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The effect of specific training of short duration on proximal and distal adjustments at the onset of reaching, in preterm and low birth weight infants: A randomized clinical trial

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ABSTRACT
This study aimed to verify the effect of specific training of short duration on the proximal (uni-and bimanual) and distal (aperture, orientation and the contact surface of the hand) adjustments of reaching, in the period of emergence in preterm infants and with low birth weight. The study included 18 infants of both sexes, born between 29-33 weeks gestational age, weighing less than 2500 grams, and who required peri- and postnatal hospital care. The infants were divided into two groups: experimental and control. The experimental group received a single specific training session (serial varied practice condition) for five minutes, and the control group received no training. Both groups were assessed twice on the same day (pre- and post-training). There was significant difference in the frequency of reaching of the experimental group after training (Z=-2.501, p=0.012) and when compared to the control group (U=17, p=0.037). Significant difference was observed in proximal adjustments where the infants in the experimental group showed more unimanual (Z=-2.252, p=0.024) and bimanual (Z=-2.232, p=0.026) reaching post-training, and between groups differences were observed for bimanual reaching (U=15, p=0.013) in the experimental group after training. In distal adjustments a significant difference was observed in the aperture of the hand (open, U=18, p=0.029), and the orientation of the palm (oblique, U=17.5, p=0.041) between groups. The results indicate that training of short duration enhanced reaching, increasing frequency, and proximal and distal adjustments consistent with age.

Keywords: Preterm, Reaching, Training, Low birth weight.

1 INTRODUCTION

During the first year of life the infant learns fundamental behaviors through intrinsic (body) and extrinsic (environmental) information (Thelen, Fisher, & Ridly-Jhonson, 1984). These changes contribute to the acquisition and development of new motor skills through standardized and precise movements that are improved over time (Barrocal, Perez, Meira Junior, Gomes, & Tani, 2006). The first phase of exploratory activities corresponds to the first four months of life (Gibson, 1982), and at this stage what stands out among other skills is manual reaching.

Reaching is the ability to locate and touch an object in space, through the trajectory performed by one or both hands in the direction of an object after fixing one's gaze on it (Savelsbergh & van der Kamp, 1994; Carvalho, Tudella, & Salvesberg, 2007; Thelen, Corbetta, & Spencer, 1996). According to the literature, it is the result of the confluence of extrinsic and intrinsic factors (Adolph, Eppler, & Gibson, 1993; Gibson & Pick, 2000). Factors intrinsic to the organism (i.e. prematurity) may influence the proximal adjustments in reaching (Fagard & Pezeacute, 1997), observed by alternating uni- and bimanual reaches during the first year of life in infants (Fagard, 2000; Heathcock, Lobo, & Galloway,

2008). In addition to prematurity, birth weight and possible clinical complications in infants, such as lesions in cortical areas and neurological pathways (O'Connor *et al*., 2002; Goyen *et al*., 2003), increase the risk of motor and visual perceptual disorders (Salt & Redshaw, 2006), which make it difficult to reach and grasp (Heathcock, Lobo, & Galloway, 2008). The constraints extrinsic to the body, such as the use of objects of different sizes and textures (Rocha, Silva, & Tudella, 2006a; Rocha, Silva, & Tudella, 2006b; Bottesini, Silva, & Tudella, 2010), and different body positions (Carvalho, Gonçalves, & Tudella, 2008), also influence proximal adjustments and distal adjustments that relate to the position and aperture of the hand and fingers to make contact and grasp the object (Fagard, 2000).

In infants born preterm (33-35 weeks) reaching starts at about 4½ months of corrected age (Clearfield, Feng, & Thelen, 2007; Heathcock, Lobo, & Galloway, 2008). However, the reaching is of lower quality when compared to term infants (Plantinga, Perdok, & De Groot, 1997). It is believed that there is a lack of planning and coordination of the reaching movement, demonstrating an inability to modulate the efferent motor activity (van der Fits *et al*., 1999) reflected in movement lacking in fluency (Hellerud & Storm, 2002). Considering the differences in reaching performance between term infants and preterm, and as there is no evidence regarding the long-term consequences of this kind of reaching in preterm infants, studies have been conducted to evaluate the effect of training on reaching.

The training, characterized by a repetitive process of exploration of the environment by the infant, allows the child to choose a more efficient movement for a given task enabling a more stable behavior (Savelsberg & van der Kamp, 1994). The learning and refinement of a skill are under the influence of the body and of the experience both of the environment in which it occurs, as well as the performance of a task (Adolph, Eppler, & Gibson, 1993; Barela, 2001; Rocha & Tudella, 2003; Guimarães, Cunha, Soares, & Tudella, 2013).

According Karni *et al*. (1998), the learning of motor tasks is highly specific to the context interfering with the subset of neural inputs that are activated with a specific stimulus (Gilbert, Li, & Piech, 2009), which makes it possible to emphasize the importance of specific training aimed at seeking the improvement of a skill. Therefore, it is believed that the specific training of reaching should be directed at promoting the experience and practice of the movements to be incorporated into the infant's motor repertoire (Lobo & Galloway, 2008).

Among the types of practices used in training, studies with older children have shown that the condition of varied practice, increases the flexibility of the production of the movement, allowing the application of what was learned in the acquisition phase in the performance of similar actions in new contexts (Wulf, 1991; Schmidt & Wrisberg, 2010), in addition to the construction of a broader motor program (Lage *et al*. 2011).

For Carvalho, Tudella, Caljouw, & Savelsbergh (2008b), and Thelen, Corbetta, & Spencer (1996), experience favors the refinement of reaching considering that the repetition of the task leads to improved function. The pioneering study of Lobo, Galloway, & Savelsberg (2004), on the training of reaching in typical infants, showed that specific reaching training over time led to the improvement in the number of hand-object contacts, hands closer to the object and open hand during touching. Lobo & Galloway (2008) conducted a study in term infants aged 9-21 weeks to determine the effect of daily training of postural activities, and interaction with the object in the supine position for three weeks. They found that both trainings enhanced the acquisition of reaching and increased the number of contacts of the hand with the object. Thus, they inferred that early experiences with objects and postural activities can promote advances in the development of reaching and can be used as an intervention technique for infants with special needs. Heathcock, Lobo, & Galloway (2008) conducted one of the first studies to investigate the effect of training in manual reaching, in the supine and reclined postures in preterm infants with low birth weight. They found that after 4-6 weeks of training, for 15-20 minutes, 5 days a week, these infants had longer duration of hand contact with the toy, and after 8 weeks of training had more reaching with open hand and with the ventral surface of the hand than preterm infants untrained. The authors concluded that after training the reaching of preterm infants had become similar to the reaching of term infants.

A review of the literature revealed that there are few studies on the effect of training in infants, especially, when it comes to preterm infants and the emergence of reaching. The present study aimed to verify whether specific short duration training, in the form of serial varied practice, could positively influence the acquisition of reaching ability in preterm infants with low birth weight. Given the above, the hypothesis of this study was that specific training, in the form of serial varied practice, of short duration, will promote more mature reaching observed by the oblique orientation of the palm of the hand, ventral surface contact, and, hands semi-open.

2 MATERIAL AND METHOD

For this randomized clinical trial, the sample size calculation for a confidence interval of 95% and a power of 80% suggested the minimum number of 8 participants in each group.

The study was approved by the Research Ethics Committee of the Federal University of Triangulo Mineiro (protocol 1856/2011) and registered with the *Brazilian Registry of Clinical Trials* (RBR-4RJWRX). The consent of parents was obtained beforehand.

2.1 PARTICIPANTS

The study included 18 preterm infants (32.17±1.3 weeks gestational age) with low birth weight (1661.67±380.8 grams), Apgar score greater than seven in the first (7.94±0, 8) and fifth minute (8.83±0.6), who required hospitalization at birth (26.94±15 days), incubator (19.72±11.7 days) and phototherapy (4.39±1.9 days), and of both sexes (9 males and 9 females). At the time of data collection the infants with a corrected age between 2½ and 4½ months, had a mean motor development score of 36.11 (± 15.4) according to the Alberta Infant Motor Scale (AIMS, Piper & Darrah, 1994) (Table 1). The study excluded infants who had at least one of the following conditions, according to medical records: Apgar score less than seven within the first and fifth minutes, congenital alterations to the central nervous system, signs of neurological impairment, signs of musculoskeletal disorders, genetic syndromes or signs of withdrawal symptoms associated with reports of maternal abuse of alcohol and drugs, congenital infections, and signs of sensory deficits.

Table 1. Characterization of the groups.

Group	Sex		Gestational Age (weeks)	Birth Weight (grams)	Apgar		Hospitalization Time (days)	Incubator Time (days)	Phototherapy Time (days)	Chronological Age (weeks)	Corrected Age (weeks)	Time of Emergence of Reaching (days)	AIMS Score
	F	M			1st min	5th min							
Experimental	5	4	31.78 ±1.96	1639.44 ±438.62	7.89 ±0.78	8.78 ±0.67	29.33 ±18.26	21.22 ±14.71	4.22 ±2.33	20.89 ±3.33	12.64 ±3.06	2.22 ±0.83	36.11 ±13.17
Control	4	5	32.56 ±0.73	1683.89 ±338.72	8.00 ±0.87	8.78 ±0.67	24.56 ±11.65	18.22 ±8.42	4.56 ±1.67	18.44 ±2.40	11.50 ±3.27	1.78 ±0.44	36.11 ±18.16

M, masculine; F, feminine. Mean value and standard deviation.

Source: from the authors.

2.2 PROCEDURES

Based on the selection of records of infants born at/or cared for at the Hospital de Clinicas of the Federal University of Triangulo Mineiro (UFTM), contact was made with the parents and/or guardians who were properly informed about the study objectives and the procedures to be performed. Upon agreeing to participate in the study, the researcher explained to the parents/guardians of the infants that manual reaching consists of the action of touching an object with one or both hands without grasping it.

In a bid to ascertain the precise day on which the infant started to reach, the researcher began to contact the parents/guardians on a weekly basis, from the week before the infant's three-month anniversary. Whenever the parents/guardians suspected the emergence of reaching, the researcher would personally pay a visit to make sure that the infant had acquired reaching. When reaching was confirmed, an assessment was scheduled in the laboratory, and to ensure similarity between the groups, an assessment of motor development was carried out using the Alberta Infant Motor Scale (AIMS) (between 25th and 75th percentile).

In the research laboratory, the first assessment occurred within three days of the date that the acquisition of reaching was identified, an average of 2.22 contacts having been made with parents/guardians by telephone, to detect the onset of the reaching period.

Infants were randomly assigned to two groups: experimental: nine (5 girls and 4 boys), and control: nine (4 girls and 5 boys). Randomization of infants for the groups was performed by a statistician who was not part of the data collection. The allocation to the groups, and training were only carried out when the infant had performed at least three reaching movements prior to the pre-training evaluation.

To record the experimental phase, three digital video cameras (60 Hz) were used, positioned in such a way as to visualize the movement of each of the upper limbs via at least two cameras simultaneously. The images captured were viewed using the Dvideow 5.0 videogrammetry system (Carvalho, Tudella, & Savelsberg, 2007; Carvalho, Tudella, Caljouw, & Savelsbergh, 2008b; Figueroa, Leite, & Barros, 2003; Toledo, Soares, & Tudella, 2011) in order to identify the start and end of the reach, and to analyze frame by frame the entire movement.

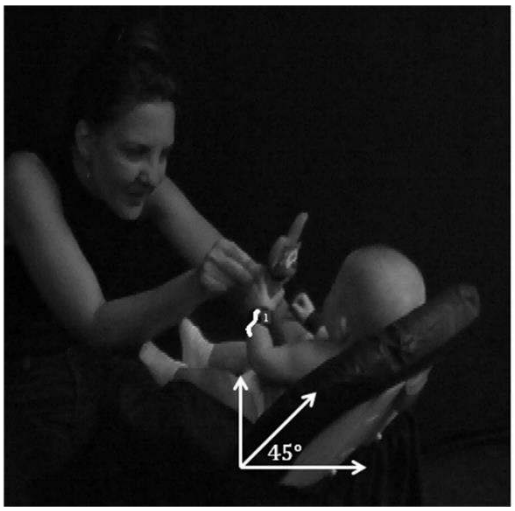
2.3 TEST PROCEDURE

Infants wearing only a diaper and with markers attached bilaterally to the dorsal region of the wrist, were evaluated twice (pre-and post-training) in a single day. They remained seated in a child seat in the recumbent posture at 45°, with the support of one of the hands of the researcher at the height of the xiphoid process of the infant (Figure 1).

During the test a malleable red object was presented at the height of the infant's xiphoid process within a reachable distance (Toledo & Tudella, 2008; Cunha, Soares, Ferro, & Tudella, 2013) for 2 minutes. With each reach performed the object was removed from the infant's field of view. If the infant did not reach out, the object was also removed for 5 seconds.

To perform the experimental procedure the infants had to be in an active or inactive alert state (Prechtl & Beintema, 1964), and should not have presented any health problem the day before nor during the evaluation.

Figure 1. Positioning the infant sitting reclined at 45°, supported at the xiphoid process by the researcher, and the object presented.



Source: from the authors.

2.4 THE REACHING TRAINING PROTOCOL

Between pre-and post-training evaluations the experimental group received a single specific training session of short duration (about 5 minutes), in the serial varied practice form (activity A, activity B, activity C). Ten repetitions were performed of the sequence (ABC) for each member (Figure 2), starting with the right upper limb, and, after 10 repetitions, the same was done with the left upper limb. The object used in the training was the same used in the evaluation, and this was performed on the lap of the researcher (Figure 3). The training protocol is detailed in Table 2.

Table 2. Training protocol in reaching at 45° reclining posture.

Activity A	Researcher holds the object in one hand, in the midline and at the height of the xiphoid process of the infant, and the other hand holds the forearm of the infant in order to guide the child's hand towards the object to touch it. 100 sec duration.
Activity B	The upper limbs of the infant should be positioned alongside the body. The researcher conducts tactile stimuli with the object on the infant's arm and forearm, in the proximodistal direction, and moves the object to the midline at the xiphoid process, within sight of the infant. 100 sec duration.
Activity C	The researcher holds the object in one hand, in the midline and at the height of the infant's xiphoid process, and waits a few seconds to allow it to perform spontaneous uni- or multiarticulate movements of the upper limbs. If the infant does not touch or explore the object with the hand spontaneously, the researcher performs tactile stimuli with the object on the infant's stimulated hand. Each time the infant touches the object, the researcher should, with smiling face, praise the child. If the infant grasps the object, the researcher will allow the child to do so. 100 sec duration.

Source: from the authors.

The control group received no specific training, and merely remained on the researcher's lap in the same position and for the same time as the experimental group, without their upper limbs being touched (Figure 3).

Figure 2. Training protocol: Activity A, Activity B, Activity C.

Source: from the authors.

Figure 3. Infant interaction with the researcher without training.

Source: from the authors.

2.5 DESCRIPTION OF THE REACHING AND THE DEPENDENT VARIABLES

Reaching was considered to have occurred when the infant touched the object with one or both upper limbs, after locating it in space, independent of grasping it (Toledo, Soares, & Tudella, 2011; Cunha, Soares, Ferro, & Tudella, 2013).

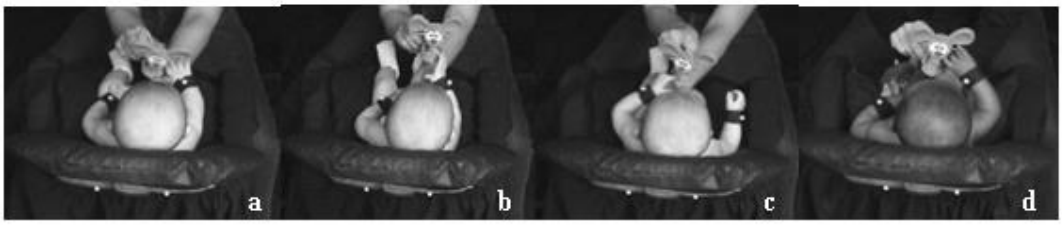
The frequency of reaching was characterized by the total number of valid reaches performed during the period of 2 minutes in each assessment (pre- and post-training) (Cunha, Soares, Ferro, & Tudella, 2013).

The proximal adjustments classified as: *unimanual* - when the infant moved only one upper limb towards the target (Corbetta & Thelen, 1996) or with a difference of more than 20 frames from the beginning of the movement from one member to the other (Toledo, Soares, & Tudella, 2011), or yet again, when one member did the reaching and the other continued to produce small movements, but not directed to the toy (Thelen, Corbetta, & Spencer, 1996); *bimanual* - when the infant simultaneously moved the upper limbs towards the target (Corbetta & Thelen, 1996), or when the upper limbs traversed at least 50% of the movement trajectory showing a difference less than or equal to 20 frames from the beginning of the movement from one member to the other (Toledo, Soares, &

Tudella, 2011). Reaching could happen with both hands simultaneously, or with an initial touch of one hand (Corbetta & Snapp-Childs, 2009).

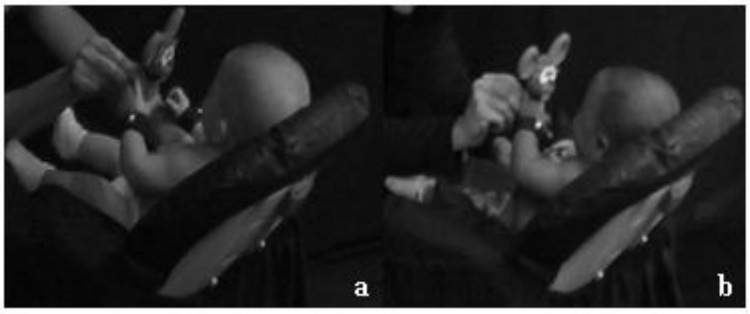
Distal adjustments were analyzed at the moment the infant touched the object. These were classified as: hand orientation: a) *horizontal* - the palm was placed down, with the forearm in pronation, or upward with the forearm in supination (Figure 4a), b) *vertical* - the forearm was in a neutral position and the palm of the hand facing the midline of the infant's body (Fagard, 2000; Cunha, Soares, Ferro, & Tudella, 2013) (Figure 4b), and c) *oblique* - the hand was in an intermediate position between the horizontal and vertical, that is to say, approximately 45° of supination of the forearm in relation to the horizontal (Rocha *et al*. 2009; Toledo, Soares & Tudella, 2011; Cunha, Soares, Ferro, & Tudella, 2013) (Figure 4c), d) *internal oblique* - when the hand was in an intermediate position between the vertical and horizontal, but, with approximately 45° of pronation of the forearm, with the thumb pointing downward (Figure 4d). Contact surface of the hand and fingers: a) *ventral* - the palm of the hand or the digital area of the fingers touched the object (Figure 5a), and b) *dorsal* - the back of the hand or fingers touched the object (Figure 5b.) The aperture of the hand was classified as *open* when the fingers were extended (Fagard, 2000; Toledo, Soares & Tudella, 2011; Cunha, Soares, Ferro, & Tudella, 2013) (Figure 6a); *closed* when all the fingers were bent, or yet again, if only one finger was not fully closed (Figure 6b) and, semi-open, when the fingers merely remained flexed, regardless of the degree of flexion (Cunha, Soares, Ferro, & Tudella, 2013) (Figure 6c), or, only one finger was flexed.

Figure 4. Hand Orientation: a) Horizontal b) Vertical c) Oblique d) Internal Oblique.



Source: from the authors.

Figure 5. Contact surface of the hand and fingers: a) Ventral b) Dorsal.



Source: from the authors.

Figure 6. Hand aperture: a) Open b) Closed c) Semi-open.

Source: from the authors.

2.6 STATISTICAL ANALYSIS

To ensure the reliability of the coding of the actions, reaches of 10 infants in the sample were analyzed by three independent trained observers. The average rate of concordance between the three observers computed for all variables was 96.5%. The interobserver concordance was calculated using the following equation: [number of agreements/(number of agreements + number of disagreements)] × 100. And the reliability between two observers evaluated by Cohen's Kappa was found to be 0.96 (95% CI±0.05), indicating consistent coding.

Nonparametric tests were used in the intragroup (Wilcoxon) and intergroup (Mann-Whitney) comparisons. Median values for each child were used in all the variables, adopting a significance level of $p \leq 0.05$.

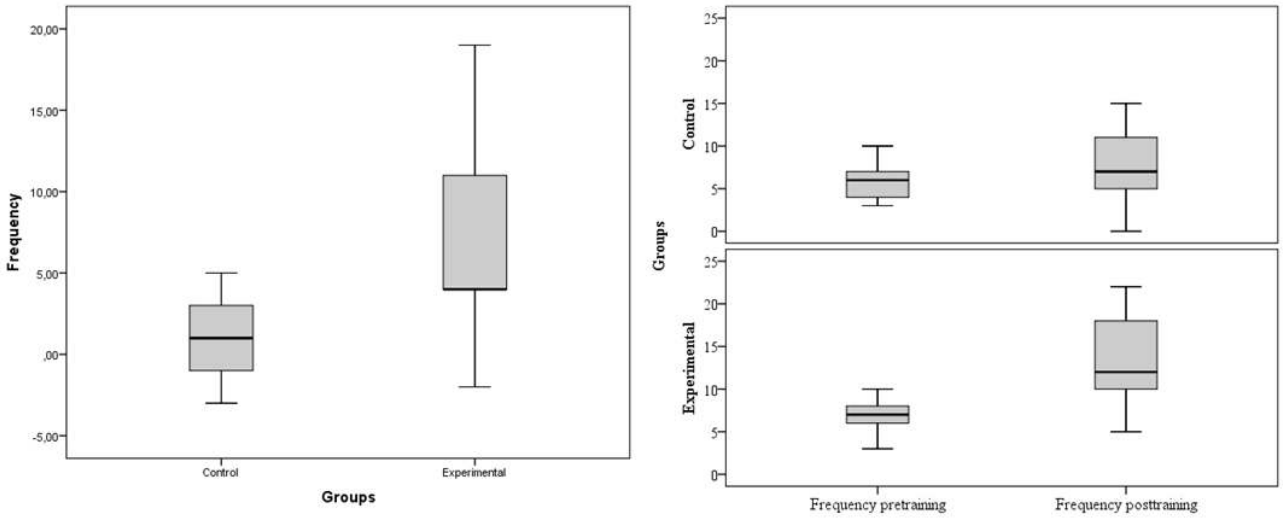
3 RESULTS

The number of reaching movements analyzed was 299, of which 115 in the pre-training period and 184 post-training.

3.1 FREQUENCY OF REACHING

The frequency of reaching in the pre-training period showed no significant difference between the experimental group and the control group (U=28, p=0.261). In the post-training period, there was a significant increase in the frequency of reaching (U=17, p=0.037) in the experimental group (4.0) compared to the control group (1.0). In the intragroup analysis only the experimental group showed a significant increase in reaching (Z=-2.501, p=0.012) in the post-training period (12) compared to the pre-training period (7.0) (Figure 7).

Figure 7. Median and interquartile deviation of the difference of the frequency of reaches (post- minus pre-training) between groups, and of the intra-group frequency of reaches of pre-and post-training.

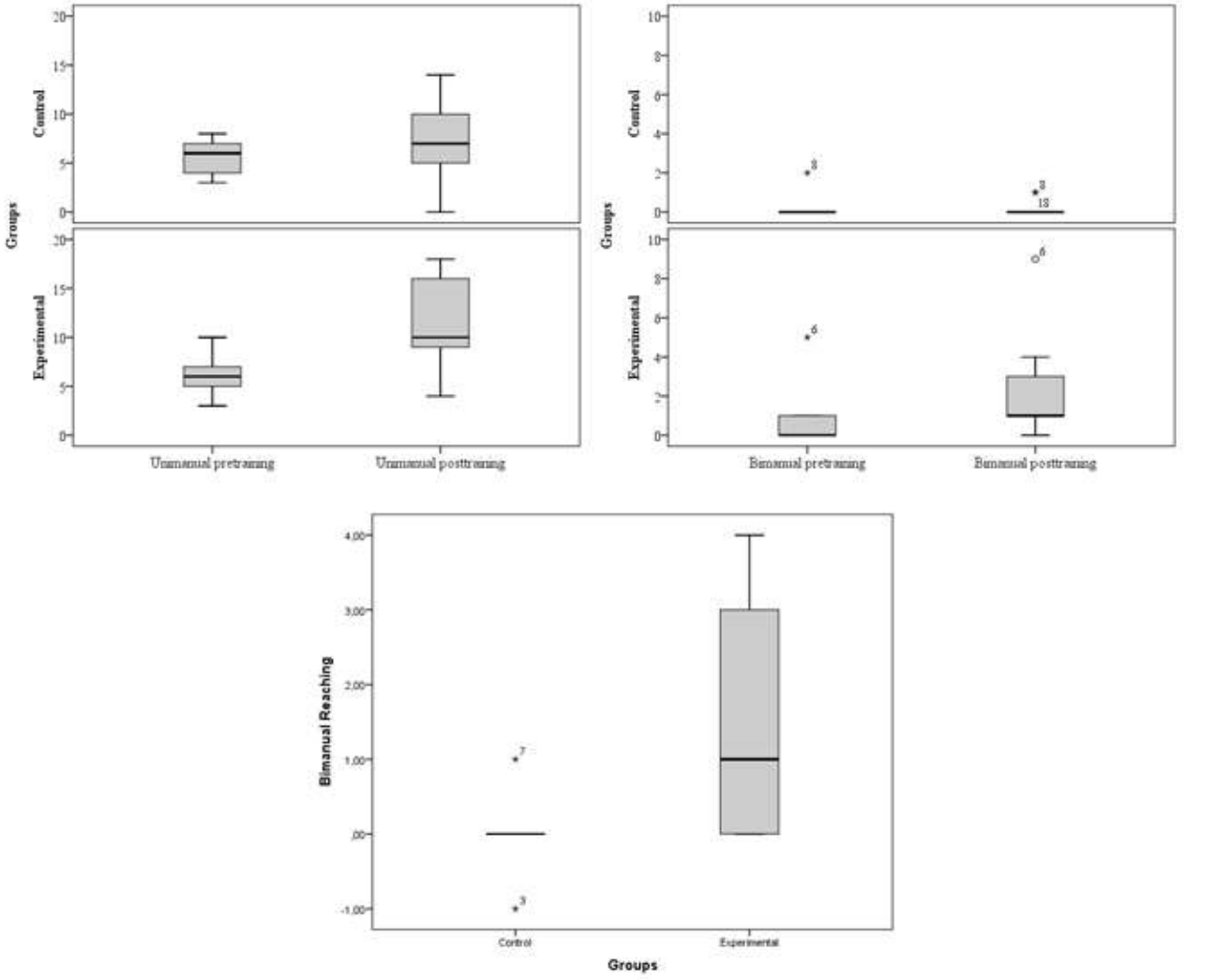


Source: from the authors.

3.2 PROXIMAL ADJUSTMENTS

It was observed in intra-group analysis, that the experimental group significantly increased the frequency of unimanual (Z=-2.252, p=0.024) and bimanual (Z=-2.232, p=0.026) reaching in the post-training period. On the other hand, the control group showed no significant differences (Z=-1.014, p=0.311) and (Z=0.000, p=1.000). In the intergroup analysis there was a significant difference (U=15, p=0.013) post-training, where the experimental group exhibited more bimanual reaching (4.0) than the control group (1.0) (Figure 8).

Figure 8. Median and interquartile deviation of the intra-group frequency of uni- and bimanual reaches pre- and post-training, and the difference in frequency of uni-and bimanual reaches (post- minus pre-training) between groups.

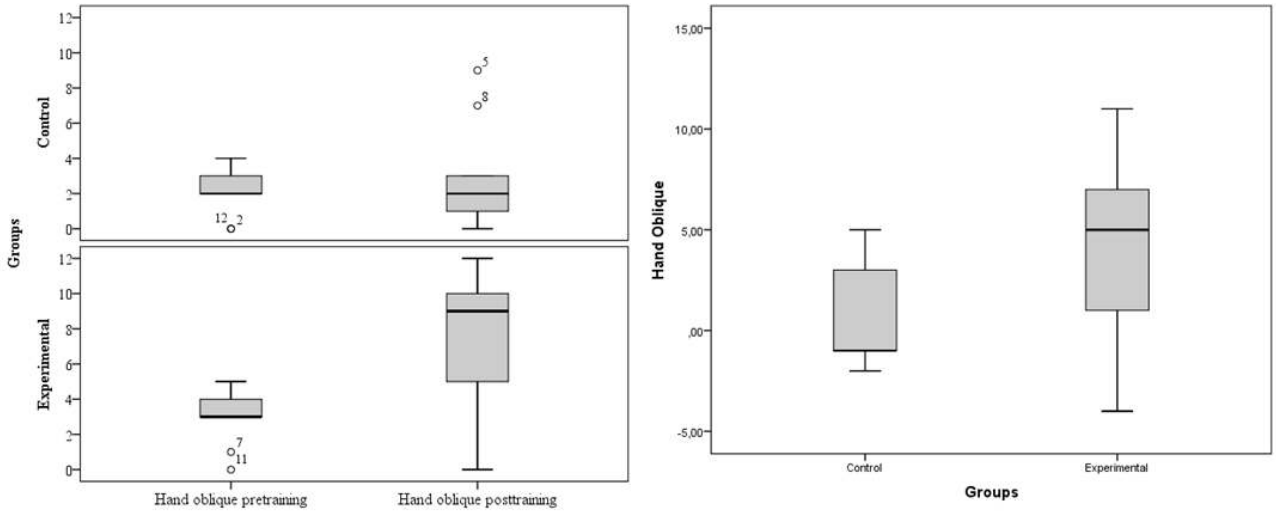


Source: from the authors.

3.3 DISTAL ADJUSTMENTS

With respect to the orientation of the hand, in the intra-group analysis, there was a significant difference in the post-training for the oblique orientation (Z=-2.243, p=0.025). In the intergroup analysis there was a significant difference for the oblique hand (U=17.5, p=0.041) in the experimental group after training (Figure 9).

Figure 9. Median and interquartile deviation of the oblique orientation of the hand pre - and post-training intra-group, and of the difference (post- minus pre-training) of the oblique orientation between the groups.



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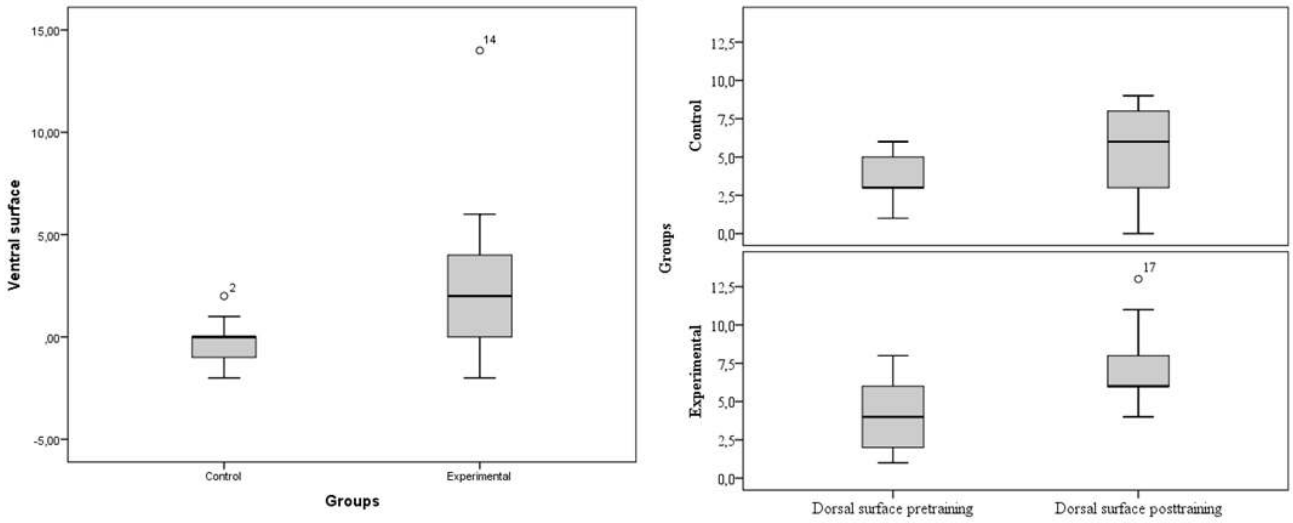
In relation to the contact surface of the hand and the fingers in the intragroup analysis, a significant difference (Z=-2.213, p=0.027) was found for dorsal contact of the hand and fingers on reaching, in the experimental group after training (Figure 10). In the intergroup analysis there was no significant difference between the contact surfaces of the hand and fingers during reaching, however, the experimental group had more ventral contact after training than the control group.

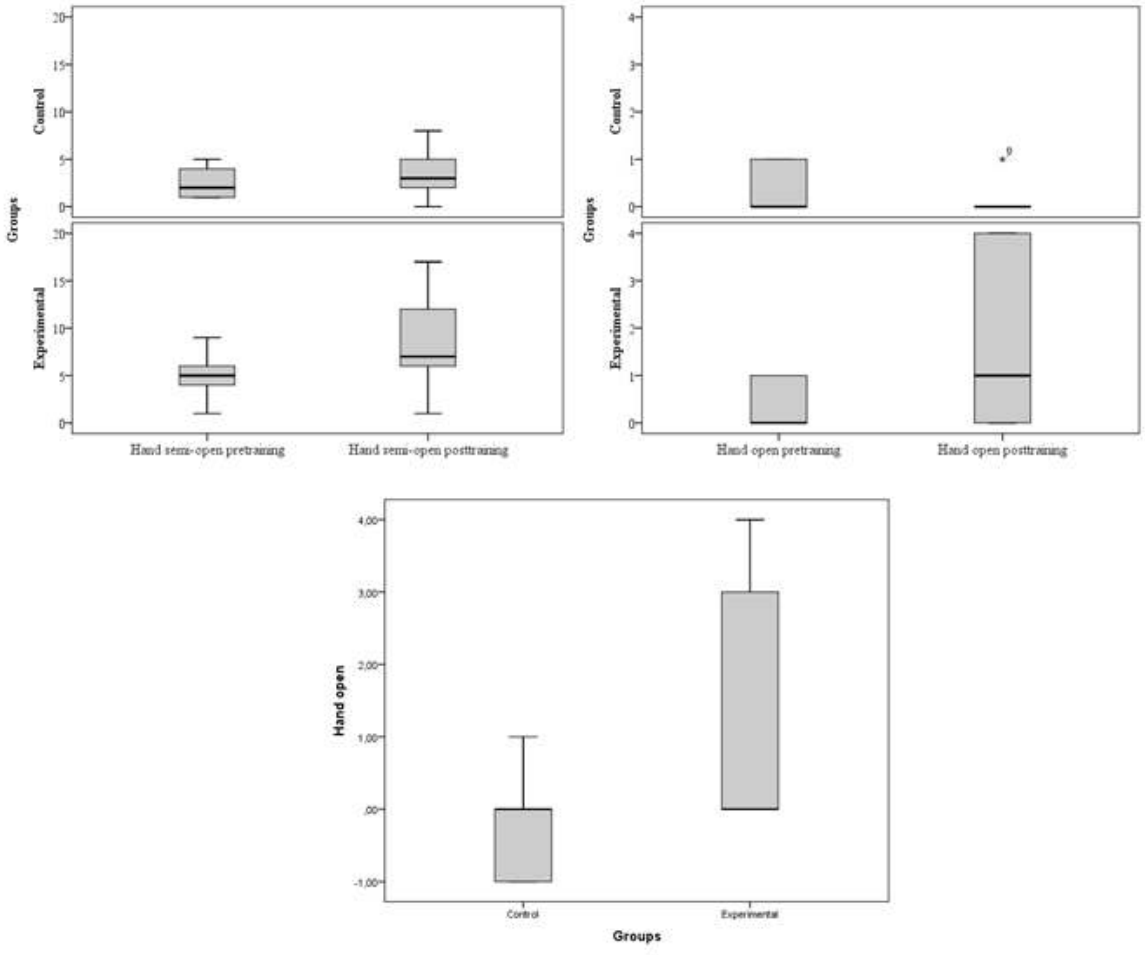
And, with regard to the aperture of the hand, in the intra-group analysis, no significant difference was observed for any of the variables between the pre- and post-training. However, there was a tendency for the hand to be open (p=0.06) and semi-open (p=0.06) in the experimental group after training. In the intergroup analysis there was a significant difference in the open hand (U=18, p=0.029) in the experimental group after training (Figure 11).

Figure 10. Median and interquartile deviation of the difference (post- minus pre-training) of the ventral surface of the hand between the groups, and of the intra-group frequency of the dorsal surface of the hand pre - and post-training.



Source: from the authors.

Figure 11. Median and interquartile deviation of the hand aperture in the intra-group pre - and post-training, and the difference (post- minus pre-training) in the hand aperture between the groups.



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4 DISCUSSION

The present study investigated the effect of a single training session (serial varied practice condition) of short duration on the frequency of reaching, and, on the proximal and distal adjustments of reaching in the immediate period of the acquisition of this ability in preterm infants with low birth weight.

The infants in this study, preterm and low birth weight, but without diagnosed sensorimotor alterations, required a lengthy hospital stay and incubation, extrinsic factors that could affect motor development (Fallang, Saugstad, & Hadders-Algra, 2003). However, these effects appear not to have influenced the period of the emergence of reaching in this population, nor adequate performance in the evaluation of motor behavior (AIMS). These results may be related to the use of corrected age at the time of evaluation.

The age of the emergence of reaching in the study population ranged from 2½ to 4½ months, corroborating the period (3-5 months) shown in studies of full-term infants (Thelen *et al*., 1993; Thelen, Corbetta, & Spencer, 1996; van der Fits *et al*., 1999) as well as for preterm infants born between 33 and 35 weeks, which showed the onset of reaching around 4½ months (Clearfield, Feng, & Thelen, 2007; Heathcock, Lobo, & Galloway 2008).

The significant increase in frequency of reaching observed in the experimental group inter- and intra-groups after a single training session of short duration corroborates the findings of Heathcock, Lobo, & Galloway (2008), confirming that training has a positive effect on the ability to reach in preterm, low birth weight infants. However, these authors found an effect after the third week of daily training and completed the study after 8 weeks of training, while in the present study there was only one session of specific training (serial varied practice) for 5 minutes. This reinforces the idea that neurosensorimotor experiences, albeit of short duration, can overcome limitations common to prematurity.

Regarding the proximal adjustments of reaching, after training only the infants in the experimental group showed a significant increase in the frequency of both uni- and bimanual reaching, which may be related to the short duration of the training. The training time of 5 minutes may not have been sufficient for the infant to display a preference for uni- or bimanual reaching. Moreover, the age of 2½ to 4½ months of corrected age, is a period of great variability of strategies for performing reaching (Rochat, 1992; Corbetta & Thelen, 1996; van Hof *et al*., 2005). It is worth noting that the first intrinsic biomechanical efforts generated during reaching, tend to radiate to the other upper limb, causing bimanual responses in reaching (Corbetta & Thelen, 1996), which may also be an explanation for the results found in this study, confirming the positive effect of training.

The training effect can also be seen in relation to the distal adjustments of reaching. It was

found that in the intra-group analysis of the experimental group there were changes in the quality of the reaching from pre- to post- training. An increase was observed in the frequency of reaching with the dorsal surface of the hand and fingers, hand open and semi-open, and oblique orientation. Further evidence of the effect of training, however, was observed in the intergroup analysis, where there was a higher frequency of open hand with oblique orientation, and, with the ventral surface of the hand in the experimental group, which is considered a more functional standard (Heathcock, Lobo, & Galloway, 2008).

The present study confirms the hypothesis that specific training, in the form of *serial varied practice*, of short duration can promote manual motor coordinations such as reaching, contributing to a more mature standard. Therefore, providing sensorimotor experiences seeking to enhance the ability to learn skills such as reaching, is of fundamental importance. Furthermore, this study, the first to investigate the effect of a specific, short duration training protocol and the emergence of manual reaching in preterm infants with low birth weight, can support future studies on protocols and training conditions for other infants at risk of late development of manual skills.

5 CONCLUSIONS AND LIMITATIONS

The results of this study indicate that specific sensorimotor stimuli, of short duration, may favor reaching, in the period of acquisition of the skill, approximating it to the standard of reaching observed in term infants. Although the study sample may not be representative of the entire population of preterm infants with low birth weight, taking into consideration sociocultural differences, future studies could investigate more specific effects and determine the level of interference of short duration training in populations with different risk conditions, verifying the retention of long-term learning. Thus, studies with this approach can empirically support the use of short duration training as a strategy for early intervention for the acquisition, as well the improvement of reaching ability in the period of its emergence. And this may be applied in child care units, in addition to being used as guidance for parents and caregivers in the daily domestic routine.

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