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Original Article

Head-Jaw Position in Premature and Injector Feeding Method

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ABSTRACT

Background: The aim was to determine the benefits of the head-jaw position given to the premature during feeding with the injector.
Methods: In this experimental study, the effect of head-chin position on the prematures on the length of stay in the neonatal intensive care unit, the transition time to the mother's breast, the feeding time, and the amount in premature babies was tested.
Results: When we evaluated the day and evening feeding times and amount of the premature, it was determined that the day and evening feeding times and amount of the premature in the experimental group were statistically significantly higher than the daytime feeding times of the premature in the control group. It was determined that the duration of stay in the neonatal intensive care unit of the premature in the experimental group was statistically significantly less than the length of stay in the neonatal intensive care unit (NICU) of the premature in the control group.
Conclusion: As a result, the head-jaw position had been seen as a useful practice that positively affects the feeding time and amount, the length of stay in the newborn and the transition period to the mother's breast of the premature babies born as immature.

Keywords: Head-jaw position, Injector feeding, Premature

Introduction

Premature experience nutritional problems due to their physiological and neurological immaturity, weak oral-motor reflexes, inability to coordinate between sucking-swallowing and respiration, inability to maintain flexion posture during feeding, staying awake for a short time, and inability to maintain normal physiological values during feeding (1-3).

Since the lung functions of premature do not develop sufficiently, they experience physiological stress during oral feeding, which causes nutritional problems, poor sucking activity and insufficient food intake. Therefore, there is a need for interventions to support the physiological state by providing adequate respiration during oral feeding for prematures. It may be possible to shorten the transition period of premature to oral feeding, to improve oral feeding skills, to support their growth and development, to be discharged earlier, to be less exposed to hospital infections and to provide cost-free and effective care (2-4).

Oral phase disruptions: The oral phase is altered in preterm infants who experience prolonged external stimulation (oral or nasal endotracheal tubes, non-invasive respiratory support interfaces, orogastric or nasogastric tubes, tapes, and securing devices). Immature or absent oral reflexes result in subtle to overt symptoms from an abnormal oral phase, including weak and disorganized sucking, immature

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patterns such as biting or chewing, and poor bolus formation and propulsion, leading to dribbling during feeding (5, 6). Breastfeeding failure is also a frequent concern. Residual feeding problems in growing preterm infants span a broad spectrum of phenotypes, including feeding tube dependency (7) non-specific feeding difficulties, oral aversion feeding aversion, poor progression to solid foods, challenges with eating specific food types (e.g., solids), and subtle swallowing difficulties (8-10).

Giving the premature the proper position during and after feeding is important in providing the baby's nutritional tolerance and comfort. Otherwise, not giving developmental positions to support prematüre causes the physiological balance to deteriorate and the baby's stress and agitation to increase (4, 11). In order to minimize these problems, the common purpose of the position given to the premature during or after feeding is to strengthen the oral motor functions of the premature and to create sufficient suction power (3, 4).

One of the methods used to pass premature to oral feeding is feeding with head and jaw position support. The purpose of feeding with head and jaw position is to support sucking, to stimulate sucking, and to strengthen sucking to ensure that the premature receives more comfortable and more nutrients. While the nurse is feeding the premature, the baby needs to have a suitable and comfortable feeding method (1, 4, 12).

In this method, the nurse; during feeding, while holding the premature's head and neck in the same plane with one hand, feeds the premature by keeping it in a way that supports the jaw with the other hand. With this position given to the head and jaw, the development of oral-motor functions of premature is supported, and in this way, premature can participate in nutrition more actively, gain weight faster and are discharged from the hospital earlier (4). Considering the nutritional problems of premature, therapeutic interventions should be included in the care of neonatal nurses in order to ensure a successful and safe oral feeding experience (13, 14). When the literature is examined, these interventions are grouped under the headings of cue-based feeding, oral stimulus interventions that support the development of oral-motor functions, non-feeding sucking and oral feeding position interventions (13, 15, 16).

This study aimed to evaluate the effect of the head-jaw position, which supports orol-motor functions, on the newborn's length of stay, the transition period to the mother's breast, and the duration and amount of feeding.

Methods

Hypotheses of Research

Hypothesis 1 (H1): Premature who are placed in the a head-jaw position during feeding have a shorter time to breastfeed than the others.

Hypothesis 2 (H2): Premature who are given a head-jaw position during feeding have a shorter neonatal intensive care unit (NICU) stay in newborns than others.

Hypothesis 3 (H3): Premature who are given a head-jaw position during feeding have a longer feeding time than others.

Hypothesis 3 (H3): Premature who are given a the head-jaw position during feeding are more fed than the others.

Population and Sample of the Research

Research data were conducted as a randomized controlled experimental study in a hospital NICU. The data of the research were collected between 10 January and 22 April 2023.

The universe of the research; All of the premature hospitalized in the NICUs where the research was conducted between the specified dates (N=120).

The sample of the research; in order to determine the number of samples, a priori power analysis was performed using the G*Power (v3.1.7) program. The first type of error was 0.05 and Cohen's effect width was taken as 0.8 and the sample was determined as 27 premature for each group. The power calculated according to these inputs was found to be 90%.

Randomization was performed using the random numbers table while the prematüre were assigned to the treatment and control groups. In the study, the total number of cases was determined through the program with the randomization URL https://www.randomizer.org. Before entering the data on the sample number into the program, it was assumed that set 1 represented the experimental group and set two represented the control group. In line with the program, the order of the cases forming the sample group was determined by randomized method. According to this determination, the numbers of the experimental and control groups were listed as follows (17).

 # 1 Experiment

2, 3, 4, 6, 10, 11, 12, 15, 17, 19, 22, 24, 26, 27, 31, 32, 34, 35, 37, 38, 42, 43, 45, 49, 50, 52, 53.

 # 2 Control

1, 5, 7, 8, 9, 13, 14, 16, 18, 20, 21, 23, 25, 28, 29, 30, 33, 36, 39, 40, 41, 44, 46, 47, 48, 51, 54.

Inclusion criteria

- Being in NICU regardless of race and ethnicity,
- Postnatal age 32 weeks and over,
- The clinical condition is in balance,
- No need for oxygen support with nasal cannula and hood,
- Vital signs in balance for at least 24 hours,
- The service was found suitable to be included in the investigation by the neonatologist doctor,
- Premature with written and verbal consent from their parents were included in the study.

Exclusion criteria

- Congenital defect or birth trauma,
- Necrotizing Enterocolitis (NEC),
- Respiratory Distress Syndrome (RDS),
- Those diagnosed with severe asphyxia,
- Intraventricular bleeding,
- Newborn Withdrawal Syndrome,
- Fetal Alcohol Syndrome,
- Receiving ventilator support,
- Patients undergoing extracorporeal membrane oxygenation therapy,
- Those who were included in the study group and who developed any complications during the follow-up period and whose balance status deteriorated,
- Premature who could not get written and verbal consent from their parents were excluded from the study.

Data Collection

The data were collected by the researchers with the "Data Collection Form", which includes information about the premature who are hospitalized (SANKO University Hospital).

Data Collection Form: The data collection form was occured of five parts in the total by scanning the literatüre (1-4). In the first part the introductory information of the premature (protocol number, gender, date of birth, time of birth, medical diagnosis, social security). The second part includes the birth history (gestational age, mode of delivery, growth measurements at birth), the third part contains the follow-ups related to the evaluations made within the scope of the research (body weight). Height, head circumference, number of days the baby was hospitalized in the NICU, date of first oral feeding, first breastfeeding), In the fourth part, the family's introductory information (time of pregnancy, age, education level, occupation, employment status and family's income status). In the fifth section, information consisting of the measurement of sucking time (sec), total sucking time (sec) and total sucking amount (ml) of premature (application/control) without leaving the injector was given.

Feeding with head jaw position

With the support given to the head and jaw, the jaw muscles and sucking reflex of premature babies are strengthened. In this way, premature can participate in nutrition more actively, gain weight faster and are discharged from the hospital earlier (4). Considering the nutritional problems of preterm infants, neonatal nurses should actively use this supportive care to ensure a successful and safe oral feeding experience (8, 9). The head-jaw position is an application that facilitates the infant's sucking by supporting and stimulating the nurse's bird finger under the infant's jaw and allows the infant to start sucking more quickly. An example from the application we use is shown in (Figure 1).

Implementation of the research

- "Data Collection Form" was filled in line with the information obtained from the patient file and family.
- The "sucking functions" of all premature in the experimental and control groups who switched to oral feeding were evaluated on the 1st, 3rd, 5th and 7th days of the study, consisting of injector sucking time (sec) and total sucking amount (ml) measurements. The reason why the evaluation is carried out for seven days is that the average time for babies to start breastfeeding is seven days.
- Premature able to suckle breasts were observed with the mother for several weeks.
- In these observations, when it was determined that the mother and the premature baby were ready for breastfeeding, the mother and the premature baby were taken to a special room and their follow-up continued there.
- The mother's being active in the care of the premature was supported in this room.
- When it was observed that the mother and the premature were suitable for discharge, the discharge process was initiated (Figure 1).

Ethical Approval

Ethics committee approval was obtained from the Ethics Committee of a University. (SANKO

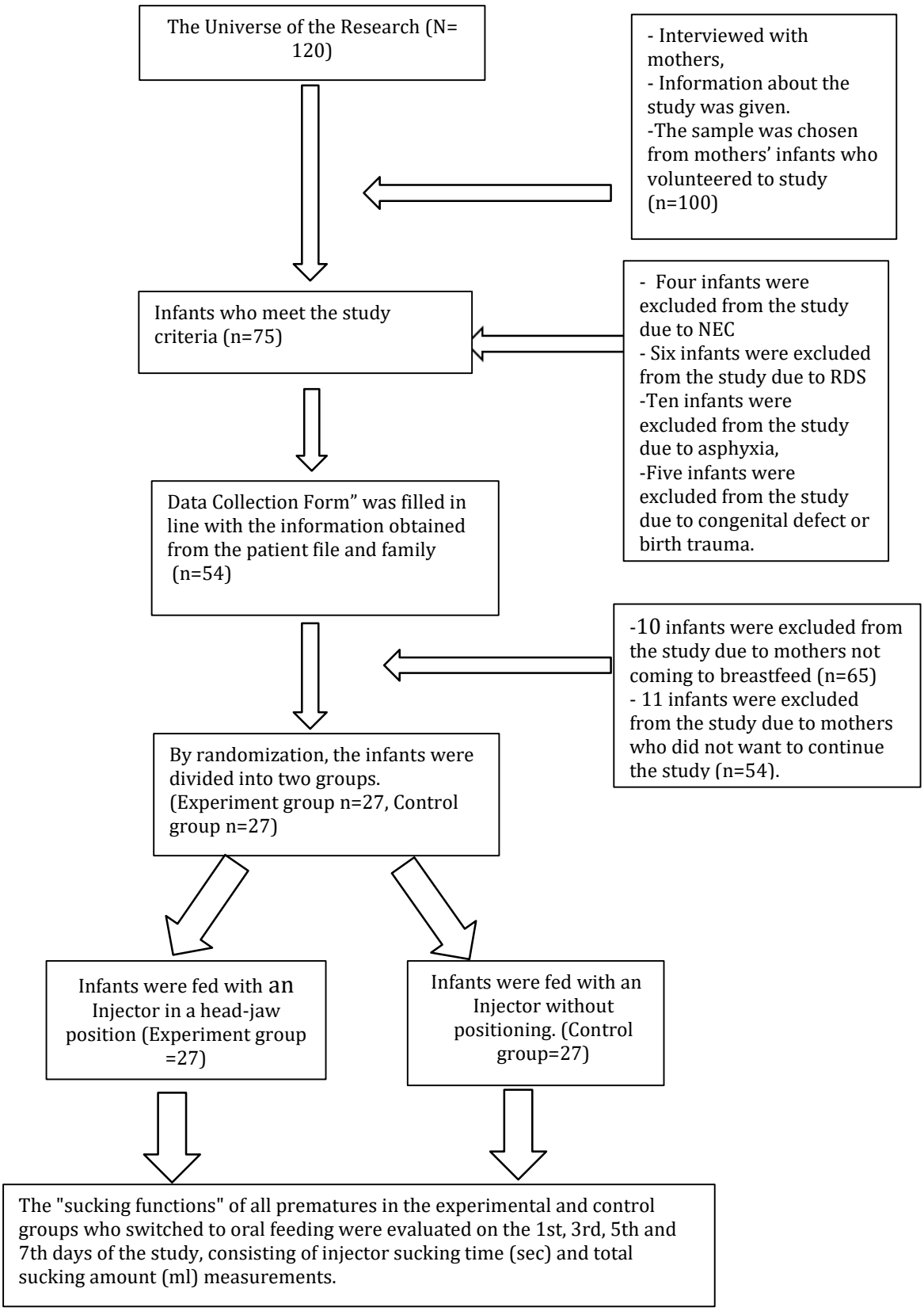

Figure 1. Consort

Table 1. Head-Jaw Position Practice Phase

Experimental group (n=27)	Control group (n=27)
-Head-jaw position was given during the routine procedure and feeding of the baby in the NICU. -In order to prevent the mothers from being affected and the mothers in the control group would not try this practice, the head-jaw position during the feeding of the baby was done when the parents were not present. -Hygienic hand washing was done before starting the head-jaw position during the feeding of the baby. -Within the scope of the research, the practitioner nurse gave the baby a head-jaw position with her bird finger during injector feeding (until she switched to full oral feeding) to the baby who switched to oral feeding in the experimental group. Thus, it was aimed to contribute to the absorption functions. -The head-jaw position given during the feeding of the baby was continued until the day when the baby fully sucked the breast. -During the evaluation of the head-jaw position or sucking functions given during the feeding of the baby, it was observed in terms of any physiological/behavioral stress and distress findings that may develop in prematüre and monitored (apnea, decrease in SaO2 (below 90%), crying, achycardia, hypotonia, convulsions, facial discoloration, etc.) with a monitor. When even one of the specified conditions developed, the processing was interrupted until the values returned to normal.	-The routine procedure in the NICU was applied. -During the evaluation of the sucking functions of the baby, it was observed in terms of any physiological/behavioral stress and distress (apnea, decrease in SaO2 (below 90%), crying, tachycardia, hypotonia, convulsions, facial discoloration, etc.) that may develop in prematures and monitored with a monitor. When even one of the specified conditions developed, the processing was interrupted until the values returned to normal. -Premature were given a mother's breast when they were ready to suckle the mother. -Afterwards, when it was decided that they were ready to suckle, feeding with the mother's breast was started. - In order to avoid ethical problems after the control group started to suckle on the mother, the sucking functions were supported by giving the baby the head-jaw position while sucking the mother (until he switched to full oral feeding).

University Non-Interventional Research Ethics Committee decision no: 2022/04, date: April 13, 2022). Institutional permission was obtained from the hospital where the data of the study were collected. Written and verbal informed consent was obtained from the parents of premature infants. The research was conducted in accordance with the Principles of the Declaration of Helsinki.

Statistical analysis of data

SPSS (Statistical Package for the Social Science) for Windows 23.0 package program was used for the statistical analysis of the research data. The Chi-square test was used for categorized (sex, diagnosis, type of birth) data to determine the homogeneity of both groups, and the t-test was used for independent groups for uncategorized data (gestational age, weight, height, head circumference). The t-test was used to evaluate the significance between independent groups. Normality assumption was checked with the 'Kolmogorov-Smirnov' test. In the study, descriptive statistics for the descriptive characteristics of the participants, such as percentage, frequency, mean, standard deviation, minimum and maximum values, were calculated.

Results

Of the infants in the experimental group, 25.9% had a gestational age of 22-31 weeks, 25.9% had a postnatal age of 35-36 weeks, 35.2% were female, 29.6% were born by cesarean section, 25.9% had a weight of 2010-2910 g, and 38.9% had a height of 46-49 cm. Of the infants in the control group, 25.9% had a gestational age of 32-36 weeks, 25.9% had a postnatal age of 32-34 weeks, 29.6% were female, 38.9% were born by cesarean section, 25.9% had a weight of 2010-2910 g, and 29.6% had a height of 46-49 cm (Table 2).

Table 2. Characteristics of premature babies

Data		Experiment group(n=27)	Control group(n=27)	Significance
Gestational age	22-31 week	14(25.9%)	13(24.1%)	X^2=0.07
	32-36 week	13(24.1%)	14(25.9)	p=0.5
Postnatal age	32-34 week	13(24.1%)	14(25.9)	X^2=0.07
	35-36 week	14(25.9%)	13(24.1%)	p=0.5
Sex	Female	19(35.2%)	16(29.6%9	X^2=0.73
	Male	8(14.8%)	11(20.4%)	p=0.3
Type of birth	Cesarean section	16(29.6%)	21(38.9%)	X^2=2.14
	Normal birth	11(20.4%)	6(11.1%)	p=0.1
Weight	750-2000 gr	13(24.1%)	16(29.6%)	X^2=0.67
	2010-2910 gr	14(25.9%)	11(20.4%)	p=0.3
Height	33-45 cm	6(11.1%)	11(20.4%)	X^2=2.15
	46-49 cm	21(38.9%)	16(29.6%)	p=0.1

Table 3. Evaluation of daytime and evening feeding times and amounts of premature babies

Total Nutrition Duration (sec) and amount (ml)	Experiment group(n=27) X±S.S	Control group(n=27) X±S.S	Significancep<0.05
Daytime feeding times	5140.74±1195.51	4528.51±367.11	t*=2.54, p=0.01
Daytime feeding amounts	130.00±33.22	108.88±26.43	t=2.58, p=0.01
Evening feeding times	4943.14±803.33	4431.48±793.05	t=2.35, p=0.02
Evening feeding amounts	131.66±31.89	113.51±24.56	t=2.34, p=0.02

*Independent Samples t Test

Table 4. The effect of the head-jaw position support application given in the transition period of prematures to breastfeeding on the duration of stay in the newborn and the transition period to the mother's breast

Time of stay in the NICU (days) Transition time to the mother's breast (days))	Experiment group(n=27) X±S.S	Control group(n=27) X±S.S	Significancep<0.05
Time of stay in the NICU	21.18±12.26	33.11±19.81	t*=2.65, p=0.01
Transition time to the mother's breast	9.81±8.10	14.48±7.04	t=2.25, p=0.02

*Independent Samples t Test

When we evaluated the daytime and evening feeding times and amount of the premature, it was determined that the daytime and evening feeding times and amount of the premature in the experimental group were statistically significantly higher than the daytime feeding times of the prematures in the control group (Table 3). It was determined that the duration of stay in the newborn of the premature in the experimental group was statistically significantly higher than the duration of stay in the newborns of the premature in the control group. It was determined that the transition period of the premature in the experimental group to the mother's breast was statistically significantly lower than the transition period of the premature in the control group to the mother's breast (Table 4). When we look at the day-to-day feeding times and amounts of premature babies, it was observed that there was a significant change after the fifth day. In addition, it was determined that the feeding times and amounts of the prematures in the experimental group on the fifth and seventh days were statistically significantly higher than the premature in the control group (Table 5).

Table 5. Changes in feeding times and amounts of prematures from day to day

Day-to-day Nutrition times(sec)	Experiment group(n=27) X±S.S	Control group(n=27) X±S.S	Significancep<0.05
1. day	1196.29±458.46	1100.00±152.31	t*=1.03, p=0.33
3. day	1191.11±326.81	1108.51±121.99	t=1.23, p=0.21
5. day	1291.11±330.05	1114.07±137.42	t=2.57, p=0.01
7. day	1462.22±506.43	1205.92±203.94	t=2.43, p=0.01
Day-to-day feeding amount (ml)			
1.day	22.22±10.59	23.88±7.63	t*=0.66, p=0.51
3.day	29.44±9.93	26.48±7.57	t=1.23, p=0.22
5. day	35.18±8.37	27.03±8.11	t=3.63, p=0.01
7. day	43.14±6.67	31.48±10.26	t=4.95, p=0.01

*Independent Samples t Test

Discussion

Premature babies who are before 32 weeks of gestation have no or weak sucking movements and swallowing movements may not be developed in these babies. In term babies, the maturation of these sucking and swallowing movements can occur within the first 1-2 days after birth. This process may take weeks, especially in premature babies with a birth weight of less than 2000 g (18). Therefore, some interventions are needed to support and strengthen the oral feeding of premature. Unlike a full-term baby, premature; oral feeding cannot be started immediately after birth due to weak oral muscle tone, inadequate sucking-swallowing-respiratory coordination, and immaturity of search/sucking reflexes (19, 20). In this study, the position given by supporting the head and jaws of premature babies was tried to help strengthen the jaw muscles of the baby to suckle. In the results of our application, it was observed that the feeding times and amounts of the premature who were applied head-jaw position were positively affected and they could be breastfed by switching to the mother's breast faster. There are many orol-motor supportive applications for the feeding of premature babies in the literature and it has been reported that these applications have positive effects on the nutrition of prematures. For example, in one study, the sucking success of premature by applying oral motor stimulation was evaluated with the LATCH breastfeeding diagnostic measurement tool, and the breastfeeding success of the group that received oral motor stimulation was determined to be more positive (21). In another study, the amount of food taken by prematures by applying oral motor stimulation was compared and it was found that the prematures who received oral motor stimulation fed more (22). In another study, it was determined that the amount of breast milk and oral intake rate increased in prematures who received oral motor stimulation, thus increasing the success of sucking (23). These results show that supporting premature babies during feeding provides positive results in nutrition. Accordingly, we can say that the dissemination of these applications in the NICU will benefit premature. In addition, it was determined that premature who were given the head-jaw position stayed shorter in the neonatal intensive care unit. It is a well-known condition that the shortening of the hospital discharge period of premature infants depends on successful oral feeding of the premature infant (19, 20). In addition, it is known that prolonged hospitalizations cause hospital-acquired infections, increase the toxic stress of premature babies, cause them to stay away from their families, and negatively affect their neurodevelopment (24, 25). Considering all these, we can better understand the importance of healthy discharge of prematüre from the NICU as soon as possible.

Strengths and limitations

The fact that the research was conducted in a single center and that it was studied with a certain sample constituted the limitation of the research. Another limitation was that only one method was tested.

Conclusion

As a result, the head-jaw position has been seen as a useful practice that positively affects the feeding time and amount, the length of stay in the newborn and the transition period to the mother's breast of the premature babies born as immature. Expanding the routine use of this practice in neonatal intensive care units is very important and necessary for premature babies. In addition, training can be given to neonatal nurses on head-chin position and the practice can be made widespread. In fact, mothers can be taught this method and have this massage given to each baby by the mother's hand. In this way, mothers can help premature babies more with their own flora and scent.

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None.

Conflicts of interest

There is no conflict of interest of the authors and / or family members regarding this study.

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