

## Does the Tongue Shape the Palate?

Question from a clinician: Dr. Mason - I have heard many clinicians say that the tongue shapes the hard palate. It seems logical to me that the tongue plays an important role in the development and shape of the hard palate and maxillary dental arch. Is this true? Am I wrong? Will you please verify this?

Thank you.

Dr. Mason's reply: Let's begin here: when I ask a person to push the back of the tongue up against the back of the hard palate and keep it there, most reply that they cannot contact the palate with the posterior part of the tongue. This actually can't easily be done, and in most individuals cannot be accomplished at all. For those who can do so, considerable effort is involved; effort that cannot be sustained for a long time and that is not compatible with a habit pattern. Most habit patterns are associated with tongue activity that results in pleasure and not requiring full effort. I mention this to dispel the perception of many that the tongue can influence and "mold" the shape of the hard palate.

Contrary to opinions still held by many clinicians, the tongue does not play a significant role in the development and shape of the hard palate and the maxillary dental arch. Then how does the shape of the hard palate develop? The answer is that the shape of the maxilla and hard palate is controlled by growth events that occur above the hard palate rather than events that may occur involving the tongue below the hard palate in the oral cavity.

To appreciate this, clinicians will need to change their perspective of facial growth and accept that what is taking place in facial growth occurs above the hard palate rather than what they see happening in the oral cavity. The details: the growth of the hard palate involves regional growth starting at the basicranium, which serves as the overall template from which the hard palate develops. The regional growth influences that determine the final form of the hard palate that are taking place above the hard palate include such factors as: the route of the optic nerves, a large factor in the rotational growth of the hard palate and the maxillary dental arch; the development of the interorbital distance which influences the width dimensions and the shape of the hard palate; and the course and spread of the olfactory nerves, which is a major factor in determining hard palatal location and the extent of maxillary protrusion. Other peripheral contributions to maxillary shape are from the buccal and labial musculature, which are obvious biomechanical influencing factors; and whether the facial skeleton and dentition is Class I, II, or III, each of which has a differential effect on palatal growth and form. In all, hard palatal development, its shape and form, progresses from the basicranium downward, with the tongue and mandible dropping down and out of the way during the various growth and development actions above the hard palate that influence its shape and position as well as the maxillary dental arch (Enlow and Hans, 1996).

A few words need to be said here about thumb and finger sucking habits and their influence on hard palatal arch form. A thumb or fingers habit can distort the palate short term but such habits are not responsible for the overall and eventual development and shape of the hard palate. Once the finger/thumb habit is removed, the palate fairly quickly returns to its previous form. (Enlow and Hans, 1996). As is well known among clinicians: with a sucking habit, negative pressure is exerted against the maxillary posterior dentition by the muscles of the cheeks, and the maxillary dental arch not only can narrow, but can also elongate vertically, exaggerating the perception of narrowing of the palate. After the habit is removed, the contour of the hard palatal vault and whatever narrowing and vertical lengthening of the posterior segments that may have developed will usually self-correct, and in short order. There is a difference, however, in the effect of a sucking habit as compared with anything the tongue does that has been claimed to influence the shape of the hard palate.

The tongue can't be implicated as an important factor influencing the shape of the hard palate. The explanation here for how the hard palate develops, including its shape, is based on the studies by Donald Enlow and discussed in the classic text by Enlow and Hans, titled: *Essentials of Facial Growth*, published by W. B. Sanders (Philadelphia), 1996. I attribute the information provided above to Enlow and Hans. Any skeptics of what is said here are encouraged to purchase a new or used copy of this classic text. Since the text is available in paperback form, it should be within the budget of most clinicians. Another source for greater detail than provided here can be found in an article that I published in the *International Journal of Orofacial Myology*, Volume 37, November, 2011, pages 27-38, titled: "Myths that Persist about Orofacial Myology". You can find this article on our website by clicking on Research Corner. Check out Myth #7 in the article. It pertains specifically to the question asked here.

Thank you for this question, and I hope that you are now convinced that the tongue is not responsible for the eventual shape of the hard palate.