

Social-educational evolution of crawling

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ABSTRACT

GOMEZ F, D'ANNA C, AGRILLO F. Social-educational evolution of crawling. *J. Hum. Sport Exerc.* Vol. 8, No. Proc2, pp. S180-S191, 2013. For an adult who observes, a crawling baby is a tender and fun image, even though it's not possible to imagine what can be hidden behind this movement. There are lot of thoughts on it, for example the idea that crawling is easier than walking alone and so children prefer it as it is their first physical movement. In spite of this we considerer that crawling is a motor sequence which is neither simple or immediate, especially for a baby whose average crawling age is eight months. The interest on this issue comes out from the question "crawling or not crawling?", which is a frequent question of parents with children who are about to walk. Many children don't crawl and their parents wonder about what is the right path for a correct psycho-physical development. The aim of this work is to think about the value of crawling during the psycho-motor development of a person. A qualitative research has been carried out to show the changes and the evolution of this motor action from the parents'childhood period to that of their children in the same sample group. Thirty couples of parents, whose children attended the same nursery, have been analysed through a questionnaire made of 45 questions anonymously given out. The same information received about the parents and their children give us the possibility to compare the two generations. The research has allowed us to reflect on the typical motor action from all points of view: the amounts of crawling within the reference group; the changes regarding the average age when this movement starts developing; the influence by early childhood tools, for example the use of the playpen and the walker, frequently used by many parents today. The data obtained gives us some points of reflection, but it also puts in evidence the different ways of movement, the different development of human beings and the many developments that are possible in a child. The subjectivity that characterises the psycho-motor development puts in a difficult position the traditional approach and the stereotyped idea of fixed phases. It's important to underline that apart from the neurological development of the child, there can also be psycho-motor, mechanical and environmental factors, for example their previous experiences, motivations, external stimulations and various other aspects that can change from person to person. **Key words:** CHILDHOOD, CRAWLING, MOTOR ACTIVITY, PSYCHO-MOTOR DEVELOPMENT, PARENTS, CHILDREN, ENVIRONMENT.

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INTRODUCTION

For an adult who observes, a crawling baby is a tender and fun image, even though it's not possible to imagine what can be hidden behind this movement. There are a lot of thoughts on it, for example the idea that crawling is easier than walking alone and so children prefer it as it is their first physical movement. In spite of this we consider that crawling is a motor sequence which is neither simple nor immediate (De Negri, 1999), especially for a baby whose average crawling age is eight months. The interest on this issue comes out from the question "crawling or not crawling?" which is a frequent question of parents with children who are about to walk. Many children don't crawl and their parents wonder about what is the right path for a correct psycho-physical development.

Crawling falls within the study on the motor development which, around 1940, had been interpreted with enthusiasm by the classical Physiology, or rather, the neuromaturational theory, as the gradual unfolding of predetermined schemes in the central nervous system, in particular those of the cerebral cortex. Arnold Gesell, starting from this conception, gives experience very limited influence on motor development; in fact, he has been the biggest supporter of the neuromaturational perspective which is based on the idea that the biological maturation is the origin of all the abilities that appear with the progress of age by establishing the biological importance and that of the genetic heritage in determining the general development schemes. Gesell affirms that this development occurs independently of the practice and the exercises (Gesell, 1959).

At the end of 1960, the motor development theory had been re-analyzed by the cognitivism, with new theoretical tools, which concentrates on the active subject who act in the world not for his/her stimuli and learning, but thanks to the development of his/her mental skills. This theory is based on the assumption that the human mind works like an information processor received by the sense organs.

According to this view, the interaction with the environment and the meaning of this interaction, are essential elements for the development of the child's motor skills.

Over the past twenty years, the study on the motor development has been characterized by the affirmation two theories: the ecological approach and theory of the dynamical systems.

The two theories assume that even though all humans share common basic conditions (geographic or cultural environment) from which come many universal behaviors (sitting down, crawling, walking), the situations in which these behaviors occur are different and change from child to child.

It is worth pointing out that some children skip the period of "crawling", they learn to walk by skipping this step. However, they achieve optimal results in the subsequent stages of the cognitive and motor development. Wenda Trevathan (2009) of New Mexico State University, on the basis of her researches, claims that the stage of crawling is a recent invention, more precisely of the last two centuries, i.e. that when the hygienic conditions, especially of the industrialized West, have improved enough to give security to mothers in placing children on the ground more often and longer.

A study carried out in Ireland by researchers of the Mater Hospital in Dublin and published in the British Medical Journal in 2002, came to the conclusion that "the baby walker slows the normal locomotor development of children and its use should not be recommended" (Garrett, 2002).

Also Siegel and Burton analyzed the motor development delays due to the use of the baby walker, children who had used it would sit down, crawl and walk later than children who would not make use of it (Siegel, 1999).

Interesting are the conclusions reached by Crouchman who carried out a study based on the influence that the amount of time spent in the baby walker could have on the progress of certain stages of motor development. Therefore, these results suggest that an excessive or prolonged use over time of this tool can alter the normal motor development (Crouchman, 1986).

A first example is provided by the American researchers Glenn Doman and Karl Delacato who, in their theoretical paradigm, trace an outline of the development of neurological functions stage by stage. Each stage is marked by a specific range of motion allowed by the maturation and organization level of the nervous system, whose omission or hindrance causes delays or functional neuro-developmental abnormalities. Among the listed movement patterns, crawling represents the third stage of the development hierarchy, at around the 10th month of life when the midbrain, which mainly contains neurons involved in the sensory systems and the control of the motion, achieves the highest level of its functions. Doman and Delacato consider crawling a milestone for the establishment of the bilateral function, whose consolidation will introduce the child to the standing position and, subsequently, to the emergence of the dominance of the cortical hemisphere (Doman, 2009).

The opinions are divided. In fact, there are two opposite groups about the value that this movement would have within the process of motor development: some researchers believe that it is not just an important milestone for a correct development, but it's also a fundamental experience allowing the human being to independently experience the world surrounding him/her for the first time and internalize those concepts of spatiality that until then were entirely theoretical. However, crawling represents the first articulated and global movement of the child who, in addition to establishing the synergy of various bodily, musculoskeletal, vestibular and proprioception systems, makes it an active explorer of the space and objects, by enhancing a process of multi-sensory knowledge.

The aim of this work is to think about the value of crawling during the psycho-motor development of a person. A qualitative research has been carried out to show the changes and the evolution of this motor action from the parents' childhood period to that of their children in the same sample group.

The research has allowed us to reflect on the typical motor action from all points of view: the amounts of crawling, at what age this action appears and if the children have received stimulus to do it. We have wanted to investigate the possible influence of some tools like the baby walker and the playpen that most parents use to entertain the child during the acquisition of crawling.

MATERIAL AND METHODS

The sample

The survey has involved 30 couples of parents whose children attended the same nursery. Such choice is fundamental since the children carry out the same activities during the day.

The tool

The tool used for the information reception about crawling has been the questionnaire. It has been administered during an afternoon school-parents meeting. It was made of 45 questions and it was divided

in three sections: the first concerned the child, the second concerned the mother and the last concerned the father. The aim has been to analyze both the motor habits of the children during crawling and those of their parents during their childhood.

Asking the same questions about both the parents and the children has allowed us to make comparisons between the two generations (Appendix a, b, c).

RESULTS

We have decided to show the results in a pie chart since they can be easily understood and it's immediately possible to perceive, on the basis of the colors and percentages, the comparison between the answers that they have given. The following charts concern the first section of the questionnaire: the questions about the children.

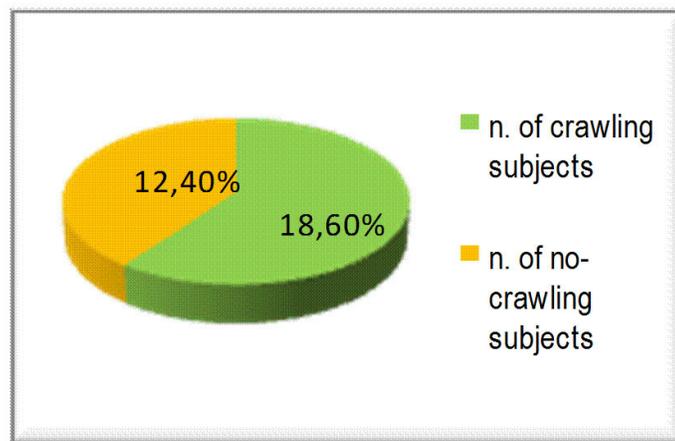


Figure 1. Who crawls and who doesn't crawl.

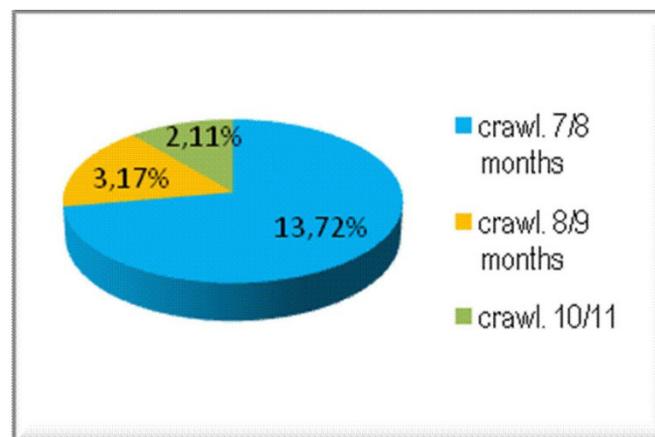


Figure 2. Manifestation of the period of crawling.

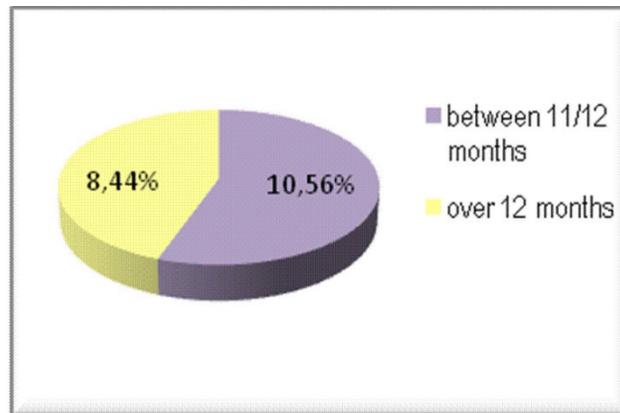


Figure 3. Achieve independent walking.

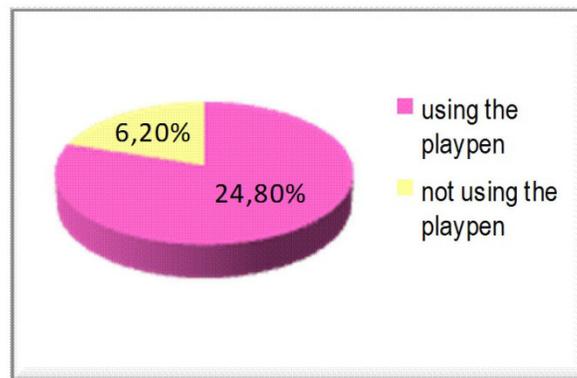


Figure 4. Use of the playpen.

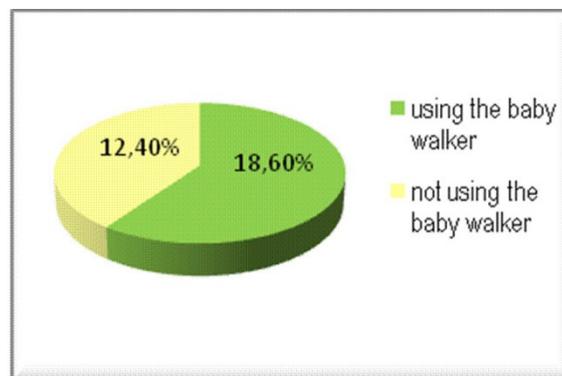


Figure 5. Use of the baby walker.

DISCUSSION AND CONCLUSIONS

The data obtained from the questionnaire, which have been collected and elaborated, show that within the sample there is a majority of male children (more exactly 21 children) and just 9 female children, all aged from two years to three years. Leaving aside the gender and analyzing the entire group, it results obvious that a 60% of the children have automatically and naturally gone through the stage of crawling and another 40% has started moving autonomously directly through the walking (Figure 1). More in particular, within a 40% of not-crawling children, just half of them have been encouraged to acquire the habit of crawling by resisting, however, to the solicitations.

The other half, however, has not received any support or encouragement for the development of this movement. The percentage of children who used to crawl between seven and eight months amounts a 72%. Another 28% is homogeneously concentrated between eight and nine months and ten and eleven months. Thus it's possible to affirm that no child used to crawl after eleven months (Figure 2). A 56% of crawling children has done it for over two months and from the data comparison, although it's just a very small percentage (a 33%), this seems to have postponed the achievement of the standing position and the acquisition of the independent walking if compared to children who used to crawl for a shorter time (Figure 3). But on the other hand, a data that must be kept in mind is that among those who used to crawl (18 children) only one child has exceeded the fourteenth month of life to reach the autonomous walking while, among the children who have completely skipped this step (12 children), three of them have gained the locomotor independence after the fourteenth month of life.

The most impressive information seems to be that concerning the percentage of crawling children, for a short or a long period, who have reached the independent walking between eleven and twelve months and that represents a 56% (Figure 3). However, it must be pointed out that in the group of not-crawling children, less than a half of them (42%) seem to have achieved an autonomous walking among eleven and twelve months. This could mean that crawling, although it was used as a moving strategy for over two months, influence significantly less on the age of the achievement of an independent walking if compared to its total absence.

For what concerns the use of the baby walker and the playpen, from the questionnaires it has emerged a wider use of the playpens than the baby walkers. The use of the playpen is around a 80% while that of the baby walker is around a 60%; probably this result depends on the campaign against the use of the baby walkers that many pediatricians have pursued for several years (Figure 4 and 5). The data show that the playpen is introduced into the everyday lives of children between six and eight months, in almost all cases it gets used until the child reaches a full autonomy in the independent walking and it emerges that the time the baby spends inside of it is higher than the hour spent by the half of children who have used it. A characteristic shared by the two objects concerns the age group in which the children come in contact with them; in fact, for what concerns the baby walker too, a 83% of children have used it between six to eight months and only a small percentage has done it later between nine and ten months. A significant difference emerges in the amount of time that the baby walker is used in relation to the playpen: in most cases the child is left free to move or stand inside of it for no more than half an hour a day. As for the playpen, even the baby walker is still being used, on average, until the child starts walking alone.

The interest in the rates of use of these tools allows to understand how and if the introduction of the baby walkers and playpens in the life of the child influence the development of the quadrupedal movement.

The initial assumption is that, by limiting in different ways the child's freedom of movement, they may contribute to affect the natural development by slowing, accelerating or even inhibiting some processes of motor development.

Children who have used the baby walker are eighteen and they represent a 60% of the sample: they are divided between those who used to crawl and those who did not use to do it. One of the information that stand out is exactly the latter concerning the percentage of children who has used the baby walker but that has not gone through the stage of crawling: assuming that the total of number of not-crawling children is twelve, this information is equivalent to a 75% of it. Another data that is similar to the former is the one concerning the percentage of not-crawling children who has used both the baby walker and the playpen that represents a 58% of the total of those who did not use to crawl.

For what concerns the use of the playpen, those who used to crawl in spite of its use are 14 and they represent a 78% of all the crawling children.

The administered questionnaire consists also of two sections of questions, one related to the mother and the other to the father of the child. The objective of this decision is to investigate, as far as possible, the evolution of crawling from one generation to the other by highlighting both the common aspects and the differences in parents' motor aptitudes. In the sections regarding the parents, unfortunately, there have been many unanswered questions maybe because of the nature of the requested information.

In the question concerning the stage of crawling there has been a good amount of responses from which it has been possible to verify that a 57% of the group of the mothers has gone through the stage of crawling, while in the group of the fathers a 56% has done so.

These data, when compared with those of children, reveal a 60% prevailing increase, even if minimal, of the manifestation of crawling. This could depend on the improvement of sanitary-hygienic conditions of today that allow parents to leave their children on the floor much more easily than in the past or it could arise from the considerable difference of the use of objects for young children as the baby walker and the playpen.

The baby walker has been used both by mothers and fathers in about half the cases, while just a 43% has used the playpen. Unfortunately, in the questions concerning the continuing use of these objects and the amount of time spent for their use, there has not been sufficient information allowing an elaboration.

In conclusion the aim of this issue has been to achieve a deeper knowledge of crawling as an important stage of children's development but that is less and less discussed.

The sample of this study is numerically limited and the analysis of the habits of parents and their children is only one part of this motor action.

We can state that for a better investigation it could be better to extend the research to a wider group. It could be interesting to investigate, through a longitudinal study, the influence of the duration and frequency of crawling on the motor development and the acquisition of new motor skills. Anyway, we can state that

crawling represents an important opportunity for the growth of a child described from many points of view. We can start from the physical point of view, in fact it allows the development of legs and arms muscles and so the child can experiment the balance and the coordination, which are essential for the control of the standing and of the walking. We have stressed its value because it is an alternation crossing movement that calls the development of the callused body and allows a continuous exchange of information between the two hemispheres of the brain. Secondly, but no less important, we have traced the aspects of the of mental development: during crawling, the child can experiment the concepts of space and proportion reaching a greater awareness of his body, practicing new movements and leading new stimulations to the body schema. At the end we have analysed the psychological effects of crawling: for the first time the child gains motor independence, which is also the first independence from the adult, he/she becomes able to make a choice, both for movements and in affective manifestations. The child experiments the freedom and he/she feels free to explore the spaces by dominating it and understanding the world surrounding him/her. This confidence will help him/him in the moment of the independent walking. Crawling has been intentionally defined as an "important opportunity of growth ", with this definition we want to state that it is not a "must" for the psychomotor development of the child. It is certainly useful and functional for the correct development but it's not essential, so the lack of crawling doesn't mean pathologies or development retardation. When we talk about human development we have to respect the molars of every person's individuality.

All children have their own time, growing modality and terms of relationship with the outside world and the adults have to respect them. This progression changes from child to child as they use many different strategies to conquest their motor abilities in different ways and time from each other. Each child has his/her rhythm of development and chooses his/her style of movement and learning, each time fitting for him/her.

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APPENDIX A. The tool (P1).

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Questionnaire about the child

- 1) What is his gender?
 male female
- 2) How old is he?
 less than 1 2 years 3 years
- 3) When did he start walking?
 11-12 months 13-14 months more than 14 months
- 4) Before you walk did he crawl?
 yes no
- 5) If yes, how old was when he started?
 7-8 months 8-9 months 10-11 months 12 months
- 6) How long did he crawl?
 less than a month 1-2 months more than 2 months
- 7) If you said no to the question No. 4, did you induced him to do?
 yes no
- 8) Have you ever used the walker?
 yes no
- 9) If yes, how old was when he started?
 5-7 months 7-8 months 9-10 months
- 10) How long did he use it for?
 1 month 2 months 3 months until it has walked
- 11) How many hours did he spend in the walker a day?
 few minutes half an hour more than an hour
- 12) Have you ever used the box?
 yes no
- 13) If yes, how old was when he started?
 6-7 months 7-8 months 9-10 months
- 14) How long did he use it for?
 1 month 2 months 3 months until it has walked
- 15) How much time per day spent in the whole box?
 few minutes half an hour more than an hour

APPENDIX B. The tool (P2).

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Questionnaire about Mom

(only If she has the information)

- 1) How old are you?
 less than 30 between 30 and 40 more than 40
- 2) When did you start walking?
 11-12 months 13-14 months more than 14 months
- 3) Before walking did you crawl?
 yes no
- 4) If yes, how old were you when you started??
 7-8 months 8-9 months 10-11 months 12 months
- 5) How long did you crawl?
 less than a month 1-2 months more than 2 months
- 6) If you've said no to the question No. 4, have you ever been encouraged to the crawling?
 yes no
- 7) Have you ever used the walker?
 yes no
- 8) If yes, how old were you when you start?
 6-7 months 7-8 months 9-10 months
- 9) How long did you use it for?
 1 month 2 months 3 months until the walking
- 10) How much time did you spent in the walker a day?
 few minutes half an hour more than an hour
- 11) Have you ever used the box?
 yes no
- 12) If yes, how old were when you start to use it?
 6-7 months 7-8 months 9-10 months
- 13) How long did you use it for?
 1 month 2 months 3 months until the walking
- 14) How much time did you spent in the whole box a day?
 few minutes half an hour more than an hour

APPENDIX C. The tool (P3).

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Questionnaire about dad

- 1) How old are you?
 less than 30 between 30 and 40 more than 40
- 2) When did you start walking?
 11-12 months 13-14 months more than 14 months
- 3) Before walking did you crawl?
 yes no
- 4) If yes, how old were you when you started??
 7-8 months 8-9 months 10-11 months 12 months
- 5) How long did you crawl?
 less than a month 1-2 months more than 2 months
- 6) If you've said no to the question No. 4, have you ever been encouraged to the crawling?
 yes no
- 7) Have you ever used the walker?
 yes no
- 8) If yes, how old were you when you start?
 6-7 months 7-8 months 9-10 months
- 9) How long did you use it for?
 1 month 2 months 3 months until the walking
- 10) How much time did you spent in the walker a day?
 few minutes half an hour more than an hour
- 11) Have you ever used the box?
 yes no
- 12) If yes, how old were you when you start to use it?
 6-7 months 7-8 months 9-10 months
- 13) How long did you use it for?
 1 month 2 months 3 months until the walking
- 14) How much time did you spent in the whole box a day?
 few minutes half an hour more than an hour