

# Motor development of twins born pre-term: there are differences between the birth order?

## *Desenvolvimento motor de gêmeos pré-termo: existem diferenças entre a ordem de nascimento?\**

DOI: <http://dx.doi.org/10.31011/1519-339X.2018a18n85.06>

Rayne Ramos Fagundes<sup>1</sup> • Cibelle Kayenne Martins Roberto Formiga<sup>2</sup> • Livia Ellen França do Amaral<sup>3</sup> • Maria Beatriz Martins Linhares<sup>4</sup>

### ABSTRACT

The aim of this study was to analyze the motor development of preterm twins from 0 to 6 months of chronological age corrected by the Alberta Infant Motor Scale (AIMS), and to compare the differences between the twins, considering birth order and neonatal variables. A cross-sectional study with 38 twins between 0 and 6 months old, of both genders, preterm, low birth weight, with no severe morbidity in the neonatal period, and without sensorineural sequelae at hospital discharge from the Maternal-Infant Hospital of Goiânia, GO, Brazil. The collection was performed by trained evaluators and was composed of anamnesis interview, socioeconomic questionnaire and motor development evaluation with AIMS. The data analysis was blindly performed, through video recordings and each pair of twins was evaluated on the same day. The first and second twins (TI and TII) presented similar neonatal variables. There was no significant difference when comparing the motor development among the pairs. Most were classified with normal development, with no difference between pairs. It concludes that preterm twins presented similar neonatal variables and motor development, when compared to TI and TII. It is important to monitor the development of twin infants, especially when there is an association with prematurity.

**Keywords:** Premature; Twins; Child Development.

### RESUMO

O objetivo do estudo foi analisar o desenvolvimento motor de gemelares nascidos pré-termo de 0 a 6 meses de idade cronológica corrigida pela Alberta Infant Motor Scale (AIMS), e comparar as diferenças existentes entre os gêmeos, considerando a ordem de nascimento e as variáveis neonatais. Estudo transversal, com 38 gemelares entre 0 a 6 meses, de ambos os sexos, nascidos pré-termo, de baixo peso, sem morbidades graves no período neonatal e sem sequelas neurossensoriais na alta hospitalar, oriundos do Hospital Materno-Infantil de Goiânia, GO, Brasil. A coleta foi realizada por avaliadores treinados e composta por entrevista de anamnese, questionário socioeconômico e avaliação do desenvolvimento motor com a AIMS. A análise dos dados foi cega, realizada por intermédio de videografações e cada par de gemelares foi avaliado no mesmo dia. O primeiro e segundo gemelar (GI e GII) apresentaram variáveis neonatais semelhantes. Não houve diferença significativa ao comparar o desenvolvimento motor entre os pares. A maioria dos bebês foi classificada com desenvolvimento normal, sem diferença entre os pares. Conclui-se que os bebês gemelares pré-termo apresentaram variáveis neonatais e desenvolvimento motor semelhantes, quando comparados entre GI e GII. Ressalta-se a importância de acompanhar o desenvolvimento dos bebês gemelares, sobretudo quando há associação com a prematuridade.

**Palavras-chave:** Recém-Nascido Prematuro; Gêmeos; Desenvolvimento Infantil.

### NOTE

<sup>1</sup> Physiotherapist. Master in Health Sciences in Medicine School of Federal University of Goiás (UFG). Goiânia, GO, Brazil. E-mail: rayneramos.f@gmail.com. Corresponding author.

<sup>2</sup> Physiotherapist. PhD in Medical Sciences from the Medicine School of Ribeirão Preto, University of São Paulo (FMRP/USP). Adjunct Professor of the State University of Goiás (UEG). E-mail: cibellekayenne@gmail.com.

<sup>3</sup> Physiotherapist. Multiprofessional Resident in Functional Health and Rehabilitation of the Rehabilitation and Redeployment Center Dr. Henrique Santillo. E-mail: liviahellen@hotmail.com.

<sup>4</sup> Psychologist. PhD in Sciences (Experimental Psychology) from the Institute of Psychology, University of São Paulo, Professor, Associate Professor in the Department of Neurosciences and Behavioral Sciences of the Medicine School of Ribeirão Preto, University of São Paulo (FMRP/USP). E-mail: linhares@fmrp.usp.br.

We declare no conflict of interest.

\*The study received financial support from the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), Brazil.

## INTRODUCTION

Child development begins in intrauterine life, involves physical growth, neurological maturation, and cognitive, social and affective abilities, and must be accompanied for the early identification of developmental disorders<sup>(1)</sup>.

One group that deserves special attention is the twin infants. In the United States, in the period from 1980 to 2009, the birth rate of twins more than doubled, from 68,339 to values greater than 137,000 births per year. Between 2006 and 2009, this increase in the twins birth was higher among women aged 30 years or more<sup>(2)</sup>. Advanced maternal age increases the risk of their morbidity and mortality, in addition to the risk of preterm births, fetal mortality, perinatal and neonatal mortality, low birth weight and permanence in the Neonatal Intensive Care Unit - NICU<sup>(3)</sup>.

In Brazil, there was also an increase in multiple pregnancies - double, triple or more<sup>(4)</sup>. The greater number of twin pregnancies is due in large part to the increased use of assisted reproduction techniques, such as in vitro fertilization<sup>(5)</sup>. The multiple pregnancy occurrence is associated with higher rates of prematurity and high incidence of low birthweight infants<sup>(6)</sup>.

Preterm infants have a delayed development compared to full-term infants; however, among preterm infants, there may be differences in comorbidities at birth<sup>(7)</sup>. In this sense, twinning represents a greater neonatal risk to Maternal-Infant Health due to its association with low birthweight and other complications arising from prematurity<sup>(6)</sup>. And the second twin tends to present later, since there is a higher incidence of adverse results in the second twin compared to the first<sup>(8)</sup>.

The guiding question of the study is: does the second twin have more delay in motor development than the first twin? It is important to evaluate the development of preterm twins, since there is an association of two risk factors (twin birth and prematurity). In addition, most studies compared twins to non-twins, or monozygotic twins to dizygotic twins. There are limited researches that compare twins to each other, especially in the early stages of development.

Thus, the aim of this study was to verify the possible differences between the motor development of 0-6 months of premature twin brothers, considering birth order (TI and TII) and neonatal variables.

## METHOD

A cross-sectional study with a convenience sample of 38 infants, who met the following inclusion criteria: preterm (<37 weeks of gestational age) and low birth weight (<2,500g), twin, without severe morbidity in the neonatal period and without sensorineural sequelae at hospital discharge, of both sexes, from the Maternal-Infant Hospital (MIH) of the city of Goiânia, GO, whose parents

signed the Free and Informed Consent Term (FICT). Infants with congenital malformations or genetic syndromes, with other neurological disorders, or who were receiving intervention in their motor development, were excluded. The study was approved by the Ethics Committee on Human and Animal Research (ECHAR) of the General Hospital of Goiânia (GHG), protocol of CEPHA-HGG No. 73/2004. By the end of the study, no sample infant was diagnosed with sensory impairment (visual or auditory) or had a need for rehospitalization.

The infants were evaluated in the routine monthly consultations at the high risk outpatient clinic of the Maternal-Infant Hospital of Goiânia (GO), from 2004 to 2006. The evaluation was divided into four parts: the application of the anamnesis script, created by the researchers, which contained questions about the child's biological data, maternal data during gestation, birth information, and neonatal variables. Afterwards, participants were characterized according to the socioeconomic questionnaire, collected in an interview with the mother or guardian, which included questions about maternal education and family income. Soon after, the questionnaire of Economic Classification of the Brazilian Association of Research Companies was fulfilled<sup>(9)</sup>, which considers the family purchasing power and the education level of the head of household. At the end of the study, motor development was evaluated by the Alberta Infant Motor Scale (AIMS).

This scale was standardized by a sample of infants from the province of Alberta in Canada. It is composed of 58 items subdivided into postures: prone, supine, sitting and standing. It is used in the evaluation of the gross motor development of preterm or term infants<sup>(7)</sup>. It helps identify whether the preterm newborn is late in motor development when compared to term ones. It is among the most used scales in Brazil for measuring motor changes, is fast and easy to use, can be used from birth to 18 months<sup>(10)</sup>, and it has been validated for the Brazilian population<sup>(11)</sup>.

During the evaluation, the baby was placed in the prone, supine, sitting and standing postures, however, his movement was not facilitated by the examiner, and only toys could be used to stimulate his movements. The time of the instrument application had an average duration of 15 minutes. All the evaluation was applied by trained examiners, recorded through video for later analysis and assignment of the scores on a record sheet, and each pair of twins was evaluated on the same day. Analysis of the videotapes for each infant's AIMS score was performed by blind evaluators regarding information on the infant's patient records.

The infants' total score was placed on the percentiles curve of the scale, analyzed according to their corrected age (CA) and their motor development was then classified. The 10th percentile was recommended as the cutoff point with acceptable levels of specificity and sensitivity in the AIMS, with a percentile less than or equal to 10% were classified as

delayed, and those with a percentile greater than 10% were classified as normal<sup>(12)</sup>.

The data was organized into a Microsoft Excel® Software spreadsheet. Subsequently, they were transferred to a spreadsheet of the Statistical Package for Social Sciences - SPSS (version 22.0). Initially, the data distribution analysis was performed through the Kolmogorov-Smirnov Test. In the descriptive analysis, was calculated the average, standard deviation (SD), median, minimum and maximum values for continuous variables, and absolute and relative frequencies for the discreet variables. In the comparison analysis between groups the Student's T-Test was used for two independent samples. In cases where the variables were considered non-normal by the Kolmogorov-Smirnov Test, the Mann-Whitney U-Test was used for comparisons between the groups. The Chi-Square Test was used to compare TI and TII regarding the AIMS development classification and the classification as small or appropriate for gestational age, respectively, small for gestational age (SGA) and appropriate for gestational age (AGA). In the present study, the significance level of 5% ( $p \leq 0.05$ ) was adopted in all analyzes.

## RESULTS

The sample consisted of 38 twins (19 pairs) between 0 and 6 months. The number of infants in each of the age groups were: 8 newborns, 6 infants with 1 month, 6 with 2 months, 6 with 3 months, 4 with 4 months, 6 with 5 months and 4 with 6 months of age.

Table 1 shows the characterization of the biological and socioeconomic variables of the 38 twins. It is observed that, predominantly female, the majority of the infants were born with more than 1,500g and with an average of length of 43.9 cm, the Apgar Scale average in the 5th minute was 8.22, on average TI was 33 weeks, the infants' majority remained in the NICU on average for 6.29 days, and economic class D was the most common.

Table 2 shows the comparison of twins' pairs in relation to the neonatal variables, and it was observed that they do not differ in weight, length at birth, gestational age, Apgar and days of hospitalization, nor in the weight adequacy for gestational age, in other words, they present similar neonatal characteristics.

As shown in Table 3, there was no statistically significant difference when comparing the twin scores between the pairs (TI and TII) in any of the AIMS postures. The majority of the sample was described as normal (percentile > 10%), only 5 infants were classified as late.

## DISCUSSION

The motor development of twin preterm infants in the sample was similar to the reference values of the scale normative standard, with the majority of twins being classified as normal. A fact that may justify such a result is that

**Table 1.** Characterization of the sample studied and their mothers, from 2004 to 2006. Goiânia, GO, Brazil, 2017.

Characteristics	N / Average	% / Min-Max
Gender		
Male	11	28,9%
Female	27	71,1%
Birthweight (grams)*	1.720	1.225 - 2.340
Birthweight Categorization*		
Less than 1,500g	8	21,1%
Greater than or equal to 1,500g	29	76,3%
Length at birth (cm)	43,9	39 - 50
Apgar at the 5th minute		
Gestational Age (GA) (weeks)	33	30,6 - 35,7
Prematurity Categorization		
Less than 33 weeks	21	55,3%
Greater than or equal to 33 weeks	17	44,7%
NICU and/or HRNU** hospitalization		
Yes	27	71,1%
No	11	28,9%
Time of Hospitalization (NICU/HRNU)**	6,29	0 - 30
Delivery Type		
Normal	18	47,4%
Cesarean section	20	52,6%
Maternal Age	23,95	15 - 36
Maternal Education*		
From 1st to 4th grade		26,3%
From 5th to 8th grade		10,5%
High School	18	47,4%
Income***		
1 wage		26,3%
From 2 to 3 wages	16	42,1%
From 4 to 5 wages	6	15,8%
Socioeconomic Classification*		
C	10	26,3%
D	18	47,4%
E	4	10,5%

Source: survey data.

Note: \*One infant did not have weight collected and three pairs of twins did not have socioeconomic characterization and classification collected.

\*\*NICU: Neonatal Intensive Care Unit; HRNU: High Risk Neonatal Unit.

\*\*\*1 wage= R\$ 305,00.

**Table 2.** Comparison of twin preterm infants regarding neonatal variables, from 2004 to 2006. Goiânia, GO, Brazil, 2017.

Neonatal Variables	TI	TII	p
	Average	Average	
Weight	1.749	1.689	0,56
Length at birth	44,1	43,7	0,66
Gestational Age	33,0	33,0	0,83
Apgar at the 5th minute	8,4	8,0	0,30
Hospitalization Days*	5,9	6,7	0,77
SGA	2 (10,5%)	17 (89,5%)	0,59
AGA	3 (16,7%)	15 (83,3%)	

Source: survey data.

\*Note: Sum of hospitalization days in the NICU and HRNU.

**Table 3.** Comparison of AIMS scores of twin preterm infants between pairs, from 2004 to 2006. Goiânia, GO, Brazil, 2017.

Age Group	Twin Pair	Prone		Supine		Sitting		Standing		Total		Abnormal Develop. n (%)
		Average	p	Average	p	Average	p	Average	p	Average	p	
NB (n=08)	T I	1,50	0,50	2,25	0,19	0,75	1,00	1,25	1,00	5,75	0,87	0
	T II	1,75		1,75		0,75		1,25		5,00		1 (25%)
1 month (n=06)	T I	2,67	1,00	2,67	1,00	1,00	1,00	2,00	0,11	8,33	0,52	0
	T II	2,67		2,67		1,00		1,33		7,67		0
2 months (n=04)	T I	4,50	0,70	3,00	0,32	1,00	1,00	2,00	1,00	10,50	1,00	0
	T II	4,00		3,50		1,00		2,00		10,50		0
3 months (n=06)	T I	4,33	1,00	4,33	0,10	1,00	0,12	1,67	1,00	11,33	1,00	0
	T II	4,33		3,33		2,00		1,67		11,33		1 (33%)
4 months (n=04)	T I	5,00	0,29	4,50	0,70	1,50	0,54	2,00	1,00	13,00	1,00	1 (50%)
	T II	3,00		5,00		3,00		2,00		13,00		1 (50%)
5 months (n=06)	T I	7,33	0,41	7,33	0,21	7,00	0,69	2,67	0,11	24,33	0,20	0
	T II	6,00		5,67		6,33		2,00		20,00		1 (33%)
6 months (n=04)	T I	12,00	0,67	7,00	0,18	5,00	0,49	2,50	1,00	26,50	0,86	0
	T II	11,00		9,00		3,50		2,50		26,00		0

Source: survey data.

the sample consisted mostly of moderate preterm infants (31 to 36 weeks), with the minimum gestational age being 30.6 weeks, and also having followed the recommendation of a study to use corrected age for the infants' evaluation<sup>(13)</sup>.

No significant difference was found between the infants' development in the study when compared to twins in each pair (Twin I and Twin II), since they had similar biological and neonatal data. As in the study<sup>(14)</sup>, in which the twin pairs considered concordant, that is, with a 20% difference in relation to the birth weight, did not present differences in the cognitive evaluation, of language, nor in the fine and gross motor development.

Regarding the AIMS, caution is suggested in its use in the first 02 months and over 15 months, and it is recommended to use other instruments to complement it in these older ages, in order to make a motor development evaluation more reliable<sup>(15)</sup>. In a study<sup>(16)</sup>, the AIMS evaluation at 03 months was not able to predict gross motor development and walking skills at 15 months.

The motor development of preterm infants tends to be different and late in relation to term ones in the AIMS standardization sample. This was confirmed by a study<sup>(7)</sup>, that analyzed infants between 04 and 06 months, and premature infants presented delayed motor development in relation to term infants in the same age group. The present study found different results, since most of the preterm twins presented normal development.

Among the researches that evaluate the twins' development, in an behavior analysis of gross, delicate, adaptive, personal-social and triplet language, it was observed that they were behind in all these domains, however, the most affected in the three infants was the language<sup>(17)</sup>. The present study differed from these results, which may be justified because it is a triplet research, which increases the risk of delays' development.

There is an increased risk of death and neurodevelopmental disorders in twins, regardless of the prematurity and birthweight influence<sup>(6)</sup>. On the other hand, in another study<sup>(18)</sup>, the twin premature infants group performed similarly to preterm infants of a single gestation, demonstrating in this study that prematurity and not twinning were a factor that influence the global motor and motor performance.

In this same study<sup>(18)</sup>, it was not observed a significant difference between the first and second twins, even comparing the twins pairs, between the one with the smaller and greater weight, that is, the weight had no influence on a better or worse tests performance. This result was similar to that found in the present study, in which there was no statistically significant difference when comparing the scores between the pairs and in which the biological variables, among them, the weight that had no influence on the superior or inferior development between the twins.

At such a young age (0 to 6 months), there is no difference in gross motor development between the pair of twin infants born preterm. However, the follow-up importance of preterm infants up to the initial years of schooling is reinforced, since it constitutes a risk group for delayed development<sup>(18)</sup>.

Longitudinal follow-up is also important because differences in motor development between twins may arise only over the years. As presented in a study<sup>(19)</sup>, that analyzed the motor development of twins through parent reports, with intrapairs comparisons, developmental differences between twins were observed only around 11, 12 and 16 years. In another study<sup>(14)</sup>, it was confirmed that the neurological development of the lower birthweight twin was lower than its heaviest pair, only at about 2 to 3.5 years of age.

It was verified in the present study that the AIMS is an easy application scale, low cost, good validity and reliability, and it is an instrument that can be used both to follow the motor development of infants, as for researches<sup>(20)</sup>. The use of this scale in Brazil has intensified, and its validation, adopting national references<sup>(11-15)</sup>, being extremely important to increase the scientific relevance of the studies that use it. However, AIMS has some limitations, such as its low specificity at the older ages<sup>(15)</sup> and its limited ability to predict motor development at more advanced ages<sup>(16)</sup>.

The current study reinforces the need for an integrated follow-up of the team that serves mothers and premature infants, aiming to the family well-being and infants' growth and development monitoring. In the impossibility of minimizing the number of preterm births, it is important that the team be prepared to understand and intervene by neutralizing risk factors through preventive measures, and early health detection and preterm infant development<sup>(21)</sup>.

This study has limitations on sample size and design. Therefore, it is recommended to carry out longitudinal follow-up studies to verify if there are differences between the twins over a long period or if they continue to present similar motor development. It is suggested that research be done to identify whether motor development in this group is more negatively influenced by preterm birth or twin birth.

## CONCLUSION

The preterm twins motor development was similar to the reference values of the scale normative standard, and there were no differences between the twins according to the birth order. It is important to follow the development of infant twins, especially when there is an association with prematurity, since both are a risk factor for the infant's growth and development. In this way, it is possible to identify delays and make early interventions, when necessary.

## REFERENCES

- Miranda LP, Resegue R, Figueiras ACM. Children and adolescents with developmental disabilities in the pediatric outpatient clinic. *J Pediatr*. [Internet]. 2003 [access in 2017 Nov 13]; 79(suppl.1):33-42. Available in: [http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S0021-75572003000700005](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0021-75572003000700005).
- Martin JA, Hamilton BE, Osterman MJ. Three decades of twin births in the United States, 1980-2009. *NCHS Data Brief* [Internet]. 2012 [access in 2017 Nov 13]; (80):1-8. Available in: <https://www.ncbi.nlm.nih.gov/pubmed/22617378>.
- Laopaiboon M, Lumbiganon P, Intarut N, Mori R, Ganchimeg T, Vogel JP, et al. Advanced maternal age and pregnancy outcomes: a multicountry assessment. *BJOG* [Internet]. 2014 [access in 2017 Nov 13]; 121 (Suppl 1):49-56. Available in: <https://www.ncbi.nlm.nih.gov/pubmed/24641535>.
- Ministry of Health. Datasus. Information on live births - type of pregnancy in Brazil in 2013 and 2015. [Internet]. 2015 [access in 2017 Nov 09]. Available in: <http://tabnet.datasus.gov.br/cgi/tabcgi.exe?sinasc/cnv/nvuf.def>.
- Dinis SR, Domingues AP, Belo A, Couto D, Fonseca E, Moura P. Do induced twin pregnancies influence the obstetric and neonatal results of multiple births born before 32 weeks? Comparison to spontaneous gestation. *Rev Bras Ginecol Obstet* [Internet]. 2015 [access in 2017 Nov 13]; 37(5):216-21. Available in: <https://www.ncbi.nlm.nih.gov/pubmed/26107572>.
- Wadhawan R, Oh W, Perritt RL, McDonald SA, Das A, Poole WK, et al. Twin gestation and neurodevelopmental outcome in extremely low birth weight infants. *Pediatrics* [Internet]. 2009 [access in 2017 Nov 13]; 123(2):220-7. Available in: <https://www.ncbi.nlm.nih.gov/pubmed/19139085>.
- Maia PC, Silva LP, Oliveira MMC, Cardoso MVLML. Motor development of premature and full-term children: use of the Alberta Infant Motor Scale. *Acta paul. enferm.* [Internet]. 2011 [access in 2017 Nov 13]; 24(5):670-5. Available in: [http://www.scielo.br/scielo.php?pid=S0103-21002011000500012&script=sci\\_abstract&tlng=pt](http://www.scielo.br/scielo.php?pid=S0103-21002011000500012&script=sci_abstract&tlng=pt).
- Coelho PBÁ. Determinants of perinatal morbidity and mortality in twin pregnancy [Thesis]. Rio de Janeiro: Oswaldo Cruz Foundation - Fernandes Figueira Institute [Internet]. 2011 [access in 2017 Nov 13]. Available in: <https://www.arca.fiocruz.br/handle/icict/8033>.
- Brazilian Association of Economic Research (ABEP). Economic Classification Criteria Brazil 2003. [Internet]. 2003 [access 2017 Nov 10]. Available in: <http://www.abep.org/criterio-brasil>.
- Herrero D, Gonçalves H, Siqueira AAF, Abreu LC. Escalas de desenvolvimento motor em lactentes: test of infant motor performance e a alberta infant motor scale. *Rev. bras. crescimento desenvolv. hum.* [Internet]. 2011 [access 2017 Nov 13]; 21(1):122-32. Available in: [http://pepsic.bvsalud.org/scielo.php?script=sci\\_arttext&pid=S0104-12822011000100012](http://pepsic.bvsalud.org/scielo.php?script=sci_arttext&pid=S0104-12822011000100012).
- Valentini NC, Sacconi R. Brazilian validation of the Alberta Infant Motor Scale. *Phys Ther* [Internet]. 2012 [access 2017 Nov 13]; 92(3):440-7. Available in: <https://www.ncbi.nlm.nih.gov/pubmed/22135706>.
- Darrah J, Piper M, Watt MJ. Assessment of gross motor skills of at-risk infants: predictive validity of the Alberta Infant Motor Scale. *Dev Med Child Neurol* [Internet]. 1998 [access 2017 Nov 13]; 40(7):485-91. Available in: <https://www.ncbi.nlm.nih.gov/pubmed/9698062>.
- Formiga CKMR, Vieira MEB, Linhares MBM. Developmental assessment of infants born preterm: comparison between the chronological and corrected ages. *Rev. bras. crescimento desenvolv. hum.* [Internet]. 2015 [access 2017 Nov 13]; 25(2):230-6. Available in: [http://pepsic.bvsalud.org/scielo.php?pid=S0104-12822015000200015&script=sci\\_abstract&tlng=en](http://pepsic.bvsalud.org/scielo.php?pid=S0104-12822015000200015&script=sci_abstract&tlng=en).
- Halling C, Malone FD, Breathnach FM, Stewart MC, McAuliffe FM, Morrison JJ, et al. Neuro-developmental outcome of a large cohort of growth discordant twins. *Eur J Pediatr* [Internet]. 2016 [access 2017 Nov 13]; 175(3):381-9. Available in: <https://www.ncbi.nlm.nih.gov/pubmed/26490567>.
- Sacconi R, Valentini NC. Reference curves for the Brazilian Alberta Infant Motor Scale: percentiles for clinical description and follow-up over time. *J Pediatr* [Internet]. 2012 [access in 2017 Nov 13]; 88(1):40-7. Available in: <https://www.ncbi.nlm.nih.gov/pubmed/22057554>.

16. Nuysink J, van Haastert IC, Eijssermans MJ, Koopman-Esseboom C, Helders PJ, Vries LS, et al. Prediction of gross motor development and independent walking in infants born very preterm using the Test of Infant Motor Performance and the Alberta Infant Motor Scale. *Early Hum Dev* [Internet]. 2013 [access in 2017 Nov 13]; 89(9):693-7. Available in: <https://www.ncbi.nlm.nih.gov/pubmed/23712056>.
17. Ferreira AT, Silva MMAd, Silva L, Merighi LBM, Miranda AM, De-Vitto LPM, et al. Communicative performance in preterm triplets. *Rev. CEFAC* [Internet]. 2008 [access in 2017 Nov 13]; 10(1):15-21. Available in: [http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S1516-18462008000100003](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1516-18462008000100003).
18. Pinheiro RC, Gagliardo HGRG, Martinez CMS, Santos JLF, Barba PCSD. Comparative study of the motor and motor performance of preterm twins at school age. *REFACS* [Internet]. 2015 [access in 2017 Nov 13]; 3(Supl 1):126-33. Available in: <http://seer.uftm.edu.br/revistaeletronica/index.php/refacs/article/view/1093>.
19. Aaltonen S, Latvala A, Rose RJ, Pulkkinen L, Kujala UM, Kaprio J, et al. Motor Development and Physical Activity: A Longitudinal Discordant Twin-Pair Study. *Med Sci Sports Exerc* [Internet]. 2015 [access in 2017 Nov 13]; 47(10):2111-8. Available in: <https://www.ncbi.nlm.nih.gov/pubmed/26378945>.
20. Almeida KM, Dutra MVP, Mello RR, Reis ABR, Martins PS. Concurrent validity and reliability of the Alberta Infant Motor Scale in premature infants. *J Pediatr (Rio J)* [Internet]. 2008 [access in 2017 Nov 13]; 84(5):442-8. Available in: <https://www.ncbi.nlm.nih.gov/pubmed/18923790>.
21. Teixeira GA, Carvalho JBL, Sena AV, Morais PC, Alves TRM. Maternal characteristics of preterm birth. *Rev Enferm Atual* [Internet] 2017 [access in 2017 Nov 27]; 81(19):19-23. Available in: [http://revistaenfermagematual.com.br/revistas/revista\\_19-02.pdf](http://revistaenfermagematual.com.br/revistas/revista_19-02.pdf).