

KINDERKINETICS: AN INVESTMENT IN THE TOTAL WELL-BEING OF CHILDREN

Anita E. PIENAAR

*School of Biokinetics, Recreation and Sport Science, North-West University, Potchefstroom,
Republic of South Africa*

ABSTRACT

The total well-being of children entails sound development in all dimensions of their overall development. The young child has comprehensive developmental needs of which sound motor and physical development are main areas that needs to be addressed by experts in their fields. Motor abilities are one of the key areas of the school readiness make-up of young children, while the health of children have a strong relationship with physical activity patterns. Physical activity in children is not only advantageous for children's current health, but also provides a stronger platform for the maintenance of good health throughout life. High percentages of childhood obesity and motor backlogs among South African children reflects modern tendencies among youth of inactivity and the use of technology, and sets the basis for the development of chronic diseases and an unhealthy nation. Specialists of the movement needs of children are therefore essential to address the special needs children have regarding sound motor and physical development. Kinderkinetics emerged as a new specialized field from Human Movement Science to address the needs of children in this area, but also play an important role in the maintenance of a healthy body and mind. The aim of this article is to describe this development, to justify the need towards such a profession from a scientific point of view and to identify future challenges for this profession.

Key words: Physical activity; Adapted physical activity; Motor; Children; Health; Kinderkinetics.

INTRODUCTION

Any civilization should place a high priority on the health of children, as they will be society's next generation of workers, leaders and parents. As a result, their survival, health, nutrition and educational progress should be key issues to which attention should be paid in order to ensure their productivity as future citizens (Mandela, 1996). The Medical Research Council of South Africa (Steyn, 2007) reports that health services currently spends 8 billion rand per annum involving direct and indirect costs related to lifestyle related diseases such as heart disease and stroke. Disease prevention is therefore just as important as the treatment thereof and should receive high priority. Strategies to prevent diseases should therefore be in place from a very young age as research clearly indicates that exposure to health risks due to inactivity already begins in childhood, although the consequences are only experienced in mid- to later life. Figure 1 indicates the key stages in the development of lifestyle related diseases throughout the life course, where the bottom line indicates those who maintain a low illness risk due to an active lifestyle in contrast to those who are inactive (top

line).

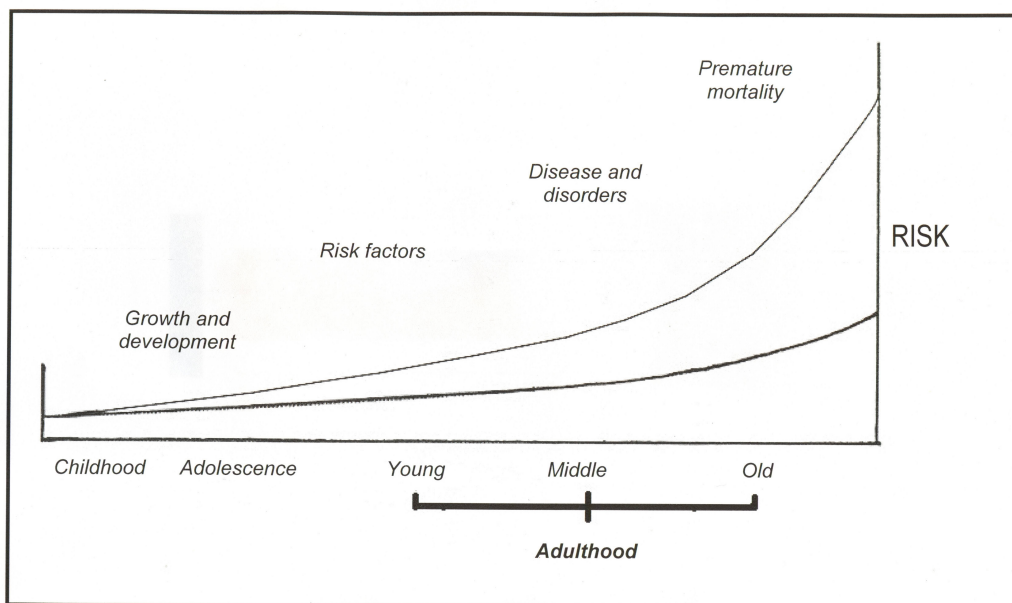


FIGURE 1. A LIFECYCLE PERSPECTIVE ON KEY STAGES OF THE DEVELOPMENT OF DISEASES (adapted from Department of Health, Physical Activity, Health improvement and Prevention, 2004)

The figure also shows that chronic disease has a long incubation period and an inactive childhood (although these children will be healthy during childhood, unless born that way), can exert considerable influence on this situation. As a result, physical activity in children is not only advantageous to their current health, but also provides a stronger platform for the maintenance of good health throughout life (for example, maintaining optimal weight which decreases the risk of adult obesity, also stimulating optimal bone development which decreases the risk of developing osteoporosis later in life).

Physical development (which includes motor development) is the key aspect of total development and well-being of children which must be addressed in the early developing years. The diversity of the South African living conditions does however set various challenges to the development of children. These challenges include the developed, but also the developing nature of the population, each with its own unique demands with regard to health and wellness of children. Thirty two percent of the South African population is currently under the age of 15 years (Statistics South Africa, 2008). At least one fifth (11.2 million) of the total South African population of 48.7 million, currently receive social grants which indicates that a large percentage of the populations are exposed to poor socio-economic circumstances (Statistics South Africa, 2008). In this regard, Kruger (2007) refers to a quadruple burden of disease to which South African children are exposed to within these circumstances which include malnutrition and over feeding (which can occur in one household), the problem of human immunity deficiency virus and acquired immunity deficiency syndrome (HIV/AIDS), trauma and violence. HIV currently affects approximately

11.1% (approximately 5.35 million people), of which nearly 2 million are children (Statistics South Africa, 2008).

The early developmental years are characterised by unique, diverse and comprehensive development that takes place, and specialist guidance of such children in early child development programs are essential to ensure that the necessary attention is paid to their developmental needs (Garcia, *et al.*, 2002). Seen from a health perspective, the optimal development of children can seriously be restrained without proper assistance during this period. It often happens that very young children from poor economic circumstances are only looked after by untrained people at day care facilities with attention only to their essential needs without any stimulation. Statistics on children in early development programs (0–4 years) and help is limited, even though the Minister of Education, Ms. Naledi Pandor has indicated that one of the matters of importance for the Department of Education was to ensure that at least one million children should be in registered centres for early child development by 2010 (*Volksblad*, 2007). Currently the education budget is of such a nature that assistance in grades 10–12 of education is a priority and if any more money was to be spent out of the budget on early development, this phase will receive less financial support.

In contrast, the growing up years of children from middle and higher income groups are often characterised by single parent homes or homes where parents are absent due to work responsibilities, and the care and supervision of these children are often left to day-care and after school care centres. Research in America indicates that 80% of the children of working parents spend forty hours per week in these types of facilities (Schneider & Lounsbury, 2008). Households in these income groups are usually well equipped with technological pastimes that include television, computers, internet and cellular phones. These pastimes are mostly of a sedentary nature and can seriously impede the physical and motor development of these children in early years. Statistics show that 13.6 million South Africans between 15 and 24 years make use of the internet chat program Facebook, with 2 500 new registrations daily, that there are currently 8.6 million Mxit subscribers and that there are even chat rooms for children as young as 5 years of age (*Beeld*, 2008). It is written that the inception of the Information technology era will probably cause the largest generation gap in the history of mankind and that this era of alternative social networks and instant fixes will create a unique challenge to understand the youth. Inactivity has many health related consequences. Currently very few schools also offer Physical Education to children in South Africa. Statistics provided by the Medical Research Council of South Africa show that 22% of South African boys and 27% of girls spend more than three hours in front of the television (Steyn, 2007). Environmental dangers such as traffic and stranger danger limits children's freedom further when playing outside and being able to function independently outside of the home (Hillman *et al.*, 1991), and in many cases it appears as if children have much less control over their activity habits than before.

It is against this background that this article aims to describe the development of a new career opportunity, namely Kinderkinetics, to justify the need towards such a profession from a scientific point of view and to identify future challenges for this profession. Kinderkinetics as a science will be discussed firstly and the importance of specialised training in the developmental needs of children will be motivated in the form of a literature overview. Changing developmental needs of children will be discussed in this regard, as well as individuality of development.

KINDERKINETICS AS A SCIENCE

KINDERKINETICS is the professional field which, from a health perspective and based on educational principals, aims to increase the total well-being of children between the ages of 0–12 years by stimulation, rectifying and optimalization/promotion of age specific motor and physical movement. The word KINDER refers to the specialization area which focuses on 0–12 year old children, while KINESES (movement) refers to the optimalization and rectifying of child movement in the 0–12 year old category.

Child development and movement

Children of various ages are assisted in the profession of Kinderkinetics through scientifically based and individualised exercise programs in their psycho-motor, physical and neuro-motor development. **Physical activity** is used as the key to realizing these goals within a Kinderkinetics program, adapted according to the developmental needs of the child and the specific program that is offered. Physical activity is described as any bodily movement that is caused by the skeletal muscles and which leads to energy output (Casperson *et al.*, 1985).

Developmental programs that are offered during early childhood, offer a variety of challenges as young children are unique, diverse and possess comprehensive developmental needs during this period. Garcia *et al.* (2002) describe early childhood as a unique period in a child's life as it is a period when they develop physically, emotionally, intellectually and socially and as a result require specialised knowledge to realize the full deployment of potential in these ages. Movement play a critical role in the development of young children as it reflects neurological organisation and provides stimulation to the neurological systems that are essential for development and optimal functioning. Neuro-scientists originally thought that the structure of the brain during birth was genetically predetermined, but have found that although the neurons are present at birth, it is the experiences of each day which eventually determine the structure of the brain and as a result determine the nature and extent of the child's abilities. Physical activity is the trigger of comprehensive activity in the cerebral and motor cortex of the brain and neuro-scientists (Berthox, 2000) found that movement provides a form of stimulation to the brain which allows the neural pathways to develop and contributes to the eventual structure of the brain. Therefore, movement plays a critical role in the sensory and physiological stimulation of the brain which results in the development of more synapses during early childhood (Changeux & Conic, 1987; Hannaford, 1995) and in so doing, contribute to neural growth. The plasticity of the brain indicates that it can continually adapt and that the structure thereof can be changed by various forms of stimulation, which includes movement stimulation. During the developmental period of the neural network formation, plasticity of the brain is described as high and as a result is regarded as a critical period/window of opportunity where the brain is more receptive to appropriate stimulation than at any other time (Chugani, 1999). This plasticity does, however, decrease with the increase in age and as a result the window of opportunity for neural growth closes again. This means that, in theory, if a child misses this opportunity for further brain development, it could mean that the brain is denied the opportunity to develop neural networks to its full potential. The main emphasis of the motor development programmes at a young age should be aimed at development of gross motor (0-5 years), perceptual-motor (3.5-7 years) and fine motor skills (0-9 years), as this is the time when stimulation with regard to these aspects are the most essential (Gabbard, 1998).

Physical activity, movement experience and exposure to structured movement development programmes are critical to contribute to the development of fundamental movement patterns, perceptual motor skills and self confidence. It is also a critical aspect of a young child's school readiness make-up as it is related to a positive cognitive outcome and also associated with health consequences (Coe *et al.*, 2006). Children's development to a proficient learner also goes through various phases of which kinaesthetic learning is the first phase on which learning is based (Wilken, 2008). As a result it is not strange that problems associated with learning problems are regarded as intrinsic and attributed to the dysfunction of the central nervous system (Lerner, 1993).

A good movement development foundation can therefore be regarded as the foundation of total development in young children, which can affect all other facets of their development and impede their total-well being. As a result it is clear why specialists regard this period as a period of essential play with the viewpoint that play is the most important job of a child in his early developing years. Kinderkineticists also regard this phase as the optimizing phase for health, as children are equipped during this phase with the necessary skills and a love for movement which will make them life long movers (Pienaar *et al.*, 2007b).

As children age, different demands are made on them regarding physical activity.

Physical activity is a complex multidimensional behaviour that can be characterised into frequency, duration, intensity and type of activity (Miles, 2007). During early childhood a child should be equipped with skills which enable him to also be physically active later in his life. For general public health, daily activity in the moderate intensity zone is suggested, as activity that meet this requirement, stimulate the cardiovascular system, muscular-skeletal and metabolic systems and as time goes on adapt it to be more efficient with regard to function (as a result the body becomes fitter).

There exists much epidemiological and experimental proof that the human body flourishes on regular physical exercise, and that the body, in contrast, will react negatively to regular periods of inactivity. Biologists and anthropologies are of the opinion that humans receive a genetic genome within which there are genes that can only come to full expression within an environment of regular physical activity (Booth *et al.*, 2002). These researchers indicate that when activity is lower than the acceptable norm, the expression of these genes change and clinical defects such as cardiovascular diseases, metabolic diseases and certain types of cancer will manifest.

The first guidelines touching on acceptable amounts of physical activity in children were formulated in 1988. The American College of Sports Medicine made an opinion statement, based on the guidelines for adults with regard to the amount of physical activity that is needed for optimal functional capacity and health, which was 20–30 minutes of vigorous exercise each day. An International Physical Activity conference was held in 1993 where empirical based guidelines were comprised. Following this, the Health Education Authority of England developed a modified set of guidelines for children in 1998 (Department of Health, 2000), which contained primary recommendations (one hour of moderate activity per day, accumulated) and secondary recommendations which suggest that activity on at least two days of the week should include activities that will improve bone health, muscle strength and flexibility. A systematic literature overview was published in 2005 (Strong *et al.*) with regard to physical activity, in which the findings with regard to suggested guidelines were similar to the existing guidelines.

Four main reasons for the promotion of physical activity in children and adolescents regarding health advantages of exercise are highlighted. Firstly it contributes to healthy growth of the muscular skeletal and cardiovascular system. In this regard it has been reported that although exercise increased skeletal growth in prepubescent children, there is increasing proof that it gains the greatest advantage with regard to bone health during early puberty (Mosley & Lanyon, 2002). Literature indicated that the bone mineral density of boys and girls increase significantly during the childhood and adolescent years, but that it especially takes place during the rapid growth phase at approximately age 12 years in girls and 14 years in boys. The accumulation of bone density during these growing phases will hold long-term advantages as it is this accumulation of bone mass during this time that counteracts the loss of bone mass as age increases. Physical activity is secondly important to maintain an energy balance (to ensure healthy weight). In terms of risk factors for cardiovascular diseases, the primary role of physical activity is indirectly to prevent excessive weight from accumulating. Chronic disease has a long incubation period and childhood and adolescence forms the early phases of accumulated exposure to risk factors throughout the life cycle, therefore it is thirdly important to prevent risk factors such as hypertension (high blood pressure) and abnormal lipid profiles through regular physical activity. Fourthly it is important to offer opportunities for social interaction, mastering of skills and mental health by means of participation in physical activity. Research indicates that children with low levels of physical activity, exhibit more symptoms of psychological stressors as shown with higher physical activity, while a positive relationship was also found between physical activity and wellness, regardless of social class or health status. Children with higher physical activity levels also often exhibit better cognitive functioning.

The childhood and adolescent years provide the biggest opportunity to establish good attitudes with regard to physical activity. Children who completed their school years with a positive attitude towards their body and their skills will probably also be active adults. The quality of physical activity experiences during childhood apparently also plays a large role in the continuation of an active lifestyle as adults than the quantity of the physical activity (Engstrom, 1991; Telama *et al.*, 1994; Taylor *et al.*, 1999). The nature of the experience of exercise and sport at school impacts directly on continued participation during adulthood (Health Education Authority, 1992). It is often the improved mental condition, a feeling of achievement, relaxation or unloading of daily stress which ensures participation in physical activity by children, rather than the health advantages obtained from it.

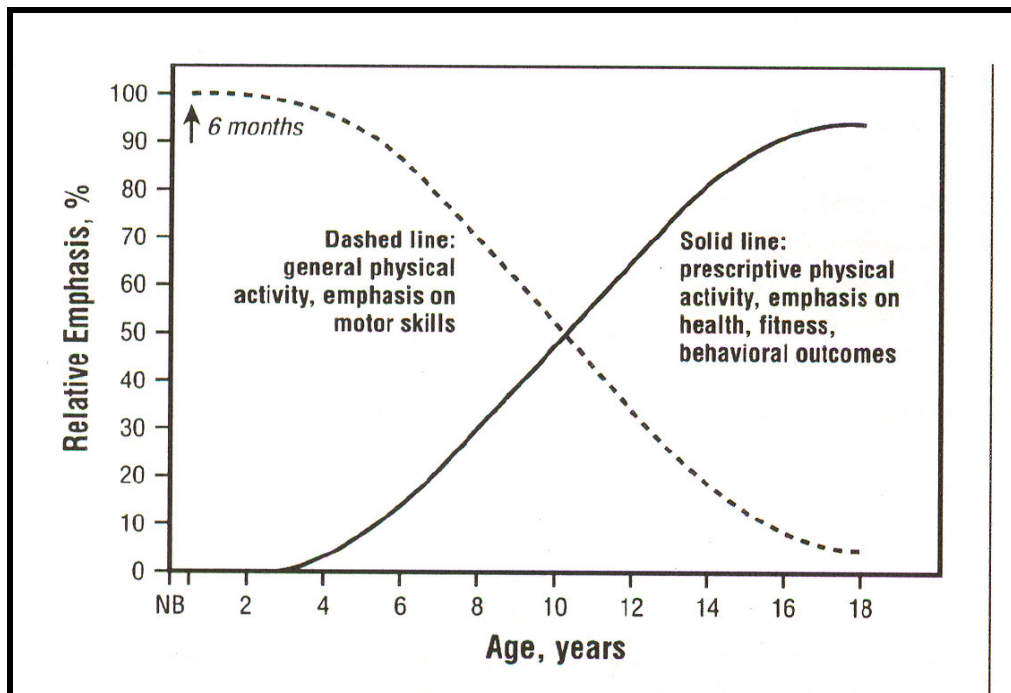


FIGURE 2. PERCENTAGE EMPHASIS ON VARIOUS ASPECTS OF PHYSICAL ACTIVITY DURING CHILDHOOD AND ADOLESCENCE (adapted from Strong *et al.*, 2005)

Strong *et al.* (2005) indicates that it is important to judge the demands that physical activity sets as it is influenced by the many challenges that are associated with childhood and adolescence, which include physical, biological maturation and emotional development. These processes vary tremendously between individuals, occur simultaneously and are also interactive and is against this background that children, especially adolescents, weigh their own status against others in their group of peers. The percentage emphasis that must be placed on various aspects of physical activity during childhood and adolescence with regard to the development of skills and behaviour related health and fitness advantages are indicated in figure 2. The figure emphasises that during the pre-school and early schooling years great emphasis must be placed on the development of general motor skills, and as these basic movement patterns are established and skills improved, the emphasis must gradually be shifted to health, fitness and behavioural aspects that are associated with maintaining physical activity (Strong *et al.*, 2005).

Although physical activity of sixty minutes per day of moderate intensity holds important advantages in terms of bone health, psychological welfare and other dimensions of health in children, research shows increasingly that although most children reach these goals, obesity in the child population is still high. From this it would appear more and more that the recommended 60 minutes of at least moderate physical activity in children and adolescents per day is not sufficient, and it is still unclear if children, although they are more active than adults, participate in enough activities to obtain the full spectrum of health benefits. Further

support for this concern is obtained from the results of recently published research in the *Lancet*, an authoritative journal. The researchers (Anderson *et al.*, 2006) indicate that the international guidelines of at least one hour per day of moderate intensity activity for children can be too low with regard to metabolic health to prevent the clustering of cardiovascular risk factors, and that physical activity levels must be higher to oppose this clustering effect (systolic blood pressure, triglycerides, ratio of total cholesterol to HDL, HOMA value, sum of 4 skin folds and aerobic fitness) or to prevent it. The researchers indicate that at least 90 minutes of daily activity is required to prevent insulin resistance in children, which appears to be the central characteristic of this clustering effect. A definitive gradual negative correlation between grouping of risk factors and physical activity was found by the researchers as can be seen from figure 3. Risk was considerably higher in the first three quintiles of physical activity than what was found in the most active physical activity quantile.

The adolescent years are highlighted as critical regarding the increasingly lower levels of physical activity in children and especially in girls worldwide. Researchers in England indicate that a third of boys and a third to half of girls report physical activity levels that can be detrimental to their health (Health Survey for England, 2002). A study performed on 2 000 European children (Riddoch *et al.*, 2004) also shows that 9-year-olds meet the required 60 minutes per day activity intensity, while only 8 out of 10 boys and 6 out of 10 girls of the age of 15 years meet this requirement. In a NICHD American study 90% of 9 and 11-year-olds meet the suggested 60 minute standards, while only 31% on week days and 17% on weekends of 15-year-olds meet these requirements (Nader, 2008). Similar tendencies with regard to South African children between 10 – 15 years of age (N = 1257), living in the North West Province of South Africa are reported (Engelbrecht *et al.*, 2004, Hurter & Pienaar, 2007).

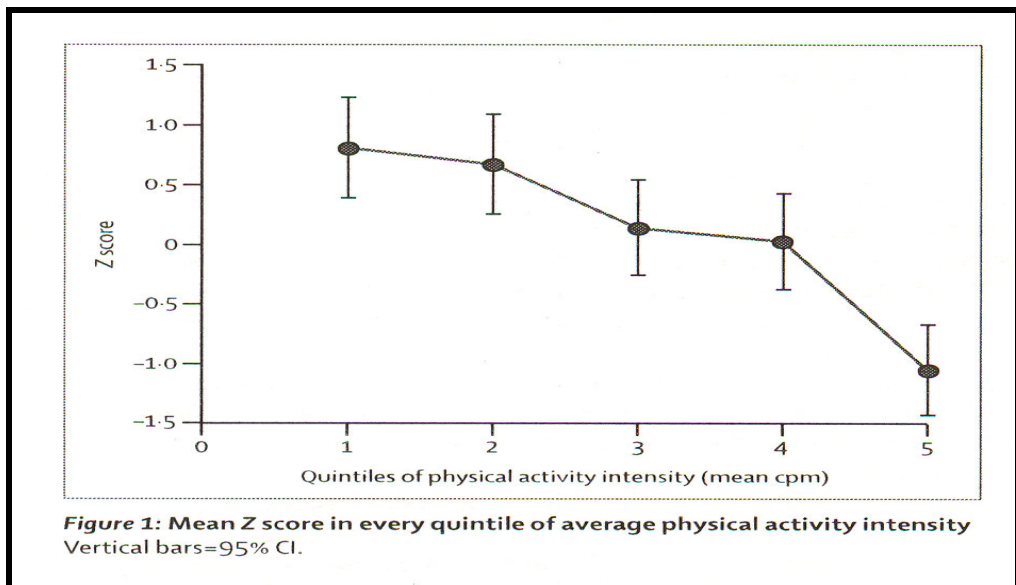


FIGURE 3. MEAN Z-SCORE FOR CARDIOVASCULAR DISEASE RISK BY PHYSICAL ACTIVITY QUANTILE (adapted from Anderson *et al.*, 2006)

Obesity is the main visual sign of inactivity, although it is only one of 20 chronic diseases and disorders which are associated with low physical activity as a contributing factor (Department of Health, Physical Activity, Health Improvement and Prevention, 2004). Obesity under South African children is a worrying occurrence. Recent statistics in this regard for overweight and obesity vary between 14% and 3.2% for boys and 17.9% and 4.9% for girls (Armstrong *et al.*, 2006) which is approximately one out of every five children that fall into this category. These statistics are equal to and even higher than is the case in many first world countries. Over a period of 10 years obesity has doubled in boys and increased by 60% in girls.

Different circumstances, gender as well as genetic factors play a role in the incidences of obesity in children. Obesity is higher in children from deprived environments as well as 12 times higher in boys and 10 times greater in girls if both parents are obese (Department of Health, Physical Activity, Health Improvement and Prevention, 2004). There is also a relationship between childhood and adult obesity, where childhood obesity can contribute to adult obesity, especially in children where one or both parents are obese. Research findings also indicate that 26–41% of obese toddlers and 42–63% of obese primary school children become obese adults (Twisk *et al.*, 1997; Freedman *et al.*, 1999; Sinaiko *et al.*, 1999). The age of seven years is especially emphasised as a time when obesity can occur in children due to emotional problems. Researchers are of the opinion that 7-year-olds are susceptible to becoming overweight as a result of over eating that compensates for feelings of unhappiness and loneliness, and that eating at this stage in a child's life offers comfort and relief. This specific period is important because children experience a change from the close emotional relationship with his family to the creation of new relationships with his peers. If it should happen that they cannot build new relationships with their peers, they will experience feelings of loneliness and as compensation mechanism they will turn to food for comfort. Eating can also be used as a method of consolation when children experience problems at home or school. Children often measure their self worth based on their relationships with their peers, parents and other authoritative figures. When a child moves from the child centred world at home to the competitive world of the early school years, they experience social stress as they must exhibit competencies in physical abilities, courage, manipulation skills and social adaptation in direct relation to children of their own age. The punishment for failure is ridicule and rejection, which places tremendous emotional and social limitations on a young child. The activity deficit phenomenon (Bouffard *et al.*, 1996) refers to a sedentary lifestyle which occurs as a result of an avoidance strategy which children with motor deficiencies use to shield their ego and manage emotional trauma. Children as young as seven years are already being able to apply this avoidance and withdrawal strategies which can seriously impede their skills development and socio-emotional growth. Clumsiness increases with the years and these children usually become the passive learners. Research findings have already indicated a relationship between poor motor abilities and body mass index in primary school children (Graf *et al.*, 2004).

Individual differences

The training of Kinderkineticists is further based on the scientific knowledge that some people, more than others, will fail with regard to movement demands that are required of them, and that these failures will influence all aspects of their development and quality of life. The theory of individual differences between people is therefore prominent in the justification of this profession. The concept of deviating from the normal has its roots in the development of the normal distribution curve in 1800 (Sherrill, 2004). It indicates that when there are 100 or

more people to be tested, the results of the middle 68% will fall between +1 and -1 standard deviation, and these markers include what is considered average (see figure 4). The further the individuals score deviates from the middle 68%, the more he differs (unique, special, different or exceptional). The traditional marker to justify assistance in the psycho-motor field, is a result of 2 or more assessments which place the person in a standard deviation of -2, and only 2-3% of all children usually fall into this category. Policy makers involved in health policies can however choose to categorise/identify the lower 16% or even 50% for special assistance than what is allowed by the government/laws, but these decisions will greatly depend on the financial status of the country. Sherrill (2004) suggests that in the light of the extremely important role that physical activity plays in the life cycle as well as in quality of life, that service providers should highly recommend assistance to all children that continuously fall below the 50th percentile, such as those whose movements appear to an expert to be clumsy, and those who are overweight, obese or unfit. According to researchers, these are the children that are usually excused from physical education, or the adults who will eventually experience the most lifestyle related health problems.

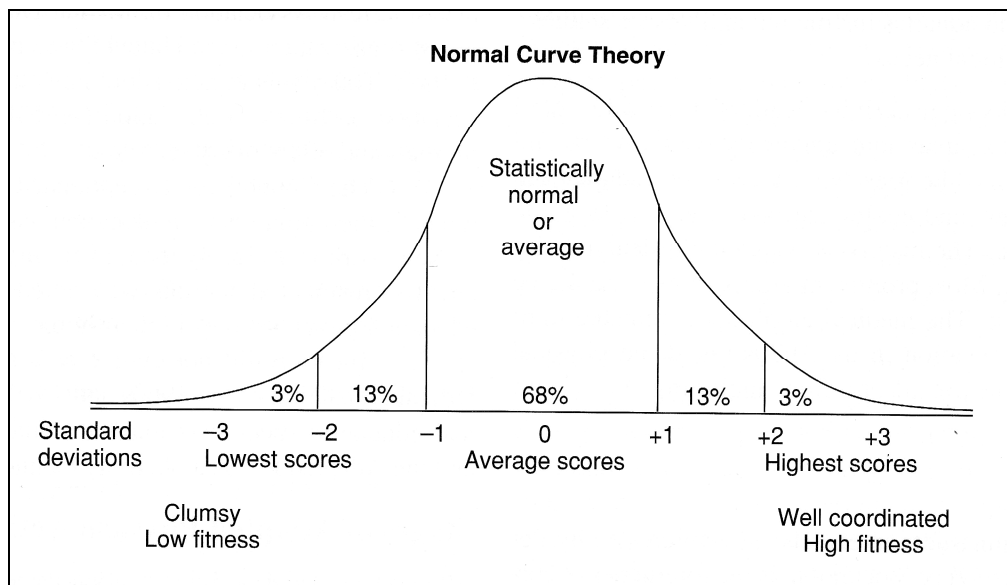


FIGURE 4. INDIVIDUAL DIFFERENCES BASED ON THE THEORY OF NORMAL DISTRIBUTION (adapted from Sherrill, 2004)

Individual differences refer to person-environment interactions that significantly deviate from the norm, which significantly interferes with psycho-motor goal achievements (Sherrill, 2004). Psycho-motor problems result from specific limitations, barriers, or deficiencies in the interaction of the self with the environment which limits or prevents achieving goals and self actualization. Cognitive, physical and sensory limitations complicates the person-environment interaction which requires professional preparation in making changes to address unique needs that are identified by means of skills assessment techniques. People with such problems are often referred to as clumsy, uncoordinated, fat, lazy, slow or handicapped and as a result they are treated differently to the norm or the vast majority. Peer groups are inclined to avoid, tease and discard these children within a physical activity environment, while those in authority

positions are often uncertain how to make changes which will facilitate success in them which can contribute to a healthy activity lifestyle. This different kind of treatment by the society influences these people's total wellness as it can lead to psychological, social, cognitive and emotional maladjustments. Sherrill (2004) indicates that the individual differences that influences the American lifestyle the most is the interaction between eating and exercise. An approximate 60% of Americans are overweight or obese, and it is indicated that environmental and personal variables must change to be able to change these statistics. According to this researcher, approximately one out of every four adults has cardiovascular disease of which the origin can be traced back to their childhood.

Kinderkinetics programmes address the individual differences that influence the achieving of physical activity goals and aspirations and the variables associated with this success and failure. Kinderkineticists use physical activities as the key to developing success in children that deviate from the norm, but in an adapted form, based on individual needs. Movement offered in the form of adapted physical activity is consequently service delivery, pedagogy, coaching, learning or empowerment by a qualified person to increase the physical activity goal achievement of individuals of 0–12 years of age with movement limitations or social obstacles. Application of programmes based on adapted physical activities differ from normal physical activity programmes in the sense that the main goals are the same, but the subgoals, timelines and didactic presentation will differ. All the goals of physical activity programmes consequently demand integrated functioning of the cognitive, affective and psycho-motor abilities. The ability based treatment method is prominent in practicing this profession, where the focus is placed on the person and not the problem (emphasize ability, not inability), while holistic and person centered thought is also emphasized (focus on the whole person, not only parts thereof).

Services are, where needed, delivered within the profession and it includes one on one or small group situations, in special classes and programmes and in general or normal schooling environments. Professional persons must, regardless where this service delivery takes place (in the school, exercise, recreation, rehabilitation or medical centre), be able to adapt variables in such a way that physical activities are safe for all, adapted according to assessed individuals needs, and instrumental in assisting individuals in being the best they can be. Handling success of such cases demands professional knowledge, skills and values as well as a concerned and helping attitude.

The quality of physical activity experiences during childhood appears to play a greater role in the continuation of an active lifestyle as an adult than the quantity of physical activity (Engstrom, 1991; Telama *et al.*, 1994; Taylor *et al.*, 1999). It is therefore critical that people trained to be specialists of children's movement needs and the solutions to the problems in this regard, must be involved in such programmes. Consequently, not only cooperation networks by specialists in the field, but also education authorities and governmental institutions are essential to the effective application of the knowledge of Kinderkineticists. Sherrill (2004) indicated that specialists in movement and movement needs, individuality in movement and assistance in this regard, can be categorised as generalists or specialists, and she refer to the Physical Education teacher as a generalist. In contrast, there are those who are further specialized in this field, namely specialists of childhood movement (which is known as Kinderkineticists in South Africa and which is a specialized post graduate training in Human Movement Science). Sherrill (2004) indicates that such specialists should be used as

consultants who offer assistance with adapted programmes for children who require more help than others in schools for children without special needs.

Accordingly the development of Kinderkinetics as a new academic curriculum at the North West University (NWU) will be discussed briefly followed by a look into the future concerning the challenges that are set for this profession.

DEVELOPMENT OF KINDERKINETICS AS AN ACADEMIC CURRICULUM AT THE NORTH-WEST UNIVERSITY (NWU)

Origin and progress

The development of Kinderkinetics, the profession that uses scientifically based and individualised exercise programmes to guide the development of the psycho-motor, physical and neuro-motor development of children of various ages, began officially in 1994 within Human Movement Science at the North-West University (then the Potchefstroom University for Christian Higher Education (PU for CHE)). As it happens, the influences which include people and occurrences within this environment, forms an integral part of the development of this discipline and these influences stretch far back to long before 1994.

In the memorial album that celebrated the 50th anniversary (1957–1994) of the Department of Human Movement Science at the North-West University (then PU for CHE), Prof. Wynand Putter, former Head of the Department (1974–1985), wrote that there is a golden thread woven throughout the growth of this Department, namely the continuous and single minded pursuit with the insight at hand to continue to build and maintain Physical Education as a science in its own right (Malan & Coetzee, 1994). He further emphasized that the cultivation of the science based on the Light of the Word is furthermore unique to this Department. He also refers to the quality of personnel, the unanimity amongst them and the exceptional contribution from this Department to the scientific development of this field in the Republic of South Africa. Prof. Gert Strydom (then head of the Department) also writes as part of the introduction that his predecessors (Prof. D.P.J. Smith, Prof. W.J. Putter and Prof. T.S.P. van der Walt) were people to whom their jobs were considered a calling and who led the department with perceptiveness and vision. Prof. Strydom led the way with his own pioneering research into the use of exercise into cardiac rehabilitation, and Biokinetics as a profession emerged from this (see figure 5). After him, Prof. Dawie Malan marked the field of Sport Science and expanded this field to where this vision resulted in the birth of the Institute for Sport Science and Development in January 1996 and where Sport Science is currently one of the most important strategic role players in the vision of the North-West University.

The critical predisposition of the North-West University over the years also played a critical role in the development of Human Movement Science at this University. Malan and Strydom (2007) describe the period surrounding 1993 as a 'time of crisis' for the field of Human Movement Science when the University restructured which resulted in subjects being phased out and joined together and Departments closed. Human Movement Science survived this process but the message was clear, that it was an expensive Department that will have to produce in order to justify and ensure its existence. The message was clear that in order to survive academically and financially, innovative and creative thought had to take place. These recommendations were not seen negatively, but rather as a challenge and played a significant role in the development of Kinderkinetics as a new possible profession.

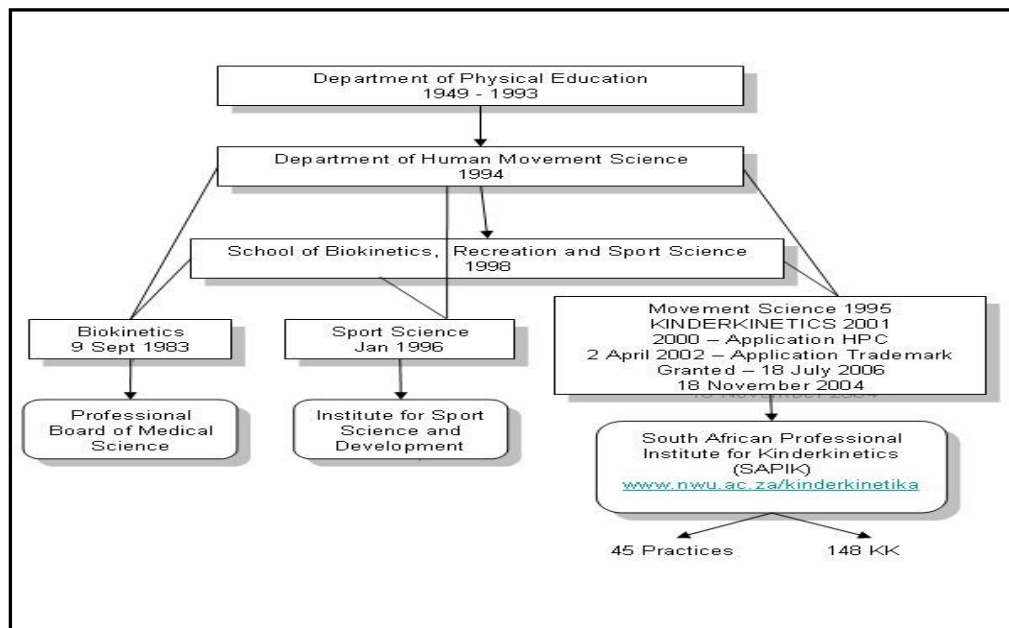


FIGURE 5. DEVELOPMENT OF KINDERKINETICS AS AN ACADEMIC CURRICULUM AT THE NWU

During this same period, the future of the subject Physical Education at school level became uncertain in 1993 and it was finally removed from the school curriculum as part of the learning plan of South African schools in 1997 (South Africa, Department of Education, 1997). The result was a lowpoint in the enrolment of students due to the fact that the future of the profession became uncertain. The completion of a doctoral study by Pienaar (1994) with the title “The incidence and treatment of gross motor deficiencies in 6 – 9 year old children in the junior primary phase” during this time was the driving force behind the development of a new entrepreneurial vocational opportunity. This research indicates marked percentages of children with motor difficulties, and that such problems have a negative impact on the total development of these children. It also provided evidence that professional guidance by means of motor intervention programmes can improve such problems to a great extent. Children’s need for movement also did not diminish in this unstable time, but rather increased (Pienaar, 2004; Pienaar *et al.*, 2007a), while there were also prospective students who still wanted to study the needs of these children from a movement perspective.

A part-time Honnours programme (originally known as Movement Science) was therefore developed from 1995 and instituted with 2 registered students in the first year. The programme’s popularity grew each year and for many years, due to capacity problems and for quality purposes but also because there was no established market yet, only eight students were selected for training in the full time honours programme. In 2001 the name of the programme was changed to Kinderkinetics, and since 2007 the University has the capacity to train 12 students within this full-time honours programme. Currently the numbers in this programme is the second largest post graduate training programme, after Biokinetics in the School of Biokinetics, Recreation and Sport Science. The University of the Free State began

training Kinderkineticists in 1998 and since then the University of Zululand and Tygerberg College has followed.

Prof. Gert Strydom, then Department head and Dr. Anita Pienaar, programme leader for Kinderkinetics, decided due to the development and possibilities of this new profession to follow the same route as Biokinetics and applied for registration of Kinderkinetics with the Health Professions Council of South Africa (HPCSA), and a memorandum with such an application was submitted to the HPCSA on 28 June 2000. Although there was support for the initiative from various Universities, it was also unfortunately met with a letter of resistance which was distributed to all Departments at Universities that trained Human Movement Scientists as well as to the Health Professions Council which stated that the proposed new profession would be detrimental to the training of Physical Education teachers and as a result should not be supported. The application was rejected with the main reason being that at least four institutions must offer this training for any application to be positively considered. Although this outcome was disappointing, it was not regarded as a damper but rather as a directional indicator for the further development and course of the opportunities within this profession.

Meanwhile, the South African market has given clear indications that the University can lose this market and training advantage if drastic far-sighted action is not taken. Much discussion surrounding this matter led to the conclusion that this profession was unique to the NWU with certain intellectual copyright and that the registration of a Trademark should be considered. This thought process was discussed by Prof. Strydom and Dr. Pienaar with Mr. Frans Kruger, the legal advisor of the NWU, who submitted an application for a registered Trademark on 2 April 2002. The name KINDERKINETIKA / KINDERKINETICS was then also granted to the NWU as a Trademark on 18 July 2006, retro active for a period of 10 years from 2 April 2002 when the application was submitted. Afterwards various follow-up actions were performed to support the profession of Kinderkinetics. One important step was the establishment of a professional professions board and much deliberation led to the opinion that a professional registration with a Professional Institute was the way to go. The School of Biokinetics, Recreation and Sport Science (BRS), therefore, applied on 6 October at the NWU for the establishment of the South African Professional Institute for Kinderkinetics® (SAPIK) within the Focusarea of Health Sciences of the NWU. After much discussion and deliberation with various parties (*inter alia* the Legal advisor, Registrar, Vice-Rector, Research Director, Prof. Dawie Malan and Prof. Pienaar), the School was advised to establish the planned Institute independent of the NWU, mainly because the training in Kinderkinetics does not only take place at the NWU, and as a result the University could curtail academic freedom which should be avoided. The School of BRS was however accepted as the address of the South African Professional Institute for Kinderkinetics (SAPIK) from where it could be managed and the Trademark could be protected. An establishment assembly was held on 18 November 2004 at 13:00 in Rustenburg where the South African Professional Institute for Kinderkinetics was officially established with Prof. Anita Pienaar elected as the first Director of SAPIK. Currently there are 4 tertiary training institutions, 48 registered Kinderkinetics practices and 151 registered Kinderkineticists registered with SAPIK (www.nwu.ac.za/kinderkinetika). The public has access to parts of the website where they can obtain information concerning registered Kinderkineticists as well as existing practices, while registered Kinderkineticists can obtain information concerning the profession on the restricted part of the site.

FUTURE CHALLENGES FOR THE PROFESSION

When physical activity is insufficient or avoided due to experiences from everyday life or if individuals are restricted due to disability, the risk of coronary disease, high blood pressure, various forms of cancer, diabetes, chronic depression and other conditions that limit quality of life and shorten life span are increased substantially. The 21st century challenges movement specialists worldwide to not only provide better service and support to children who are diagnosed with serious activity/movement deficiencies (people who meet the legal requirements to be classified as disable), but also to address all the other individual needs that require professional help. As a result, children who are not identified by governmental regulations for special assistance, but who possess individual needs that require specialized assistance, should also be enabled to acquire the specialised knowledge of people such as Kinderkineticists. Such children include those with injuries or specific medical conditions, those with poor fitness levels (which include overweight and obese children), insufficient motor development, poor skills levels or individuals with poor functional posture.

Improved technology in the early nineties contributed to research which could better analyse the brain processes, and in this regard neuro-physiologists report with proof based findings that physical activity can improve mental functioning (Hannaford, 1995, Jensen, 1998). Consequently physical activity can be prescribed for two reasons for children with learning problems and development coordination disorder (DCD), namely to improve general brain functions, increase specific memory and alertness and solve problems associated with clumsiness. In this regard, lawmakers in America acknowledge that this country has a larger than average percentage of individuals with perceptual motor, motor coordination and other movement deficiencies which require intensive assistance (Sherril, 2005). The country however has federal laws and systems in place to assist most of these children. Research in South Africa shows that problems in this field are far larger (Pienaar, 2004; Pienaar & Lennox, 2006; Pienaar *et al.*, 2007), but that the current structures for assistance are insufficient and that these children, who make up most of the early childhood development system, are largely left to their own devices. In this regard, Winnick (2005) emphasises the advantages should a government allow children at risk (children younger than three years who run the risk of developing pronounced development deficiencies if early intervention services are not available) to make use of the services of amongst other things movement specialists (for every three dollars spent in this way, seven additional dollars will be saved on additional education, which makes it practically impossible not to deliver services to these children).

There are many contemporary threats to the physical activity levels of children, which mainly lead to a sedentary lifestyle with overweight and obesity. Although there are many initiatives in South Africa to increase the physical activity of children and adolescents such as the Youth Fitness and Wellness Charter and Lets play awareness campaign (www.letsplay.org), these are mostly isolated initiatives. Physical Education has been rewritten into the school syllabus and much money has currently been invested in the training of identified persons within the Education system so that it can once again play a role through Life Orientation in the schools. Generalist of movement can in this way once again be put in place to address the immediate movement needs of children. Specialists of movement such as Kinderkineticist have been trained in the past few years to pay specific attention to children with special needs, but the specialised nature of the training result in only a handful of specialists being trained at a time and the training does not take place at all universities. Although the profession is currently still entrepreneurial in nature, the knowledge of the trained are sought after and they are

employed in a variety of working environments, and the experience is that the current demand for their expertise outweighs the supply. The wheels of all these initiatives however still turn slowly and consequently it is not enough to effectively address the health promotional and developmental needs of children. Much research must still be conducted to better understand the effect of the various tendencies on child development and to come up with preventative strategies within the complexities of the South African society. Although substantial research from the field of Kinderkinetics over the past few years has contributed to understanding the motor and physical development of South African children, there still exist many deficiencies in this regard. Childhood obesity is for example a complex phenomenon without any simple solutions and researchers agree that it is a trying experience to understand childhood obesity. A meta-analysis conducted by Campbell *et al.* (2001) in this regard reported a research environment that was devoid of current statistical power to set clear guidelines for the prevention of obesity across a variety of risk groups. Primary health care must also start to play a more prominent role and deliberate attempts should be made to bring home the advantages of regular physical activity for adolescents. Consequently it should be regarded as routine health promotion practice where health workers will evaluate the physical activity of adolescents and make recommendations. The government must also make more funding available for research on child development, so that research projects on a greater scale can be planned and executed.

CONCLUSION

Kinderkinetics emerged as a profession due to the demands of the time and it is strived in the exercising of this profession to apply science in such a way that it serves the child to fully unlock his health promotional development and potential. One of the greatest challenges of this profession is probably to try and understand the new generation child with his unique way of thinking and doing, as well as the demands that their modern-day lifestyles of different social structures and instant fixes place on their development and especially their health, and to be able to address this with effective health promotive and disease preventative strategies. South Africa's diverse population places unique challenges to this vision. Increased race, ethnic, religious, language, style of family, diversity as well as challenges that occur due to poverty, makes service delivery and empowerment in a country such as South Africa exceptionally complex. The political situation in South Africa resulted in some children that need the help and expertise of specialists such as Kinderkineticists more than others. As Kinderkinetics is still mainly an entrepreneurial profession, it is ironic that many children who require this specific knowledge, financially cannot afford it. Critical goals to increase the service delivery of this profession are consequently to promote greater awareness of the knowledge field of Kinderkineticists in South African and internationally, better cooperation between different specialists of movement, and the creation of structures which will make it possible for children to make use of the specialised knowledge of Kinderkineticists without financial constraints. Better cooperation with Health services, and networks which implies cooperation between Biokineticists, occupational therapists, social workers, therapeutic recreational scientists, physical education teachers and educational psychiatrists, are also suggested for better service delivery.

REFERENCES

- AMERICAN COLLEGE OF SPORTS MEDICINE (1988). Physical fitness in children and youth. *Medicine and Science in Sports and Exercise*, 20: 422-423.
- ANDERSON, L.; MAARIKE, H.; SARDINHA, L.; FROBERG, K.; EKELUND, U.; BRAGE, S. & ANDERSSSEN, S. (2006). Physical activity and clustered cardiovascular risk in children: a cross sectional study (The European Youth Heart Study). *The Lancet*, 368: 299-304, July.
- ARMSTRONG, M.E.G.; LAMBERT, M.I.; SHARWOOD, K.A. & LAMBERT, E.V. (2006). Obesity and overweight in South African primary school children – the Health of the Nation Study. *South African Medical Journal*, 96: 439-444.
- BEELD (2008). Slim sake oorbrug IT-gaping tussen oud en jonk. Sake24. Vrydag 5 September, p.14.
- BERTHOZ, A. (2000). *The brain's sense of movement*. Cambridge: Harvard University Press.
- BIDDLE, S.; SALLIS, J.F. & CAVILL, N. (Eds.) (1999). *Young and active? Young people and health enhancing physical activity – evidence and implications*. London: Health Education Authority, 1-49.
- BOOTH, F.W.; CHAKRRAVARTHY, M.V.; GORDON, S.E. & SPANGENBURG, E.E. (2002). Waging war on physical inactivity. Using modern molecular ammunition against an ancient enemy. *Journal of Applied Physiology*, 93: 3-30.
- BOUFFARD, M.; WATKINSON, E.J.; THOMPSON, L.P.; DUNN, J.L.C. & ROMANOW, S.K.E. (1996). A test of the activity deficit hypothesis with children with movement difficulties. *Adapted Physical Activity Quarterly*, 13: 61-73.
- COMMUNITY SURVEY (2007). Revised edition, 24 October 2007 [http://www.statssa.gov.za/publications/P0301/P0301.pdf]. Date of access, 21 August 2008.
- CAMPBELL, K.; WATERS, E.; O'MEARA, S. & SUMMERBELL, C. (2001). Interventions for preventing obesity in childhood: A systematic review. *Obesity Reviews*, 2: 149-157.
- CASPERSON, C.J.; POWELL, K.E. & CHRISTENSON, G.M. (1985). Physical activity, exercise, and physical fitness. Definitions and distinctions for health-related research. *Public Health Reports*, 100: 125-131.
- CHANGEUX, J.P. & CONIC, M. (Eds.) (1987). *The neural and molecular bases of learning. Report on the Dahlem Workshop in Berlin, 1985*. Oxford: John Wiley.
- CHUGANI, H.T. (1999). Metabolic imaging: A window on brain development and plasticity. *The Neuroscientist*, 5(1): 29-40.
- COE, D.P.; PIVARNIK, J.M.; WOMECK, C.J.; REEVES, M.J. & MALINA, R.M. (2006). Effects of physical education and activity levels on academic achievement in children. *Medicine and Science in Sports and Exercise*, 38(8): 1515-1519.
- SOUTH AFRICA (1997). *Department of Education. Policy document. Foundation Phase (Grades R to 3)*. Pretoria: Department of Education.
- DEPARTMENT OF HEALTH (2000). Health Survey of England. The Stationary Office. A report from the Chief Medical Officer: London: Wellington House.
- DEPARTMENT OF HEALTH, PHYSICAL ACTIVITY, HEALTH IMPROVEMENT AND PREVENTION (2004). *At least five a week. Evidence on the impact of physical activity and its relationship to health. A report from the Chief Medical Officer*. London: Wellington House.
- ENGELBRECHT, C.; PIENAAR, A.E. & COETZEE, B. (2004). The role of racial background in possible relationships between physical activity and physical fitness of girls: The Thusa Bana study. *South African Journal for Research in Sport, Physical Education and Recreation*, 26(1): 41-53.
- ENGSTROM, L.M. (1991). Exercise adherence in sport for all from youth to adulthood. In P. Oja & R. Telama (Eds.), *Sport for all* (473-183). Amsterdam: Elsevier.

- FREEDMAN, D.S.; DIETZ, W.H.; SRINIVASAN, S.R. & BERENSON, G.S. (1999). The relation of overweight to cardiovascular risk factors among children and adolescents. The Bogalusa Heart Study. *Pediatrics*, 103: 1175-1182.
- GABBARD, C. (1998). Windows of opportunity for early brain development. *Journal of Physical Education, Recreation and Dance*, 69(4): 52-54, October.
- GARCIA, C.; GARCIA, L.; FLOYD, J. & LAWSON, J. (2002). Improving public health through early childhood movement programs. *Journal of Physical Education, Recreation and Dance*, 73(1): 27-31, January.
- GRAF, C.; KOCH, B.; KRETCHMANN-KANDEL, E.; FALKOWSKI, G.; CHRIST, H. & COBURGER, H. (2004). Correlation between BMI, leisure, habits and motor abilities in childhood. (CHILT-Project). *International Journal of Obesity*, 28: 22-26.
- HANNAFORD, C. (1995). *Smart moves: why learning is not all in your head*. Arlington, VA: Great Ocean Publishers.
- HEALTH EDUCATION AUTHORITY, SPORTS COUNCIL (1992). *Allied Dunbar National Fitness Survey: Main Findings*. London: Sports Council and Health Education Authority Health Survey for England.
- HILLMAN, M.; ADAMS, J. & WHITELEG, J. (1991). *One false move: a study of children's independent mobility*. London: Policy Studies Institute.
- HURTER, Z. & PIENAAR, A.E. (2007). Physical activity levels and patterns of 13 to 15 year-old boys in the Northwest province. *South African Journal for Research in Sport, Physical Education and Recreation*, 29(2): 41-57.
- JENSEN, E. (1998). *Teaching with the brain in mind*. Alexandria, VA: Association for Supervision and Curriculum Development.
- KRUGER, H.S. (2007). Goeie voedingstatus van Suid-Afrikaanse kinders is 'n belegging vir die toekoms. Intreerede 19 Oktober 2007. Potchefstroom: Noordwes Universiteit (Reeks H. Wetenskaplike Publikasies).
- LERNER, J. (1993). *Children with learning disabilities. Theories, diagnosis and teaching strategies*. Boston, MA: Hough –Mufflin.
- MANDELA, N. (1996). *RDP office. Children, poverty, and disparity reduction*. Pretoria: Government Printer.
- MALAN, D.D.J. & COETZEE, M. (1994). *Feesbundel: 50-jarige bestaan van die Departement Menslike Bewegingskunde, P.U. vir C.H.O.* Potchefstroom: P.U. vir C.H.O.
- MALAN, D.D.J. & STRYDOM, G.L. (2007). The evolution of physical education at the North West University – a multi faceted historical development. *African Journal for Physical, Health Education, Recreation, and Dance*, 1-23, Special edition, September.
- MILES, L. (2007). *Briefing paper: Physical activity and health*. London: British Nutrition Foundation, High Holborn House.
- MOSLEY, J.R. & LANYON, L.E. (2002). Growth rate rather than gender determines the size of the adaptive response of the growing skeleton to mechanical strain. *Bone*, 30: 314-319.
- NADER, P.R. (2008). Moderate-to-vigorous physical activity from ages 9 to 15 years. *Journal of the American Medical Association*, 300(3): 295-305, July.
- PIENAAR, A.E. (1994). The incidence and treatment of gross motor deficiencies among 6-9 year old children in the junior primary phase. Unpublished doctoral dissertation. Potchefstroom: P.U. for C.H.E.
- PIENAAR, A.E. (2004). Developmental coordination disorder in an ethno-racially diverse African nation: should norms be adjusted? *Journal of Human Movement Studies*, 47: 075-092.
- PIENAAR, A.E. & LENNOX, A. (2006). The value of an intervention programme based on an integrated approach on 5-8-year-old farm worker children with DCD FLAGH-study. *South African Journal for Research in Sport, Physical Education and Recreation*, 28(1): 69-83.

- PIENAAR, A.E.; LABUSCHAGNE, G.M. & PEENS, A. (2007a). The motor and sensory development of 5-6 year old children in low SES circumstances: Thusano-study. *African Journal for Physical, Health Education, Recreation, and Dance*, 13(1): 304-320 September (Supplement).
- PIENAAR, A.E.; STADLER, C.; OOSTHUIZEN, A.; TRUTER, L. & ENGELBRECHT, L. (2007b). Physical activity and the effect of a movement activity program on the energy expenditure of pre-school children. *International Council of Sport Science and Physical Education (ICSSPE). Bulletin no 51. Feature on Physical Education in Early Childhood*, 51: 1-7, September.
- RIDDOCH, C.H.; ANDERSON, L.B.; WEDDERKOPP, N.; HARRO, M.; KLASSON-HEGGEBO, L. & SARDINHA, L.B. (2004). Physical activity levels and patterns of 9-to 5-year old European children. *Medicine and Science in Sports and Exercise*, 36: 86-92.
- SALLIS, J.F. & PATRICK, K. (1994). Physical activity guidelines for adolescents. Consensus statement. *Pediatric Exercise Science*, 6: 302-314.
- SHERRILL, C. (2004). *Adapted physical activity, recreation and sport. Cross disciplinary and lifespan. (6th ed.)*. New York, NY: McGraw Hill.
- SINAIKO, A.R.; DONAHUE, R.P.; JACOBS, D.R. & PRINEAS, R.J. (1999). Relation of weight and rate of increase of weight during childhood and adolescence and body size, blood pressure, fasting insulin and lipids in young adults. The Minneapolis Children's Blood Pressure Study. *Circulation*, 99: 1471-1476.
- SCHNEIDER, H. & LOUNSBERY, M. (2008). Setting the stage for lifetime physical activity in early childhood. *Journal of Physical Education, Recreation and Dance*, (7): 19-23.
- SOUTH AFRICA (1997). Department of Education. Policy document. Foundation Phase (Grades R to 3). Pretoria: Department of Education.
- STATISTICS SOUTH AFRICA (2008). Statistical release, P0302. Mid-year population estimates for 2008, 31 July 2008. Pretoria: Statistics South Africa.
- STEYN, C. (2007). All South Africans at risk of dying young, says new report [www.heartfoundation.co.za/doc/releases/SAREPORT]. Retrieved 15 October 2008.
- STRONG, W.; MALINA, R.M. & BLIMKIE, C.J. (2005). Evidence based physical activity for school aged youth. *Journal of Pediatrics*, 146: 732-737.
- TAYLOR, W.C.; BLAIR, S.N.; CUMMINGS, S.S.; WUN, C.C. & MALINA, R.M. (1999). Childhood and adolescent physical activity patterns and adult physical activity. *Medicine and Science in Sports and Exercise*, 31: 118-123.
- TELAMA, R.; LAASKO, L. & YANG, A. (1994). Physical activity and participation in sports of young people in Finland. *Scandinavian Journal of Medicine*, 4: 65-74.
- TWISK, J.; KEMPER, H.C.; VAN MECHELEN, W. & POST, G.B. (1997). Tracking of risk factors for coronary heart disease over a 14-year period: A comparison between lifestyle and biologic risk factors with data from the Amsterdam Growth and Health Study. *American Journal of Epidemiology*, 145: 888-898.
- VOLKSBLAD (2007). Vroeë kinderontwikkeling kry hulp. 7 Oktober.
- WILKEN, F. (Spreker). (2008). Saamtrek van Belangegroep vir Preprimêre skole van die Suid-Afrikaanse Onderwysers Unie (SAOU): Gauteng streek. Huidige verwickelinge in preprimêre onderwys. Utopia Place, Pretoria, 30 Augustus 2008.
- WINNICK, J.P. (2005). *Adapted physical education and sport (4th ed.)*. Champaign, IL: Human Kinetics.

Prof. Anita E. Pienaar: School of Biokinetics, Recreation and Sport Science, North-West University Potchefstroom Campus, Private Bag X6001, Potchefstroom 2520, Republic of South Africa. Tel: + 27 (0)18 299 1796, Fax: + 27 (0)18 299 1796, E-mail: anita.pienaar@nwu.ac.za

(Subject editor: Dr. G.K. Longhurst)