



HOW DO PACIFIERS AND BOTTLES AFFECT FACIAL GROWTH?

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YOUNG REVIEWERS:



AANYA

AGE: 13



LAUREN

AGE: 12



RAYNA

AGE: 11

Sucking is a very important reflex that babies depend on to feed. The sucking reflex can be observed while the baby is still in the mother's womb. According to the World Health Organization, breastfeeding should be the only form of infant feeding during the first 6 months of life, but some families choose to use bottles. Sucking that is not related to feeding is called non-nutritive sucking. Examples include sucking pacifiers, lips, fingers, and toys, which, as the baby gets older, can alter the growth pattern of bones, unbalance the facial muscles, and cause the teeth to be malpositioned. Risks associated with non-nutritive sucking habits should be explained to families. If a child develops non-nutritive sucking habits, the entire family should help the baby to break the habit in the best possible way such as reduce the duration of non-nutritive suction, do not offer pacifiers and distract the child with other activities.

CRANIOFACIAL GROWTH

Craniofacial growth is how the head and face grow and change as you get older.

NASAL CAVITY

The nasal cavity is a space inside your nose. When you inhale, air comes into your nose and travels through this space.

MAXILLA

The bone that forms the upper part of the mouth where the upper teeth are attached.

BREASTFEEDING

Breastfeeding is when a mother feeds her baby with milk from her breasts.

NUTRITIVE SUCKING

Nutritive sucking is how babies drink milk to get the food they need to grow strong and healthy.

NON-NUTRITIVE SUCKING

Non-nutritive sucking is when babies suck on things, but they are not really trying to get food. This can be sucking on a pacifier, their thumb, or even their fingers.

Sucking is a natural behavior that babies use to eat. Although the World Health Organization recommends that babies should be breastfed exclusively for the first 6 months, but some families prefer to use baby bottles. Sucking that is not for feeding is called non-nutritive sucking. This can change how bones grow, disrupt the balance of facial muscles, and misplace teeth. Let us understand how the skull, face, and jaw grow, how non-nutritive sucking can affect this growth, and what parents can do about it.

GROWTH OF THE SKULL, FACE, AND JAW

You may have noticed that a baby's head and face do not simply look like a smaller version of an adult's head and face. To become more adult looking, a baby's skull, face, and jaw must undergo a complex growth process, called **craniofacial growth**. During the first two years of life, the volume of the skull can increase to three times the volume of the skull at birth. Babies have small, flexible spaces between their skull bones filled with soft tissue, which allow the skull to change shape during childbirth. Over time, these spaces become hard bone tissue.

The mid-face is the region where the **nasal cavity** and the **maxilla** are found, and this region also contains the upper teeth. The maxilla is the primary bone in the mid-face, and it gradually increases in size over time, until the age of 16–18. The jawbone connects to the skull and the mid-face (**Figure 1**). At birth, the baby's chin is positioned further back than an adult's chin, because the jaw is smaller than the maxilla. Over time, the jaw grows forward. **Breastfeeding** stimulates the forward growth of the jaw, promoting the development and proper alignment of the maxilla with the jawbone. When babies are bottle fed, there is a greater likelihood of future problems with bone alignment because there is not enough stimulus for proper bone growth.

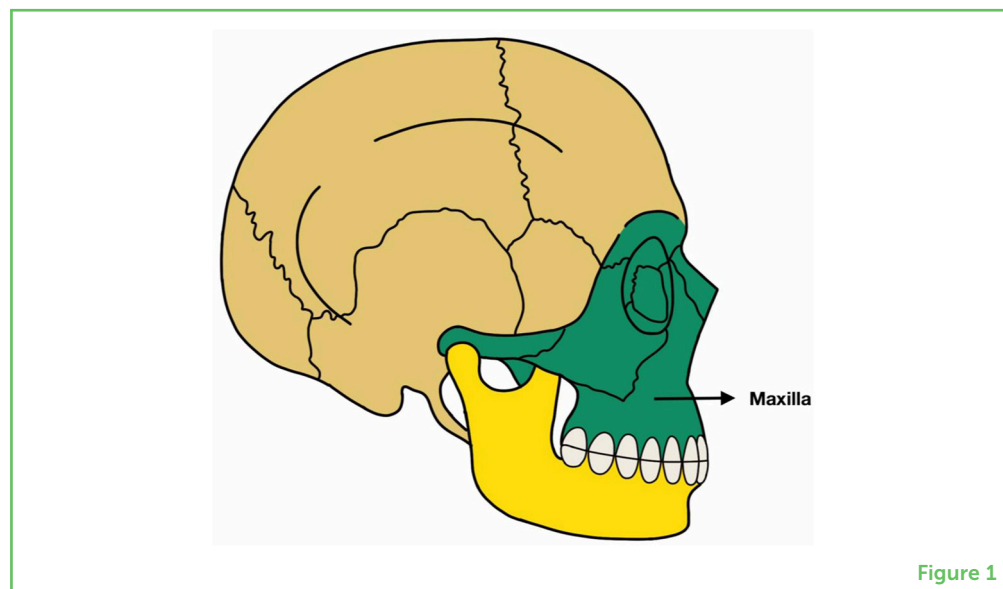
SOME TYPES OF SUCKING CAN AFFECT FACIAL GROWTH

Pacifiers and bottles, known as artificial nipples, can have a negative impact on children's health and development if used improperly or for too long [1]. Some mothers cannot breastfeed and resort to using bottles to feed their infants; sucking on the mother's breast or on a bottle is called **nutritive sucking**, as it provides nourishment. There is another type of sucking habit, called **non-nutritive sucking**, in which the baby sucks a pacifier, their fingers (especially the thumb), or toys.

Even when the baby is still in the mother's womb, an examination called an ultrasound can reveal the baby with their finger in their

Figure 1

A skull divided into the three parts important for understanding craniofacial growth: the skull (beige), mid-face (green), and jaw (yellow).



mouth, indicating that the sucking habit is an instinct that helps babies survive, because they need to suck to feed after they are born [2].

During the period from birth to 12 months old, babies commonly bring their fingers and even other objects to their mouths as part of learning about the world around them using their senses. However, this behavior can become harmful if it lasts too long, because it can alter the growth pattern of the face. For example, the teeth may become misaligned, the facial muscles may be incorrectly activated because of the force used for sucking, and the facial bones may grow less than normal [3]. While medical professionals from the World Health Organization generally do not recommend the use of pacifiers, parents often use them because they sometimes work to calm and comfort the child.

The harmful effects of non-nutritive sucking depend on the combination of three factors: the length of time the habit is done (duration), the frequency (how often), and how hard the object is sucked on (force used). Several changes in the face can occur due to prolonged sucking of a bottle or pacifier, or sucking on the fingers or another object. First, the **oral cavity** can change shape to accommodate an object that does not naturally belong in the mouth. This can cause the teeth to begin to change their positions, which is called **malocclusion**. When an object is in the mouth, the tongue is in incorrect position, resulting in the deepening of the **hard palate** (increase in height and concavity), which can reduce the space inside the nose, as the hard palate is the “floor” of the nose (Figure 2).

Two common malocclusion problems are posterior crossbite and anterior open bite. In crossbite, the upper and lower teeth do not fit together correctly - teeth may be tilted forward or backward. An open bite, on the other hand, occurs when the top and bottom front teeth

ORAL CAVITY

Oral cavity is the inside part of the mouth. It includes lips, tongue, gums, and the roof and floor of the mouth. It is where you chew your food and mix it with saliva, which is a special juice that helps make it easier to swallow.

MALOCCLUSION

Imperfect positioning of teeth when the jaws are closed.

HARD PALATE

The hard structure that forms the roof of the mouth, behind the front teeth. Also called the palatine bone.

Figure 2

The drawing shows the face of a child and a tomographic image of the maxillary region (circle), where you can see the close relationship between the floor of the nasal cavity and the roof of the mouth (hard palate).

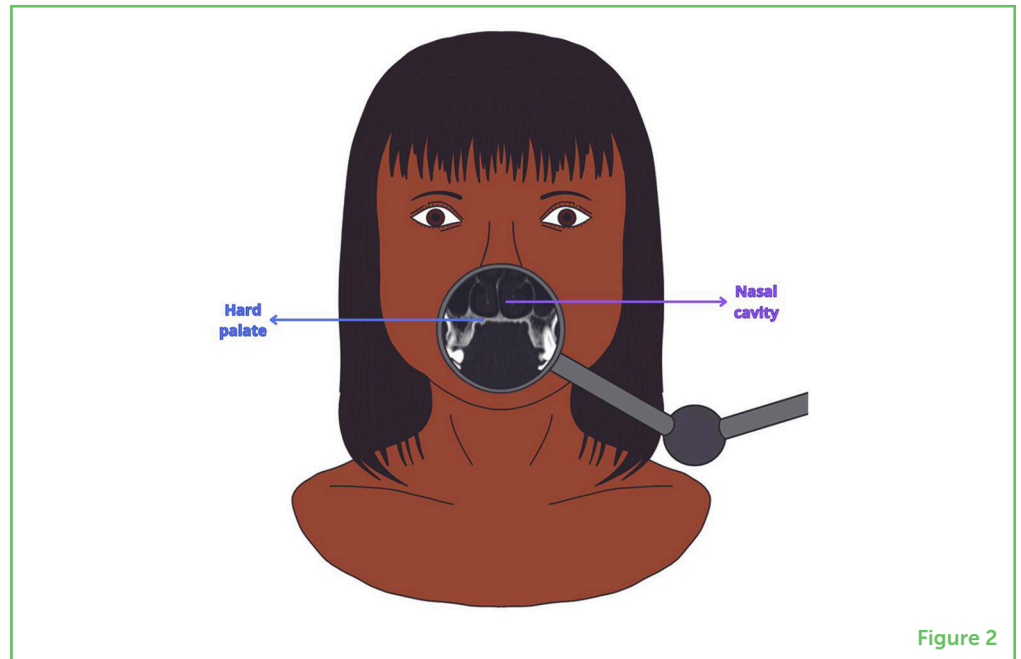


Figure 2

do not touch each other, even when the mouth is closed (Figure 3). These malocclusions require dental devices like braces or retainers to correct them.

Figure 3

This child, who used pacifier, has both an open bite (top and bottom front teeth do not touch even when the mouth is closed) and a cross bite (top or bottom teeth are shifted and no longer line up with each other properly).



Figure 3

WHAT ABOUT NUTRITIVE SUCKING/FEEDING?

After birth, breathing, swallowing, and sucking usually all function together in a healthy way. During breastfeeding, the baby's facial muscles are stimulated during sucking. It is as if the baby is massaging the mother's breast, causing the milk to be expelled for the baby to drink. This work of the facial muscles during breastfeeding contributes to facial development. Also, during breastfeeding, the tongue does not play a role in swallowing, which allows the baby to breathe

and swallow in a coordinated manner. In the case of bottle feeding, the baby must suck to pull the milk into the mouth, which requires less force, and this method uses fewer muscles than breastfeeding. With bottle feeding, the tongue is used as an organ of swallowing, moving the liquid backward to swallow it, which interrupts breathing. Therefore, like non-nutritive sucking, long-term bottle feeding can also have some negative effects on the baby's facial development. Even though natural breastfeeding stimulates more muscles and is more tiring for the baby, it is more beneficial, as it promotes the growth and development of facial bones and helps with muscle tone [4].

HOW PARENTS CAN HELP

While sucking habits are common and can provide comfort to children, it is essential for families to recognize the risks associated with prolonged use of pacifiers, bottles, and thumb sucking. Although sucking is important for a baby's development, using inappropriate items or engaging in sucking for extended periods can negatively affect facial growth and development. To support their babies' facial, jaw, and dental development, parents should minimize the duration of non-nutritive sucking, avoid offering pacifiers, and engage their children in other activities to distract them.

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AANYA, AGE: 13

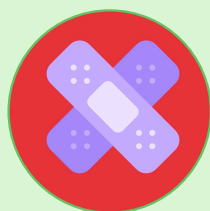
Aanya, a vibrant 13-year-old science enthusiast, is a music lover, passionate dancer, and adventurous traveler with a foodie's heart. A budding science enthusiast, she combines her curiosity with a deep compassion for animals and people, always going the extra mile to care for them. Bold and empathetic, Aanya stands up for the weak and fights for justice, embodying a blend of courage and kindness and inspires.

LAUREN, AGE: 12

I am 12 years old and have a deep interest in science, especially physics and biology. My hobbies include track and field, ice skating, roller skating, writing, reading, and chess. I also enjoy math, programming, Sudoku, and exploring new places. I live with my parents, my little sister and my 2 cats.

RAYNA, AGE: 11

Rayna, an 11-year-old with a quiet and attentive nature, has a deep passion for space science and dreams of visiting Disney World, Japan, and South Korea. A big K-pop fan, she enjoys spending time with her dog and cherishes moments with her friends. Caring and thoughtful, Rayna's calm and observant demeanor reflects her curiosity about the world and her kind, obedient personality makes her truly special.



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