

MOTOR EFFECTS OF KANGAROO POSITION: ELECTROMYOGRAPHIC DIFFERENCES BETWEEN PRONE AND LATERAL DECUBITUS

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BACKGROUND

The kangaroo position is the main feature of Kangaroo Care and can be performed in two ways: prone or lateral decubitus (Figure 1). Since these decubitus, each one is associated to a particular muscle organization they could exert different motor influence on the child¹.

Some studies^{2,3} showed that premature infants when are placed in the kangaroo position show an increased electromyographic activity of flexor muscles, but the evaluations were only performed with the kangaroo position in prone decubitus.

However, by using neurobehavioral evaluation it was shown a better motor flexor response when the child was placed on lateral decubitus⁴.



Figure 1. Kangaroo position in prone (A) and lateral decubitus (B).

Source: Barradas J, Fonseca A, Guimarães CL, Lima GM. Relationship between positioning of premature infants in Kangaroo Mother Care and early neuromotor development. *J Pediatr (Rio J)*. 2006; 82:475-80.

OBJECTIVE

To test the hypothesis of different muscle responses between preterm newborns submitted to Kangaroo Position on prone or lateral decubitus.

METHODS

A randomized clinical trial was conducted at the Instituto de Medicina Integral Prof. Fernando Figueira (IMIP) in Recife, Brasil, evaluating the electromyography activity of biceps brachii and hamstring muscles of preterm newborns submitted to Kangaroo Position in prone decubitus (PDG) (n=29) or lateral decubitus (LDG) (n=30), during four moments: initial (before Kangaroo Position), after one week, at discharge and in the term equivalent age (TEA). The kangaroo position was carried out during 8 – 12 hours per day. The electromyographic activity was evaluated through of surface electromyography (EMGs). For analyses, the electromyographic signal was transformed in Root Mean Square (RMS). Linear Mixed Model was used for statistical analysis.

RESULTS

On both PDG and LDG it was observed a similar increase of electromyographic activity until the 1st week, at biceps brachii and hamstring muscles as well. However, from the 1st week until TEA a different electromyography behavior between the two decubitus was found. The LDG shown better performance an than PDG (Figure 2 and 3).

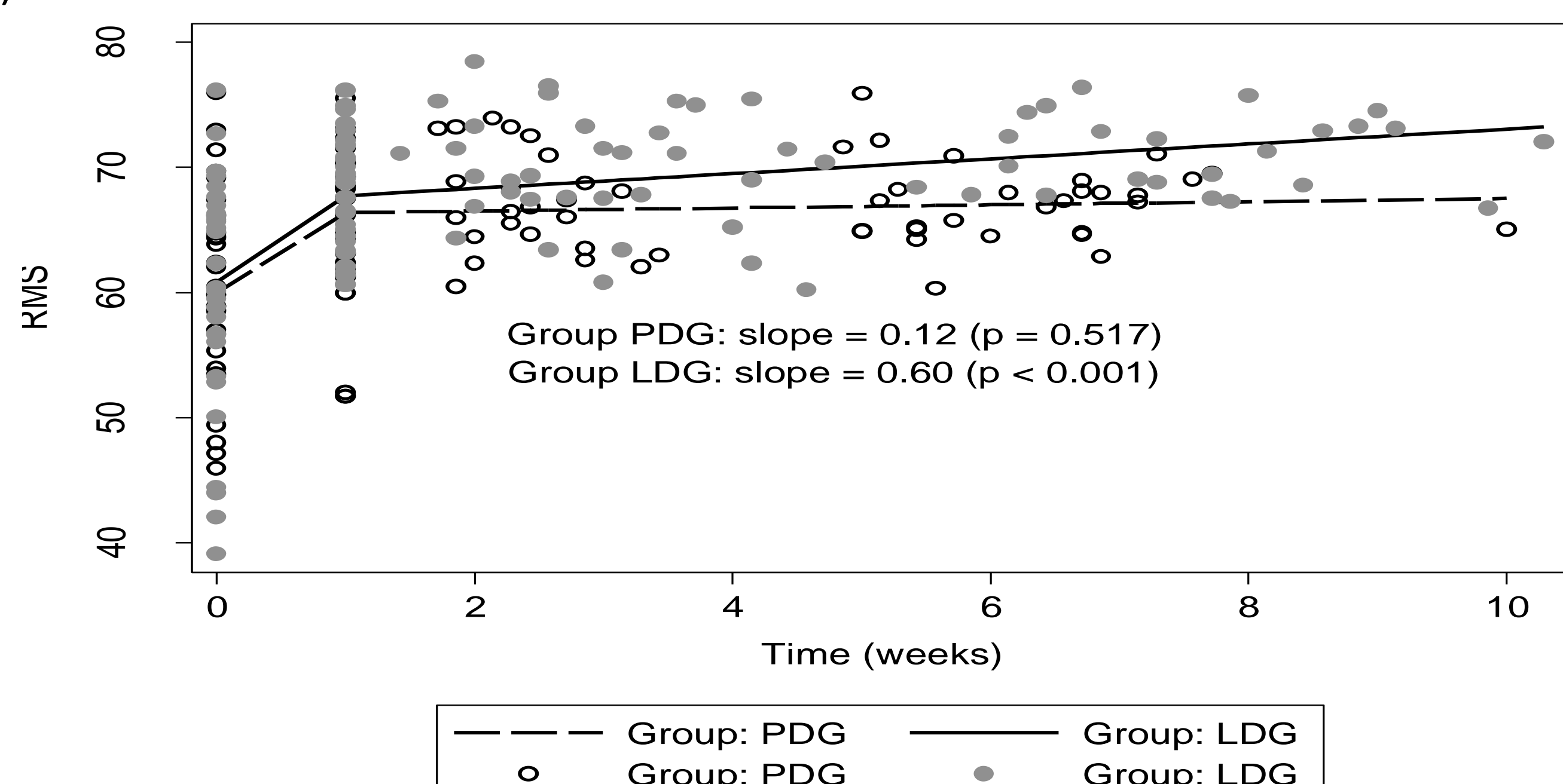


Fig 2.: Electromyographic activity of the brachial biceps muscle of preterm newborns placed in kangaroo position on prone and lateral decubitus.

RMS: Root Mean Square (RMS) normalized; PDG: Prone Decubitus Group; LDG: Lateral Decubitus Group. Data were analyzed by linear mixed model

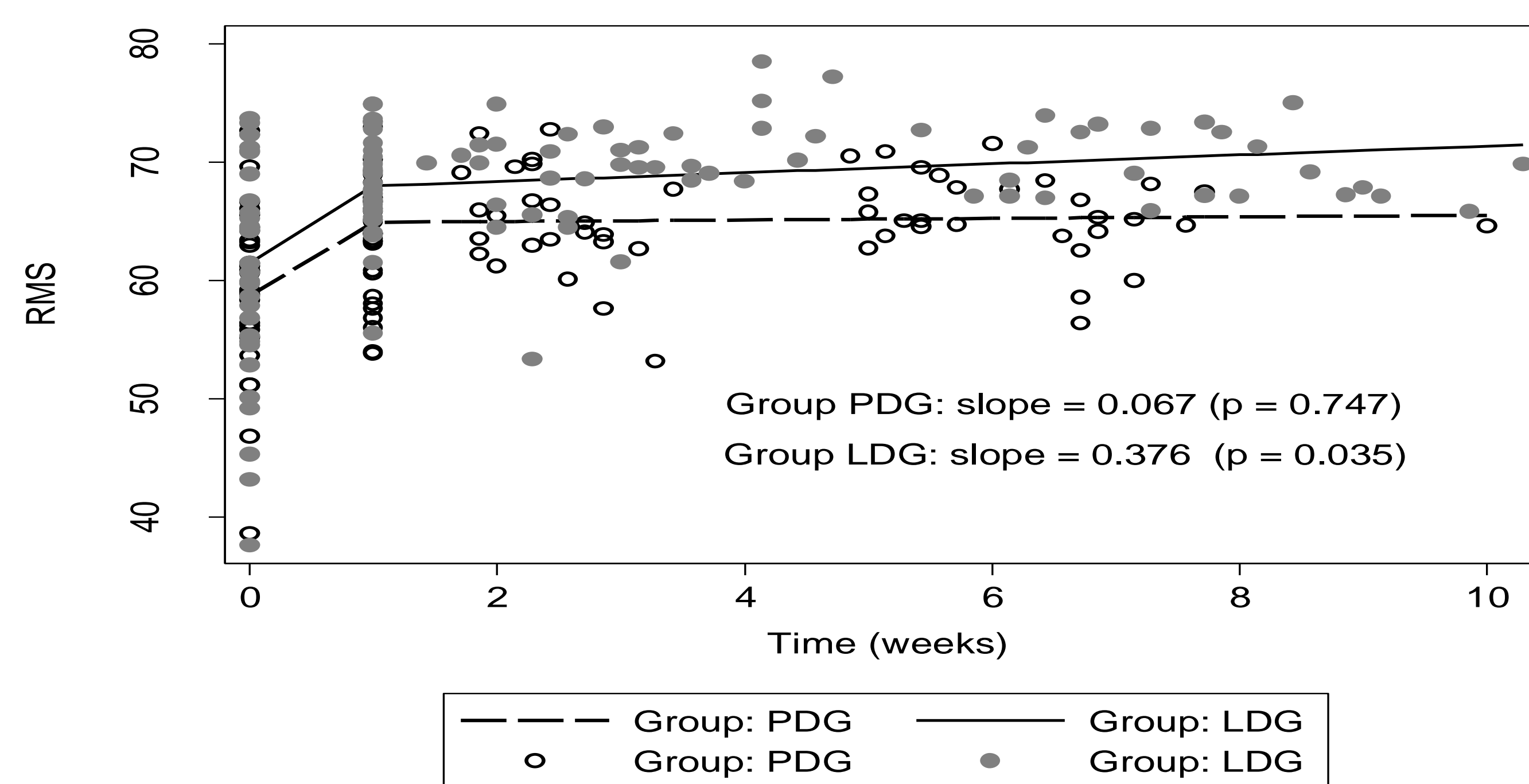


Fig 3.: Electromyographic activity of the hamstring muscles of preterm newborns placed in kangaroo position on prone and lateral decubitus.

RMS: Root Mean Square (RMS) normalized; PDG: Prone Decubitus Group; LDG: Lateral Decubitus Group. Data were analyzed by linear mixed model.

DISCUSSION

An increased electromyographic activity for the brachial biceps as for hamstring muscles was observed in both decubitus, but this increase was more intense in the lateral than in prone decubitus. Other studies had already observed increased electromyographic activity in newborns submitted to kangaroo position in prone position, but not studied in lateral decubitus^{2,3}. To our knowledge until now, only one research⁴ investigated muscle responses of children placed in the lateral decubitus during kangaroo position. That study found that the babies, in lateral position, produced a better biomechanical response than babies put in prone decubitus. Our study added new information about these previous findings since it shows a change in muscle physiological behavior that may justify, in turn, a change of biomechanical behavior.

CONCLUSION

The originality of this study must be emphasized, since, for the first time a study compared the effect of the lateral and ventral decubitus during kangaroo position specifically in the physiological muscular response. The increase of electromyographic activity in both groups but being even more important in newborns submitted to lateral decubitus provide evidence that the kangaroo position in the lateral decubitus can also be a way to stimulate muscles that are very important for motor development of the newborn.

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