



Periodontitis and the Impact of Oral Health on the Quality of Life of Psoriatic Individuals: A Case-Control Study – Commentary

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Periodontitis (PE) is characterized by host-mediated and microbiologically associated inflammation that results in periodontal clinical attachment loss – protective and supportive teeth system. Bacterial biofilm formation can initiate gingival inflammation; however, the initiation and progression of periodontitis is dependent on dysbiotic ecological changes in the microbiome and an imbalance in the individual's inflammatory response^{1,2}. Since the 1990s, considerable evidence has emerged on the potential effects of periodontitis on systemic diseases, such as changes in the gestational course, endocrine, respiratory, cardiac and autoimmune disorders such as psoriasis³⁻⁶.

Psoriasis is a common chronic inflammatory skin disease characterized by inflammation of the dermis and epidermis. Its prevalence varies due to a specific country variation and epidemiological studies variability. Limited data on the epidemiology of psoriasis is available and the provided prevalence data come from only 20 countries, meaning there is extent geographic gaps in knowledge.⁷ It has been shown that in a worldwide analysis it can range from 0.14%- 3%.⁸, to almost 11,5%⁷ in adults. Accounting for population growth and ageing, and the fact that psoriasis mainly affects the adult population, the burden associated with psoriasis could continue to rise⁸. In the general population, it has significant impacts on both physical and emotional health related to quality of life (QoL)⁹. The burden of the disease is further increased by several comorbidities^{10,11}, as individuals with psoriasis are at a higher risk of developing other chronic serious diseases, such as psoriatic arthritis, metabolic syndrome or its components, anxiety and depression^{5,12,13}.

The biologic plausibility for the association between periodontitis and psoriasis is based not only in the fact that they are both chronic inflammatory immune-mediated diseases but also share some common immunopathogenic processes, such as the activation of innate and adaptive immune responses and its deregulation^{4,13}. It is also hypothesized that bacterial colonization in the oral cavity can trigger an exaggerated immune response in a susceptible host, leading to an exacerbated inflammatory process associated with autoimmune disorders³.

Several observational studies* have reported a positive association between periodontitis and psoriasis, which were synthesized by two recent systematic reviews and meta-analyses^{4,14}. In their analysis, they showed that patients with periodontitis were associated with a higher risk of psoriasis with pooled odds ratios (ORs) ranging from 1.55 (95% confidence interval [CI], 1.35–1.77) to 2.87 (95% CI, 1.75–4.69).

It is interesting to point out that since most of the available studies in literature are observational, caution should be taken when interpreting the results. Well-designed prospective studies are still necessary to evaluate interactions between both diseases

The clinical signs of psoriasis, such as visible disfigurement of the skin, can trigger a negative reaction in other individuals, which can have a great negative impact, with a psychological burden, on people with the disease. Thus, some authors¹¹ reiterate that in a comparison with a selection of other chronic diseases, including cancer, myocardial infarction and congestive heart failure, only depression and chronic lung disease impair QoL more than psoriasis. Thus, psoriatic individuals tend to have a worse QoL and be negatively impacted by the disease.

A cohort study¹⁵ demonstrated that the impact of psoriasis on QoL was greater in patients with more severe psoriatic lesions, in younger patients and in those with psoriatic arthritis. It was found that psoriasis affects QoL equally in both sexes, and that body mass index had no effect on the severity of psoriasis or QoL. Patients with psoriasis had a significantly lower QoL than healthy subjects. Comparisons with data from patients with other chronic medical conditions demonstrated that psoriasis has a negative effect on health-related QoL, and again, this impact was similar to that of other chronic conditions (such as depression, diabetes and hypertension), corroborating the findings of other studies^{16,17}.

Over the past two decades, studies have measured the impact of oral health on QoL¹⁸⁻²² and now more commonly referred to as self-reported QoL measures related to oral health (OHRQL)²¹. Particularly, studies revealed a significant association between periodontitis and OHRQL²³⁻²⁵.

The most widely used instrument to measure OHRQL is the Oral Impacts on Daily Performance (OIDP)¹⁹. Studies using OIDP have shown that physical, psychological and social performance, reflecting OHRQL and the well-being of individuals, can be affected by problems of oral origin^{19,21,22,26}.

Regularly, the treatment of dermatological patients focuses only on clinical signs and symptoms and on a subjective view of the impact of the disease on the individual's life. The assessment of QoL can help provide better care to patients, recognizing their real needs and interfering in treatment decisions^{27,28}. QoL measures are particularly beneficial in chronic diseases, as they assess how the disease affects one's life socially, psychologically and physically²⁹. To assess the impact of QoL in patients with dermatological diseases is important for clinical management as it is essential to detect patients at a higher risk of presenting worse QoL in order to treat them in a more integrated way²⁸. QoL data fulfill the role of measuring

the intangible changes in a patient's life that determine "treatment success".

Although several studies have reported a worse QoL in psoriasis patients^{9-11,30-32}, no study had been published when we decided to analyze the impact of oral health and particularly periodontitis on QoL in psoriasis patients.

Therefore, our 2021 Clinical Oral Investigations'³³ paper provides a significant and good quality case control study that evaluated through the OIDP instrument the OHRQL of psoriasis patients and its association with periodontitis. The study had an expressive sample (295 individuals with psoriasis and 359 controls), with a strong method of full-mouth periodontal examination, a literature and Brazilian validated instrument of OHRQL measurement and a robust criteria for periodontitis and psoriasis definition and diagnosis, enabling higher reliability to our findings.

A higher prevalence of periodontitis was observed among individuals with psoriasis (41.0%) when compared with controls (33.1%). Individuals with psoriasis were 1.4 times more likely to have periodontitis than controls (OR = 1.40; p = 0.019). Additionally, these individuals had significantly worse periodontal clinical condition, expressed by higher means of plaque index, bleeding on probing, periodontal probing depths, and clinical attachment loss.

As evidence suggests that psoriasis individuals have worse oral conditions and worse periodontal parameters, it can be estimated that the QoL of these individuals are even more negatively affected by oral changes. Fact corroborated by the literature stating that oral conditions, such as pain, caries, tooth mobility, and tooth loss have negative effects on the well-being of individuals, especially those with periodontitis^{25,34}.

The study also demonstrated that individuals with periodontitis and psoriasis had significantly worse OHRQL indicators. In addition, the severity of periodontitis and psoriasis significantly increased these negative impacts. It should be noted that mood disorders, particularly depression, have been suggested to be extremely more prevalent in individuals with psoriasis (up to 62%) than in the general population (4 to 10%)^{11,35}. It has also demonstrated that individuals with psoriasis showed higher values of body mass index, alcohol consumption, diabetes, and greater use of anxiolytics and antidepressants. Thus, corroborating previous findings, these variables can contribute to the activation of systemic triggers for a prolonged period of time, leading to immunological changes (exacerbation in the expression of cytokines), endocrine, and behavioral disorders (poor hygiene, smoking, and other deleterious habits) which may predispose to greater susceptibility to both diseases^{3,5}.

Our results presented worse scores of total OI DP, when assessing the frequency of impacts on daily activities, in psoriasis individuals with periodontitis, when compared with the control group (without periodontitis). Individuals with psoriasis and periodontitis stage III/IV had worse indicators than controls, demonstrating the role of periodontitis severity in the impact of OHRQL. In addition, the worst indicators of OI DP were reported individually, both for psoriasis and periodontitis. When separately evaluating the most affected daily activities by those with periodontitis and without PE, the item “eating” was the one that showed the greatest impacts, both for the frequency as for the severity in the case group, and only for severity in the control group. In intergroup comparisons, individuals with periodontitis had a greater impact on the item eating, both in frequency and severity. It is important to emphasize that psoriasis individuals with PE reported higher means of the items talking, cleaning their teeth, smiling, sleeping, and recreation.

There are some limitations that must be attributed to the study as due to temporality the case-control study does not demonstrate the causal link. Hence, it is not possible to determine whether periodontitis has led to greater susceptibility to psoriasis, or whether individuals with psoriasis are more prone to develop periodontitis.

Nonetheless, many questions are raised regarding psoriasis and associated comorbidities, now including one of oral source. We highlight that dermatologists should extend their considerations and search for periodontitis as another important comorbidity associated with psoriasis. This study can be considered an important starting point for investigations on OHRQoL of individuals with psoriasis and both dentists and doctors should focus their attention to the oral condition and its impact on QoL of these individuals, since they are in greater physical-emotional vulnerability.

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Appendix

Association between periodontitis and psoriasis – a summary of studies

| Authors | Study type | Results |
|---|------------------------------------|--|
| YAMADA; AMAR; PETRUNGARO, 1992 | Case report | Cutaneous exacerbation accompanied by gingival and periodontal epithelial changes |
| PREUS et al., 2010 | Case-control | Psoriatics had a lower radiographic bone level, ($p < 0.001$) and a significantly greater number of missing teeth ($p < 0.001$) when compared to their age- and sex-matched controls (51% vs 26%, $p < 0.001$). |
| KELLER; LIN, 2012 | Cohort– 5 years follow up | Increased risk of psoriasis among individuals with periodontitis and higher incidence of periodontitis in psoriatic patients (RR 1.88 CI 95% 1.77-1.99)) |
| LAZARIDOU et al., 2013 | Case-control | Association between periodontitis and psoriasis (OR = 3.329, 95% CI: 1.513-7.324, $p=0.003$) and between psoriasis and metabolic syndrome (OR = 2.293, 95% CI: 1.250-4.207, $p=0.007$). |
| FADEL et al., 2013 | Case-control | Mild and moderate psoriasis with lower radiographic alveolar bone levels and fewer teeth compared to non-psoriatic psoriasis |
| NAKIB et al. 2013 | Cohort | Increased risk of psoriasis for those with mild alveolar bone loss (RR = 1.35, 95% CI: 1.03-1.75) and moderate to severe alveolar bone loss (RR = 1.49, 95% CI: 1.08-2.05), compared to those without periodontal bone loss. |
| ANTAL et al., 2014 | Case-control | Six times greater chance of severe periodontitis in psoriatic smokers compared to non-smokers. |
| GANZETTI et al., 2015 | Experimental | Salivary expression of TNF- α , TGF- β 1, IL-1 β and MCP-1 higher in the saliva of individuals with psoriasis than in healthy controls, with a positive correlation between TGF- β 1, IL-1 β and MCP-1 expression and severity of gingivitis/periodontitis |
| SARAC et al., 2017 | Case-control | Individuals with psoriasis had worse dental scores and toothbrushing habits than controls ($p=0.01$). Most psoriatic patients (60.5%) had poor oral hygiene habits ($p=0.001$). |
| UNGPRASERT; WIJARNPREECHA; WETTER, 2017 | Systematic review and metaanalysis | Individuals with periodontitis had a significantly increased risk of psoriasis (1.55 95% CI: 1.35–1.77). |
| EGEBERG et al., 2017 | Retrospective cohort | Increased risk of periodontitis associated with psoriasis, being higher with the severity of psoriasis. Adjusted periodontitis incidence rates were 1.66; (95% CI: 1.43-1.94) for mild psoriasis; 2.24; (95% CI: 1.46-4.44) for severe psoriasis; and 3.48 (95% CI: 2.46-4.92) for psoriatic arthritis. |
| WOESTE et al., 2019 | Case-control | Worse community periodontal index, worse oral health and greater bleeding on probing in individuals with psoriasis. |
| MENDES et al., 2019 | Case-control | High prevalence of periodontitis among psoriatic patients (46.1%) when compared to controls (33.1%). Individuals with psoriasis were 1.72 times more likely to have periodontitis than controls (OR = 1.72; 95%CI: 1.28–2.32; $p<0.001$). Increased prevalence of periodontitis according to the severity of psoriasis: Mild form (44.4%); moderate (46.3%) and advanced (47.1%)] when compared to the control group (33.1%). The final multivariate logistic model showed that the number of teeth (OR = 1.08; 95% CI: 1.01–1.14; $p= 0.018$), smoking (OR = 1.91; 95% CI: 1.19–3 .07; $p= 0.008$) and body mass index (OR = 1.13; 95%CI: 1.11–1.16; $p<0.001$) remained significantly associated with the occurrence of periodontitis. |
| Barros et al., 2020 | Case-control | Patients with psoriasis had significantly more sites with CAL ≥ 3 mm ($p < 0.03$) and CAL ≥ 5 mm ($p < 0.0001$), less sites with plaque ($p < 0.0001$), fewer teeth ($p < 0.0001$), and a high DMFT index ($p < 0.02$) as compared with controls. Severe periodontitis was significantly more frequent (87.1% \times 58.1%) and was a risk indicator for psoriasis after adjusting for sex, age, race, and smoking habits (odds ratio: 3.7, 95% confidence interval: 1.5-9.0, $p < 0.003$). |
| Baurecht et al, 2022 | Mendelian randomization (MR) | MR analyses did not suggest any effect of periodontitis on psoriasis. Similarly, there was no evidence to support an effect of psoriasis on periodontitis. |
| Dalmády et al.,2020 | Review article | Periodontitis, via the immunomodulatory effect of the oral microbiota, may play both a direct and indirect role in the development or exacerbation of psoriasis, and may influence the efficacy of antipsoriatic therapy. These new findings indicate a need for increased awareness, early recognition and focus on prevention of periodontitis for patients with psoriasis. |

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| Wu et al., 2022 | Cross-sectional | Baseline Psoriasis Area Severity Index (PASI) was significantly associated with Plaque Index. PASI at follow-up was positively correlated with CAL \geq 4 mm (%) and saliva IL-1 β levels. Psoriasis patients who used non-steroidal anti-inflammatory drugs or topical steroids had significantly lower gingival index, PD \geq 4 mm (%), and saliva IL-1 β and TNF- α levels. Moreover, a history of tobacco use was associated with higher PD \geq 4 mm (%). |
| Majchrzycka et al., 2022 | Case-control | All dental indices reflecting oral hygiene and periodontal health were significantly better in healthy controls than in patients with psoriasis. Further analysis revealed a statistically significant correlation between the levels of CRP, a few of the cytokines (IL-1, IL-17), and dental indices in psoriatic patients. Additionally, found that patients with psoriasis visited the dentist less frequently than healthy participants. |
| Han et al., 2022 | Retrospective cohort | In multivariable analysis, compared to the non-periodontitis group, periodontitis patients had a significantly higher risk of developing psoriasis (hazard ratio 1.116, 95% confidence interval 1.101-1.13). Non-smokers with periodontitis had an 11% increase in risk of psoriasis and smokers with periodontitis had a 26.5% increase in risk of psoriasis compared to non-smokers without periodontitis. |
| Zhang et al., 2022 | Systematic review and metaanalysis | Pooled effect estimate for nine studies showed that patients with periodontitis associated with a higher risk of psoriasis with a pooled OR of 2.87 (95% CI, 1.75–4.69) |