



# Nonpharmacologic Intervention on the Prevention of Pain and Anxiety During Pediatric Dental Care: A Systematic Review

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Conflict of Interest: The authors declare that they have no conflicts of interest.

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Received for publication September 17, 2015; accepted August 27, 2016.

## ABSTRACT

**BACKGROUND:** Nonpharmacologic interventions may be used to reduce fear and anxiety during dental treatment.

**OBJECTIVES:** To systematically review trials on the effect of nonpharmacologic interventions in behavior, anxiety, and pain perception in children undergoing dental treatment.

**DATA SOURCES:** Medline, Scopus, Web of Science and CINAHL, Google Scholar, and studies' reference lists.

**PARTICIPANTS AND INTERVENTIONS:** Studies performed with children and adolescents that evaluated the effect of interventions on children's behavior, anxiety, and pain perception during dental treatment were included.

**STUDY APPRAISAL METHODS:** Independent quality assessment of the studies was carried out following the classification categories present on the Cochrane Handbook for Development of Systematic Reviews of Intervention.

**RESULTS:** Twenty-two articles, reporting 21 studies, were selected. Most studies tested distraction techniques. Eight studies presented bias and results were not considered. The re-

maining 13 studies had control groups with inactive controls, and 4 also included a variation of the intervention. Of the 4 studies assessing behavior, 3 found difference between intervention and control. Anxiety was evaluated by 10 studies: 4 found differences between intervention and control and 2 found differences between interventions. Five studies investigated pain perception: 3 found difference comparing active versus inactive interventions. In 1 of the 3, variations in the intervention decreased pain perception.

**CONCLUSIONS:** More research is needed to know whether the techniques are effective for improving behavior and reducing children's pain and distress during dental treatment. However, the majority of the techniques improved child's behavior, anxiety, and pain perception.

**KEYWORDS:** anticipatory anxiety; dental anxiety; nociception; pediatric dentistry

**ACADEMIC PEDIATRICS** 2017;17:110–119

## WHAT THIS SYSTEMATIC REVIEW ADDS

- Nonpharmacologic approaches can be effective in behavior management.
- A range of nonpharmacologic techniques may be used to manage children's dental fear and anxiety; most interventions are effective.
- Future studies are recommended to confirm the effectiveness of some of the techniques.

## HOW TO USE THIS SYSTEMATIC REVIEW

- This systematic review can help primary care providers counsel the family about the possibilities of effective behavior management.
- Dentists can use nonpharmacologic methods to address anxiety and fear either in place of pharmaco-

logic approaches or, when appropriate, in addition to them.

ACCORDING TO THE latest survey of oral health conducted in Brazil, the oral health status of children and adolescents has improved in many aspects; however, access to health services is still poor, especially in economically disadvantaged populations.<sup>1,2</sup> Besides factors associated with access to dental care, psychosocial factors such as fear and anxiety may also compromise dental care, interfering with regular oral health care and contributing to poor oral conditions in children.<sup>3</sup> In the United States, a national survey showed that many actions to improve oral health, encouraged by medical policies, are performed by pediatricians. Thus, the management of child's behavior and anxiety is deemed important in the general health context.<sup>4</sup>

Dental fear and anxiety can have psychological, cognitive, and behavioral effects in children. The behavior, focused on the degree of cooperation that the child exhibits during dental treatment, appears to be conditioned by many situations such as level of mental development, temperament, and previous experiences, as well as the attitude and anxiety of parents.<sup>5,6</sup> It has been shown that positive experiences can reduce dental fear and improve children's oral health-related quality of life.<sup>7</sup>

Dental procedures are a common source of pain and distress for children. The identification of behaviors that indicate traces of anxiety during dental treatment and use of management strategies of anxiety and pain perception, allied with the establishment of a trust relationship among the child, the family, and the health care professional, can contribute to positive experiences during the treatment.<sup>8,9</sup> A number of psychological interventions for managing pain and distress in children exist that help individuals develop and use coping skills to manage pain and distress. Systematic reviews examining the effect of nonpharmacologic interventions during injections,<sup>10</sup> during medical procedures,<sup>11</sup> and in emergency departments<sup>12</sup> have shown the efficacy of using these techniques to manage pediatric pain and distress.

In recent years, studies have been conducted to evaluate the effectiveness of additional resources for behavior management in dental treatment, which use distraction, visualization, and persuasion, combined with traditional techniques.<sup>13</sup> The use of the techniques such as viewing positive images related to dental care,<sup>14,15</sup> virtual reality,<sup>16,17</sup> music,<sup>18</sup> and magic tricks<sup>19</sup> could facilitate compliance, obtain improvement in child behavior, and decrease anxiety and pain perception.

It is important that such evaluations are conducted using appropriate methodologies, aiming to provide reliable answers about their effectiveness and reinforcing its use in pediatric dentistry. For this, randomized clinical trials are the most appropriate methodology to adequately evaluate the effects of interventions in health, considering that the technique is tested after randomization, which allows the same probability of an individual belonging to the intervention group or control group.<sup>20</sup> Thus, our review sought to systematically review the existing literature on randomized clinical trials on the effect of nonpharmacologic interventions on behavior, anxiety, and pain perception in children undergoing dental treatment compared to inactive or active controls.

## METHODS

### SEARCH METHODS FOR IDENTIFICATION OF STUDIES

This systematic review was oriented following the Preferred Reporting Items for Systematic Reviews and Meta-analyses protocol.<sup>21</sup> A systematic search of articles published before February 2016 was conducted following the criteria described in the Inclusion/Exclusion Criteria. The electronic databases used were Medline via PubMed (1953–present), Scopus (1823–present), Web of Science (1945–present) and CINAHL (1976–present). Also, Goo-

gle Scholar was used as a method for searching for literature (limited to the 100 most relevant articles). The syntax used for the search adapted to each database is described in Table 1. The electronic search was supplemented by a manual cross-reference search of identified articles. The references of articles that were read in full were checked to identify potentially relevant studies. Only articles in English were included. No publication status or publication date restrictions were imposed. All references were managed by the reference manager software EndNote Basic (Thomson Reuters, New York, NY), and duplicates were removed.

### INCLUSION/EXCLUSION CRITERIA

The inclusion criteria for the study were related to: (1) types of studies: randomized clinical trials assessing the use of nonpharmacologic interventions in the management of children's behavior during dental care, comparing with a nonintervention (usual treatment or inactive controls) or comparing with other interventions or variations of the same intervention (active controls); (2) types of participants: children and adolescents up to 18 years for dental treatment, not physically or mentally handicapped, with or without a history of dental care; (3) outcomes: interventions that evaluated behavior, anxiety, and pain perception. The exclusion criteria were: (1) cross-sectional studies, cohort studies, case reports, reviews, letters, and conference abstracts; (2) clinical trials investigating nonpharmacologic interventions that were not cognitive behavioral (for example, acupuncture; heat or cold); (3) clinical trials in which the outcomes were not behavior, pain, or anxiety; (4) clinical trials that used pharmacologic techniques, nitrous oxide, or general anesthesia; and (5) clinical trials conducted in individuals older than 18.

### STUDY SELECTION

The articles were selected by title and abstracts according to the inclusion/exclusion criteria independently by 2 authors to identify eligible papers. To avoid double counting, data from multiple reports of the same study were identified. Thereafter, the reading of full papers that met the inclusion criteria was performed. Two review authors made the collection. Any disagreement of inclusion, exclusion, and quality assessment criteria was discussed to be resolved; if resolution could not be reached, a third reviewer was consulted.

### QUALITY ASSESSMENT

Independent quality assessment of the included studies was carried out following the classification categories present on the Cochrane Handbook for Development of Systematic Reviews of Intervention, version 5.1.0 (Cochrane Handbook), as follows: random sequence generation and allocation concealment (selection bias), blinding of participants and personal (performance bias), blinding of outcome assessment (detection bias), incomplete outcome data (attrition bias), selective reporting (reporting bias), and other bias. The quality evaluation was performed in Review Manager 5.3 software.

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