



Exploring the effect of periodontal treatment on disease activity in patients with rheumatoid arthritis



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Question

Does periodontal treatment (PT) have an effect on rheumatoid arthritis (RA) disease activity?

Introduction

- Rheumatoid arthritis (RA) is an autoimmune disease that targets the cells that line joints. The immune system attacks a tissue called synovium which produces synovial fluid. This acts as a lubricant, protecting bones and cartilage from rubbing together and causing friction. Damage to these tissues by the immune response results in inflammation, which can lead to stiffness, pain, and the erosion of the joints and surrounding tissue¹
- Periodontal disease (PD) is an inflammatory condition of gingival tissue which has progressed into the bone and ligaments supporting the teeth. This can cause teeth to become mobile and result in tooth loss.²

Both conditions result in inflammation, and multiple studies have proven a link between the two. Li *et al.* state that they 'share similar osteoclasia, human leukocyte antigen-DR4 allelic genes and immunological profile, and characteristic cytokines'.³ RA and PD have a common risk factor of smoking. PD has also been identified as a risk factor for RA, found in a systematic review and meta-analysis of studies investigating the relationship between RA and PD.⁴

Porphyromonas gingivalis (PG) is a gram negative, anaerobic bacterium which plays a major role in the development of PD. It has also been linked to RA, as a causal factor towards the onset of disease.³

It has been seen that when one of these conditions is not under control, it can have a negative effect on the other, causing patients who suffer from both to become stuck in a cycle where neither condition is able to improve or stabilise.⁵

As demonstrated above, RA and PD are linked in several ways, showing the complex nature of both conditions and the relationship between the two. By investigating this relationship and highlighting this to dental care professionals (DCPs), patients can be better educated and motivated to maintain good oral health.

Considering the ways in which these two conditions have been linked, the **aim** of this

review is to assess if periodontal treatment (PT) has an effect on RA disease activity.

Disease activity of RA can be measured in multiple ways. Some researchers choose to focus on one parameter for their studies, whereas others measure multiple parameters.

Methodology

Searches, using Boolean operators and truncators, were carried out across five different databases (Cochrane Library, Embase, Ovid Medline, CINAHL, and Web of Science). After exclusion, based on year of publication (2017-2021) and participants' medical history, six records were included:

- Two systematic reviews and meta-analyses
- Two randomised controlled trials
- Two cohort studies.

assessed across the studies in this review; all of these gave an indication of patients' RA condition before and after treatment. Types of PT also varied between studies, but all were appropriate intervention methods at the time they were carried out. Across six studies, only one lists smoking as part of the exclusion criteria. As a risk factor for both RA and PD, this is an important confounding factor which was not taken into consideration. The length of review period also differs, with some carrying out periodontal reviews after only six weeks of healing. This could be a major factor towards only seeing improvements in some RA disease activity parameters. Some parameters are more sensitive to RA disease activity than others; an improvement was seen in these parameters more often.

RA disease activity as some current evidence is low quality with several limitations which impact results. These should be done with suitable inclusion criteria, delivering effective PT as per BSP guidelines⁷ and with appropriate follow up periods to allow for healing. This will allow for more systematic reviews and meta-analyses to be conducted in the future which can be used to influence practice.

References

1. National Health Service. Overview: Rheumatoid arthritis. 2019. Available at: <https://www.nhs.uk/conditions/rheumatoid-arthritis/> (accessed 6 December 2021).
2. National Health Service. Overview – Gum disease. Available at: <https://www.nhs.uk/conditions/gum-disease/> (accessed 6 December 2021).
3. Li R, Tian C, Postlethwaite A *et al.* Rheumatoid arthritis and periodontal disease: What are the similarities and differences? *Int J Rheum Dis* 2017; **20**: 1887–1901.
4. Qiao Y, Wang Z, Li Y, Han Y, Zhou Y, Cao X. Rheumatoid arthritis risk in periodontitis patients: A systematic review and meta-analysis. *Joint Bone Spine* 2020; **87**: 556–564.
5. Mehta K J. Two-way relationship between rheumatoid arthritis and periodontal disease. *Int J Res Med Studies* 2016; **4**: 2511–2513.
6. Critical Appraisal Skills Programme. CASP Checklists. Available at: <https://casp-uk.net/casp-tools-checklists/> (accessed 30 November 2021).
7. British Society of Periodontology. BSP UK clinical practice guidelines for the treatment of periodontal diseases. 2021. Available at: https://www.bsperio.org.uk/assets/downloads/BSP_Treatment_Flow_Chart_16_For_Screen.pdf (accessed 1 December 2021).

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Evidence and appraisal

From the hierarchy of evidence, the top three study types, based on strength of results, were chosen for inclusion. These six studies were critically appraised to highlight strengths and weaknesses. Critical appraisal skills programme checklists for each individual study type were used to do this.⁶

Results

Four studies investigated the effect of PT compared with no PT on RA disease activity. Two studies saw patients receive PT, and measured RA disease activity parameters before treatment and after a follow-up period. Five studies found a decrease in at least one parameter. Other parameters had no statistically significant changes.

Discussion

Several RA disease activity parameters were

Conclusion

In five out of six studies in this review, PT was seen to have an effect on at least one parameter indicating RA disease activity. The results of other parameters vary greatly from seeing no change in one study to reductions in the others. This suggests that PT appears to have an effect on RA disease activity under certain conditions, reducing parameters indicating activity.

The periodontal status of patients and associated treatment would determine results and be more relevant to patients seen in practice who would undergo a course of treatment rather than a one-off visit and review period. Results would more likely be seen under these circumstances.

Recommendations

More robust intervention studies need to be carried out to investigate the effect of PT on

Useful resources

1. Aveyard H. *Doing a literature review in health and social care: a practical guide*. Maidenhead: McGraw-Hill Education, 2014.

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