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# PerioMonitor™: Advancing chairside detection of periodontal inflammation through neutrophil quantification

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Periodontal disease remains one of the most common chronic conditions globally, affecting nearly half of adults over age 30 and more than 70% of seniors.<sup>1</sup> Yet despite its prevalence and impact, traditional diagnostic tools—such as periodontal probing and radiographs—primarily identify historical tissue destruction rather than ongoing inflammation. Research through the Glogauer lab at the University of Toronto recognized the need for early and dynamic detection of inflammation and disease activity and focused on the study of oral neutrophil levels, a key white blood cell, and their association with periodontal inflammation levels. This resulted in the concept of oral inflammatory load (OIL). After validation of this biomarker as an indicator of periodontal inflammation, a method was developed to quantify neutrophils in oral rinse samples, offering a noninvasive, evidence-based approach to assessing periodontal inflammation<sup>2</sup> (Figure 1).

Oral Inflammatory Load: Treatment Considerations		
RESULT	NEUTROPHIL COUNT RANGE (CELLS/mL x1000)	TREATMENT CONSIDERATIONS
NEGATIVE	<1,500	Stable, healthy. Continue current treatment, hygiene instruction, and oral self-care.
LOW	15,000–50,000	Mild. Implement appropriate treatment and monitor regularly. Healthy outcomes are likely with progression.
MEDIUM	50,000–200,000	Moderate. Full assessment warranted. RAMP. Consider changes to treatment, more frequent hygiene intervals and improved oral self-care.
HIGH	>200,000	Full assessment warranted ASAP. Documented inflammation or loss. High inflammatory status likely. Treat immediately to prevent or arrest.

Figure 1: Oral inflammatory load: Oral neutrophil counts in a 30 second mouth rinse correlate with periodontal health status. Individualized care can be formulated based on the level of the immune response as reflected in the oral neutrophil count.

## Rethinking inflammation in periodontal diagnostics

The pathogenesis of periodontal disease is driven by a dysregulated host immune response to a microbial biofilm, with neutrophils playing a central role.<sup>3</sup> As first responders of the innate immune system, neutrophils migrate from the bloodstream to periodontal tissues and eventually into the oral cavity through the gingival crevice. Elevated neutrophil

counts in oral fluids reflect active inflammation and correlate with the presence and severity of periodontal disease.<sup>2</sup>

Traditional clinical assessments, such as bleeding on probing (BOP), probing depths, and attachment loss, offer valuable data but often reflect cumulative damage. They can fail to capture active inflammatory status, especially in early or subclinical stages. This is where PerioMonitor™ adds significant value—by directly measuring neutrophil levels in real time to identify ongoing inflammation before irreversible damage occurs.<sup>2</sup>

## The science behind PerioMonitor™

PerioMonitor™ is a Health Canada-approved, chairside screening test that quantifies neutrophils collected from a simple 30-second oral rinse. Unlike site-specific diagnostic methods, PerioMonitor™ provides a whole-mouth inflammatory burden score, reflecting the level of neutrophilic activity in the oral environment.

The underlying technology leverages cell-capture and biochemistry to isolate and quantify neutrophils from a collected rinse. A recent clinical validation study, published in the *Journal of Clinical Periodontology*, confirmed oral neutrophil levels measured by PerioMonitor™ strongly correlate with clinical signs of periodontal disease.<sup>4</sup> Participants with higher periodontal probing depths and BOP showed significantly elevated neutrophil counts, establishing the test's relevance to both localized and generalized inflammation.

The test is performed chairside in under 5 minutes, with results quantified as neutrophils per mL. This immediate feedback enables clinicians to integrate objective inflammatory data into their periodontal assessments during the same appointment — transforming the dental hygiene visit into an opportunity for early intervention.

## Clinical applications in dental hygiene practice

Dental hygienists are at the forefront of preventive and periodontal care. The introduction of an objective, quantifiable biomarker like oral neutrophil counts has the potential to shift dental hygiene practice toward a precision-based, inflammation-centred model of care (Figure 2).

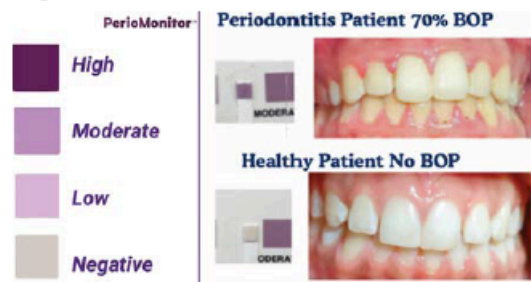


Figure 2: Two client PerioMonitor™ results are highlighted in relation to the bleeding on probing percentage from the examination. These examples are reflective of the sensitivity of the test in differentiating health from periodontal inflammation normally reflected in the percentage of probing sites that bleed.

Applications of PerioMonitor™ include:

- Early detection of subclinical inflammation: Neutrophil counts may be elevated even in the absence of clinical signs, identifying clients at risk before tissue destruction occurs.
- Personalized care planning: Results allow tailored recare intervals, therapy choices, and client education strategies based on the individual's inflammatory burden.
- Motivational interviewing and communication: Sharing visual, numerical data with clients improves understanding and engagement in oral health decisions.
- Monitoring treatment response: Neutrophil levels tend to decline following effective periodontal therapy, offering a noninvasive method to track healing or detect persistent inflammation.

## Validating the evidence

In a pivotal study, oral neutrophil quantification was validated in a cross-sectional cohort involving over 300 adult participants. The authors found a strong positive correlation between oral neutrophil counts and clinical measures of periodontitis, including bleeding on probing, probing depth, and plaque scores.<sup>4</sup> Additionally, neutrophil levels exhibited a clear stratification between healthy, gingivitis, and

periodontitis groups — highlighting the test's diagnostic utility across the disease spectrum.

Importantly, the test's reproducibility and consistency were confirmed under typical clinical conditions, reinforcing its reliability as a chairside screening tool.

## Integration into clinical protocols

PerioMonitor™ is designed to augment — not replace — standard clinical protocols. Its role is to enhance diagnostic accuracy by providing objective insight into inflammatory status. Best practices for implementation include:

- Performing the test at dental hygiene or periodontal maintenance appointments, especially for high-risk clients.
- Performing the test on clients with full arch/All-on-X to screen for peri-implant inflammation and disease where access to the implants is not easily obtained.
- Using test results to prompt further examination, client education, or periodontal referral.
- Tracking changes in neutrophil levels over time to assess treatment efficacy.

As inflammation becomes increasingly recognized as the common denominator linking oral and systemic diseases, such as diabetes and cardiovascular conditions, tools like PerioMonitor™ may also have value in interdisciplinary care pathways in non-dental settings.<sup>5</sup>

## Looking ahead

Oral neutrophil testing represents a new frontier in preventive and periodontal care—offering clinicians and clients alike a real-time window into inflammatory status. By providing rapid, objective, and noninvasive results, PerioMonitor™ aligns with the future of personalized oral health care and supports a shift from reactive treatment to proactive prevention.

For dental hygienists, this test empowers more informed decision-making and enhances the ability to detect, educate, and intervene early—before irreversible damage occurs. As salivary and oral fluid diagnostics continue to evolve, PerioMonitor™ stands as a clinically validated, science-driven innovation ready for everyday practice.<sup>5</sup>

\*References available upon request



