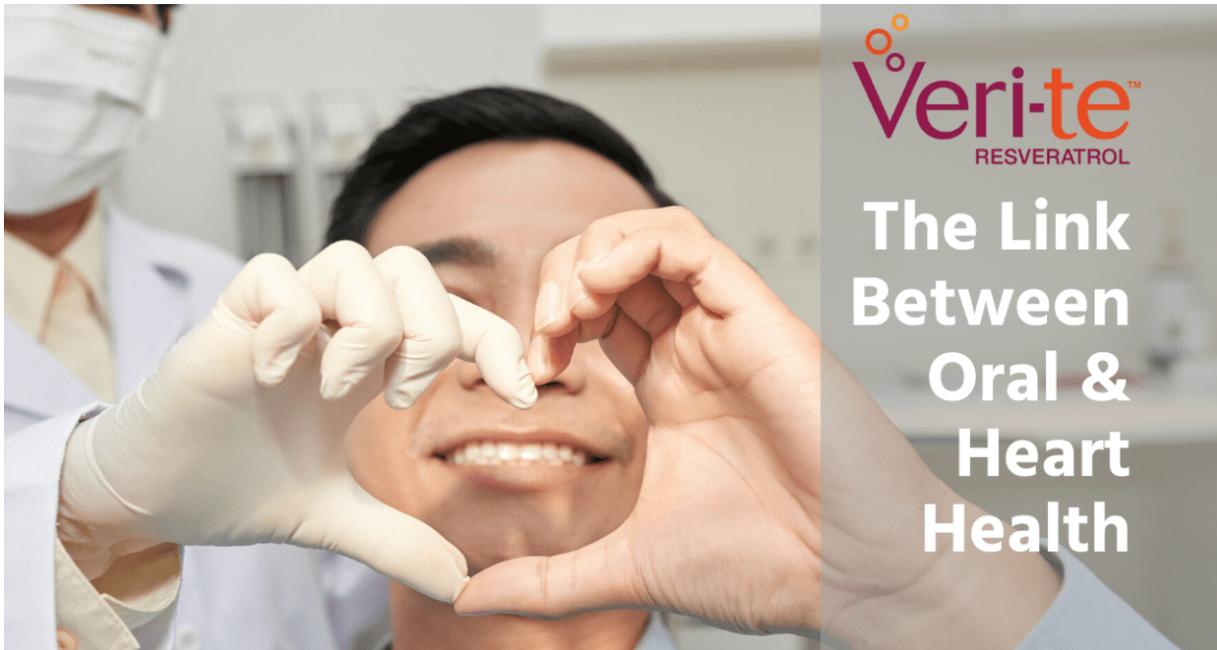


# Resveratrol's Benefit From Mouth to Heart



Written by Marcia da Silva Pinto, PhD, Technical Sales & Customer Support Manager, Evolva

## Is there a link between oral health and heart health?

A recent meta-analysis has brought public attention to the scientific evidence that periodontitis is highly associated with hypertension.<sup>1</sup> The big question from the authors was: are patients with periodontitis more likely to have hypertension? Their observations suggest that the management of periodontitis could not only improve oral health but also be of relevance in the management of hypertension. Additionally, the authors found out that the more severe the periodontitis is, the higher the likelihood of having hypertension. The scenario for the two diseases is of ultimate public health importance. Cardiovascular diseases (CVD) are the current leading global cause of death, with estimated numbers reaching 23.6 million deaths by 2030.<sup>2</sup> Hypertension is the most prevalent of all CVD, and it accounts for more than 50% of deaths from stroke.<sup>2</sup> Moreover, hypertension is considered a silent killer, and despite available treatments, the condition remains poorly controlled. Periodontitis is a disease caused by many factors such as unbalanced oral microbiota, genetics, smoking, alcohol use, diet, diabetes, stress, and impaired immune response. It is estimated that 50% of the world population is affected by periodontitis.<sup>3</sup> Periodontitis leads to dental loss and significantly affects one's quality of life.<sup>4</sup>

## How is oral health correlated to heart health?

It is well established that endothelial dysfunction, oxidative stress, and inflammation are implicated in the development of hypertension. Periodontitis is associated with systemic inflammation in which mediators (CRP, IL-6; TNF- $\alpha$ ) can all affect endothelial function. Therefore, it is no surprise that there is an overlap of mechanisms and mediators that can affect both oral and heart health. This link has been investigated in *in vitro*, animal, and human studies. For instance, animal studies indicate that an immune response to a common periodontal pathogen results in elevated blood pressure, vascular inflammation, and

endothelial dysfunction.<sup>5</sup> On the other hand, some studies have reported improvement in endothelial dysfunction and systemic inflammation following periodontal treatment.<sup>6,7</sup>

### **What is the mechanism involved?**

Several studies have reported that the mechanism involved is through hypertension, causing microcirculatory changes in the gingival tissue leading to increased inflammation and/or alteration in the composition of the oral microbiota. A recent publication reported the pro-inflammatory cytokine, interleukin (IL)-1 $\beta$ , which is elevated in periodontitis, as the possible causal link between periodontitis and systemic diseases such as CVD.<sup>8</sup> Additionally, the role of ROS (Reactive Oxygen Species) has been established in the pathogenesis of periodontitis.<sup>9</sup> It is well characterized that enhanced production of ROS by leukocytes and inflammatory cells in periodontitis results in tissue damage.

### **Can resveratrol help?**

Resveratrol is reported as having very high antioxidant potential besides effects as anti-inflammatory and cardioprotective.<sup>10</sup> For some other authors, resveratrol represents a great potential as adjuvant therapy for periodontal diseases; for instance, resveratrol is capable of reducing IL-1 $\beta$  and bone loss in animal models of experimental periodontitis.<sup>8</sup> Andrade *et al.*<sup>11</sup> performed a systematic review of the potential effect of resveratrol in controlling the progression of periodontal disease in preclinical studies. These authors concluded that resveratrol treatment prevented periodontitis progression, probably due to the modulation of both oxidative stress and inflammatory profile.

At present, clinical studies evaluating the effects of resveratrol supplementation simultaneously on periodontitis and hypertension are still scarce. Evolva is continuously investing in human clinical studies to provide our customers with science-based evidence for resveratrol supplementation in many areas, including oral health and cardiovascular health.

***Please note this review is for educational purposes and intended for commercial use only.***

### **References**

1. Muñoz Aguilera E, Suvan J, Buti J, et al. Periodontitis is associated with hypertension: a systematic review and meta-analysis. *Cardiovasc Res.* 2020;116(1):28–39.
2. World Health Organization. *Cardiovascular Disease: Global Atlas on Cardiovascular Disease Prevention and Control*; WHO: Geneva, Switzerland, 2012.
3. Kassebaum NJ, Bernabé E, Dahiya M, Bhandari B, Murray CJL, Marcenes W. Global burden of severe periodontitis in 1990–2010: a systematic review and meta-regression. *J Dent Res* 2014;93:1045–1053.
4. Khazaei S, Khazaei M, Kazemi S, Yaghini J. Resveratrol as a supplemental treatment for periodontitis. *Dent Res J (Isfahan).* 2012;9(5):655–657.
5. Czesnikiewicz-Guzik M, Nosalski R, Mikolajczyk TP, Vidler F, Dohnal T, Dembowska E, Graham D, Harrison DG, Guzik TJ. Th1-type immune responses to *Porphyromonas gingivalis* antigens exacerbate angiotensin II-dependent hypertension and vascular dysfunction. *Br J Pharmacol* 2019;176:1922–1931.
6. Tonetti MS, D’aiuto F, Nibali L, Donald A, Storry C, Parkar M, Suvan J, Hingorani AD, Vallance P, Deanfield J. Treatment of periodontitis and endothelial function. *N Engl J Med* 2007;356:911–920.
7. Orlandi M, Suvan J, Petrie A, Donos N, Masi S, Hingorani A, Deanfield J, D’Aiuto F. Association between periodontal disease and its treatment, flow-mediated dilatation

and carotid intima-media thickness: a systematic review and meta-analysis. *Atherosclerosis* 2014;236:39–46.

8. Cheng R, Wu Z, Li M, Shao M, Hu T. Interleukin-1 $\beta$  is a potential therapeutic target for periodontitis: a narrative review. *Int J Oral Sci.* 2020;12(1):2.
9. Agnihotri R, Pandurang P, Kamath SU, et al. Association of cigarette smoking with superoxide dismutase enzyme levels in subjects with chronic periodontitis. *J Periodontol.* 2009;80(4):657–662.
10. Salehi B, Mishra AP, Nigam M, et al. Resveratrol: A Double-Edged Sword in Health Benefits. *Biomedicines.* 2018;6(3):91.
11. Andrade EF, Orlando DR, Araújo AMS, et al. Can Resveratrol Treatment Control the Progression of Induced Periodontal Disease? A Systematic Review and Meta-Analysis of Preclinical Studies. *Nutrients.* 2019;11(5):953.