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Effect of dentin hypersensitivity treatment on oral health related quality of life — A systematic review and meta-analysis

Dhelfeson Willya Douglas-de-Oliveira[a], Glayson Pereira Vitor[a], Juliana Oliveira Silveira[a], Carolina Castro Martins[b], Fernando Oliveira Costa[a], Luís Otávio Miranda Cota[a,*]

[a] Department of Dental Clinics, Oral Pathology, and Oral Surgery, School of Dentistry, Federal University of Minas Gerais, Belo Horizonte/MG, Brazil
[b] Department of Pediatric Dentistry and Orthodontics, School of Dentistry, Federal University of Minas Gerais, Belo Horizonte/MG, Brazil

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ABSTRACT

Objective: This study aimed to evaluate if in patients with dentin hypersensitivity (DH), the DH treatments are able to improve individuals' oral health related quality of life (OHRQoL).

Data and sources: A systematic review was performed based on PRISMA guidelines (PROSPERO CRD42016050864). Clinical trials reporting OHRQoL before and after DH treatment were included. The search was performed in the PubMed/MEDLINE, Scopus, Web of Science, Cochrane Library, LILACS, EMBASE and Scielo databases until May 2017. Hand searches and grey literature were included. Three researches independently selected the studies, extracted data, and assessed the methodological quality. The risk of bias was estimated based on the Cochrane Handbook for Systematic Reviews of Interventions. Meta-analysis was performed by I^2 test. The quality of evidence was assessed using Grading of Recommendations Assessment, Development and Evaluation (GRADE).

Study selection: Six clinical trials were included. DH was assessed by evaporative, cold, and tactile stimuli. OHRQoL was evaluated by OHIP-14 and DHEQ questionnaires. In-home and in-office desensitizing agents for DH treatment were used. The revised studies reported statistically significant reduction of DH and significant improvement in quality of life after treatment ($p < 0.05$). Two studies were judged as high risk of bias. The studies presented high heterogeneity ($I^2 = 0.8407$). The evidence was very low to moderate.

Conclusions: The studies indicated decreasing of DH and improving of OHRQoL after DH treatment, although, they presented low to moderate methodological quality.

Clinical significance: The Oral Health Relate Quality of Life of whom complaint of DH can be improved after DH treatment.

1. Introduction

Dentin hypersensitivity (DH) is characterized by distinctive short, sharp pain arising from exposed cervical dentin in response to several external stimuli which cannot be attributed to any other form of dental pathology [1,2]. This clinical condition is able to disturb and restrict individuals during daily activities, having a negative effect on the individual's quality of life [3]. The part of health-related quality of life that emphasizes oral health and orofacial problems is called Oral Health-related Quality of Life (OHRQoL) [4]. It defines how oral health may affect function, psychological status, social factors, and pain/discomfort [3].

As people are retaining more vital or minimally restored teeth that could be prone to tooth wear, DH is likely to become a more frequent complaint [5]. Several approaches to DH treatment have been proposed [6,7], including lasers, ions, dentinal sealants, root coverage, occluding and depolarization agents that are chosen according to the primary cause of the condition [8,9].

The negative impact of DH on daily life is a strong reason that led individuals to seek for dental assistance in order to improve their quality of life [10]. Since DH can promote behavioural changes and negatively influence the OHRQoL, it is important to evaluate if DH treatments can improve the individual's OHRQoL [11]. It was reported that the knowledge about the influence of DH treatment on OHRQoL is incomplete and has not been systematically studied [3].

To the best of the authors' knowledge, to date, no systematic review has been undertaken on this important issue. Thus, the objective of the present systematic review was to evaluate the scientific evidence if DH

* Corresponding author at: Department of Dental Clinics, Oral Pathology and Oral Surgery School of Dentistry, Federal University of Minas Gerais Antônio Carlos Avenue, 6627, Pampulha. PO Box 359. Zip Code 31270-901. Belo Horizonte, MG, Brazil.
E-mail addresses: luiscota@ufmg.br, dhodonto@hotmail.com (L.O.M. Cota).

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treatment is able to improve the individuals' OHRQoL.

2. Materials and methods

2.1. Protocol

The present systematic review was performed based on the PRISMA Statement Guidelines [12]. The protocol for this systematic review was registered on PROSPERO (CRD42016050864).

2.2. Focus question

In individuals with DH, is DH treatment able to improve oral health related quality of life?

2.3. Search strategy

The studies included in this systematic review were obtained through electronic searches of the PubMed/MEDLINE, Scopus, Web of Science, Cochrane Library electronic, LILACS, EMBASE and Scielo databases until May 2017. Unpublished studies were searched on the U.S. National Institute of Health (clinicaltrials.gov) and ISRCTN Register. The keywords were searched in Medical Subject Headings (Mesh) and in the related published manuscripts. The following terms were used: (quality of life) AND (dentin* sensitiv* OR dentin* hypersensitiv* OR gingival recession OR erosion OR abfraction). Search strategies used in each database is presented on Table 1. For the U.S. National Institute of Health and ISRCTN Register a combination of two uniterms was used.

The databases were searched without language restriction neither publication date. It was performed a manual search for the grey literature in the reference list of the full text articles.

2.4. Screening and selection process

Inclusion criteria were:

Table 1
Search strategy used in each database and grey literature.

Database	Search strategy
Pubmed/Medline Scopus Scielo LILACS Clinical Trials ISRCTN	(quality of life) and (dentin* sensitiv* OR dentin* hypersensitiv* OR gingival recession OR erosion OR abfraction)
Web of Science	#1: TS = (quality of life) #2: TS = (dentin* sensitiv* OR dentin* hypersensitiv* OR gingival recession OR erosion OR abfraction) #3: #1 AND #2
EMBASE	#1: quality of life #2: dentin* sensitiv* #3: dentin* hypersensitiv* #4: gingival recession #5: dental erosion #6: tooth erosion #7: dental abfraction #8: tooth abfraction #9: (#2 OR #3 OR #4 OR #5 OR #6) #10: (#1) AND (#9)
Cochrane library	#1: quality of life #2: dentin* sensitiv* #3: dentin* hypersensitiv* #4: gingival recession #5: erosion #6: abfraction #7: (#1) AND (#2 OR #3 OR #4 OR #5 OR #6)

2.4.1. Participants

Individuals who complain of having DH.

2.4.2. Type of intervention

It included any in-office or in-home intervention that was used to treat the DH.

2.4.3. Outcomes

The outcomes were reports of DH and OHRQoL evaluated through questionnaires; two evaluations in time (before and after treatment).

2.4.4. Type of study

Clinical trials (either randomized or not) that reported: DH treatment (any in-office or in-home) and OHRQoL evaluation.

2.4.5. Exclusion criteria

Clinical trials that did not assess DH and OHRQoL before and after treatment. Observational studies (cross-sectional, case-control, cohort), in vitro, animal studies, reviews and systematic reviews were excluded. However, the systematic reviews raised in the searches, were read and used to manually find studies not retrieved by electronic searches.

2.5. Review process and data extraction

The studies selection process was performed by three reviewers (D.W.D.O, G.P.V, and J.O.S) in two phases. In the first phase, the three reviewers independently selected all retrieved studies from the electronic databases and other search methods, based on the inclusion criteria applied to the titles and abstracts. For studies meeting the inclusion criteria or for those with insufficient data in the title and abstract, the full text was selected for full reading. In the second phase, full texts were obtained and independently analyzed by the same researchers, in order to determine the inclusion based on the eligibility criteria. The three reviewers discuss and compared their findings, and the disagreements were solved by consensus among them; this procedure was applied at all steps. Each independent researcher qualitatively assessed the studies using an evaluation form which contained data on the following items: author; year of publication; country; study design; characteristics of participants; follow-up; intervention; inclusion criteria; hypersensitivity stimulation and assessment; quality of life measurement; DH and quality of life outcomes. The authors of the clinical trials were contacted by e-mail, when necessary, to clarify issues related to the trials. Studies excluded were recorded along with the underlying reasons.

2.6. Risk of bias assessment

The risk of bias was estimated for each selected clinical trial based on the Cochrane Handbook for Systematic Reviews of Interventions [13]. A review management software was used (Review Manager version 5.3. Copenhagen: The Nordic Cochrane Centre, The Cochrane Collaboration, 2014) in order to judge the following items: random generation, allocation concealment, blinding (participants and assessors), incomplete outcome data, and other bias (bias not addressed in the other domains, as sample size and validated questionnaire).

2.7. Meta-analysis

The meta-analysis was performed by the mean difference of the pre- and post-mean OHRQoL (standard deviation), as reported by the authors. Six studies could be included [11,14–18]. Statistical heterogeneity was evaluated by I^2 [19]. After sensitivity analysis, one study was excluded [15] due to high heterogeneity imputed in the model. A subgroup analysis was made for studies that treated DH using chemical agents [14,16–18], and one for laser treatment [11]. Fixed and random effect model was used to test the consistency of the model [19], as well