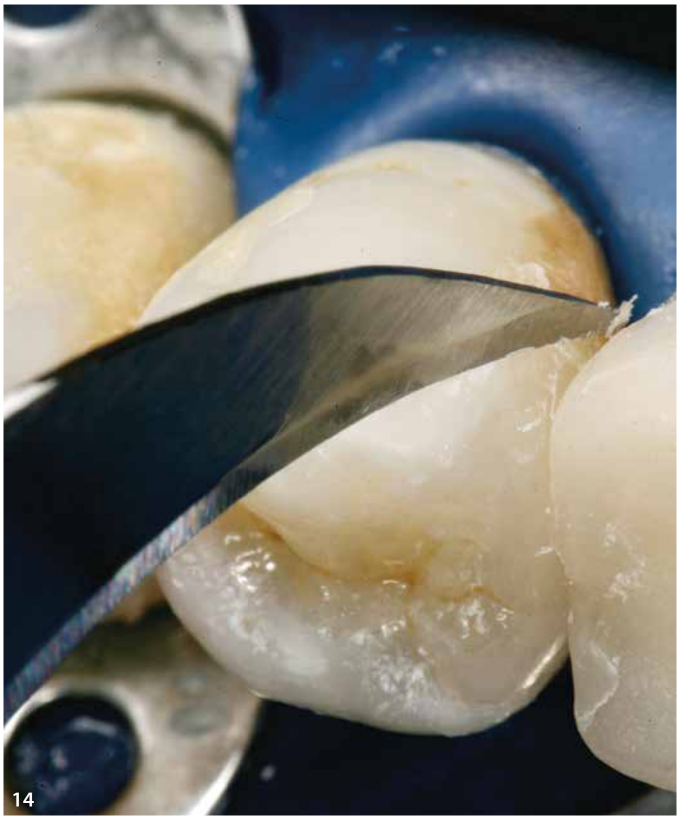
After the preparation was cleaned with 2% chlorhexidine (Consepsis), the preparation was etched for 15 seconds with 32% phosphoric acid (Uni-Etch with BAC, Bisco), rinsed with water for 5 seconds, and lightly air dried (Fig 8). An adhesive (All-Bond 3, Bisco) was applied, air thinned, and light cured for 40 seconds (Figs 9 to 11). The composite resin cement (Illusion, Bisco) was injected into the preparation (Fig 12), and the inlay was positioned and held firmly in place using a ball-tipped instrument. The excess resin cement was removed with a sable brush, leaving only a residual amount at the margin to compensate for polymerization shrinkage, and light cured for 40 seconds (Fig 13).



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The residual cement was removed with a scalpel blade (#12 BD Bard-Parker), and a thin application of glycerin was applied to all the margins to prevent the formation of an oxygen inhibition layer on the composite resin cement (Fig 14). The restoration was polymerized from all aspects—buccal, occlusal, lingual, and proximal surfaces—each for 40 seconds. Final polishing at the restorative interface was achieved with pre-polishing and high-shine polishing points (DC1M, DC1, CeramiPro Dialite, Brasseler USA) (Fig 15). The postrestorative occlusal view illustrates an optimal and durable interfacial adhesion between the tooth and ceramic biomaterial that can be attained from utilizing a thorough adhesive protocol (Fig 16).

Laboratory courtesy of Alex H. Schuerger, CDT.


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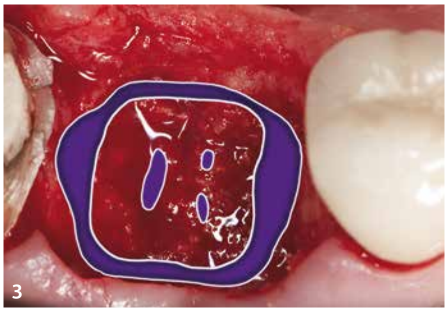
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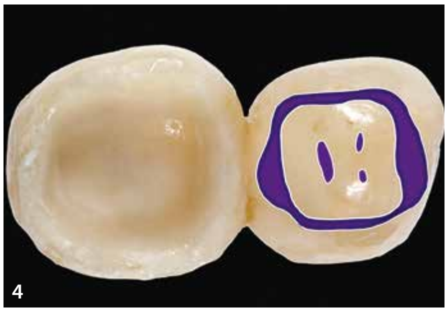
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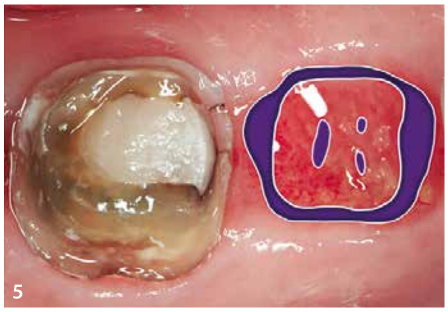
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anatomical morphologic design of the peri-implant zone

Biointegration refers to the biologic impact the implant, abutment, and prosthetic contours have on the peri-implant tissues. Although the principal determinant of the esthetic potential for any implant prothesis is the osseous anatomy, the esthetic outcome of the definitive restoration requires the creation of biologic balance between the implant fixture, the restoration, and the peri-implant tissues while developing a natural emergence profile that mimics the adjacent dentition. Natural esthetics can be achieved when the anatomical cross section of the peri-implant region has an anatomical contour similar to that of the root structure of the tooth that is to be replaced. This requires selection of the proper implant diameter, and the implant placement design must ensure that the configuration of the abutment will mimic the cervical configuration of the natural tooth when it reaches emergence. The geometric concept of tooth anatomy described by Wheeler[150] can provide insight for developing the peri-implant zone.This anatomical morphologic design concept creates the form and contour necessary to optimally support the biologic volume of the peri-implant tissues. Success in implant dentistry has metamorphosed from a time when osseointegration and function were a main concern to an era of peri-implant morphology that requires an anatomical morphologic thinking process.

Figure 1 shows the preoperative evaluation of a failing mandibular right first molar. Periodontal assessment reveals an osseous buccal defect from a root fracture. A diagnostic wax-up was developed to visualize the interrelationship between the definitive restorations and the oral structures before the surgical procedure was performed (Fig 2). This presurgical three-dimensional diagnostic communication tool can be shared by the interdisciplinary team prior to treatment to provide precise information essential for diagnostic and presurgical planning. In this staged implant placement


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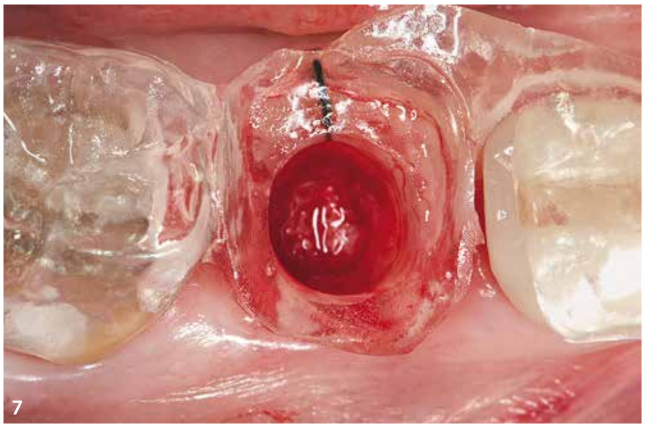
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procedure, the tooth was extracted and a bovine bone graft (Bio-Oss, Osteohealth) with a barrier membrane was placed to correct the defect. During this staged implant protocol, the cervical configuration of the natural tooth should be the guide for implant selection and placement, abutment contours, and the volume of peri-implant tissue that is maintained and developed (Fig 3). The composite provisional restoration was designed from the diagnostic wax-up, and it can be used to develop and preserve the gingival architectural form of the peri-implant region (Figs 4 and 5).

After careful radiographic evaluation, the surgical guide can be fabricated from the diagnostic wax-up (Figs 6 and 7). This guide can provide precise and predictable implant orientation with consistent esthetic results. The ideal position of the implant fixture in relation to the adjacent teeth confirms the preplanned position. This philosophy of an anatomical morphologic design of the peri-implant zone requires that the final form of the abutment is a direct derivative of the cervical configuration of the natural tooth. This preplanned concept allows for a precise placement of the implant fixture while managing the volume and morphologic contour of the peri-implant tissue for an optimal esthetic result (Figs 8 to 10).

Laboratory courtesy of Victor Castro, CDT.

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restoring the anterior alveolar ridge deficiency

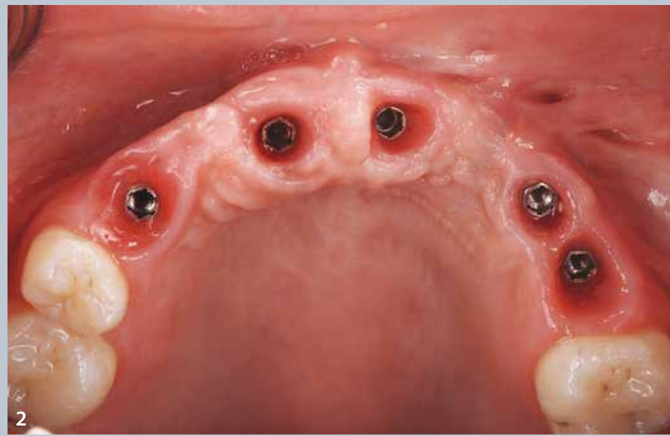
using the oral stratified porcelain buildup technique

Prosthetic rehabilitation of the deficient anterior alveolar ridge can be critical and challenging because of the esthetic demands and the potential requirements.[153,154] The ridge deformities are characterized by deficiencies in the amount of alveolar bone and/or gingival tissue volume as classified by Seibert[148] and Allen et al.[149] The etiology of these type of defects can be attributed to trauma, tooth extraction, periodontal disease, tumors, and congenital developmental disturbances.[153] These isolated anterior edentulous regions present difficult challenges in prosthetic reconstruction for esthetics, phonetics, and function. Periodontal plastic surgical procedures have been described in the literature to restore and maintain alveolar and soft tissue architecture for these deficient edentulous regions.[7,12,18,19,23,28–31,133–136,139–141,144–149,153,155–159]

In addition, prosthetic treatment alternatives can vary significantly according to a multitude of factors. These factors include alveolar bone and soft tissue augmentation requirements, periodontal biotype, alveolar bone quality, selection of implant system design and size, anticipated prosthetic design, experience and training of the interdisciplinary team, patient expectations, and cost considerations.[157] Predictable and optimal treatment results with these complex clinical dilemmas require advanced surgical and prosthetic training, detailed pretreatment planning, and a high level of interdisciplinary communication.

The patient had endured trauma to the anterior segment of the maxillary arch at age 4 years. Several periodontal plastic surgeries had been performed to attempt to restore the deficient maxillary anterior ridge to a normal anatomical morphology of the oral tissues. The patient presented at age 21 years with sufficient bone volume to receive implants, but optimal alveolar bone and gingiva could not be obtained (Fig 1); therefore, gingival and alveolar replacement with metal ceramics was selected. The patient was dissatisfied with the esthetics of the existing removable partial denture and was referred to an interdisciplinary team for a functional and esthetic solution (Figs 2 to 4).

The diagnostic wax-up is an essential component for evaluating and determining tooth length, form and incisal edge position, interdental papillae position, gingival architectural contours, emergence angle, incisal embrasures, lip position, occlusal and esthetic planes, smile analysis, phonetic considerations, and personal patient input. The prototype wax-up try-in technique is a removable wax-up that allows each of these parameters to be assessed intraorally prior to developing the provisional restoration. This technique provides insight into the detection and elimination of potential challenges while evaluating the future success of the definitive prosthetic therapy. This diagnostic wax-up is a schematic for the laboratory design and creation of the definitive restorations. In addition, this wax-up model provides visualization for the patient and the interdisciplinary team and communicates extensive details concerning the treatment plan. It also provides additional preprosthetic surgical planning of hard and soft tissue augmentation or elimination, as well as fabrication of the provisional restorations and development of the definitive restorations. The diagnostic wax-up should be completed and approved by the patient and the interdisciplinary team prior to finalization of the treatment plan.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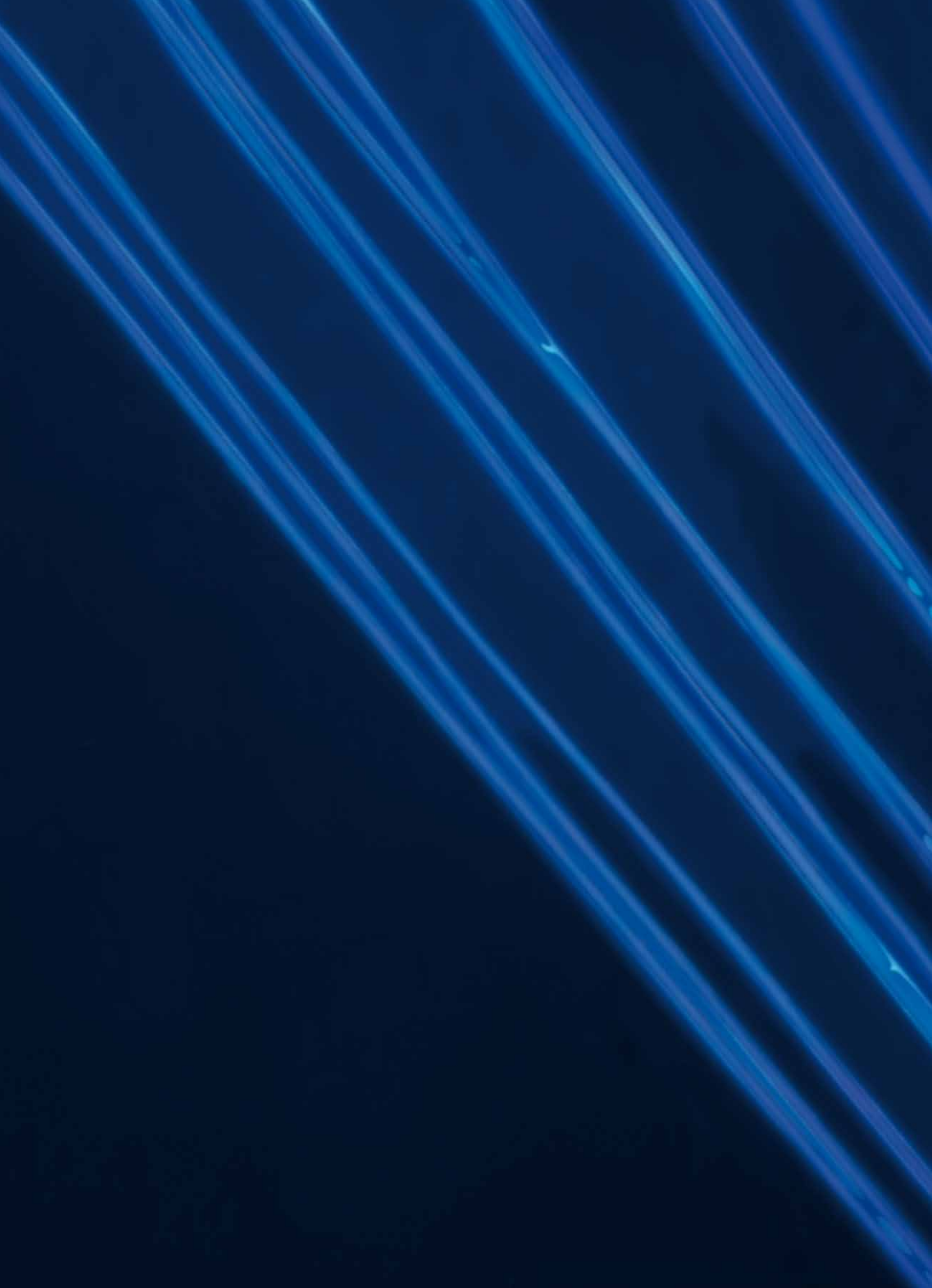

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I would like to express my gratitude to my friend Maestro Willi Geller for being my teacher and showing me the way by sharing his vision of esthetics. During this journey, I have realized that true value has come not from words on paper but from all the wonderful experiences I have shared with individuals along the way. I would like to express my gratitude to my dedicated team, Melissa and Lloyd, for their patience, commitment, and midnight hours to complete this endeavor. Also, I would like to recognize a special appreciation to the Quintessence team for their organization and relentless dedication to excellence. And most importantly, I would like to thank my Creator for giving our team the knowledge and wisdom to discover the Truth.