

## Short Communication

# The Dental Microscope: Expanding Vision, Precision, and Ergonomics in Dentistry

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## Abstract

Microscope dentistry has been shown to enhance the visual capabilities and motor skills of dentists, regardless of their specialization. Additionally, there is an often-overlooked benefit: cognitive support. This assistance boosts confidence in their tasks, leading to improved decision-making by influencing the prefrontal cortex. Furthermore, using a microscope helps protect the brain's mental functions, which is crucial in a profession that demands precision and focus. Overall, this tool promotes the health and well-being of the operator by integrating ergonomic principles.

## Introduction

A few days ago, I read an intriguing psychology article titled *"What You Don't Know Can Hurt You."* The article detailed how situational uncertainty impairs executive function in subsequent, unrelated tasks [1]. Executive function plays a crucial role in decision-making, self-control, and initiative. Research shows it directly impacts motivation, accuracy, and even energy levels—key factors in performing at the highest level.

From a psychophysical perspective, ergonomic behavior is another critical factor in optimizing dental performance. Studies demonstrate that adopting proper ergonomic guidelines, incorporating programmed stretching, and utilizing ergonomic equipment can significantly reduce work-related musculoskeletal disorders (WMSDs) [2].

I highlight these psychological and ergonomic principles because, as a full-time endodontist, I firmly believe the dental microscope is a game changer. It doesn't just enhance our vision—it transforms our entire approach to clinical practice. By magnifying the field of view up to 100x and dramatically improving illumination, the microscope elevates our manual precision through enhanced visual resolution [3]. However, its impact extends beyond magnification alone; it fosters certainty, efficiency, and behavioral changes that improve clinical outcomes and practitioner well-being.

## The power of visual certainty in dentistry

Uncertainty during dental procedures drains energy,

reduces motivation, and compromises quality. Doubt about diagnostic accuracy or procedural steps is unacceptable in a field where precision is paramount. The ability to *see* clearly—rather than rely on assumptions—is essential in achieving optimal results.

Nothing is more mentally exhausting than uncertainty during diagnosis or treatment. It leads to hesitation, frustration, and suboptimal decision-making. The dental microscope mitigates these issues by providing unparalleled clarity, ensuring that each step is executed with confidence and precision.

When used strategically, the highest magnification settings of the microscope significantly enhance diagnostic and procedural accuracy. Whether identifying caries, locating canals, or refining tooth preparations, precision and certainty are mandatory. Without proper illumination and magnification, achieving the accuracy required for excellence is nearly impossible [4,5] (Figures 1-3).

## More Information

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**Figure 1:** Pulp Remnant inside the Palatal Canal after Cleaning and Shaping.



**Figure 2:** Active Cavity, Margins, and Gum Invasion in the Proximal Surface of the Tooth.



**Figure 3:** MB2 Canal in a First Upper Molar.

### Ergonomics and workflow efficiency

Integrating the dental microscope requires adjustments not only in technology but also in work practices. A microscope-centered approach necessitates changes in positioning, posture, and team coordination. Proper ergonomic guidelines—including an ergonomic stool with back and arm support—are essential for optimizing comfort and efficiency.

Moreover, an effective ergonomic system includes the assistant as an integral part of the workflow. Four-handed or six-handed dentistry allows the operator to maintain a neutral posture, minimizing unnecessary movements and maximizing precision. This synergy enhances eye-hand coordination and improves procedural efficiency, ultimately benefiting both the clinician and the patient.

### The transformative effect of the microscope

Adopting the microscope into daily practice reshapes the way we work. It compels us to refine our techniques, invest in proper training, and improve teamwork. These adjustments not only elevate clinical outcomes but also contribute to long-term physical and mental well-being.

By expanding our field of vision, we unlock new levels of precision and certainty. This shift reduces stress, prevents physical strain, and fosters confidence in every procedure. The microscope is not just a tool—it is an essential component of modern dental excellence.

## Conclusion

With the dental microscope, we eliminate doubt in diagnosis, treatment margins, residual cavities, and MB2 canal location, among other critical tasks. The microscope enhances both clinical outcomes and ergonomic practices, offering a profound advantage in dental procedures. Beyond improving technical performance, it protects our physical and mental health, ensuring longevity and excellence in our profession.

It is one thing to *think* we are delivering high-quality care; it is another to *know* with certainty that we are achieving excellence.

### Author contributions

Dr. Juan Carlos Ortiz Hughes, DDS, CEAS, AEP, Endodontist, is a Master of the Academy of Microscope Enhanced Dentistry (CEAS II) and serves as the President of the Academy of Microscope Enhanced Dentistry (AMED). He specializes in providing efficient and painless dental care. As the author of the book “Ergonomics Applied to Dental Practice,” Dr. Ortiz Hugues offers lectures, training, and consultations on Advanced Dental Ergonomics across Latin America and the United States, with a focus on the application of ergonomics in dental microscopy.

Dr. Juan Carlos Ortiz Hugues has no financial interests in any of the companies mentioned in this article and did not receive compensation for writing it.

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