Obstructive Sleep Apnea

Subjects: Pathology
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The aim of this study was to assess the current scientific data and to summarize systematically the evidence of efficiency of adenotonsillectomy (AT) and orthodontic treatment (i.e.: rapid maxillary expansion (RME) and mandibular advancement (MA)) in the treatment of pediatric OSA. AT and orthodontic treatment were more effective together than separately to cure OSA in pediatric patients. There was a higher decrease of Apnea Hypoapnea Index (AHI) and Respiratory Disturbance Index (RDI), a major increase of the lowest oxygen saturation and the oxygen desaturation index (ODI) after undergoing both treatments. Nevertheless, reappearance of OSA could occur several years after reporting adequate treatment. In order to avoid recurrence, myofunctional therapy (MT) could be recommended as follow-up. However, further studies with good clinical evidence are required to confirm this finding.

Keywords: surgical ; orthodontic treatments ; apnea

Obstructive sleep apnea (OSA) is described as a sleeping breathing disorder, characterized by prolonged partial upper airway obstruction and/or intermittent complete obstruction [1]. This syndrome is commonly correlated with intermittent hypoxemia and sleep fragmentation [2].

1. Introduction

The prevalence of OSA has been estimated, in a general orthodontic population, by questionnaires and it was found to be 10.8%, which is more than double that reported by similar methods in a healthy pediatric population [3].

OSA has also been associated with frequent snoring, disturbed sleep, daytime neurobehavioral problems, neurocognitive impairments, academic underperformance, hypertension, cardiac dysfunction and systemic inflammation. Daytime sleepiness may occur but is uncommon in young children [4]. Etiological factors include any condition that reduces the caliber of the upper airways, such as craniofacial dysmorphism, hypertrophy of lymphoid tissues, obesity, hypotonic neuromuscular diseases and neuromotor control alterations during sleep. However, adenotonsillar hypertrophy remains the main anatomical risk factor [4][5][6][7].

Therefore, adenotonsillectomy (AT) is the recommended first-line treatment for pediatric OSA in children with adenotonsillar hypertrophy [4][8][9][10]. It has been demonstrated that AT reduced the severity of OSA in most children, and reduced symptoms and improved behavior, quality of life and polysomnographic findings [9]. However, a significant number of patients with pediatric OSA undergoing AT exhibit residual persistent post-surgery OSA [10].

2. Latest Research, Data, Model, Management, Applications or Influences or …

A literature search was conducted in several databases, including PubMed, Embase, Medline, Cochrane and LILACS up to 5th April 2020. The initial search yielded 509 articles, with 10 articles being identified as eligible after screening.

2.1. Importance of pediatric treatment

Sleep disorders in children occur during the critical period of brain development. The consequences of not treating them can be of high relevance, leading to the following health conditions: stunted growth, cognitive and behavioral abnormalities such as hyperactivity, poor school performance, cardiovascular and endothelial dysfunction and an overall reduced quality of life [9][21].

2.2. Efficiency of combining treatments

As OSA is a multifactorial syndrome [22], a multidisciplinary approach should be taken to treat OSA in children. That is why, combined soft tissue surgery, orthodontic treatment worked more effectively together, reducing the *AHI* [11][12][13][14][15][16][17][18][19][20] and increasing the mean of the lowest oxygen saturation. [19][20][22]. These improvements were

irrespective of the order in which the treatments were performed [20]. Moreover, the reappearance of OSA could occur several years after reporting adequate treatment. In order to avoid recurrence, myofunctional therapy could be recommended as a follow-up [17].

2.3. Optimal age

Any child aged 1 to 18 years old could be a candidate for tonsillectomy [23]. The most common late complications of AT were dehydration or secondary post-tonsillectomy hemorrhage (PTH) [24]. Patients younger than three years of age were more likely to present dehydration. However, PTH was more common in older children [25].

RME has to be undergone before the fusion of maxillary sutures, which is completed at the age of 14–15 in females and 15–16 in males [26].

Hence, functional treatment to treat skeletal class II was efficient when it was performed during the pubertal growth spurt [27][28][29]. Before, they will not have clinically relevant effects to correct the skeletal relationship but they achieved a dentoalveolar correction, effective in reducing overjet and severity of malocclusion [30].

3. Conclusions

AT and orthodontic treatment were more effective together rather than separately to cure OSA in pediatric patients. There was a greater decrease in AHI and RDI, a major increase in the mean of the lowest oxygen saturation and the ODI in patients after undergoing both treatments. Further research with good clinical evidence is required to confirm this finding.

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