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The Dental Prosthesis Technician in Contemporary Aesthetic Rehabilitation: Competencies, Collaborative Workflow, and Impact on the Predictability of Prosthetic Outcomes

The Dental Prosthetic Technician In Contemporary Aesthetic Rehabilitation. Competencies, Collaborative Workflow, And Impact On The Predictability Of Prosthetic Outcomes

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Summary

Aesthetic rehabilitation in dentistry depends on a chain of mutually influencing clinical and laboratory decisions. The dental technician occupies a central position in this chain, being responsible for materializing the treatment plan proposed by the dentist into a functional, resistant prosthetic piece that is aesthetically integrated with the remaining dentition. Despite this relevance, the technician's participation in the rehabilitation process still receives limited attention in the scientific literature, especially regarding the specific competencies required by contemporary aesthetic rehabilitation. This article discusses the role of the dental technician in current aesthetic rehabilitation, analyzing the necessary technical competencies, the collaborative workflow between the laboratory and the dental office, the communication tools that support the predictability of the result, and the impact of digital technologies on the laboratory routine. The analysis is based on a narrative literature review and the author's professional experience of over 27 years in the field.
Keywords: dental prosthesis technician; aesthetic rehabilitation; dental ceramics; digital workflow; interdisciplinary collaboration.

Abstract

Aesthetic rehabilitation in dentistry depends on a chain of clinical and laboratory decisions that influence each other. The dental prosthesis technician holds a central position in this chain, being responsible for materializing the treatment plan proposed by the dentist into a functional, resistant, and aesthetically integrated prosthetic restoration. Despite this relevance, the technician's participation in the rehabilitation workflow still receives limited attention in the scientific literature, particularly regarding the specific competencies required by contemporary aesthetic rehabilitation. This article discusses the role of the dental prosthesis technician in current aesthetic rehabilitation, analyzing the necessary technical competencies, the collaborative workflow between laboratory and dental office, the communication tools that support outcome predictability, and the impact of digital technologies on laboratory routine. The analysis is based on a narrative literature review and on the author's professional experience over more than 27 years of practice in the field.
Keywords: dental prosthesis technician; aesthetic rehabilitation; dental ceramics; digital workflow; interdisciplinary collaboration.

1. Introduction

Aesthetic rehabilitation in dentistry has evolved significantly over the last three decades. New ceramic materials, more reliable adhesive systems, and digital planning technologies. They have transformed the way indirect restorations are designed, manufactured, and installed. Evolution has brought significant gains in predictability, accuracy, and the naturalness of results. What What is not always discussed with the necessary depth is the fact that this evolution required a equivalent transformation in the skills of the professional responsible for manufacturing these Restorations in a laboratory setting.

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A dental prosthesis technician is the professional who transforms clinical planning into a real prosthetic piece. The molding, the working model, the waxing, the material selection, the Ceramic layering, control of firing cycles, finishing and polishing are all part of the process. The hands of this professional are taken before any restoration reaches the patient's mouth. Each of these The stages involve technical decisions that directly influence marginal adaptation and resilience. The mechanics, color stability, and aesthetic integration of the final work.

Law No. 6,710, of November 5, 1979, regulated the profession of dental technician. Dental education in Brazil and established the requirements for its practice, including professional certification. at the secondary level and registration with the Regional Council of Dentistry. Decree No. 87,689, The decree of October 11, 1982, supplemented the regulations and defined the duties and prohibitions of profession. Since then, the field of activity for the dental technician has expanded in complexity, keeping pace with the development of restorative materials and techniques, without the legislation or the scientific literature has fully kept pace with this transformation.

In contemporary clinical practice, the quality of the aesthetic outcome depends on both Decisions made in the doctor's office as well as decisions made in the laboratory. Substrate selection. ceramic, the layering protocol, the control of cutting thicknesses and the reproduction of Understanding the optical characteristics of a natural tooth is the responsibility of a dental technician. When this... The professional demonstrates technical expertise, knowledge of materials, and the ability to communicate effectively with the client. In clinical practice, the predictability of the outcome increases measurably. When this link is weak, the The outcome is affected regardless of the quality of the preparation or cementation.

The aim of this article is to analyze the role of the dental prosthesis technician in rehabilitation. contemporary aesthetics, discussing the required technical skills, the collaborative flow between Laboratory and consulting room, the impact of digital technologies and the relationship between qualification Laboratory analysis and the predictability of protein results. The analysis is based on a narrative review of Based on literature and the author's experience, accumulated over 27 years working in the ceramics industry, including the technical coordination of specialization courses in dental prosthetics at the University of São Paulo and at the Federal University of Pernambuco.

2. The dental prosthesis technician in the Brazilian context

Brazil has one of the largest populations of dental surgeons in the world, and Proportionally, a significant number of dental prosthesis laboratories are in operation. Data from the Federal Council of Dentistry indicates the existence of thousands of dental technicians. registered, distributed in laboratories of different sizes throughout the country. This The wide geographical distribution causes the skill level of these professionals to vary.

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considerably from one region to another and from one laboratory to another.

In Brazil, the training of dental prosthesis technicians is at the technical level, with courses in... Average duration of two years. The curriculum includes subjects such as dental anatomy, sculpture, and materials. dental appliances, fixed prosthesis, removable prosthesis, complete denture, ceramics and, more recently, Digital technologies applied to the laboratory. The training base is solid in terms of fundamentals, However, the speed at which new materials and techniques reach the market demands constant updating. Constant professional development is essential. This includes continuing education courses, technical immersion programs, conferences, and more. Direct exchange of experience between peers has become an indispensable component of training. continued.

One aspect that deserves reflection is the positioning of the prosthetic technician in the value chain. of oral rehabilitation. Historically, this professional was seen as an executor of prescriptions, a The operator received the mold and returned the finished piece without actively participating in the planning process. This view is outdated. In high-level aesthetic rehabilitation, the technician participates in the discussion. Regarding the case from the initial stages, it gives an opinion on the technical feasibility of the proposed plan, and suggests... materials and protocols, and contributes information that the clinician does not always have about the behavior of materials in specific situations.

This change in positioning reflects a global trend. In reference centers in In Europe, the United States, and Japan, a dental technician specializing in ceramics is... treated as a high-level technical collaborator, with active participation in postgraduate courses. undergraduate studies, scientific publications, and the development of work protocols. In Brazil, this... This trend is already a reality in specialized laboratories, where the ceramic technician acts as a mentor. for professionals in training and as a technical reference for clinical teams.

3. Technical skills in contemporary aesthetic rehabilitation

Contemporary aesthetic rehabilitation demands a set of challenges from the prosthetic technician. skills that go far beyond the mechanical fabrication of prosthetic parts. The demand for Restorations that faithfully reproduce the natural appearance of teeth require expertise in optical fundamentals, in-depth knowledge of available ceramic systems, and skill. A refined manual for layer stratification.

The first critical skill is mastery of ceramic materials. The technician needs To understand the mechanical and optical properties of each system with which one works. Disilicate of Lithium, for example, exhibits flexural strength in the range of 360 to 400 MPa, and compatible translucency. with the reproduction of natural enamel and coefficient of thermal expansion that allows association with Porcelain veneers. Zirconia offers superior strength, between 900 and 1,200 MPa, with

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distinct applications. Feldspathic ceramics exhibit excellent optical properties, with greater resistance.
Limited, between 60 and 100 MPa. Each material has specific requirements, and it is up to the technician to provide guidance.
When consulted, which system best meets the requirements of the case in question?

The second skill is ceramic stratification itself. Stratifying a
Restoration in ceramics means building layers of materials with varying degrees of opacity.
translucency and fluorescence, simulating the natural structure of the tooth. Dentin exhibits chroma and
The enamel has its own opacity. It contributes translucency and optical effects such as opalescence and
Internal reflection. The incisal region has depth characteristics that depend on the interaction
between the layers. Reproducing these effects in a laboratory specimen requires knowledge of anatomy.
Dental expertise, color sensitivity, and practical experience accumulated over years of work.

The third competency is the control of firing protocols. Each ceramic system has...
specific parameters of temperature, lifting rate, drying time and time of
maintenance at the final level. Seemingly small variations in these parameters can alter the
translucency, color, and surface texture of the piece. The technician who masters these protocols can...
To reproduce results consistently from case to case, which is fundamental for predictability.
clinic.

A fourth skill, often underestimated, is the finishing and polishing of
restoration. The surface texture of the ceramic piece directly influences the reflection of light, the
biofilm retention and patient comfort. The finishing process involves the sequential use of
abrasive tools, diamond tips, polishing rubbers and specific pastes, each one
with a defined function in refining morphology and surface. A well-executed finish.
It can transform a technically correct piece into a clinically excellent restoration.
Neglected finishing compromises any job, regardless of its quality.
stratification.

The fifth competency relates to understanding the adherence protocols. The technician in
A prosthesis that understands the mechanisms of adhesive cementation can be planned to...
to function within this protocol. The minimum thickness of the infrastructure, the internal configuration of
On the surface, the compatibility between the ceramic substrate and the cementing agent are variables that...
The technician can and should consider this during manufacturing. When the laboratory professional and the clinician...
They share the same understanding of adhesion, the risk of failure due to maladaptation, fracture, or...
Detachment decreases significantly.

4. The collaborative workflow between dentist and dental technician

The quality of a prosthetic restoration depends on the quality of communication between those involved.

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The case is planned in the office, and the piece is manufactured in the laboratory. This statement may seem...
It's obvious, but practice shows that communication between dentists and dental technicians is still, in many cases, difficult.
cases, disabled.

The traditional workflow is linear. The dentist prepares the tooth, takes the impression,
The technician selects the color and sends the material to the laboratory with a written prescription.
The material is manufactured, the piece is made, and it is returned for testing and cementation. In this model, the decisions are...
Taken in isolation and sequentially. The technician works based on limited information about
The case is complicated, and the dentist is unaware of the technical limitations the laboratory faces during manufacturing.

The collaborative workflow proposes a different dynamic. The technician participates in the planning.
From the outset, with access to intraoral photographs, detailed color records, study models, and
Whenever possible, maintain direct eye contact with the patient. This interaction allows the technician to...
Understand the context of the case before starting fabrication. The color of adjacent teeth, the line of
smile, the presence of asymmetries, the degree of translucency of the remaining tooth structure, and the expectations of
Patient information affects laboratory decisions and is not always included in the...
conventional prescription.

Based on the experience accumulated over decades of laboratory practice, including in courses on
Specialization programs coordinated at USP and UFPE, the difference in results between cases conducted in
The collaborative workflow and linear flow of cases are noticeable. This same perception is...
shared by leading professionals in international centers, where the collaborative workflow already exists.
It's established practice. Collaborative workflow reduces the need for repetition and decreases the total time.
treatment increases patient satisfaction with the aesthetic result. The reason is simple. When
The technician has access to complete case information, making laboratory decisions more precise.
and the number of uncontrolled variables decreases.

One point that deserves attention is color registration. The color selection performed exclusively
with conventional scales, under variable lighting and without standardized photographic documentation, it is
One of the biggest sources of dissatisfaction with the aesthetic outcome of ceramic restorations. The record
photographic with a defined protocol, using standardized lighting and scales positioned alongside.
The analysis of the reference teeth provides the technician with a much more reliable information base.
Color analysis in a laboratory setting, when performed on calibrated photographs, allows for decisions of
more secure stratification.

The participation of the prosthetic technician in the infrastructure test and the biscuit test.
Ceramic is another element that strengthens the collaborative flow. When the technician accompanies these
In these steps, he can assess marginal adaptation, color relationship with adjacent teeth, and adjustments.
necessary in real time, correcting problems that would only be identified in the final delivery.
This practice, common in centers of excellence, reduces rework and speeds up case completion.

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5. Communication and planning tools

Communication between clinics and laboratories has gained new tools in the last two years.
For decades, the prosthetic technician who masters these tools has positioned themselves as a professional.
Unique in the market.

Clinical photography is probably the most impactful communication tool in daily practice.
Laboratory. Standardized photographs of the face, smile, and intraoral areas provide the technician with information.
regarding dental proportions, smile line, gingival exposure, surface texture and characteristics
chromatic nuances that no written prescription can convey. The minimum photographic protocol for
Aesthetic cases include frontal photo with retractor, side photo, photo with positioned color scale and
Reference photo showing wet teeth and dry teeth. This documentation allows the technician to...
Analyze the case thoroughly before touching the ceramic.

Diagnostic waxing is another planning tool with direct participation from
laboratory. Waxing allows for a three-dimensional visualization of the proposed result before
Any preparation must be done on the patient's tooth. The creation of a quality wax-up is essential.
It requires knowledge of occlusal anatomy, aesthetic proportions, and interdental relationships. When this
Waxing serves as the basis for making silicone guides and mockups, and the planning process is enhanced.
Concreteness allows the patient to assess the expected outcome before committing to treatment.

Digital planning has brought an additional layer of precision to this process. Software
Computer-aided design allows the technician and clinician to visualize, modify, and approve
The restoration design is created in a virtual environment before fabrication. Intraoral scanning, which...
It replaces conventional molding in a growing number of cases, generating digital files that can...
can be shared instantly between the office and the lab. The technician can then initiate the
Planning in CAD software while the patient is still in the chair, speeding up the workflow and
Reducing sources of error.

Direct communication between professionals, facilitated by messaging applications and
Image-sharing platforms have also transformed the work routine. The exchange
Quick uploading of photos, videos, and comments during the manufacturing process allows for real-time adjustments.
which previously would only have been possible with the technician's physical presence in the office. This increased efficiency benefits
both the professional and the patient, and it demands both technical and professional competence from the prosthetic technician.
communicative.

6. The impact of digital technology on the performance of the dental technician.

The introduction of digital technologies in the prosthetic laboratory has profoundly changed the...

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The technician's work routine includes CAD/CAM systems, intraoral scans, and 3D printers. Benchtop milling machines have become part of the daily routine in laboratories that work with rehabilitation. aesthetics. This transformation brought gains in precision and reproducibility, and at the same time demanded from the technician's perspective, the acquisition of new skills, which were not part of the traditional training of profession.

The digital workflow in the production of ceramic veneers, for example, replaces molding. conventional intraoral scanning, manual waxing using CAD software and The technique of injection molding by direct milling of ceramic blocks. Each step of this workflow requires... Specific knowledge. The manipulation of digital files in STL format, the configuration of milling parameters, selecting the appropriate block for each application, and the finish of the milled part. These are the technical skills that a professional needs to master in order to deliver a satisfactory result. meeting the demands of aesthetic rehabilitation.

A common misconception is the perception that digital technology eliminates the need for Manual skill. In practice, what technology does is shift the point of application of that skill. Milling produces an infrastructure with precise marginal adaptation and controlled geometry, but Aesthetic customization continues to depend on the manual layering of porcelain veneers. Contact adjustment, surface texture definition, and individual color characterization are These are steps that no software or milling machine can handle on its own. The technician with expertise in the technologies... digital and manual stratification techniques possess a repertoire that positions it at a level. high level of professional performance.

The coexistence of analog and digital workflows is a reality in most laboratories. Brazilians. There are cases where the digital workflow presents clear advantages, such as in the production of infrastructures with complex geometries or in situations that require dimensional precision. superior. There are others where analog streaming remains the best choice, such as in production of previous single-piece garments with extreme aesthetic demands, in which the modeling A manual allows for finer control of anatomical details. The technician who understands the instructions and the limitations of each flow, and which transitions safely between both, offers the partner clinician Technical flexibility that translates into better patient outcomes.

Training in digital technologies requires continuous investment. Manufacturers like Ivoclar Vivadent, Dentsply Sirona, Shofu, Noritake, Exocad, and 3shape offer training programs. in their systems, and participation in these programs is essential for the technician to remain updated. The exchange of experiences at specialized congresses and the holding of demonstrations to I make a living from laboratory techniques, both in academic settings and at events promoted by industry, they complement training and allow the dissemination of knowledge among professionals. with different levels of experience.

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7. Professional training, education and dissemination of knowledge

The qualification of dental prosthesis technicians in Brazil presents a scenario of great challenge. heterogeneity. While some professionals consistently invest in training They continue to participate in international courses and keep up with the scientific literature in the field, among other things. remain limited to the knowledge acquired in initial technical training. This disparity is This directly reflects the quality of the work delivered and the professional's ability to perform in... complex cases of aesthetic rehabilitation.

Dental prosthetics education in dental schools devotes limited attention to the stage... laboratory work. The emphasis is on clinical procedures, which is understandable given the nature of the work. from the undergraduate course in dentistry. The practical consequence, however, is that many surgeons- Dentists begin their professional lives with little knowledge of what happens in the laboratory. after the molding is sent. This training gap contributes to the difficulty of communication between office and laboratory, and for the undervaluation of the work of the dental technician.

The participation of dental technicians in teaching and research environments is a way to... Overcoming this gap. When the ceramic technician acts as a coordinator or instructor in courses. In addition to his specialization, he transfers practical knowledge that dental students rarely acquire. They would access it in another way. This action has a double impact. It trains more clinical professionals. They are prepared to interact with the laboratory and it gives the technician visibility and recognition in the field. academic environment.

The publication of scientific articles by dental technicians, although still infrequent in In Brazil, this represents another way of disseminating knowledge and strengthening the profession. documentation of technical protocols, analysis of complex laboratory cases, and participation in Collaborative research with universities allows the experience accumulated in the laboratory to The work reaches a wider audience and contributes to the advancement of the field. The scientific literature The study of prosthetic materials and techniques gains depth when it includes the perspective of professional who handles these materials daily.

Mentoring between professionals with different levels of experience is yet another dimension of Dissemination of knowledge that deserves to be recorded. In reference laboratories, the technician An experienced professional supervises and guides professionals in training, transmitting knowledge that is often... These are not found in books or manuals. The ideal thickness of an opaque layer, the exact point of Porcelain moisture before condensation, correct bur angle during adjustment Knowledge about lithium disilicate infrastructure is passed down at the workbench, from professional for professional, in a training process that values practical experience as legitimate source of knowledge.

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8. Predictability of protein outcome

Predictability is the ultimate goal of any protocol in aesthetic rehabilitation. The patient
The doctor wants to know what the outcome will be before starting treatment. The doctor wants to be sure that...
The plan will be executed as expected. The technician wants to deliver a part that meets the requirements.
Case specifications without the need for successive adjustments. When the three objectives align,
The outcome is predictable.

Predictability depends on controlling variables at every stage of the process.
In the dental office, tooth preparation must respect the minimum thicknesses required by the material.
The chosen restorative method. The impression, whether conventional or digital, needs to reproduce it faithfully.
The prepared tissues and adjacent tissues. Color registration must be done according to protocol.
Standardized, under known lighting conditions, with reference photographic documentation.

In the laboratory, the variables controlled by the prosthetic technician are equally crucial.
The construction of the work model, when using an analog workflow, needs to follow correct proportions.
Powder and liquid mixing is necessary to avoid dimensional distortions. The selection of the ceramic system needs to consider...
the mechanical and aesthetic indications of the case. Stratification must respect the protocols of
layers of the system used. The firing cycles must follow the parameters recommended by
Manufacturer. The finish needs to refine the anatomy without compromising the integrity of the piece.

When any of these variables gets out of control, the outcome becomes unpredictable.
A preparation with insufficient thickness can result in fracture of the restoration. An impression with
Distortion produces a mismatched piece. An inaccurate color registration leads to layering with
Unsatisfactory color result. A firing protocol with altered parameters may modify this.
The translucency and color of the ceramic are irreversibly altered. Predictability is, therefore, the result.
cumulative effect of correct decisions at each stage of the chain.

The point this article highlights is the contribution of the prosthetics technician to...
The predictability of the outcome is as significant as the clinician's contribution. The literature on
The longevity of ceramic restorations demonstrates that the most frequent failures, including cracks due to...
Insufficient thickness, chipping due to lack of adequate infrastructure support and
Marginal maladaptations involve variables that are totally or partially controlled in
laboratory. The qualified technician knows these flaws, knows how to prevent them, and works within
protocols that minimize its occurrence.

Table 1. Frequent failures in ceramic restorations and the laboratory's role in...
prevention.

Type of failure	most frequent cause	Laboratory responsibility in

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		prevention
Fracture or crack in the restoration.	Thickness of the infrastructure below of the minimum recommended	Dimensional control during the manufacturing and communication with the clinician regarding material limits
Chipping of ceramics coverage (chipping)	Lack of adequate support from infrastructure or failure to adhere between layers	Application of an adhesion protocol between substrate and porcelain covering; control of infrastructure geometry
Marginal maladjustment	Distortion of the work model or error in the manufacturing process	Strict control in the making of model; verification of adaptation in each step
Unsatisfactory color result	Inaccurate color registration or inadequate stratification	Request for photographic documentation standardized; stratification domain with layers of effect
Loss of retention or detachment	Incompatibility between the inner surface of the part and the cementation protocol	Preparation of the internal surface as per system protocol; guidance to clinical aspects of the cementing agent indicated

The table above summarizes the most frequent situations and shows that the laboratory participates. actively involved in the prevention of each of these conditions. The prosthetic technician with experience in rehabilitation. Aesthetics recognizes these risks and works preventively, incorporating checks. intermediate to its manufacturing flow.

9. Final considerations

Contemporary aesthetic rehabilitation has reached a level of sophistication that demands... Excellence in every step of the process, from clinical planning to laboratory execution. The technician In dental prosthetics, the professional occupies a central position in this chain, and their skills directly influence... The quality, longevity, and aesthetics of the restorations delivered to the patient.

The skills required of a technician in modern aesthetic rehabilitation go beyond mere ability. manual. They include mastery of ceramic materials and their processing protocols, understanding the optical principles that govern the natural appearance of teeth, ability to Communication with the clinical team and fluency in the digital technologies that are part of the daily routine.

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contemporary laboratory.

The collaborative workflow between the doctor's office and the laboratory is the model that best supports the... Predictability of the prosthetic outcome. The exchange of detailed information about the case, the participation the technician's role in intermediate stages of treatment and the use of visual communication tools and Digital technologies reduce sources of error and increase patient satisfaction with the outcome.

The continuing education of the dental technician, their participation in teaching environments and Research and the publication of one's knowledge in scientific journals are paths that strengthen The profession and contribute to the advancement of aesthetic rehabilitation as a whole. Recognition of The role of the laboratory in the rehabilitation chain is a necessary step to raise the quality standard. of prosthetic treatments in Brazil and to bring national practice closer to standards of excellence. observed in international reference centers.

About the Author

Ivan Pereira dos Santos is a Dental Prosthesis Technician, graduated from the Butantã School. Registered under number TPD 11682 with the Regional Council of Dentistry of São Paulo. It has... Over 27 years of experience in the field of dental prosthetics, specializing in veneers. Ceramics, dental contact lenses, implant-supported prostheses, and advanced layering techniques. and the application of porcelain over multiple structures.

He worked for 20 years at the Júlio Dental Prosthetics Laboratory in São Paulo, where he practiced... The role of Technical Coordinator and Head of the Ceramics Sector, being responsible for production. of ceramic prostheses and through the training and supervision of the technical team. During this period, he worked with references from Brazilian dentistry, including Prof. Dr. Dario Adolf, Dr. Reinaldo Missaka, Dr. Renata Moraes, among others.

Between 2008 and 2015, he worked as Technical and Dental Ceramics Coordinator in courses on Specialization in Dental Prosthetics at the Northern Paulista University Center (UNORP-SP) and at Hermínio Ometto University Center (FHO-UNIARARAS), with participation in activities of teaching and training professionals in various Brazilian states, including São Paulo, Pernambuco, Brasilia, Salvador, Aracaju, and Rio de Janeiro.

Since 2016, he has been the General Director of the Excellentia Laboratory in São Paulo, where he works with... Analog and digital prosthetic systems designed for all types of prostheses on the market. It has... experience in the development and handling of ceramic materials and CAD/CAM technologies of companies such as Ivoclar Vivadent, Dentsply, Degudent, Shofu and Noritake. Took courses international advanced training in Germany, Spain (with TPD August Bruguera, in Barcelona), United States and Argentina. Participates in conferences as a visiting professor,

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Performing live demonstrations of porcelain layering.

He is co-author of the scientific article "Precision and torque deviation in mechanical TLDs: implications for implant-supported restorations", published in the Journal of Dental Health, Oral Disorders & Therapy in 2026 (DOI: 10.15406/jdhodt.2026.17.00660), and author of the technical book "Disilicate of Lithium in Practice: Adherence and Stratification Protocols with the IPS e.max System.

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