Episode 119 – Detecting Periodontal Disease via a Novel In-office Screening Test

October 25, 2024

Research

Utilizing oral neutrophil counts as an indicator of oral inflammation associated with periodontal disease: A blinded multicentre study

Background

Periodontal diseases are chronic inflammatory conditions requiring early detection for effective long-term management. The subclinical symptoms of periodontal diseases and their episodic progression emphasize the need for early screening tools that allow long-term monitoring of periodontal health.

Conventional methods for detecting periodontal diseases involve using a periodontal probe to measure periodontal probing depths, bleeding on probing, and clinical attachment loss. While probing depth and clinical attachment loss reflect the condition of the periodontium during the examination, they cannot detect ongoing tissue destruction or predict future periodontal breakdown.

In healthy oral tissues, there is a balance between oral bacteria and the influx of innate immune cells, predominantly oral polymorphonuclear neutrophils (oPMNs). When periodontopathogenic bacteria accumulate and initiate oral dysbiosis, this balance is disturbed, increasing oPMNs trafficked to the gingiva to clear the bacteria and prevent tissue invasion.

Accumulating evidence demonstrates an association between the number of oPMNs and the presence of inflammatory periodontal diseases. Based on previous studies, the number of oPMNs (quantified in oral rinses) is a reliable measure of periodontal inflammation. The correlation between elevated oPMN counts and periodontal disease severity highlights the potential of using oPMN counts as an indirect biomarker for monitoring periodontal health and inflammation.

Research indicates that the oral neutrophil count (ONC) is associated with active periodontal inflammation and its severity. Recognizing the potential significance of ONCs in assessing gingival inflammation, Elebyary et al. (2024) analyzed the effectiveness and safety of a point-of-care test that measures neutrophil enzyme activity by employing a colorimetric strip test. [1]

Research team

Researcher	Affiliation
Omnia Elebyary	Faculty of Dentistry, University of Toronto, Toronto, ON, Canada Princess Margaret Cancer Centre, University Health Network, Toronto, ON, Canada
Chunxiang Sun	Faculty of Dentistry, University of Toronto, Toronto, ON, Canada
Elis Angela Batistella	Faculty of Dentistry, University of Toronto, Toronto, ON, Canada
Thomas E. Van Dyke	Forsyth Institute, Cambridge, Massachusetts, USA Harvard School of Dental Medicine, Boston, Massachusetts, USA
Samuel B. Low	Department of Periodontics, College of Dentistry, University of Florida, Gainesville, Florida, USA
Sonica Singhal	Faculty of Dentistry, University of Toronto, Toronto, ON, Canada
Howard Tenenbaum	Faculty of Dentistry, University of Toronto, Toronto, ON, Canada Department of Laboratory Medicine and Pathophysiology, Faculty of Medicine, University of Toronto, Toronto, ON, Canada
Michael Glogauer	Faculty of Dentistry, University of Toronto, Toronto, ON, Canada Princess Margaret Cancer Centre, University Health Network, Toronto, ON, Canada

References

[1] O. Elebyary, C. Sun, E. Bastistella, et al., "Utilizing oral neutrophil counts as an indicator of oral inflammation associated with periodontal disease: A blinded multicentre study," *Journal of Clinical Periodontology,* pp. 1-11, 19 August 2024.

Additional Resources

Utilizing oral neutrophil counts as an indicator of oral inflammation associated with periodontal disease: A blinded multicentre study, Elebyary, O; Sun, C; Batistella, E; Van Dyke, T; Low, S; Singhal, S; Tenenbaum, H; Glogauer, M. *Journal of Clinical Periodontology*, August 19, 2024, p 1-11
https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14054

Novel rinse assay for the quantification of oral neutrophils and the monitoring of chronic periodontal disease, Bender, J; Thang, J; Glogauer, M. *Journal of Periodontal Research*, Volume 41, Issue 3, February 15, 2006, p 214–220
https://onlinelibrary.wiley.com/doi/10.1111/j.1600-0765.2005.00861.x

The neutrophil: Constant defender and first responder. Fine, N; Tasevski, N; McCulloch, C; Tenenbaum, H; Glogauer, M. *Frontiers in Immunology*, Volume 11, September 23, 2020, p 1-15
https://www.frontiersin.org/journals/immunology/articles/10.3389/fimmu.2020.571085/full

Oral inflammatory load: Neutrophils as oral health biomarkers, Khoury, W; Glogauer, J; Tenenbaum, H; Glogauer, M. *Journal of Periodontal Research*, Volume 55, Issue 5, May 6, 2020, p 594-601. https://onlinelibrary.wiley.com/doi/10.1111/jre.12758

Quantifying oral inflammatory load: Oral neutrophil counts in periodontal health and disease. Landzberg, M; Doering, H; Aboodi, G; Tenenbaum, H; Glogauer, M. *Journal of Periodontal Research*, Volume 50, Issue 3, July 14, 2014, p 330-336
https://onlinelibrary.wiley.com/doi/10.1111/jre.12211