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**Physical Education in Early Childhood  
Education and Care  
Researches – Best Practices – Situation**

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*Editors*

**Bratislava 2019**

## **Physical Education in Early Childhood Education and Care: Researches – Best Practices – Situation**

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## Introduction

You are holding a book that is one of the intellectual outcomes of the ERASMUS + project '590769-EPP-1-2017-1-TR-SPO-SSCP, Development of Preschool Physical Activity, Sports and Game Program for Strengthening of Grassroots Sports in EU. The project acronym is „LUDUS – Just Move and Have Fun“. This project, addressed in 2018 - 2019, is focused on supporting physical activity of preschool children. Six partner institutions are involved: Sport Volunteers Association and Hacettepe University in Turkey, University of Padua in Italy, Asterias Sports Club in Greece, Kindrgarden Mecho Pooh in Bulgaria and Comenius University in Bratislava, Slovakia.

The book is also part of the 4<sup>th</sup> Physical Education World Wide Survey, which is carried out by UNESCO in cooperation with FIEP and its partners. The publication is part of one of its lines, focusing on mapping the basic characteristics of physical education and physical activities of children and youth in the world at individual levels of schools, from pre-school education to universities. In 2017 the book "Physical Education in Primary School: Researches - Best Practices - Situation", edited by D. Collela, B. Antala and S. Epifani, was published by Pensa Multimedia in Italy and has 502 pages. 102 authors from 27 countries and 5 continents participated. In 2018, it was followed by a publication "Physical Education in Secondary School: Researches - Best Practices - Situation", published by the University of Montenegro in cooperation with the Montenegrin Sport Academy. The editors were S.Popovič, B.Antala, D.Bjelica and J.Gardašević. It had 343 pages and was prepared by 84 authors from 24 countries and 5 continents.

The publication "Physical Education in Early Childhood Education and Care: Researches - Best Practices -Situation" is published in Slovakia by the Slovak Scientific Society for Physical Education and Sport. Its editors are B. Antala, G. Demirhan, A. Carraro, C. Oktar, H. Oz and A. Kaplánová. It has 464 pages. The contribution of the international organization AIESEP, whose members of its Special Interest Group for Early Years, is also a significant part of the publication. A series of these 4<sup>th</sup> Physical Education World Wide Survey publications will be completed in 2020 with the publication of "Physical Education in Universities: Researches - Best Practices - Situation"

The book is divided into four parts. In the first part of "LUDUS - Just Move and Have Fun" we bring the results of the scientific part of the project focused on literary reviews in the individual participating countries of the project and the results of comparative research of the opinions of parents, teachers, directors of institutions and trainers in individual countries on selected issues of pre-school children participating in regular exercise activities at nurseries and kinder gardens. In the second part of the publication called "Researches", we bring the latest research findings aimed at exploring the physical activity of children in pre-school facilities. The third part, the “Best Practices” brings examples of good practice from different countries of the world and the last fourth part “Situation” is focused on presenting knowledge related to the characteristics of the state of the issue in various countries of the world.

120 authors from 32 countries and five continents participated in the book, of which 20 were European countries (Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Finland, Germany, Greece, Italy, Ireland, Lithuania, Norway, Poland, Portugal, Serbia, Slovakia, Spain, Turkey, Ukraine, United Kingdom) 2 countries from America (Mexico, USA), 4 countries from Asia (China, Hong Kong, Malaysia, Singapore), 3 countries from Africa (Algeria, RSA, Senegal) and 3 countries from Oceania (Australia, New Zealand, Samoa). Therefore, the publication brings a broad international perspective on the issue of pre-school physical education and physical activities in pre-school facilities.

A thank you goes also to the reviewers who, through their comments and advice, helped the authors improve the quality of their contributions.

Branislav Antala  
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Editors



## Resistance Exercises or Free Play in Function of Preschool Children Inactivity Prevention

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### Abstract

Over the past last decades, in most developed nations, opportunities for children to play, especially to play outdoors with other children, have continually decreasing causing many related health problem such as obesity and decrease of muscle strength. Muscle strength is considered as a powerful marker of health in children and adolescents. For adequate and balanced children development some form of resistance training is highly recommended as a part of regular daily activities. Exercises with bands comprised of elastic material that requires muscle force have been documented as a safe and effective strategy to improve the muscle strength and increase the ability to perform functional tasks in various frail populations with low initial level of muscle capabilities. The benefits of structured physical exercise programs in young children are not well defined in the literature. The decontextualized, repetitive movements performed on devices and machines are not suitable for young children, even thou possibility of performing functional movements allows the stimulation of functional motor patterns against resistance in different planes. The game is a sociocultural phenomenon, because it concerns the set of human activities and ambitions, presenting an infinite quantity and variety. With eminent characteristics of the game, a free action, within a social context and a set of rules, prevailing the symbolism to the reality and that promotes fun and pleasure in accomplishing it presents an irreplaceable part of preschool physical activity. The benefits of structured physical exercise programs involving elastic band for very young children have to be incorporate only as a part of preschool physical activity with a lot of attention on basic principles, safety and fun.

**Key words:** Preschool children, Physical inactivity, Free play, Elastic band

### **Emerging problems of physical inactivity in preschool children**

Physical activity levels are declining in all parts of the world. Wealthy, middle or low-income countries share a decline in physical activity. It's clear that this decline in physical activity is a key contributor to the global obesity epidemic, and in turn, to rising rates of chronic disease everywhere (NCD Risk Factor Collaboration, 2016; WHO, 2017, 2019). Overweight and obesity in childhood is reaching alarming proportions globally and poses an urgent and serious challenge, and has lately developed into a global health issue (WHO, 2017).

Although an emerging trend suggests a stagnating prevalence of obesity - especially for younger (pre-school) children (Olds, 2011), in 2016, forty-one million children under the age of 5 were overweight or obese (WHO, 2019). Healthy physical activity habits established in childhood and adolescence are often carried into adulthood (Sallis & McKenzie, 1991). Positive association was shown (Moore, Gao, Bradlee, et al., 2003) between higher levels of physical activity in kindergarten children and their lower body weight and body fat later in the period of early adolescence, indicating the importance of sufficient physical activity in the early childhood. Enrolment in physical activity programs in preschoolers can lead to improved overall health. More specifically, in improvement in body composition, increase in bone mineral density, enhance mental health and well-being and stimulate a more positive attitude towards lifetime physical activity and development of motor skill (Lopes et al., 2011; Donnelly et al., 2016).

Researchers are focused on main reasons for decreased physical activity levels in childhood. Development of technology and entertainment industry has changed nature of children's recreational pursuits. Two decades ago the emergence of television shows, computer games and the internet was one of the important factors influencing decreased physical activity (*The 1997 Survey of Parents and Children*). Today, with constant trend of change in environmental factors such as insufficient safe space for playing, produced situation where children are spending much more of their free time engaged in sedentary pursuits

Motor development is recognized as important dimension of child development and can be used for assessment of the overall rate and level of development during the early childhood (years from 2 to 6), which has been often considered as the "golden years" for motor development (Williams, & Monsma, 2006). Some studies (Williams, Pfeiffer, O'Neill, Dowda, McIver et al., 2008; Cliff, Okely, Smith, & McKeen, 2009) showed that preschool children with poorer motor skill performance were less active than children with better-developed motor skills.

### ***Motor skills and child development***

The movements are really a critical aspect of evolutionary development, because it is through them that the child interacts with the environment, exchanging energy and information (Tani, 2016). The children's movement becomes apparent during the beginning of the fetal period, resulting from spontaneous dynamics, called reflexes and rhythmic stereotypes. Two essential functions of the primitive reflexes of survival are to seek nourishment and protection; later, postural reflexes begin to emerge as precursors of voluntary movements that appear between the

ninth and fifteenth month after birth. Already the voluntary movements presuppose intention and motivation, which are manifested in the first motor experiences through the perception and exploration of the body, objects and spaces. All voluntary movements, in the first place, involve an element of perceptual awareness, the product of some kind of sensory stimulation. Secondly, the development of the individual's perceptual capacities depends in part on motor activity (Haywood & Getchell, 2009; Gallahue, Ozmun & Goodway, 2012).

Motor developmental disorders have been associated in the literature with a lower level of physical activity, physical fitness, higher body mass index, school failure, difficulties in the relationship between peers and lower involvement in plays in school (D'Hondt, 2013; Barnett et al, 2016). The development of motor skills can be characterized as a complex phenomenon that evolves from the free play to complex and specific movements performed in structured programs of physical exercises and in the sport. Given the playful context in the early years of childhood, the free play is a key point for the motor competence.

### ***Children's game and free play***

From the end of the 60's, there was a great interest in studying the child in free and typical situations of childhood, that is, in their natural habitat (Perrotti & Manoel, 2001). The play in a free situation were essential for the acquisition of motor skills, improvement of physical fitness and perceptive motor development, as well as providing ontogenetic adaptations of great relevance for the formation of patterns of social interaction. From the age of three, there is a predominance of chase-racing activities and rough and tumble play (Pereira, 2012). These behaviors have been widely investigated where children simulate duels experiencing or experiencing situations of conflict, domination and cooperation (Storli, 2015).

The game is a sociocultural phenomenon, because it concerns the set of human activities and ambitions, presenting an infinite quantity and variety. The diversity of phenomena considered as game shows the complexity in defining it, not different, there are innumerable ways to approach its study, from pedagogy to mathematics, passing through Huizinga, Piaget, Vygotsky, Neuman, Nash (Caillois, 2017). In general, they are eminent characteristics of the game, a free action, within a social context and a set of rules, prevailing the symbolism to the reality and that promotes fun and pleasure in accomplishing it (Huizinga 2003, Kishimoto 1998).

The game is temporally and spatially limited and can be more or less structured and capable of promoting socialization without material or lucaric interest (Huizinga, 2003; Kishimoto, 1998). In the game we find different levels of organization (molecular, cellular, organic, behavioral and social) that are linked to generate behaviors, which assume strong social and cultural meanings (Perrotti & Manoel, 2001; Papalia & Feldman, 2009, Gallahue et al, 2012).

### ***Free play and school recess***

School playgrounds are privileged spaces for the promotion of active and healthy lifestyles, and should not be neglected (Lopes, Santos, Lopes & Pereira, 2012). The use of school playgrounds can stimulate the development of numerous skills, such as: cooperation, sharing, communication, conflict resolution, self-discipline, entrepreneurial characteristics, respect for rules, and respect for cultural diversity (National Association of Early Childhood Specialists [NAEC], 2002), however, it is necessary to create the conditions so that the child can explore, imagine, enjoy different environments and materials (Pereira, Pereira & Condessa, 2014). Therefore, the space used for school playgrounds is fundamental to optimize children's games and play and can be divided into natural and / or traditional spaces in large or small, poor or enriched environments.

The natural environment are characterized by the possibility of interaction and exploration of different types of soils, trees and shrubs that allow skills such as climbing, jumping, and hiding. The traditional spaces are paved areas, with the presence of manufactured and rigid equipment, which allow the exploration in a more structured way. The dimension of space is a critical factor for the emergence of behaviors involving skills such as running through the various games of chase. The materials in the environment stimulate manipulative skills such as throwing, rolling and kicking the ball. The differences in the configuration of spaces and the physical attributes they contemplate, the distinction between green and traditional spaces, large and small, and rich and enriched are essential determinants for the stimulation of play at school playground.

According to the ecological approach of Gibson's Perception and Action (1979), motor development is influenced by the manipulation of environmental constraints and properties that can be perceived by children in substances, surfaces, places, and objects, enabling different forms of movement, these possibilities of actions are characterized as affordances. Natural spaces, ample and enriched provide more affordances, that is, more possibilities of motor actions.

The Current trends in urbanization, reduced natural spaces, and little exposure of children to nature have led to the growth of research on the effects of playgrounds on children's physical and motor development (Lim, Donovan, Harper & Naylor, 2017). Dyment, Bell & Lucas (2009) in a systematic review was observed positive associations between school yards with larger dimensions and green spaces with children's levels and physical activity. In contrast, with obesity rates and the body mass index was observed negative associations. More recently, the literature review proposed by Hartig et. al (2014) indicated that contact with green areas contributes to physical benefits and minimizes health problems related to physical inactivity.

Thus, the contact with natural spaces in the school playground has been shown to be an impact factor for the development of motor skills in children (Fjortoft, 2001; Fjortoft, 2004). The engagement of children in different motor actions is not only related with the perception of possibilities of actions, but also with the perception of limits and risks that these actions are inserted in the environment.

In short, the presence of large, natural spaces enriched in school playgrounds has been positively associated with increased levels of physical activity, especially vigorous intensities, development of motor skills and perception of skills and affordances in the environment. This cycle is important because the increase in the perception of motor competence results in the perception of new and more challenging affordances in the playground environment, contributing to increase the complexity of the motor actions performed in the class intervals. However, many are the restrictions of free play to children in recent years and this trend impact on the decline of motor development, physical and fitness activity.

### ***Decrease of children's play***

At the moment, children play is in unfairable position. Over the past last decades, in most developed nations, opportunities for children to play, especially to play outdoors with other children, have continually decreasing (Grey, 2011). Situation is even more pronounced in very young children. Children 3 to 11 years of age have lost 12 hours per week of free time, decreasing children's playtime by 25% in period of 1981 to 1997 (Hofferth, 2011). With focus dominantly on achievement, concerns about school performance and child future academics, after-school enrichment programs, increased homework and extraculicular activities all lead to ever-increasing control of adults over children's activities, and logically decreased free playtime. Influence and aggressive approach of TV shows video games for smartphone and tablet all encourages passivity and the culture of consumption rather than active free play. Also, many children do not have safe places to play with many realistic safety concerns in many neighborhoods combined with less access to quality public spaces. All this combined with parent's lack of time caused with "modern" and stressful way of living lead to current position of children's play.

Alarming statement of Joe Frost in his book: *A History of Children's Play and Play Environments*, has come to an end. "Even under the most terrible conditions children played their traditional games in their traditional ways—until now," writes Frost. "Now, for the first time in history, the children of entire industrialized nations, especially American children, are losing their natural outdoor grounds for play and forgetting how to engage in free, spontaneous outdoor play. The consequences are profound" (Frost, 2009).

### **Decreases of muscle strength**

Muscle strength is considered as a powerful marker of health in children and adolescents. For adequate and balanced children development some form of resistance training is highly recommended as a part of regular daily activities. In addition to increased muscular strength regular engagement in resistance exercises has the potential to influence several other aspects of health like: improvement of body composition, increased bone mineral density, increased cardio-respiratory fitness, enhanced mental health and well-being and a more positive attitude towards lifetime physical activity (Figenbaum et al, 2009).

It is evident that present-day children and adolescents are not as active compared to their peers few decades ago. Several evidence based research showed a reduction over the years in children's participation in physical activity and organized community sport (Dollman, Norton, & Norton, 2005; Donnelly & Lambourne, 2011). Also, there is an evident trend of decrease in children muscular capabilities observed in several European countries in the last decade (Urdiales, Ruiz, Ortega et al., 2010; Ignjatovic, 2017).

### **Resistance training in preschool children**

Although there is not a single chronological age at which it seems acceptable for youth to formally start organized exercising, recent guidelines recommended that any child engaging in a form of resistance training is emotionally mature enough to accept and follow directions and possesses competent levels of balance and postural control (approximately 6-7 years of age) (Lloyd et al., 2015). Foundational levels of strength should be engaged even from early childhood (Lloyd et al., 2015) when it is performed under supervision and with appropriate instructions.

Still, there is a clear lack of information's concerning very young children (under 7 years). Some studies showed that children as young as 5 and 6 years have benefit from regular participation in a resistance training program (Annesi, 2005; Faigenbaum et al., 1999). However, these studies included children of wide age span (from 5 till 12) and studies including more homogenous child group consisting of preschool age are needed.

Classical resistance training programs designed for children and youth usually include adult and children size weight machines, free weights, hydraulic machines, pneumatic machines, medicine balls, elastic bands, isometric contractions, and body weight exercises (Faigenbaum et al, 2009). However, majority of them are not applicable for very young children. Performing planned number of sets and repetitions could be very monotonous and dull for children to perform on the regular basis.

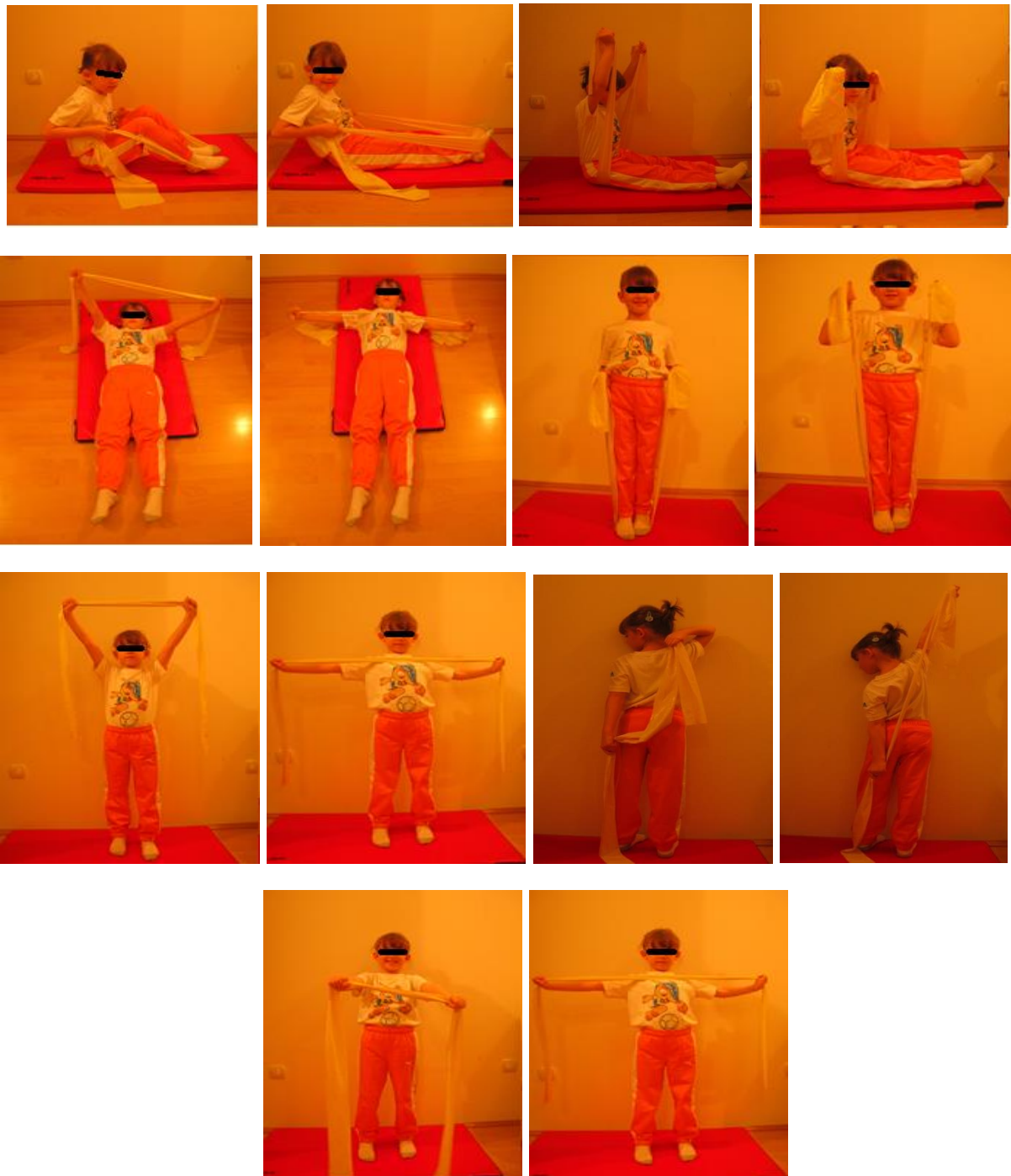
### **Resistance exercises with rubber bands**

Exercises with elastic bands gained considerable popularity as a form of resistance training among various populations seeking to increase their muscle strength and performance. One of the reasons for this popularity lies in the possibility to generate muscle force throughout entire range of motion and the potential for providing resistance in different planes (not just in vertical plane – direction of gravity). In this way it's possible to provide resistance to more functional movement patterns that mimic everyday activities and simple motor tasks which makes it suitable for use with very young children.

Exercises with bands comprised of elastic material that requires muscle force to transiently extend the length of band have been documented as a safe and effective strategy to improve the muscle strength and power, and increase the ability to perform functional tasks in various populations: Children (Faigenbaum, 1999) youth (Coskun, 2014), athletes (Treiber, 1998) and older adults (Galvao and Taaffe, 2005). The resistance exercise program using elastic bands

showed to be especially safe and beneficial on functional fitness for frail older adults (Dancewicz et al., 2003) and Wheelchair-bound Senior (Chen, 2015) providing enough evidence for safety and effectiveness in frail populations with low initial level of muscle capabilities.

With additional supervision of adults, interesting presentation of exercises, lot of patient, cheerful and exciting working atmosphere elastic band exercise could be a valuable strategy for muscle strength increase in very young children.



### **Children play is irreplaceable**

A secular decline in the physical activity level, physical fitness and motor development has been suggested in the literature (Roth et al., 2010; Tester, Ackland, & Houghton, 2014). This trend is related to several factors, namely: urbanization process, reduction of free spaces, overvaluation of the schooling process and technological advances. The technology already present long before science in antiquity these days are strongly associated with the recurrent advances of artificial intelligence and the high time spent by adults and children in front of the screens (Lee et al., 2015). Sedentary behavior is now seen as a public health problem. Therefore, strategies are needed to increase the level of physical activity of children.

Physical activity can be observed in children in formal and informal activities, that is, in functional and daily activities, in urban mobility (active transportation), involvement in structured exercise programs, high-performance recreational in free games between pairs. Given the constraints of spaces for free play in childhood, school recess is a possible and effective alternative to allow times and spaces enriched with possibilities for a variety of games and movements (Hartig et al., 2014). Natural spaces have more affordances when compared to traditional spaces playgrounds and the presence of materials enhance the emergence of more complex and diversified motor skills. However, for greater benefits in physical fitness it is also necessary to create strategies to increase the intensity of games in childhood (Fjortoft, 2001; Fjortoft, 2004).

The benefits of structured physical exercise programs in young children are not well defined in the literature. The decontextualized, repetitive movements performed on devices and machines are not suitable for young children. Already the use of elastic bands in resistance training has become increasingly popular. The possibility of performing functional movements allows the stimulation of functional motor patterns against resistance in different planes. With the young child in a continuous process of development of motor performance, the use of the elastic bands allows the increase of the control of the motor skills and consequently of the expression of the muscular force.

However, use of elastic bands in young children must be limited to certain time while children possess desire to be involved in this kind of exercises. In our previous experience, children are not interested in repetition of the same exercises twice, demanding diversity of the exercises at all time in order to keep them interested and motivated. Also, exercises with the use of elastic band should mimic the movement of animals or things interesting and familiar to children in order maintain the interests for exercising.

Additionally, the principle of safety should be carefully taken for consideration. The exercises with rubber bands must be supervised at all time, with constant help and assistance in exercise performance should be given to most of children. Depending on the number of children in the group, more educators are needed in order to maintain optimal and safe exercise program.



Finally, the overall exercising must be fun and enjoyable for children, so the movement with resistance (rubber bands) should only be one part of the exercise session, making it a possible addition value of children daily physical activity. Various children games are still irreplaceable, and should make a dominant part of every preschool child physical activity program.

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