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Orthodontic teats

A study overview – background, data, facts and results for the NUK system

Infants should be breastfed as long as possible because mother's milk has been proven to be the best food there is for a baby. In line with a resolution passed by the World Health Assembly in 2002, Germany therefore specifically recommends exclusive breastfeeding during the first six months of the infant's life. However, today's lifestyle and the demands of young mothers in terms of their quality of life means that breast milk is frequently expressed and then used to bottle feed the infant.

The NUK FIRST CHOICE teat is the modern-day result of continuous further development of the classic NUK shape launched in 1956. It was based on studies carried out by Dr. med. dent. A. Müller and Prof. Dr. Dr. W. Balters [Balters 1960, Müller 1956]. Modelled on nature, the NUK shape (which is natural in form and thus jaw-friendly) emulates, as far as possible, the form of the nipple during breastfeeding. This means it can probably help to avoid long-term consequences such as malalignments and malpositions of the jaw and teeth. Scientific studies over 50 years offer grounds for this assumption.

The beginnings – investigation into jaw malformations

Since around 1935, Prof. Dr. Dr. W. Balters has been occupied with radical new ideas about data acquisition for malformations of the jaw and their treatment. He identified the principle of self-healing of such malformations as being a key factor here. Balters was a man who observed nature closely; he noticed that jaw malformations may well come about in children from an extremely early age. At the same time, Kantorovicz noted that some 95 percent of malformations requiring orthodontic treatment came under the so-called "Habit Group," the group for adopted habitual behaviours [Kantorovicz 1959]. For Balters, the obvious step was to intervene as early as possible by offering therapy or applying a prophylactic approach.

However, with the edentulous jaw of infants, the standard mechanical treatment of orthodontics is not possible. This meant that it was first necessary to identify the key factors leading to the development of such malformations.

The following issues were considered here:

- Controlled self-healing of jaw malformations
- Morphogenesis of dentition through formative forces
- The significance of spatially functional thinking

- The action of suction as a spatial function during breastfeeding

One notable aspect of Balters' studies was that he specifically refrained from viewing the teeth and dental arches merely as an apparatus for chewing and grinding up food.

He pointed out that a mechanistic concept was insufficient to explain the plentiful phenomena observed in the jaw and mouth area. His holistic approach to the problem also included the psyche of the infant and toddler. In his opinion – quite out of step with the views of many of his contemporaries – mental disturbances could manifest as early as childhood or adolescence and additionally express themselves in organic disorders [Balters 1948, Balters 1964].

The development of a true-to-nature teat

Following Balters' findings about the nature of jaw malformations and their correction, the next step was to design a new teat and soothe modelled on the process of breastfeeding. An understanding of the formative forces involved and spatial function is essential if a teat is to be designed correctly [Balters 1961, Bennholdt-Thomsen 1957].

The NUK teat was developed in the 1950s in cooperation with dentist, Dr. A. Müller. The objective of designing a so-called orthodontic teat was to emulate the natural process of breastfeeding as far as possible. Jaw malformations are virtually unknown in native people who only breastfeed their babies. This has been proven by studies carried out by Professor Ascher and Professor Diamond [Ascher 1961, Diamond 2006]. Examination of the teeth of such native people revealed that they all had a well developed jaw with a full set of teeth, virtually devoid of the tooth decay, gum disease and malformations observed in otherwise healthy persons. Similar findings



Fig. 1: An orthodontic teat may encourage good overall development of the jaw and teeth.

were made by Kollath in animals which had enjoyed natural development [Kollath 1971].

Preventing malformations of the jaw and palate

The basic shape of the NUK teat is modelled on the natural form of the nipple during breastfeeding. In two studies performed by a dentist, Usadel, during the 1950s, similarities were observed in the motor functions and the negative pressure produced via suction during breastfeeding and sucking on a NUK bottle and teat system [Usadel 1958]. In a paper published by Herrmann on the Bionator treatment method in 2004, he stated that an orthodontic teat such as the NUK could help to prevent malalignments and malpositions of the jaw and teeth [Herrmann 2004].

Orthodontic teats encourage forward movement of the lower jaw, which is still retracted in newborn babies.

The mouth can close completely apart from at the suction opening. The teat's generous lip support encourages infants to open the mouth wide, as when breastfeeding. The flattened baglet ensures that the tongue is not confined,


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so possibly contributing to positive jaw development. The sagittal milking action enabled by the favourable overall shape of the teat not only helps to normalise occlusion, but also closely simulates the natural pattern of movement during breastfeeding.

In complementary medicine, dentists make use of the NUK principle as an aid for applications ranging from orthodontics to treating jaw fractures, from dealing with the common cold to respiratory organ therapy and from correcting disorders caused by false posture to scoliosis. The orthodontic teat is however viewed by many orthodox medical practitioners as a “marginal phenomenon” of little significance, as Kimmel lamented in 1989, already 25 years after the introduction of the NUK teat. The author would like to reiterate the importance of this simple aid in terms of preventing and treating jaw malformations [Kimmel 1989].

Despite the promising studies of Balters and Müller we have to date very few findings about possible similarities in the feeding process between bottle feeding and breastfeeding. The only available study involving orthodontic NUK teats was carried out by Usadel in 1958 [Usadel 1958], in which he established close similarity between the two feeding methods.

A recent study from Russia closes the gap in research

In 2003, the NUK teat was developed further as the NUK FIRST CHOICE system, with the same anatomical shape but featuring a wider lip support. This makes babies open their mouth wider, as for breastfeeding, so emulating the sucking action used at the breast more closely.

The NUK FIRST CHOICE system was investigated in 2007 in a study carried out by Prof. O. Arsenina from the Central Research Institute for Stomatology in Moscow, dealing with the above-mentioned criteria in relation to breastfeeding and feeding with round teats [Arsenina, unpublished, 2007]. The aim of the study was firstly to investigate differences in the sucking action of infants during breastfeeding and bottle feeding. Secondly, the study considered the

influence of different types of bottle teats on the development of jaw malformations. Lastly, it compared criteria involved in sucking behaviour during bottle feeding and breastfeeding.

Ultrasound as the most meaningful method

Ultrasound is the most meaningful, most gentle and child-friendly method for studying the physiology of sucking and swallowing behaviour in infants and was therefore used for this purpose by Arsenina et al. The echogram shows all parts of the tongue, the intermaxillary space as well as both the hard and soft palate (os incisivum, palatum durum and palatum molle). Ultrasonic investigation allows us to observe the movements of the soft tissue during sucking and swallowing. Here the transducer is positioned underneath the baby's jaw at the side or the front during feeding, so creating a series of images for the entire process.

In physiological terms, the sucking process can be broken down into three consecutive phases, which are characterised by the harmonious transposition of the dorsum of the tongue, the root of the tongue and the soft palate. This allows milk to pass into the oral cavity and on to the oropharynx.

The results of the study should indicate which teat is better at helping to reproduce physiological sucking behaviour. All parts of the tongue (tip, dorsum and root) should be involved in the sucking process as far as possible, so encouraging positive development of the alveolar arch. This is one of the factors that will help to prevent alveolar pathologies during the growth and development of a child.

Practical significance

Ultrasonic examination during feeding allows us to identify the type of teat that is better at encouraging physiological sucking and swallowing behaviour during bottle feeding. Parameters relevant to such investigation are the mean feeding (sucking) time, the mean feeding time over three feeding phases, the mean scope of movement by the tongue during breastfeeding and in the case of bottle feeding, the use of different types of teats.

Breastfeeding vs. bottle feeding

This study was not the only one to investigate the sucking action of infants during breastfeeding and bottle feeding with the NUK FIRST CHOICE teat and other types of teats: another study was also underway at more or less the same time in Barcelona under the direction of Dr. Àngel Moral García at Barcelona's Hospital Mutua de Terrassa. This descriptive study, which is going to be published, considered the mechanico-physiological parameters of feeding in babies, who here were either only breastfed, only bottle fed or were fed using a combination of the two

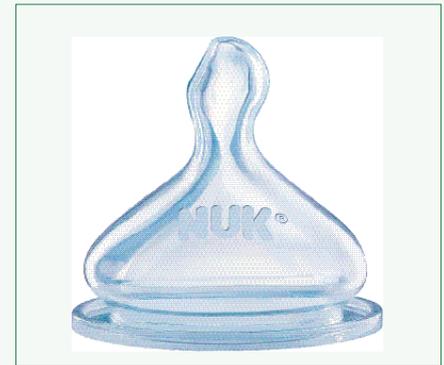


Fig. 2: The NUK FIRST CHOICE teat is available in two versions, one made of latex (above) and the other of silicone (below).

methods. In the last of these three groups, a randomised, open and crossover field trial was also performed to investigate the equivalency of breastfeeding and bottle feeding when the NUK FIRST CHOICE teat is used. Here, the most important variable for analysis was the number of sucking and extraction movements made by the baby for each feeding period [García, going to be published].

Conclusion

Although we still await final publication of the two recent studies described above, earlier observation points toward similarity in the patterns of movement seen during breastfeeding and bottle feeding when using an orthodontic teat.

As for breastfeeding, an orthodontic teat (e.g., NUK FIRST CHOICE teat) may encourage positive overall development of the jaw and teeth in babies.

Further scientific investigation is however necessary here as the process of breastfeeding itself is not yet fully understood.





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