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**LEVANTAMENTO METODOLÓGICO DE REVISÕES SISTEMÁTICAS
DE ESTUDOS DE INTERVENÇÃO EM PERIODONTIA UTILIZANDO
AMSTAR 2 E ROBIS**

**Faculdade de Odontologia
Universidade Federal de Minas Gerais
Belo Horizonte
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Alexandre Godinho Pereira

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ESTUDOS DE INTERVENÇÃO EM PERIODONTIA UTILIZANDO AMSTAR 2 E
ROBIS**

Tese apresentada ao Colegiado de Pós-graduação em Odontologia da Faculdade de Odontologia da Universidade Federal de Minas Gerais, como requisito parcial à obtenção do grau de Doutor em Odontologia – área de concentração em Periodontia.

Orientador: Prof. Dr. Luis Otávio de Miranda Cota
Coorientadora: Prof.^a Dra. Carolina Castro Martins

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LEVANTAMENTO METODOLÓGICO DE REVISÕES SISTEMÁTICAS DE ESTUDOS DE INTERVENÇÃO EM PERIODONTIA UTILIZANDO AMSTAR 2 E ROBIS

ALEXANDRE GODINHO PEREIRA

Tese de Doutorado defendida e aprovada, no dia vinte e oito de junho de dois mil e vinte e dois, pela Banca Examinadora designada pelo Colegiado do Programa de Pós-Graduação em Odontologia da Universidade Federal de Minas Gerais constituída pelos seguintes professores:

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RESUMO

Este estudo teve o objetivo de avaliar a qualidade metodológica e risco de viés das revisões sistemáticas e metanálises de estudos de intervenção (randomizados e não randomizados) na área de Periodontia. Buscas foram realizadas nas bases de dados: MedLine (PubMed), Embase (Elsevier), Web of Science, Scopus, Cochrane Library e LILACS para artigos de revisão sistemática, com ou sem metanálise, indexados no ano 2019 a 2020. Adicionalmente, foram realizadas buscas na literatura cinzenta, nas referências dos artigos selecionados e nos principais periódicos de área. As avaliações da qualidade metodológica e risco de viés foram realizadas através das ferramentas AMSTAR 2 e ROBIS, respectivamente. Os dados foram importados para o software IBM SPSS Statistics for Windows versão 25. Análises descritivas de frequência relativa e absoluta foram realizadas nas variáveis categóricas. Análises descritivas de média, desvio padrão e mínima/máxima foram realizadas nas variáveis contínuas. Cento e vinte e sete revisões sistemáticas cumpriram os critérios de elegibilidade e foram avaliadas. Na avaliação geral pelo ROBIS, 113 (90,6%) das revisões apresentaram alto risco de viés, 11 (7,1%) baixo risco de viés e 3 (2,4%) risco de viés indefinido. Segundo o AMSTAR 2, a qualidade metodológica foi alta em 13 revisões (10,2%), moderada em 1 (0,8%), baixa em 31 (24,4%) e criticamente baixa em 82 (64,6%). No geral, a qualidade das revisões sistemáticas de estudos de intervenção na área de Periodontia foi considerada baixa. Sugere-se que os pesquisadores que pretendam realizar revisões sistemáticas utilizem ao menos um dos dois instrumentos no processo de desenvolvimento do protocolo da revisão. Este simples processo, se respeitado e seguido em conjunto o PRISMA, tem o potencial de resultar na criação de protocolos mais completos e, conseqüentemente, em revisões de melhor qualidade.

Palavras-chave: Metanálise. Periodontia. Revisão sistemática. AMSTAR 2. ROBIS. Estudo metodológico.

ABSTRACT

Methodological survey of systematic reviews of intervention studies in periodontology using AMSTAR 2 and ROBIS

This study aimed to assess the methodological quality and risk of bias of systematic reviews and meta-analyses of intervention studies (randomized and nonrandomized studies) in periodontics. The following databases were searched: MedLine (PubMed), Embase (Elsevier), Web of Science, Scopus, Cochrane Library, and LILACS for systematic review articles, with or without meta-analysis, indexed between 2019 to 2020. Additionally, we searched on grey literature, and a manually searched the references of selected articles and main journals in the area. AMSTAR 2 and ROBIS tools were used to assess the methodological quality and risk of bias, respectively. Data were imported into the IBM SPSS Statistics for Windows version 25 software. Categorical variables were descriptively analyzed by relative and absolute frequency. Continuous variables were analyzed by mean, standard deviation, and minimum/maximum. One-hundred twenty-seven systematic reviews were included and were evaluated. In the overall ROBIS assessment, 113 (90.6%) were at high risk of bias, 11 (7.1%) were at low risk of bias, and 3 (2.4%) had unclear risk of bias. According to AMSTAR 2, 13 reviews (10.2%) had high methodological quality, 1 (0.8%) moderate, 31 (24.4%) low and 82 (64.6%) critically low. Overall, the quality of systematic reviews of intervention studies in the field of periodontics was low. Systematic review authors could use at least one between both tools before creating the study protocol. This simple process, if followed together with PRISMA, has the potential aid authors in the creation of more complete protocols and, consequently, better quality reviews.

Keywords: Meta-analysis. Periodontics. Systematic review. AMSTAR 2. ROBIS. Methodological Study.

LISTA DE TABELAS

Tabela 1 – Overall methodological quality according to AMSTAR 2 and overall risk of bias according to ROBIS.....	42
Tabela 2 – Detailed methodological quality assessed through AMSTAR 2.....	43
Tabela 3 – Detailed methodological quality assessed through ROBIS.....	46
Tabela 4 – Studies characteristics (categorical variables)	95
Tabela 5 – Studies characteristics (continuous variables)	100
Tabela 6 – Studies searching methods characteristics.....	101
Tabela 7 – Risk of bias tools used according to study design.....	102

LISTA DE ABREVIATURAS E SIGLAS

AMSTAR	A MeaSurement Tool to Assess systematic Reviews
GRADE	Grading of Recommendations Assessment, Development and Evaluation
nRCTs	Non-Randomized Clinical Trials
PRISMA	Preferred Reporting Items for Systematic reviews and Meta-Analyses
QUOROM	QUality Of Reporting Of Meta-analysis
RCTs	Randomized Clinical Trials
ROBINS-I	Risk Of Bias In Non-randomized Studies of Interventions
ROBIS	Risk Of Bias In Systematic Reviews
RSs	Revisões Sistemáticas
SRs	Systematic Reviews

SUMÁRIO

1 CONSIDERAÇÕES INICIAIS	11
1.2 Qualidade de evidência e risco de viés na área de Periodontia	13
2 OBJETIVOS	16
2.1 Objetivo Geral	16
2.2 Objetivos Específicos	16
3 JUSTIFICATIVA	17
4 METODOLOGIA E RESULTADOS	18
Appendix 1 – Search strategy	51
Appendix 2 – List of variables extracted during data extraction	76
Appendix 3 – List of excluded studies and reasons for exclusion.....	78
Appendix 4 – List of references included in this methodological survey	82
Appendix 5 – Tables 4 – 7	95
5 CONSIDERAÇÕES FINAIS	104
REFERÊNCIAS.....	105
ANEXO A – AMSTAR 2	107
ANEXO B – ROBIS	111
ANEXO C – Registro PROSPERO.....	114

1 CONSIDERAÇÕES INICIAIS

As revisões sistemáticas (RSs) de ensaios clínicos randomizados são consideradas os estudos com maior nível de evidência científica, sendo utilizadas para fundamentar recomendações de tratamentos e estratégias de saúde pública (CUELLO-GARCIA *et al.*, 2018).

Um dos principais precursores deste desenho de estudo foi James Lind. Em seu livro *Treatise on the scurvy*, considerado como a primeira revisão sistemática publicada (CLARKE; CHALMERS, 2018), Lind buscou exibir uma visão geral sobre o escorbuto, uma doença causada pela deficiência de vitamina C que, àquela época, assolava os marinheiros britânicos (LIND, 1753).

Tendo como princípio a avaliação imparcial de toda a informação disponível até o momento, o autor realizou uma busca nas principais bibliografias médicas da época e consultou especialistas no assunto buscando assim realizar um compilado bibliográfico para auxiliar médicos no diagnóstico, prevenção e tratamento dessa doença. No entanto, as técnicas de pesquisas epidemiológicas do século 18 ainda não eram cientificamente fundamentados, e, segundo próprio Lind, grande parte da literatura sobre o escorbuto era de confiabilidade duvidosa e/ou obtida por meio de metodologias deficientes (LIND, 1753).

Esta verificação da qualidade metodológica realizada pelo autor, ainda que um tanto subjetiva, levantou questionamentos sobre a validade da metodologia científica em seu tempo. E estes questionamentos se tornariam cada vez mais presentes na literatura médica (CLARKE; CHALMERS, 2018).

Apesar de Lind apresentar um estudo inovador para época, levariam ainda pelo menos 2 séculos para que as técnicas modernas de pesquisa epidemiológica começassem a se solidificar. O livro *Effectiveness and Efficiency: Random Reflections on Health Services*, escrito por Archie Cochrane em 1972, pode ser considerado um ponto de inflexão entre conceitos de pesquisa arcaicos e modernos (HILL, 2000).

Cochrane, após experiências traumatizantes durante o período em que foi, simultaneamente, prisioneiro de guerra e médico do campo de prisioneiros, percebeu que não havia evidência científica em muito do que realizava, chegando

a se questionar que muitas das intervenções empregadas por ele poderiam ter adiantado ou até mesmo causado a morte de seus pacientes (COCHRANE, 1972).

Ficou evidente para ele que pesquisas fundamentadas por ensaios clínicos randomizados controlados eram imprescindíveis para guiar tanto a prática clínica quanto as diretrizes de saúde pública, e que critérios explícitos deveriam ser utilizados para avaliar a qualidade das pesquisas publicadas (COCHRANE, 1972).

Seus conceitos serviriam como pedra angular da medicina baseada em evidências e resultariam, ao longo dos anos, em um aumento significativo do investimento público e da qualidade metodológica pesquisas médicas (HILL, 2000).

Porém, ainda que houvesse avanços conceituais nas metodologias utilizadas, parte substancial dos estudos e das revisões sistemáticas publicadas compartilhavam deficiências e imprecisões importantes. Mulrow, em 1987, verificou que grande parte das revisões publicadas na área médica eram "*frequentemente subjetivas, cientificamente infundadas, ineficientes*" e "*... com pouca atenção à avaliação sistemática*" (MULROW, 1987).

Relatos como de Mulrow foram observados por outros autores (SACKS *et al.*, 1987; 1996), fazendo com que, em 1999, fosse realizada uma tentativa de estabelecer um consenso para definir diretrizes para relatar revisões sistemáticas e metanálises (MOHER *et al.*, 1999).

A conferência *Quality of Reporting of Meta-analysis (QUOROM)*, foi um encontro de 3 dias envolvendo um grupo de especialistas onde foram definidos itens essenciais no relato de revisões sistemáticas (MOHER *et al.*, 1999).

O QUOROM statement viria 10 anos mais tarde a se tornar o *Preferred reporting items for systematic reviews and meta-analyses (PRISMA)* e se tornaria parte fundamental no esforço de padronização e aumento da qualidade metodológica de RSs (MOHER *et al.*, 2009). Porém, o PRISMA funciona como uma diretriz de itens a serem relatados, não servindo como instrumento de avaliação. Diante da necessidade de avaliar a qualidade dos artigos publicados, sugeriram, ao longo dos anos 2000, dezenas de instrumentos de avaliação de qualidade metodológica (SHEA *et al.*, 2007).

Estes instrumentos surgiram em diversos formatos e modelos. Entretanto, apresentavam deficiências importantes na avaliação ou eram de difícil aplicação, fazendo com que fossem raramente utilizados (SHEA *et al.*, 2007).

Em 2007, objetivando a criação de um instrumento que fosse facilmente aplicável e, ao mesmo tempo, eficiente, o *A MeaSurement Tool to Assess systematic Reviews* (AMSTAR) foi criado. Desenvolvido a partir do apanhado geral dos principais instrumentos utilizados, o instrumento AMSTAR é composto por 11 perguntas e indicado para avaliar criticamente a qualidade metodológicas de RS de ensaios clínicos randomizados (SHEA *et al.*, 2007).

Apesar de atingir uma parcela de sucesso entre pesquisadores, o AMSTAR continha certo grau de subjetividade e não englobava revisões com ensaios clínicos não randomizados, fatores que podem ser considerados deficiências, o que resultou em sua atualização em 2017, sendo renomeado AMSTAR 2 (Anexo 1). Na versão atualizada, ele foi adaptado para incluir também revisões sistemáticas de estudos de intervenção não randomizados e foram adicionados ou modificados itens do instrumento original para solucionar as deficiências identificadas (SHEA *et al.*, 2017).

O AMSTAR 2 é considerado um instrumento confiável e validado para avaliar criticamente a qualidade metodológica das revisões sistemáticas de ensaios clínicos controlados randomizados (RCTs) e não randomizados (nRCTs). Este instrumento consiste em 16 domínios e, dentre estes, 7 são considerados críticos e são utilizados para classificação da qualidade geral do viés metodológico das RSs analisadas (SHEA *et al.*, 2017).

Uma outra ferramenta desenvolvida foi o *Risk Of Bias In Systematic Reviews* (ROBIS) (Anexo 2). O ROBIS consiste na análise em 3 etapas. A primeira avalia a relevância da revisão e é opcional. A segunda visa identificar preocupações com o processo de revisão, e é dividida em quatro domínios: (1) “Critérios de elegibilidade do estudo”; (2) “Identificação e seleção de estudos”; (3) “Coleta de dados e avaliação de estudos”; e (4) “Síntese e achados”. E a terceira etapa avalia o risco de viés na interpretação dos resultados, e se esta interpretação abordou as preocupações identificadas na segunda fase (WHITING *et al.*, 2016).

1.2 Qualidade de evidência e risco de viés na área de Periodontia

Alguns estudos na área de Periodontia verificaram a qualidade metodológica das RSs. Natto e Hameedaldain (2019) analisaram a qualidade metodológica de RSs sobre a relação entre doenças periodontais e sistêmicas. Neste estudo, os autores utilizaram o AMSTAR e encontraram 25 estudos de alta qualidade, 14 de qualidade média e apenas 3 de baixa qualidade.

Faggion *et al.* (2013) avaliaram a qualidade metodológica de RSs sobre o efeito do histórico de periodontite na perda de implantes dentários. O estudo mostrou que das 9 revisões incluídas, 7 atenderam a menos de 50% dos critérios sugeridos pelo AMSTAR, demonstrando a baixa qualidade metodológica dos estudos nesta área.

A qualidade metodológica de RSs de estudos de regeneração periodontal foi também avaliada por Elangovan *et al.* (2013). Os autores concluíram que, das 14 revisões incluídas, apenas uma respondia positivamente a todos os itens do AMSTAR, 11 apresentavam pelo menos 7 respostas como positivas e 2 apresentaram somente 2 respostas positivas. Os autores ressaltaram que foi verificada significativa variabilidade estrutural e metodológica nos estudos avaliados.

Hasuike *et al.* (2017) utilizaram o AMSTAR para analisar RSs sobre o efeito do tratamento periodontal no controle glicêmico em pacientes com diabetes. Das 9 RSs e metanálises incluídas no estudo, 6 foram consideradas de qualidade moderada e apenas 3 de alta qualidade.

Um estudo recente avaliou a qualidade metodológica e o risco de viés em RSs de tratamentos para peri-implantite (HASUIKE *et al.*, 2019). Os autores verificaram que, dos 23 estudos incluídos e analisados pelo AMSTAR 2, 3 apresentaram alta qualidade, 6 baixa qualidade metodológica, e 14 foram julgados como tendo qualidade metodológica criticamente baixa. Este estudo também avaliou o risco de viés pelo ROBIS. O estudo verificou que apenas 1 revisão apresentou baixo risco de viés (revisão Cochrane) enquanto todas as outras apresentaram alto risco de viés. Este estudo em questão levanta questionamentos sobre a qualidade das evidências para o tratamento de peri-implantite, uma vez que a grande maioria apresentou alto risco de viés e baixa qualidade metodológica (HASUIKE *et al.*, 2019).

Esta grande variabilidade na qualidade das RSs demonstrada na literatura ressalta a importância da realização de estudos que avaliem o processo

metodológico nas pesquisas, para garantir que a prática clínica baseada em evidências seja fundamentada em estudos de alta qualidade e com baixo risco de risco de viés.

2 OBJETIVOS

2.1 Objetivo Geral

Avaliar a qualidade das revisões sistemáticas e metanálises de estudos de intervenção (randomizados e não randomizados) indexados no período de 01 outubro 2019 a 01 outubro de 2020 na área de Periodontia.

2.2 Objetivos Específicos

- a) Identificar sistematicamente as revisões sistemáticas de ensaios clínicos randomizados (RCTs) e não randomizados (nRCTs) na área de Periodontia indexadas no ano de 2019 a 2020;
- b) Avaliar a qualidade metodológica das revisões sistemáticas por meio da ferramenta AMSTAR 2;
- c) Avaliar o risco de viés das revisões sistemáticas por meio da ferramenta ROBIS;

3 JUSTIFICATIVA

A avaliação das revisões sistemáticas (RSs) e metanálises mais recentes na área de Periodontia fornecerá dados importantes relacionados à qualidade das evidências disponíveis relativas a tratamento e as principais tendências de pesquisa. Como as RSs e metanálises de estudos de intervenção são considerados os maiores níveis de evidência disponíveis, e influenciam diretamente na tomada de decisões clínicas em saúde, a verificação da qualidade destes artigos é de extrema importância. Esta avaliação pode orientar estudos futuros e apontar pontos importantes para a melhoria dos desenhos experimentais e controle de viés.

4 METODOLOGIA E RESULTADOS

A metodologia e os resultados serão apresentados na forma de um artigo científico, a seguir:

Methodological survey of systematic reviews of intervention studies in periodontology using AMSTAR 2 and ROBIS

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Authors' contribution

All authors have made substantial contributions to conception and design of the study. LOMC and CCM were involved in study conceptualization. AGP, CCM, JRC, SFF, SQN, TPP, LCMC and SFSF were involved in screening selection and data extraction. CCM and AGP were involved in data analysis. AGP, CCM and LOMC were involved in data interpretation and writing original draft. LOMC, FOC and CCM were involved in manuscript revision and editing. LOMC and CCM were involved in project administration and supervision.

Data Availability Statement

Data that support the findings of this study are available from the corresponding author upon reasonable request.

Abstract

Objective: To assess the methodological quality and risk of bias of systematic reviews of intervention studies in periodontics using AMSTAR 2 and ROBIS.

Methods: This methodological survey overviewed systematic reviews of randomized and non-randomized clinical trials, with or without meta-analysis, in the field of periodontology. MedLine, Embase, Web of Science, Scopus, Cochrane Library, LILACS were searched between October 1st, 2019 to October 1st, 2020, with no language restrictions. Additionally grey literature and hand search was performed. Paired independent reviewers screened studies, extracted data and assessed the methodological quality and risk of bias through the AMSTAR 2 and ROBIS tools. **Results:** One hundred twenty-seven reviews were included. According to AMSTAR 2, the methodological quality was mainly critically low (64.6%) and low (24.4%), followed by moderate (0.8%) and high (10.2%). According to ROBIS, 90.6% were at high risk of bias, followed by 7.1% low, and 2.4% unclear risk of bias. **Conclusion:** Current systematic reviews of intervention studies in periodontology were classified as low or critically low methodological quality and high risk of bias. Both tools led to similar conclusions. This highlights the need for stricter research practices when conducting systematic reviews in periodontics.

Keywords: bias, evidence-based dentistry, methods, periodontics, systematic review.

Clinical Relevance

Scientific rationale for study: Systematic reviews of intervention studies are considered the highest level of evidence, being frequently used to support treatment decisions. Methodological quality assessments are important to avoid imprecise clinical recommendations.

Principal findings: Most systematic reviews were classified as low quality and high risk of bias, mainly due to the low quality of the methodology used and the lack of mandatory information reported.

Practical implications: Researchers should follow stricter research protocols when conducting systematic reviews to improve the quality of the scientific evidence of periodontal interventions.

Introduction

Systematic reviews (RSs) of intervention studies are considered of high level of scientific evidence, being used to raise evidence that can support treatment recommendations and public health strategies (Cuello-Garcia et al., 2018). As other study designs, SRs are subject to biases that can compromise their validity and quality of evidence (Glenny, Esposito, Coulthard & Worthington, 2003). Some tools were developed to assess the methodological quality and risk of bias of SRs, such as AMSTAR 2 [*A Measurement Tool to Assess Systematic Reviews 2* (Shea et al., 2017)] an updated version of ASMTAR (Shea et al., 2007), and ROBIS (*Risk of Bias in Systematic Reviews*), the Cochrane Collaboration tool for risk of bias of SRs (Whiting et al., 2016).

Some overviews in periodontal field have assessed the methodological quality of SRs through AMSTAR, showing inconstant quality (Faggion & Giannakopoulos, 2013; Elangovan, Avila-Ortiz, Johnson, Karimbux, & Allareddy, 2013; Hasuike, Iguchi, Suzuki, Kawano & Sato, 2017; Natto & Hameedaldain,

2019). One overview assessed the methodological quality of SRs using the AMSTAR 2 and the risk of bias through ROBIS, and demonstrated very low overall quality (Hasuike et al., 2019). Among 23 SRs, only 3 SRs on peri-implantitis therapy had high quality according to AMSTAR 2, and only one were judged as low risk of bias according to ROBIS (Hasuike et al., 2019). This very low overall quality raised questions about the general quality of the available evidence from RSs in periodontology.

Hence, this overview aimed to: 1) describe the characteristics of SRs in periodontology; 2) assess if the certainty of the evidence is reported in these reviews; 3) assess the methodological quality using AMSTAR 2; 4) assess the risk of bias using ROBIS.

Review

This methodological survey was designed and performed following the recommendations of the Cochrane Handbook for Systematic Reviews of Interventions (Higgins, 2021) and was reported in accordance with the PRISMA checklist (Page et al., 2021).

Research question

What is the methodological quality and risk of bias of the SRs of intervention studies in periodontology published in 2019-2020?

Eligibility criteria

Inclusion criteria were SRs of intervention studies – randomized (RCTs) and non-randomized clinical trials (nRCTs) – with or without meta-analysis, in the field

of periodontology, indexed between October 1st, 2019 to October 1st, 2020. SRs that authors classified the studies as having prospective design were included as nRCTs. According to the *Risk of Bias in Non-randomized Studies of Interventions* (ROBINS-I), nRCTs are cohort studies in which intervention groups were allocated during the usual course of treatment instead of randomization (Sterne et al., 2016). To be consistent, all non-randomized studies, nominated by authors as clinical trials, controlled clinical trials, prospective controlled trials, non-randomized prospective studies, prospective clinical studies, prospective controlled clinical studies and retrospective cohort studies, were classified as nRCTs.

Exclusion criteria were: (a) SRs not related to the field of periodontology, (b) narrative or scope reviews, clinical guidelines, editorials or expert opinion papers, SRs of case-control and cross-sectional studies with PECO question, case reports and case series, pilot, in vitro and/or animal studies.

Search in databases

An expert in SRs (CCM) designed and verified the strategies searches, and one reviewer (AGP) searched the following databases: MedLine (Pubmed), Embase (Elsevier), Web of Science, Scopus, Cochrane Library and LILACS for articles indexed between October 1st, 2019 to October 1st, 2020, with no language restrictions. This time length is enough to represent the current status of the quality of evidence in periodontology in the previous years, as the average time between the last search for a SR and its publication varies between 8 (Beller, Chen, Wang & Glasziou, 2013) to 15 months (Sampson et al., 2008), and the mean time between the protocol's publication and the SR's publication is about 16 months (Andersen, Fonnes, Andresen & Rosenberg, 2021).

Grey literature was searched in OpenGrey, GreyLit and Google Scholar. A hand search was performed in the references list of selected articles, and in the main journals of periodontology found in the Journal Citation Reports (JCR) in the category "Dentistry, Oral Surgery and Medicine": *Journal of Clinical Periodontology*, *Journal of Periodontology*, *Journal of Periodontal Research*, *International Journal of Periodontics & Restorative Dentistry*, *Journal of Periodontal and Implant Science*, *Periodontology 2000*.

Additional information of search strategies, including search terms, are detailed in the supplementary material (Appendix 1).

Studies selection

Two pairs of independent reviewers screened studies based on titles and abstracts and then full text (AGP and SFF; JRC and LCMC). The reviewers were trained with a set of 10% of studies in each phase. In cases of less than 80% of agreement, additional rounds of training were carried out until reaching the necessary standard for each step. After reviewers achieved at least 80% of agreement, they underwent the screening process with the remaining of studies. The Rayyan platform (Ouzzani, Hammady, Fedorowicz & Elmagarmid, 2016) was used for studies screening. In cases of disagreement, an expert reviewer was consulted (CCM).

Data extraction and assessment of methodological quality

Data extraction, assessment of methodological quality and risk of bias were performed through the AMSTAR 2 (Shea et al., 2017) and ROBIS (Whiting et al., 2016) tools by four pairs of independent reviewers (AGP and SFF; AGP and LCMC; JRC and SQN; CCM and TPP), using Excel spreadsheet editor. Reviewers were

trained by two reviewers (AGP and CCM), the second one with broad experience in systematic reviews methodology. Again, the reviewers underwent as many rounds of training as necessary, until reaching 80% of agreement. All disagreements were solved by discussion and consensus. If consensus was not achieved, the principal investigator made the final decision.

General data were extracted from the articles, and the list of the extracted data is available in the supplementary material (Appendix 2). We uploaded the SRs protocols from the registration platform to compare with the published review, and extracted the JCR impact factor and the h-5 index of the journals from the JCR and Google Scholar Metrics, respectively.

Disagreements during this step were resolved between the pair of reviewers. If disagreement persisted, the principal investigator was responsible for reaching a final consensus. Two reviews in Mandarin were translated using a translation tool.

Statistical analysis

Data was entered in IBM SPSS Statistics for Windows version 25 (Armonk, NY: IBM Corp.) for descriptive analyses. We calculated the relative and absolute frequencies for categorical variables, and mean, standard deviation and minimum/maximum values were provided for continuous variables.

Results

Literature search

One hundred twenty-seven SRs were included (Figure 1 shows the screening process). A list of excluded studies with reasons for exclusion is available on Appendix 3 and a list of references of the included RSs is available in Appendix 4.

Characteristics of the studies

Studies characteristics are presented in Tables 4-7 (Appendix 5). The main language of publication was English (n= 124; 97.6%). The most common journals where the SRs were published were: *Journal of Clinical Periodontology* (n=17; 13.4%), *Clinical Oral Investigations* (n=10; 7.9%) and *BMC Oral Health* (n=9; 7.1%). Only 34.6% (n=44) of SRs were open access, and 66.1% (n=84) were available without restriction. Ninety-three (73.2%) journals had JCR impact factor with mean of 4.4 ± 2.5 . One-hundred three (96.8%) journals had h5 index, with an average of 46.1 ± 29.3 (1.6 – 9.3).

Origin and authorship

The number of authors ranged from 1 to 24 (mean 5.3, ± 2.6). Twenty-seven per cent of SRs had authors from different continents sharing the authorship (n=34). Few SRs included an epidemiologist (n=6, 4.7%), a librarian (n=9, 7.1%) and a biostatistician (n=9, 7.1%) in the research team.

Main topics of study

The main intervention topics addressed by SRs were related to: antiseptics (n=23; 18.1%), soft tissue regeneration (n=20; 15.7%), periodontal photomedicine (n=18; 14.2%), antimicrobials (n=14; 10.9%) and guided bone regeneration (n=13; 10.2%).

The main periodontal conditions treated were: periodontitis (n=37; 29.1%), gingivitis and plaque/oral hygiene (n=33; 26.0%), gingival recessions (n=14; 11.0%), peri-implant diseases (n=13; 10.2%) and periodontal bone defects (n=12; 9.4%).

Funding and conflict of interest

The main source of funding was: own financing (n=48; 37.8%), government/university (n=45; 35.4%) and industry (n=4; 3.1%). Twenty-seven RSs (21.3%) did not report funding sources. One-hundred eight SRs (85.0%) reported not having conflict of interest.

Protocol, register and PRISMA

More than a third of the SRs (n=48; 37.8%) did not mention a study protocol. Among the 79 SRs that reported a protocol, 71 (89.9%) and 8 (10.1%) had registered and non-registered protocols, respectively. The most common registration platform was the *International Prospective Register of Systematic Reviews* (PROSPERO) (n=61; 85.9%).

Searches and eligibility restrictions

A mean of 3.6 (± 1.5) databases were searched, and 1.2 (± 1.5) databases for grey literature. A manual search on the articles' references was performed by 70.9% (n=90) of SRs, and 41.7% (n=53) of SRs manually searched in journals' interest area.

The most common databases searched were: MedLine (n=125; 98.4%), Cochrane Library (n=97; 76.4%), Embase (n=70; 55.1%), Web of Science (n=40; 31.5%), Scopus (n=38; 29.9%), Lilacs (n=16; 12.6%) and CINAHL (n=10; 7.9%).

Number of studies and the presence of meta-analysis

The mean number of studies included per SR was 15.9 ± 15.7 (range of 2–91), being 15.6 ± 15.7 (1–91) RCTs and 0.4 ± 1.3 (0–12) nRCTs. The total number of participants ranged from 67 to 13,426 individuals and the mean number of analysed outcomes was 4.6 ± 2.9 (1–19). Most SRs ($n=96$; 75.6%) presented meta-analysis, 13 (10.2%) presented network meta-analysis, and 8 (6.3%) had a meta-regression. On average, 14.3 ± 16.3 (2–105) studies were included in the meta-analyses and 3.2 ± 1.9 (1–11) outcomes were meta-analysed SR.

Assessment of risk of bias and certainty of the evidence

The main risk of bias tool used for RCTs was Cochrane ($n=103$; 81.1%) and ROBINS-I for nRCTs ($n=17$; 23.5%).

Thirty-two (25.2%) SRs assessed the certainty of the evidence using the GRADE approach, and among them, 12 (37.5%) assessed the certainty of the evidence following the GRADE approach guide, 7 (21.9%) partially followed it, and 13 (40.6%) deviated from the GRADE approach guide.

AMSTAR 2

In general, the methodological quality was critically low ($n=82$, 64.6%), low ($n=31$, 24.4%), high ($n=13$, 10.2%) and moderate ($n=1$, 0.8%). The AMSTAR 2 assessment is shown in Tables 1 and 2.

The items with the highest percentage of overall negative responses were: item 3 (reason for selection of certain study designs; 87.4%), item 10 (report of funding sources for the included studies; 67.7%) and item 4 (careful search of the literature; 65.4%). Five items considered critical according to AMSTAR 2 had large percentage of negative assessments: item 2 (presence of protocol and justification for its modifications; 37.8%), item 4 (careful literature search; 65.4%), item 7 (list of

excluded articles with justifications; 41.7%), item 13 (consideration of the risk of bias in individual studies; 40.9%), item 15 (investigation and discussion of the impact of publication bias; 40.2%).

ROBIS

In general, 113 (90.6%) SRs were considered to be at high risk of bias, 11 (7.1%) with low risk, and 3 (2.4%) with unclear risk of bias. Data from ROBIS evaluations are shown in Tables 1 and 3.

Seventy-five per cent (n=95) SRs were judged with high risk on domain 1 (study eligibility criteria), and 25.2% (n=32) were judged as low risk of bias. The main issues were unjustified absence or deviation from the protocol (Q1.1; n=64; 50.6%) and unjustifiable restrictions in the eligibility criteria (Q1.5; n=63; 49.6%).

In domain 2 (identification and selection of studies), 81.1% of SRs (n=103) were at high risk and 18.1% (n=23) low risk of bias. The main issues were related to deficiencies in the literature searching in the main databases (Q2.1; n=56; 44.1%) and in the complementary searches (Q2.2; n=69; 54.2%).

The domain 3 (data collection and study appraisal), 36.2% of SRs (n=46) were at high risk of bias, 34.6% (n=44) low risk of bias and 29.1% (n=37) were at unclear risk of bias. The main issues were related to the lack of details of the included studies (Q3.2; n=36; 28.3%) and lack of the inclusion of relevant study results (Q3.3; n=22; 17.3 %). It is noteworthy that this was the domain with the highest percentage of undefined risk of bias, mainly due to use of an inappropriate risk of bias tool (Q3.4; n=48; 37.8%) and lack of independent reviewers to extract data (Q3.1; n=30; 23.6%).

The domain 4 (synthesis and findings) accounted with the highest overall risk of bias among the 4 domains: 110 (86.6%) SRs had high risk, while 12 (9.4%) SRs

had low risk and 5 (3.9%) had unclear risk of bias. The main issues were the lack of additional analysis or synthesis to test robustness of the results (Q4.5; n=95; 74.8%) and lack of assessment of the high risk of bias studies in the synthesis of results (Q4.6; n=79; 62.2%).

Discussion

The majority of SRs had high risk of bias according to the ROBIS that agreed with the low methodological quality of AMSTAR 2. It seems that both tools can indicate similar results as they point out in the same direction.

A wide variety of methodological deficiencies resulted in the classification of SRs as having high risk of bias. The absence or unjustified changes of the study protocol was the most important issue according to both tools. The prior creation and registration of a protocol is essential for ensuring the transparency of study methods and allowing adequate peer review of the proposed methodology, avoiding thus the selective reporting bias (Higgins et al., 2021).

The deficiency of search strategies was another important identified bias. Search strategies for SRs should be as extensive as possible, without unjustifiable restrictions, including searches in the references of selected studies and in clinical trial registries. Additionally, complementary searches constitute an important source for the identification of potential studies. Its absence or unjustified restrictions increases the possibility of publication, language and selection biases, among others (Higgins et al., 2021).

Among the nine SRs that included a librarian on the research team, 77.8% had high methodological quality searches when assessed by AMSTAR 2, in contrast to 17.8% of high-quality searches in SRs not including librarians. The inclusion of librarians, although not mandatory, is beneficial as it provides guidance at various

stages of the research, such as in the processes of designing search strategies and is associated with more reproducible searches and improved methodological reporting in dental medicine SRs (Schellinger, Sewell, Bloss, Ebron & Forbes, 2021).

The processes of selection, data extraction and assessment of the risk of bias, which should be ideally carried out independently by more than one reviewer, were presented incompletely in most of the SRs. Cross-checking or duplicate selection processes, data extraction and assessment of risk of bias can reduce biases, as well as the potential subjectivity of one single reviewer (Aromataris & Munn, 2020).

In addition to factors associated with methodological processes, the lack of robustness of the results and excessive bias in primary studies also lead to negative classification through ROBIS assessment. Findings from SRs, especially those with meta-analyses, must be evaluated through complementary tests to assess its robustness, such as sensitivity tests, subgroup analysis, meta-regression and funnel plots (Whiting et al., 2016). Few studies have proven the robustness of their findings, and the absence of such tests can result in false positive inferences in a meta-analysed result, leading the reader to believe in ineffective treatments.

Saltaji, Armijo-Olivo, Cummings, Amin & Flores-Mir (2017) reported that 68% of RCTs in the field of dentistry had an unclear or high risk of bias, according to the Cochrane risk of bias domains. If SRs do not test the robustness by meta-analytic approaches such as sensitivity analysis and meta-regression, the overall evidence may be biased.

The vast majority of SRs were of low and critically low quality when assessed by AMSTAR 2 and judged as high risk of bias by ROBIS. Overall, these two instruments led to similar conclusions in 93.7% of the assessments, although they

are intended for different purposes. The first one is designed to assess the methodological quality of RS, or if the important aspects of the methods are being full filled (Shea et al., 2017). The second one can detect the risk of bias, so, although the SRs had full filled one item, it does not mean that is free of bias (Whiting et al., 2016). This high agreement is probably due to the overlapping questions between these instruments (Perry, Whitmarsh, Leach & Davies, 2021), as well as the low general methodological quality of the SRs analysed.

General characteristics

The main source of SRs was the collaboration among authors from different continents (26.8%) and most SRs (97.6%) were published in English. This trend demonstrates the globalization of world science with authors from different countries resulting in international partnerships, exchange of knowledge and resources between research groups and a greater visibility of scientific research (Wagner, Whetsell & Mukherjee, 2019).

Regarding the scope of the journals, 44.9% of SRs were published in general dental journals. This can be partially explained by the high percentage of studies (26%) whose interventions aimed at improving oral hygiene habits (plaque reduction and gingivitis), areas of common interest in most dental specialties. In addition, it is important to note that some periodontology journals are no longer accepting submissions of reviews.

Few RSs (7.9%) did not mention conflict of interest in the paper at all or did not mention about funding (21.3%). The presence of financial ties can be associated with positive outcomes in RCTs (Ahn et al., 2017). In addition, a survey of 3,247 scientists funded by the US National Institutes of Health showed that 15.5% admitted to altering a study's design, methods, or results in response to pressure

from funding sources (Martinson, Anderson & de Vries, 2005). Thus, reporting potential conflicts of interest and funding sources is mandatory in scientific publications, as they aim to demonstrate the transparency and impartiality of the researchers who carry out the studies (Higgins et al., 2021).

Only a quarter of SRs assessed the certainty of evidence using the GRADE approach. The assessment of the certainty of the evidence is important to help interpreting the results. As it is a more conservative approach, it can help to avoid misleading conclusions. (Zhang, Akl & Schünemann, 2018). Therefore, any SRs of intervention, independent of the field of science, should add the analysis of the certainty of the body of evidence in their methods (Zhang et al., 2018).

Potential factors associated with the low methodological quality

The pressure for scientific publication, exerted either by academic competition or by funding agencies, can often drive researchers to publish at any cost, a concept known as “publish or perish” (Neill, 2008). Therefore, scientific research is now facing academic quality erosion, often with individualistic objectives, generating a large volume of articles of questionable quality and, lately, the spread of predatory journals (Else & Van Noorden, 2021). The pursuit of publications may lead researchers to conduct SRs because they might mistakenly consider that this study design presents some easiness and readiness over others. Many times, ideal methodological processes may be neglected.

Moreover, the peer review process might not include experienced and qualified reviewers to judge the SRs with the scientific rigor required (Bohannon, 2013). This can be observed by the high number of articles being removed from scientific databases, either due to duplication, falsification of results or even due to

logic issues, as in the case of SciGen articles, created by an automatic article generator software (Bohannon, 2013; Noorden, 2021).

This chaotic context in which scientific research is inserted has been the subject of studies that showed that competitive research environments may increase not only the productivity of scientists, but also their bias (Fanelli, 2010), reliability (Tiokhin, Yan & Morgan, 2021) and may be directly influencing the quality of currently published SRs (Sarewitz, 2016).

Limitations

The present review had three pairs of independent reviewers, which may have resulted in different classifications by the peers. However, in order to establish solid classification criteria and to achieve high levels of agreement, four training and calibration sessions were conducted using the guidance documents of AMSTAR 2 and ROBIS (Whiting et al., 2016; Shea et al., 2017). A certain degree of variability in inter-examiner agreement was previously demonstrated (Perry et al., 2021; Gates et al., 2021). This methodological review is strong as it is the first one that raised the methodological quality using the new AMSTAR 2 together with ROBIS for risk of bias. Moreover, we extracted data of several characteristics of included SRs that are detailed in the supplementary material.

Conclusion

The SRs of intervention studies in periodontology were of low methodological quality and high risk of bias. Although designed for different purposes, both AMSTAR 2 and ROBIS could lead to similar directions. The GRADE approach has been is being used by about one quarter of the SRs. This methodological survey

highlights the need for stricter research practices when conducting SRs. AMSTAR 2 and ROBINS could help the authors to plan the protocol of their SRs.

Protocol and register

This study protocol was registered a priori at PROSPERO (#CRD42020215676; “*Quality assessment of systematic reviews and meta-analysis of periodontal intervention studies: an overview*”) and no changes were deemed necessary after the start of the study.

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Conflict of interest

Authors declare no conflict of interest regarding authorship, execution and publication of the present study.

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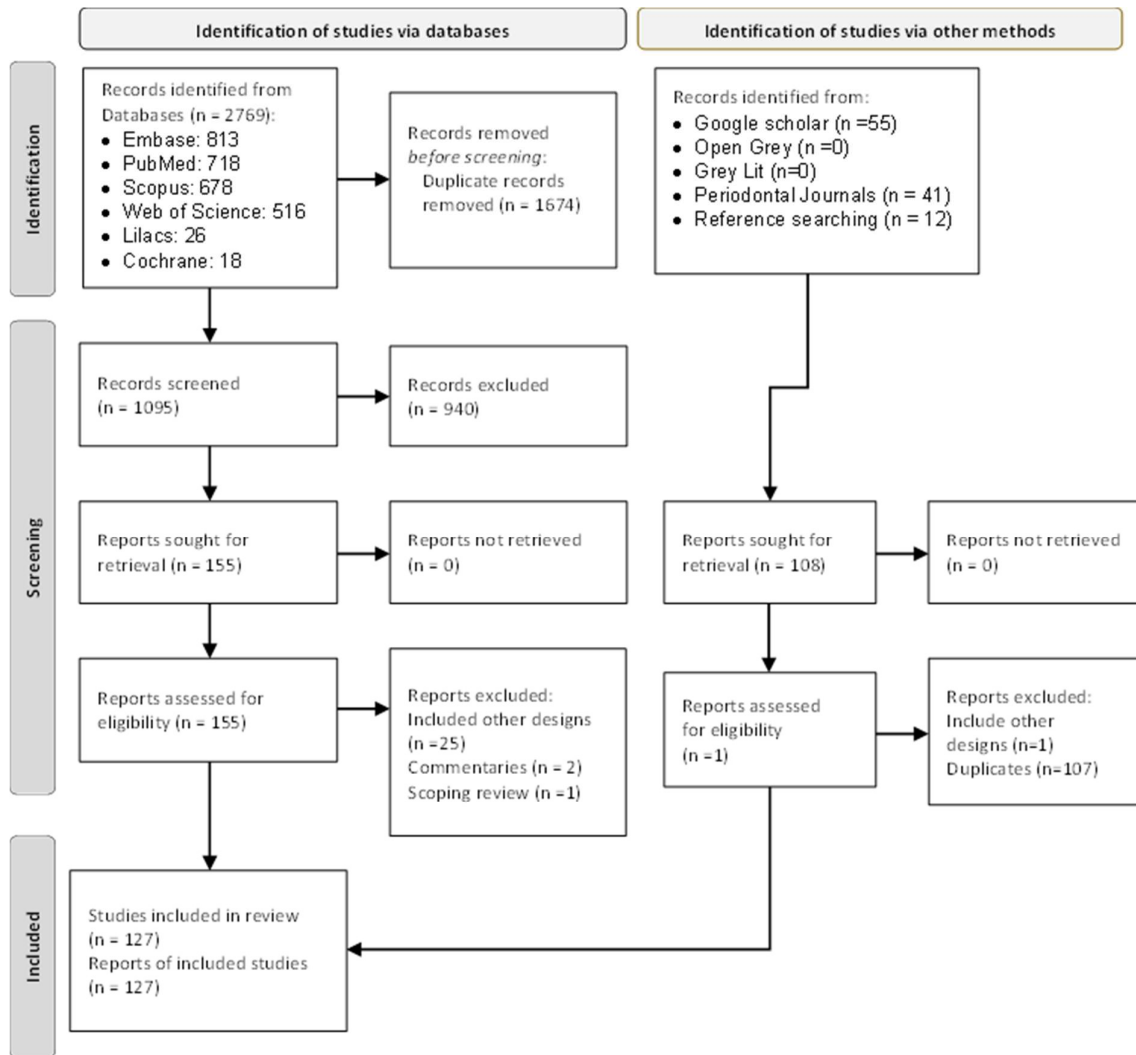


Figure 1. PRISMA flowchart.

Table 1. Overall methodological quality according to AMSTAR 2 and overall risk of bias according to ROBIS.

AMSTAR 2	n = 127 (100%)
High	13 (10.2%)
Moderate	1 (0.8%)
Low	31 (24.4%)
Critically low	82 (64.6%)
ROBIS	n = 127 (100%)
High	115 (90.6%)
Low	9 (7.1%)
Unclear	3 (2.4%)

Table 2. Detailed methodological quality assessed through AMSTAR 2.

1-Did the research questions and inclusion criteria for the review include the components of PICO?	n = 127 (100%)
Yes	119 (93.7)
No	8 (6.3)
2-Did the report of the review contain an explicit statement that the review methods were established prior to conduct of the review and did the report justify any significant deviations from the protocol?	n = 127 (100%)
Yes	46 (36.2)
Partial yes	33 (26.0)
No	48 (37.8)
3-Did the review authors explain their selection of the study designs for inclusion in the review?	n = 127 (100%)
Yes	16 (12.6)
No	111 (87.4)
4-Did the review authors use a comprehensive literature search strategy?	n = 127 (100%)
Yes	27 (21.3)
Partial yes	17 (13.4)
No	83 (65.4)
5-Did the review authors perform study selection in duplicate?	n = 127 (100%)
Yes	105 (82.7)
No	22 (17.3)
6-Did the review authors perform data extraction in duplicate?	n = 127 (100%)
Yes	95 (74.8)
No	32 (25.2)

7-Did the review authors provide a list of excluded studies and justify the exclusions?	n = 127 (100%)
Yes	74 (58.3)
No	53 (41.7)
8-Did the review authors describe the included studies in adequate detail?	n = 127 (100%)
Yes	78 (61.4)
Partial yes	32 (25.2)
No	17 (13.4)
9-Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?	n = 127 (100%)
Yes	115 (90.6)
Partial yes	4 (3.1)
No	8 (6.3)
10- Did the review authors report on the sources of funding for the studies included in the review?	n = 127 (100%)
Yes	39 (30.7)
No	88 (69.3)
11-If meta-analysis was justified did the review authors use appropriate methods for statistical combination of results? (Only complete this item if meta-analysis of other data synthesis techniques were reported)	n = 127 (100%)
Yes	94 (74.0)
No	2 (1.6)
No meta-analysis conducted	31 (24.4)
12- If meta-analysis was performed did the review authors assess the potential impact of RoB in individual studies on the results of the meta-analysis or other evidence synthesis?	n = 127 (100%)
Yes	28 (22.0)
No	68 (53.5)
No meta-analysis conducted	31 (24.4)

13- Did the review authors account for RoB in individual studies when interpreting/ discussing the results of the review?	n = 127 (100%)
Yes	75 (59.1)
No	52 (40.9)
14- Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?	n = 127 (100%)
Yes	98 (77.2)
No	28 (22.0)
15-If they performed quantitative synthesis did the review authors carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the results of the review?	n = 127 (100%)
Yes	45 (35.4)
No	51 (40.2)
No meta-analysis conducted	31 (24.4)
16-Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?	n = 127 (100%)
Yes	116 (91.3)
No	11 (8.7)

Table 3. Detailed risk of bias assessed through ROBIS.

Q1.1 Did the review adhere to pre-defined objectives and eligibility criteria?	n = 127 (100%)
Yes	46 (36.2)
Probably yes	17 (13.4)
Probably no	53 (41.9)
No	11 (8.7)
Q1.2 Were the eligibility criteria appropriate for the review question?	n = 127 (100%)
Yes	91 (71.7)
Probably yes	24 (18.9)
Probably no	10 (7.9)
No	2 (1.6)
Q1.3 Were eligibility criteria unambiguous?	n = 127 (100%)
Yes	105 (82.7)
Probably yes	13 (10.2)
Probably no	7 (5.5)
No	2 (1.6)
Q1.4 Were any restrictions in eligibility criteria based on study characteristics appropriate (e.g. date, sample size, study quality, outcomes measured)?	n = 127 (100%)
Yes	86 (67.7)
Probably yes	15 (11.8)
Probably no	18 (14.2)
No	7 (5.5)
Not informed	1 (0.8)
Q1.5 Were any restrictions in eligibility criteria based on sources of information appropriate (e.g. publication status or format, language, availability of data)?	n = 127 (100%)
Yes	59 (46.5)
Probably yes	4 (3.1)
Probably no	32 (24.4)

No	31 (25.2)
Not informed	1 (0.8)
Concerns regarding specification of study eligibility criteria	n = 127 (100%)
High	95 (74.8)
Low	32 (25.2)
Unclear	0 (0.0)
Q2.1 Did the search include an appropriate range of databases/electronic sources for published and unpublished reports?	n = 127 (100%)
Yes	70 (55.1)
No	56 (44.1)
Not informed	1 (0.8)
Q2.2 Were methods additional to database searching used to identify relevant reports?	n = 127 (100%)
Yes	53 (41.7)
Probably yes	4 (3.1)
Probably no	0 (0.0)
No	69 (54.3)
Not informed	1 (0.8)
Q2.3 Were the terms and structure of the search strategy likely to retrieve as many eligible studies as possible?	n = 127 (100%)
Yes	46 (36.2)
Probably yes	22 (17.3)
Probably no	40 (31.5)
No	13 (10.2)
Not informed	6 (4.7)
Q2.4 Were restrictions based on date, publication format, or language appropriate?	n = 127 (100%)
Yes	47 (37.0)
Probably yes	3 (2.4)
Probably no	37 (29.1)
No	38 (29.9)

Not informed	2 (1.6)
Q2.5 Were efforts made to minimize error in selection of studies?	n = 127 (100%)
Yes	88 (69.3)
Probably yes	14 (11.0)
Probably no	0 (0.0)
No	2 (1.6)
Not informed	23 (18.1)
Concerns regarding specification of study eligibility criteria	n = 127 (100%)
High	103 (81.1)
Low	23 (18.1)
Unclear	1 (0.8)
Q3.1 Were efforts made to minimize error in data collection?	n = 127 (100%)
Yes	74 (58.3)
Probably yes	21 (16.5)
Probably no	2 (1.6)
No	0 (0.0)
Not informed	30 (23.6)
Q3.2 Were sufficient study characteristics available for both review authors and readers to be able to interpret the results?	n = 127 (100%)
Yes	79 (62.2)
Probably yes	12 (9.4)
Probably no	21 (16.5)
No	15 (11.8)
Q3.3 Were all relevant study results collected for use in the synthesis?	n = 127 (100%)
Yes	69 (54.3)
Probably yes	35 (27.6)
Probably no	14 (11.0)
No	8 (6.3)

Not informed	1 (0.8)
Q3.4 Was risk of bias (or methodological quality) formally assessed using appropriate criteria?	n = 127 (100%)
Yes	98 (77.2)
Probably yes	19 (15.0)
Probably no	6 (4.7)
No	4 (3.1)
Q3.5 Were efforts made to minimize error in risk of bias assessment?	n = 127 (100%)
Yes	69 (54.3)
Probably yes	8 (6.3)
Probably no	2 (1.6)
No	0 (0.0)
Not informed	48 (37.8)
Concerns regarding specification of study eligibility criteria	n = 127 (100%)
High	46 (36.2)
Low	44 (34.6)
Unclear	37 (36.2)
Q4.1 Did the synthesis include all studies that it should?	n = 127 (100%)
Yes	61 (48.0)
Probably yes	56 (44.1)
Probably no	9 (7.1)
No	0 (0.0)
Not informed	1 (0.8)
Q4.2 Were all pre-defined analyses reported or departures explained?	n = 127 (100%)
Yes	56 (44.1)
Probably yes	6 (4.7)
Probably no	3 (2.4)
No	11 (8.7)
Not informed	51 (40.2)

Q4.3 Was the synthesis appropriate given the nature and similarity in the research questions, study designs and outcomes across included studies?	n = 127 (100%)
Yes	94 (74.0)
Probably yes	30 (23.6)
Probably no	0 (0.0)
No	3 (2.4)
Q4.4 Was between-study variation (heterogeneity) minimal or addressed in the synthesis?	n = 127 (100%)
Yes	74 (58.3)
Probably yes	32 (25.2)
Probably no	12 (9.4)
No	9 (7.1)
Q4.5 Were the findings robust, e.g. as demonstrated through funnel plot or sensitivity analyses?	n = 127 (100%)
Yes	19 (15.0)
Probably yes	13 (10.2)
Probably no	45 (35.4)
No	50 (39.4)
Q4.6 Were biases in primary studies minimal or addressed in the synthesis?	n = 127 (100%)
Yes	17 (13.4)
Probably yes	31 (24.4)
Probably no	40 (31.5)
No	39 (30.7)
Concerns regarding specification of study eligibility criteria	n = 127 (100%)
High	110 (86.6)
Low	12 (9.4)
Unclear	5 (3.9)

Appendix 1 – Search strategy

Search strategies used according to electronic databases (date: from 01 October 2019 to 01 October 2020).

MedLine through PUBMED

((Periodontium OR Parodontium OR Parodontium OR "Tooth Supporting Structures" OR Periodontitis OR Pericementitis OR periodont* OR Gingivitis OR "Periodontal Diseases" OR Parodontosis OR "Pyorrhea Alveolar*" OR "Chronic Periodontitis" OR "Adult Periodontitis" OR "Aggressive Periodontitis" OR "Early-Onset Periodontitis" OR "Juvenile Periodontitis" OR "Circumpubertal Periodontitis" OR "Prepubertal Periodontitis" OR Periodontosis OR periodontal* OR "Periodontal Attachment Loss" OR "Attachment Loss" OR "Periodontal Ligament" OR "Alveolodental Ligament" OR "Alveolodental Membrane" OR Gomphosis OR "Periodontal Pocket" OR "Periodontal abscess" OR periodontic* OR "Periodontal Medicine" OR "Periodontal Atrophy" OR "Atrophy of Periodontium" OR "Gingivo-Osseous Atrophy" OR "Gingival Hemorrhag*" OR "Dental Calcul*" OR Tartar OR "Furcation Defect*" OR furcation* OR "Gingival Disease*" OR Gingivosis OR "Gingival Pocket" OR "Peri-Implantitis" OR Periimplantitis OR "peri-implant*" OR periimplant* OR "Peri-implant Mucositis" OR "Periimplant mucositis" OR "Crestal bone loss*" OR "Tongue coat*" OR "Gingival Recession*" OR "Atrophy of Gingiva" OR "Gingival Atrophy" OR "Alveolar Bone Loss*" OR "Alveolar Bone Atrophy" OR "Alveolar Process Atrophy" OR "Alveolar Resorption" OR "Periodontal Bone Loss" OR "Periodontal Resorption" OR Pericoronitis OR "Tooth Mobilit*" OR "Gingival Crevicular Fluid" OR "Gingival Exudate" OR "Necrotizing Ulcerative Gingivitis" OR "Acute Membranous Gingivitis" OR "Acute Necrotizing Ulcerative Gingivitis" OR "Fusospirillary Gingivitis" OR Fusospirillosis OR "Phagedenic Gingivitis" OR "Ulcerative Stomatitis" OR "Trench Mouth" OR "Vincent Angina" OR "Vincent Infection" OR "Vincent's Infection" OR "Vincent's Gingivitis" OR "Vincent's Stomatitis" OR "Necrotizing ulcerative periodontitis" OR "Necrotizing periodontitis" OR "Gingival Hypertrophy" OR "Gingival Hyperplasia" OR "Gingival Overgrowth" OR halitosis OR "bad breath*" OR "Breath malodor*" OR "Breath malodour*" OR "Oral malodor*" OR "Oral malodour*" OR "suppurative periodont*" OR "Gingival dehiscence*" OR "Gingival inflammation" OR "Mucogingival problem*" OR "infrabony pocket*" OR "infrabony defect*" OR "intrabony pocket*" OR "intrabony defect*" OR "suprabony pocket*" OR "suprabony defect*" OR "interdental bone loss*" OR "Periodontal Index*" OR "Bleeding on probing*" OR CPITN OR "Community Periodontal Index of Treatment Needs" OR "Gingival Bleeding on Probing" OR "Gingival Index*" OR "Dental Plaque Index" OR "Dental Plaque Indice*" OR "Dental Plaque" OR "Clinical attachment level*" OR "Clinical attachment loss*" OR "Probing depth*" OR "Guided Tissue Regeneration" OR "Guided Periodontal Tissue

Regeneration" OR "Periodontal Guided Tissue Regeneration" OR "Periodontal Debridement*" OR "Periodontal Pocket Debridement" OR "Dental Scaling*" OR "Root Scaling" OR "Subgingival Scaling" OR "Supragingival Scaling" OR "Periodontal Dressing*" OR "Periodontal Splint*" OR "Periodontal Prosthesis*" OR Gingivoplasty OR "Subgingival Curettage*" OR "Gingival curettage*" OR "Periodontal Epithelial Debridement" OR "root planing*" OR Mouthwash* OR "mouth rinse" OR "Mouth Bath" OR "Mouth Wash" OR "oral irrigat*" OR "oral rinse*" OR "Therapeutic Irrigation" OR "Crown Lengthening*" OR Dentifrice* OR "Dental Polish*" OR Toothbrush* OR "Dental Device*" OR "Dental Floss*" OR "Dental Prophylaxis" OR Toothpaste* OR "mechanical plaque control*" OR "ultrasonic scaling*" OR "ultrasonic debridement" OR "chemical plaque control*" OR "Powered floss*" OR "Essential oil rins*" OR chlorhexidine OR "disclosing agent*" OR "dental water jet*" OR antigingivitis* OR "distal wedge" OR "coronally advanced tunnel*" OR "periodontal microsurger*" OR "Periodontal plastic surger*" OR "Supportive periodontal therap*" OR "Periodontal surger*" OR "Periodontal therap*" OR "Supportive periodontal treatment*" OR "Surgical periodontal treatment*" OR "Enamel matrix derivative*" OR "Full-mouth disinfection*" OR "periodontal maintenance*" OR "Mucogingival surger*" OR "Subgingival irrigation*" OR "modified widman flap*" OR "excisional new attachment procedure*" OR "Laser-assisted new attachment procedure*" OR "Papilla preservation*" OR "host-modulation*" OR "mechanical plaque removal*" OR "pocket elimination*" OR "access flap*" OR "Nonsurgical Periodont*" OR "non surgical periodont*" OR "non surgical instrument*" OR "nonsurgical instrument*" OR "non surgical debridement*" OR "nonsurgical debridement*" OR frenectomy OR "guided bone regeneration*" OR "Interdental cleaning*" OR "Dental Enamel Protein*" OR emdogain OR Perio-aid OR Periochip) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))

EMBASE through Ovid

- #1. periodontium
- #2. parodontium
- #3. parodontium
- #4. tooth supporting structures'
- #5. periodontitis
- #6. pericementitis
- #7. periodont*
- #8. gingivitis
- #9. 'periodontal diseases'
- #10. parodontosis
- #11. 'pyorrhoea alveolar*'
- #12. 'chronic periodontitis'
- #13. 'adult periodontitis'

- #14. 'aggressive periodontitis'
- #15. 'early-onset periodontitis'/exp
- #16. 'juvenile periodontitis'/exp
- #17. 'circumpubertal periodontitis'
- #18. 'prepubertal periodontitis'
- #19. 'prepubertal periodontitis'/exp
- #20. periodontosis
- #21. 'periodontosis'/exp
- #22. periodontal*
- #23. 'periodontal attachment loss'
- #24. 'attachment loss'
- #25. 'periodontal ligament'
- #26. 'alveolodental ligament'
- #27. 'alveolodental membrane'
- #28. gomphosis
- #29. 'periodontal pocket'
- #30. 'periodontal abscess'
- #31. 'periodontal abscess'/exp
- #32. periodontic*
- #33. 'periodontal medicine'
- #34. 'periodontal atrophy'
- #35. 'atrophy of periodontium'
- #36. 'gingivo-osseous atrophy'
- #37. 'gingival hemorrhag*'
- #38. 'dental calcul*'
- #39. 'dental calculus'/exp
- #40. 'dental calculus'
- #41. 'gingival hemorrhage'/exp
- #42. tartar
- #43. 'tartar'/exp
- #44. 'furcation defect*'
- #45. furcation*
- #46. 'gingival disease*'
- #47. gingivosis
- #48. 'gingival pocket'
- #49. 'peri-implantitis'
- #50. periimplantitis
- #51. 'peri-implant*'
- #52. periimplant*
- #53. 'peri-implant mucositis'
- #54. 'periimplant mucositis'
- #55. 'crestal bone loss*'
- #56. 'tongue coat*'
- #57. 'gingival recession*'
- #58. 'atrophy of gingiva'
- #59. 'gingival atrophy'
- #60. 'alveolar bone loss*'
- #61. 'alveolar bone atrophy'

- #62. 'alveolar process atrophy'
- #63. 'alveolar resorption'
- #64. 'periodontal bone loss'
- #65. 'periodontal resorption'
- #66. pericoronitis
- #67. 'tooth mobilit*'
- #68. 'gingival crevicular fluid'
- #69. 'necrotizing ulcerative gingivitis'
- #70. 'acute membranous gingivitis'
- #71. 'acute necrotizing ulcerative gingivitis'/exp
- #72. 'acute necrotizing ulcerative gingivitis'
- #73. 'fusospirillary gingivitis'
- #74. fusospirillosis
- #75. 'phagedenic gingivitis'
- #76. 'ulcerative stomatitis'
- #77. 'trench mouth'/exp
- #78. 'trench mouth'
- #79. 'vincent angina'
- #80. 'vincent infection'
- #81. 'vincent gingivitis'
- #82. 'vincent stomatitis'
- #83. 'necrotizing ulcerative periodontitis'/exp
- #84. 'necrotizing ulcerative periodontitis'
- #85. 'necrotizing periodontitis'
- #86. 'gingival hypertrophy'/exp
- #87. 'gingival hypertrophy'
- #88. 'gingival hyperplasia'
- #89. 'gingival overgrowth'
- #90. 'halitosis'/exp
- #91. 'halitosis'
- #92. 'bad breath*'
- #93. 'breath malodor*'
- #94. 'breath malodour*'
- #95. 'oral malodor*'
- #96. 'oral malodour*'
- #97. 'periodontal suppurat*'
- #98. 'gingival dehiscence*'
- #99. 'gingival inflammation'
- #100. 'mucogingival problem*'
- #101. 'infrabony pocket*'
- #102. 'infrabony defect*'
- #103. 'intrabony pocket*'
- #104. 'intrabony defect*'
- #105. 'suprabony pocket*'
- #106. 'suprabony defect*'
- #107. 'interdental bone loss*'
- #108. 'periodontal index*'
- #109. 'bleeding on probing*'

#110. cpitr
#111. 'community periodontal index of treatment needs'
#112. 'gingival bleeding on probing'
#113. 'gingival index*'
#114. 'dental plaque index'
#115. 'dental plaque indice*'
#116. 'dental plaque'
#117. 'clinical attachment level*'
#118. 'clinical attachment loss*'
#119. 'probing depth*'
#120. 'guided tissue regeneration'
#121. 'guided periodontal tissue regeneration'/exp
#122. 'guided periodontal tissue regeneration'
#123. 'periodontal guided tissue regeneration'
#124. 'periodontal debridement'/exp
#125. 'periodontal debridement*'
#126. 'access flap*'
#127. 'periodontal pocket debridement'
#128. 'dental scaling*'
#129. 'root scaling'
#130. 'subgingival scaling'
#131. 'supragingival scaling'
#132. 'periodontal dressing*'
#133. 'periodontal splint*'
#134. 'periodontal prosthesis*'
#135. 'gingivoplasty'
#136. 'subgingival curettage'/exp
#137. 'gingival curettage*'
#138. 'periodontal epithelial debridement'
#139. 'root planing*'
#140. 'root planing'/exp
#141. mouthwash*
#142. 'mouthwash'/exp
#143. 'mouth rinse'/exp
#144. 'mouth rinse'
#145. 'mouth bath*'
#146. 'mouth wash'/exp
#147. 'mouth wash*'
#148. 'oral irrigat*'
#149. 'oral rinse*'
#150. 'therapeutic irrigation'
#151. 'crown lengthening'
#152. dentifrice*
#153. 'dental polish*'
#154. toothbrush*
#155. 'dental device*'
#156. 'dental floss*'
#157. 'dental prophylaxis'

- #158. toothpaste*
- #159. 'mechanical plaque control**'
- #160. 'ultrasonic scaling'
- #161. 'ultrasonic scal**'
- #162. 'ultrasonic debridement'
- #163. 'chemical plaque control**'
- #164. 'powered floss**'
- #165. 'powered flossing'
- #166. 'essential oil rins**'
- #167. 'chlorhexidine'
- #168. 'disclosing agent**'
- #169. 'dental water jet**'
- #170. antigingivitis
- #171. 'distal wedge'
- #172. 'coronally advanced tunnel**'
- #173. 'periodontal microsurger**'
- #174. 'periodontal plastic surger**'
- #175. 'supportive periodontal therap**'
- #176. 'periodontal surger**'
- #177. 'periodontal therap**'
- #178. 'supportive periodontal treatment**'
- #179. 'surgical periodontal treatment**'
- #180. 'enamel matrix derivative**'
- #181. 'full-mouth disinfection**'
- #182. 'periodontal maintenance**'
- #183. 'mucogingival surger**'
- #184. 'subgingival irrigation**'
- #185. 'modified widman flap**'
- #186. 'excisional new attachment procedure**'
- #187. 'laser-assisted new attachment procedure**'
- #188. 'papilla preservation**'
- #189. 'host-modulation**'
- #190. 'mechanical plaque removal**'
- #191. 'pocket elimination**'
- #192. 'nonsurgical periodont**'
- #193. 'non surgical periodont**'
- #194. 'non surgical instrument**'
- #195. 'nonsurgical instrument**'
- #196. 'non surgical debridement**'
- #197. 'nonsurgical debridement**'
- #198. 'guided bone regeneration**'
- #199. 'frenectomy'
- #200. 'dental enamel protein**'
- #201. emdogain
- #202. 'perio aid'
- #203. periochip
- #204. 'interdental cleaning**'
- #205. 'systematic review'

#206. 'systematic review'/exp
#207. 'systematic review (topic)'
#208. 'systematic review (topic)'/exp
#209. 'meta analysis'
#210. 'meta analysis'/exp
#211. 'meta analysis (topic)'
#212. 'meta analysis (topic)'/exp
#213. 'network meta-analysis'
#214. 'network meta-analysis'/exp
#215. 'network meta-analysis (topic)'
#216. 'meta-analyzes'
#217. 'meta-analyzes (topic)'

#218. #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10
OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR
#19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #27
OR #28 OR #29 OR #30 OR #31 OR #32 OR #33 OR #34 OR #35 OR
#36 OR #37 OR #38 OR #39 OR #40 OR #41 OR #42 OR #43 OR #44
OR #45 OR #46 OR #47 OR #48 OR #49 OR #50 OR #51 OR #52 OR
#53 OR #54 OR #55 OR #56 OR #57 OR #58 OR #59 OR #60 OR #61
OR #62 OR #63 OR #64 OR #65 OR #66 OR #67 OR #68 OR #69 OR
#70 OR #71 OR #72 OR #73 OR #74 OR #75 OR #76 OR #77 OR #78
OR #79 OR #80 OR #81 OR #82 OR #83 OR #84 OR #85 OR #86 OR
#87 OR #88 OR #89 OR #90 OR #91 OR #92 OR #93 OR #94 OR #95
OR #96 OR #97 OR #98 OR #99 OR #100 OR #101 OR #102 OR #103
OR #104 OR #105 OR #106 OR #107 OR #108 OR #109 OR #110 OR
#111 OR #112 OR #113 OR #114 OR #115 OR #116 OR #117 OR #118
OR #119 OR #120 OR #121 OR #122 OR #123 OR #124 OR #125 OR
#126 OR #127 OR #128 OR #129 OR #130 OR #131 OR #132 OR #133
OR #134 OR #135 OR #136 OR #137 OR #138 OR #139 OR #140 OR
#141 OR #142 OR #143 OR #144 OR #145 OR #146 OR #147 OR #148
OR #149 OR #150 OR #151 OR #152 OR #153 OR #154 OR #155 OR
#156 OR #157 OR #158 OR #159 OR #160 OR #161 OR #162 OR #163
OR #164 OR #165 OR #166 OR #167 OR #168 OR #169 OR #170 OR
#171 OR #172 OR #173 OR #174 OR #175 OR #176 OR #177 OR #178
OR #179 OR #180 OR #181 OR #182 OR #183 OR #184 OR #185 OR
#186 OR #187 OR #188 OR #189 OR #190 OR #191 OR #192 OR #193
OR #194 OR #195 OR #196 OR #197 OR #198 OR #199 OR #200 OR
#201 OR #202 OR #203 OR #204

#219. #205 OR #206 OR #207 OR #208 OR #209 OR #210 OR #211 OR
#212 OR #213 OR #214 OR #215 OR #216 OR #217

#220. #218 AND #219

#221. #220 AND (2019:py OR 2020:py OR 2021:py)

WEB OF SCIENCE

((Periodontium OR Parodontium OR Parodontium OR "Tooth Supporting Structures" OR Periodontitis OR Pericementitis OR periodont* OR Gingivitis OR "Periodontal Diseases" OR Parodontosis OR "Pyorrhea Alveolar*" OR "Chronic Periodontitis" OR "Adult Periodontitis" OR "Aggressive Periodontitis" OR "Early-Onset Periodontitis" OR "Juvenile Periodontitis" OR "Circumpubertal Periodontitis" OR "Prepubertal Periodontitis" OR Periodontosis OR periodontal* OR "Periodontal Attachment Loss" OR "Attachment Loss" OR "Periodontal Ligament" OR "Alveolodental Ligament" OR "Alveolodental Membrane" OR Gomphosis OR "Periodontal Pocket" OR "Periodontal abscess" OR periodontic* OR "Periodontal Medicine" OR "Periodontal Atrophy" OR "Atrophy of Periodontium" OR "Gingivo-Osseous Atrophy" OR "Gingival Hemorrhag*" OR "Dental Calcul*" OR Tartar OR "Furcation Defect*" OR furcation* OR "Gingival Disease*" OR Gingivosis OR "Gingival Pocket" OR "Peri-Implantitis" OR Periimplantitis OR "peri-implant*" OR periimplant* OR "Peri-implant Mucositis" OR "Periimplant mucositis" OR "Crestal bone loss*" OR "Tongue coat*" OR "Gingival Recession*" OR "Atrophy of Gingiva" OR "Gingival Atrophy" OR "Alveolar Bone Loss*" OR "Alveolar Bone Atrophy" OR "Alveolar Process Atrophy" OR "Alveolar Resorption" OR "Periodontal Bone Loss" OR "Periodontal Resorption" OR Pericoronitis OR "Tooth Mobilit*" OR "Gingival Crevicular Fluid" OR "Gingival Exudate" OR "Necrotizing Ulcerative Gingivitis" OR "Acute Membranous Gingivitis" OR "Acute Necrotizing Ulcerative Gingivitis" OR "Fusospirillary Gingivitis" OR Fusosporillosis OR "Phagedenic Gingivitis" OR "Ulcerative Stomatitis" OR "Trench Mouth" OR "Vincent Angina" OR "Vincent Infection" OR "Vincent's Infection" OR "Vincent's Gingivitis" OR "Vincent's Stomatitis" OR "Necrotizing ulcerative periodontitis" OR "Necrotizing periodontitis" OR "Gingival Hypertrophy" OR "Gingival Hyperplasia" OR "Gingival Overgrowth" OR halitosis OR "bad breath*" OR "Breath malodor*" OR "Breath malodour*" OR "Oral malodor*" OR "Oral malodour*" OR "suppurative periodont*" OR "Gingival dehiscence*" OR "Gingival inflammation" OR "Mucogingival problem*" OR "infrabony pocket*" OR "infrabony defect*" OR "inrabony pocket*" OR "inrabony defect*" OR "suprabony pocket*" OR "suprabony defect*" OR "interdental bone loss*" OR "Periodontal Index*" OR "Bleeding on probing*" OR CPITN OR "Community Periodontal Index of Treatment Needs" OR "Gingival Bleeding on Probing" OR "Gingival Index*" OR "Dental Plaque Index" OR "Dental Plaque Indice*" OR "Dental Plaque" OR "Clinical attachment level*" OR "Clinical attachment loss*" OR "Probing depth*" OR "Guided Tissue Regeneration" OR "Guided Periodontal Tissue Regeneration" OR "Periodontal Guided Tissue Regeneration" OR "Periodontal Debridement*" OR "Periodontal Pocket Debridement" OR "Dental Scaling*" OR "Root Scaling" OR "Subgingival Scaling" OR "Supragingival Scaling" OR "Periodontal Dressing*" OR "Periodontal

Splint*" OR "Periodontal Prosthesis*" OR Gingivoplasty OR "Subgingival Curettage*" OR "Gingival curettage*" OR "Periodontal Epithelial Debridement" OR "root planing*" OR Mouthwash* OR "mouth rinse" OR "Mouth Bath" OR "Mouth Wash" OR "oral irrigat*" OR "oral rinse*" OR "Therapeutic Irrigation" OR "Crown Lengthening*" OR Dentifrice* OR "Dental Polish*" OR Toothbrush* OR "Dental Device*" OR "Dental Floss*" OR "Dental Prophylaxis" OR Toothpaste* OR "mechanical plaque control*" OR "ultrasonic scaling*" OR "ultrasonic debridement" OR "chemical plaque control*" OR "Powered floss*" OR "Essential oil rins*" OR chlorhexidine OR "disclosing agent*" OR "dental water jet*" OR antigingivitis* OR "distal wedge" OR "coronally advanced tunnel*" OR "periodontal microsurger*" OR "Periodontal plastic surger*" OR "Supportive periodontal therap*" OR "Periodontal surger*" OR "Periodontal therap*" OR "Supportive periodontal treatment*" OR "Surgical periodontal treatment*" OR "Enamel matrix derivative*" OR "Full-mouth disinfection*" OR "periodontal maintenance*" OR "Mucogingival surger*" OR "Subgingival irrigation*" OR "modified widman flap*" OR "excisional new attachment procedure*" OR "Laser-assisted new attachment procedure*" OR "Papilla preservation*" OR "host-modulation*" OR "mechanical plaque removal*" OR "pocket elimination*" OR "access flap*" OR "Nonsurgical Periodont*" OR "non surgical periodont*" OR "non surgical instrument*" OR "nonsurgical instrument*" OR "non surgical debridement*" OR "nonsurgical debridement*" OR frenectomy OR "guided bone regeneration*" OR "Interdental cleaning*" OR "Dental Enamel Protein*" OR emdogain OR Perio-aid OR Periochip) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))

SCOPUS

TITLE-ABS-KEY ((Periodontium OR Paradentium OR Parodontium OR "Tooth Supporting Structures" OR Periodontitis OR Pericementitis OR periodont* OR Gingivitis OR "Periodontal Diseases" OR Parodontosis OR "Pyorrhea Alveolar*" OR "Chronic Periodontitis" OR "Adult Periodontitis" OR "Aggressive Periodontitis" OR "Early-Onset Periodontitis" OR "Juvenile Periodontitis" OR "Circumpubertal Periodontitis" OR "Prepubertal Periodontitis" OR Periodontosis OR periodontal* OR "Periodontal Attachment Loss" OR "Attachment Loss" OR "Periodontal Ligament" OR "Alveolodental Ligament" OR "Alveolodental Membrane" OR Gomphosis OR "Periodontal Pocket" OR "Periodontal abscess" OR periodontic* OR "Periodontal Medicine" OR "Periodontal Atrophy" OR "Atrophy of Periodontium" OR "Gingivo-Osseous Atrophy" OR "Gingival Hemorrhag*" OR "Dental Calcul*" OR Tartar OR "Furcation Defect*" OR furcation* OR "Gingival Disease*" OR Gingivosis OR "Gingival Pocket" OR "Peri-Implantitis" OR Periimplantitis OR "peri-implant*" OR periimplant* OR "Peri-implant Mucositis" OR "Periimplant mucositis" OR

"Crestal bone loss*" OR "Tongue coat*" OR "Gingival Recession*" OR
 "Atrophy of Gingiva" OR "Gingival Atrophy" OR "Alveolar Bone Loss*" OR
 "Alveolar Bone Atrophy" OR "Alveolar Process Atrophy" OR "Alveolar
 Resorption" OR "Periodontal Bone Loss" OR "Periodontal Resorption" OR
 Pericoronitis OR "Tooth Mobilit*" OR "Gingival Crevicular Fluid" OR
 "Gingival Exudate" OR "Necrotizing Ulcerative Gingivitis" OR "Acute
 Membranous Gingivitis" OR "Acute Necrotizing Ulcerative Gingivitis" OR
 "Fusospirillary Gingivitis" OR Fusospirotilosis OR "Phagedenic Gingivitis"
 OR "Ulcerative Stomatitis" OR "Trench Mouth" OR "Vincent Angina" OR
 "Vincent Infection" OR "Vincent's Infection" OR "Vincent's Gingivitis" OR
 "Vincent's Stomatitis" OR "Necrotizing ulcerative periodontitis" OR
 "Necrotizing periodontitis" OR "Gingival Hypertrophy" OR "Gingival
 Hyperplasia" OR "Gingival Overgrowth" OR halitosis OR "bad breath*" OR
 "Breath malodor*" OR "Breath malodour*" OR "Oral malodor*" OR "Oral
 malodour*" OR "suppurative periodont*" OR "Gingival dehiscence*" OR
 "Gingival inflammation" OR "Mucogingival problem*" OR "infrabony
 pocket*" OR "infrabony defect*" OR "inrabony pocket*" OR "inrabony
 defect*" OR "suprabony pocket*" OR "suprabony defect*" OR "interdental
 bone loss*" OR "Periodontal Index*" OR "Bleeding on probing*" OR
 CPITN OR "Community Periodontal Index of Treatment Needs" OR
 "Gingival Bleeding on Probing" OR "Gingival Index*" OR "Dental Plaque
 Index" OR "Dental Plaque Indice*" OR "Dental Plaque" OR "Clinical
 attachment level*" OR "Clinical attachment loss*" OR "Probing depth*" OR
 "Guided Tissue Regeneration" OR "Guided Periodontal Tissue
 Regeneration" OR "Periodontal Guided Tissue Regeneration" OR
 "Periodontal Debridement*" OR "Periodontal Pocket Debridement" OR
 "Dental Scaling*" OR "Root Scaling" OR "Subgingival Scaling" OR
 "Supragingival Scaling" OR "Periodontal Dressing*" OR "Periodontal
 Splint*" OR "Periodontal Prosthesis*" OR Gingivoplasty OR "Subgingival
 Curettage*" OR "Gingival curettage*" OR "Periodontal Epithelial
 Debridement" OR "root planing*" OR Mouthwash* OR "mouth rinse" OR
 "Mouth Bath" OR "Mouth Wash" OR "oral irrigat*" OR "oral rinse*" OR
 "Therapeutic Irrigation" OR "Crown Lengthening*" OR Dentifrice* OR
 "Dental Polish*" OR Toothbrush* OR "Dental Device*" OR "Dental Floss*"
 OR "Dental Prophylaxis" OR Toothpaste* OR "mechanical plaque
 control*" OR "ultrasonic scaling*" OR "ultrasonic debridement" OR
 "chemical plaque control*" OR "Powered floss*" OR "Essential oil rins*"
 OR chlorhexidine OR "disclosing agent*" OR "dental water jet*" OR
 antigingivitis* OR "distal wedge" OR "coronally advanced tunnel*" OR
 "periodontal microsurger*" OR "Periodontal plastic surger*" OR
 "Supportive periodontal therap*" OR "Periodontal surger*" OR
 "Periodontal therap*" OR "Supportive periodontal treatment*" OR "Surgical
 periodontal treatment*" OR "Enamel matrix derivative*" OR "Full-mouth
 disinfection*" OR "periodontal maintenance*" OR "Mucogingival surger*"
 OR "Subgingival irrigation*" OR "modified widman flap*" OR "excisional
 new attachment procedure*" OR "Laser-assisted new attachment
 procedure*" OR "Papilla preservation*" OR "host-modulation*" OR
 "mechanical plaque removal*" OR "pocket elimination*" OR "access flap*"

OR "Nonsurgical Periodont*" OR "non surgical periodont*" OR "non surgical instrument*" OR "nonsurgical instrument*" OR "non surgical debridement*" OR "nonsurgical debridement*" OR frenectomy OR "guided bone regeneration*" OR "Interdental cleaning*" OR "Dental Enamel Protein*" OR emdogain OR Perio-aid OR Periochip) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*")) AND (LIMIT-TO (PUBYEAR,2020) OR LIMIT-TO (PUBYEAR,2019))

COCHRANE

- #1. Periodontium
- #2. paradentium
- #3. parodontium
- #4. "tooth supporting structure"
- #5. periodontitis
- #6. pericementitis
- #7. periodont*
- #8. gingivitis
- #9. "periodontal diseases"
- #10. parodontosis
- #11. "pyorrhea alveolar*"
- #12. "chronic periodontitis"
- #13. "adult periodontitis"
- #14. "aggressive periodontitis"
- #15. "early-onset periodontitis"
- #16. "juvenile periodontitis"
- #17. "circumpubertal periodontitis"
- #18. "prepubertal periodontitis"
- #19. periodontosis
- #20. periodontal*
- #21. "periodontal attachment loss"
- #22. "attachment loss"
- #23. "periodontal ligament"
- #24. "alveolodental ligament"
- #25. "alveolodental membrane"
- #26. gomphosis
- #27. "periodontal pocket"
- #28. "periodontal abscess"
- #29. periodontic*
- #30. "periodontal medicine"
- #31. "periodontal atrophy"
- #32. "atrophy of periodontium"
- #33. "gingivo-osseous atrophy"
- #34. "gingival hemorrhag*"
- #35. "dental calcul*"

- #36. "dental calculus"
- #37. "gingival hemorrhage"
- #38. tartar
- #39. "furcation defect*"
- #40. furcation*
- #41. "gingival disease*"
- #42. gingivosis
- #43. "gingival pocket"
- #44. "peri-implantitis"
- #45. periimplantitis
- #46. "peri-implant*"
- #47. periimplant*
- #48. "peri-implant mucositis"
- #49. "periimplant mucositis"
- #50. "crestal bone loss*"
- #51. "tongue coat*"
- #52. "gingival recession*"
- #53. "atrophy of gingiva"
- #54. "gingival atrophy"
- #55. "alveolar bone loss*"
- #56. "alveolar bone atrophy"
- #57. "alveolar process atrophy"
- #58. "alveolar resorption"
- #59. "periodontal bone loss"
- #60. "periodontal resorption"
- #61. pericoronitis
- #62. "tooth mobil*"
- #63. "gingival crevicular fluid"
- #64. "necrotizing ulcerative gingivitis"
- #65. "acute membranous gingivitis"
- #66. "acute necrotizing ulcerative gingivitis"
- #67. "fusospirillary gingivitis"
- #68. fusospirillosis
- #69. "phagedenic gingivitis"
- #70. "ulcerative stomatitis"
- #71. "trench mouth"
- #72. "vincent angina"
- #73. "vincent infection"
- #74. "vincent gingivitis"
- #75. "vincent stomatitis"
- #76. "necrotizing ulcerative periodontitis"
- #77. "necrotizing periodontitis"
- #78. "gingival hypertrophy"
- #79. "gingival hyperplasia"
- #80. "gingival overgrowth"
- #81. "halitosis"
- #82. "bad breath*"
- #83. "breath malodor*"

- #84. "breath malodour**"
- #85. "oral malodor**"
- #86. "oral malodour**"
- #87. "periodontal suppurat**"
- #88. "gingival dehiscence**"
- #89. "gingival inflammation"
- #90. "mucogingival problem**"
- #91. "infrabony pocket**"
- #92. "infrabony defect**"
- #93. "intrabony pocket**"
- #94. "intrabony defect**"
- #95. "suprabony pocket**"
- #96. "suprabony defect**"
- #97. "interdental bone loss**"
- #98. "periodontal index**"
- #99. "bleeding on probing**"
- #100. cpitn
- #101. "community periodontal index of treatment needs"
- #102. "gingival bleeding on probing"
- #103. "gingival index**"
- #104. "dental plaque index"
- #105. "dental plaque indice**"
- #106. "dental plaque"
- #107. "clinical attachment level**"
- #108. "clinical attachment loss**"
- #119. "probing depth**"
- #110. "guided tissue regeneration"
- #111. "guided periodontal tissue regeneration"
- #112. "periodontal guided tissue regeneration"
- #113. "periodontal debridement**"
- #114. "access flap**"
- #115. "periodontal pocket debridement"
- #116. "dental scaling**"
- #117. "root scaling"
- #118. "subgingival scaling"
- #119. "supragingival scaling"
- #120. "periodontal dressing**"
- #121. "periodontal splint**"
- #122. "periodontal prosthesis**"
- #123. "gingivoplasty"
- #124. "subgingival curettage"
- #125. "gingival curettage**"
- #126. "periodontal epithelial debridement"
- #127. "root planing**"
- #128. mouthwash*
- #129. "mouth rinse"
- #130. "mouth bath**"
- #131. "mouth wash"

- #132. "oral irrigat**"
- #133. "oral rinse**"
- #134. "therapeutic irrigation"
- #135. "crown lengthening"
- #136. dentifrice*
- #137. "dental polish**"
- #138. toothbrush*
- #139. "dental device**"
- #140. "dental floss**"
- #141. "dental prophylaxis"
- #142. toothpaste*
- #143. "mechanical plaque control**"
- #144. "ultrasonic scaling"
- #145. "ultrasonic scal**"
- #146. "ultrasonic debridement"
- #147. "chemical plaque control**"
- #148. "powered floss**"
- #149. "powered flossing"
- #150. "essential oil rins**"
- #151. "chlorhexidine"
- #152. "disclosing agent**"
- #153. "dental water jet**"
- #154. antigingivitis
- #155. "distal wedge"
- #156. "coronally advanced tunnel**"
- #157. "periodontal microsurger**"
- #158. "periodontal plastic surger**"
- #159. "supportive periodontal therap**"
- #160. "periodontal surger**"
- #161. "periodontal therap**"
- #162. "supportive periodontal treatment**"
- #163. "surgical periodontal treatment**"
- #164. "enamel matrix derivative**"
- #165. "full-mouth disinfection**"
- #166. "periodontal maintenance**"
- #167. "mucogingival surger"
- #168. "subgingival irrigation**"
- #169. "modified Widman flap**"
- #170. "excisional new attachment procedure**"
- #171. "laser-assisted new attachment procedure**"
- #172. "papilla preservation**"
- #173. "host-modulation**"
- #174. "mechanical plaque removal**"
- #175. "pocket elimination**"
- #176. "nonsurgical periodont**"
- #177. "non surgical periodont**"
- #178. "non surgical instrument**"
- #179. "nonsurgical instrument**"

- #180. "non surgical debridement**"
- #181. "nonsurgical debridement**"
- #182. "guided bone regeneration**"
- #183. "frenectomy"
- #184. "dental enamel protein**"
- #185. emdogain
- #186. "perio aid"
- #187. periochip
- #188. "interdental cleaning**"

LILACS through Bireme (Virtual Health Library)

- #1. ((Periodontium) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #2. ((paradentium) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #3. ((parodontium) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #4. (("tooth supporting structure") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #5. ((periodontitis) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #6. ((pericementitis) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #7. ((periodont*) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #8. ((gingivitis) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #9. (("periodontal diseases") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #10. ((parodontosis) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #11. (("pyorrhea alveolar**") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #12. (("chronic periodontitis") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #13. (("adult periodontitis") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #14. (("aggressive periodontitis") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #15. (("early-onset periodontitis") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #16. (("juvenile periodontitis") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #17. (("circumpubertal periodontitis") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))

- #18. (("prepubertal periodontitis") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #19. ((periodontosis) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #20. ((periodontal*) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #21. (("periodontal attachment loss") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #22. (("attachment loss") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #23. (("periodontal ligament") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #24. (("alveolodental ligament") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #25. (("alveolodental membrane") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #26. ((gomphosis) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #27. (("periodontal pocket") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #28. (("periodontal abscess") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #29. ((periodontic*) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #30. (("periodontal medicine") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #31. (("periodontal atrophy") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #32. (("atrophy of periodontium") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #33. (("gingivo-osseous atrophy") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #34. (("gingival hemorrhag*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #35. (("dental calcul*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #36. (("dental calculus") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #37. (("gingival hemorrhage") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #38. ((tartar) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #39. (("furcation defect*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #40. ((furcation*) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #41. (("gingival disease*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))

- #42. ((gingivosis) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #43. (("gingival pocket") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #44. (("peri-implantitis") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #45. ((periimplantitis) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #46. (("peri-implant*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #47. ((periimplant*) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #48. (("peri-implant mucositis") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #49. (("periimplant mucositis") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #50. (("crestal bone loss*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #51. (("tongue coat*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #52. (("gingival recession*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #53. (("atrophy of gingiva") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #54. (("gingival atrophy") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #55. (("alveolar bone loss*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #56. (("alveolar bone atrophy") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #57. (("alveolar process atrophy") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #58. (("alveolar resorption") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #59. (("periodontal bone loss") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #60. (("periodontal resorption") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #61. ((pericoronitis) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #62. (("tooth mobilit*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #63. (("gingival crevicular fluid") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #64. (("necrotizing ulcerative gingivitis") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #65. (("acute membranous gingivitis") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))

- #66. (("acute necrotizing ulcerative gingivitis") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #67. (("fusospirillary gingivitis") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #68. ((fusospirillosis) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #69. (("phagedenic gingivitis") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #70. (("ulcerative stomatitis") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #71. (("trench mouth") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #72. (("vincent angina") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #73. (("vincent infection") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #74. (("vincent gingivitis") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #75. (("vincent stomatitis") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #76. (("necrotizing ulcerative) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*")) periodontitis"
- #77. (("necrotizing periodontitis") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #78. (("gingival hypertrophy") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #79. (("gingival hyperplasia") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #80. (("gingival overgrowth") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #81. (("halitosis") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #82. (("bad breath*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #83. (("breath malodor*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #84. (("breath malodour*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #85. (("oral malodor*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #86. (("oral malodour*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #87. (("periodontal suppurat*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #88. (("gingival dehiscence*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #89. (("gingival inflammation") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))

- #90. (("mucogingival problem*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #91. (("infrabony pocket*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #92. (("infrabony defect*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #93. (("intrabony pocket*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #94. (("intrabony defect*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #95. (("suprabony pocket*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #96. (("suprabony defect*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #97. (("interdental bone loss*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #108. (("periodontal index*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #99. (("bleeding on probing*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #100. ((cpitn) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #101. (("community periodontal index of treatment needs") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #102. (("gingival bleeding on probing") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #103. (("gingival index*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #104. (("dental plaque index") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #105. (("dental plaque indice*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #106. (("dental plaque") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #107. (("clinical attachment level*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #108. (("clinical attachment loss*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #119. (("probing depth*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #110. (("guided tissue regeneration") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #111. (("guided periodontal tissue regeneration") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))

- #112. (("periodontal guided tissue regeneration") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #113. (("periodontal debridement*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #114. (("access flap*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #115. (("periodontal pocket debridement") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #116. (("dental scaling*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #117. (("root scaling") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #118. (("subgingival scaling") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #119. (("supragingival scaling") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #120. (("periodontal dressing*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #121. (("periodontal splint*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #122. (("periodontal prosthesis*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #123. (("gingivoplasty") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #124. (("subgingival curettage") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #125. (("gingival curettage*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #126. (("periodontal epithelial debridement") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #127. (("root planing*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #128. (("mouthwash*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #129. (("mouth rinse") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #130. (("mouth bath*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #131. (("mouth wash") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #132. (("oral irrigat*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #133. (("oral rinse*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #134. (("therapeutic irrigation") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))

- #135. (("crown lengthening") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #136. ((dentifrice*) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #137. (("dental polish*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #138. ((toothbrush*) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #139. (("dental device*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #140. (("dental floss*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #141. (("dental prophylaxis") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #142. ((toothpaste*) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #143. (("mechanical plaque control*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #144. (("ultrasonic scaling") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #145. (("ultrasonic scal*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #146. (("ultrasonic debridement") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #147. (("chemical plaque control*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #148. (("powered floss*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #149. (("powered flossing") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #150. (("essential oil rins*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #151. (("chlorhexidine") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #152. (("disclosing agent*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #153. (("dental water jet*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #154. ((antigingivitis) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #155. (("distal wedge") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #156. (("coronally advanced tunnel*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #157. (("periodontal microsurger*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #158. (("periodontal plastic surger*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))

- #159. (("supportive periodontal therap*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #160. (("periodontal surger*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #161. (("periodontal therap*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #162. (("supportive periodontal treatment*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #163. (("surgical periodontal treatment*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #164. (("enamel matrix derivative*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #165. (("full-mouth disinfection*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #166. (("periodontal maintenance*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #167. (("mucogingival surger) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #168. (("subgingival irrigation*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #169. (("modified Widman flap*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #170. (("excisional new attachment procedure*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #171. (("laser-assisted new attachment procedure*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #172. (("papilla preservation*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #173. (("host-modulation*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #174. (("mechanical plaque removal*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #175. (("pocket elimination*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #176. (("nonsurgical periodont*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #177. (("non surgical periodont*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #178. (("non surgical instrument*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #179. (("nonsurgical instrument*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #180. (("non surgical debridement*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #181. (("nonsurgical debridement*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))

- #182. (("guided bone regeneration*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #183. (("frenectomy") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #184. (("dental enamel protein*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #185. ((emdogain) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #186. (("perio aid") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #187. ((periochip) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))
- #188. (("interdental cleaning*") AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))

OpenGrey – 6 results

((Periodontium OR Parodontium OR Parodontium OR "Tooth Supporting Structures" OR Periodontitis OR Pericementitis OR periodont* OR Gingivitis OR "Periodontal Diseases" OR Parodontosis OR "Pyorrhea Alveolar*" OR "Chronic Periodontitis" OR "Adult Periodontitis" OR "Aggressive Periodontitis" OR "Early-Onset Periodontitis" OR "Juvenile Periodontitis" OR "Circumpubertal Periodontitis" OR "Prepubertal Periodontitis" OR Periodontosis OR periodontal* OR "Periodontal Attachment Loss" OR "Attachment Loss" OR "Periodontal Ligament" OR "Alveolodental Ligament" OR "Alveolodental Membrane" OR Gomphosis OR "Periodontal Pocket" OR "Periodontal abscess" OR periodontic* OR "Periodontal Medicine" OR "Periodontal Atrophy" OR "Atrophy of Periodontium" OR "Gingivo-Osseous Atrophy" OR "Gingival Hemorrhag*" OR "Dental Calcul*" OR Tartar OR "Furcation Defect*" OR furcation* OR "Gingival Disease*" OR Gingivosis OR "Gingival Pocket" OR "Peri-Implantitis" OR Periimplantitis OR "peri-implant*" OR periimplant* OR "Peri-implant Mucositis" OR "Periimplant mucositis" OR "Crestal bone loss*" OR "Tongue coat*" OR "Gingival Recession*" OR "Atrophy of Gingiva" OR "Gingival Atrophy" OR "Alveolar Bone Loss*" OR "Alveolar Bone Atrophy" OR "Alveolar Process Atrophy" OR "Alveolar Resorption" OR "Periodontal Bone Loss" OR "Periodontal Resorption" OR Pericoronitis OR "Tooth Mobilit*" OR "Gingival Crevicular Fluid" OR "Gingival Exudate" OR "Necrotizing Ulcerative Gingivitis" OR "Acute Membranous Gingivitis" OR "Acute Necrotizing Ulcerative Gingivitis" OR "Fusospirillary Gingivitis" OR Fusospirillosis OR "Phagedenic Gingivitis" OR "Ulcerative Stomatitis" OR "Trench Mouth" OR "Vincent Angina" OR "Vincent Infection" OR "Vincent's Infection" OR "Vincent's Gingivitis" OR "Vincent's Stomatitis" OR "Necrotizing ulcerative periodontitis" OR "Necrotizing periodontitis" OR "Gingival Hypertrophy" OR "Gingival

Hyperplasia" OR "Gingival Overgrowth" OR halitosis OR "bad breath*" OR "Breath malodor*" OR "Breath malodour*" OR "Oral malodor*" OR "Oral malodour*" OR "suppurative periodont*" OR "Gingival dehiscence*" OR "Gingival inflammation" OR "Mucogingival problem*" OR "infrabony pocket*" OR "infrabony defect*" OR "intrabony pocket*" OR "intrabony defect*" OR "suprabony pocket*" OR "suprabony defect*" OR "interdental bone loss*" OR "Periodontal Index*" OR "Bleeding on probing*" OR CPITN OR "Community Periodontal Index of Treatment Needs" OR "Gingival Bleeding on Probing" OR "Gingival Index*" OR "Dental Plaque Index" OR "Dental Plaque Indice*" OR "Dental Plaque" OR "Clinical attachment level*" OR "Clinical attachment loss*" OR "Probing depth*" OR "Guided Tissue Regeneration" OR "Guided Periodontal Tissue Regeneration" OR "Periodontal Guided Tissue Regeneration" OR "Periodontal Debridement*" OR "Periodontal Pocket Debridement" OR "Dental Scaling*" OR "Root Scaling" OR "Subgingival Scaling" OR "Supragingival Scaling" OR "Periodontal Dressing*" OR "Periodontal Splint*" OR "Periodontal Prosthesis*" OR Gingivoplasty OR "Subgingival Curettage*" OR "Gingival curettage*" OR "Periodontal Epithelial Debridement" OR "root planing*" OR Mouthwash* OR "mouth rinse" OR "Mouth Bath" OR "Mouth Wash" OR "oral irrigat*" OR "oral rinse*" OR "Therapeutic Irrigation" OR "Crown Lengthening*" OR Dentifrice* OR "Dental Polish*" OR Toothbrush* OR "Dental Device*" OR "Dental Floss*" OR "Dental Prophylaxis" OR Toothpaste* OR "mechanical plaque control*" OR "ultrasonic scaling*" OR "ultrasonic debridement" OR "chemical plaque control*" OR "Powered floss*" OR "Essential oil rins*" OR chlorhexidine OR "disclosing agent*" OR "dental water jet*" OR antigingivitis* OR "distal wedge" OR "coronally advanced tunnel*" OR "periodontal microsurger*" OR "Periodontal plastic surger*" OR "Supportive periodontal therap*" OR "Periodontal surger*" OR "Periodontal therap*" OR "Supportive periodontal treatment*" OR "Surgical periodontal treatment*" OR "Enamel matrix derivative*" OR "Full-mouth disinfection*" OR "periodontal maintenance*" OR "Mucogingival surger*" OR "Subgingival irrigation*" OR "modified widman flap*" OR "excisional new attachment procedure*" OR "Laser-assisted new attachment procedure*" OR "Papilla preservation*" OR "host-modulation*" OR "mechanical plaque removal*" OR "pocket elimination*" OR "access flap*" OR "Nonsurgical Periodont*" OR "non surgical periodont*" OR "non surgical instrument*" OR "nonsurgical instrument*" OR "non surgical debridement*" OR "nonsurgical debridement*" OR frenectomy OR "guided bone regeneration*" OR "Interdental cleaning*" OR "Dental Enamel Protein*" OR emdogain OR Perio-aid OR Periochip) AND ("meta-analysis*" OR "meta-analyzes" OR "network meta-analysis*" OR "Systematic Review*"))

Sytematic Review + Periodontal

Google Scholar (18,300 articles found - only the first 500 were screened)

(systematic review) + periodontal

Custom range 2019 - 2020

Appendix 2 – List of variables extracted during data extraction

- Reference;
- Author's continent;
- First author's country academic source;
- Authors' academic source;
- Publication year;
- Article language;
- Journal scope;
- Journal name;
- Impact factor;
- H5 index;
- Open Access journal;
- Open access articles;
- Does it have "systematic review" or "meta-analysis" in the title?;
- Is Cochrane review?;
- Intervention;
- Condition/Topic;
- Number of studies included;
- Study designs;
- Number of RCTs;
- Number of nRCTs;
- Risk of bias tool for RCTs;
- Risk of bias tool for nRCTs;
- Number of participants;
- Number of outcomes;
- Presence of meta-analysis?;
- Presence of network meta-analysis?;
- Presence of meta regression?;
- Number of studies in meta-analysis;
- Number of outcomes in meta-analysis;
- Number of boxplot;
- Number of funnel plot;
- Funding sources;
- Conflict of interests;
- Presence of an epidemiologist?;
- Presence of a librarian?;
- Presence of a biostatistician?;
- The authors cited PRISMA?;
- Certainty of the evidence assessed by the GRADE methodology;
- Was the GRADE methodology used correctly?;
- GRADE per;
- Presence of protocol?;
- Has the protocol been registered?;
- Where was the protocol registered?;
- Unjustified protocol deviation?;
- Number of scientific databases searched;

- Number of grey literature databases searched;
- Periodontal journals hand-search?;
- Reference list hand-search?;
- Clinical trials registries search?;
- Language restriction;
- Reason for language restriction;
- Date of publication restriction;
- Reason for restricting date of publication;
- AMSTAR 2;
- ROBIS.

Appendix 3 – List of excluded studies and reasons for exclusion

Excluded studies list	Observational studies, case report/series, in vitro, animal studies, before and after studies	Systematic reviews with PECO question	Overview, scoping reviews or narrative reviews	Editorials, commentaries, abstracts	It is not a systematic review
Alblowi & Naser, 2019	X				
Bogdan <i>et al.</i> , 2020	X				
Botelho <i>et al.</i> , 2020	X				
Castro-Rodríguez, Castagnola & Pomarino, 2020			X		
Chang, Meng, Lalla, & Lee, 2021	X				
Chen <i>et al.</i> , 2019	X				
Ferraroti <i>et al.</i> , 2020	X				
Fuchs, Signer-Buset, Mendes, Schmidt, & Walter, 2019	X				
Galie <i>et al.</i> , 2019				X	X
Ho <i>et al.</i> , 2020	X				
Jeevan <i>et al.</i> , 2019	X				
Keerthana, Ramya & Gita, 2019	X				
Koidou, Cavalli, Hagi-Pavli, Nibali, & Donos, 2020	X				
Kruse <i>et al.</i> , 2020	X				
Lanau, Mareque-Bueno & Zabalza, 2021	X	X			
Lauritano, Limongelli, Moreo, Favia & Carinci, 2020	X				
Longoni, Tinto, Pacifico, Sartori & Andreano, 2019	X				
Nibali <i>et al.</i> , 2021	X				
Novello, Debouche, Philippe, Naudet & Jeanne, 2020	X				
Padbanabhan <i>et al.</i> , 2020	X				
Shelswell <i>et al.</i> , 2019				X	X
Sindhuja <i>et al.</i> , 2019	X				
Tafazoli & Moghadam, 2020	X				
Tavelli <i>et al.</i> , 2021	X				
Trombelli <i>et al.</i> , 2021	X				
Wang, Yu, Mandelaris & Wang, 2020	X				
Yamada, Nakamura-Yamada, Konoki & Baba, 2020	X				
Yussif & Rahman, 2020	X				

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Appendix 5 – Tables 4 – 7

Table 4 – Studies characteristics (categorical variables).

Author's continent	n = 127 (100%)
Multi-continent	34 (26.8)
Asia	31 (24.4)
Europe	28 (22.0)
Latin America	13 (10.2)
Middle East	8 (6.3)
North America	7 (5.5)
Africa	4 (3.1)
Oceania	2 (1.6)
First author's country academic source	n = 127 (100%)
China	21 (16.5)
Brazil	18 (14.2)
Italy	9 (7.1)
United Kingdom	8 (6.3)
United States of America	8 (6.3)
Saudi Arabia	7 (5.5)
India	6 (4.7)
Spain	6 (4.7)
Australia	5 (3.9)
The Netherlands	5 (3.9)
Switzerland	4 (3.1)
Canada	3 (2.4)
Germany	3 (2.4)
Egypt	2 (1.6)
Israel	2 (1.6)
Taiwan	2 (1.6)
United Arab Emirates	2 (1.6)
Bahrain	1 (0.8)
Belgium	1 (0.8)
Chile	1 (0.8)
Ethiopia	1 (0.8)
France	1 (0.8)
Hong Kong	1 (0.8)
Hungary	1 (0.8)
Indonesia	1 (0.8)
Japan	1 (0.8)
Lithuania	1 (0.8)
Malaysia	1 (0.8)
Morocco	1 (0.8)
Pakistan	1 (0.8)
South Africa	1 (0.8)
Sweden	1 (0.8)
Turkey	1 (0.8)
Authors' academic source	n = 127 (100%)
Periodontics + other	58 (45.7)
Other	48 (37.8)
Unclear	10 (7.9)
Department of periodontology	11 (8.7)

Journal	n = 127 (100%)
Acta Odontologica Scandinavica	1 (0.8)
American Journal of Orthodontics and Dentofacial Orthopedics	1 (0.8)
Australian Dental Journal	3 (2.4)
Bioscience Biotechnology Research Communications	1 (0.8)
BMC Complementary Medicine and Therapies	1 (0.8)
BMC Oral Health	9 (7.1)
Brazilian Journal of Oral Sciences	1 (0.8)
Brazilian Oral Research	1 (0.8)
Chinese Journal of Evidence-Based Medicine	1 (0.8)
Clinical and Experimental Dental Research	1 (0.8)
Clinical Implant Dentistry and Related Research	1 (0.8)
Clinical Nutrition	1 (0.8)
Clinical Oral Investigations	10 (7.9)
Cochrane Database of Systematic Reviews	2 (1.6)
Community Dentistry and Oral Epidemiology	1 (0.8)
Contemporary Clinical Dentistry	1 (0.8)
Current Pharmaceutical Design	1 (0.8)
Dental Research Journal	1 (0.8)
Dentistry Journal	5 (3.9)
European Journal of Dentistry	1 (0.8)
European Review for Medical and Pharmacological Sciences	1 (0.8)
Evidence-Based Complementary and Alternative Medicine	1 (0.8)
Heliyon	2 (1.6)
Indian Journal of Public Health Research & Development	2 (1.6)
International Dental Journal	2 (1.6)
International Journal of Dental Hygiene	7 (5.5)
International Journal of Environmental Research and Public Health	1 (0.8)
International Journal of Molecular Sciences	1 (0.8)
International Journal of Oral and Maxillofacial Surgery	1 (0.8)
International Journal of Oral Implantology	1 (0.8)
International Journal of Periodontics & Restorative Dentistry	2 (1.6)
International Orthodontics	1 (0.8)
Journal of Applied Oral Science	1 (0.8)
Journal of Clinical & Diagnostic Research	1 (0.8)
Journal of Clinical and Experimental Dentistry	1 (0.8)
Journal of Clinical Medicine	1 (0.8)
Journal of Clinical Periodontology	17 (13.4)
Journal of Dental Research	1 (0.8)
Journal of Esthetic and Restorative Dentistry	1 (0.8)
Journal of Evidence-Based Dental Practice	1 (0.8)
Journal of Herbal Medicine	1 (0.8)
Journal of Indian Society of Periodontology	1 (0.8)
Journal of Maternal-Fetal & Neonatal Medicine	1 (0.8)
Journal of Oral Biology and Craniofacial Research	1 (0.8)
Journal of Oral Implantology	1 (0.8)
Journal of Periodontal Research	1 (0.8)
Journal of Periodontology	2 (1.6)
Journal of Pharmaceutical Sciences and Research	1 (0.8)
Journal of the American Dental Association	1 (0.8)
Journal of the International Academy of Periodontology	3 (2.4)
Lasers in Medical Science	4 (3.1)
Materials	1 (0.8)
Medicina Oral Patologia Oral y Cirugia Bucal	3 (2.3)
Oral Diseases	1 (0.8)
Oral Surgery	1 (0.8)
Patient Education and Counseling	1 (0.8)

Pediatric Dentistry	1 (0.8)
Photodermatology, Photoimmunology & Photomedicine	1 (0.8)
Photodiagnosis and Photodynamic Therapy	2 (1.6)
PLoS One	1 (0.8)
Probiotics and Antimicrobial Proteins	1 (0.8)
Saudi Dental Journal	2 (1.6)
Stem Cells Translational Medicine	1 (0.8)
Swiss Dental Journal	1 (0.8)
Systematic Reviews in Pharmacy	1 (0.8)
West China Journal of Stomatology	2 (1.6)
Open Access journal	n = 127 (100%)
Yes	44 (34.6)
No	83 (65.4)
Open access articles	n = 127 (100%)
Yes	84 (66.1)
No	43 (33.9)
Open access articles published in journals with restricted access	n = 40 (31.5%)
Australian Dental Journal	1 (2.5)
Bioscience Biotechnology Research Communications	1 (2.5)
Clinical Oral Investigations	2 (5.0)
Cochrane Database of Systematic Reviews	2 (5.0)
Current Pharmaceutical Design	1 (2.5)
European Review for Medical and Pharmacological Sciences	1 (2.5)
International Dental Journal	2 (5.0)
International Journal of Dental Hygiene	5 (12.5)
International Journal of Oral Implantology	1 (2.5)
International Journal of Periodontics & Restorative Dentistry	1 (2.5)
Journal of Clinical Periodontology	15 (37.5)
Journal of Oral Biology and Craniofacial Research	1 (2.5)
Journal of Periodontal Research	1 (2.5)
Journal of Periodontology	1 (2.5)
Medicina Oral Patologia Oral y Cirugia Bucal	3 (7.5)
Oral Surgery	1 (2.5)
Photodermatology, Photoimmunology & Photomedicine	1 (2.5)
Journal scope	n = 127 (100%)
General Dentistry	57 (44.9)
Periodontics	27 (21.3)
Other	16 (12.6)
Photomedicine	8 (6.3)
Evidence-Based Practice	5 (3.9)
Medicine	4 (3.1)
Pharmaceutical	3 (2.4)
Public health	3 (2.4)
Implant Dentistry	2 (1.6)
Surgery	2 (1.6)
Article language	n = 127 (100%)
English	124 (97.6)
Mandarin	3 (2.4)
Intervention †	
Antiseptics	23 (18.1)

Soft tissue regeneration	20 (15.7)
Photomedicine	18 (14.2)
Antimicrobials	14 (10.9)
Hard tissue regeneration	13 (10.2)
Periodontal treatment	10 (7.9)
Probiotics	10 (7.9)
Toothbrushes	8 (6.3)
Behavior techniques	5 (3.9)
Toothpastes	5 (3.9)
Ultrasonic devices	4 (3.1)
Host modulation	2 (1.6)
Ozone	2 (1.6)
Dietary supplements	1 (0.8)
Drugs for pain control	1 (0.8)
Growth factor	1 (0.8)
Chewing guns	1 (0.8)
‡It was considered more than 1 type of intervention per study	
Condition/Topic ‡	
Periodontitis	37 (29.1)
Oral hygiene / Plaque / Gingivitis	33 (26.0)
Gingival recession	14 (11.0)
Peri-implant diseases	13 (10.2)
Periodontal bone defects	12 (9.4)
Periodontal medicine	6 (4.7)
Phenotype modification	5 (3.9)
Aesthetics	3 (2.4)
Pain control	3 (2.4)
Gingival enlargement	1 (0.8)
Taste perception	1 (0.8)
Wound healing	1 (0.8)
‡It was considered more than 1 topic per study	
Does it have “systematic review” or “meta-analysis” in the title?	n = 127 (100%)
Yes	122 (96.1)
No	5 (3.9)
Is a Cochrane review?	n = 127 (100%)
Yes	2 (2.4)
No	124 (97.6)
Funding	n = 127 (100%)
None	48 (37.8)
Government/university grant	45 (35.4)
Not reported	27 (21.3)
Industry	4 (3.1)
Non-profit organization	2 (1.6)
Both university and industry	1 (0.8)
Conflict of interests	n = 127 (100%)
Yes, the authors declare no conflict of interests	108 (85.0)
No, the authors do not report conflict of interests	10 (7.9)
Yes, the authors declare potential conflict of interests	9 (7.1)
Presence of meta-analysis?	n = 127 (100%)
Yes	96 (75.6)
No	31 (24.4)

Presence of network meta-analysis?	n = 127 (100%)
Yes	13 (10.2)
No	114 (89.8)
Presence of meta regression?	n = 127 (100%)
Yes	8 (6.3)
No	119 (93.7)
Presence of an epidemiologist?	n = 127 (100%)
Yes	6 (4.7)
Not reported	121 (95.3)
Librarian presence?	n = 127 (100%)
Yes	9 (7.1)
Not reported	118 (92.9)
Presence of biostatistician?	n = 127 (100%)
Yes	9 (7.1)
Not reported	118 (92.9)
Presence of protocol?	n = 127 (100%)
Yes	79 (62.2)
Not reported	48 (37.8)
Has the protocol been registered?	n = 127 (100%)
Yes	71 (55.9)
No	8 (6.3)
Not reported	48 (37.8)
Where was the protocol registered?	n = 71 (55.0%)
Prospero	61 (85.9)
Cochrane	2 (2.8)
INPLASY database	2 (2.8)
Published previously in other journal	2 (2.8)
ClinicalTrials.gov	1 (1.4)
Joanna Briggs Systematic review database	1 (1.4)
Non-profit organization scientific committee	1 (1.4)
Open Science Framework	1 (1.4)
The authors cited PRISMA?	n = 127 (100%)
Yes	108 (85.0)
Partial yes	4 (3.1)
No	15 (11.8)
Design restriction of included studies as considered by the authors	n = 127 (100%)
RCT only	106 (83.5)
RCT+NRCT	16 (12.6)
RCT+Cohort	3 (2.4)
RCT+NRCT+Cohort	2 (1.6)
Certainty of the evidence assessed by the GRADE methodology	n = 127 (100%)
Yes	32 (25.2)
No	95 (74.8)
Was the GRADE methodology used correctly?	n = 32 (25.2%)
Yes	12 (37.5)

Partial yes	7 (21.9)
No	13 (40.6)
GRADE per	n = 32 (25.2%)
Outcome	25 (78.1)
Reported but not used for study/outcome	3 (9.4)
Study	2 (6.3)
Domain	1 (3.1)
Unclear	1 (3.1)

Table 5 – Studies characteristics (continuous variables).

Variables	n = 127 (100%)	Mean	SD	Min-Max
Number of authors		5.3	2.6	1-24
How many primary studies included in the systematic review		15.9	15. 7	2-91
Number of RCTS		15.6	15. 7	1-91
Number of nRCTS		0.4	1.3	0-12
Number of participants §		1185.6	217 9.5	67- 13.426
Number of outcomes		4.6	2.9	1-19
§ 5 studies did not report the patient's number				
Variables	n = 94 (74.0%)	Mean	SD	Min-Max
How many studies included in meta-analysis ¶		14.3	16. 3	2-105
Number of outcomes in meta-analysis		3.2	1.9	1-11
Number of forest plots		8.0	12. 2	0-69
Number of funnel plots		1.3	4.2	0-30
¶2 studies did not report the number of studies in the MA				
Google h5 index	n = 123 (96.9%) ‡	Mean	SD	Min-Max
h5 index		46.1	29. 3	5-185
H5 index median		69.5	46. 9	8-246
‡ 2 journals (4 studies) did not have h5 index				
JCR impact factor	n = 93 (73.2%) †	Mean	SD	Min-Max
JCR impact Factor		4.4	2.5	1.6-9.3
†25 journals (34 studies) did not have a JCR impact factor				

Table 6 – Studies searching methods characteristics.

Variables	n = 127 (100%)	Mean	SD	Min-Max
Number of scientific databases searched		3.6	1.5	0-8
Number of grey literature databases searched		1.2	1.5	0-6
1 study did not report the databases search				
Reference list hand-search				n = 127 (100%)
Yes				90 (70.9)
No				37 (29.1)
Periodontal journals hand-search				n = 127 (100%)
Yes				53 (41.7)
No				74 (58.3)
Grey literature search				n = 127 (100%)
Yes				72 (56.7)
No				55 (43.3)
Clinical trials registries search				n = 127 (100%)
Yes				38 (29.9)
No				89 (70.1)
Language restriction				n = 127 (100%)
English				60 (47.2)
No restrictions				50 (39.4)
English, Chinese				6 (4.7)
English, German				3 (2.4)
English, German, Spanish, Portuguese, Turkish				1 (0.8)
English, Spanish, French				1 (0.8)
English, Spanish, Portuguese				1 (0.8)
unclear/none reported				5 (3.9)
Reason for language restriction				n = 73 (57.5%)
None given				58 (79.5%)
Time constraints				8 (11.0)
Limited Access				2 (2.7)
Limited Resources				2 (2.7)
Difficulty				2 (2.7)
Most papers are in English				1 (1.4)
Date of publication restriction				n = 127 (100%)
Yes				24 (18.6)

No	99 (78.0)
Not reported	4 (3.1)
Reason for restricting date of publication	n = 24 (18.9%)
None given	15 (62.5%)
Previous systematic review covering the date limit	5 (20.8)
Increased availability of the studied product during the period	2 (8.3)
Identify strategies appropriate for current social norms	1 (4.2)
Start point of publishing the topic on literature	1 (4.2)
Frequencies of scientific databases searched	n = 127 (100%)
Medline	125 (98.4)
Cochrane Library / Central	97 (76.4)
Embase	70 (55.1)
Web of Science	40 (31.5)
Scopus	38 (29.9)
Lilacs	16 (12.6)
CINAHL	10 (7.9)
Science Direct	7 (5.5)
Others (n=23)	51 (40.18)

Table 7 – Risk of bias tools used according to study design

Risk of bias tools used for RCTs	n = 127 (100%)
Cochrane Handbook for Systematic Reviews of Interventions (unreferenced)	103 (81.1)
Van der Weijden et al. (2009)	6 (4.7)
Jadad scale	5 (3.9)
Modified Cochrane tool	2 (1.6)
Critical Appraisal Skills Program 2017	2 (1.6)
Downs and Black	1 (0.8)
Modified Jadad scale	1 (0.8)
SBU Handbook	1 (0.8)
PRISMA	1 (0.8)
Not performed	4 (3.1)
Risk of bias tools used for nRCTs	n = 15 (11.8%)
ROBINS-I	4 (23.5)
Cochrane Handbook for Systematic Reviews of Interventions version 5.1.0	2 (11.8)
MINORS	2 (11.8)
Newcastle-Ottawa	2 (11.8)
Van der Weijden et al. (2009)	1 (5.9)
Modified Cochrane tool	1 (5.9)
SBU handbook	1 (5.9)

None

2 (11.8)

5 CONSIDERAÇÕES FINAIS

No presente estudo, a maior parte das RSs identificadas apresentaram baixa qualidade metodológica e alto risco de viés.

Estes achados levantam preocupações sobre a qualidade metodológica da evidência sendo produzida em Periodontia e ressaltam a importância da realização de levantamentos metodológicos da literatura. Este desenho de estudo identifica as principais deficiências presentes, atuando como um medidor da qualidade geral da metodologia da produção científica em um determinado período.

Sugere-se que os pesquisadores que pretendam realizar RSs adotem práticas metodológicas mais rígidas de pesquisa, tenham maior aderência às diretrizes como PRISMA e o Cochrane handbook, e estejam atentos aos itens que devem estar presentes no relato de RSs.

A familiarização dos autores com as ferramentas AMSTAR 2 e ROBIS poderá auxiliar no processo de criação do protocolo de RSs resultando no desenvolvimento de estudos de melhor qualidade metodológica, uma vez que as principais deficiências potenciais estão descritas detalhadamente em ambas as ferramentas.

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ANEXO A – AMSTAR 2

1. Did the research questions and inclusion criteria for the review include the components of PICO?

- | | | |
|---|--|------------------------------|
| For Yes: | Optional (recommended) | |
| <input type="checkbox"/> <u>P</u> opulation | <input type="checkbox"/> Timeframe for follow-up | <input type="checkbox"/> Yes |
| <input type="checkbox"/> <u>I</u> ntervention | | <input type="checkbox"/> No |
| <input type="checkbox"/> <u>C</u> omparator group | | |
| <input type="checkbox"/> <u>O</u> utcome | | |

2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?

- | | | |
|--|--|--------------------------------------|
| For Partial Yes:
The authors state that they had a written protocol or guide that included ALL the following: | For Yes:
As for partial yes, plus the protocol should be registered and should also have specified: | |
| <input type="checkbox"/> review question(s) | <input type="checkbox"/> a meta-analysis/synthesis plan, if appropriate, <i>and</i> | <input type="checkbox"/> Yes |
| <input type="checkbox"/> a search strategy | <input type="checkbox"/> a plan for investigating causes of heterogeneity | <input type="checkbox"/> Partial Yes |
| <input type="checkbox"/> inclusion/exclusion criteria | <input type="checkbox"/> justification for any deviations from the protocol | <input type="checkbox"/> No |
| <input type="checkbox"/> a risk of bias assessment | | |

3. Did the review authors explain their selection of the study designs for inclusion in the review?

- For Yes, the review should satisfy ONE of the following:
- | | |
|---|------------------------------|
| <input type="checkbox"/> <i>Explanation for</i> including only RCTs | <input type="checkbox"/> Yes |
| <input type="checkbox"/> OR <i>Explanation for</i> including only NRSI | <input type="checkbox"/> No |
| <input type="checkbox"/> OR <i>Explanation for</i> including both RCTs and NRSI | |

4. Did the review authors use a comprehensive literature search strategy?

- | | | |
|--|---|--------------------------------------|
| For Partial Yes (all the following): | For Yes, should also have (all the following): | |
| <input type="checkbox"/> searched at least 2 databases (relevant to research question) | <input type="checkbox"/> searched the reference lists / bibliographies of included studies | <input type="checkbox"/> Yes |
| <input type="checkbox"/> provided key word and/or search strategy | <input type="checkbox"/> searched trial/study registries | <input type="checkbox"/> Partial Yes |
| <input type="checkbox"/> justified publication restrictions (e.g. language) | <input type="checkbox"/> included/consulted content experts in the field where relevant, searched for grey literature | <input type="checkbox"/> No |
| | <input type="checkbox"/> conducted search within 24 months of completion of the review. | |

5. Did the review authors perform study selection in duplicate?

- For Yes, either ONE of the following:
- | | |
|---|------------------------------|
| <input type="checkbox"/> at least two reviewers independently agreed on selection of eligible studies and achieved consensus on which studies to include | <input type="checkbox"/> Yes |
| <input type="checkbox"/> OR two reviewers selected a sample of eligible studies and achieved good agreement (at least 80 percent), with the remainder selected by one reviewer. | <input type="checkbox"/> No |

6. Did the review authors perform data extraction in duplicate?

For Yes, either ONE of the following:

- at least two reviewers achieved consensus on which data to extract from included studies Yes
- OR two reviewers extracted data from a sample of eligible studies and achieved good agreement (at least 80 percent), with the remainder extracted by one reviewer. No

7. Did the review authors provide a list of excluded studies and justify the exclusions?

For Partial Yes:

- provided a list of all potentially relevant studies that were read in full-text form but excluded from the review

For Yes, must also have:

- Justified the exclusion from the review of each potentially relevant study Yes
- Partial Yes No

8. Did the review authors describe the included studies in adequate detail?

For Partial Yes (ALL the following):

- described populations
- described interventions
- described comparators
- described outcomes
- described research designs
-

For Yes, should also have ALL the following:

- described population in detail Yes
- described intervention in detail (including doses where relevant) Partial Yes
- described comparator in detail (including doses where relevant) No
- described study's setting timeframe for follow-up

9. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?**RCTs**

For Partial Yes, must have assessed RoB from:

- unconcealed allocation, *and* lack of blinding of patients and assessors when assessing outcomes (unnecessary for objective outcomes such as all-cause mortality)

For Yes, must also have assessed RoB from:

- allocation sequence that was not truly random, *and* Yes
- selection of the reported result from among multiple measurements or analyses of a specified outcome Partial Yes
- Includes only NRSI No

NRSI

For Partial Yes, must have assessed RoB:

- from confounding, *and*
- from selection bias

For Yes, must also have assessed RoB:

- methods used to ascertain exposures and outcomes, *and* Yes
- selection of the reported result from among multiple measurements or analyses of a specified outcome Partial Yes
- Includes only RCTs No

10. Did the review authors report on the sources of funding for the studies included in the review?

For Yes

- Must have reported on the sources of funding for individual studies included in the review. Note: Reporting that the reviewers looked for this information but it was not reported by study authors also qualifies Yes
- No No

11. If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results?

RCTs

For Yes:

- | | |
|--|---|
| <input type="checkbox"/> The authors justified combining the data in a meta-analysis | <input type="checkbox"/> Yes |
| <input type="checkbox"/> AND they used an appropriate weighted technique to combine study results and adjusted for heterogeneity if present. | <input type="checkbox"/> No |
| <input type="checkbox"/> AND investigated the causes of any heterogeneity | <input type="checkbox"/> No meta-analysis conducted |

For NRSI

For Yes:

- | | |
|---|---|
| <input type="checkbox"/> The authors justified combining the data in a meta-analysis. | <input type="checkbox"/> Yes |
| <input type="checkbox"/> AND they used an appropriate weighted technique to combine study results, adjusting for heterogeneity if present | <input type="checkbox"/> No |
| <input type="checkbox"/> AND they statistically combined effect estimates from NRSI that were adjusted for confounding, rather than combining raw data, or justified combining raw data when adjusted effect estimates were not available | <input type="checkbox"/> No meta-analysis conducted |
| <input type="checkbox"/> AND they reported separate summary estimates for RCTs and NRSI separately when both were included in the review | |

12. If meta-analysis was performed, did the review authors assess the potential impact of RoB in individual studies on the results of the meta-analysis or other evidence synthesis?

For Yes:

- | | |
|---|---|
| <input type="checkbox"/> included only low risk of bias RCTs | <input type="checkbox"/> Yes |
| <input type="checkbox"/> OR, if the pooled estimate was based on RCTs and/or NRSI at variable RoB, the authors performed analyses to investigate possible impact of RoB on summary estimates of effect. | <input type="checkbox"/> No |
| | <input type="checkbox"/> No meta-analysis conducted |

13. Did the review authors account for RoB in individual studies when interpreting/ discussing the results of the review?

For Yes:

- | | |
|---|------------------------------|
| <input type="checkbox"/> included only low risk of bias RCTs | <input type="checkbox"/> Yes |
| <input type="checkbox"/> OR, if RCTs with moderate or high RoB, or NRSI were included the review provided a discussion of the likely impact of RoB on the results | <input type="checkbox"/> No |

14. Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?

For Yes:

- | | |
|--|------------------------------|
| <input type="checkbox"/> There was no significant heterogeneity in the results | <input type="checkbox"/> Yes |
| <input type="checkbox"/> OR if heterogeneity was present the authors performed an investigation of sources of any heterogeneity in the results and discussed the impact of this on the results of the review | <input type="checkbox"/> No |

15. If they performed quantitative synthesis did the review authors carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the results of the review?

For Yes:

- | | |
|---|---|
| <input type="checkbox"/> performed graphical or statistical tests for publication bias and discussed the likelihood and magnitude of impact of publication bias | <input type="checkbox"/> Yes |
| | <input type="checkbox"/> No |
| | <input type="checkbox"/> No meta-analysis conducted |

16. Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?

For Yes:

- | | |
|---|------------------------------|
| <input type="checkbox"/> The authors reported no competing interests OR | <input type="checkbox"/> Yes |
| <input type="checkbox"/> The authors described their funding sources and how they managed potential conflicts of interest | <input type="checkbox"/> No |

ANEXO B – ROBIS

Phase 1: Assessing relevance (Optional)

ROBIS is designed to assess the risk of bias in reviews with questions relating to interventions, aetiology, diagnosis and prognosis. State your overview/guideline question (target question) and the question being addressed in the review being assessed:

Intervention reviews:

Category	Target question (e.g. overview or guideline)	Review being assessed
Patients/Population(s):		
Intervention(s):		
Comparator(s):		
Outcome(s):		

For aetiology reviews:

Category	Target question (e.g. overview or guideline)	Review being assessed
Patients/Population(s):		
Exposure(s) and comparator(s):		
Outcome(s):		

For DTA reviews:

Category	Target question (e.g. overview or guideline)	Review being assessed
Patients):		
Index test(s):		
Reference standard:		
Target condition:		

For prognostic reviews:

Category	Target question (e.g. overview or guideline)	Review being assessed
Patients:		
Outcome to be predicted:		
Intended use of model:		
Intended moment in time:		

Does the question addressed by the review match the target question?

YES/NO/UNCLEAR

Phase 2: Identifying concerns with the review process

DOMAIN 1: STUDY ELIGIBILITY CRITERIA

Describe the study eligibility criteria, any restrictions on eligibility and whether there was evidence that objectives and eligibility criteria were pre-specified:

- 1.1 Did the review adhere to pre-defined objectives and eligibility criteria? Y/PY/PN/N/NI
 1.2 Were the eligibility criteria appropriate for the review question? Y/PY/PN/N/NI
 1.3 Were eligibility criteria unambiguous? Y/PY/PN/N/NI
 1.4 Were any restrictions in eligibility criteria based on study characteristics appropriate (e.g. date, sample size, study quality, outcomes measured)? Y/PY/PN/N/NI
 1.5 Were any restrictions in eligibility criteria based on sources of information appropriate (e.g. publication status or format, language, availability of data)? Y/PY/PN/N/NI

Concerns regarding specification of study eligibility criteria LOW/HIGH/UNCLEAR
 Rationale for concern:

DOMAIN 2: IDENTIFICATION AND SELECTION OF STUDIES

Describe methods of study identification and selection (e.g. number of reviewers involved):

- 2.1 Did the search include an appropriate range of databases/electronic sources for published and unpublished reports? Y/PY/PN/N/NI
 2.2 Were methods additional to database searching used to identify relevant reports? Y/PY/PN/N/NI
 2.3 Were the terms and structure of the search strategy likely to retrieve as many eligible studies as possible? Y/PY/PN/N/NI
 2.4 Were restrictions based on date, publication format, or language appropriate? Y/PY/PN/N/NI
 2.5 Were efforts made to minimise error in selection of studies? Y/PY/PN/N/NI

Concerns regarding methods used to identify and/or select studies LOW/HIGH/UNCLEAR
 Rationale for concern:

DOMAIN 3: DATA COLLECTION AND STUDY APPRAISAL

Describe methods of data collection, what data were extracted from studies or collected through other means, how risk of bias was assessed (e.g. number of reviewers involved) and the tool used to assess risk of bias:

- 3.1 Were efforts made to minimise error in data collection? Y/PY/PN/N/NI
 3.2 Were sufficient study characteristics available for both review authors and readers to be able to interpret the results? Y/PY/PN/N/NI
 3.3 Were all relevant study results collected for use in the synthesis? Y/PY/PN/N/NI
 3.4 Was risk of bias (or methodological quality) formally assessed using appropriate criteria? Y/PY/PN/N/NI
 3.5 Were efforts made to minimise error in risk of bias assessment? Y/PY/PN/N/NI

Concerns regarding methods used to collect data and appraise studies LOW/HIGH/UNCLEAR
 Rationale for concern:

DOMAIN 4: SYNTHESIS AND FINDINGS	
Describe synthesis methods:	
4.1 Did the synthesis include all studies that it should?	Y/PY/PN/N/NI
4.2 Were all pre-defined analyses reported or departures explained?	Y/PY/PN/N/NI
4.3 Was the synthesis appropriate given the nature and similarity in the research questions, study designs and outcomes across included studies?	Y/PY/PN/N/NI
4.4 Was between-study variation (heterogeneity) minimal or addressed in the synthesis?	Y/PY/PN/N/NI
4.5 Were the findings robust, e.g. as demonstrated through funnel plot or sensitivity analyses?	Y/PY/PN/N/NI
4.6 Were biases in primary studies minimal or addressed in the synthesis?	Y/PY/PN/N/NI
Concerns regarding the synthesis and findings Rationale for concern:	LOW/HIGH/UNCLEAR

Y=YES, PY=PROBABLY YES, PN=PROBABLY NO, N=NO, NI=NO INFORMATION

Phase 3: Judging risk of bias

Summarize the concerns identified during the Phase 2 assessment:

Domain	Concern	Rationale for concern
1. Concerns regarding specification of study eligibility criteria		
2. Concerns regarding methods used to identify and/or select studies		
3. Concerns regarding methods used to collect data and appraise studies		
4. Concerns regarding the synthesis and findings		

RISK OF BIAS IN THE REVIEW	
Describe whether conclusions were supported by the evidence:	
A. Did the interpretation of findings address all of the concerns identified in Domains 1 to 4?	Y/PY/PN/N/NI
B. Was the relevance of identified studies to the review's research question appropriately considered?	Y/PY/PN/N/NI
C. Did the reviewers avoid emphasizing results on the basis of their statistical significance?	Y/PY/PN/N/NI
Risk of bias in the review Rationale for risk:	RISK: LOW/HIGH/UNCLEAR

Y=YES, PY=PROBABLY YES, PN=PROBABLY NO, N=NO, NI=NO INFORMATION

ANEXO C – Registro PROSPERO

Citation

Alexandre Pereira, Carolina Martins, Luis Cota. Quality assessment of systematic reviews and meta-analysis of periodontal intervention studies: an overview.. PROSPERO 2020 CRD42020215676 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020215676

Review question

To perform an overview evaluating the quality of systematic reviews and meta-analysis in periodontal field.

Searches

The searches will be performed in the following databases: MEDLINE through PubMed, Embase through Ovid, Web of Science, Scopus, Cochrane Database of Systematic Reviews and LILACS. Additionally, manual searches will be carried out in the Journal Citation Reports (JCR) in the category “Dentistry, Oral Surgery and Medicine” for periodontal journals. The list of periodontal journals will be retrieved, and we will manually search for systematic reviews in the last year (2019-2000).

Types of study to be included

Systematic reviews /or meta-analysis of intervention studies, randomized or non-randomized, published in the last year in the periodontal field (related to prevention or therapeutics), published from 2019-2020; in any language.

We will exclude: primary clinical studies (observational studies or clinical trials), systematic reviews with PECO question (comparison versus exposure evaluated through observational studies), overviews, scoping reviews or narrative reviews, systematic reviews of in vitro studies, editorials, commentaries, case report/ case series, in vitro or animal studies.

Condition or domain being studied

Quality of systematic reviews and meta-analysis in the periodontal field.

Participants/population

Systematic reviews and meta-analysis related to periodontics that have been published in the last year (2019-2020). We will select only systematic reviews and meta-analysis of interventions (randomized controlled trials and non-randomized studies of interventions) related to prevention or therapeutics.

We will exclude: primary clinical studies (observational studies or clinical trials), systematic reviews with PECO question (comparison versus exposure evaluated through observational studies), overviews, scoping reviews or narrative reviews, systematic reviews of in vitro studies, editorials, commentaries, case report/ case series, in vitro or animal studies.

Intervention(s), exposure(s)

Intervention/comparison does not apply to overviews.

Comparator(s)/control

Intervention/comparison does not apply.

Context

We will assess the methodological quality of the systematic reviews and meta-analysis related to periodontal treatments that have been published in the previous year (randomized controlled trials and non-randomized trials of interventions).

The following studies will be excluded: (a) not related to periodontal treatment (PECO question), (b) unclear or undefined PICO question, (c) overviews, scoping reviews or narrative reviews, (d) clinical guidelines, editorials, opinion articles or letters to the editor, (e) observational studies, (e) case reports / series, (f) in vitro or animals studies.

Main outcome(s)

Assess the methodological quality of the systematic reviews through Assessing the Methodology Quality of Systematic Reviews (AMSTAR 2) tool (Shea et al., 2017) and Risk of bias in systematic reviews (ROBIS) tool (Whiting et al., 2016).

Measures of effect

Descriptive analysis of data (absolute and relative frequency, %).

Additional outcome(s) Secondary outcomes are:

- Cochrane and non-Cochrane reviews;
- Country;
- Number of authors
- Number of primary studies included;
- Subject/ area in periodontics;
- Study design (randomized / not);
- Impact factor of the journal;
- Type of funding (industry/ government or university grant/ no)
- Conflict of interest;
- Presence of epidemiologist/ biostatistician/ librarian on the team (yes/ no)
- Meta-analysis (yes/ no)
- Risk of bias (yes/ no)
- Assessment of the certainty of evidence (yes/ no)

Measures of effect

Descriptive analysis of data (absolute and relative frequency, %).

Data extraction (selection and coding)

Pairs of independent reviewers will extract the relevant data from the included studies to a form that will be created in an Excel spreadsheet editor.

The following variables will be collected: (a) number of authors, (b) country of authors, (c) year of publication, (d) subject studied, (e) design of included studies, (f) number of included studies; (g) impact factor of the scientific journal, (h) data necessary for classification of methodological quality and risk of bias by AMSTAR2 and ROBIS, (i) sources of research funding, (j) reported conflict of interest, (k) presence or absence of metaanalysis, (l) involvement of an epidemiologist and / or biostatistics in the study, (m) searches elaborated / verified by a librarian, (n) Cochrane or not Cochrane review.

Disagreements will be solved by consensus.

Risk of bias (quality) assessment

AMSTAR 2 (Shea et al., 2017) and ROBIS (Whiting et al., 2016) will be used to evaluate the quality and the risk of bias of the studies included. The evaluation will be performed by paired independent and trained reviewers. Disagreements will be solved by discussion and consensus.

Strategy for data synthesis

We will descriptively report the quality assessment and risk of bias by AMSTAR 2 and ROBIS according to each criteria (absolute and relative frequency).

We will analyze the secondary outcomes through absolute and relative frequency for categorical variables; and means and standard deviation for numeric variables.

If possible, we will try to statistically evaluate, using χ^2 test, the quality of the studies through AMSTAR 2 and ROBIS according to the impact factor of the journal.

Analysis of subgroups or subsets

If possible, we will run separate analysis for each study design (randomized controlled trials/ non-randomized studies of interventions); use of meta-analysis or not; assessment of the certainty of the evidence of not; subject in periodontics; number of included studies; country of the authors; Cochrane and non-Cochrane reviews.

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Type and method of review

Epidemiologic, Meta-analysis, Systematic review

Anticipated or actual start date

21 November 2020

Anticipated completion date

21 April 2021

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State the funder, grant or award number and the date of award
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Conflicts of interest

None known

Language

English

Country

Brazil

Stage of review

Review Ongoing

Subject index terms status

Subject indexing assigned by CRD

Subject index terms

MeSH headings have not been applied to this record

Date of registration in PROSPERO

21 November 2020

Date of first submission

21 October 2020

Stage of review at time of this submission

The review has not started

Stage	Started	Completed
Preliminary searches	No	No
Piloting of the study selection process	No	No
Formal screening of search results against eligibility criteria	No	No
Data extraction	No	No
Risk of bias (quality) assessment	No	No
Data analysis	No	No

The record owner confirms that the information they have supplied for this submission is accurate and complete and they understand that deliberate provision of inaccurate information or omission of data may be construed as scientific misconduct.

The record owner confirms that they will update the status of the review when it is completed and will add publication details in due course.

Versions

21 November 2020