



MALMÖ HÖGSKOLA

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Most parents tend to remember, vividly, the first movements of the child – lifting its head, rolling over on the back, managing to sit up, crawling a few meters, standing up, and eventually, true to the spirit of Homo Erectus, taking the first few steps into its very own existence? Anyway, regardless of the fundamental purpose of this genetically coded development, it is obvious that motor activity and motor development is intrinsic to human development and physical capability in a lifelong perspective. And, following that insight, it becomes as obvious that any defect in the human motor function is a potential handicap, a disability that becomes an uninvited companion throughout the life cycle. Jan P. Piek has published a comprehensive study of the motor development of infants, *Infant Motor Development* (Human Kinetics). We asked the Swedish expert on motor and intellectual development, Ingegerd Ericsson, for a review, and she is enthusiastic and impressed by Piek's effort.

Worth Knowing About Motor Development

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Infant Motor Development

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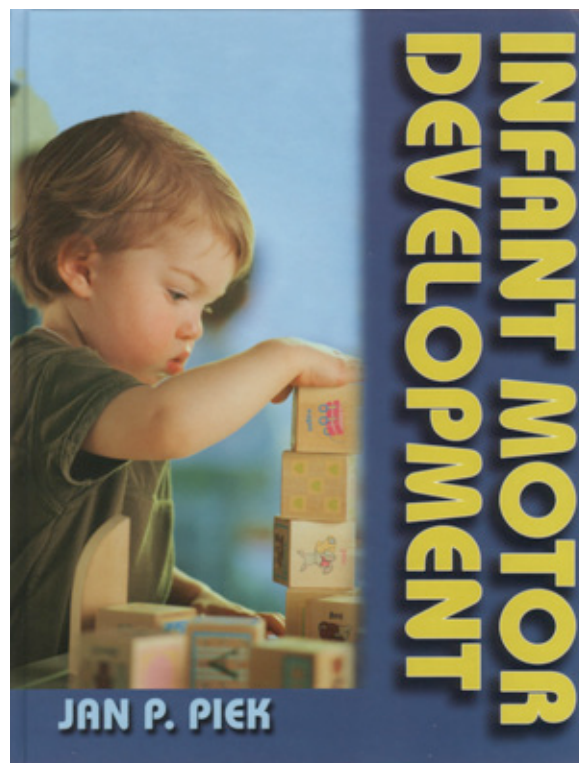
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The greatest qualitative changes in life occur in infancy, and Jan P. Piek has written an essential textbook about infant motor development. Piek earned her PhD from University of Western Australia, and her major areas of research are motor control and motor development.

The book *Infant Motor Development* consists of four parts and contains theory and research about motor ability and disability up to around two years of age, including the latest prenatal research. It also covers assessment and therapeutic practice.

My first impression of this book was not altogether positive. Although I find the topic most interesting and important, I was confused by the large pages with lots of empty space, the huge headings and the long introductions. The first chapter actually starts after 24 pages of preface and text about the content. The fact that information about the author was hard to find did not help. The size of the book with its 326 pages makes it hard to hold and handle; reading in bed is out of the question.

Nevertheless, when I started to understand the organization of the text, the appreciation of it increased more and more. There are many helpful reading features, such as sidebars to highlight the relationship between research and



practice, objectives and summaries that clarify the main ideas of each chapter, key points that highlight main concepts, and a glossary with clear definitions of concepts used in the book. There is also a ten pages long index covering most of the content. But above all, there is a great deal of knowledge about motor development and motor ability to be found in this comprehensive resource. Traditional and current theoretical approaches as well as neural development and its relationship to motor control are clearly described, with extensive references to both traditional and recent research, such as Arnold Gesell, Myrtle McGraw, Jean Piaget, Nikolai Bernstein, Eleanor and James Gibson, and Virginia Apgar. The reference list covers 45 pages.

There are different theories about how locomotor skills develop in the first year of life. Evidence now shows that both genetics and environment play an important role in human development. This means that with appropriate experience there is a potential to improve the outcome for all infants. The motor milestones of crawling, creeping and walking are very important in the infant's motor development. They are important not only as a base for the development of other functional skills such as running, jumping, and climbing but also for social and cognitive development, Piek states.

One of many interesting parts is about infantile reflexes and psychomotor patterning. The early cortical inhibition hypothesis argued that reflex-based movement patterns were inhibited through a process of increasing cortical control. It was proposed that these primitive motor reflexes must be dissolved or extinguished before functional movements emerge and voluntary motor control becomes possible. Although this view is no longer supported, since there is little evidence for cortical inhibition of infantile reflexes (Prechtl, 1981; Thelen & Smith, 1994; Ericsson, 2003), it still remains a dominant principle in many intervention strategies for children with motor disabilities. The idea that primitive reflexes are the basis for later movement abilities has little support in research, according to Piek. Rather than being causally linked, primitive reflexes and voluntary control develop in parallel with each other.

Psychomotor patterning aims at correcting "the central nervous system disorganization" and it includes passive movements, sensory stimulation, re-breathing of expired air, and dietary restrictions. High demands and expectations are placed both on parent and child. There may be a considerable financial burden for the family and the time demands may impact the relationship between the parents and the siblings of the child. The principles underlying the therapy have been questioned by the scientific community more than once. The method has been critically reviewed and dismissed as completely ineffective by the American Academy of Pediatrics both in 1982 and in 1999. These statements are also confirmed by Novella (2006) who concludes that the patterning technique is premised on a bankrupt and discarded theory and that it has failed when tested under controlled conditions.

The book also covers assessment and interventions to improve motor functioning. Particular problems and motor difficulties of preterm infants are described. As medical technology improves, more infants who are born preterm survive. Research shows significant developmental problems in this population, especially developmental delay and disabilities in motor skills. The last two chapters include the specific disabilities cerebral palsy and Down syndrome. In order to treat disabilities in motor development they must first be identified. The most popular assessment instruments used to examine infant motor ability; e.g. stage-dependent tests and screening tools, are well described and analysed. At what age can assessment accurately predict later development outcome? Important issues related to the use of appropriate assessment tools for neonates and infants are thoroughly discussed.

An area that needs more research is that of useful screening tools, since very few assessments are carried out on all infants. Brain scanning has proven effective in identifying infants who are at greater risk than others for later delay and disability. These techniques are very costly and cannot be performed on every child. Until a fast reliable screening tool is developed that can be used on every child, Piek states, many children who may be in need of early intervention will not be identified.

An important issue, briefly mentioned by Piek, is the efficacy of different intervention strategies. Research testing various intervention programs is limited, and much of it is based on poor design and methodology. It is very difficult to compare different studies because of the huge heterogeneity in sensory, motor, mental and behavioural problems. There are also the difficulties in finding suitable measures for determining improvements, and controlling and measuring the frequency and intensity of the training. Maybe the time spent on training, rather than the type of treatment program, could be the key to improved performance. Intermittent therapy with periods without training included might be the most effective. Practise defined as "the repetition of movement" appears to be important to consolidate the learning achieved through the training, according to research discussed by Piek. This is very well in line with other theories about the importance of repeated practise until automatization of basic motor skills is attained (Ericsson, 2003).

The book *Infant Motor Development* is unique in concentrating on motor development in infancy in such a

comprehensive way. It integrates literature from different disciplines, including psychology, physical therapy, neuroscience, occupational therapy, nursing, pediatrics, human movement studies and kinesiology. In my opinion it is an excellent resource for graduate students, researchers and health professionals, since prenatal and infant development are crucial in determining subsequent motor ability and behaviour in adults.

From my own point of view, as lecturer and teacher educator in sport sciences, one would have wished for an equally comprehensive textbook covering motor ability and disability in later childhood and in the early school years. There is a need for more knowledge about motor development in children and school pupils. What assessment tools and screening instruments are appropriate for pre-school and school staff? Could *MUGI observation scheme* (Ericsson, 2003), which was used in the Swedish Bunkeflo Project be an alternative?

Pre-school teachers and school staff also need to know more about interventions and motor training to stimulate and improve motor functioning, for all children and for those with disabilities, motor training that can be conducted by physical education teachers, teachers in special needs education, school health nurses or physical therapists, for example.

I am convinced that many teacher educators would most warmly welcome a textbook about motor ability and disability, assessment tools and maybe above all, about motor training and successful intervention strategies for school children, written by Jan P. Piek or another author, equally qualified.


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