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Research Article

Evaluation the Results of Combine Treatment Patients with Mesial Occlusion

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Abstract

Objective: To analyze the results of combine treatment patients with mesial occlusion (Class III skeletal form) according to the airways and intraoral soft tissues changes.

Materials and Methods: 36 patients (10 men, 26 women) 18-44 years old with mesial occlusion (Class III skeletal form) who underwent combine treatment. It was analyzed airways (Gundega Jakobsone., *et al*. 2011), the tongue area, the oral cavity, the tongue free-space (J Battagel, 2002), the soft palate length and thickness (T Lymberg, 1989), the position of the tongue (Tsvetkova MA 2012) and statistic method [10,11].

Results: The analysis patients with mesial occlusion (Class III skeletal form) found out that a neutral type of skeletal growth have changes of the airways width at the oropharynx, patients with a horizontal one significantly increased at the larynx and the tongue was also dropped reliably. The results of combine treatment compared to the condition before were obtained a reliable expansion of the oropharynx, elongation of the soft-palate and the tongue lowering at point "lowest". At the same time patients with vertical and horizontal skeletal growth didn't observe such kind of changes. The patients with the neutral type of skeletal growth significantly increased the oropharynx width. There were no more significant changes of other parameters, regardless of the type of skeletal growth.

Conclusion: There are significant changes of the airways and intraoral soft tissue parameters during the combined treatment patients with mesial occlusion (Class III skeletal form) depending on the type of skeletal growth.

Keywords: *Mesial Occlusion; Class III Skeletal Form; Soft Tissues; Airway; Tongue; Combine Treatment; Orthodontic; Surgery*

Introduction

Nowadays, the prevalence of mesial occlusion among the dentoalveolar anomalies is from 8 to 16% [1-3]. One third of are at the age of 16 - 61 underwent orthognathic surgery as the part of the combine treatment of mesial occlusion. [4,5]. The analysis of the literature revealed that there is no enough information about the dynamics of morphological and functional indices during and after combine treatment, which determines the relevance of our study [6-9].

Aim of the Study

To analyze the dynamic changes of respiratory tract and intraoral soft tissues during the stages of combine treatment patients with mesial occlusion (Class III skeletal form) depending on the type of skeletal growth.

Materials and Methods

36 patients (10 men, 26 women) 18-44 years old with mesial occlusion (Class III skeletal form) which underwent the combine treatment at the departments of orthodontics and pediatric maxillofacial surgery. There were 16.67% with vertical, 50.00% with neutral and 33.33% patients with horizontal type of skeletal growth (Sum Bjork). It was analyzed airways and intraoral soft tissues using X-ray (2D and 3D – cephalometric). It was analyzed airways (Gundega Jakobsone., *et al*. 2011) (Table 1, Figure 1), the tongue area, the oral cavity, the tongue free-space (J Battagel 2002), the soft palate length and thickness (T Lymberg, 1989), the position of the tongue – the "highest" and the "lowest" point (Tsvetkova MA 2012) (Figure 2) at all stages of combine treatment and statistic method [10,11].

Designation	Parameter
PNS	Posterior nasal spina
U	The tip of the tongue, the most posterior-lower point of the lingual
V	The deepest, intersection of epiglottis and the base of tongue
UPW	Upper pharyngeal wall, intersection of PNS-Ba (basion) and posterior pharyngeal wall
MPW	The middle wall of the pharynx, the intersection of the perpendicular drawn from the point U to the posterior wall of the pharynx
LPW	The lower wall of the pharynx, the intersection of the perpendicular drawn from point V to the posterior wall of the pharynx
PNS-UPW	Distance from point PNS to UPW, airway space in the area of the nasopharynx, millimeters
MPW-U	Distance from point U to MPW, airway space in the area of the oropharynx, millimeters
LPW-V	Distance from point V to LPW, airway space in the area of the laryngopharynx, millimeters
PAS min	The minimum distance between the base of the tongue and the posterior wall of the pharynx, the minimal space of the pharyngeal airway, millimeters

Table 1: *Parameters for airway size estimation by the method of Gundega Jakobsone., et al. (2011) [4].*

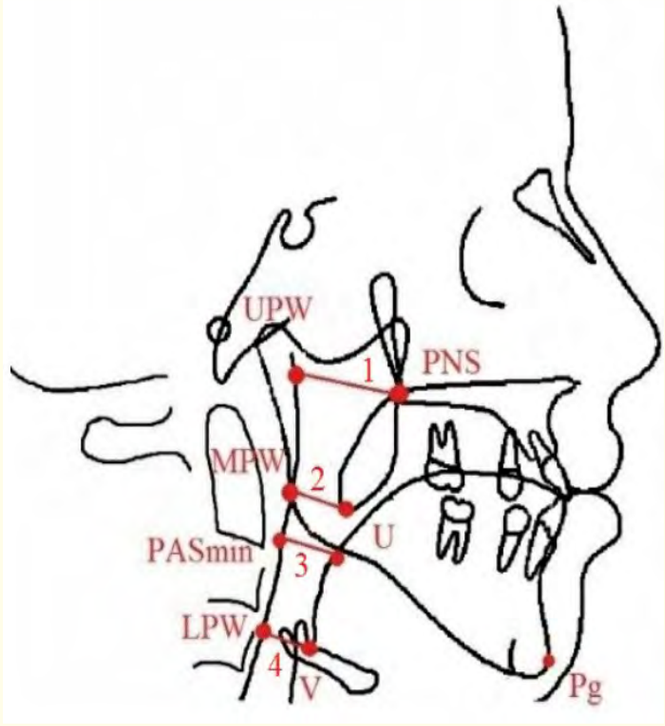

Figure 1: *Parameters for estimation airway size: upper (1), medium (2), PAS min (3), low (4) by Gundega Jakobsone., et al. (2011) method [4].*

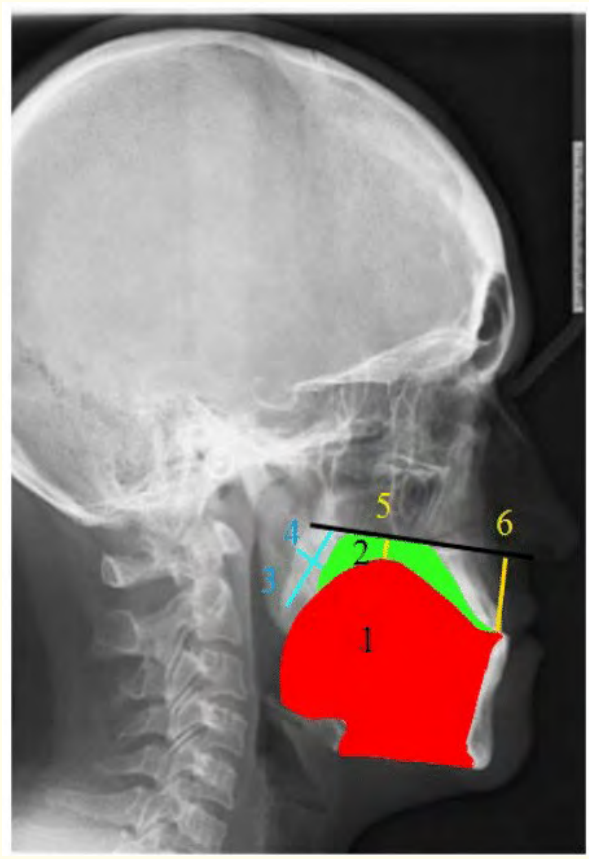

Figure 2: *Parameters for the estimation intraoral soft tissues and tongue position: the oral cavity (1 and 2), the tongue area (1) and the tongue free-space area (2), the soft palate length (3) and thickness (4), the position of the tongue – the "highest" (5) and the "lowest" point (6) through cephalometric [10].*

Results

The airways size, the soft palate, the tongue and the oral cavity analysis according to the X-rays (cephalometric) patients with mesial occlusion with the third degree of expression (Class III skeletal form) depending on the type of growth before treatment revealed the absence of significant changes. Except of the tongue position at the "highest" and "lowest" points by comparing patients with vertical and horizontal type of growth and at highest point by comparing patients with neutral and horizontal types of growth (Table 2).

Parameter	$M_v \pm m_v$	$M_{nt} \pm m_{nt}$	$M_h \pm m_h$	$d_{v\text{-}nt} \pm m_{v\text{-}nt}$ (p)	$d_{v\text{-}h} \pm m_{v\text{-}h}$ (p)	$d_{nt\text{-}h} \pm m_{nt\text{-}h}$ (p)
Highest point of the tongue	12,00 ± 1,22	9,41 ± 0,78	8,25 ± 0,83	2,59 ± 1,45 (> 0,05)	3,75 ± 1,48 (< 0,05)	1,17 ± 1,14 (> 0,05)

Table 2: *Assessment of the airways and intraoral soft tissues according to the cephalometric compared to the types of growth patients with mesial occlusion (vertical ($M_v \pm m_v$), neutral ($M_{nt} \pm m_{nt}$), horizontal ($M_h \pm m_h$)).*

There are significant changes of the airways size, the soft palate, the tongue and the oral cavity according to the X-rays (cephalometric) patients with mesial occlusion with the third degree of expression (Class III skeletal form) at the end of the preoperative orthodontic stage of combine treatment. It was found patients with a vertical type of growth after orthodontic preoperative preparation have a significantly narrower oropharyngeal than with neutral and horizontal types of growth.

As it shown on table 3 the soft palate was reliably elongated and the position of the tongue changed ("lowest" point) during the surgery. Postoperative changes of intraoral soft-tissues with a vertical type of growth were not observed. The tongue free space significantly increased at neutral type of growth patients with mesial occlusion (Class III skeletal form) before and after surgery. The same parameters as in the analysis of the entire group of patients were obtained during the surgery horizontal type patients, namely: the soft palate was reliably elongated and the position of the tongue changed ("lowest" point).

Parameter	$M_3 \pm m_3$	$M_2 \pm m_2$	d ± md	P
All				
Soft palate length	35,56 ± 0,83	32,24 ± 0,55	3,22 ± 0,10	< 0,01
Lowest point of the tongue	25,30 ± 0,46	28,46 ± 0,97	-2,60 ± 0,76	< 0,001
Neutral type of growth				
Tongue free-space	6,42 ± 0,62	4,73 ± 0,32	1,69 ± 0,70	< 0,02
Horizontal type of growth				
Soft palate length	36,51 ± 1,48	32,45 ± 1,07	4,06 ± 1,83	< 0,05
Lowest point of the tongue	24,75 ± 0,78	28,46 ± 0,97	3,71 ± 1,24	< 0,01

Table 3: *The comparison of significant airways and intraoral soft tissues changes according to the cephalometric before ($M_2 \pm m_2$) and after surgery ($M_3 \pm m_3$).*

Such a comparative analysis changes of the airways size, the soft palate, the tongue and the oral cavity before and after the completion of the combine treatment found a reliable expansion of the oropharynx, soft palate length and the tongue position change at the "highest" point in the group as a whole revealed. Vertical and horizontal patients did not received any significant changes in the types of growth. Neutral type ones had the significantly increased oropharynx width as the result of combine treatment. But airways size, the soft palate, the tongue and the oral cavity patients with third degree of mesial occlusion (Class III skeletal form) had shown no significant difference depending on the type of growth in comparison to before and after treatment (Figure 3).

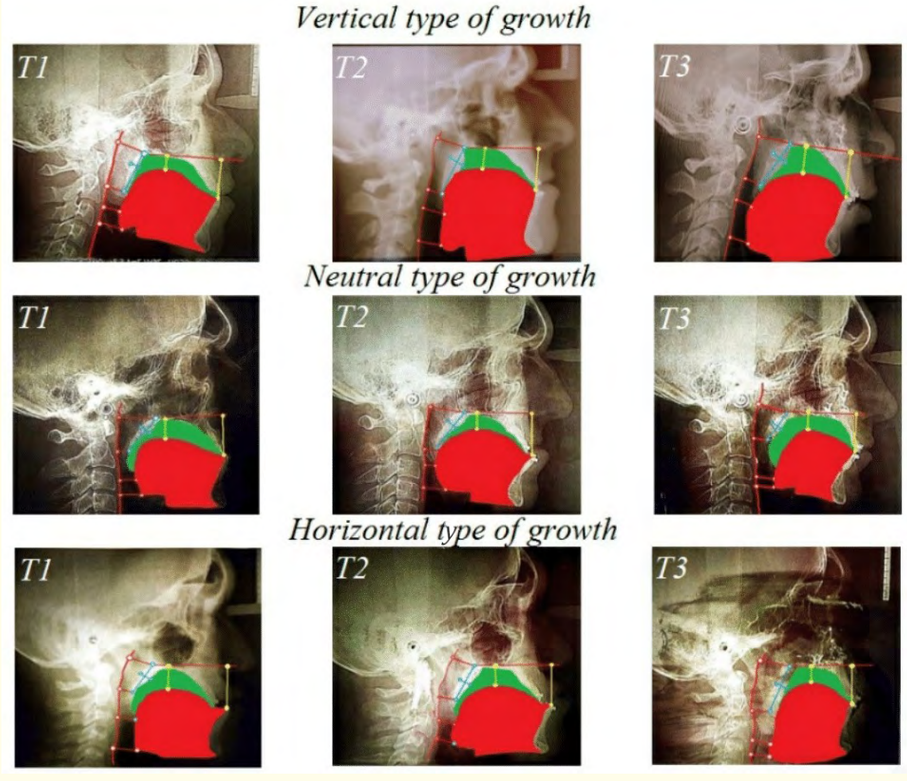

Figure 3: *Analysis the airway and intraoral soft tissues patients with mesial occlusion through the cephalometric during the stages of combined treatment (T1 - before, T2 - during, T3 - after) compared to the types of growth (vertical, neutral, horizontal).*

Conclusion

The airways size, the soft palate, the tongue and the oral cavity analysis according to the X-rays (cephalometric) patients with mesial occlusion with the third degree of expression (Class III skeletal form) figure out the absence of significant changes depending on the type of growth before treatment, except for the position of the tongue at the "highest" and "lowest" points (comparing vertical and horizontal growth) and at "highest" point (comparing neutral and horizontal types).

In the process of pre-surgery orthodontic treatment, it was found a significant increase in the airway width at the oropharynx and larynx, except the vertical type of growth patients. Horizontal ones observed the significantly increased airway width and more high position of the tongue.

The soft palate was reliably elongated and the tongue position ("lowest" point) was changed in the group as a whole and in the horizontal type, in particular comparing intraoral soft tissue before and after surgery.

The same analysis in comparison the parameters before and after the combine treatment revealed a reliable expansion of the oropharynx, soft palate length and a tongue position change at the "highest" point in the group as a whole and the neutral type of growth, in particular. Vertical and horizontal ones were not received reliable changes with respect to the airways size, the soft palate, the tongue and the oral cavity.

Bibliography

1. Gioeva Yu A. "Mesial occlusion (Clinic, diagnosis, treatment): Tutorial". Moscow: Medicine (2008): 190.
2. Grigor'eva O Sh. "Features of the dental diseases diagnosis in the violation of inter-proximal dental contacts and sagittal anomalies of occlusal dentitions". Dissertation candidate of medical science, Moscow (2013): 157.
3. Persin LS., *et al*. "Pediatric dentistry". Tutorial, Moscow: Medicine (2006): 640.
4. Persin LS., *et al*. "Orthodontia. Diagnosis and treatment dentofacial anomalies and deformities". Tutorial, Moscow: GEOTAR-Media (2015): 640.
5. Toll DE., *et al*. "The use of MRI diagnostics in orthognathic surgery: prevalence of TMJ pathologies in Angle Class I, II, III patients". *Journal of Orofacial Orthopedics* 71.1 (2010): 68-80.
6. Halimi A. "Surgical-orthodontic treatment of patients suffering from severe periodontal disorders - a clinical case study". *International Orthodontics* 11.3 (2013): 314-332.
7. Jose NP., *et al*. "Evaluation of hyoid bone position and its correlation with pharyngeal airway space in different types of skeletal malocclusion". *Contemporary Clinical Dentistry* 5.2 (2014): 187-189.
8. Molina-Berlanga N., *et al*. "Lower incisor dentoalveolar compensation and symphysis dimensions among Class I and III malocclusion patients with different facial vertical skeletal patterns". *The Angle Orthodontist* 83.6 (2013): 948-955.
9. Panou E., *et al*. "Dimensional changes of maxillary sinuses and pharyngeal airway in Class III patients undergoing bimaxillary orthognathic surgery". *The Angle Orthodontist* 83.5 (2013): 824-831.
10. Jakobsone G. "The effect of maxillary advancement and impaction on the upper airway after bimaxillary surgery to correct Class III malocclusion". *American Journal of Orthodontics and Dentofacial Orthopedics* 139.4 (2011): e369-376.

11. Tsvetkova M Ya. "Evaluation the influence the tongue size and position on the parameters of the facial part of the skull patients with sagittal anomalies of occlusion". Dissertation candidate of medical science, Tsvetkova, Moscow (2012): 162.

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