



Titolo: Retrospective Study on Elastodontic Diagnosis and Therapy in Growing Patients: Effects on Airways and Skeletal Divergence

Benito Francesco Pio Pennacchio¹
Liviana Balestriere¹, Gianna Dipalma¹, Daniela Di Venere¹, Francesco Inchingolo¹.



¹Department of Interdisciplinary Medicine, University of Bari “Aldo Moro”, Bari, Italy

Aim: The aim of this retrospective study is to evaluate the dento-skeletal changes induced by treatment with an elastodontic mandibular advancement device, with a particular focus on its effects on the dimensions of the pharyngeal airway space (figure 1). Special attention was given to assessing whether the treatment influenced skeletal divergence parameters in addition to airway modifications

Materials and Methods:

A study sample of 24 growing patients treated with elastodontic devices was selected from the patient population. The treated group was compared with a control group of 25 untreated subjects with similar skeletal characteristics. Lateral cephalometric radiographs taken before and after treatment were analyzed to assess changes in skeletal structures, dental relationships, and pharyngeal airway dimensions (figure 2). Statistical analyses were performed to determine the significance of the observed changes between the two groups.

Discussion:

The results demonstrated a statistically significant increase in airway dimensions following treatment, indicating the effectiveness of the elastodontic device in improving upper airway patency. Specifically, SPAS, MAS, and IAS showed a statistically significant effect with $p<0.05$; in particular, SPAS demonstrated a highly significant result with $p<0.01$ ($p=0.00039$) (figure 3). However, no statistically significant modifications were observed in hyperdivergent skeletal parameters, suggesting that while the treatment had a positive impact on airway structures, it did not induce relevant changes in vertical skeletal relationships. These findings highlight the role of elastodontic therapy in addressing airway issues while underscoring its limited influence on skeletal divergence.



Figure 1. The AMCOP SC device worn by the patient.

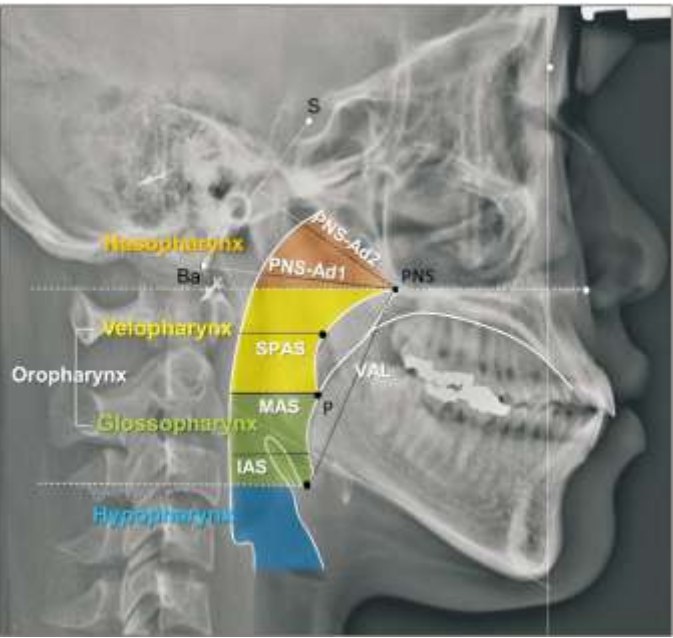


Figure 2. Lateral X-ray view showing the SPAS, IAS, and MAS angles.

variable (valori calcolati come differenza fra il tempo t1 e il tempo t0)	Statistic	sum_sq	df	F	PR(>F)	Significant?
SNA_T1	C(GRUPPO)	23.7095	1	5.95792	0.01847	statistically significant
	Residual	187.036	47	NaN	NaN	
SNB_T1	C(GRUPPO)	11.0007	1	4.1719	0.04673	statistically significant
	Residual	123.932	47	NaN	NaN	
ANB_T1	C(GRUPPO)	66.6762	1	26.3683	5E-06	statistically highly significant
	Residual	118.847	47	NaN	NaN	
SnaSep^Go Gn_T1	C(GRUPPO)	7.79109	1	1.31673	0.25699	not significant
	Residual	278.1	47	NaN	NaN	
SN^GoGn_T1	C(GRUPPO)	2.21694	1	0.45496	0.50329	not significant
	Residual	229.023	47	NaN	NaN	
FMA_T1	C(GRUPPO)	6.78103	1	1.55658	0.21835	not significant
	Residual	204.75	47	NaN	NaN	
Co-Me_T1	C(GRUPPO)	226.408	1	5.36134	0.025	statistically significant
	Residual	1984.8	47	NaN	NaN	
OVI_T1	C(GRUPPO)	17.4227	1	4.35081	0.04245	statistically significant
	Residual	188.21	47	NaN	NaN	
OVB_T1	C(GRUPPO)	13.3334	1	4.32819	0.04296	statistically significant
	Residual	144.788	47	NaN	NaN	
SPAS_T1	C(GRUPPO)	92.2768	1	14.6134	0.00039	statistically highly significant
	Residual	296.784	47	NaN	NaN	
MAS_T1	C(GRUPPO)	24.1144	1	6.05523	0.0176	statistically significant
	Residual	187.173	47	NaN	NaN	
IAS_T1	C(GRUPPO)	27.1302	1	5.59823	0.02215	statistically significant
	Residual	227.772	47	NaN	NaN	

Figure 3. Summary table of study results.

Conclusion: This study confirms that functional therapy using an elastodontic mandibular advancement device can lead to significant improvements in airway dimensions in patients with skeletal Class II malocclusion. However, the treatment did not produce statistically significant changes in hyperdivergent skeletal parameters.

Bibliografia:

1) Cho H, Yoon HJ, Park JH, Park Y, Kim S. Effect of extraction treatment on upper airway dimensions in patients with bimaxillary skeletal protrusion relative to their vertical skeletal pattern. Korean J Orthod 2021
2) Gong, X.; Li, W.; Gao, X. Effects of Craniofacial Morphology on Nasal Respiratory Function and Upper Airway Morphology. J Craniofac Surg **2018**, 29, 1717–1722, doi:10.1097/SCS.00000000000004638.
3) Li, J.; Ge, X.; Guan, H.; Zhang, S.; Qiao, X.; Chang, W.; Ma, W. Three- Dimensional Changes of the Upper Airway in Patients with Class II Malocclusion Treated with Functional Appliances: A Systematic Review and Meta-Analysis. Eur J Orthod **2021**, 43, 415–423, doi:10.1093/ejo/cjaa080.