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MAIN CONSIDERATIONS ABOUT CONSCIOUS SEDATION IN DENTISTRY: A BRIEF REVIEW

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ABSTRACT

Introduction: Many children still do not cooperate with care due to lack of psychological or emotional maturity and / or physical, mental or medical disorders. In view of this, it is often necessary to include advanced behavioral control techniques for conducting appropriate dental treatment, which include protective stabilization, sedation and general anesthesia.
Objective: This study aimed to make a literature review about the main considerations regarding the use of sedatives in pediatric dentistry.
Methods: The words were included "Conscious Sedation", "Sedation in Dentistry", "Pediatric Dentistry". A total of 45 articles were found involving conscious dental sedation. A total of 23 articles were evaluated in full, and 19 were included and discussed in this study.
Conclusion: The association of oral sedatives midazolam and ketamine with sevoflurane gas increases the physiological stress of children undergoing dental treatment. However, infant behavior is more cooperative when these sedatives are associated compared to the use of oral midazolam alone.

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INTRODUCTION

Pediatric dentistry may use behavior control techniques such as verbal and non-verbal communication, speaking-show-doing, voice control, positive reinforcement, distraction, memory restructuring, parental presence / absence, and communication skills with parents or even Inhalation sedation with nitrous oxide / oxygen (American Academy OF Pediatric Dentistry, 2015). However, many children still do not cooperate with care due to lack of psychological or emotional maturity and / or physical, mental or medical disorders (American Academy OF Pediatric Dentistry, 2015), being intensified by younger age and anxiety (Krikken *et al*.,2012). In view of this, it is often necessary to include advanced behavioral control techniques for conducting appropriate dental treatment, including protective stabilization, sedation and general anesthesia (American Academy OF Pediatric Dentistry, 2015).

About 10.0% of the world's population of children and adolescents present with dental anxiety and behavior problems during dental treatment (Klingberg *et al*., 2006) and an average of 3.8% in a sample of 3,500 Brazilian children from 2 to 5 years old required sedation For dental treatment. Furthermore, in an epidemiological survey, 83.5% of Brazilian children aged 2 to 5 years presented carious lesion and need dental treatment, thus deserving special attention to these pre-school children. NESO (Nucleus of Studies in Dental Sedation) is a reference center in Brazil composed of a multidisciplinary team trained and qualified to act in dental sedation for children and adults who present behavioral problem and / or dental anxiety. In view of the great need for dental sedation in infants (88.7% between 2 and 15 years of age), NESO has made it possible to carry out research in order to investigate a sedative protocol that promotes greater comfort and lower possible risk of pediatric dentistry (Costa *et al*., 2012; Da Cost *et al*., 2007;

Gomes *et al*., 2016). In order to investigate the most effective sedative technique for children, there are observational scales that were developed to assess behavior and infant and maternal anxiety (Corah, 1969). However, observational assessment is a subjective measure and may not reflect the patient's physiological stress. Thus, aiming at a sedative protocol that controls both stress and behavior, using an objective physiological measure for this assessment may contribute to clinical and scientific practice.The present work had as objective to make a literary review on the main considerations of the use of sedatives in pediatric dentistry.

METHODS

Experimental and clinical studies were included (case reports, retrospective, prospective and randomized trials) with qualitative and / or quantitative analysis. Initially, the key words were determined by searching the DeCS tool (Descriptors in Pubmed, Health Sciences, BIREME base) and later verified and validated by MeSh system (Medical Subject Headings, the US National Library of Medicine) in order to achieve consistent search.

Mesh Terms

The words were included "Conscious Sedation", " Sedation in Dentistry", "Pediatric Dentistry". The literature search was conducted through online databases: Pubmed, Periodicos.com and Google Scholar. It was stipulated deadline, and the related search covering all available literature on virtual libraries.

Series of Articles And Eligibility

A total of 45 articles were found involving treatment by conscious dental sedation. Initially, it was held the exclusion existing title and duplications in accordance with the interest described this work. After this process, the summaries were evaluated and a new exclusion was held. A total of 23 articles were evaluated in full, and 19 were included and discussed in this study.

ConsciousSedation

Sedation is indicated for patients in whom basic behavioral techniques were not satisfactory for the control of fear and / or anxiety regarding dental treatment. In addition, it is indicated for patients who cannot cooperate with the procedure due to lack of physical, mental, physiological and emotional maturity (American Academy OF Pediatric Dentistry, 2015). The useof sedatives aims at physical and psychological comfort, behavior control and anxiety as well as promote amnesia while safeguarding the patient's safety (American Academy OF Pediatric Dentistry, 2015). Thus, sedation promotes depression of consciousness and alters pain perception through the use of medications (Costa *et al*., 2012). According to the American Society of Anesthesiologists, three levels of sedation are defined: Minimum (anxiolysis) - the patient has depressed cognitive and coordination functions, but normal responses to verbal commands, as well as preserved cardiovascular and ventilatory functions; Moderate (conscious) - depression of consciousness occurs, the patient maintains response to verbal commands or light tactile stimulus, preserving adequate spontaneous breathing, without airway intervention, in addition to maintained cardiovascular function; Deep depression of consciousness is greater, however, cardiovascular function remains preserved.

In addition, the patient has reflexes to continuous and repeated stimuli, but is not easily aroused and may require ventilatory assistance to maintain a free airway (American Academy OF Pediatric Dentistry, 2015). General anesthesia, even indicated, is often replaced by moderate sedation due to its high cost and need for more complex equipment and physical structure, making it difficult for the population with low socioeconomic status (Costa *et al*., 2012). Several drugs have been used for sedation, among them midazolam, ketamine and dexmedetomidine, either orally, intranasally or intravenously. In addition to these, sedation can be performed using oxygen / nitrous oxide, promethazine, propofol and diazepam (Lourenco-Matharu *et al*., 2012). However, it is known that the effect of sedatives depends on the chronological age and psychological development of the patient (American Academy OF Pediatric Dentistry, 2016; Costa *et al*., 2012).

Midazolam is a benzodiazepine drug that exhibits anxiolytic and amnestic properties due to its activity in specific receptors of the central nervous system (Gazal *et al*., 2016). These receptors are next to GABA (gamma amino butyric acid) receptors favoring the opening of their channels for chloride ion input, which promotes the depolarization of this neuron reducing anxiety (Gazal *et al*., 2016). Its advantages are time to action (20 to 90 minutes), reabsorption and rapid effect after administration (15 minutes) (Gazal *et al*., 2016), so it is indicated for pediatric patients promoting safe and effective sedation (18) with a high success rate (Costa *et al*., 2012; Da Costa *et al*., 2007). However, a systematic review presented weak evidence of the effectiveness of oral midazolam in dentistry, suggesting that well-designed clinical trials using this sedative agent (Lourenco-Matharu *et al*., 2012) were performed. Sevoflurane is an anesthetic gas that also acts on GABA receptors in the central nervous system, improving their activation (Xu *et al*., 2015). It has an advantage in pediatrics since it is an inhaled anesthetic agent, but does not cause respiratory tract irritability. In addition, it causes mild changes in cardiovascular function and presents rapid onset and recovery (American Academy OF Pediatric Dentistry, 2016; Abdulla *et al*., 2015). Therefore, the use of sevoflurane in subanesthetic doses during moderate odontopediatric sedation can bring favorable results in terms of safety and effectiveness.

Scales Propensity

There are several observational scales that are used during the dental care for the evaluation of the patient and his companion (Corah, 1969; Frankl *et al*., 1962). The use of observational scales that assess behavior is justified, in the case of children, because they are practices and do not depend on the patient's collaboration. However, these measures are subjective and do not always associate with patient stress (Gomes *et al*., 2016). The scales, which evaluate the companion, are often used through self-reporting depending, therefore, on their collaboration (Corah, 1969). Some of these instruments are: Ohio State University Behavioral Rating Scale (OSUBRS) and Corah's Dental Anxiety Scale (DAS) (Corah, 1969). The first evaluates movements of head and extremity, crying and physical endurance of the patients. The Corah scale, which has been adapted for Brazil, includes questions about anxiety itself in relation to dental treatment (Hu, 2007). The major glucocorticoid hormone, cortisol, is released by the adrenal cortex in the blood according to the circadian rhythm, with its peak in the morning and decreasing throughout the day until it

reaches its lower level at night in healthy patients (Carlsson *et al*., 2006). When a stressful stimulus occurs, the circadian rhythm of cortisol is altered due to the interaction of two systems, the sympathetic nervous system and the hypothalamic-pituitary-adrenal (HHA) axis. The reactivity of the latter promotes the production and release of corticotropin releasing hormone (CRH) by the hypothalamus that will stimulate the production of the adrenocorticotrophic hormone by the pituitary, which in turn will cause the release of cortisol in the blood through the adrenal cortex (Jessop, 2008). About 15 to 20 minutes after the stressful stimulus, cortisol reaches its peak blood and followed by 2-3 minutes its peak occurs in saliva (American Academy OF Pediatric Dentistry, 2016; Jessop , 2016).

Stress response

A stressful stimulus produces a neuronal-hormonal interlocking response triggered by activation of the HHA axis through the release of corticotropin-releasing factor (Gunn, 2015). Dysregulation of the HHA (reactivity) axis can provide the hippocampus with an adaptive capacity that would be the body's return to normality, known as stress resilience, or permanent damage in that region. This will depend on the type, intensity and duration of stress, as well as individual characteristics of each organism to overcome the situation (Gunn, 2015).

A normal response to stress, which would be the reactivity of the HHA axis followed by resilience, is critical for the body to survive and be able to overcome and adapt to future stressful situations 13. However, the difficulty of resilient stress or repetitive stressful stimuli can generate a prolonged response to stress and cause damage to the hippocampus. This difficulty in this phenomenon can persist until adulthood and be transmitted to future generations, in addition to lead to the atrophy of this region reducing the receptors to the stress hormones (Gunn, 2015).

Conclusion

The association of oral sedatives midazolam and ketamine with sevoflurane gas increases the physiological stress of children undergoing dental treatment; However, infant behavior is more helpful when these sedatives are associated compared to oral midazolam alone.

Conflict of interests

There is no conflict of interest between authors.

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