

# Study on the correlation between tongue size, position and lower dental arch morphology in skeletal class II adolescents

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## Objective:

In this study, the three-dimensional measurement and analysis of the tongue and lower arch morphology of skeletal class II adolescents was conducted to explore the correlation between the size and position of the tongue and the morphology of the lower dental arch in skeletal class II adolescents. It aims to provide a theoretical basis for the treatment of adolescent patients.

## Method:

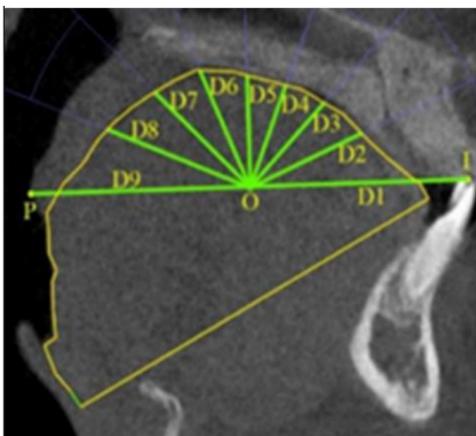
According to the inclusion criteria, 60 cases of skeletal class II adolescent patients (21 males and 39 females, with an average age of  $14.94 \pm 1.83$  years) were collected. Use Invivo5 to perform three-dimensional reconstruction of the CBCT data of all patients, adjust the three-dimensional level, measure the position and size of the tongue, the length of the lower dental arch, the width of the front and back and other indicators. Use SPSS 23.0 software package to perform correlation statistical analysis on the measurement data.

## Results:

The front width of the lower arch is positively correlated with the length of the tongue, the area of the tongue body, the total area and the area of the middle part of the tongue, and it is significantly positively correlated with the height of the tongue and the position of the tip of the tongue; the width of the back of the lower arch is positively correlated with the height of the tongue and the area of the tongue. Position, total area and mid-tongue area are significantly positively correlated; the length of the lower arch is significantly positively correlated with the length of the posterior tongue in the mouth. The above correlations are statistically significant ( $P < 0.05$ ).

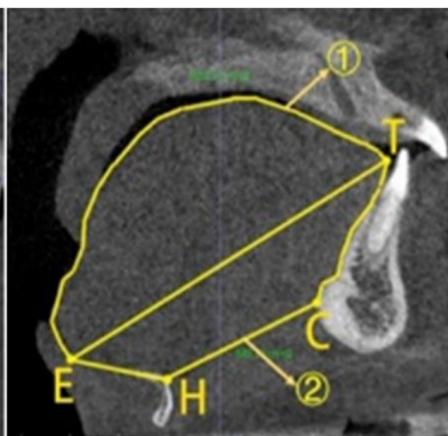
## Conclusions:

The size and position of the tongue of skeletal adolescents are correlated with the width and length of the front and back of the lower dental arch. Patients with a larger tongue and a higher position of the tongue in the mouth have a wider and longer dental arch.



**Figure 1. Tongue position.**

I: the incisor point of the lower central incisor;  
P: the last point of the soft palate;  
O: the midpoint



**Figure 2. The area of tongue.**

T: tip of tongue; E: root of epiglottis; ET: connection between tip of tongue and root of epiglottis;  
C: most convex point of mental spine; H: uppermost point of hyoid bone; ①: area of tongue body; ②: area of tongue base.

Project	Correlation Analysis of Tongue Index and Lower Dental Arch Index		
	Front width of lower arch	Posterior width of lower arch	
Tongue length	0.323*	0.232	0.082
Tongue height	0.399**	0.337*	0.206
Tongue tip position	0.468**	0.416**	0.246
Dorsal tongue position	0.214	0.272	0.252
Tongue body area	0.327*	0.310*	0.115
Tongue base area	0.143	0.270	-0.044
The total tongue area	0.360*	0.397**	0.087
Tongue body area ratio	0.109	0.001	0.112
Tongue base area ratio	-0.109	-0.001	-0.112
Mid tongue area	0.362*	0.588**	-0.039
D1	0.294*	0.308*	0.160
D2	0.276	0.265	0.008
D3	0.252	0.325*	0.015
D4	0.272	0.298*	0.077
D5	0.433**	0.315*	0.115
D6	0.313*	0.242	0.203
D7	0.429**	0.101	0.296*
D8	0.339*	-0.015	0.436**
D9	0.227	-0.087	0.498**

\*:  $P < 0.05$ ; \*\*:  $P < 0.01$ .