with multilevel surgery at a University Hospital in 2015–2019 were identified from a prospectively maintained database. The inclusion criteria were age 18–70 years, body mass index (BMI) <35 kg/m^2, apnea–hypopnea index (AHI) >20, and lingual tonsil hypertrophy grade 3 or 4. Drug-induced sleep endoscopy (DISE) was performed before surgery in all patients. Multilevel surgery was performed in one stage and included expansion sphincter pharyngoplasty (ESP), coblation tongue base reduction (CTBR), and partial epiglottectomy (PE) as required. The outcome measures were postoperative AHI, time percentage oxygen saturation <90%, and Epworth Sleepiness Scale (ESS) score. **Results:** Twenty-four patients were included: median age 49.1 years, average BMI 27.26 kg/m^2, and 90% men. Ten patients received ESP plus CTBR plus PE, eight received ESP plus CTBR, and six received ESP plus PE. The mean preoperative AHI was 33.01 at baseline, and improved to 17.7 ± 13 after surgery ($p < 0.05$). The ESS score decreased from 11 ± 5.11 to 7.9 ± 4.94 ($p < 0.05$). The surgical success rate according to Sher's criteria, was 82.3%. The median follow-up was 23.3 months (range 12–36). **Conclusions:** These findings suggest that multilevel surgery is a safe and successful procedure for the treatment of moderate to severe obstructive sleep apnea-hypopnea syndrome (OSAHS). Multilevel surgery seems appropriate for patients with OSAHS whose treatment is not tolerable or as first-line treatment in selected patients with well-defined airway obstruction, based on the detection of upper airway (UA) collapses using DISE. Multilevel surgery in one step seems to help reduce the risk of UA collapse in younger, non-obese patients with moderate to severe OSAHS.

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ORAL CAVITY, LINGUAL FRENULUM AND HEAD FORWARD POSTURE IN CHILDREN AT RISK OF OSAS

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Introduction: Obstructive sleep apnea syndrome (OSAS) is a disorder that occurs during sleep and is characterized by partial or complete obstruction of the upper airways leading to impaired ventilation. Pediatric OSAS may lead to serious health consequences in child's development for example: arterial hypertension, insulin resistance, hyperactivity, daytime sleepiness and learning difficulties. Many risk factors for pediatric OSAS have been described including obesity, increased waist circumference, allergic rhinitis, narrowing of the pharynx and hypertrophy of the palatine tonsils and adenoids. Moreover recent studies have described short frenulum, leading to abnormal orofacial development, as a potential risk factor for OSAS in children. In addition by reduction of tongue mobility, ankyloglossia impairs sucking, chewing and swallowing and requires the use of additional cervical muscles. This hyperactivity of the cervical muscles may cause their shortening and induces a forward head posture. The aim of this study was to evaluate lingual frenulum, oral cavities and head posture in children at risk of OSAS.

Materials and Methods: The study included children aged 3-17 without craniofacial abnormalities. In the first part of the study children's guardians were asked to fill in the Pediatric Sleep Questionnaire (PSQ), afterwards children at risk of OSAS (8 or more points) were enrolled to the study group. A control group was established randomly from patients with negative PSQ results. Physical examination performed in both groups included assessment of the following: length of the lingual frenulum; oropharynx in Mallampati classification; palatine tonsils size in Pirquet scale; presence of the high arched palate, malocclusion and head forward posture (HFP). Moreover, children's guardians were asked to assess their child's time spent with electronic mobile devices, such as smartphones or tablets.

Results: 1,500 PSQ questionnaires were distributed, with less than half (713) of them being returned correctly filled in. In the second part of the study 131 children were evaluated, 65 in the study and 66 in the control group. The mean ages were 9.5±3.0 and 9.4±3.1 years, respectively. Among children from the study group the presence of the higher grades (III and IV) in the Mallampati classification, Pirquet scale (III – IV), crossbite and high arched palate were significantly more frequent compared to the control group (p<0.001). Moreover, children at risk of OSAS had significantly shorter lingual frenulum (p=0.01), higher HFP measure (p=0.03) and spent longer time using mobile devices (p<0.001). Additionally, a statistically significant correlation between mobile device use and HFP was found regardless of OSAS risk.

Conclusions: Conducted study found an association between certain features in oral cavity and the risk of OSAS. Evaluation of these elements is an easy procedure, and may be useful in screening for OSAS in children. Furthermore, the forward head posture and use of mobile devices was also associated with a higher risk of sleep apnea.

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OROPHARYNGEAL STIMULATION WITH THE TONGUE-RIGHT-POSITIONER (TRP) DEVICE ON OSA PATIENTS

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Introduction: The Tongue-Right-Positioner (TRP) is a sensorimotor tongue stimulation device. It acts on tongue position and functions and consequently on the neural control of the tongue and other pharyngeal dilators muscles and soft palate. Effects of TRP may act both on obstructive events and the oxygen saturation during sleep.

Materials and Method: Observational multi-centric retrospective study was carried out in 20 patients with diagnosed OSA. They underwent sleep studies before (T0) and during treatment (T1) with the TRP appliance. At T0, there were seven severe, ten moderate, and three mild OSA patients. There were nine females and 11 males. The average age was 53±12.8 years; the average body mass index (BMI) 24.6±3.6; average treatment duration until T1: 11.3±8.2 months use. All 20 patients were compliant and used TRP the whole night every day during the treatment period.

Results: Average AHI was reduced from 27.7±13.4 at T0 to 14.3±10 at T1. TRP treatment was successful in 13 patients (65%). Complete response (AHI≤10/h) was achieved in 8 of 20 patients (40%), including one patient with AHI≥30 at T0. Five of 20 patients (25%), including four patients at T0 with AHI≥30, achieved a partial response (50% decrease in AHI but AHI>10). Seven patients (35%) were poor responders (less than 50% reduction in AHI). Average AHI in supine position dropped from 32.3±21 at T0 to 23.3±15.5). Average REM sleep AHI dropped from 29±13.2 at T0 to 18.2±6.9. Average arousals dropped from 21.7±12.1 at T0 to 13.2±7.5 events/hour.

Average mean SpO_2 ($mSpO_2$) increased from 93.3±2.4% at T0 to 94.9±1.3%. At T0, mSpO2 <90% in 3, 90%-95% in 11, and ≥95% in 6 patients. At T1, all patients had mSpO2 >90%; 11 had $mSpO_2$ ≥95% and the remaining 9 had $mSpO_2$ 90%-95%. Anti-correlation between $mSpO_2$ variation during treatment with its baseline level (r=-0.775; p-value<0.001) suggests that the effect of TRP is inversely proportional to patients' initial $mSpO_2$ level.

Discussion: The nightly use of the TRP device increases phasic and tonic activity of the tongue and related oropharyngeal muscles, promotes nasal breathing, and thereby decreases respiratory efforts. Moreover, nasal breathing promotes the admixture of nasal nitric oxide (NO) in the inhaled breath. Therefore, it can increase the volume of inhaled air and, through the vasodilating effect of inhaled NO, the amount of oxygen in the blood (ventilation perfusion match), thus the $mSpO_2$.

Conclusion: The TRP appliance as a mono-maxillary device with good comfort and high compliance in patients can significantly reduce obstructive events (AHI), improve oxygen saturation during sleep. We recommend TRP alone in mild to moderate OSA to achieve a complete response. In addition, the AHI reductions noted in supine position suggest its use alone or in combination with a CPAP.