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DIAMOND POLISHERS VS SILICONE POLISHERS

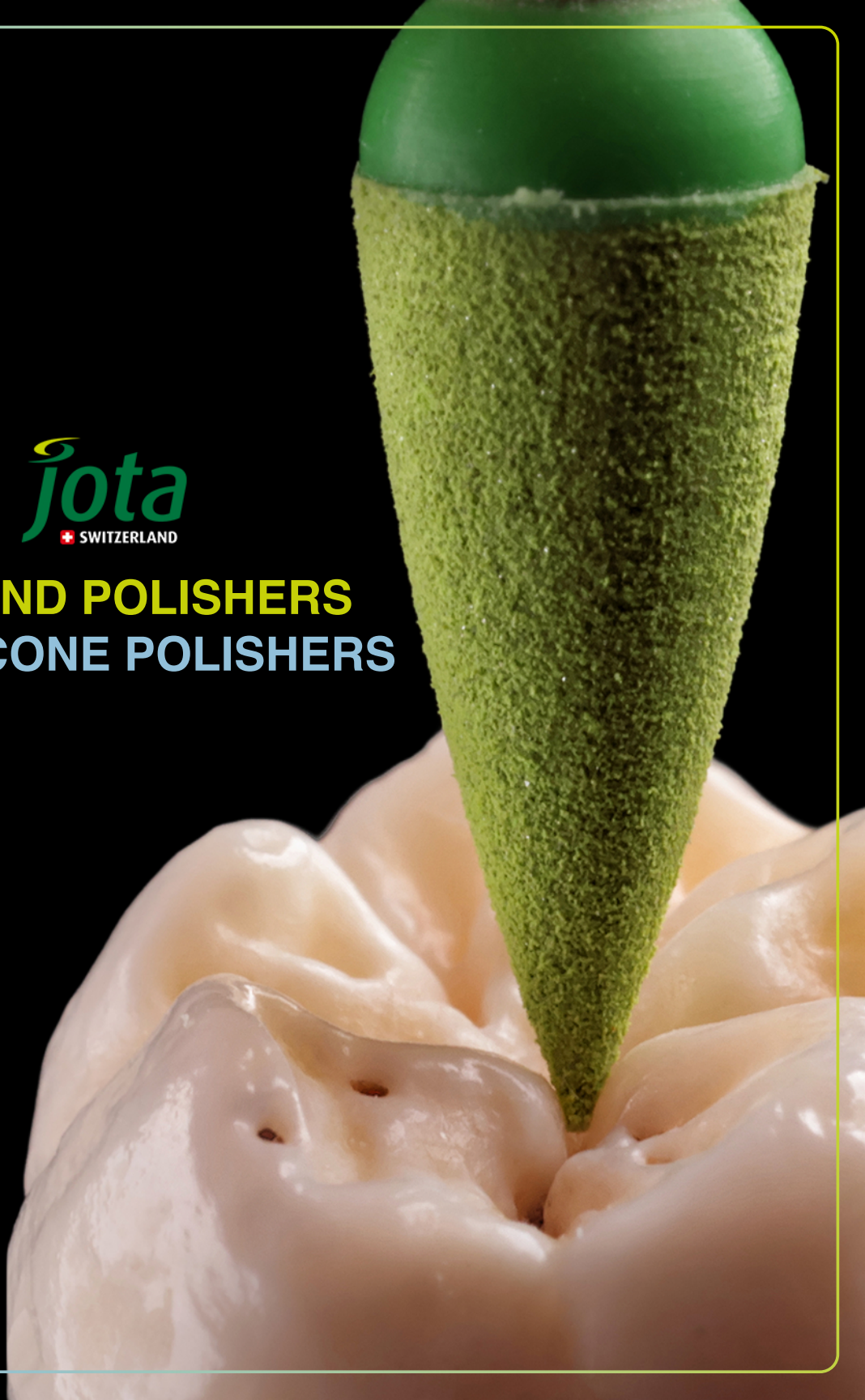

Foto By Dr. Daniel Rosa

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COMPOSITE FINISHING
INSTRUMENTS

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

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
VS SILICONE POLISHERS

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

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	10,000–20,000 rpm	5,000–15,000 rpm

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

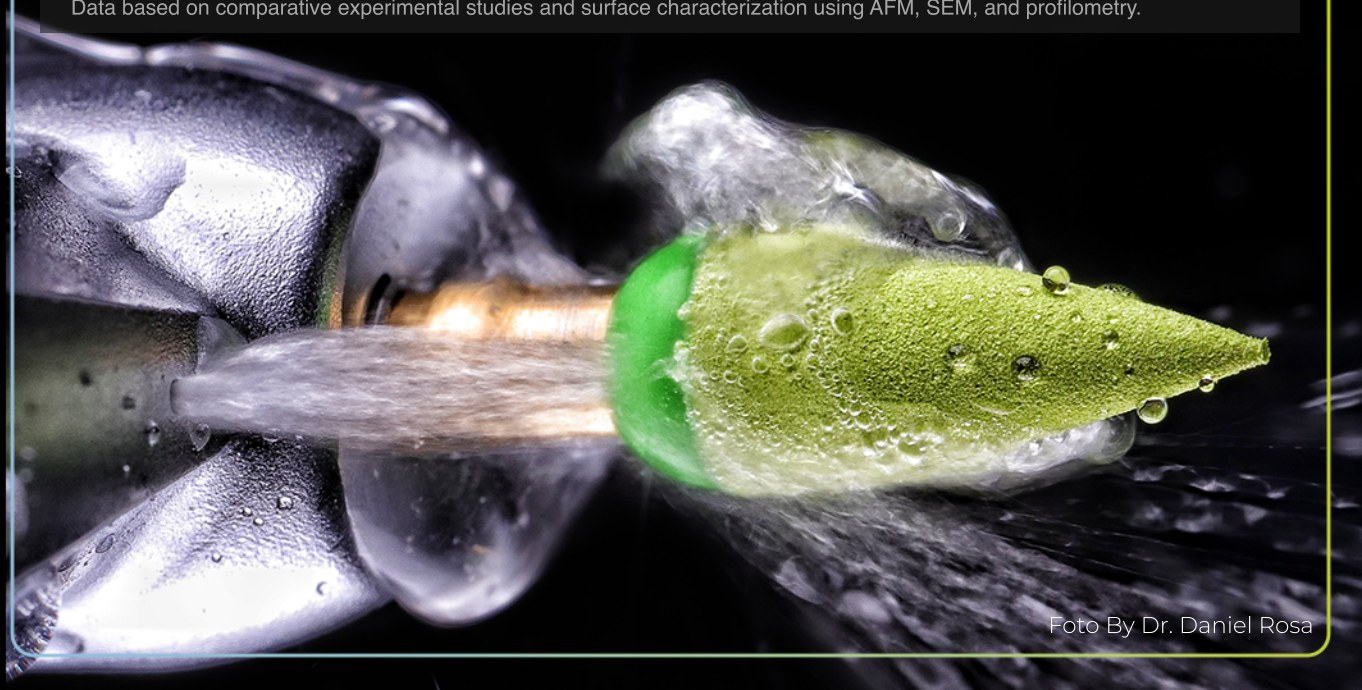


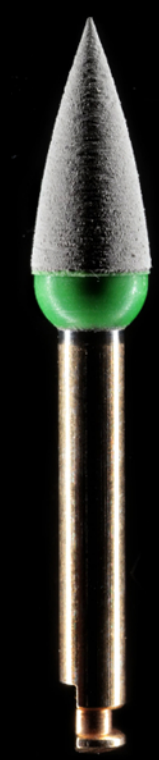
Foto By Dr. Daniel Rosa

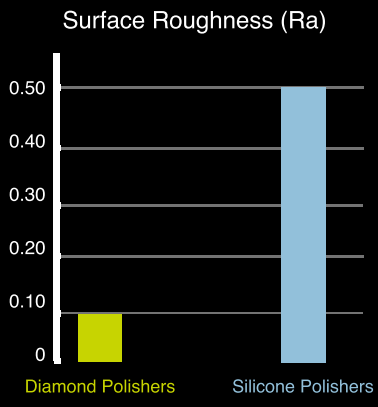
CLINICAL AND LABORATORY OUTCOMES

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

DIAMOND POLISHERS

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

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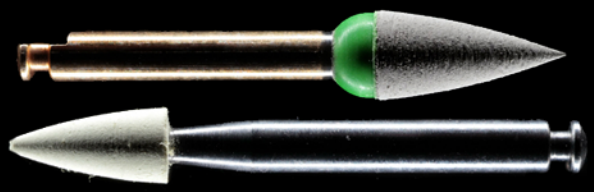
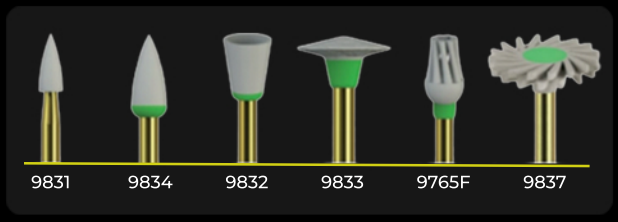
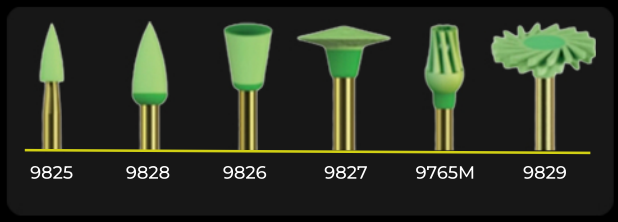


TYPES AND SHAPES
DIAMOND POLISHERS FOR COMPOSITE





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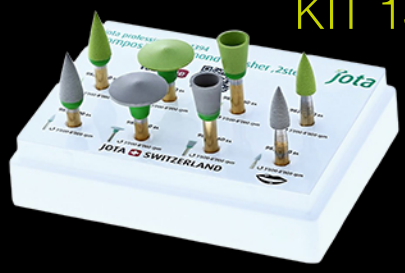
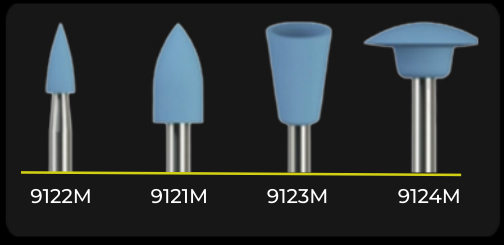
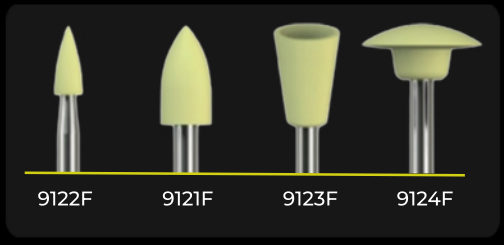


SILICON POLISHERS FOR COMPOSITE





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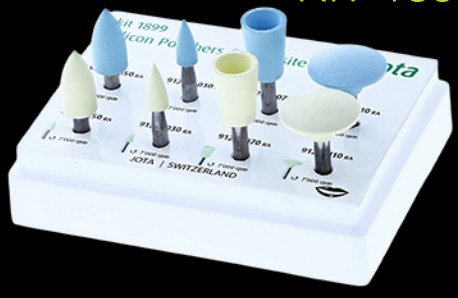


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