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Effects of rapid maxillary expansion on respiratory events in children: are we doing no harm?

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Introduction and aim

Rapid maxillary expansion devices are used in children with upper maxillary transverse deficit and cross-bite. They were consistently shown to improve obstructive apnoea syndrome in children. However, the impact of the device in place into the child's mouth has never been studied. The aim of our study was to quantify the effect of the device on respiratory events while in place. Secondary endpoints were to evaluate its impact on quality of life and on respiratory events after treatment.

Material and methods

12 consecutive children with maxillary cross-bite were prospectively included in this cohort study. Respiratory events were recorded before, during and after rapid maxillary expansion using a validated type 3 polygraphy including jaw movements. Subjective outcomes were evaluated using Obstructive Sleep Apnea (OSA)-18 quality-of-life questionnaire (OSA-18). Maxillary width and 16/26 distance were evaluated before and after rapid maxillary expansion on anterior radiography.

Results

Estimated apnea hypopnea index increased from 2.67/h (±1.31/h) to 2.9/h (±2.4/h) with the device in place. Respiratory effort characterized by jaw motion > 0.4mm during the respiratory cycle increased from 7.58% (±10.01%) to 16.05% (±15.53%). Sleep-related breathing impairment was confirmed by parents' questionnaires.

Conclusion

While rapid maxillary expansion is an effective treatment for obstructive apnea syndrome in children, our study suggested a transient worsening of sleep breathing while the device is in place. It may be related to an incorrect tongue position and/or to the crowding of the device into the mouth.