

The Role of Rapid Maxillary Expansion in Managing Obstructive Sleep Apnea in Children: A Literature Review

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Abstract : Obstructive sleep apnea (OSA) is a sleep disorder that can result in behavioral and psychomotor impairments in children. The classical treatment modalities for OSA have been continuous positive airway pressure and adenotonsillectomy. However, orthodontic intervention through rapid maxillary expansion (RME) has also been commonly used to manage skeletal transverse maxillary discrepancies. Aim and objectives: The aim of this study is to determine the efficacy of rapid maxillary expansion in paediatric patients with obstructive sleep apnea by assessing pre and post-treatment mean apnea-hypopnea index (AHI) and oxygen saturations. Methodology: Literature was identified through a rigorous search of the Embase, Pubmed, and CINAHL databases. Articles published from 2012 onwards were selected. The inclusion criteria consisted of patients aged 18 years and under with no systemic disease, adenotonsillar surgery, or hypertrophy who are undergoing RME with AHI measurements before and after treatment. In total, six suitable papers were identified. Results: Three studies assessed patients pre and post-RME at 12 months. The first study consisted of 15 patients with an average age of 7.5 years. Following treatment, they found that RME resulted in both higher oxygen saturations (+ 5.3%) and improved AHI (- 4.2 events). The second study assessed 11 patients aged 5-8 years and also noted improvements, with mean AHI reduction from 6.1 to 2.4 and oxygen saturations increasing from 93.1% to 96.8%. The third study reviewed 14 patients aged 6-9 years and similarly found an AHI reduction from 5.7 to 4.4 and an oxygen saturation increase from 89.8% to 95.5%. All modifications noted in these studies were statistically significant. A long-term study reviewed 23 patients aged 6-12 years post-RME treatment on an annual basis for 12 years. They found that the mean AHI reduced from 12.2 to 0.4, with improved oxygen saturations from 78.9% to 95.1%. Another study assessed 19 patients aged 9-12 years at two months into RME and four months post-treatment. Improvements were also noted at both stages, with an overall reduction of the mean AHI from 16.3 to 0.8 and an overall increase in oxygen saturations from 77.9% to 95.4%. The final study assessed 26 children aged 7-11 years on completion of individual treatment and found an AHI reduction from 6.9 to 5.3. However, the oxygen saturation remained stagnant at 96.0%, but this was not clinically significant. Conclusion: Overall, the current evidence suggests that RME is a promising treatment option for paediatric patients with OSA. It can provide efficient and conservative treatment; however, early diagnosis is crucial. As there are various factors that could be contributing to OSA, it is important that each case is treated on its individual merits. Going forward, there is a need for more randomized control trials with larger cohorts being studied. Research into the long-term effects of RME and potential relapse amongst cases would also be useful.

Keywords : orthodontics, sleep apnea, maxillary expansion, review

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