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FINISHING AND POLISHING SOLUTION
FOR COMPOSITES AND 3D-PRINTED RESINS

Foto By Dr. Daniel Rosa

The Importance of Finishing in Modern Dentistry

A surface roughness of less than 0.2 µm may contribute to bacterial retention and supports clinical longevity.[1]

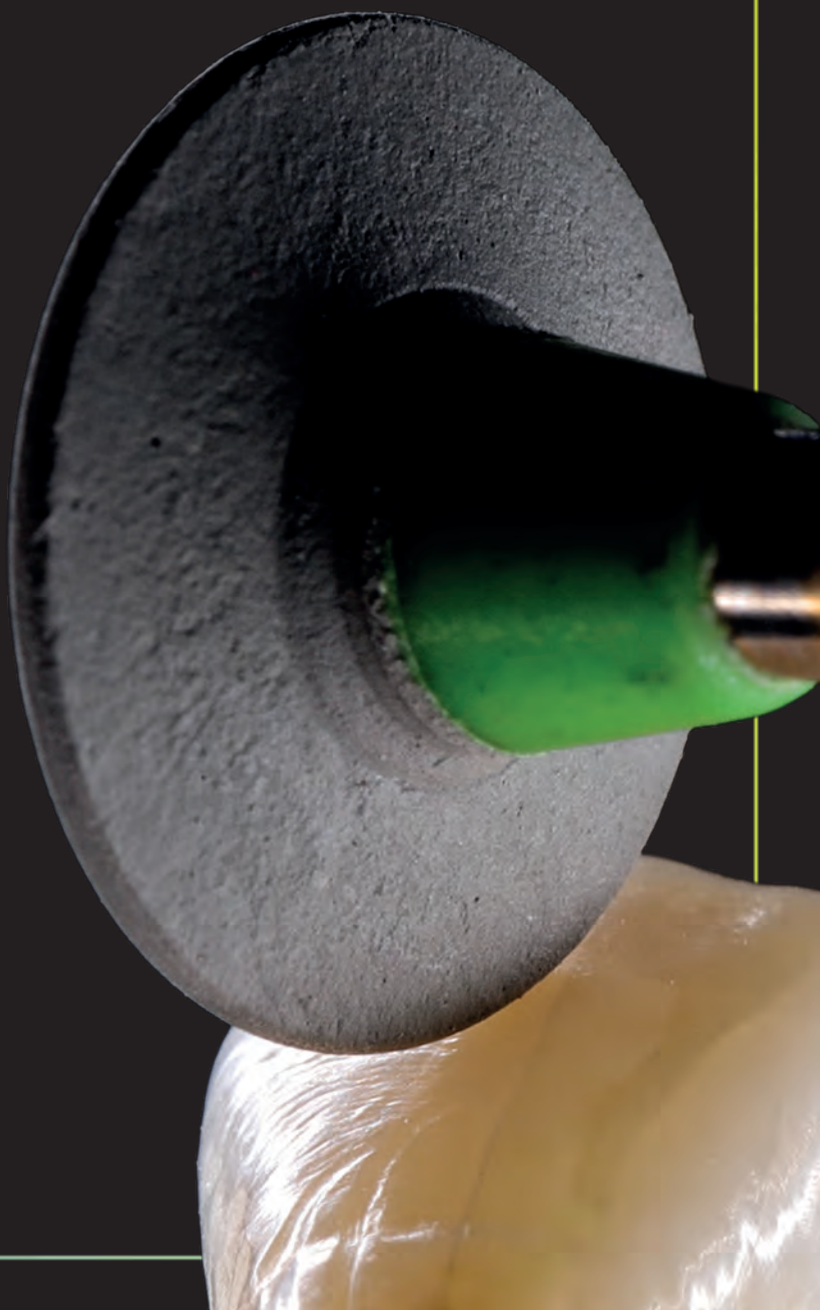
The finishing and polishing of composite restorations is not just a matter of aesthetics. It is a fundamental part of:

Biocompatibility: a smooth surface reduces bacterial adhesion.

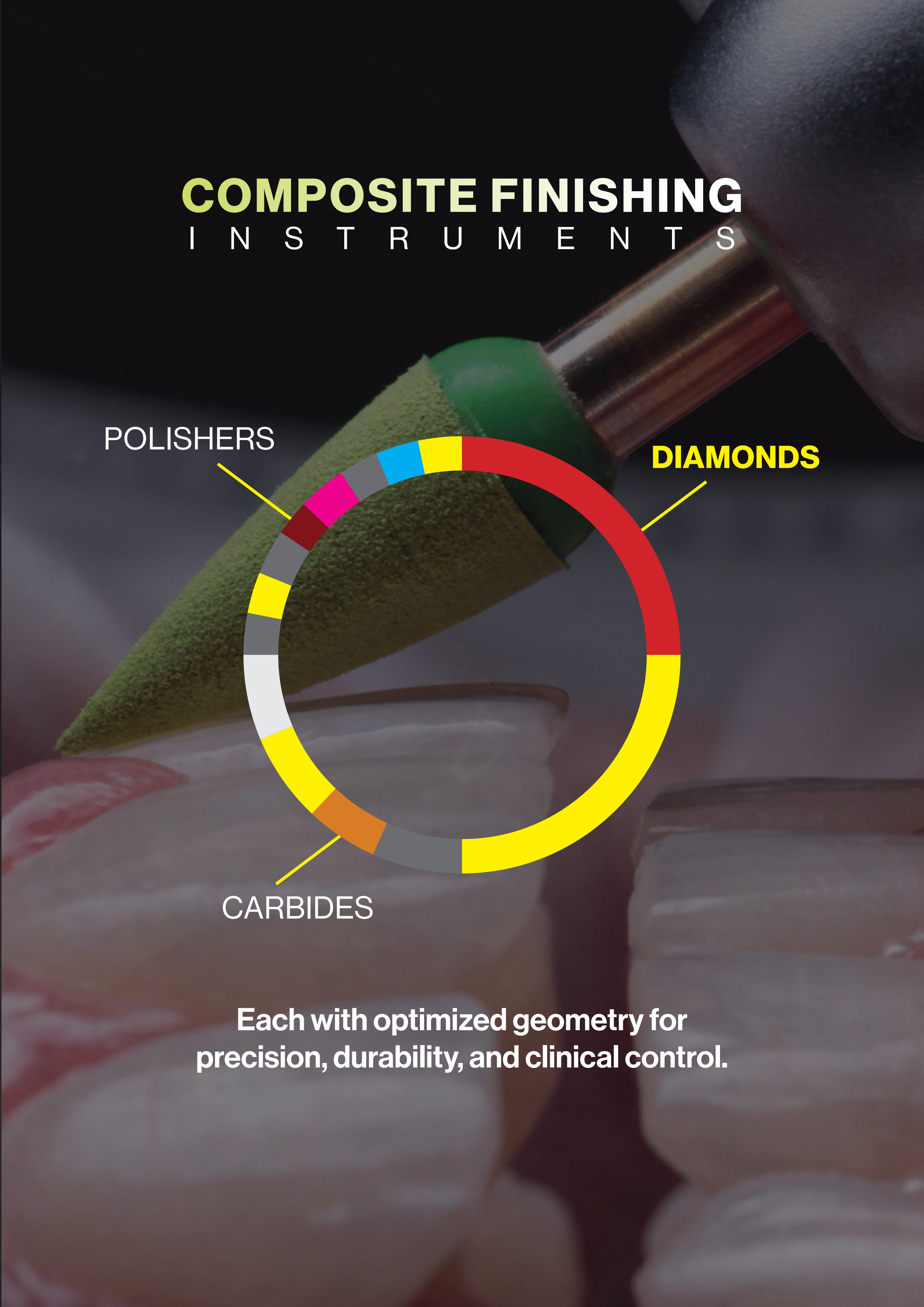
Durability: Proper finishing supports reducing abrasion and marginal wear.

Aesthetics: Polished surfaces can achieve a surface texture and gloss similar to natural enamel.

"A well-finished surface contributes to long-term clinical performance and patient satisfaction."



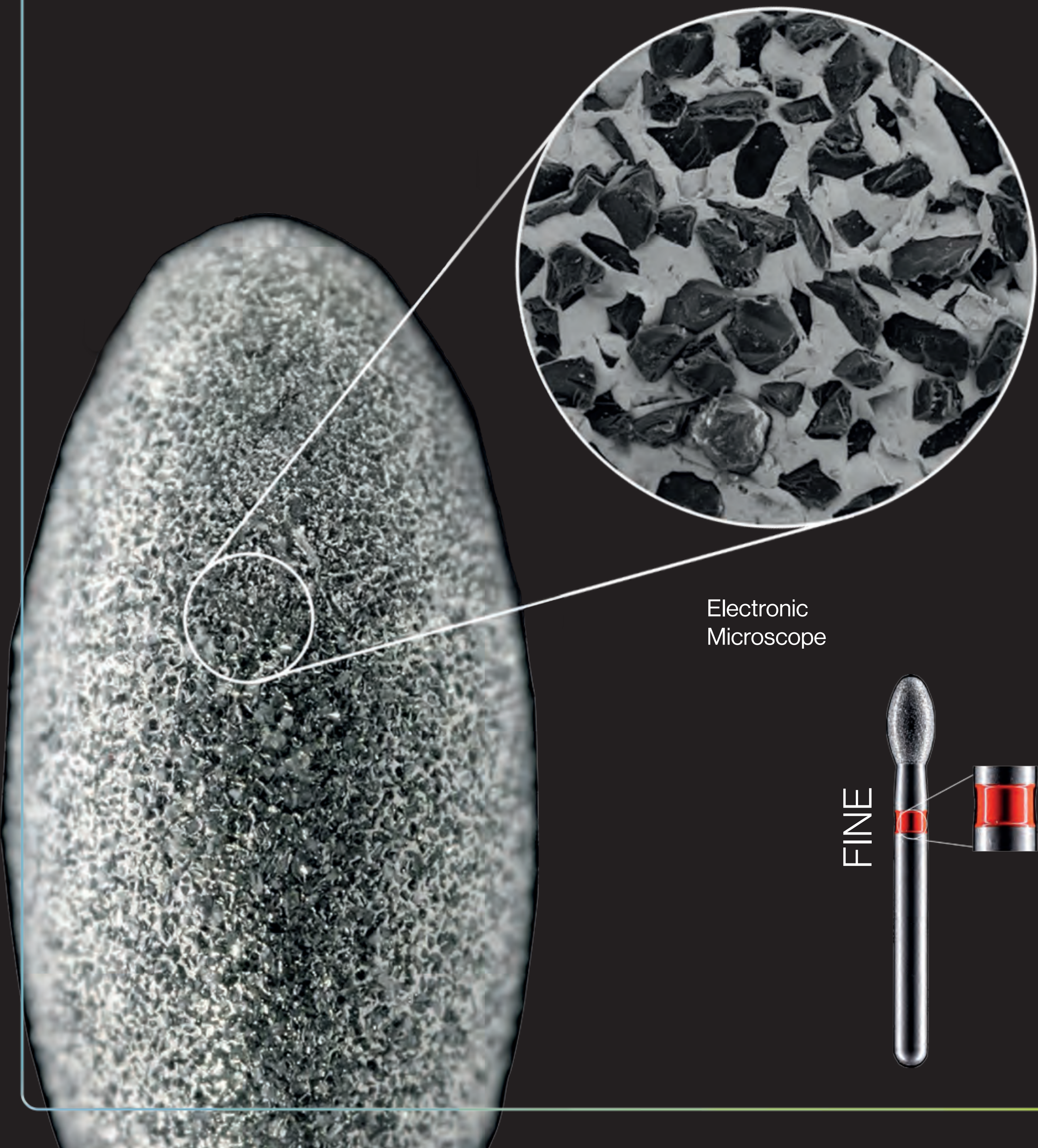
[1] Jaramillo-Cartagena, R.; López-Galeano, E.J.; Latorre-Correa, F.; Agudelo-Suárez, A.A. Effect of Polishing Systems on the Surface Roughness of Nano-Hybrid and Nano-Filling Composite Resins: A Systematic Review. Dent. J. 2021, 9, 95.


COMPOSITE FINISHING
INSTRUMENTS
POLISHERS
DIAMONDS
CARBIDES
Each with optimized geometry for
precision, durability, and clinical control.

Diamonds

RED RING

38 - 45 micrometers



RED RING

38 - 45 micrometers

Those Diamond burs are shaped especially for anatomical contouring of different tooth surfaces, both anterior and posterior.

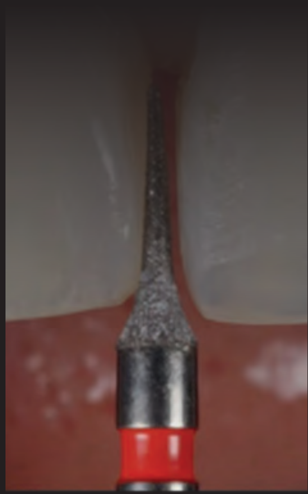
They support the shaping of occlusal profiles, the controlled removal of excess material in interdental areas, and the contouring of vestibular surfaces of restorations. Proper finishing and polishing can support an aesthetic appearance comparable to natural dentition.

CLINICAL APPLICATIONS

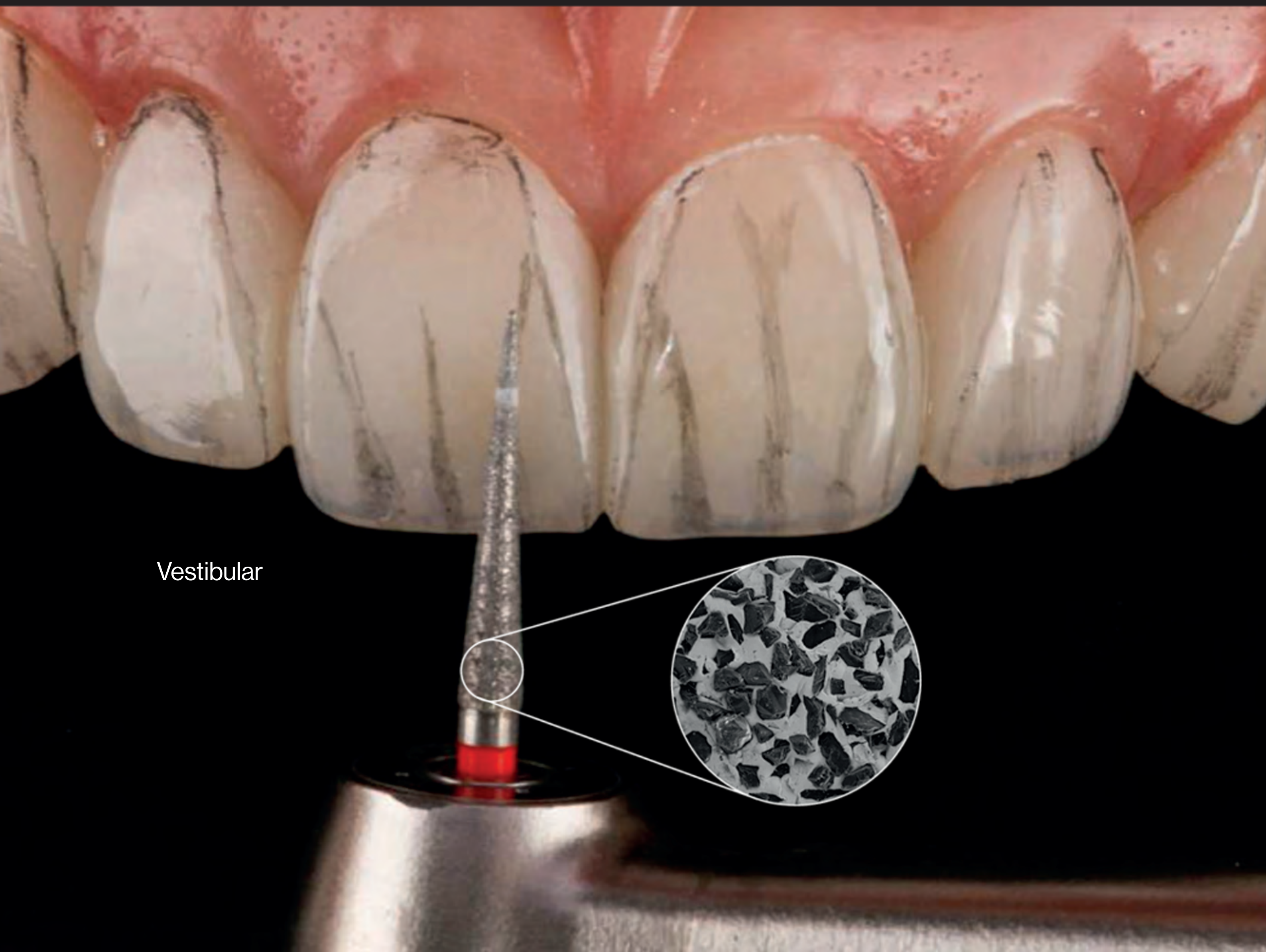
JOTA manufactured diamond burs made from natural diamond grit, designed for efficient material removal and long-term performance under appropriate conditions.
Red Diamonds are recommended for contouring.

Anatomical

Palatal



Interproximal



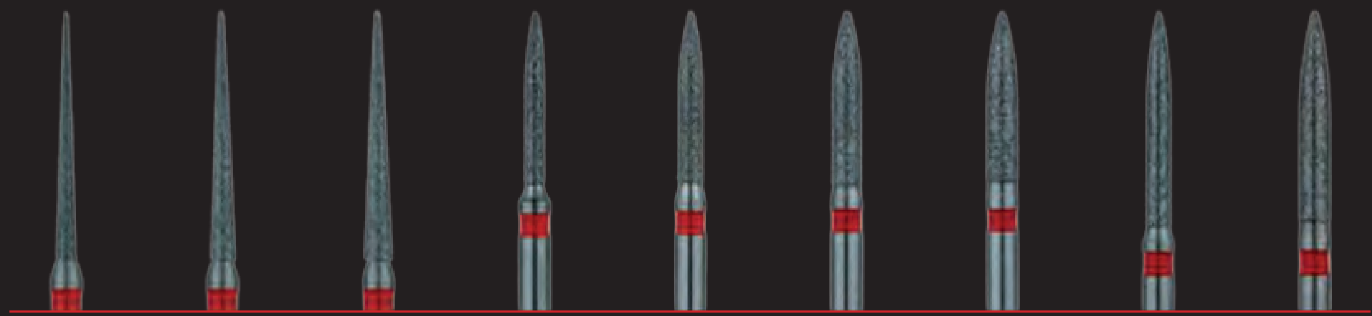
Vestibular

Diamonds

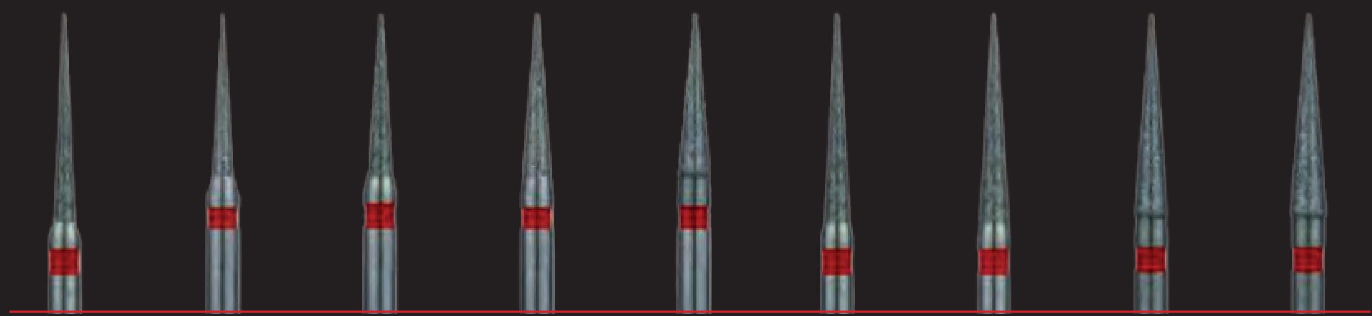
RED RING

38 - 45 micrometers

Vestibular and straight surfaces



859 LF.FG.010	859LF.FG.012	859LF.FG.014	862F.FG.010	862F.FG.012	862F.FG.014	862F.FG.016	863F.FG.012	863F.FG.016
806314167514010	806314167514012	806314167514014	806314249514010	806314249514012	806314249514014	806314249514016	806314250514012	806314250514016
L=12.0 mm	L=12.0 mm	L=12.0 mm	L=8.0 mm	L=8.0 mm	L=8.0 mm	L=8.0 mm	L=10.0 mm	L=10.0 mm



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806314165514010	806314165514012	806314165514014	806314165514016	806314166514018	806314166514010	806314166514012	806314166514014	806314166514016
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Occlusal, palatal and interproximal surfaces

811F.FG.033	829F.FG.027	830F.FG.016	830F.FG.018	830F.FG.021	830F.FG.023	525F.FG.012	525F.FG.017	526F.FG.023
806314038514033	806314463514027	806314257514016	806314257514018	806314257514021	806314257514023	806314525514012	806314525514017	806314526514023
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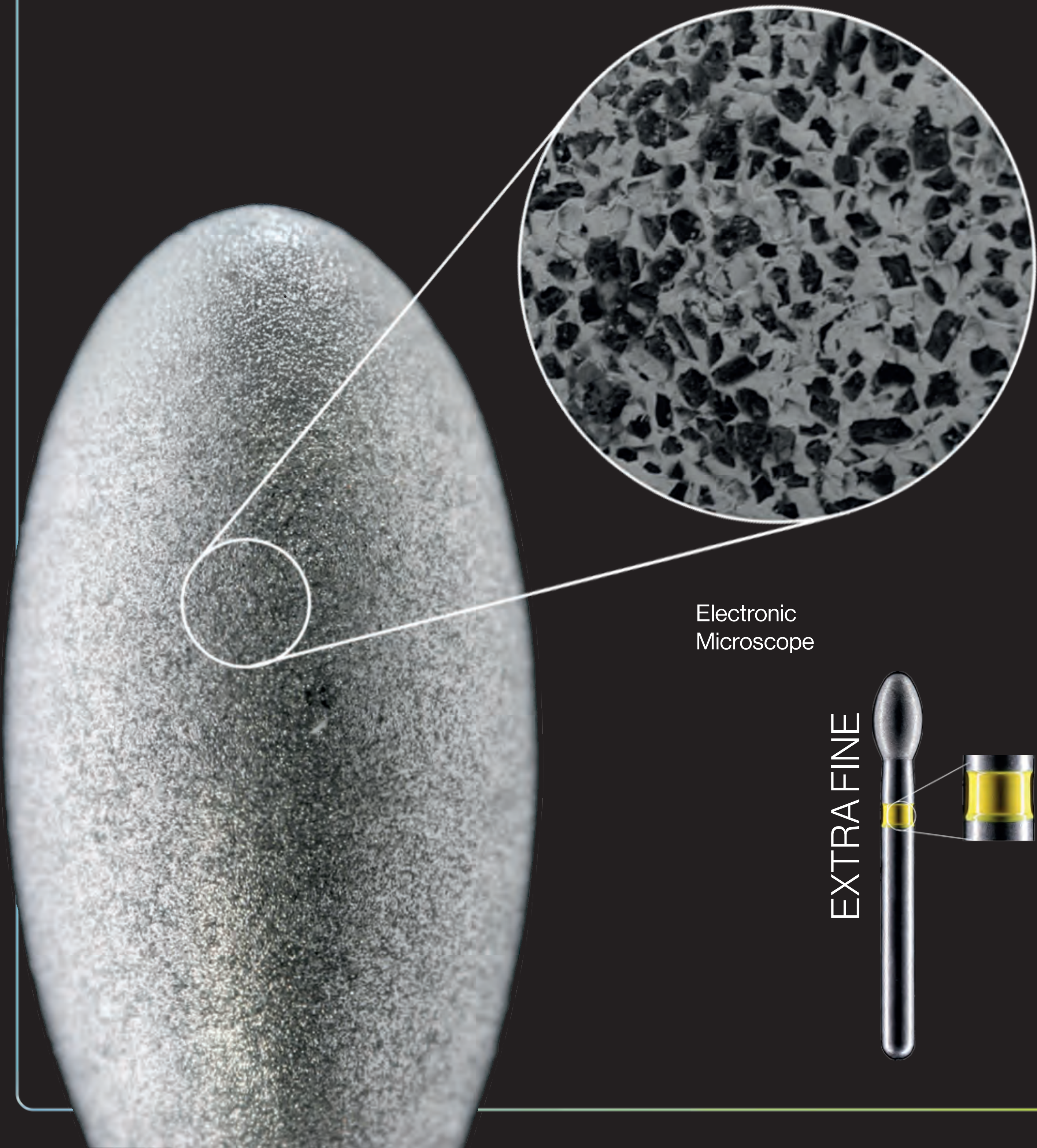
820F.FG.016	820F.FG.031	855LF.FG.007	855LF.FG.009	890F.FG.010	890LF.FG.008	895F.FG.016	898F.FG.012	898F.FG.014
806314465514016	806314465514031	806314195514007	806314195514009	806314160514010	806314699514008	806314274514016	806314164514012	806314164514014
L=5.0 mm	L=4.0 mm	L=5.0 mm	L=5.0 mm	L=4.0 mm	L=3.0 mm	L=3.5 mm	L=6.0 mm	L=6.0 mm

Diamonds
YELLOW RING

20 - 30 micrometers



CLINICAL APPLICATIONS

Extra Fine diamond burs are specially selected for the contouring and finishing composites and even 3D Printed resins always before the Pre-polisihing step.

EXTRA FINE

JOTA Extra-Fine diamond burs are designed for achieving an exceptional clinical finish in composite resin and 3D (CAD/CAM) resin restorations. With a natural grain size of approximately 20–30 µm precisely calibrated, they enable highly controlled micrometric cutting under appropriate conditions.

The homogeneous diamond distribution and stable cutting edges support increased durability, consistent cutting performance with reduced surface roughness.
Internal comparative evaluations indicate surface roughness values of approximately Ra 0.88 µm, supporting the creation of highly smooth surfaces and efficient final polishing.
The result is a refined surface texture that contributes to high-gloss restorations with reduced plaque adhesion and a natural tactile sensation during clinical exploration.

Key Performance Benefits:
Contributes to smoother surfaces with highly accurate anatomical contouring.
Helps reduce polishing time and enhanced esthetics.
Designed with natural diamond quality for reliable long-term performance.

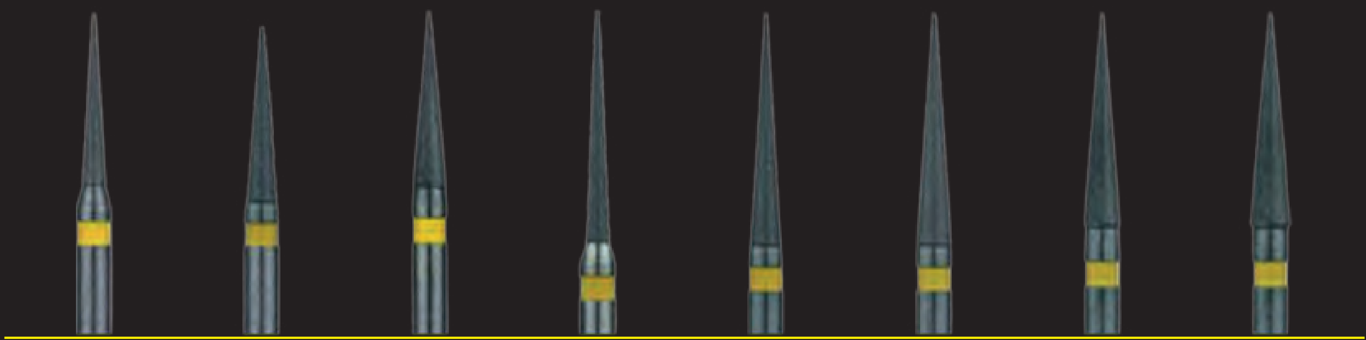
Diamonds

YELLOW RING

20 - 30 micrometers

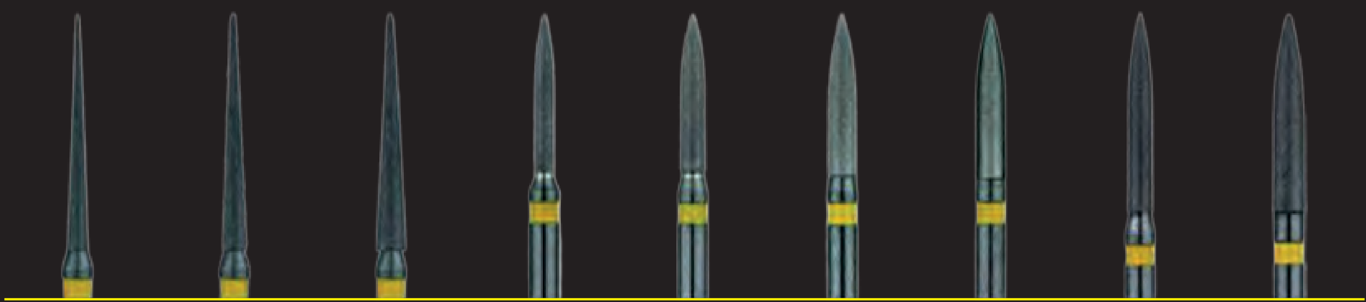
Vestibular and straight surfaces

858EF.FG.010	858EF.FG.012	858EF.FG.014	859EF.FG.010	859EF.FG.012	859EF.FG.014	859EF.FG.016	859EF.FG.018



806314165504010	806314165504012	806314165504014	806314166504010	806314166504012	806314166504014	806314166504016	806314166504018
L=8.0 mm	L=8.0 mm	L=8.0 mm	L=10.0 mm	L=10.0 mm	L=10.0 mm	L=10.0 mm	L=10.0 mm

859LEF.FG.010	859LEF.FG.012	859LEF.FG.014	862EF.FG.010	862EF.FG.012	862EF.FG.014	862EF.FG.016	863EF.FG.012	863EF.FG.016



806314167504010	806314167504012	806314167504014	806314249504010	806314249504012	806314249504014	806314249504016	806314250504012	806314250504016
L=12.0 mm	L=12.0 mm	L=12.0 mm	L=8.0 mm	L=8.0 mm	L=8.0 mm	L=8.0 mm	L=10.0 mm	L=10.0 mm

820EF.FG.014	820EF.FG.016	820EF.FG.031	827EF.FG.018	890EF.FG.010	890LEF.FG.008	895EF.FG.016	898EF.FG.014

806314465504014	806314465504016	806314465504031	806314464504018	806314160504010	806314699504008	806314274504016	806314164504014
L=5.0 mm	L=5.0 mm	L=4.0 mm	L=3.0 mm	L=4.0 mm	L=3.0 mm	L=3.5 mm	L=6.0 mm

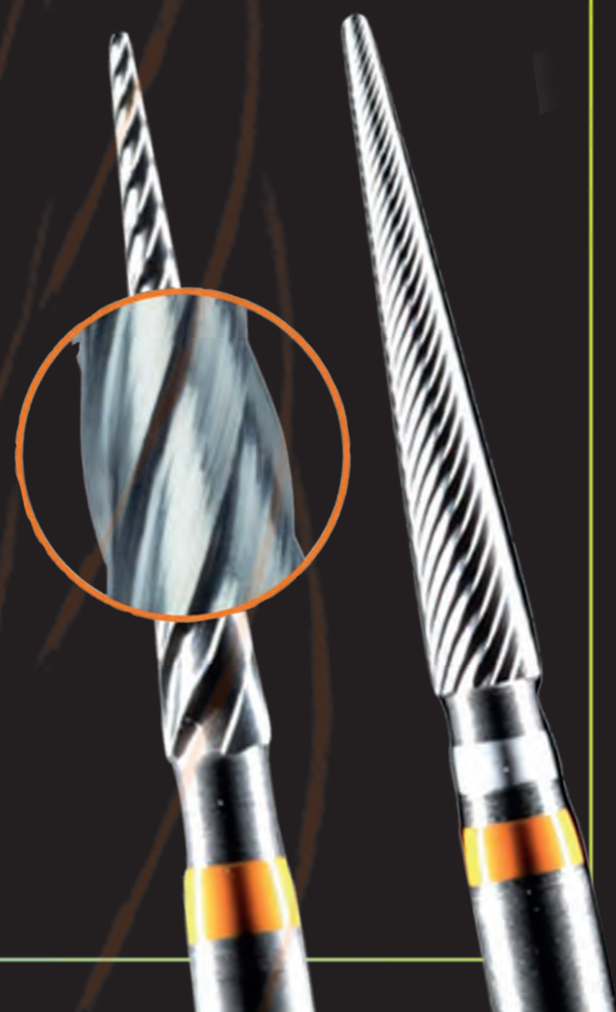
Occlusal, palatal and interproximal surfaces

830EF.FG.016	830EF.FG.018	830EF.FG.021	830EF.FG.023	525EF.FG.017	526EF.FG.023	893HEF.FG.023

806314257504016	806314257504018	806314257504021	806314257504023	806314525504017	806314526504023	806314707504023
L=4.5 mm	L=4.5 mm	L=5.0 mm	L=5.0 mm	L=4.0 mm	L=4.0 mm	L=7.6 mm

DRALL FINISHERS

The Geometry of the Perfect Finish

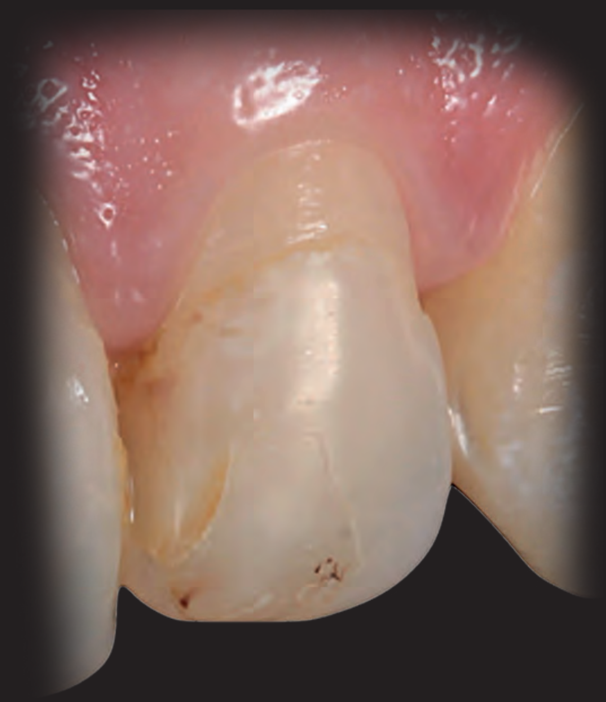


Drall Carbide Finishing Burs: Scientific Excellence in the Finishing of Composite Resins and 3D-Printed Materials

The Clinical Relevance of Finishing and Polishing in Restorative Dentistry

In modern restorative dentistry, finishing and polishing procedures play a key role in achieving high-quality clinical outcomes that go beyond aesthetic appearance alone. The surface quality of a composite resin restoration is an important factor influencing its durability and long-term performance in daily clinical use.

Insufficient finishing and polishing may negatively influence clinical outcomes and contribute to a range of biological and mechanical effects. These factors can affect both the long-term performance of the restoration and health of the surrounding tissues.Potential negative consequences may include:



Increased susceptibility to plaque accumulation:
adhesion and biofilm formation, which can be associated with an increased risk of periodontal irritation.

Potential for gingival irritation:
A rough surface at the restoration margin may contribute to chronic inflammation of the adjacent gingival tissues.

Increased risk of extrinsic stains:
may promote the adhesion of dietary pigments, which can affect color stability and the long-term aesthetic appearance of the restoration.

Increased susceptibility to secondary caries:
Plaque accumulation at the margins of insufficiently polished restorations may be associated with an increased likelihood of recurrent caries development.

Reduced durability and clinical performance:
Increased surface roughness may contribute to accelerated wear of the restoration and the opposing dentition, which can affect the durability of the treatment.

To mitigate these risks, it is imperative that the clinician understands the scientific parameters that define an optimal surface and selects the appropriate instruments to achieve it.

The success of a finishing procedure is not evaluated solely subjectively but is measured objectively through scientific parameters. The main indicator of surface quality is average surface roughness (Ra), defined as the arithmetical mean of all absolute distances of the profile within the measuring length. This value quantifies the microscopic irregularities (peaks and valleys) of a surface and is the gold standard for assessing the effectiveness of polishing systems.

From a biological perspective, surface roughness has a direct clinical implication on bacterial adhesion. Research has established a critical roughness threshold below which plaque retention does not significantly decrease. This surface roughness threshold for bacterial retention is 0.2 µm. Therefore, the goal of any finishing and polishing procedure is to achieve an Ra value as close as possible to or below this threshold to ensure long-term biocompatibility and periodontal health.

To clinically contextualize Ra values, surface roughness can be classified according to its condition. The following table details the most relevant roughness classes for restorative dentistry:

roughness class	rugosity Ra (µm)	Condition Surface
N1	0.025	Extremly fine, mirror-like finish. No visible marks.
N2	0.05	
N3	0.01	
N4	0.02	Equivalent to the biological threshold
N5	0.04	Very fine finish. Marks are not visible and are imperceptible to the touch.
N6	0.08	

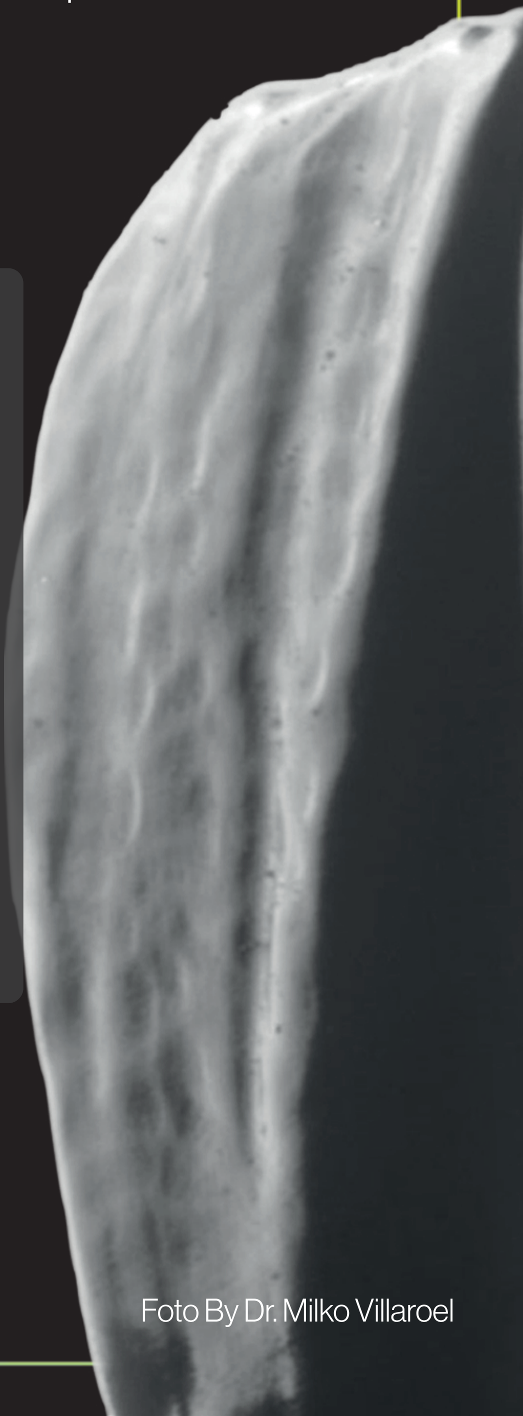
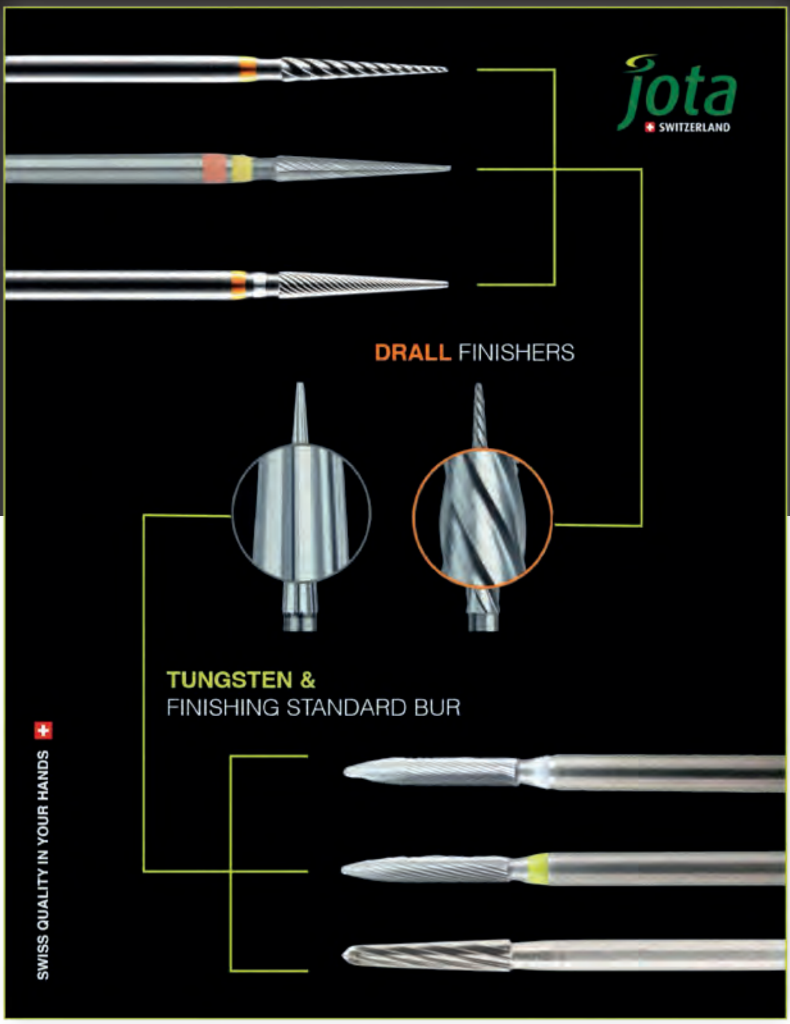
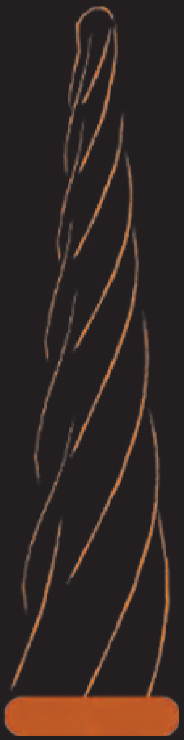


Foto By Dr. Milko Villaroel

In response to the need for superior finishing instruments, JOTA has developed the Drall Carbide Finishers, an innovative solution designed specifically for contouring and finishing composite resins. Their unique design is oriented toward overcoming the limitations of conventional finishing instruments, such as diamond or standard carbide burs, providing an exceptionally smooth surface prepared for final polishing.



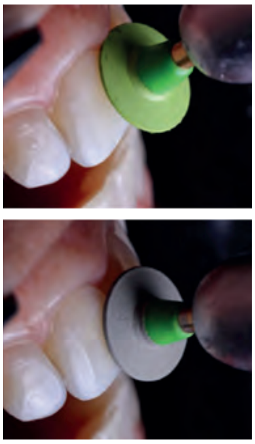
The distincitve features
of the Drall Finishers
transalte directly into superior
clinical performance.
Their design and composition
have been optimized to
achieve a high-precision finish
with maximum efficiency.



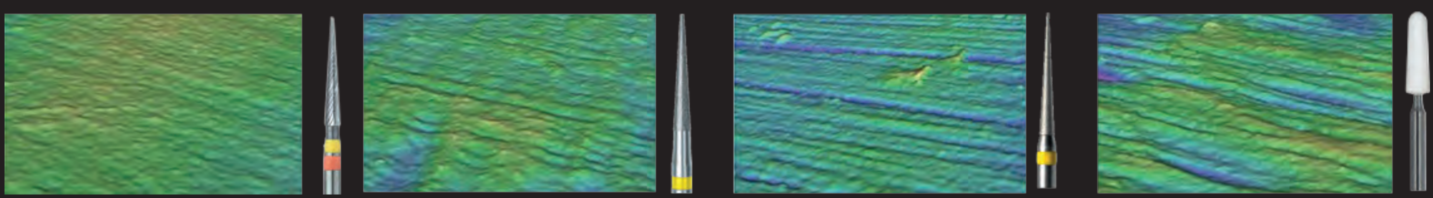
PRECISION GEOMETRIC HELICAL

Innovative Blade Design:
The flutes of the Drall Finishers have a unique design that ensures vibration-free operation. This stability allows for a much finer and more controlled cutting action than standard carbide burs, reducing the risk of creating deep scratches or damaging the restorative material.

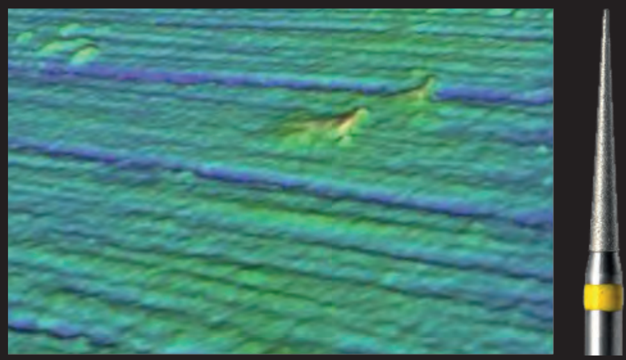
Extremely Smooth Surface:
Thanks to their optimized cutting geometry, these burs leave no perceptible marks on the composite surface. The result is a perfect and extremely smooth finish that significantly reduces the time required in the subsequent polishing stages.



Quantifiable Performance: The superior performance of the Drall Finishers can be measured objectively. These burs achieve an average surface roughness of Ra = 0.67 μm, a remarkably low value that places them among the elite of rotary finishing instruments.



This quantitative analysis reinforces the principle that the cutting action of carbide burs is superior for finishing resins. This is evidenced by observing that the Yellow Diamond Bur (Ra = 0.88 µm), acts by abrasion, generating significantly greater roughness than all carbide options.



Yellow Diamond Finishers RA=0.88 µm

Drall Carbide Finishers RA = 0.37 µm

The superior performance of Ra = 0.37 µm places the Drall Finishers in the N5 finishing class (“very fine”) , while other instruments such as the Yellow Carbide Finishers (0.6 µm) and the Arkansas Stone Finishers (0.7 µm), barely reach the N6 class, demonstrating a qualitative and quantitative difference in the final result.
This exceptional performance translates into direct clinical benefits not only for traditional composite resins but also for the emerging challenges presented by new 3D printing materials.

CLINICAL APPLICATIONS AND ADVANTAGES

The main objective when finishing a composite resin restoration is to achieve a smooth and homogeneous surface that mimics the texture of dental enamel. This is not only crucial for aesthetics but also for minimizing abrasion, preventing marginal microleakage, and reducing plaque accumulation. Carbide burs are ideal for this purpose because their mechanism of action is cutting, unlike diamond burs, which act by abrasion, which may generate more irregular scratch pattern on the composite surface.

KIT 1327

With a quantified performance of Ra = 0.37 µm, the Drall Finishers position themselves as a tool of excellence. "This value is classified within category N5, corresponding to a „very fine finish" with marks imperceptible to the touch.
Crucially, this result approaches the critical threshold of 0.2 µm, below which bacterial plaque retention does not increase.This makes the Drall Finishers an ideal option for preparing the restoration surface for final polishing, ensuring a more biocompatible and durable result.

Finishing 3D-printed materials presents a unique challenge due to the nature of their fabrication. The additive manufacturing process, which builds the object layer by layer, generates an inherent "stepwise effect" on the surface. The initial roughness of a printed piece is influenced by multiple factors, such as print orientation and layer thickness, making F&P procedures indispensable to achieving a clinically acceptable surface. The Drall Finishers instruments are ideal for achieving an optimal and predictable result on the complex surfaces of printed materials.

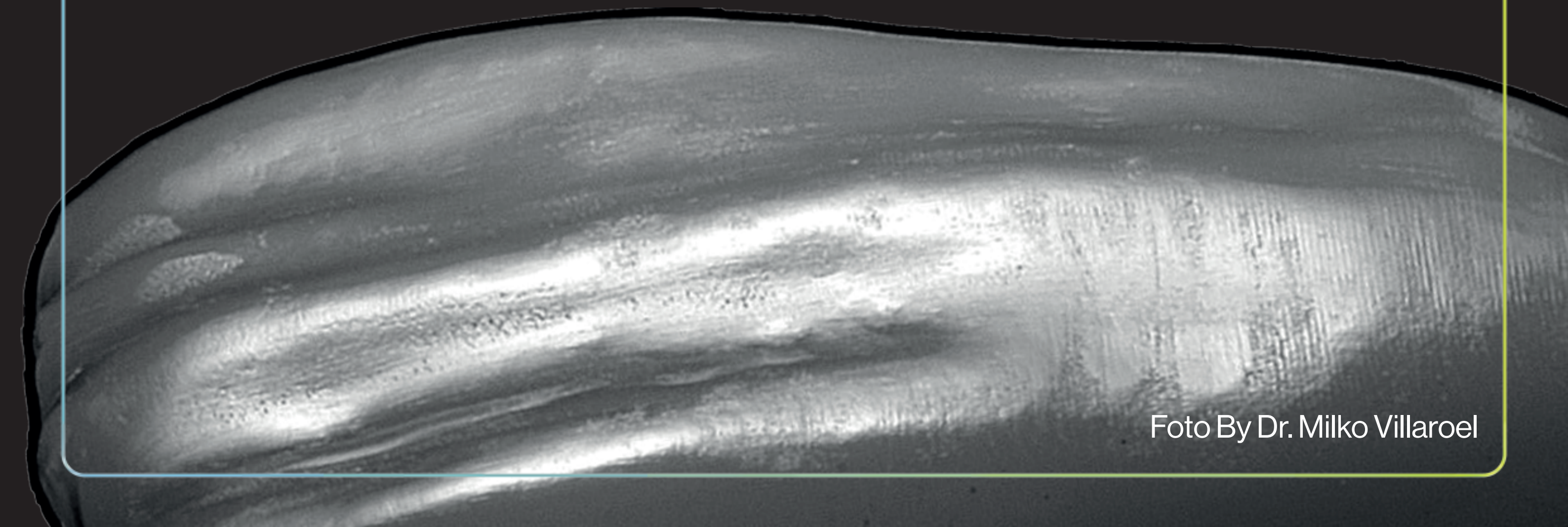


Foto By Dr. Milko Villaroel

Orange ring fine CD- 8-12 blades

Yellow/Orange ring extra fine CD-F 16-20 blades

White/Orange ring Ultra fine CD-U 30 blades

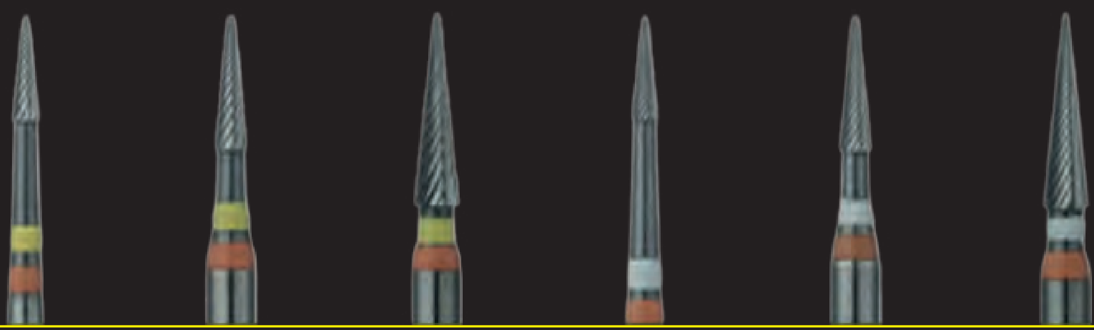
Vestibular and straight surfaces

CD135.FG.014	CD132.FG.008	CD133.FG.010	CD134.FG.014	CD135F.FG.014	CD135U.FG.014
500314166072014	500314699072008	500314159072010	500314164072014	500314166042014	500314166032014
L=9.0 mm	L=3.1 mm	L=4.2 mm	L=6.0 mm	L=9.0 mm	L=9.0 mm

Palatal and lingual surfaces

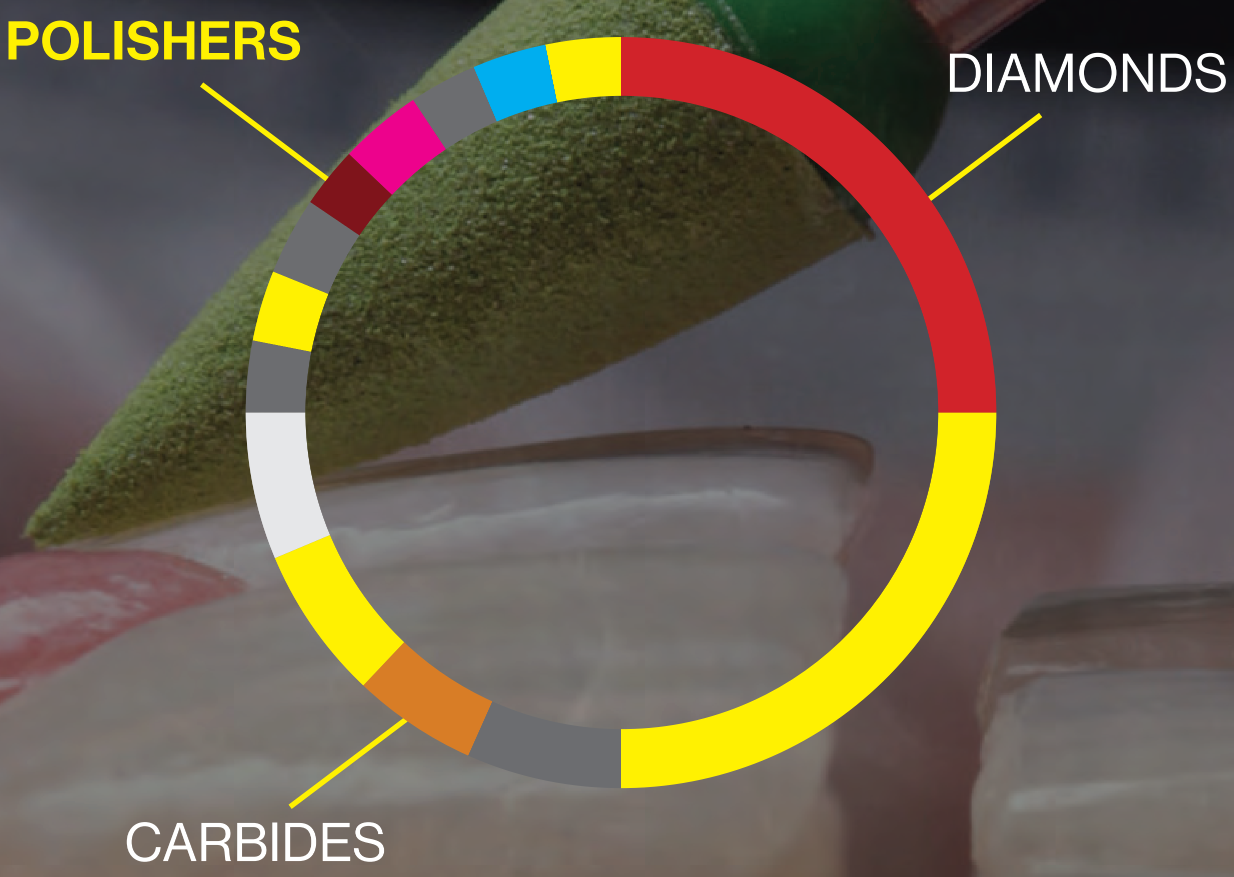
CD379.FG.018	CD379.FG.023	CD379F.FG.018	CD379F.FG.023	CD379U.FG.018	CD379U.FG.023
500314277972018	500314277972023	500314277942018	500314277942023	500314277932018	500314277932023
L=3.5 mm	L=4.2 mm	L=3.5 mm	L=4.2 mm	L=3.5 mm	L=4.2 mm

Occlusal and approximal surfaces



CD132F.FG.008	CD133F.FG.010	CD134F.FG.014	CD132U.FG.008	CD133U.FG.010	CD134U.FG.014
500314699042008	500314159042010	500314164042014	500314699032008	500314159032010	500314164032014
L=3.1 mm	L=4.2 mm	L=6.0 mm	L=3.1 mm	L=4.2 mm	L=6.0 mm

COMPOSITE FINISHING
INSTRUMENTS



Each with optimized geometry for precision, durability, and clinical control.

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DIAMOND POLISHERS VS SILICONE POLISHERS

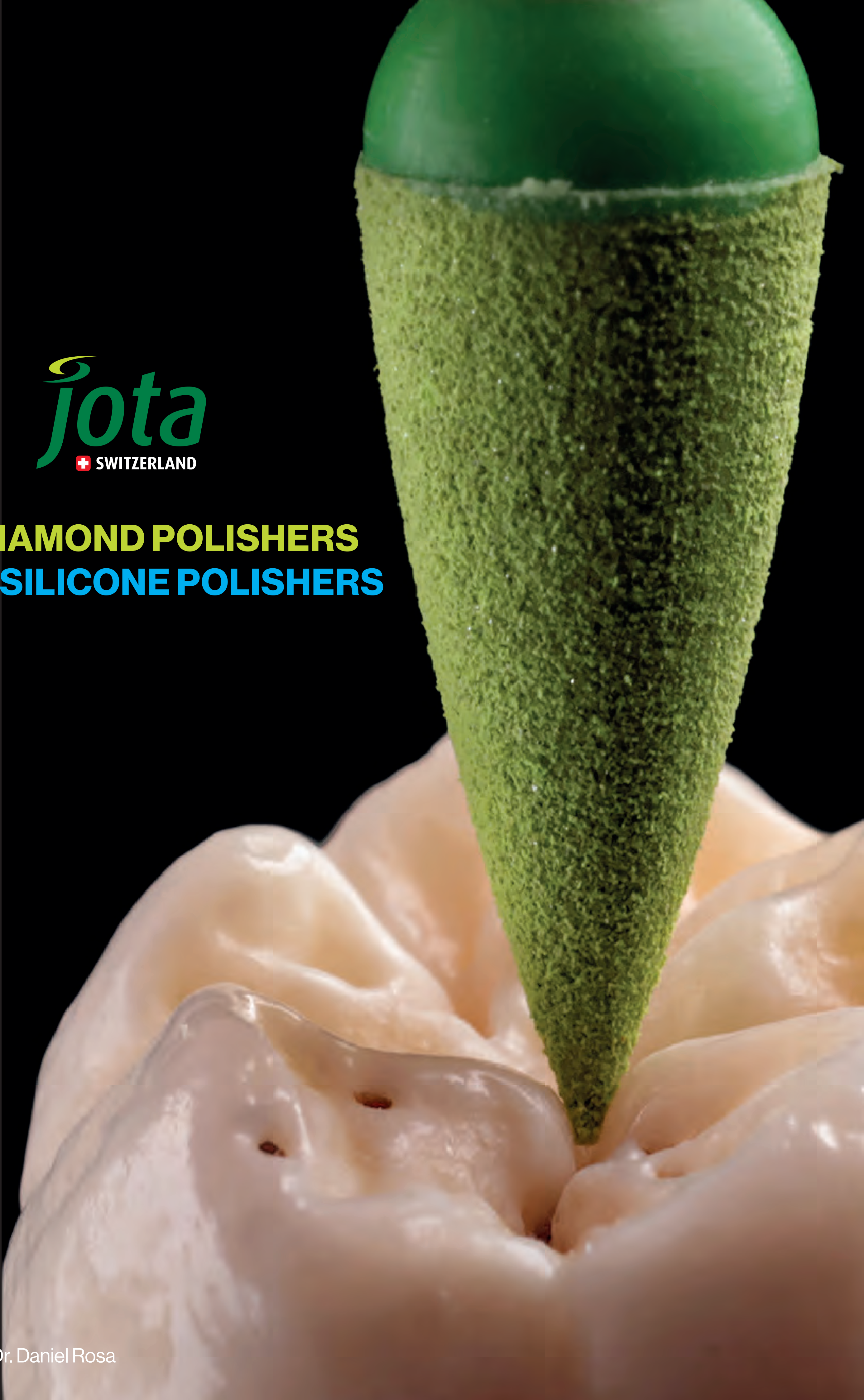

Foto By Dr. Daniel Rosa

PHYSICOCHEMICAL AND TRIBOLOGICAL PROPERTIES

Diamond polishers employ diamond abrasives with ultrafine particle sizes (1–6 μm), providing extremely high hardness (Mohs 10), markedly superior to that of composite resin (Mohs ~2–4). This hardness differential enables precise material removal through direct mechanical abrasion. In contrast, silicone polishers incorporate aluminum oxide grains (5–40 μm) embedded in an elastomeric matrix, favoring polishing through friction and controlled plastic deformation with reduced aggressiveness. From a tribological standpoint, diamond polishers tend to produce lower volumetric material loss but carry a higher risk of inducing microcracks within the organic matrix and filler particles, whereas silicone polishers better preserve the degree of conversion of the composite resin.

Foto By Dr. Daniel Rosa

DIAMOND POLISHERS

Abrasive:	Hardness:	Mechanism:
Ultrafine diamond	Very high (Mohs 10)	Direct mechanical abrasion

SILICONE POLISHERS

Abrasive:	Hardness:	Mechanism:
Aluminum oxide / silicon-based particles	Medium (Mohs ~9)	Elastic friction


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Diamond polishers for composite resin incorporate diamond particles within a rigid matrix, whereas silicone polishers use abrasives such as aluminum oxide or silicon carbide embedded in a flexible silicone matrix. These structural differences result in distinct effects on surface roughness (Ra), gloss, and wear behavior of composite resin restorations.
Foto By Dr. Daniel Rosa

PHYSICOCHEMICAL AND TRIBOLOGICAL PROPERTIES

Property	Diamond Polishers	Silicone Polishers
Type of abrasive	Ultrafine diamond	Aluminum oxide / silicon-based abrasives
Grain size / distribution	1–6 µm, uniform	5–40 µm, polydisperse
Relative hardness vs. composite resin	Very high (Mohs 10)	Medium (Mohs ~9)
Polishing Mechanism	High, direct abrasion	Moderate, elastic friction
Matrix flexibility	Low / rigid	High / elastic
Optimal operating speed	3,000–10,000 rpm	5,000–8,000 rpm

Data based on comparative experimental studies and surface characterization using AFM, SEM, and profilometry.

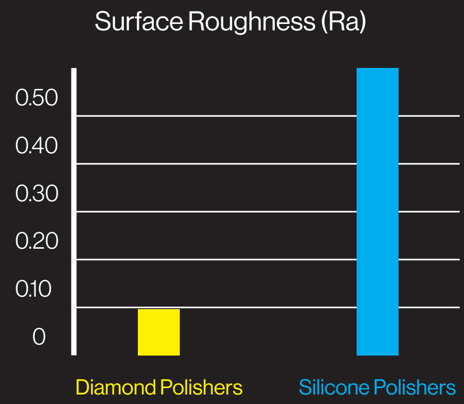
Foto By Dr. Daniel Rosa

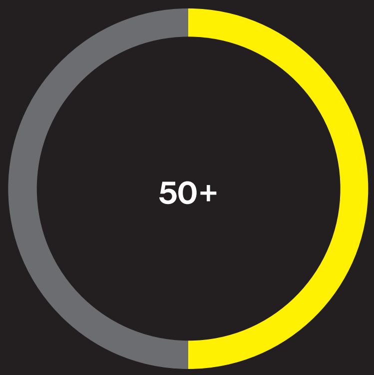
CLINICAL AND LABORATORY OUTCOMES

In vitro studies demonstrate that diamond polishers achieve a final surface roughness of Ra < 0.2 μm and gloss values exceeding 50 GU in nanofilled composite resins, outperforming conventional silicone polishers (Ra = 0.3–0.5 μm; gloss = 30–50 GU). JOTA diamond polishing systems exhibit reduced volumetric loss during finishing procedures (approximately 5–10% less), contributing to greater preservation of restorative material.

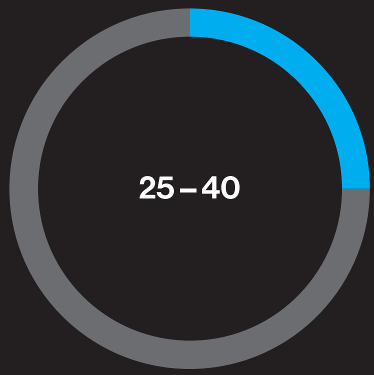
Conversely, JOTA silicone polishers with Swivel technology demonstrate superior control during the polishing phase, significantly reducing microcrack formation and enhancing anatomical adaptability in direct restorations. The flexible Swivel mounting allows the polisher to self-adjust to complex surface morphologies, minimizing excessive pressure and angulation errors.

Limited clinical trials suggest that diamond polishers may shorten operative time by 20–30%. However, silicone-based Swivel polishers show a lower susceptibility to early surface staining, supporting their use in the final polishing stages where surface integrity and long-term esthetics are critical.





Gloss – Diamond Polishers
Gloss units (GU)

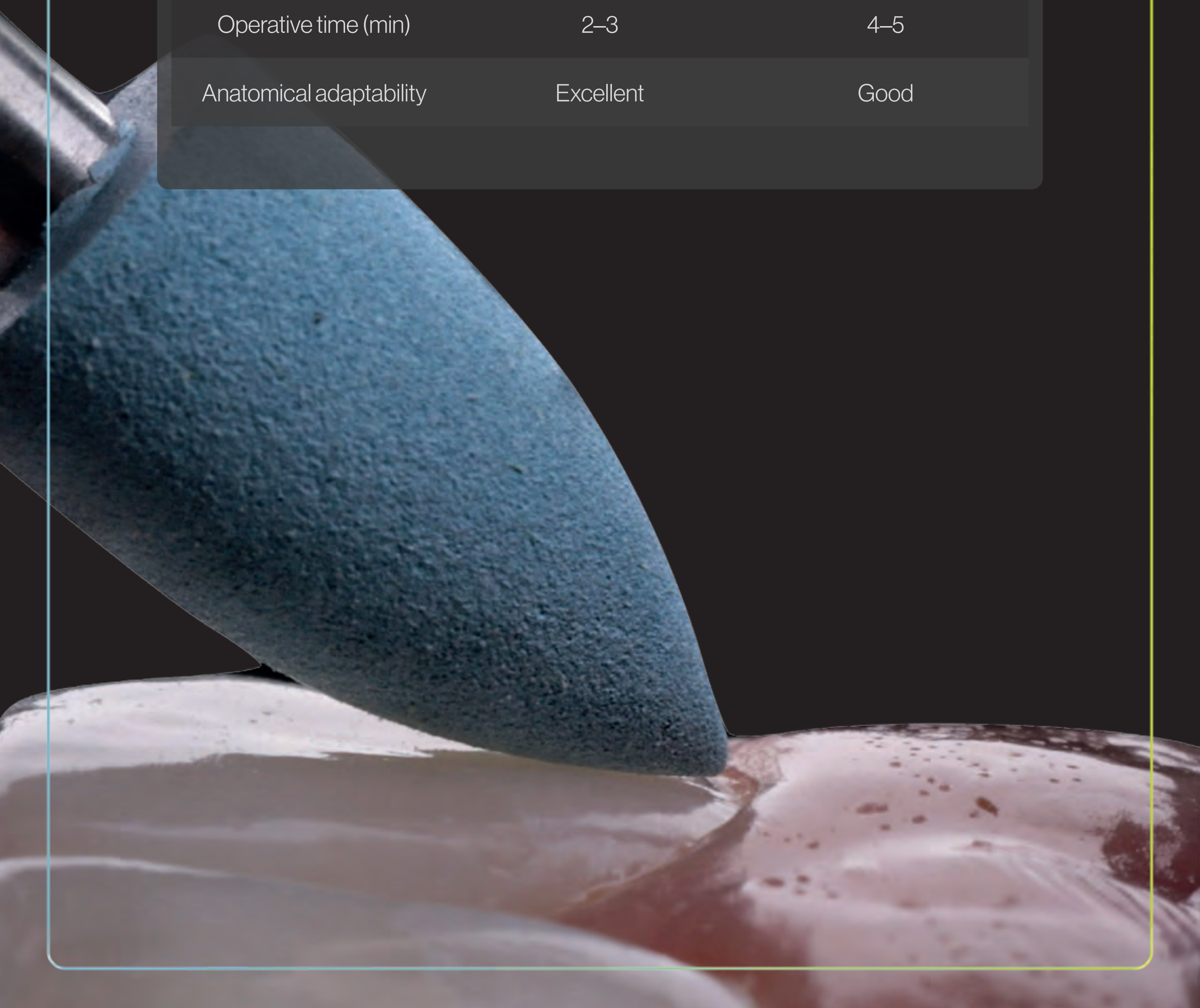


Gloss – Silicone Polishers
Gloss units (GU)

In dentistry, Gloss Units (GU) quantify the shininess of restorations, with values typically around 40-60 GU considered aesthetically acceptable, mimicking natural enamel. Measured by a glossmeter, higher GU means higher gloss, achieved by reducing surface roughness, which also helps prevent plaque buildup, staining, and inflammation for better long-term success of resin composites.

CLINICAL AND LABORATORY OUTCOMES

Parameter	Diamond Polishers	Silicone Polishers
Final surface roughness (Ra, µm)	0.1–0.2	0.3–0.5
Gloss (GU)	>50	25–40
Volumetric loss (%)	Low (5–10%)	Moderate (≈15%)
Operative time (min)	2–3	4–5
Anatomical adaptability	Excellent	Good



ADVANTAGES AND LIMITATIONS

DIAMOND POLISHERS

Advantages

- ✔ Superior surface smoothness (Ra = 0.08-0.15 um)
- ✔ Higher gloss levels (> 50 GU)
- ✔ Faster polishing protocols (2-3 steps)
- ✔ Reduced wear rate, scratch resistance
- ✔ Durability and stain resistance

SILICONE POLISHERS

Advantages

- ✔ Better adaptaton to curved surfaces
- ✔ Moderate gloss levels (25-40 GU)
- ✔ Longer-lasting shine after curing
- ✔ Minimal resin wear, easier sterilization
- ✔ Low heat generation, safe for margins

DIAMOND
POLWHERS

Prioritize tribological precision and immediate esthetic outcomes through hard abrasive mechanisms, making them well suited for high-demand oral rehabilitation procedures; however, they may compromise long-term structural integrity.

Foto By Dr. Daniel Rosa

SILICONE POLISHERS

In contrast, promote greater surface stability through gentler polishing mechanisms, reducing wear under clinical conditions. This distinction directly affects esthetic stability: diamond polishers achieve superior initial gloss (GU), whereas silicone polishers demonstrate better polish retention after material degradation.

Foto By Dr. Daniel Rosa

SCIENTIFIC CONCLUSION

Fundamental Difference

From a biomaterial's perspective:
Diamond polishers provide high-precision direct mechanical abrasion, whereas silicone polishers deliver controlled friction with greater structural preservation.

Clinical Implications

In oral rehabilitation:
The choice between systems depends on balancing immediate esthetic outcomes (diamond polishers) with long-term surface stability and material integrity (silicone polishers).

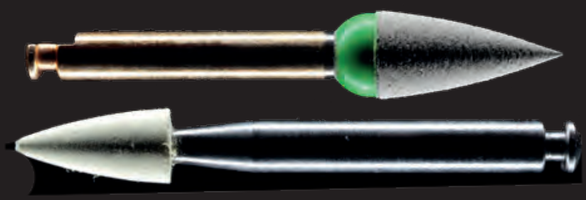
Esthetic Performance

Long term:
Silicone polishers better maintain surface integrity and stain resistance over time, despite providing lower initial gloss levels.

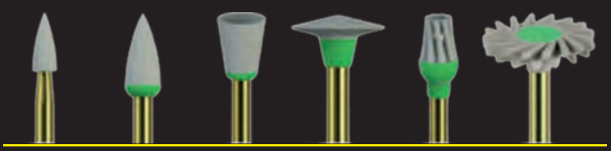
Scientific References

1. https://www.scirp.org/journal/paperinformation?paperid=64832
2. https://jns.kashanu.ac.ir/article_114281.html
3. https://pmc.ncbi.nlm.nih.gov/articles/PMC5022396/
4. https://www.dedeco.com/hi-gloss-diamond-ra-composite-6-kit/
5. https://pmc.ncbi.nlm.nih.gov/articles/PMC9355858/
6. https://jrdrms.dentaliau.ac.ir/browse.php?a id=256&sc lang=en&sid=1&ftxt=1&html=1
7. https://pubmed.ncbi.nlm.nih.gov/33981391/
8. https://www.sciencedirect.com/science/article/pii/S1646289016300048

DIAMOND POLISHERS
VS SILICONE POLISHERS



TYPES AND SHAPES
DIAMOND POLISHERS FOR COMPOSITE



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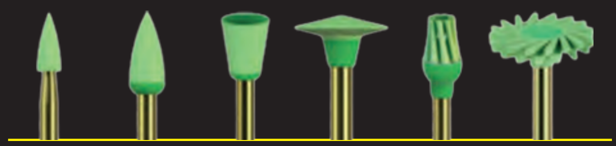

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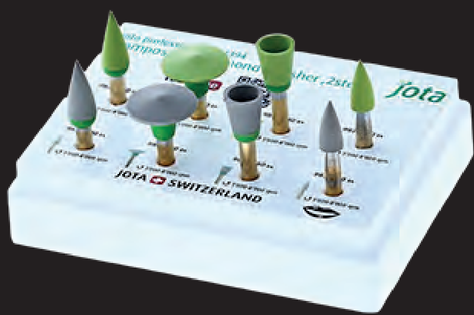

SILICON POLISHERS FOR COMPOSITE

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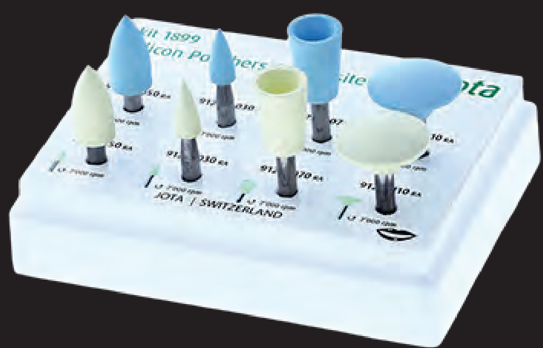

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