Original Article

Artigo Original

Characterization of the transition technique from enteral tube feeding to breastfeeding in preterm newborns

Caracterização da técnica de transição da alimentação por sonda enteral para seio materno em recém-nascidos prematuros

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Keywords

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ABSTRACT

Purpose: To verify the corrected gestational age when oral feeding (breast half full) and exclusive breastfeeding were initiated in preterm newborns submitted to the transition technique from enteral feeding directly to breastfeeding, and time spent (in days) under speech-language pathology intervention until discharge. **Methods:** Study participants were 35 preterm infants (PTI) divided into two groups. Group 1 (G1) was composed by 22 PTI who did not present any important medical complications during hospitalization, and Group 2 (G2) comprised 13 PTI with a history of major medical complications. The following data were recorded: gestational age at birth, birth weight, weight and corrected gestational age during speech-language pathology evaluation, corrected gestational age when started oral feeding, number of days stimulated through the non-nutritive sucking (NNS) technique, corrected gestational age when oral feeding started and when they were discharged from speech-language pathology intervention, and total number of days under speech-language pathology intervention. **Results:** No differences were found between the groups (G1 and G2) for any of the analyzed parameters. In general, oral feeding started with an average of 36 weeks corrected gestational age. Exclusive oral feeding occurred with an average of 36.6 weeks corrected gestational age. In average, speech-language pathology intervention lasted 12.3 days, and the NNS technique in "gloved finger" or "empty breast" lasted an average of 4.54 days. **Conclusion:** The technique allowed the PTI to be discharged in exclusive breastfeeding at a corrected gestational age corresponding to that of healthy term newborns.

Descritores

Prematuro
Nutrição enteral
Aleitamento materno
Terapia intensiva neonatal
Idade gestacional

RESUMO

Objetivo: Verificar a idade gestacional corrigida do início da dieta por via oral (mama parcialmente cheia) e da alimentação exclusiva em seio materno e o tempo dispendido (em dias) de atendimento fonoaudiológico para alta de recém-nascidos prematuros submetidos à técnica da transição da alimentação enteral direta para o seio materno. **Métodos:** Fizeram parte do estudo 35 recém-nascidos prematuros (RNPT) divididos em dois grupos. O Grupo 1 (G1) foi composto por 22 RNPT que não apresentaram intercorrências médicas importantes durante a internação e o Grupo 2 (G2) por 13 RNPT com histórico de intercorrências médicas importantes. Foram registrados os seguintes dados: idade gestacional ao nascimento, peso ao nascimento, peso do recém-nascido e idade gestacional corrigida durante avaliação fonoaudiológica, idade gestacional corrigida no momento do início da alimentação por via oral, número de dias em que o recém-nascido realizou a técnica de sucção não nutritiva, idade gestacional corrigida no momento do início da alimentação por via oral exclusiva e da alta fonoaudiológica, e o número total de dias de atendimento fonoaudiológico. **Resultados:** Não houve diferença entre os grupos (G1 e G2) para nenhum dos parâmetros analisados. De maneira geral, o início da oferta por via oral ocorreu com média de idade gestacional corrigida de 36 semanas. A alimentação por via oral exclusiva ocorreu com média de 36,6 semanas de idade gestacional corrigida. A média de dias de atendimento fonoaudiológico total foi de 12,3, sendo que o treino de sucção não nutritiva (SNN) em "dedo enluvado" ou "mama vazia" durou em média 4,54 dias. **Conclusão:** A técnica possibilitou a alta hospitalar do recém-nascido prematuro com alimentação exclusiva em seio materno em idade gestacional corrigida correspondente a do recém-nascido termo e saudável.

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INTRODUCTION

The practice of breastfeeding has been approached by different health professionals and scientific literature provides evidence of its importance[1]. The woman can start producing milk (lactogenesis) from the 16th week after conception, if the birth occurs prematurely. In the case of mothers of premature babies, the biggest problem at the beginning of milk stimulation is that mammary gland obeys the law of supply and demand: the greater the offer of the breast, the greater the volume produced[2].

Feeding the preterm infant (PTI) with breast milk provides benefits that are generally related to improvements in immunity, digestion and nutrient absorption[3]. However, preterm infants may have feeding difficulties[4,5], especially in the acceptance of the mother's breast, which makes periodical milking necessary in order to maintain an adequate milk production for when natural breastfeeding is established.

The average milk volume, when production is stimulated, is approximately 10 to 100 ml/day, with an average of 30 ml during the colostrum phase, around 600-700 ml/day during the transition milk phase, and finally, at the mature phase, approximately 700-900 ml/day. From the fifth day after birth, the quantity of milk increases successively[6-8].

Another aspect to be emphasized is the strengthening of the mother-child bond through early skin-to-skin contact during lactation. The Kangaroo Mother Care (KMC) stimulates a strong attachment between mother and infant and an increase of the production of breast milk, and benefits breastfeeding and lactation[9]. Health professionals can contribute to the establishment of guidelines that provide the overall development of the newborn (NB), favoring muscle tone adequation through sensory stimulation and a more organized body movement[10,11].

Initial feeding of preterm infants is often parenteral or enteral, with use of orogastric (OGP) or nasogastric probe (NGP). Some authors consider that the most appropriate way to stimulate the development of the stomatognathic system structures is oral feeding (OF)[12,13] and that prolonged use of feeding tube can be harmful to the newborn because it might alter sucking/swallowing/breathing coordination (S/S/B).

Physiologically, as from 34 weeks gestation, the baby can already present S/S/B coordination[14]. To start oral feeding, a few aspects should be observed, other than gestational age, such as: weight, overall functioning, behavioral state, presence of oral reflexes, stomatognathic system characteristics, suction ability, caloric balance, respiratory status, medical complications, and clinical stability[15].

There are different levels of severity of problems faced by babies. In the Respiratory Distress Syndrome (RDS), for example, 72 hours after birth and medical intervention, there is an improvement[16]. Chronic and severe respiratory difficulties demand the need for respiratory support for long periods of time, and may impair the child's early development[17]. Cases of neuropathy, heart disease, chronic and/or severe respiratory diseases, congenital abnormalities, syndromes, and sepsis can be considered important medical complications.

Studies have shown that some clinically stable infants are able to coordinate S/S/B even before 34 gestational weeks[18]. However, when the NB is deprived of sensory input, a delay in the development of the stomatognathic system may occur[4,13,19]. It is important that proper stimulation is provided, so the PTI acquires S/S/B coordination[14,20,21].

While some authors recommend studies for early withdrawal of enteral feeding and OF offer[13], others have emphasized the "disengagement" with early withdrawal of the tube in order to ensure exclusive breastfeeding without introducing alternative OF means[21]. There is the possibility that the speech-language pathologist carry out the training of non-nutritive sucking (NNS), inserting a gloved finger into the oral cavity of the newborn to suck it, while the diet is offered through the tube[10]. The enhancement of suction can positively contribute to the S/S/B coordination when oral feeding is introduced[14,22]. The NNS technique is also used by other health professionals as a way of easing the pain during invasive procedures that cause discomfort for the baby[23].

To prepare the PTI for breastfeeding effectively and exclusively, with S/S/B coordination, it is used the direct weaning from the probe to the breast, without offering alternative forms of feeding, such as cup or bottle. The relactation technique is initially used, so that the NB associate the milk ingestion received through the tube to the suction carried out in "empty breast". "Empty breast" suction prevents that the infant, for inability and lack of coordination, choke on milk, and induces milk production by the mothers, due to stimulation of the hormones prolactin and oxytocin[2].

It is indicated that the NB is stimulated in the "empty breast" with a nasogastric tube, with the oral cavity free, which facilitates proper grip and promotes better intraoral proprioception and stimulation, providing a more pleasant feeling during sucking[10]. It is important that the technique is performed in at least four feedings, provided that the newborn does not present any respiratory distress or other signs of stress during the intervention.

When the baby starts to coordinate S/S/B, the sucking/swallowing training is carried out with "breast half full" concurrent with provision of enteral feeding. The baby's nutritional needs must be observed depending on their weight and deduct the amount of complement to be given by tube. The supplement offered through the tube can decrease 50 ml per day, distributed through at least five 10 ml feedings or two feedings of 25 ml each[24].

After a week, if the weight gain reaches 125 grams or more, the amount of supplement can be decreased in proportion, until the infant is being exclusively breastfed. The enteral feeding will be carried out only when the mother is absent from the Neonatal Intensive Care Unit (NICU). With the NB clinically well and at least four breastfeedings, feeding tube is withdrawed and the baby is discharged from Speech-Language Pathology.

This study had the aim to verify the corrected gestational age in the beginning of oral feeding (breast half full) and exclusive breastfeeding, and the period (in days) of Speech-Language Pathology intervention taken to discharge PTI

submitted to the technique of enteral nutrition transition directly to breastfeeding.

METHODS

This study gathered data from medical and speech-language pathology records newborns and mothers who attended the NICU of the Hospital e Maternidade Neomater, in São Bernardo do Campo (SP), Brazil, after the authorization of the Clinical Board and the Ethics Committee of the hospital (process no. 319/2009). The coordinators of the medical, nursing and nutrition teams were informed about the methods of the research.

Data regarding the transition from enteral feeding to breastfeeding were gathered from the speech-language pathology evaluation and monitoring protocol, which was part of the routine of the Speech-Language Pathology team (Appendix 1).

Sample characterization

Study participants were 35 extreme, moderate and borderline preterm infants (PTI) with exclusive enteral nutrition, who had been admitted at the NICU of the Neomater Hospital, selected according to the inclusion criteria for the research. Their main characteristics were subdivided into two groups: Group 1 (G1) – 22 PTIs with history of stable breathing (with no use of O_2 or with O_2 using for less than 14 days), absence of infections that required isolation, and no neurological and/or heart disease; Group 2 (G2) – 13 PTIs with history of important medical complications, and occurrence of one or more of the following clinical events during hospitalization: significant respiratory instability (used O_2 for 15 days or more), infection/sepsis, neurological and/or heart disease.

The following data were recorded and considered: gestational age at birth (GA), birth weight (BW), weight when speech-language intervention started (WSST), corrected gestational age when speech-language intervention started (CGASST), corrected gestational age when oral feeding was introduced (CGAIOF), number of days the newborn was submitted to the NNS technique, corrected gestational age when exclusive oral feeding was introduced, corrected gestational age at discharge, and total number of days of speech-language intervention.

The mean gestational age at birth (GA NASC) of the newborns studied was 32.58 weeks (G1=33.19 weeks and G2=31.53 weeks), and the mean birth weight was 1623.71 grams (G1=1634.77 and G2=1605).

We excluded all infants with the following characteristics: term birth, post-term birth, mother who was not present in at least four daily feedings in the NICU (invalidating the training for direct weaning from tube to breast), infant who received oral feeding through cup and/or bottle during hospitalization.

Procedures

Medical records from newborns in the NICU of the Hospital were analyzed, according the exclusion criteria described. The data regarding speech-language pathology intervention registered in Speech-Language Pathology Evaluation and Monitoring Protocols (Appendix 1) were inserted into Table 1.

During the procedures of the transition technique from enteral tube to breastfeeding, the infants were initially fed exclusively through OGP or NGP, with NNS training in "gloved finger" (without the mother) and "empty breast" (in the presence of the mother). We decided to accept the newborns who were submitted to the NNS technique in "gloved finger" because it was part of the speech-language pathology routine when the mother was absent from the NICU. The swallowing training was carried out only in the breast, since the transition to oral feeding was carried out exclusively in the breast.

As the NB presented adequate structures and orofacial conditions for S/S/B coordination, the mother was oriented to empty part of the breast (keeping the hind milk) and offer it to the NB concomitantly with enteral feeding. The amount of diet offered through the tube intended to ensure the nutritional adequacy of the infant[24]. Later, observing the conditions of S/S/B coordination, the "full breast" was allowed still with complementation through OGP/NGP, when needed, and the complement was gradually reduced according to the weight gain and the NB's nutritional needs.

When the complement was no longer necessary in the presence of the mother, the breast was offered on free demand (BFD) and, in the absence of the mother in the NICU, the diet was offered exclusively through OGP/NGP. The tube was removed when the baby was in exclusive BFD in the presence of the mother and with proper weight gain, allowing medical and speech-language pathology discharge.

Data regarding the transition from enteral feeding to breastfeeding included a comparative analysis between the groups using the nonparametric Mann-Whitney test[25], with significance level of 5% ($p<0.05$).

RESULTS

Data showed no differences between groups (G1 and G2) for all studied parameters. When the speech-language pathology assessment was carried out, the NBs had a mean corrected gestational age (CGA) of 35.29 weeks (34.88 weeks for G1 and 35.99 weeks for G2), and an average of 18.57 days of life (11.5 and 30.54 days, for G1 and G2, respectively).

Regarding weight, NBs had, in average, 1763.57 grams when the evaluation was carried out (1712.05 for G1 and 1850.77 for G2).

Oral feeding started with an average CGA of 36 weeks (35.75 and 36.42 weeks, respectively, for G1 and G2). Overall, exclusive OF was initiated with 36.61 weeks of CGA, in average (G1 with an average of 36.38 weeks, and G2 with an average of 37 weeks).

The infants remained in the transition technique from enteral feeding to breastfeeding for an average of 12.31 days (13 days for G1 and 11.15 days for G2) (Table 5). Non-nutritive sucking (NNS) training in "gloved finger" or "empty breast", which were part of the speech-language pathology intervention process, lasted for 4.54 days, in average (4.91 in G1 and 3.92 in G2).

Table 1. Description of the subjects regarding age, weight and length of intervention (in days) in each type of speech-language pathology intervention performed

INN	GAB	BW (g)	WTSE (g)	DLCA (days)	CGCA (weeks)	NNS GFBE (days)	CGASOF (weeks)	CGAEB (weeks)	CGASD (weeks)	DSI (days)	Tube (days)	Tube TOTAL	G
1	33 5/7	1530	1540	8	34 6/7	4	35 3/7	35 6/7	35 6/7	8	5	13	1
2	33	1750	1810	11	34 4/7	8	35 5/7	36	36 1/7	12	11	22	1
3	32	1100	1250	16	34 2/7	15	36 3/7	38 5/7	38 6/7	33	32	48	1
4	31 5/7	1210	1380	18	34 2/7	13	36 2/7	36 2/7	37 3/7	23	23	41	2
5	36	2580	2565	25	39 6/7	4	40 4/7	40 5/7	40 5/7	6	6	31	2
6	32	1715	1805	7	33	5	33 5/7	35	35	15	14	21	1
7	33	1530	1930	29	37 6/7	2	38 1/7	38 5/7	38 5/7	7	6	35	2
8	34	1600	1595	4	34 4/7	16	37 6/7	38 6/7	39 3/7	28	28	32	1
9	33 6/7	2190	2105	7	34 6/7	1	35	35 3/7	35 3/7	5	4	11	1
10	34	1110	1560	23	37 2/7	2	37 4/7	39 1/7	39 1/7	15	14	37	2
11	34	1865	1690	7	35	1	35 1/7	36 4/7	36 4/7	12	12	19	1
12	33	1760	1820	11	34 4/7	0	34 4/7	34 5/7	35 2/7	6	5	16	1
13	31 4/7	1175	1690	30	35 6/7	6	36 6/7	38 3/7	38 5/7	22	22	52	1
14	27	925	1195	36	32 1/7	8	33 2/7	35 1/7	35 1/7	23	21	57	2
15	32	1615	1825	25	35 4/7	1	35 5/7	36 1/7	36 4/7	8	7	32	2
16	32	890	1355	31	36 3/7	3	36 6/7	38 5/7	38 5/7	18	18	49	1
17	38	2280	2350	5	38 5/7	1	38 5/7	39 2/7	39 2/7	3	2	7	1
18	32	1390	1680	32	36 4/7	5	36 4/7	37 3/7	37 3/7	10	5	37	2
19	36 1/7	2765	2570	3	36 4/7	1	36 4/7	37	37	6	4	7	2
20	35 4/7	1665	1595	4	36 1/7	1	36 1/7	36 3/7	37 4/7	11	9	13	1
21	35 4/7	1845	1710	5	36 2/7	1	36 2/7	36 3/7	37 4/7	10	10	15	1
22	34	1900	1745	6	34 6/7	1	35 6/7	36 1/7	36 5/7	14	8	14	1
23	34	2050	1965	2	34 2/7	6	34 4/7	34 5/7	35 2/7	7	8	10	1
24	33	2325	2100	10	34 4/7	5	34 4/7	35 4/7	36 5/7	16	12	22	2
25	31	2170	2335	22	34 1/7	3	34 1/7	34 2/7	34 5/7	5	6	28	2
26	33	1555	2030	31	38 1/7	0	38 1/7	38 1/7	38 5/7	5	3	34	1
27	24	810	1775	95	37 6/7	4	38 1/7	38 3/7	39 1/7	16	12	107	2
28	31	1195	1330	19	34	5	34 3/7	34 4/7	34 4/7	7	5	24	1
29	34	1900	1875	1	34 1/7	2	34 2/7	34 2/7	34 5/7	7	5	6	1
30	30	1525	1650	16	32 2/7	11	33 4/7	35	35	29	28	44	1
31	32	1640	1565	10	33 3/7	11	36 1/7	36 3/7	37	17	14	24	1
32	34	1500	1820	5	34 5/7	1	34 6/7	34 6/7	35 1/7	4	1	1	1
33	33	1535	1520	12	34 4/7	3	35 1/7	35 3/7	35 5/7	6	8	10	2
34	27	900	1625	67	36 4/7	0	36 5/7	36 5/7	37 1/7	4	5	7	2
35	30	1335	1370	17	32 3/7	9	35 6/7	35 6/7	36	13	23	30	1

Legend: INN = identification of the newborn by number; GAB = gestational age at birth, BW = birth weight; g = grams; WTSE = weight at the time of speech evaluation; DLCA = day of life in clinical assessment; CGCA = corrected gestational in clinical assessment; NNS GFBE = stimulation with non-nutritive sucking with a gloved finger or empty breast; CGASOF = corrected gestational age when started oral feeding; CGAEB= corrected gestational age at exclusive breastfeeding; CGASD = corrected gestational age at speech-language pathology discharge; DSI = duration of speech-language pathology intervention; tube = period receiving enteral feeding; G1 = group 1, G2 = group 2

DISCUSSION

Feeding is a complex process that includes alertness, cognition, motor and neurological development, interaction with the mother or caregiver, and physiological maturity of the system. Many of these abilities begin in the womb and continue to develop after birth.

Premature newborns do not start an efficient suction abruptly[23] and a preparatory period is required so coordination between sucking and swallowing functions occur[14,18]. In this

Table 2. Age (days and corrected gestacional age) of the newborns in Groups 1 and 2 during evaluation

		Group		Total	p-value	Result
		G1	G2			
DLCA	Mean	11.5	30.54	18.57		
	SD	9.195	24.818	18.887		
	Minimum	1	3	1	0.1446	1 = 2
	Maximum	31	95	95		
	N	22	13	35		
CGCA	Mean	34.88	35.99	35.29		
	SD	1.59	2.04	1.82		
	Minimum	32.29	32.14	32.14	0.0912	1 = 2
	Maximum	38.71	39.86	39.86		
	N	22	13	35		
	Mean	4.91	3.92	4.54		

Mann-Whitney test (p<0.05)

Legend: DLCA = days of life during evaluation; CGCA = corrected gestational age during evaluation; G1 = group 1; G2 = group 2; N = number of subjects; SD = standard deviation

Table 3. Weight (in grams) of the newborn at birth and during the evaluation in Groups 1 and 2

		Group		Total	p-value	Result
		G1	G2			
BW (g)	Mean	1634.77	1605	1623.71		
	SD	348.83	657.216	477.301		
	Minimum	890	810	810	0.8662	1 = 2
	Maximum	2280	2765	2765		
	N	22	13	35		
WTSE (g)	Mean	1712.05	1850.77	1763.57		
	SD	265.745	434.208	338.801		
	Minimum	1250	1195	1195	0.2632	1 = 2
	Maximum	2350	2570	2570		
	N	22	13	35		

Mann-Whitney test (p<0.05)

Legend: BW (g) = birth weight (in grams); WTSE (g) = weight (in grams) at the time of speech-language pathology evaluation; G1 = group 1; G2 = group 2; N = number of subjects; SD = standard deviation

Table 4. Gestational age of newborns at the beginning of oral feeding (partially filled breast) and exclusive breastfeeding in Groups 1 and 2

		Group		Total	p-value	Result
		1	2			
CGASOF	Mean	35.75	36.42	36		
	SD	1.38	1.94	1.62		
	Mínimum	33.57	33.29	33.29	0.2566	1 = 2
	Maximum	38.71	40.57	40.57		
	N	22	13	35		
CGAEB	Mean	36.38	37	36.61		
	SD	1.6	1.83	1.69		
	Minimum	34.29	34.29	34.29	0.3157	1 = 2
	Maximum	39.29	40.71	40.71		
	N	22	13	35		

Mann-Whitney test (p<0.05)

Legend: CGASOD = corrected gestational age when started oral feeding; CGAEB = corrected gestational age when in exclusive breastfeeding; N = number of subjects; SD = standard deviation

Table 5. Duration (in days) receiving speech-language pathology intervention undergoing the transition technique from tube to breastfeeding for subjects in Groups 1 and 2

Atendimento		Group		Total	p-value	Result
		1	2			
Speech-language pathology intervention (days)	Mean	13	11.15	12.31		
	SD	8.491	6.706	7.824		
	Mínimum	3	4	3	0.5189	1 = 2
	Maximum	33	23	33		
	N	22	13	35		

Mann-Whitney test (p<0.05)

Legend: N = number of subjects; SD = standard deviation

context, the speech-language pathology intervention assumes a vital role in neonatal care.

The NBs in this study are considered to have initiated speech-language pathology intervation late, considering the period described in the literature of 34 weeks to coordinate suction/swallowing/breathing[18]. The average CGA during the speech-language pathology evaluation was 35.29 weeks, 34.88 weeks in G1 and 35.99 in G2. In G1, this "delay" may be related to the average gestational age at birth (GAB), which was 33.19 weeks, not very premature. In the G2, although the average GAB was 31.53 weeks, which could have contributed to an earlier intervention, the clinical picture of major medical complications probably delayed referral to speech-language pathology. These findings corroborate the results of a study that points out that clinical problems, such as chronic respiratory difficulties, can delay the onset of speech-language pathology stimulation, and even compromise the child's early development[17].

The onset of speech-language pathology intervention, which occurred with an average of 35.29 weeks gestational age in the NBs studied, may also be considered late for the tube-breasfeeding transition technique. This fact might have been different if the subjects had participated in Kangaroo Mother Care (KMC)[9], which did not happen. Implementation of the KMC in the NICU would allow the speech-language pathology intervention for tube withdrawal and transition to oral feeding to be carried out at an earlier age[11,12], minimizing problems such as prolonged use of the tube by the NB, early weaning, poor mother-PTI bond, prolongation of hospitalization in the NICU, among others. According to the literature, in families where there is adhesion and effective participation in the KMC program, it has been observed the possibility of

transition from gavage to breastfeeding in a more organized and fast way; training in "empty breast" favors the transition to breastfeeding[10].

Regarding the findings on the application of the transition technique from enteral tube feeding to breastfeeding, NNS training, beginning of OF (partially filled breast), and exclusive breastfeeding offer are considered. The non-nutritive sucking (NNS) training in "gloved finger" or "empty breast" lasted an average of 4.54 days, 4.91 days for G1 and 3.92 days for G2. This finding draws attention to the fact that NBs in G2, as a group with important medical complications, spent less time (in days) than G1 in NNS. This may be related to the fact that in G2 the mean age at the onset of speech-language pathology intervention (35.99 weeks of CGA and 30.54 days old) was greater than in G1 (34.88 weeks of IGC and 11.5 days old). Thus, G2 had a greater length of exposure to extra uterine experiences (average of 18.94 days of extra uterine life more than G1). Among the extra uterine experiences, the NNS conducted by health staff in painful procedures in order to minimize suffering[23].

The fact that both groups, G1 and G2, carried out NNS during speech-language pathology intervention for a brief period (G1 with an average of 4.91 days, and G2 with an average of 3.92 days) seems to evidence that they had a similar pattern of speech organs regarding the suction function, at the time of speech-language pathology intervention. Such result corroborate the assertion that sucking in the breast (in this case, "empty breast") is the most suitable and appropriate way to promote oral motor development and the correct establishment of the functions performed by the speech organs, positively influencing the maturation process[22,26].

The NBs in this study had a mean gestational age of 35.29 weeks during the clinical assessment, that favored the sucking/swallowing/breathing coordination[14,18]. G2, although constituted by infants with important medical complications, at the time of evaluation was clinically stable. Thus, both G1 and G2 had enough clinical conditions and CGA to transition to "partially filled breast", which was considered the beginning of oral feeding.

Both in G1, which began oral feeding with 35.75 weeks CGA, and G2, which began oral feeding with an average of 36.42 weeks CGA, the acceptance of oral feeding was late when compared to data found in the literature, that recommend the onset of oral feeding between 33 and 34 weeks CGA or even earlier[18]. The late age observed in this study may be related to the fact that the newborns started receiving speech-language pathology intervention also later than expected, with mean corrected gestational age of 35.29 weeks (34.88 in G1 and 35.99 in G2).

In G1, the mean gestational age at birth (GAB) of 33.19 weeks did not cooperate in the efforts to offer oral feeding earlier. In G2, the mean GAB of 31.53 weeks, that could have contributed to an earlier intervention, was delayed due to the clinical history of the group, corroborating once again the literature data that points out the difficulties presented by NBs, especially respiratory problems, which are important in the delay of the beginning of oral feeding, since pulmonary complications affect the onset and the extent of the feeding transition[17,27]. Thus, in G2, the beginning of the "partially filled breast" occurred with an average of 36.42 weeks CGA, very close to the age of G1, which started "partially filled breast" with 35.75 weeks CGA, in average.

Overall, exclusive OF (breastfeeding) started with 36.61 weeks CGA, in average. While the offer of exclusive OF occurred with CGA greater than the capacity of coordination described in literature[14], it is important to consider that the preterm infants in this study achieved an adequate pattern of breastfeeding equivalent to that of term newborns, considered normal and healthy[22].

Thus, weaning from enteral tube directly to the breast may have brought qualitative benefits, for breastfeeding provides adequate stimulus to orofacial muscles, increasing tonus and promoting correct postures during rest and stomatognathic functions[28], as expected in normal development.

Regarding the time of speech-language pathology intervention, it was observed that the NBs remained under the transition technique from enteral tube feeding to breastfeeding for, in average, 12.31 days (13 days for G1 and 11.15 days for G2). It is evidenced the fact that NBs from G2, with a history of important medical complications, had shorter intervention period, in average, than G1. It is possible to infer, once again, that these results were related to the fact that the NBs from G2 had higher mean age than G1, especially in days of life at clinical assessment. The time (in days) of extra uterine experiences may have been an important factor for these babies.

Another aspect to be considered is weight (in grams). Although the subjects from G2 presented mean birth weight below the average of G1 subjects (G1=1634.77 and G2=1605), at the time of speech-language pathology evaluation the mean weight of G2 subjects was higher than that of G1 (G2=1850.77 and G1=1712.05). Infants from G2 were heavier than those in G1 probably because they had been receiving enteral feeding for more time (in days). The greater weight of G2 when compared to G1 may have contributed to speed up speech-language pathology follow-up, since weight gain is an important factor to be considered for discharge. The fact that the period of speech-language pathology intervention was lower in G2 might suggest that, in addition to the clinical stability achieved, aspects such as weight, CGA and days of life (all of those higher in G2, when compared to G1, at the time of speech-language pathology evaluation) were important for the evolution of feeding conditions in this population, an aspect also highlighted in the literature[22].

The average age of 36.61 weeks for acceptance of breastfeeding and effective discharge within an average of 36.95 weeks CGA may be considered late, as some authors have shown that children under 36 weeks CGA can be introduced in breastfeeding. On the other hand, the mean age obtained for exclusive breast offer at discharge from speech-language pathology intervention (36.95 weeks) was equivalent to the gestational age at birth considered term. Thus, although there was a tendency for late onset in speech-language pathology intervention, the time spent in the therapy (in days) was enough, and promoted positive results regarding the establishment of

exclusive oral feeding in PTI. In this sense, it is the speech-language pathologist's responsibility to guide the mother and the interdisciplinary team as to the prescribed conduct, with the aim to clarify the speech-language pathology intervention and the family involvement in the evolution of the NB[10]. It is important to mention that the technique of direct transition from enteral feeding to breastfeeding brings benefits to lactogenesis, for frequent milking helps to promote a milk production adequate to the infant's caloric and nutritional needs. Therefore, when at the stage of the technique called sucking in "full breast", the NB will receive the appropriate volume of milk to his weight, and will gradually go to the BFD stage, without receiving oral supplement (glass and/or bottle), which favors the practice of exclusive breastfeeding, as recommended by the World Health Organization (WHO)[9].

The transition method of enteral feeding (tube) straight to breastfeeding does not cause changes in the physiological innate feeding patterns, nor in its development, which can occur when other forms of oral feeding are used. It is also noteworthy that infants subjected to this technique are discharged being exclusively breastfed, without being fed other than by the tube (OGP or NGP). With that, it is expected that exclusive breastfeeding is extended after discharge and that general health of the baby is improved[29].

CONCLUSION

The findings evidenced that preterm newborns, with or without history of important medical complications, when subjected to the weaning technique direct from enteral feeding to breastfeeding, were being effectively breastfed at the time of speech-language pathology discharge. Moreover, at that moment, the mean corrected gestational age corresponded to the normal development of the feeding function of the human being.

Further studies involving the weaning technique direct from enteral feeding to breastfeeding in newborns enrolled in the Kangaroo Mother Care are suggested, in order to elucidate the possibility of facilitation of exclusive breastfeeding at an earlier age than that observed in this study.

It is considered that the technique can benefit the infant's stomatognathic system, and breastfeeding should also reflect in improvements in the NB's global development, in maternal health, and in personal relationships within the family. Finally, it can be stated that breastfeeding is a practical and positive way for the PTI's mother to deal with the premature birth of her baby, besides feeding him the best and safest way possible.

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Appendix 1. Speech-Language Pathology evaluation and monitoring protocol

Protocol for speech-language pathology evaluation and monitoring*

1- Identification and medical history: Date: _____
Mothers name:_____ Schedule: _____
Infants name: _____
BD.:_____GA.:_____ Days _____ CGA.:_____
BW:_____ W Last day:_____ Actual W: _____ ΔW:_____
Medical diagnosis: _____

2 - Type of feeding:
Prescribed volume: _____ ml. _____/_____hours
Waste technique: ____ ml. Caloric balance: _____ cal/kg/day

Δ Breast (B)
○ Bottle normal nipple (BNN) - volume accepted _____ml
○ Bottle orthodontic nipple (BON) - volume accepted: _____ml
◊ Cup (C) - volume accepted: _____ml
☐ Non Nutritive Sucking (NNS) ☐ OGP / ☐ NGP: ___ ml.
☐ "gloved finger " technique ☐ relactation ("empty breast ")
☐ "breast half full" concomitant with tube feeding
☐ "full breast" concomitant with tube feeding

3 – Behavioral state at the beggining of feeding:
ΔO◊☐ Deep sleep ΔO◊☐ Alert
ΔO◊☐ Light sleep ΔO◊☐ Agitaded/angry
ΔO◊☐ Sleepy ΔO◊☐ Crying

4 – Readiness to feed:
ΔO◊☐ looking for breast ΔO◊☐ Brings hands to face
ΔO◊☐ Suction moviments ΔO◊☐ Grip
ΔO◊☐ Brings hands to midline ΔO◊☐ Tongue protrusion

5 – Posture/ Motor standard:
ΔO◊☐ Stable with support ΔO◊☐ Stable without support
ΔO◊☐ Flexion ΔO◊☐ Physiological hypotonia
ΔO◊☐ Unstable/ Tremors/ Disorganized

6 - Suction:
ΔO◊☐ Not sucking ΔO◊☐ Sucking sporadically
ΔO◊☐ Sucking groups: ΔO◊☐ Regular
ΔO◊☐ Irregular
ΔO◊☐ Present pause ΔO◊☐ Unacceptably long pause
ΔO◊☐ You have to give breaks to help the NB to organize
ΔO◊☐ Coordination of groups of sucking/swallowing/breathing

7- Level of suction strength:
ΔO◊☐ Weak ΔO◊☐ Medium/weak
ΔO◊☐ Medium ΔO◊☐ Strong/medium
ΔO◊☐ Strong

8- Variation of suction strength:
ΔO◊☐ Yes ΔO◊☐ No

9- Variation in the rhythm of suction:
ΔO◊☐ Yes, after _____min. _____ ml.
ΔO◊☐ No

10- Jaw movement:
ΔO◊☐ Exaggerated excursion ΔO◊☐ Tremors
ΔO◊☐ Organized movement ΔO◊☐ Crashes

11- Tongue movement:
ΔO◊☐ Retraction ΔO◊☐ Exaggerated protrusion
ΔO◊☐ Cupping ΔO◊☐ Enlarged tongue
ΔO◊☐ Organized suckling ΔO◊☐ Uncoordinated movemen

12 - Swallowing (cup)
◊ Lick the rim of the glass ◊ Lick the lips
◊ Introduces tongue in the cup ◊ Coordinately sip milk
◊ Chokes while sipping milk ◊ Milk escape when sipping

13 – Signs of stress:
ΔO◊☐ Change of color: ΔO◊☐ Cyanotic
ΔO◊☐ Reddish
ΔO◊☐ Oscillation of heart rate: ΔO◊☐ Tachycardia
ΔO◊☐ Bradycardia
ΔO◊☐ Oscillation/fall in oxygen saturation. Amount: _____
ΔO◊☐ Respiratory disconfort
ΔO◊☐ Tiredness. After _____ min. After _____ ml.
ΔO◊☐ Milk escape. After _____ min. After _____ ml.
ΔO◊☐ Nausea
ΔO◊☐ Reflux/vomiting
ΔO◊☐ Coughs/gagging

14 – Other signs of distress:
ΔO◊☐ Hiccups ΔO◊☐ Sneeling
ΔO◊☐ Grimace ΔO◊☐ Jump up
ΔO◊☐ Aversion body movements

15 - Behavioral state after feeding:
ΔO◊☐ Deep sleep ΔO◊☐ Alert
ΔO◊☐ Light sleep ΔO◊☐ Agitated/Angry
ΔO◊☐ Sleepy ΔO◊☐ Cry
After _____ min. _____ml.

16 - Feeding schedule:

	Initial	Final	ΔT
B:	_____	_____	_____
BNN:	_____	_____	_____
BON:	_____	_____	_____
C:	_____	_____	_____
NNS:	_____	_____	_____

17- Efficiency (OF): > 3 ml/min, with no signs of stress.
¡ Yes _____ ml/min.
¡ No _____ ml/min. ¡ Sign of stress.

Conduct:
( ) Encourage the kangaroo mother care (phase: ____)
( ) Encouragement of breastfeeding (BD)
( ) Breastfeeding + OF, if needed
( ) BNN (bottle with normal nipple)
( ) BON (bottle with ortodontic nipple)
( ) C (cup)
( ) Provide exclusive enteral feeding
( ) Provide all oral feeding; Tube, if necessary
( ) Suspend OF
( ) NNS (with "gloved finger ")
( ) NNS in "empty breast" (relactation technique)
( ) Sucking in "breast half full" concurrent with nasogastric tube
( ) Breastfeeding + _____ ml by tube
( ) Absence of mother: enteral feeding
( ) Conduct translactation technique
( ) Speech-language pathology monitoring
( ) Speech-language pathology discharge
Other: _____ _____
_____
_____

Responsible speech-language pathologist:_____
Nursing assistant: _____