



Oropharyngeal Airway Dimensional Changes after Treatment with Trainer for Kids (T4K) in Class II Retrognathic Children

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Dear Editor-in-Chief

Obstructive Sleep Apnea Syndrome (OSAS) in children is caused by the enlargement of tonsil-adenoids in many cases but there is no correlation between the size of enlargement and the severity of OSAS and also craniofacial abnormalities due to malocclusion is another cause of OSAS (1, 2). The children with mouth respiration have narrower maxilla and Dolichofacial pattern and retreated mandible than the children with normal breathing pattern and if there is a habit related to tongue, it can interrupt the normal growth of teeth and therefore, serious malocclusion can occur (3). If craniofacial abnormality exists due to such malocclusion, tonsil and adenoids removal, known to be the most important treatment method for OSAS, cannot bring a complete improvement in many cases (4).

The number of reports is increasing on the improvement of the children with OSAS symptoms and no enlargement of tonsil and adenoids after oral appliance treatment instead of surgical treatment and other study results indicate that sleep-disordered breathing can be prevented with orthodontic treatment and thus the interest in oral appliance, which is non-surgical treatment and can be used for children, is increasing (5, 6).

The purpose of this study was to confirm whether Myobrace (Trainer for Kids (T4K™, Myofunctional Research Co, Australia)), which is malocclusion correction device, can help OSAS treatment for children by verifying not only malocclusion treatment but also upper airway expansion.

Among various sleep disorders, OSAS is a common medical problem for children and it is a breathing disorder which occurs after upper airway blockage during sleep and it has not only night-time symptoms such as snoring or apnea but also daytime symptoms such as behavioral disorder, excessive daytime sleepiness, concentration issue, memory and cognitive function and in a serious situation, it can cause critical disease such as Cor pulmonale, systemic hypertension or heart failure (1, 2).

Myobrace (T4K™), is an easy-to-use established functional device offering Myofunctional therapy and the effect of relocating mandible and it stimulates facial muscle, masseter muscle and tongue muscle and thus moves mandible to the front and stimulates horizontal growth (7, 8).

In the case of class II malocclusion where maxillary teeth show labial inclination and mandible

shows retreat, by using Myobrace (T4K™), mandibular position can be moved to the front using maxillary anterior teeth as an anchorage and thus gains the improving effect of the axial angle, excessively labial inclined, of maxillary anterior teeth to palatal area and therefore, expansion of upper airway can be achieved(Figure 1). There-

fore, in the case of Activator, Bionator and FR-2 device generally used for class II malocclusion in mixed dentition, the cooperation level of childhood patients is usually low due to their big size and additional education on muscle function is necessary for correcting the location of tongue and mouth respiration.



Fig. 1: Clinical radiograph of Case using Myobrace (T4K™): Before and after treatment cephalometrics

However, in the case of Myobrace (T4K™), used for this study, it is smaller than the aforementioned ones with softer texture and thus creates less repulsion when located in the mouth of childhood patients and also it has elements to educate the location of tongue and mouth respiration and thus has an advantage of reducing the risk factor of upper airway obstruction.

There were not enough studies using oral appliance on Obstructive Sleep Apnea (OSA) of Korean children and adolescents. Until now, apnea treatment for children was mainly done with tonsil and adenoid removal and orthodontic

treatment on apnea caused by mouth shape such as malocclusion was relatively ignored. For the reasons behind it were that necessary additional visit to the dentist for oral appliance, discomfort including foreign body sensation in the mouth after applying and the indifference on the sleep disorder of children. Although nasal Continuous Positive Airway Pressure (CPAP), used for the continued OSAS symptoms after adenotonsillectomy, can be considered for the treatment, it has many limitations such as age and thus the importance of orthodontic treatment using oral appliance will be increased.

Table 1: Clinical Case using Myobrace (T4K™): Before and after Treatment measurements

Measurement	Before Treatment	After treatment
SNA(°)	82.43	73.10
SNB(°)	75.74	66.19
ANB(°)	6.69	6.91
U1 to A-pog(mm)	10.81	9.46
L1-Mandibular plane(°)	41.72	44.81
Interincisal angle(°)	126.07	124.35
Overjet(mm)	7.95	6.20
Overbite(mm)	4.03	4.57
Pharyngeal depth(Xi)	18.40	20.92
Pharyngeal depth(C2)	6.82	7.43

Our study confirmed the increase of upper airway dimension using Myobrace (T4K™)(Table 1). We excluded the sleep symptoms of the participating patients. Additional studies are necessary for objective improvements of AHI, using polysomnography, due to the expansion of airway and other issues, after applying Myobrace (T4K™) to the patients diagnosed with OSA. Since we obtained airway expansion using the malocclusion correction device, Myobrace (T4K™), we suggest that it can be used for orthodontic treatment of childhood OSAS patients with not so big-sized tonsil and adenoids.

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