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HOW KATANA™ Zirconia ALIGNS WITH ISO 6872



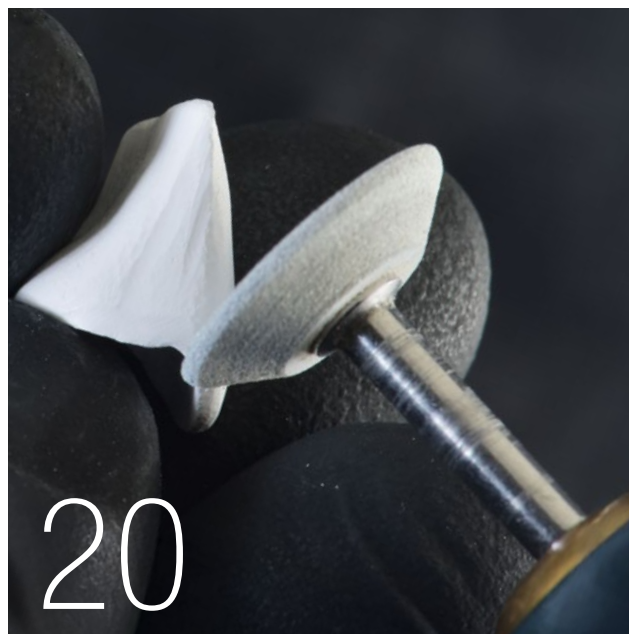
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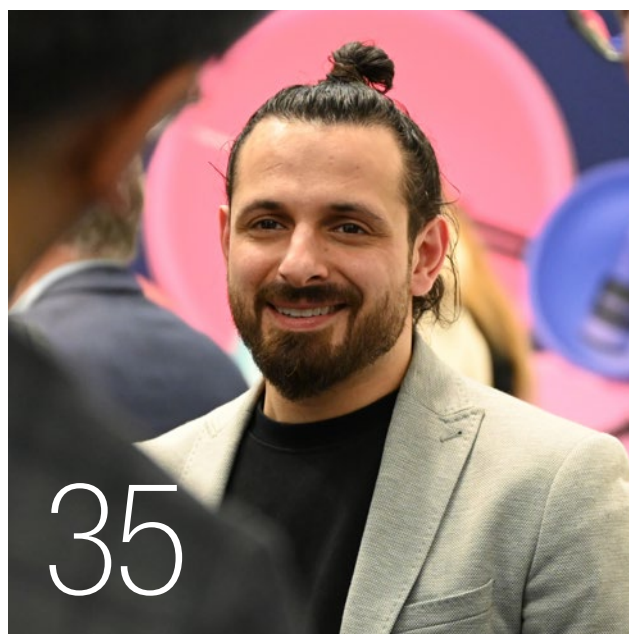
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Dear reader,

Creating lifelike dental restorations is both a craft and a science. It requires a keen understanding of function, natural proportions, and the subtle interplay of colour and translucency in the patient's own teeth. Another important prerequisite is the ability to fully leverage the potential of modern restorative materials and manufacturing technologies. At the same time, the growing range of tooth-coloured dental materials and framework design concepts presents an ongoing challenge – one that demands continuous learning, critical evaluation and a willingness to adapt.

The good news is that adapting does not have to be as complicated as you might assume: You can learn from skilled and motivated dental technicians who love testing new materials, developing techniques that perform well in their hands and sharing their knowledge with colleagues – through workshops, lectures and publications. By listening to these experts and applying their practical insights, you can integrate innovative, but already practically proven approaches into your own laboratory. Combined with your existing skills and a solid understanding of the materials and technologies you use, this provides a strong foundation for your daily work.

The successful adoption of new materials and approaches is further supported by leading manufacturers such as Kuraray Noritake Dental Inc. Recognising the

importance of procedural simplicity, they have developed materials with improved optical properties that reduce the complexity of manual processing. Modern framework materials enable monolithic designs or minimal layering in combination with matching porcelains, making lifelike outcomes achievable with fewer steps, less effort and reduced time investment.

To support your orientation and help you select high-quality dental materials efficiently, we have compiled this 13th issue of BOND Magazine. You will find in-depth insights into essential concepts such as Pure Control by Andreas Chatzimpatzakis, Nature Style by Ghaith Alousi and an anterior restoration concept by Vasilis Vasiliou, alongside background information on dental zirconia. Guidance on fine-tuning firing procedures for micro-layering is provided by Nondas Vlachopoulos, while colleagues from Scandinavia share their experience of transitioning to new materials. This issue also marks the 100th anniversary of Kuraray Noritake Dental Inc.'s parent company, Kuraray Co., Ltd. on June, 24.

Enjoy reading!

With my best regards,

Mathias Fernandez Y Lombardi

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KURARAY TURNS 100: “ADDING NEW VALUE

Few manufacturers can claim one century of innovation. However, as Kuraray celebrates its 100th anniversary, its subsidiary, Kuraray Noritake Dental – shaped by this legacy – remains humble and focused on its holistic vision for improving the delivery of oral care.

Reflecting on this centenary, Satoshi Yamaguchi, president of Kuraray Noritake Dental, shares his perspective on how the company's long-standing ethos continues to shape its direction.

In this exclusive interview, he discusses Kuraray Noritake Dental's latest solutions and the way the company combines scientific expertise with consistent quality, clear and evidence-based information, support grounded in everyday clinical needs, and a stable supply chain.

The ultimate aim, Yamaguchi says, is to bring new value to dental care and contribute to more reliable and efficient clinical practice.



Satoshi Yamaguchi, president of Kuraray Noritake Dental, previously served as head of Kuraray Europe's dental business, based in Germany.

TO DENTAL CARE”

Mr Yamaguchi, could you tell us about your professional background and how you first joined Kuraray?

My Kuraray journey began with a strong aspiration to contribute to public health. I was drawn to the company's extensive expertise in chemical manufacturing and the potential to apply its technologies in the medical field. I started in the medical development division, where I was involved in research and development activities. Later, I transitioned to a marketing role at Kuraray America and, upon returning to Japan, resumed my position in development. This allowed me to engage with the dental healthcare business from both a technical and a commercial perspective. Subsequently, I served as head of the dental business at Kuraray Europe in Germany, where I oversaw sales operations across the European region. These international experiences have profoundly shaped my professional approach, enabling me to lead with a global mindset and remain attuned to the specific needs of local markets.

How has this international experience shaped your approach as president of Kuraray Noritake Dental?

Through my international assignments, I came to recognise the importance of addressing the diverse values held across different countries and regions. In the field of dental materials, preferences often differ. In many parts of Europe and Asia, natural aesthetics are widely valued; in the US, treatment efficiency is often prioritised; and in South America, there is often an emphasis on balancing aesthetics with cost-effectiveness. Although these are general tendencies and can vary, they provide a useful guide in meeting the specific needs of each market.

My goal is to establish a robust framework for delivering reliable, evidence-based information to dental professionals. We are striving to strengthen the foundation of trust by facilitating the collection of credible data and case studies from both internal and external sources, ensuring that the information we

provide contributes to greater confidence in clinical practice. In addition, we place strong emphasis on how this information is communicated. By leveraging multiple channels – presentations at academic conferences and seminars, contributions to journals and communication through digital platforms, for example – we are creating an integrated system that ensures our messages reach dental professionals effectively.

How does Japan's role as a dental innovation hub influence the company's global operations?

In Japan, there is a focus on creating scientifically proven technologies and transforming them into trusted dental solutions. At Kuraray, a prime example is our original adhesive monomer, MDP. This solution exhibits exceptional bond strength, even when using traditionally difficult substrates such as metals and zirconia. Today, MDP is recognised as a proven global standard in adhesive monomers and is widely used by dental material manufacturers around the world.

Scientifically valid technologies developed in Japan are being utilised in clinical settings worldwide, supported by reliable, evidence-based information. This tradition is a driving force behind Kuraray Noritake Dental. We honour it by prioritising materials that can function like natural tooth substances over the long term in the oral environment – ensuring clinical reliability through durability, defined as the preservation of strength and aesthetics. Building on this foundation, we continuously enhance the value of our products by expanding indications and improving usability.

“My goal is to establish a robust framework for delivering reliable, evidence-based information to dental professionals.”

YEARS

“By sharing clinically relevant information backed by scientific evidence, we contribute to improving the quality of local dental care.”

How important is the European market in your overall strategy?

The European market plays a vital role in advancing our efforts in quality assurance and information dissemination. Given the strictly enforced medical device regulations and environmental laws, we proactively work to enhance quality and reliability in our operations in the region, including in the areas of product design, packaging and product information. In turn, these initiatives help to improve the accuracy of product development and information dissemination for all markets.

At the same time, we are strategically expanding our global business operations, focusing on the US, Asia and South America. To ensure the consistent delivery of high-quality products and services, we are working in close collaboration with local dental professionals, educational institutions and partner companies. By leveraging the expertise gained through our operations in Europe and adapting this to the unique needs and cultures of other regions, we continue to provide reliable solutions for dental professionals worldwide.

Kuraray Noritake Dental introduced several new materials last year. What can you tell us about these materials and the clinical needs they were designed to meet?

At the 2025 International Dental Show, we introduced CLEARFIL MAJESTY™ ES Flow Universal, CLEARFIL™ Universal Bond Quick 2 and CERABIEN™ MiLai. These products are based on our concept of Universal Excellence, a philosophy that emphasises scientifically grounded performance and outcomes.

Dental practitioners in clinical settings seek materials that they can use with confidence. To meet these needs, we ensured that these materials embody the principles of Universal Excellence. This means versatile, high-performance solutions that streamline clinical workflows by minimising the number of required components and procedural steps. In this way, the products support decision-making in daily dental practice and laboratory work.

KATANA™ Zirconia is recognised for aesthetics and strength. What sets your proprietary zirconia powder and multilayer technology apart in today's competitive CAD/CAM market?

We consistently develop and manage raw material powders in-house. By focusing on proprietary material development, we have created high-quality dental zirconia that combines aesthetics and mechanical strength. In addition, our advanced manufacturing technologies and strict quality control standards ensure stable and reliable product quality. Furthermore, by utilising our proprietary zirconia powder and working closely with manufacturers of milling machines and sintering furnaces, we have significantly reduced both processing and sintering times in the fabrication of zirconia restorations.

One notable example is KATANA™ Zirconia ONE SPEED CROWN, which supports a streamlined chairside workflow. We have developed a new zirconia powder that can reach a highly activated state with little energy. This accelerates the sintering process, thereby achieving an ultra-short sintering time of just 9 minutes. Furthermore, our zirconia and multilayer technology enable natural gradation by varying both shade and translucency across the layers of the zirconia disc – closely replicating the appearance of natural teeth. In KATANA™ Zirconia YML, each layer contains a different concentration of yttria: the upper layers offer natural colouration and high translucency, and the lower layers deliver superior strength. Owing to this advanced material design and multilayer technology, the KATANA™ Zirconia series combines outstanding aesthetics and mechanical performance and contributes to greater efficiency in clinical workflows.

Kuraray has regional offices in China and Brazil.

How do you adapt product development and clinical education to the diverse needs of these fast-growing markets?

China and Brazil are two of the world's fastest-growing dental care markets, characterised not only by their large populations but also by a growing interest in quality dental care, rapidly advancing adoption of CAD/CAM technologies and ongoing development of clinical dental education. We address these evolving needs by delivering products and clinical support tailored to the specific dental requirements and educational styles of each country.

For example, we continue to meet the demand for our adhesive dental materials – such as the CLEARFIL™ and PANAVIA™ series – by offering hands-on seminars and webinars in local languages. By sharing clinically relevant

YEARS

information backed by scientific evidence, we contribute to improving the quality of local dental care.

In addition, user feedback gathered through our local offices serves as a valuable source of insight for product development. By incorporating market-specific trends, preferences in product handling and differences in clinical education styles into the development of new products, we can deliver locally optimised quality solutions.

Kuraray Noritake Dental is expanding production at its new plant in Miyoshi in Japan. How will this affect supply chain resilience and product innovation?

Leading up to this year, we significantly strengthened our global supply system for dental materials. At the heart of this initiative was the strategic expansion of production capacity at our Miyoshi plant, where we ultimately aim to roughly double production capacity. This facility specialises in the manufacturing of inorganic dental materials such as zirconia and porcelain and plays a critical role in our business strategy through technological expertise, rigorous quality control and product development capabilities.

Additionally, by strengthening collaboration between our manufacturing site and our research and development, we are working to establish a system that enables rapid incorporation of feedback from clinical settings into product improvements. These efforts also contribute to enhancing our product development capabilities, allowing us to deliver dental material products that meet market needs in a timely manner. We view this as a vital step towards better meeting the expectations of dental professionals worldwide and elevating our market presence.

As the Kuraray Group marks its 100th anniversary, what vision is Kuraray Noritake Dental pursuing for the future of dental care?

Our anniversary presents an opportunity to reflect on the spirit that has shaped the company over the last 100 years. At the heart of our company lies a philosophy of embracing challenges: "For people and the planet – to achieve what no one else can". Long before the term "corporate social responsibility" became widespread, we were addressing social issues through the power of technology and developing materials that improve lives. That ethos continues to underpin our business today.

Since entering the dental industry as a chemical products manufacturer, we have remained committed to craftsmanship and quality. As noted earlier, because dental

materials are used inside patients' mouths over extended periods, we consider durability to be a particularly critical factor. This durability encompasses strength and aesthetics, which together form the foundation of reliable clinical performance.

However, even products backed by advanced technology may not fully convey their intrinsic value to users. That is why we strive to provide reliable, evidence-based information and deliver trusted products to clinical settings.

What can you tell us about future initiatives at the company?

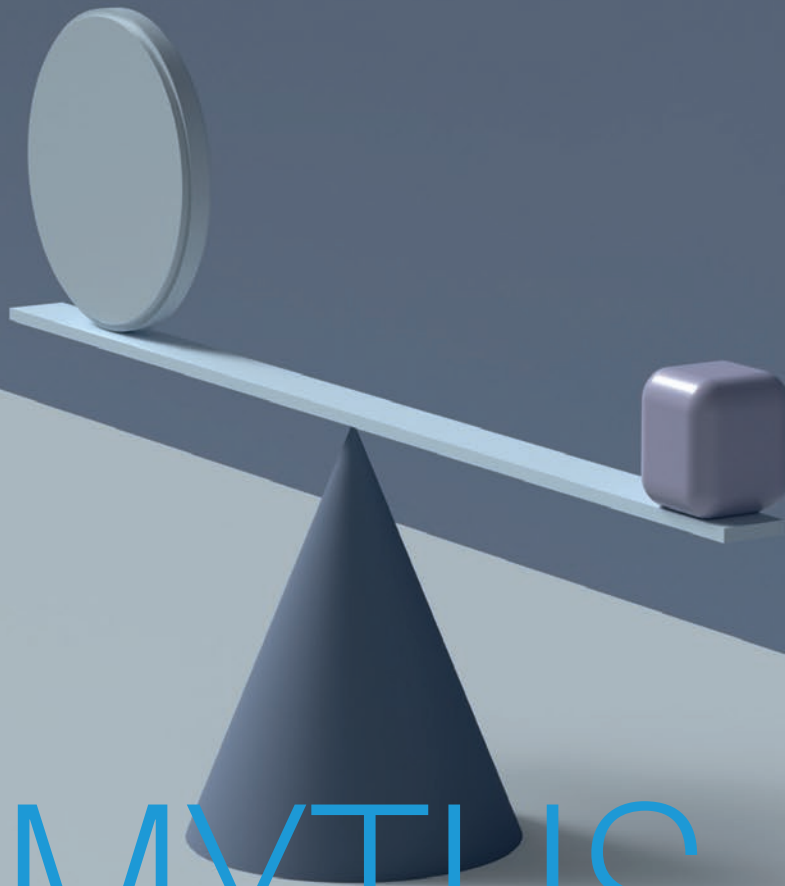
Through collaborative product development with dental clinicians, we aim to incorporate more insights from the front lines of dental care. By actively listening to dental professionals and technicians, we aim to further address the real-world challenges that they face and deliver products that more effectively meet daily clinical demands. We also aim to build greater trust with dental clinicians by sharing, evidence-based information and clearly communicating the scientific evidence and development background behind our products. Additionally, in support of our commitment to sustainability, we aim to offer responsible choices to users through designing products with environmental considerations in mind and reducing our overall environmental impact.

Through these initiatives, we will continue adding new value to dental care by leveraging our material design expertise, which is rooted in the founding spirit of our company. We aspire to remain a trusted partner for dental professionals around the world – one that they can rely on with confidence.

Originally published on Dental Tribune website on March 4th, 2026.

"We aspire to remain a trusted partner for dental professionals around the world."





8 MYTHS

BUSTING MYTHS AROUND HIGH-STRENGTH CERAMICS IN DENTISTRY

Crowns, bridges, partial restorations: When it comes to replacing or restoring an individual's teeth with fixed dental prostheses, the choice is often between the high-strength ceramics – lithium disilicate and zirconia. Originally, the higher aesthetic potential of silicate ceramics made them particularly suitable for single tooth restorations, while the high-strength option zirconia was predominantly used for bridges and frameworks. Due to continuous improvements in the development of dental ceramics and adhesive technology, things have changed.

Many of the original limitations and restrictions are no longer valid, and new opportunities arise for users in the dental setting.

In the following, we will address certain persisting myths about the use of zirconia and lithium disilicate in dentistry. In this context, you will receive an update on what is possible with the materials today and guidance on how and when to use them.

1 ZIRCONIA IS AESTHETICALLY INFERIOR TO LITHIUM DISILICATE

The original zirconia used in dentistry was whitish-opaque. Therefore, it was used as a framework material only. To create aesthetic restorations, it was necessary to apply a relatively thick layer of veneering porcelain. More recent generations of zirconia, however, include variants with a particularly high translucency and a multi-layered colour structure. These variants allow for less complex finishing techniques such as micro-layering or external staining. KATANA™ Zirconia UTML (Kuraray Noritake Dental Inc.), for example, is one of the most translucent zirconia materials on the dental market. Depending on the test method used, it offers a similar or only somewhat lower translucency compared to lithium disilicate (IPS e.max CAD LT, Ivoclar Vivadent)¹⁻⁴. The desired natural result is achieved as light reaches – and reflects – the underlying tooth structure. Consequently, true-to-life restorations can be produced in an efficient, highly automated workflow.

Conclusion

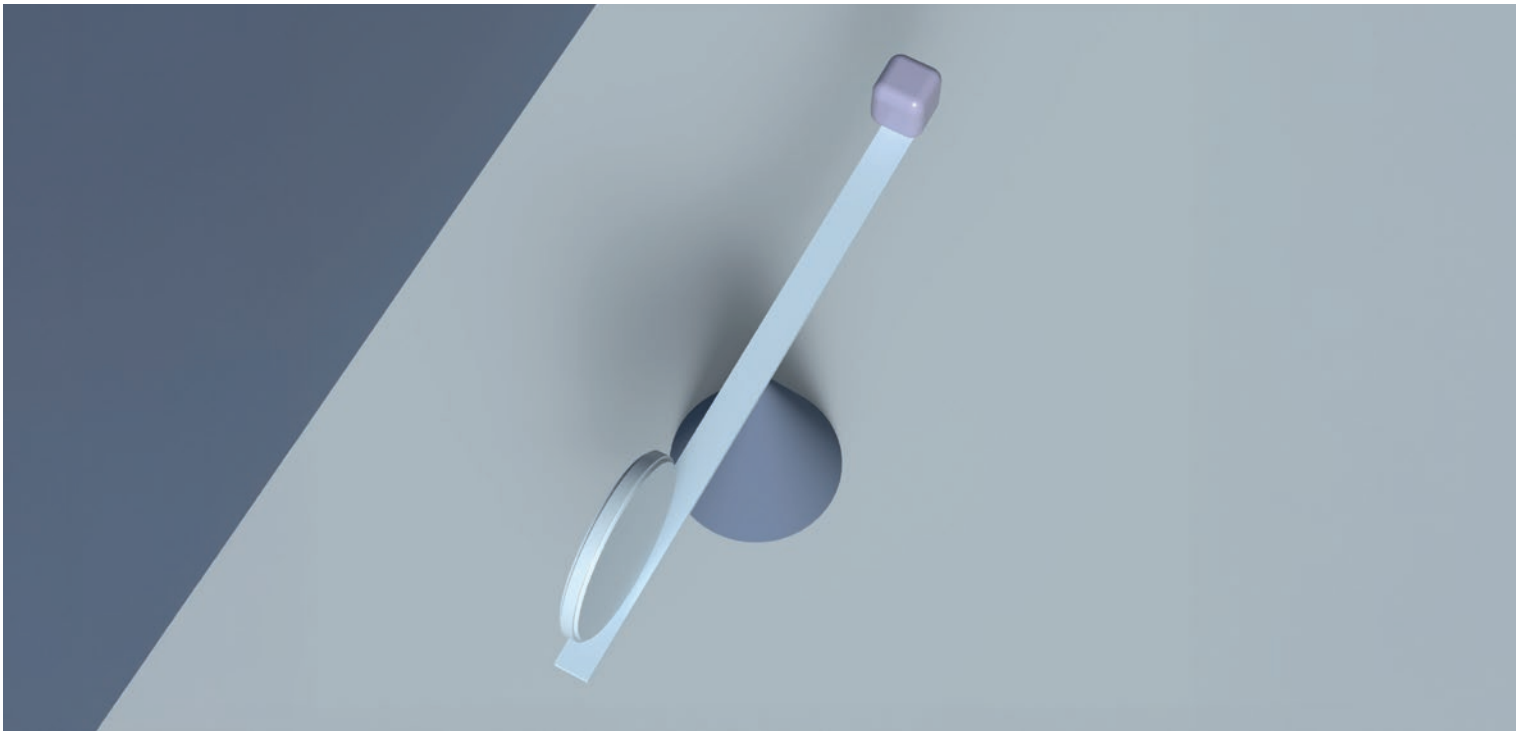
Depending on the variant of zirconia and lithium disilicate used, both materials offer similar aesthetic properties, while even the highest-translucency zirconia is stronger than the highest-strength lithium disilicate available. Material selection may therefore be based on other criteria such as preparation depth for example.

2 ZIRCONIA-BASED RESTORATIONS ARE WEAKER THAN LITHIUM DISILICATE-BASED ONES DUE TO THE NEED OF A PORCELAIN LAYER ON TOP OF ZIRCONIA

This assumption is true for the first generations of dental zirconia. For modern zirconia materials with a high translucency and multi-layered colour structure, however, the situation is different. They are suitable for the production of monolithic restorations or restorations with a minimal (vestibular) cutback and a micro-layer of porcelain. With occlusal contact areas made of plain (polished or glazed) zirconia, these restorations are stronger than monolithic lithium disilicate restorations, while the chipping risk is minimized. In fact, even the weakest zirconia offers a significantly higher flexural strength than lithium disilicate (IPS e.max CAD LT, Ivoclar Vivadent)^{2,3}. Thanks to the high edge stability of zirconia after milling, the restorations are also highly stable, a favourable property for long-term success.

Conclusion

The flexural strength of zirconia is generally higher than that of lithium disilicate (800 to 1,200 MPa for zirconia versus 360 to 460 MPa for lithium disilicate), and due to the improved aesthetic potential of the available materials, a full porcelain layer is no longer required. Hence, zirconia restorations are usually very strong and durable.



3

FINISHING OF ZIRCONIA RESTORATIONS IS MORE COMPLICATED THAN FINISHING OF LITHIUM DISILICATE RESTORATIONS

When using modern, aesthetic zirconia materials, finishing techniques are quite similar. The most popular technique for both, high-translucency zirconia and lithium disilicate, is micro-layering. Based on a full-contour restoration design and a subsequent cutback limited to the vestibular area, a micro-layer of porcelain (often a specific porcelain line-up developed for micro-layering) is applied. With CERABIEN™ MiLai from Kuraray Noritake Dental Inc., the standard procedure consists of internal staining, the application of luster porcelains and final glazing. Fewer layers and fewer bakes are required compared to full porcelain layering. However, aesthetic zirconia can also be used for the production of monolithic restorations, which are characterized with paste stains and glazed.

Conclusion

As a monolithic design or minimal cutback of restorations based on modern zirconia materials is an option, finishing of zirconia is just as easy as finishing of lithium disilicate restorations. The technique depends on the desired outcome.

4

ZIRCONIA-BASED RESTORATIONS ARE MORE INVASIVE THAN THOSE MADE OF LITHIUM DISILICATE

This myth is also based on the assumption that zirconia needs a thick porcelain layer on top to produce aesthetic results. Since this is not the case and great outcomes are possible with monolithic designs or micro-layering approaches, a minimally invasive preparation design is supported by the use of zirconia as a restorative material. Due to a comparatively high strength even of the high-translucency variants, the minimum wall thickness is quite low (e.g. 0.4 mm for veneers made of KATANA™ Zirconia UTML or STML and 0.5 mm for posterior crowns made of KATANA™ Zirconia HTML Plus)*. This allows for a defect-oriented tooth structure removal.

Conclusion

Depending on the type of zirconia and the finishing method, zirconia supports the production of minimally invasive restorations.

*In general, the minimum wall thickness depends on the product and the indication.

5

DUE TO THEIR HARDNESS, MONOLITHIC ZIRCONIA RESTORATIONS HARM THE OPPOSING DENTITION

When manufacturers of dental zirconia started promoting the monolithic use of zirconia, in-vitro studies were soon available to prove that it is not the hardness of the material, but the smoothness of the surface that determines how kind or harmful a dental restoration is to the opposing dentition⁵⁻⁸. According to those studies, well-polished zirconia surfaces maintained their smoothness and showed a superior self-wear and wear to the opposing tooth structure compared to other restorative materials including lithium disilicate⁶⁻⁸. As glaze - unlike the polished surface - tended to wear off over time, it was stressed that a perfectly polished restoration surface is essential for a wear-friendly long-term behaviour. The in-vitro study results were also confirmed in vivo^{9,10}. According to the latest umbrella review focusing on this topic, polished monolithic zirconia causes lower antagonist enamel wear than metal ceramics, feldspathic porcelains and lithium disilicate tested¹⁰.

Conclusion

Provided that the surface is smooth, monolithic zirconia restorations are kind to the opposing natural tooth structure. Over time, the opposing enamel wear may be expected to be on a similar level as natural enamel wear.

6

ADHESIVE LUTING OF ZIRCONIA-BASED RESTORATIONS IS IMPOSSIBLE

When oxide ceramics like zirconia are processed and pre-treated in the same way as silicate ceramics like lithium disilicate, the obtained bond strength is lower. Using the correct pre-treatment protocol, however, it is possible to establish a strong and durable chemical bond between the tooth structure and the zirconia. Otherwise, it would not be possible to place single-retainer resin-bonded bridges made of high-strength zirconia (3Y-TZP) successfully, for example. Their design is largely non-retentive, so that a strong bond is of paramount importance. It is established by air-abrading the bonding surface of the zirconia retainer wing with aluminium oxide (50 µm) at a low pressure (approx. 1 to 2.5 bar) after try-in^{11,12}, followed by ultrasonic cleaning, the use of a restoration primer that contains 10-MDP¹³ and the application of a high-performance resin cement like PANAVIA™ V5 (Kuraray Noritake Dental Inc.)¹⁴. Using this protocol with a predecessor of the resin cement just mentioned, ten-year survival and success rates were above 90 percent¹⁵. The described protocol is in line with the APC concept recommended by Prof Dr. Markus Blatz, which includes (A) airborne-particle abrasion, (P) zirconia primer, and (C) adhesive composite resin application¹⁶.

Conclusion

Using an appropriate protocol including small particle air-abrasion after try-in and a high-performance adhesive resin cement system with MDP primers, a strong and long-lasting chemical bond to zirconia can be established.

7 ZIRCONIA IS UNSUITABLE FOR RUSH CASES DUE TO THE NEED OF SINTERING THE RESTORATIONS AFTER MILLING

By using zirconia variants that are suitable for speed sintering, smaller restorations can be produced within very short time. Single-unit restorations and small bridges (up to three units) made of materials of the KATANA™ Zirconia Multi-Layered Series, for example, may be speed-sintered within 54 minutes, provided that a suitable furnace is used. This leads to a considerable reduction of the production time and is a great option for rush cases. For a true chairside workflow and same-day dentistry, KATANA™ Zirconia Block is a great option. It offers the same optical and mechanical properties as KATANA™ Zirconia STML and can be sintered even faster – in just 18 minutes.

Conclusion

By using suitable zirconia materials and equipment, production times of zirconia restorations are no longer an issue when it comes to rush cases.

8 ALL HIGH-STRENGTH CERAMICS HAVE A SIMILARLY WIDE RANGE OF INDICATIONS

In fact, the range of indications varies with the flexural strength and fracture toughness of the materials. While the use of lithium disilicate is limited to the production of single-tooth restorations and small bridges, zirconia typically covers a wider range of indications, with the high-strength variants being even suited for long-span bridges. The most versatile variants of zirconia are those with flexural strength gradient – like KATANA™ Zirconia YML. This material offers a particularly high translucency in the enamel layer and a high strength in the body layers. Therefore, it is well suited for the production of single-tooth restorations and of highly complex structures such as long-span bridges – depending on where the restoration is positioned in the disc.

Conclusion

Zirconia offers a wider range of indications than lithium disilicate. By selecting one of those variants with a multi-layered structure offering flexural strength gradation, it is possible to cover virtually every indication, while other variants are better suited for specific needs (highest translucency option for aesthetically demanding cases, highest strength option for complex long-span designs).

ZIRCONIA: A TRUE ALLROUNDER

Modern versions of dental zirconia are high-performance materials with well-balanced optical and mechanical properties typically suitable for a wide range of indications. As a zirconia user, you may choose to employ a single material with flexural strength gradation for virtually every situation or prefer to select different products depending on case-specific demands. You have the freedom to select the preferred finishing technique from traditional layering to just polishing and may opt for minimally invasive restoration designs. The latter is due to proven protocols establishing a long-lasting bond to zirconia. For everyone with particularly high quality demands, the KATANA™ Zirconia Multi-Layered series is worth a try. The raw material composition is unique, the powder is developed in-house in Japan and the blanks are produced in a perfectly aligned procedure delivering a homogeneous, densely pressed material for restorations with an accurate fit, high strength and superior edge stability.

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KATANA™ AVENCIA™ Block 2

In control. With confidence.

Multi-Layer (ML)

Block with a multi-layered colour structure with a natural appeal

..... **High-Translucent (HT)**

High translucency variant designed for partial restorations



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Time-effective workflow

No firing required: Save valuable time and reduce operational costs.

Excellent mechanical properties

Strength you need for dependable single-unit restorations.

Favourable wear properties

The smooth, polished surface reduces wear on opposing teeth, while excellent wear resistance supports long-term gloss retention and aesthetics.

Natural gloss in short time

Achieve a brilliant, high-gloss finish rapidly, saving chair time and enhancing workflow efficiency.

Flexible customization

Adjustable enamel-to-dentin ratio: Modify the positioning of the restoration in the block to meet each patient's individual needs.



**PRODUCT
INFORMATION**



A SMOOTH PATH TOWARDS BEAUTIFUL SMILES

MICRO-LAYERING WITH CERABIEN™ MiLai

BY DT VASILIS VASILIOU

No matter whether young or old, male or female: Our patients deserve a beautiful smile that matches their adjacent teeth, their face, their character and their individual needs. To be able to produce beautiful restorations that change their life for the better, we (as dental technicians) have to observe closely – and to listen attentively to the stories they tell.

‘We have to observe closely – and to listen attentively to the stories our patients tell us.’

– Vasilis Vasiliou –

Mr Andreas is a perfect example. He presented in the dental office in need of a full-mouth rehabilitation and the wish to improve the aesthetics of his smile. He asked for an age-appropriate, natural restoration design.

After careful observation and listening, I decided that the best way to restore his maxillary incisors would be with zirconia restorations. The plan was to mill the frameworks using low-value KATANA™ Zirconia YML, shade D3 (Kuraray Noritake Dental Inc.). To facilitate the integration of some natural characteristic effects, a framework design with a primarily vestibular cutback was selected.

The finishing technique of choice was micro-layering with CERABIEN™ MiLai (Kuraray Noritake Dental Inc.), a porcelain designed specifically for this approach.

Important steps in the finishing procedure were:

- Characterization of the milled zirconia with colouring liquids
- Pre-treatment of the sandblasted zirconia surfaces with SS Fluoro and Margin porcelain
- Internal staining with CERABIEN™ MiLai internal stains
- Application of CERABIEN™ MiLai luster porcelains

LABORATORY WORKFLOW

Zirconia splinted crowns were designed in full contour with the aid of the Leahu Library featuring tailored tooth designs (part of the Truedental Library available for exocad DentalCAD design software; Fig. 1), cut back merely in the vestibular area using the ‘calma’ reduction option (Fig. 2), and then milled and characterized with colouring liquids to optimize the chroma.

Figure 3 shows the sintered frameworks on the model, Figure 4 the try-in in the patient’s mouth. As the fit and shape of the restorations turned out to be excellent, it was time to plan the internal staining and micro-layering procedure (Figs. 5 and 6), always trying to imitate nature as closely as possible.

The tricky part is to use the available space wisely – the reason why a detailed layering sketch is useful even in the context of micro-layering. Once the planned layering procedure had been put to practice (Figs. 7 to 10), the surface texture was finalized and the restorations were tried in again for an aesthetic evaluation. Finally, they were cemented with the adhesive resin cement PANAIA™ V5 (Kuraray Noritake Dental Inc.). The beautiful treatment outcome is shown in Figure 11.

Fig. 1: Computer-aided design of the zirconia frameworks: Splinted crowns displayed in a transparent mode to show the abutment teeth.

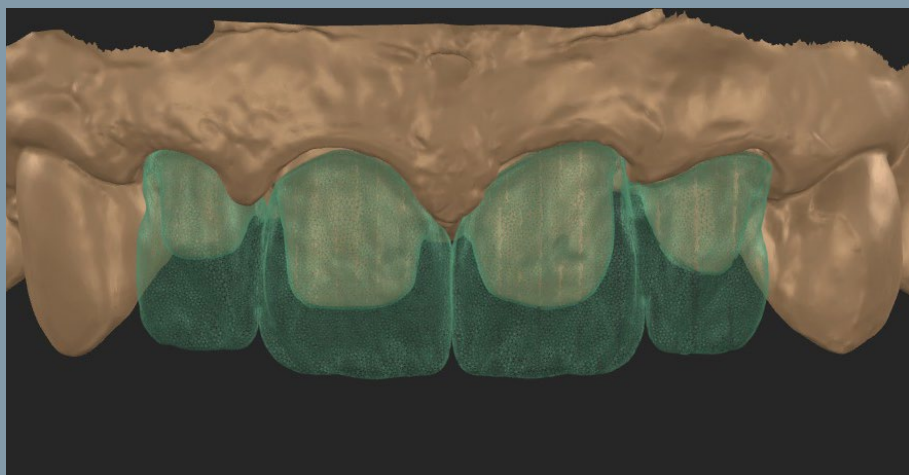


Fig. 2: Computer-aided design of the zirconia frameworks: Outer contour of the splinted crowns with a strongly elaborated surface texture and sufficient room for micro-layering.

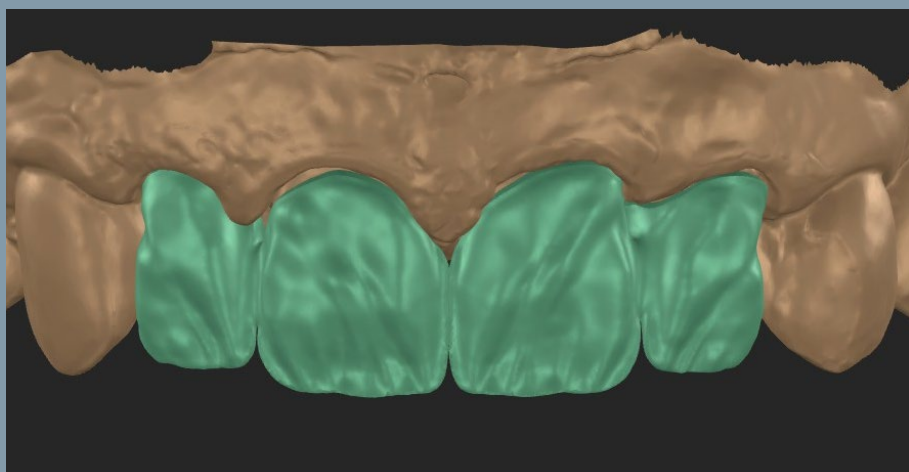


Fig. 3: Restorations after characterization with colouring liquids and sintering on the model.





Fig. 4: Try-in of the restorations.

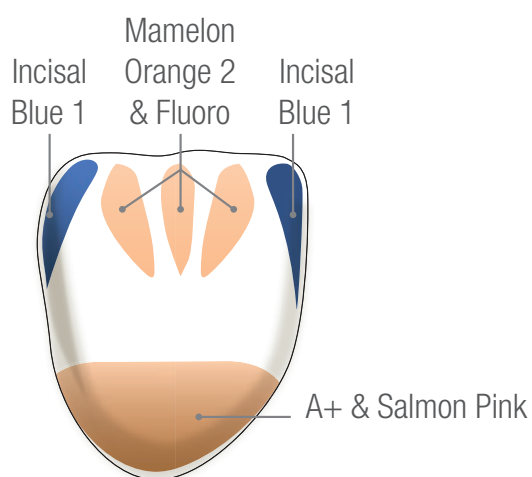


Fig. 5: Layering sketch for the restorations: Internal staining.

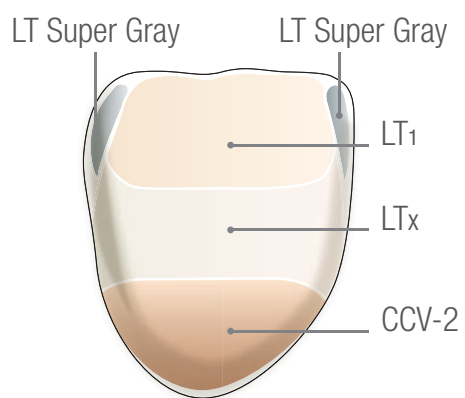


Fig. 6: Layering sketch for the restorations: Luster porcelain application.

Fig. 7: Internal staining – specific characteristics elaborated for a natural depth effect.





Fig. 8: Layering in the cervical and body areas.



Fig. 9: Final layering with lustre porcelains to complete the morphology.

Fig. 10: Final restorations after surface finishing and polishing as well as glazing on the model.





Fig. 11: Treatment outcome

CONCLUSION

The patient was thoroughly satisfied with the treatment outcome and confident that his investment was well worth it. By tailoring my approach to his unique needs, carefully observing his teeth, smile, and facial expressions, and utilizing my extensive knowledge of materials, I was able to achieve this goal successfully.

Nonetheless, I remain committed to continuous improvement by critically evaluating each restoration and seeking areas for enhancement. My dedication to growth, supported by exceptional mentors who share innovative techniques and insights, supports me in staying at the forefront of my field, striving at consistently delivering the best possible care.

I am deeply grateful to Dr. Zinonas Evagorou for invaluable partnership and clinical expertise, which were instrumental in achieving this result.



About the author

Vasilis Vasiliou was born in Nicosia, Cyprus, and graduated from the Technical School for Dental Technicians in Athens in 2004. He has furthered his education by attending several advanced seminars led by mentors and experts in the field, such as Ilias Psarris and Nondas Vlachopoulos.

Throughout his career, Vasilis has made significant contributions to the dental community, including presenting at various conferences in Greece and publishing articles in Greek dental magazines. Since 2020, he has been a key opinion leader for MPF Brush Company and, since 2022, a HASS Ambassador. Vasilis has been an active member of the International Team for Implantology (ITI) since 2019.

Together with his father, Vasilis runs a successful dental laboratory in Nicosia, specializing in all-ceramic and implant restorations. His extensive experience and commitment to excellence have established him as a respected professional in his field.

UNLOCK THE FULL POTENTIAL OF PREMIUM ZIRCONIA

THE IMPACT OF A MATERIAL SWITCH IN THE DENTAL LABORATORY

Switching to a different type of zirconium is not something you do lightly. Was the leap to KATANA™ Zirconia worth it? Three dental lab owners share their experience!



Not all zirconium oxide materials are created equal. Dental technicians worldwide recognise that zirconium oxide discs vary significantly in quality depending on their composition and manufacturing process. The most noticeable differences lie in their mechanical and optical properties, both of which are determined during production.

At first glance, zirconium oxide products from leading manufacturers may seem similar. However, – sometimes invisible – differences can exist. Achieving the highest quality requires the use of premium raw materials, advanced cleaning and pressing techniques, and precise pre-sintering methods. These factors help to provide for superior results while minimizing the risk of remakes. Selecting a high-quality zirconium oxide product is crucial, particularly when working with complex structures or specialised processing techniques. The right choice can significantly impact the final outcome and durability of dental restorations.

We had a conversation with three decision makers of Norwegian dental laboratories to learn more about their reasons to switch to the KATANA™ Zirconia Multi-Layered series (Kuraray Noritake Dental Inc.) and their path to success with these materials. Espen Rørstad is the owner and general manager of Vestfold Dental in Tønsberg, Lucas Andvik the general manager of Cicero Dental AS in Trondheim and Egil Berg the general manager of dental technology at Berg Dental in Askim. They are happy to share their experience and practical tips and tricks.

TIME FOR CHANGE

The reasons to start testing alternative zirconium oxide materials were different: Espen Rørstad, who has been a dental technician for 24 years, was looking for improvements in strength and aesthetics: “Nowadays, zirconium materials are evolving quickly, and specifically those blanks with multi-layered colour, translucency and flexural strength attracted my attention. I first tested a material from another leading manufacturer. Then, I received a single disc of KATANA™ Zirconia YML. I was immediately impressed by the homogeneous, densely pressed material and its optical properties. Ever since my first trial case with KATANA™ Zirconia YML, I have not used any other zirconium oxide again.”

“I was immediately impressed by the homogeneous, densely pressed material and its optical properties.”

Espen Rørstad



Espen Rørstad
is the owner and general manager of Vestfold Dental in Tønsberg



Lucas Andvik
is the general manager of Cicero Dental AS in Trondheim



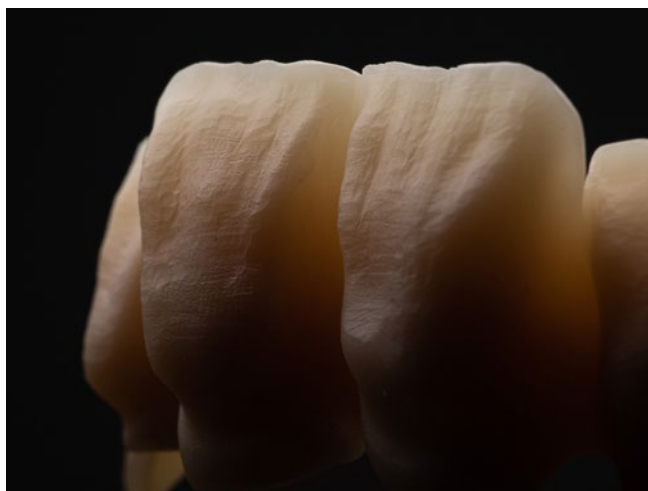
Egil Berg
is the general manager of dental technology at Berg Dental in Askim

CHOOSING THE RIGHT MATERIAL

Egil Berg uses KATANA™ Zirconia YML for most indications, and KATANA™ Zirconia HTML Plus for large reconstructions of ten or more units. The design is predominantly monolithic with a small (vestibular) cutback. The approach of Espen Rørstad is similar. He also uses KATANA™ Zirconia YML on a regular basis for reconstructions with up to ten units, even on implants in combination with Ti-bases. “For larger-span restorations, I most frequently opt for KATANA™ Zirconia HTML Plus or, occasionally KATANA™ Zirconia HT combined with a traditional layering approach”. Lucas Andvik uses all four types of multi-layered zirconia from Kuraray Noritake Dental Inc. (KATANA™ Zirconia UTML, STML, HTML Plus and YML) to have the best of all worlds.

ESTABLISHING WORKFLOWS

Switching materials always means investing time and effort until processes run smoothly and predictably. According to Espen Rørstad, it did not take long with KATANA™ Zirconia to get the parameters right and obtain high-quality results. According to him, a factor that is critical for good outcomes with KATANA™ Zirconia YML is positioning of the restoration in the disc. “Proper positioning is key to success – long-span reconstructions are only stable if positioned according to the manufacturer’s recommendations. The learning curve is quite steep and we have no issues with fractures,” he says. Lucas Andvik slightly adjusted his production procedure to provide for great outcomes: “Initially, we tried to position our restorations in blanks of the heights we had used before, and this turned out to be quite challenging. In order to have enough space for the connectors and be able to position long-span restorations in the middle of the disc as recommended, we started utilising higher blanks. With this strategy, the initial challenges were a thing of the past.”



*“Carving is easier with
KATANA™ Zirconia than
with other materials.”*

Lucas Andvik

What makes KATANA™ Zirconia different

KATANA™ Zirconia is engineered with precision at every step of the production process, from raw powder production to disc pressing, every step is tightly controlled for consistency and quality. It's the result of decades of expertise in ceramics and full in-house control. Every disc reflects that precision and expertise, offering you high quality zirconium oxide with outstanding features;

Dual gradient structure (YML)

A seamless transition in both translucency and strength.

High green-state stability

Thin margins, no chipping. Fewer sprues, smoother carving, and optimal material use.

Targeted yttria balance

Optical translucency where needed, strength where it matters, each layer is purposefully composed.

Speed sintering

54-minute cycles delivering consistent aesthetics and mechanical performance.

Optimized density and CTE

Uniform density and a stable coefficient of thermal expansion in all layers provide for minimized sintering deformation and high fitting accuracy.

EASY CARVING

One of the practical benefits of using KATANA™ Zirconia is the fact that it is perfectly suitable for carving. Lucas Andvik states: “Carving is easier with KATANA™ Zirconia than with other materials. It is even possible to go close to the margins without increasing the fracture risk. Other materials seem to be much less dense and softer, which may result in marginal fractures. Carving is really a feature that transformed our inhouse production procedure and contributes to great outcomes.” Espen Rørstad and Egil Berg agree that carving feels great with this material, while the former also stresses that the overall aesthetics when using the carving technique are very well received by partners from dental offices.

OPTIMAL RESULTS

A procedure known as a critical step in the production procedure is sintering. Virtually every leading manufacturer of high-translucency zirconium oxide advises users to calibrate furnaces and check the achieved temperatures on a regular basis to provide for optimal outcomes. The actual sintering protocols recommended for each material, however, are very different. Kuraray Noritake Dental Inc. offers three sintering programmes valid for all four materials of the KATANA™ Zirconia Multi-Layered series: The standard seven-hour programme is available for all kinds of prostheses, while the high-speed 54-minute and 90-minute programmes are suitable for restorations with up to three units. For KATANA™ Zirconia Blocks, even 18-minute sintering is possible. Lucas Andvik uses the seven-hour programme for over-night sintering of all large restorations, and speed sintering for single-tooth restorations and small bridgeworks during the day. With his new furnace, he simply adopted the recommended protocols. Espen Rørstad modified the protocols slightly for his furnace and regards speed sintering as a great option for rush cases. Egil Berg prefers over-night sintering. He reports: “It is really important to have a high-quality, modern furnace, calibrate it regularly and follow the manufacturer's instructions. My recommendation for everyone experiencing issues is to pay extra attention to warming up and cooling down properly. That way, you achieve the highest possible strength and aesthetics, including an absolutely smooth transition between the different layers in the blank.”



MICRO-LAYERING: A GAME CHANGER FOR FINISHING

In all three dental laboratories, the integration of KATANA™ Zirconia has led to a shift towards higher-efficiency finishing approaches. Espen Rørstad reports: "The switch to KATANA™ Zirconia enabled us to increase the amount of monolithic and micro cut-back zirconium oxide restorations from around 40 to 80 percent. In the anterior area, we use a minimal vestibular cutback and micro-layering, while the restorations are purely monolithic and only minimally pre-coloured in the posterior area. Classical layering is only delivered on special request." Egil Berg states: "We completely stopped using traditional porcelain layering approaches and prefer micro-layering instead – especially in combination with KATANA™ Zirconia YML. The aesthetic outcomes are so good that a cosmetic dentist recently called me and asked if I had used lithium disilicate instead of zirconia." Lucas Andvik also likes to add a little bit of porcelain: "We moved away from a full cutback to micro-layering approaches, using the same porcelain system for lithium disilicate and zirconium oxide," he says. In subgingival areas, he often just polishes the restorations for highest biocompatibility, a concept that is very well received by dental practitioners.

HAPPY WITH THE RESULTS?

Egil Berg concludes: "Once you have implemented the workflow and set all parameters, working with KATANA™ Zirconia is really great. My staff likes its handling during carving, the efficient workflows and predictable results. Although sometimes the product may be more expensive than other brands' zirconium oxide, the total economy is a lot better: We do no longer face any issues with fractures and remakes, and due to the homogeneous material structure, the service life of our milling tools is extended, while, at the same time, the edge stability of the milled restorations is increased. The blanks are so homogeneous that I am able to sinter long-span restorations without a lateral support!"

The conclusion of Lucas Andvik is similarly good: "everyone in my laboratory working with KATANA™ Zirconia is more than satisfied. My co-founder, Katharina, has tested many different materials on behalf of notable manufacturers and has never seen anything that compares to KATANA™. All the technicians that work with KATANA™ here consider it to the most versatile and aesthetic we have ever utilized. I think that all four variants are super nice to work with. My personal recommendation is to attend one of the courses offered by Kuraray Noritake Dental Inc. The instructors are super knowledgeable and we got a completely new conception of zirconium oxide as well as practical advice that was really useful for our daily work."

"The blanks are so homogeneous that I am able to sinter long-span restorations without a lateral support!"

Egil Berg

Espen Rørstad is sure that "in terms of aesthetics, KATANA™ Zirconia is the best zirconium oxide tested, and I really tested a lot in the past decades! I am happy with the material, the interaction with the Kuraray Noritake Dental team and the support offered. My team is also happy with the material, but even more important is the positive feedback of my customers: One of them requested a specific zirconium all the time, and when we switched, we did not tell him immediately. Now he knows and is very happy with what he gets." Espen is sure that economically, KATANA™ Zirconia YML is even able to compete with cheap zirconium oxide brands, as the production procedure is much more efficient and the results are predictable.

Switching zirconium oxide materials is a significant investment in both time and resources, but for many dental laboratories, the results speak for themselves. The experiences shared by these Norwegian technicians demonstrate that KATANA™ Zirconia offers a balance of aesthetics, strength, and efficiency. While adapting to new workflows takes effort, the improved outcomes, fewer remakes, and enhanced handling make the transition worthwhile. For those considering the switch, thorough testing and training are key to a smooth and successful integration.

Practical implementation tips:

- Review and adjust milling, sintering, and finishing protocols to match the manufacturer's recommendations.
- Train technicians on best practices for positioning restorations within the blank to provide for strength and aesthetics.
- Optimise material selection for different cases
- Regularly calibrate sintering furnaces and check temperature accuracy to avoid issues like fractures or compromised aesthetics.
- Work closely with the supplier for technical support and guidance when setting up new workflows.

PURE CONTROL

MASTERING AESTHETIC HARMONY IN COMPLEX REHABILITATIONS

Achieving true aesthetic harmony in modern all-ceramic restorations remains a demanding task. The challenge intensifies when combining zirconia and lithium disilicate within a single case – a common scenario in complex rehabilitations. Differences in optical behaviour, translucency, and light reflectance require more than intuition; they demand a structured approach.

This article by Andreas Chatzimpatzakis, MDT, introduces a clear, three-step evaluation process focused on Value, Chroma, and Shape. Using it enables precise control over micro-layered restorations. Discover how to simplify complexity, optimize material interaction, and achieve consistent, high-end aesthetic results with confidence.

CASE EXAMPLE

Fig. 1: Initial situation. A young very demanding patient with a missing lateral incisor has had orthodontic treatment to create the appropriate space for the prosthetic restoration.



Fig. 2: The result following orthodontic treatment and periodontal therapy.



Fig. 3: Final result: a combination of lithium disilicate veneers and zirconia bridge

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CERABIEN™ MiLai: BAKING SCHEDULE BY NONDAS VLACHOPOULOS

OPTIMIZING AESTHETIC
AND MECHANICAL
PROPERTIES

BY MDT NONDAS VLACHOPOULOS



A homogeneous porcelain structure, a strong bond between framework and veneering layer and a natural play of colours: All those characteristics of a high-quality all-ceramic restoration are not only strongly dependent on manual skills of the dental technician, but also on ideal firing conditions.

Only with a well maintained and properly functioning furnace and the right protocols, it is possible to obtain consistently great results in terms of aesthetics and function.

This is true for all kinds of all-ceramic restorations consisting of a framework and a veneering layer: It applies to full layering with a classical anatomical framework design and a relatively thick layer of porcelain, as well as to various cut-back designs finished using the modern micro-layering technique. A material that belongs to the latter category of porcelains and is becoming increasingly popular among dental technicians worldwide is CERABIEN™ MiLai (Kuraray Noritake Dental Inc.). The set of low-fusing porcelains and internal stains has been specifically developed for micro-layering, and works well with different variants of lithium disilicate and zirconia.

While the firing parameters provided by manufacturers like Kuraray Noritake Dental serve as useful and thoroughly tested guidelines, experienced technicians often explore beyond these standards to achieve the highest possible aesthetic and functional outcomes. This is precisely what MDT Nondas Vlachopoulos has

done with CERABIEN™ MiLai. A distinguished expert in porcelain layering, he uses this material in his own dental laboratory “AestheticLab” in Athens and during his trainings. Drawing on his deep understanding of ceramic behaviour and extensive experience with a variety of furnaces, he has developed a refined protocol tailored to his lab conditions and artistic goals.



CERABIEN™ MiLai Baking Schedule by MDT Nondas Vlachopoulos

	Dry-out Time	Predrying Temperature	Start Vacuum	Heat Rate	Vacuum Level	Release Vacuum	High Temperature	Hold Time in the Air	Cool Time
	min.	°C	°C	°C / min.	kPa	°C	°C	sec.	min.
Wash Bake	5	400	450	45	96	780	780	90	4
Internal Stain (on framework)	5	400	450	50	96	740-745	740-745	60	4
Internal Stain (on ceramic)	5	400	450	55	96	740-745	740-745	30	4
Liner/Enamel/Translucent/Luster/Clear Cervical	7	400	450	50	96	765-770	765-770	30	4
Minor Adjustment	5	400	450	50	96	760-765	760-765	20	4
Tissue	5	400	450	50	96	735-740	735-740	30	4
Self Glaze (not for tissue)	5	400	-	55	0	-	755-760	20	4
CERABIEN™ ZR / FC Paste Stain (for white only))	5	400	-	55	0	-	750-755	20	4
CERABIEN™ ZR / FC Paste Stain (for white and tissue*)	5	400	-	60	0	-	740-745	20	4

*No glaze material on tissue, only on white ceramic.

“...getting started with the new schedule is easy: “Just follow the IFU of your materials and equipment, enter the parameters and that’s it.”

His adjustments – such as overbaking the wash layer for structural homogeneity, adding vacuum during internal staining to avoid opacity, or fine-tuning temperatures depending on the ceramic zone (tissue vs. enamel) – are all examples of how small changes can lead to noticeable improvements in both aesthetics and function. Such expert refinements are only possible due to the exceptional flexibility of CERABIEN™ MiLai, enabled by its unique synthetic feldspar matrix. This advanced material composition offers excellent thermal stability and responsiveness, making it ideal for both standard use and high-level customization. Several leading technicians, including Alek Aronin, have independently followed similar approaches – confirming that Nondas’ schedule reflects a broader best practice among top users.

The above baking schedule has been validated on the furnaces Nondas Vlachopoulos uses in his laboratory on a daily basis – AUSTROMAT™ 624 (Dekema) and checked also in Programat® P510 (Ivoclar Vivadent). He truly

recommends using this baking schedule independent of the ambient conditions and the furnace used: “As a hands-on course instructor at the International Dental Exhibition and Conference (IDEX) Istanbul 2025 on May 9, I used a local furnace for the first time. With the aid of my protocols, baking CERABIEN™ MiLai restorations in this type of furnace the outcome was as if have been fired my laboratory.”

According to Nondas Vlachopoulos, getting started with the new schedule is easy: “Just follow the IFU of your materials and equipment, enter the parameters and that’s it.” He recommends to conduct a trial bake first, before moving on to real patient cases.

For more information on how to maximize the potential of your furnace and material, have a look at our firing guide!



About the author

Nondas Vlachopoulos was born in Toronto, Canada, and graduated from the School of Dental Technology in 1985. He earned a BSc (Hons) from the Technological Educational Institution of Athens in 1989 and founded *AestheticLab* in Athens in 1990.

An expert in aesthetic all-ceramic and implant restorations, Nondas is an international member of the American Academy of Cosmetic Dentistry, an editorial reviewer for the *Journal of the AACD*, and a member of the Hellenic Academy of Esthetic Dentistry.

In 2024, he received the Kenneth D. Rudd Award from the American Prosthodontic Society.

He collaborates with the Department of Prosthodontics at the Eastman Institute for Oral Health (University of Rochester, USA), and has worked with the Dental School of the National and Kapodistrian University of Athens. Since 2015, he contributes to the postgraduate MSc program in Dental Biomaterials.

Nondas is a global lecturer and hands-on educator, presenting in the USA, South America, Europe, Asia, Australia, and the Middle East. He has published in both Greek and international dental journals and serves as an opinion leader for Noritake Dental and MPF Brush Co. in Greece.



ZIRCONIA CLASSIFICATIONS:

HOW KATANA™ Zirconia ALIGNS WITH ISO 6872

Dentistry is evolving fast, and so are the expectations of patients and dentists. Nowadays, most dental practitioners know that different zirconia variants are available and that there are certain quality standards the selected material should meet to provide for aesthetic, functional and durable outcomes. Consequently, they often demand the use of a specific zirconia variant for their planned restorations.

Due to the widespread use of Tosoh zirconia in the market, however, many of these dentists are only familiar with the Tosoh 3Y / 4Y / 5Y zirconia terminology. This means that when prescribing a specific type of zirconia, they mention the desired yttria concentration. Unfortunately, this can create confusion in communication between dentists and dental laboratories: Not every zirconia brand and variant on the market fits into this Tosoh classification system.

KATANA™ Zirconia discs of Kuraray Noritake Dental Inc. are made of proprietary powders and advanced multi-layered technology developed in-house. The unique performance these blanks deliver cannot be simply described with the aid of the Tosoh system. Instead, **we rely on the internationally recognized ISO 6872 classification** – a standard that reflects clinical indications and material performance with precision.

WHY THE ISO 6872 CLASSIFICATION MATTERS

Unlike brand-specific powder classifications, ISO 6872 provides a clear, scientific, and globally accepted framework. Using this common framework means that when a dentist prescribes a solution, or a technician selects a material, everyone speaks the same language – based on strength, translucency, and indication range.

KATANA™ Zirconia Disc	ISO 6872 Class	Clinical indications	Comparable market language*
UTML	Class 3	Veneers, inlays/onlays, anterior crowns, short anterior bridges	Often associated with “5Y”
STML	Class 4	Single crowns, 3-unit bridges (including posterior)	Often associated with “4Y”
YML	Class 5	Single units to long-span bridges (gradient strenght/tranlucency)	Mix of “3Y/4Y”
HTML PLUS	Class 6	From single crowns up te full-arch frameworkt	Often associated with “3Y”

CONCLUSION

KATANA™ Zirconia is an advanced dental zirconia family that does not fit into standard boxes like 3Y, 4Y, or 5Y. It redefines what zirconia can do – blending beauty and strength with a scientifically validated ISO classification system. By embracing globally defined and accepted ISO 6872, we can contribute to peace of mind and eliminate confusion in the market.

*This column is included only to help translate the daily language of dentists and some dental technicians.



MEETING HIGH FUNCTIONAL AND AESTHETIC DEMANDS

WITH ALL-CERAMIC CONCEPTS

In prosthodontics, assessing the individual needs and expectations of every patient is a crucial factor on the road to success. When it comes to producing fixed dental prostheses, the art is in tailoring the material combination, framework design and finishing concept precisely to the case-specific functional and aesthetic demands. In this context, the availability of high-performance evaluation tools and the freedom to choose between different variants of high-strength ceramics is worth gold.

**CASE BY DT TOMAS FOREJTEK, FOREJTEK DENTAL LAB
AND DR LADISLAV GREGOR, SORRISO DENTAL CLINIC**



CASE EXAMPLE

Take the case of a middle-aged female patient: She presented with very unsatisfactory metal-ceramic crowns (Fig. 1) and asked for an aesthetic improvement of the situation. The crowns on her maxillary central incisors and the right lateral incisor clearly needed to be replaced not only for aesthetic, but also for functional reasons. As anterior interferences were present and orthodontic treatment was not an option, the decision was made to select a ceramic material

with a particularly high strength – KATANA™ Zirconia HT (Kuraray Noritake Dental Inc.) – and to opt for a design that would support the incisal edge with zirconia.

Consequently, porcelain layering (with CERABIEN™ ZR, Kuraray Noritake Dental Inc.) would be limited to the vestibular region. The laboratory procedure – including shade determination and reproduction with the aid of the eLAB® shade matching system* – is illustrated in Figures 2 to 9.

Fig. 1: Initial clinical situation



Fig. 2: Situation after removal of the existing crowns and preparation of the tooth structure for the planned all-ceramic restorations

* The eLAB® system is a registered trademark of Sascha Hein. It is an independent tool for dental shade determination and communication and is not developed or distributed by Kuraray Noritake Dental Inc.



Fig. 3: Shade determination with the eLAB® system

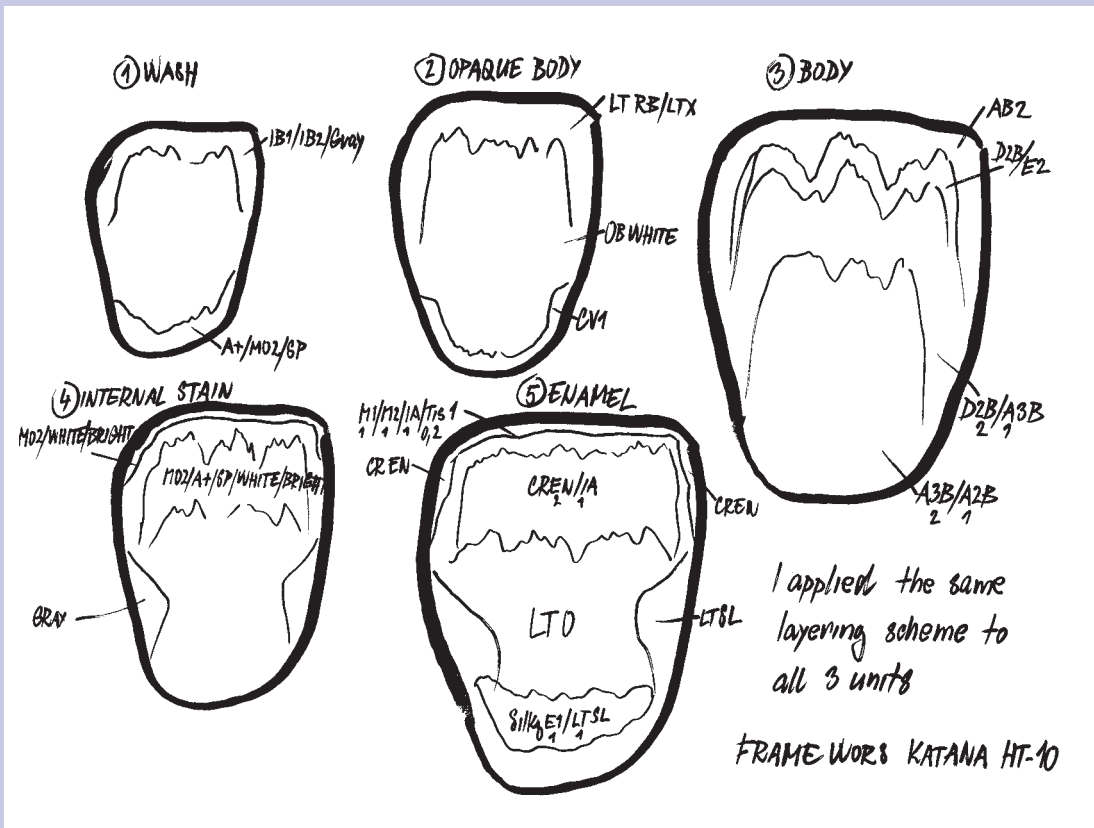


Fig. 4: Layering map for the use of CERABIEN™ ZR on all three crowns



Fig. 5: Layering procedure: Shade verification



Fig. 6: Try-in of the crowns to assess the fit and the shade match



Fig. 7: Palatal view of the crowns on the model



Fig. 8: Frontal view of the crowns on the model: A natural surface texture is obtained



Fig. 9: Natural look of the restorations

THE RESULTS



Fig. 10: Crowns after adhesive cementation with PANAVIA™ V5 (Kuraray Noritake Dental Inc.)



Fig. 11: Aesthetic treatment outcome

The key to success: Individual approach, high-quality materials

The present case is a perfect example of an aesthetically and functionally challenging situation that needed an individual treatment approach. By taking into account the patient- and case-specific requirements and using our material-related knowledge wisely, it was possible to develop an adequate treatment plan. High-quality materials and a smartly selected design concept lay the foundation for long-term success. Valuable tools used during porcelain layering (specifically the eLAB® system) – on the other hand – paved the way for a precise reproduction of the patient's tooth shade, despite the challenging individual aesthetics: The crowns were delivered on the first attempt.



Tomas Forejtek

Tomas Forejtek is a dental technician based in Brno, Czech Republic. After graduating top of his class in 2001, he joined a prestigious private clinic where he developed a strong focus on ceramic restorations. Within three years, he became certified in fixed prosthetics and was appointed head of the dental lab. Known for his intuitive and hands-on approach, Tomas enhanced his skills through both local and international training, drawing key inspiration from mentors such as Sascha Hein and Naoto Yuasa. In 2010, he opened his own lab in Brno, specializing in high-quality, esthetic restorations. Since 2016, he has focused on single central cases using the eLAB protocol and became an official eLAB instructor in 2018.



Ladislav Gregor

Ladislav Gregor is a prosthodontist at Sorriso Dental Clinic in Brno, Czech Republic. A Masaryk University graduate (2005), he later served at the University of Geneva and earned both a Dr. Med. Dent. (Geneva) and a Ph.D. (ACTA Amsterdam). He has published extensively in adhesive and reconstructive dentistry, lectures internationally, is a certified CADE member, and serves on the Scientific Council of the Czech Dental Chamber.



NATURE STYLE:

OBSERVE. UNDERSTAND. COPY.

INTERVIEW WITH GHAITH ALOUSI, DT

He inspires dental technicians with his passion and creativity as a course instructor, and with Nature Style, he has developed a well-conceived concept for the creation of lifelike anterior restorations. We are talking about Ghaith Alousi, a dental technician based in Wiesbaden, Germany. While course participants usually attend his training courses eager to learn from his experience and technical knowledge, they often return to their laboratories bursting with positive energy, truly inspired and deeply motivated to break new ground.

Ghaith Alousi, what is the dental technician's primary mission?

In my eyes, dental technicians are not artists; rather, their primary mission is to replicate nature – both functionally and aesthetically. Every tooth, like every patient, is as unique as a fingerprint. To recreate a natural tooth as accurately as possible, we must listen, observe, and understand. To truly perceive the details that matter, however, we need to know where to focus our attention. In my opinion, the three golden keys to anterior aesthetics are paramount: balanced translucency and opacity, morphology, and surface texture.

What about colour?

While colour is undoubtedly a crucial aspect, I believe it is often overemphasized. Many dental technicians focused on aesthetic anterior restorations find themselves preoccupied solely with colour. However, natural teeth – the model we aim to replicate – embody far more than just a blend of hues.

First and foremost, we must understand how light interacts with teeth. They diffuse light in a unique manner, with different layers of enamel and dentin each possessing distinct optical properties. Additionally, the individual shape and surface texture of a tooth

significantly affect the perceived attractiveness of a patient's smile and overall facial appearance. Therefore, I have learned to prioritize these elements, observing nature closely and striving to comprehend what I see before embarking on the replication process.

Let us take a brief look at each of the three golden keys, starting with the light-optical properties.

To truly grasp how light interacts with natural teeth, we must first examine their structure. Natural teeth consist of various layers, each displaying unique light-optical behaviours, with enamel and dentin being the most significant. Upon closely observing the dentin core of a tooth, we realize it is not only responsible for the tooth's fundamental colour but also exhibits distinct opacity – it does not transmit light; instead, it reflects and absorbs it. In contrast, enamel presents a different scenario: its thickness varies with factors such as the patient's age, but it is consistently highly translucent. This translucency allows a portion of light to pass through, with only a minimal amount reflected or absorbed. Once we have a solid understanding of the natural light dynamics inherent in a patient's teeth, the next step is to replicate these characteristics using selected materials. Thus, comprehending the light-optical properties of available materials, choosing them wisely, and applying them effectively are crucial milestones on the path to success.

What about morphology?

I firmly believe that mastering morphology – the replication of natural tooth shapes – can significantly impact a dental technician's work. The growing popularity of carving workshops in Japan and other parts of the world reinforces this idea. Aspiring technicians avoid using standard dental libraries that produce generic smiles for their patients. Rather than traveling long distances to attend workshops and build our own mental library of tooth shapes, we can explore the intricacies of form and shape right in our dental laboratories through careful observation and consistent practice. Some technicians capture images of the teeth they encounter, while others concentrate on their own teeth or those of colleagues and patients. This approach allows for the replication of shapes using materials like wax or ceramics. By honing our observation and replication skills, we expand our personal knowledge base. This commitment to detail fosters true mastery – a continuous journey toward perfection.

Fig. 1: Light-optical properties of natural teeth imitated with KATANA™ Zirconia YML, Esthetic Colorant and CERABIEN™ ZR porcelain (Kuraray Noritake Dental Inc.)





Fig. 2: Example of a natural surface texture reproduced with CERABIEN™ MiLai and different diamond burs, stones and rubber polishers

Is surface texture similarly important?

Absolutely. The surface texture of a restoration, even more than its hue, must precisely match that of surrounding or opposing teeth to achieve a natural appearance. To accomplish this, we must understand and replicate the intricate interplay of micro- and macrot textures that create a tooth's natural look. Macrot texture encompasses the tooth's overall surface characteristics, including varying concavities, convexities, line angles, and vertical V-shaped grooves. In contrast, microtexture focuses on finer details, such as growth lines (striae of Retzius), perikymata, small grooves, and the degree of surface gloss. A keen eye is essential to replicate every surface detail harmoniously so that light interacts optimally, creating reflections, shadows, and highlights exactly where they are needed.

How do you practice?

To practice replicating surface texture and morphology, I typically start with enlarged model teeth, first using wax and later transitioning to my preferred dental materials and instruments. The increased size of the working base allows for easier detection, reproduction, and assessment of relevant morphology and surface details compared to original-sized tooth forms. This enlargement also facilitates the evaluation of light-optical properties. For the final assessment, I often apply silver or gold powder to the surface of the model tooth, which highlights even the finest surface nuances. This method makes it easy to identify areas that are well-executed and those that may need improvement.

Once I achieve a high level of quality with the enlarged model teeth, I transfer the acquired skills to real-life applications by working with actual-sized teeth. This practice framework allows me to continuously

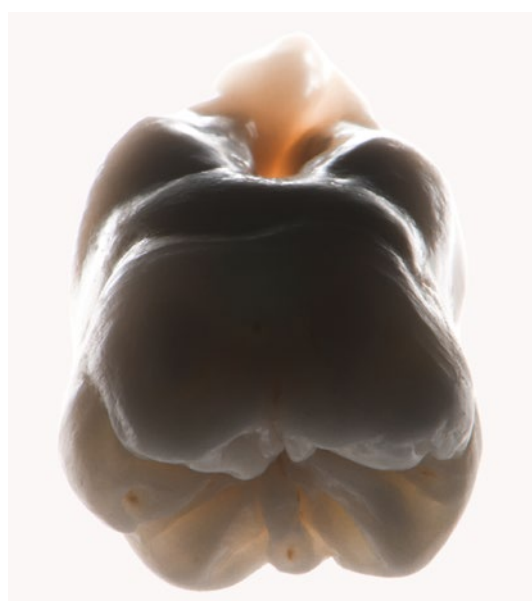


Fig. 3 Large tooth created with CERABIEN™ ZR



Fig. 4: Gold powder applied to anterior restorations ...



Fig. 5: ... to evaluate their shape and surface texture

enhance my basic skills. Moreover, each time I start working with a new instrument or material, this approach streamlines the initial learning curve, quickly elevating my performance to a high standard.

What are your preferred material combinations for different indications / needs?

For cases with the highest aesthetic demands, CERABIEN™ ZR (Kuraray Noritake Dental Inc.) is my favourite porcelain system. This system can be utilized either as a standalone solution for producing veneers using the refractory die technique or in conjunction with a zirconia framework – typically crafted from KATANA™ Zirconia variants such as KATANA™ Zirconia UTML, STML, HTML Plus, or YML (also from Kuraray Noritake Dental Inc.) – in a full layering approach.

I frequently employ this combination to produce single crowns in the anterior region, selecting the framework material based on the colour of the underlying tooth structure and the appearance of adjacent teeth.

An alternative approach is layering with CERABIEN™ MiLai, which consists of internal stains and porcelains compatible with zirconia and lithium disilicate. I prefer to combine this system with the previously mentioned zirconia variants or with lithium disilicate, predominantly using the porcelain to replicate enamel. Sometimes, I employ the system's internal stains to enhance the result with natural colour effects.



Fig. 6: Full layering approach with CERABIEN™ ZR on a KATANA™ Zirconia YML framework

Apart from observing closely, selecting appropriate materials and copying carefully, are there any additional factors decisive for great treatment outcomes from the technician's point of view?

To my mind, there are two additional essential factors: Proper interaction and communication within the restorative team and personal interaction with the patient. Especially in cases with the highest aesthetic demands, meeting a patient in person is very important. They are usually invited to visit the dental laboratory twice, prior to treatment planning and for try-in. Nothing can replace personal interaction with them and a genuine impression of the initial situation. After all, we need to give them a sense of security and build trust, while analysing their character, facial characteristics, skin colour and more allows us to produce perfectly matching restorations.

And the restorative team?

We share a common goal: to fulfil the desires of our patients. I firmly believe that achieving this requires a united effort from the entire team. Collaboration hinges on appreciative and open communication at all levels and demands absolute honesty. Furthermore, everyone involved must be committed to continuously developing their skills.

I hold high expectations not only for my own work but also for the contributions of each dentist in our team. After all, their work forms the foundation of what I do. For example, when a dentist invests in an intraoral scanner and starts providing digital records, it is my responsibility to verify whether the quality of those scans meets our high standards. If I notice that the quality could be improved, I approach the situation with respect, offering constructive feedback and guidance to help them deliver quality scans consistently. This is crucial, as high-quality scans are the prerequisite for creating outstanding restorations.

In my experience, most dental practitioners appreciate this kind of honest and supportive communication. It creates an environment where we can all grow and evolve together.

Do you have any additional comments?

Be authentic, strive for excellence, and approach each day as an exhilarating opportunity. Courage plays a vital role, too – the readiness to venture beyond your usual routines, such as experimenting with different shades to discover new possibilities, fosters growth. Even if the outcome does not meet your expectations, there is valuable insight to gain from the experience that can guide you in the future. To reach new horizons, be open to exploring uncharted paths.

Ghaith Alousi, born in 1994, successfully completed his training as a master dental technician in 2013 in Damascus, Syria, where he gained initial experience in a dental laboratory. From 2014 to 2016, he worked independently in Damascus, using his craftsmanship to produce ceramic work such as frameworks, veneers, crowns and bridges, and implant-based restorations. He also engaged in shade determination, photography, and CAD/CAM technology.

He came to Germany in 2016 and quickly felt at home. Through further education, he has continuously expanded his knowledge and skills and is currently working as a dental technician in Wiesbaden. To achieve the best possible results, Ghaith Alousi places great value on collaboration with dentists and personal contact with patients.



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