

LEVELS OF NO PRODUCTION IN SALIVA OF PERIODONTITIS PATIENTS

O. Andrukhov¹, H. Haririan¹, K. Bertl¹, W.-D. Rausch², M. Matejka¹, X. Rausch-Fan¹



¹ Department of Periodontology, Bernhard Gottlieb School of Dentistry, Medical University of Vienna, Austria

² Institute for Medical Chemistry, Veterinary Medical University, Vienna, Austria



greiner bio-one

INTRODUCTION

Nitric oxide (NO) is an important messenger molecule, which is involved in various physiological processes, such as the regulation of vascular tone, inhibition of platelet aggregation, neurotransmission and immune response (Moncada et al., 1991). Several studies suggested the involvement of NO in the progression of periodontal disease (Matejka et al., 1998; Rausch-Fan & Matejka, 2001; Batista et al., 2001). Measurements of nitrite concentrations in biological fluids could be important indicators of the NO production in the organism (Vallance & Collier, 1994). However, such measurements were rarely performed in periodontitis patients. Some studies found an increased salivary nitrite levels in periodontitis patients, whereas other studies came to opposite conclusion (Aurer et al., 2001; Reher et al., 2007; Ozer et al., 2011). Therefore, in the present study we investigated the levels of NO metabolites NO₂ in saliva of periodontitis patients.

MATERIAL AND METHODS

A total of 122 subjects (82 patients with advanced periodontitis and 40 periodontally healthy individuals) were included in the present study. Whole saliva was collected after an overnight fast using the saliva collection system® (Greiner Bio-One, Austria). Saliva collection was performed between 8.00 and 11.00 am to avoid circadian rhythm effects. Sampling in the periodontitis group was made prior to a planned conservative periodontal therapy. The percentage of whole saliva per sample was measured using a Saliva Quantification Kit (Greiner Bio-One, Austria). Levels of NO₂ in the saliva samples were determined using nitrite/nitrate colorimetric assay kit (Sigma, St.-Louis, USA).

Since the levels of NO metabolites depend substantially on individual's gender (Watanabe et al., 2000; Ghasebi et al., 2007) these parameters were analyzed in different gender groups.

Data are presented as mean ± SEM. The differences between groups were tested by Mann-Whitney U-test.

RESULTS

Mean age, smoking status, and the results of periodontal examination of periodontitis patients and healthy controls are given in Table 1. Periodontitis patients were significantly older than healthy individuals (p < 0.01). API, PBI, BoP and the number of teeth with PD higher than 5 mm were significantly higher in diseased group. The mean percentage (± SD) of saliva per sample was 72.1 % ± 7.1 and did not differ between patients and controls.

	male		female	
	control, N=17	periodontitis, n=54	control, n=23	periodontitis, n=28
Age	32.5±1.6	40.8±1.0	29.9±1.4	39.1±1.5
Smokers, %	35.3	38.9	39.1	32.1
API	24.2±4.1	66.8±3.4	21.7±3.8	58.9±4.8
PBI	9.4±2.7	35.7±4.1	9.7±1.7	30.9±6.5
BoP	5.0±1.5	34.5±4.1	4.5±0.8	34.8±6.2
Teeth PD > 5	0	16.4±0.9	0	14.5±1.7

Table 1. Demographic and clinical characteristics of study's groups. Data are presented as mean ± SEM. API, plaque index; PBI, ; BoP, bleeding on probing; PD, pocket depth, measured on deepest site.

Salivary levels of NO₂ in different gender and diagnosis groups are shown in the Figure 1. Healthy men exhibited significantly higher salivary NO₂ levels compared to healthy women. Within male individuals, salivary NO₂ levels were significantly lower in periodontitis patients than in healthy controls. In contrast, in female no significant difference in salivary NO₂ levels was observed between healthy and periodontitis groups.

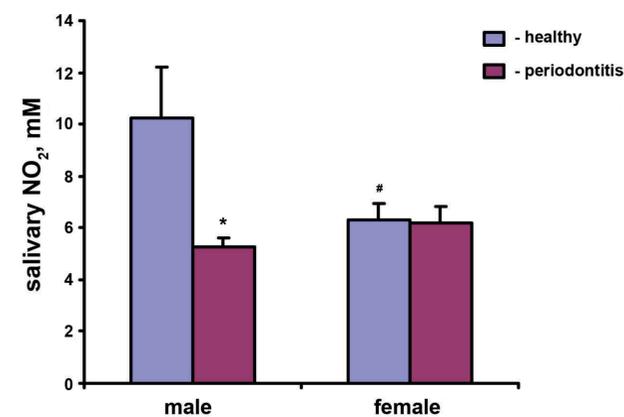


Figure 1. Salivary NO₂ levels (mean±s.e.m.) in different gender and diagnosis groups.

* Means significantly different from controls, P<0.01.

Means significantly different from male, P<0.01.

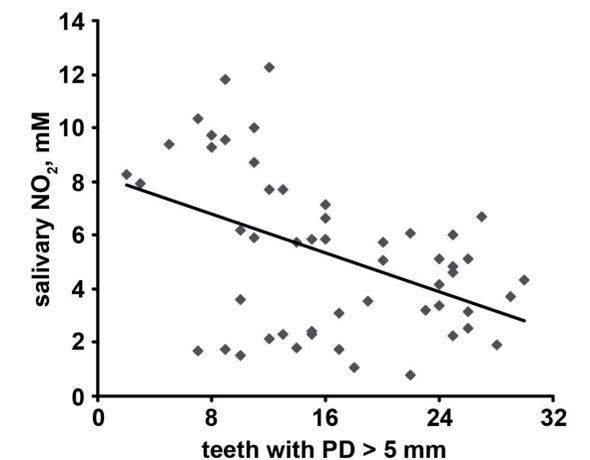


Figure 2. Relationship between salivary NO₂ levels and the number of teeth with PD > 5 mm in male periodontitis patients. Each point represents the values measured in one patient. The straight line represents the best fits by linear regression analysis to the data points.

Figure 2 shows the relationship between salivary NO₂ levels and the number of teeth with PD higher than 5 mm in male periodontitis patients. A significant negative correlation was observed between these parameters (r=0.45, p=0.001). No correlation of salivary NO₂ with other clinical parameters was found in both male and female groups.

CONCLUSION

Summarizing, our data suggest that NO production is impaired in periodontitis patients, mainly within male population. Particularly, within male patients, periodontitis is associated with lower salivary NO₂ levels. The decreased NO production in men with periodontitis could be associated with local inflammation.

ACKNOWLEDGEMENTS

The authors thank Mrs. Phuong Quynh Nguyen and Mrs. Hedwig Rutschek (Medical University of Vienna, Austria) for their help in preparing and performing the experiments. Greiner Bio-One supported this study by financing materials and sample analysis.

REFERENCES

- Aurer et al (2010). J Clin Periodontol 28:565-568.
- Batista et al (2002). Oral Dis 8:254-260.
- Ghasemi et al (2008). Life Sci 83:326-331.
- Matejka et al (1998). J Periodont Res 33:517-518.
- Moncada et al (1991). Physiol Rev 43:109-142.
- Ozer et al (2011). J Periodontol 82:320-328.
- Rausch-Fan, Matejka (2001). Eur J Clin Invest 25:889-902.
- Reher et al (2007). J Oral Sci 29:271-276.
- Vallance, Collier (1994). BMJ 309:323-334.
- Watanabe et al (2000). Clin Chim Acta 301:169-179.