Physical qualities and body mass index in children

***Msc. Marjo SHABANAJ*[1]**
Department of Education
European University of Tirana
marjo.shabanaj@uet.edu.al

***Msc. Bora SULKA* [2]**
Department of Education
European University of Tirana
bora.sulka@uet.edu.al

Abstract

Physical development refers to the level of growth and control over muscles, coordination and the ability to sit, stand, walk and run. Motor development is part of physical development and refers to increasing a child's ability to use their body and physical abilities. (Darlene Tanck, Dolly's Daycare, Merrill, Teresa Storm, Tender Times Child Care, Amery, John Ratey, MD. Harvard Psychiatrist)

[1] **Msc. Marjo Shabanaj** has finished the Master of Science "Physical Activity and Health Specialist" at the Spot University of Tirana. 2014 trainer in "Rehabilitation of Children with Autism" and the development of motor skills at the "SMART" sports center. Scientific research at the conference "International Conference in Sports Science, ICSS". Specialization and certification "Sports Administrator" International Olympic Committee "IOC". 2015 "Personal trainer, nutritionist" certification. Former football player, since November 2011 specialist in the rules of the football game, football referee at the FHF, Superior Category (Professional Football League) LPF. Currently a full-time lecturer at UET, near the Department of Psychology, Education and Sports.

[2] **Msc. Bora Sulka** has finished her master studies on "Physical Activity and Health Specialist" at the University of Sports of Tirana. Scientific research at the conference "International Conference in Sports Science, ICSS" Specialization and certification "Sports Administrator" International Olympic Committee "IOC" Specialization in "FA ALBANIA Coaching Award UEFA B DIPLOMA". Specialization "Diploma Girl's Football Coaching Course"/ 2016-2018 Manager of the fitness network "BODY CODE" 2019 Dietitian consultant. Currently a full-time lecturer at UET, near the Department of Psychology, Education and Sports.

Motor development can be divided into gross motor skills and net motor skills. (Darlene Tanck, Dolly's Daycare, Merrill, Teresa Storm, Tender Times Child Care, Amery, John Ratey, MD. Harvard Psychiatrist). Measurement of body mass index in children by the method (BMI) weight / height2. Measurement of maximum oxygen consumption VO2 max by indirect measurement, Comparison of BMI between boys and girls and maximum oxygen consumption. Comparison of data obtained from tests obtained from maximal oxygen consumption and measurement of body mass index in children aged 6-7 years to highlight the difference or not of these abilities between the two sexes. The relationships between body weight, obesity and health have been extensively studied. Although the primary role of adiposes is to replace triglycerides, they play a more complex role, in the production of many hormones, prohormones, cytokines, and enzymes with autocrine, paracrine, and endocrine actions or actions. In the state of obesity, the production of proteins derived from adipose tissue is increased, causing significant health consequences. There are regional differences in protein production in adipose tissue. Expansion of adipose tissue deep in the organs has negative effects on the body on hormonal functions and metabolism which contribute to the development of diseases and other chronic health problems. Freedman, D.S., Horlick, M. & Berenson, G.S., 2013. A comparison of the Slaughter skinfold-thickness equations and BMI in predicting body fatness and cardiovascular disease risk factor levels in children. Am. J. Clin. Nutr., 98(6), pp.1417–24.

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1. Introduction

Physical development refers to the level of growth and control over muscles, coordination, and the ability to sit, stand, walk and run. Motor development is part of physical development and refers to increasing a child's ability to use their body and physical abilities. (Darlene Tanck, Dolly's Daycare, Merrill, Teresa Storm, Tender Times Child Care, Amery, John Ratey, MD. Harvard Psychiatrist)

Motor development can be divided into gross motor skills and net motor skills. (Darlene Tanck, Dolly's Daycare, Merrill, Teresa Storm, Tender Times Child Care, Amery, John Ratey, MD. Harvard Psychiatrist)

- Gross motor skills refer to the child's ability to control large parts of the body, balance, coordination, self-control, movement and stability. (Darlene Tanck, Dolly's Daycare, Merrill, Teresa Storm, Tender Times Child Care, Amery, John Ratey, MD. Harvard Psychiatrist)
- Clear motor skills refer to the level of coordination and the ability to manipulate small body parts. (eg Using the thumb and forefinger to grasp

and lift a raisin), (Darlene Tanck, Dolly's Daycare, Merrill, Teresa Storm, Tender Times Child Care, Amery, John Ratey, MD. Harvard Psychiatrist)

The child's ability to be physically active depends on physical growth and development. (Darlene Tanck, Dolly's Daycare, Merrill, Teresa Storm, Tender Times Child Care, Amery, John Ratey, MD. Harvard Psychiatrist) There are many aspects that affect the development of physical and gross physical abilities, such as:

- Locomotor Skills: Rolling, crawling, walking and running. (Darlene Tanck, Dolly's Daycare, Merrill, Teresa Storm, Tender Times Child Care, Amery, John Ratey, MD. Harvard Psychiatrist)
- Balancing and coordination skills: Standing, jogging, walking on tiptoe and dancing.
- Manipulative Skills: Holding, throwing and waiting.

Also not all children grow and develop in the same way or degree, it is important to keep in mind the general growth patent in young children. This growth patent explains a lot about the movements and activity of children. (Darlene Tanck, Dolly's Daycare, Merrill, Teresa Storm, Tender Times Child Care, Amery, John Ratey, MD. Harvard Psychiatrist) When working with children in your care the following key points should be kept in mind:

- After birth, the part that grows fastest in our body is the head.
  - Consequently, infants and toddlers have a higher center of gravity
  - This makes it difficult to maintain balance and because of this young children are more likely to fall. (Darlene Tanck, Dolly's Daycare, Merrill)

- Body length throughout early childhood. (Darlene Tanck, Dolly's Daycare, Merrill)
  - This lowers the center of gravity. (Darlene Tanck, Dolly's Daycare, Merrill)
  - As the body grows, children are better able to maintain balance and less likely to fall. (Darlene Tanck, Dolly's Daycare, Merrill, Teresa Storm, Tender Times Child Care, Amery, John Ratey, MD. Harvard Psychiatrist)
  - Children do not develop the center of gravity in the same way as an adult until they reach the age of 6 years.

- Children grow out of their body and out (from the inside to the extreme)
  - Children's arms grow in front of the hands, hands grow in front of the fingers. The legs grow in front of the feet.

- For this reason children develop Gross motor skills earlier than Net ones. (Darlene Tanck, Dolly's Daycare, Merrill, Teresa Storm, Tender Times Child Care, Amery, John Ratey, MD. Harvard Psychiatrist)
- Infants demonstrate this process best when they learn to grasp objects. (Darlene Tanck, Dolly's Daycare, Merrill, Teresa Storm, Tender Times Child Care, Amery, John Ratey, MD. Harvard Psychiatrist) Newborns use their whole arm to slide over the object and as they grow older they begin to use their hand completely to grasp objects and will then use their fingers to grasp objects.

Brain development refers to the growth of the brain and the creation of new connections in the brain. Movement and being active positively has an impact on brain development. Physical activity helps the body produce chemicals that act as miracle-boosters for the brain (John Ratey, MD. Harvard Psychiatrist). (Wisconsin Department of Public Instruction Tony Evers, PhD, State Superintendent) (Wisconsin Department of Health Services Dennis G. Smith, Secretary) (Wisconsin Department of Children and Families Eloise Anderson, Secretary)

Factors affecting the early development of the brain.

- Physical activity
- Genetic
- Oxygen
- Accountability of carers.
- Daily experiences.
- Love

Language (speaking) development refers to the learning process of speaking and communicating. Language development is related to physical development. Knowing the words that describe the body, the types of movements, the intensity, the direction and the connections in space helps children to learn, practice and improve skills. Movement and growth stimulate the brain (frontal lobe) and enrich the tongue and motor development. (John Ratey, MD. Harvard Psychiatrist.)

Quick suggestion

When practicing physical activity with children under your care, talk about movements using vocabulary that will help children understand their activity. (Darlene Tanck, Dolly's Daycare, Merrill, Teresa Storm, Tender Times Child Care, Amery, John Ratey, MD. Harvard Psychiatrist)

"I have been trying for several months to teach a child how to dance. She was 4 and a half years old, and it was very difficult for her to cross the midline with her

body, and I tried very hard to learn the right way. After I showed her some of the ways, it was a CD which taught her this skill. That day she was able to dance, and we all had a lot of fun and did a little dance. It was very beautiful the moment when you saw her face happy for the realization of that ability. - (Teresa Storm, Tender Times Child Care, Amery).

Movement and brain

Because the motor center affects other parts of the brain, movement assists in benefits such as:

- Brain development
- Integration of sensors
- Vision
- Listening
- Coordination
- Ability to plan movement before the physicist starts moving

(Darlene Tanck, Dolly's Daycare, Merrill, Teresa Storm, Tender Times Child Care, Amery, John Ratey, MD. Harvard Psychiatrist, Verna Drake, Westby Day Care and Learning Center, Westby, Wendy Eagon, University Children's Center, Menasha, April Orth, April's Child Care, Salem,)

TABELE 0 Objectives for the development of Gross motor skills: Table for quick reference

Age	Movement skills	Ability and balance	Manipulative Skills
1 year old	-Holding the head up without moving -Raise your head / shoulders holding it high above your hands. -Rotations from the back of the boat. -Crawling -Attraction for him to get up	-Sit yourself for a moment -Stands on your feet for a moment without support Immediate landing -Falls back and forth with hands and knees (From Active Start: A Statement of Physical Activity Guidelines for Children From Birth to Age 5, 2nd Ed. (2009), www.AAHPERD.org, National Association of Sport and Physical Education)	- Open your hand to release the toys -Extension to catch things with one hand - Hit the things that are closest to you Extensions for catching toys using the whole hand

1-2 year old	-We swim when we wash it in the bath. -Going up and down stairs while being held. -Independent walk. -Move the body in new ways, e.g. tumbling -Side walk and back -Walk towards the ball and shoot it. -Runs alone -Runs increasing speed -Dancing from one place to another -Jumps on objects and goes down the stairs(From Active Start: A Statement of Physical Activity Guidelines for Children From Birth to Age 5, 2nd Ed. (2009), www.AAHPERD.org, National Association of Sport and Physical Education)	-Pertheu to catch toys -We extend to the tips of our feet to achieve something high Climbing and descending from the chair used for adults -Drop when you are playing -You crawl on the beam or the corners of a box - Tends to stay on your feet	-We hold a big ball when we are moving -Lekunde reket -Throw the ball or other objects by pushing it with both hands -Catch a large ball with both hands close to the body and hit it on the ground -We shoot a forbidden ball -Hold objects in one hand and hit the objects with the other -Unload things from the bucket and grab them with the other hand -Throw the ball on purpose -Throw the ball from the back of the head using both hands when standing
2-3 year old	-Walk through the room -Uses brisk walking -Go back -Push a toy with your foot while driving it with the steering wheel-- Climb over the tables using your feet -Move around the room -Walking up and down the stairs, alternating legs in different ways and helping with hands. -Dancing with both feet from one place to another	- Catch toys -We extend to the tips of our feet to achieve something high Ascent and descent from the chair used for adults -Drop when you are playing -You crawl on a line or an adhesive glued to the floor -Side steps on a line or adhesive glued to the floor -Side steps on the beams or corners of a box	-We hold a big ball when we are moving - Throw the ball or other objects by pushing it with both hands -Catch a large ball with both hands close to the body and hit it on the ground -We shoot a forbidden ball

Objectives for the development of Gross motor skills: Table for quick reference, (continued)

Age	Movement skills	Ability and balance	Manipulative Skills
3-4 year old	-Runs Avoidance of obstacles and persons during movements Climbing at least two steps into the gym jungle. Climbing up and down on the equipment of the toy place. -Giving the tricycle by pushing with the foot forward. -Giving the tricycle using the pedals. -Gallopim -Jumps on objects or jumps from the ladder.	-Walk forward along the edge of a curb, looking at the legs. -Dancing from the top down a low degree, the fall to be done with both feet. - Jumping over small objects.	-Throwing the ball or other objects. -Throwing the ball into the body (we fold the arms when they catch it) -Gunning the ball with a large rocket. Throwing the ball forward while jumping or running towards it.
4-5 year old	-Runs smoothly, quickly changes direction and stops / starts very quickly. -Jumps and spins. -Marches - Move through the country with obstacles. Galloping and dancing calmly. -Play “Follow the Leader” using a variety of moves. -Play games that involve jumping or throwing the ball. (From Active Start: A Statement of Physical Activity Guidelines for Children From Birth to Age 5, 2nd Ed. (2009), www.AAHPERD.org, National Association of Sport and Physical Education)	-Dancing on the play-ground, dancing with one foot and with the other foot. -Walking through benches or the edge of a cube, back and forth. Attempt to jump rope. -Jumps, skips, spins around and stops trying not to fall.	-Jump forward to throw the ball and following it directly from behind. Catching the ball after shooting with both hands. Throwing the ball from the closed hand. -Driblo ball. Shoot the forbidden ball. -I hit the ball on the ground and catch it in the air. - Throwing the ball while running Vibration, twisting or swinging of the arm or leg

From Active Start: Introducing physical activity, a guide for children from birth to age 5, 2nd edition (2009) www.AAHPERD.org, National Association of Sport and Physical Education.

Working with children of different ages means working with children at different stages of development. It is important to know what point of physical, brain and language development each child has so you can adapt activities, routine, and environment to the developmental stages of all children. (Darlene Tanck, Dolly's Daycare, Merrill, Teresa Storm, Tender Times Child Care, Amery, John Ratey, MD. Harvard Psychiatrist)

Groups of different ages can enter centers with staff members to assist or in-house with only one caregiver. With a variety of developmental levels, activities need to be flexible. Here are some ideas for achieving developmental levels in an activity. (Darlene Tanck, Dolly's Daycare, Merrill, Teresa Storm, Tender Times Child Care, Amery, John Ratey, MD. Harvard Psychiatrist)

1. Scaffolding. This is a very good way when you have two children of approximately the same age and ability, one ahead of the other. Give the child a physical activity that involves the older child helping the little one such as dribble a ball, throw a ball with rhythm. This will help both children develop their skills. (Darlene Tanck, Dolly's Daycare, Merrill, Teresa Storm, Tender Times Child Care, Amery, John Ratey, MD. Harvard Psychiatrist)
2. To support the activity organized by the children themselves. A big dice with great motor skills on each page or figures adapted to those types of skills are very good tools for promoting self-directed game. Older children can take on the role of rolling the dice or picking up cards and engaging in physical activity. (Darlene Tanck, Dolly's Daycare, Merrill, Teresa Storm, Tender Times Child Care, Amery, John Ratey, MD. Harvard Psychiatrist)
3. Do it with the best of technology (but only when you need it). When the day is busy and you need a quick fun for the kids, it is very rewarding to have an active music CD and DVD.

Activity ideas

Different colored scarves: Each child should have a scarf of different colors and represent things found in nature such as trees, water, sky or animals. Curse younger children so they can learn from sensory exploration. Younger children will also see older ones and act on what they do. (Darlene Tanck, Dolly's Daycare, Merrill, Teresa Storm, Tender Times Child Care, Amery, John Ratey, MD. Harvard Psychiatrist, Verna Drake, Westby Day Care and Learning Center, Westby, Wendy Eagon, University Children's Center, Menasha, April Orth, April's Child Care, Salem,)

Physical activity may be different for children with developmental disabilities. If you are working with a child who has a developmental disability, think about how

physical activity opportunities can be tailored to the individual needs of each child. Here are some examples: (Darlene Tanck, Dolly's Daycare, Merrill, Teresa Storm, Tender Times Child Care, Amery, John Ratey, MD. Harvard Psychiatrist, Verna Drake, Westby Day Care and Learning Center, Westby, Wendy Eagon, University Children's Center, Menasha)

- A child with a speech delay or hearing loss may need frequent visual and verbal cues, such as counting to three with their fingers and toes, and jumping three times.
- A child with a known delay may need smaller data, with simple examples. The child can benefit if assisted by a peer who demonstrates examples.
- An autistic child may be sensitive to noise, touch or light. You may need to adapt the equipment, materials, and environment. In addition, routines are very important with activities that take place at the same time throughout the day. (Darlene Tanck, Dolly's Daycare, Merrill, Teresa Storm, Tender Times Child Care, Amery, John Ratey, MD. Harvard Psychiatrist, Verna Drake, Westby Day Care and Learning Center, Westby, Wendy Eagon, University Children's Center, Menasha)
- A child with physical challenges can thrive in environments that provide enough space to play. Include suitable equipment and accessible materials. You can modify the activities in order to use different parts of the body or make other movements. (Darlene Tanck, Dolly's Daycare, Merrill, Teresa Storm, Tender Times Child Care, Amery, John Ratey, MD. Harvard Psychiatrist)

Be careful not to generalize. Not every child with a certain type of disability or delay will respond with the same suitability. Get to know the children and adapt the activities. (Darlene Tanck, Dolly's Daycare, Merrill, Teresa Storm, Tender Times Child Care, Amery, John Ratey, MD. Harvard Psychiatrist, Verna Drake, Westby Day Care and Learning Center, Westby, Wendy Eagon, University Children's Center, Menasha)

If you are aware that every child is developing at a different level or in a different way, be sensitive to the needs of that child and the child's parents. Be sure to understand the Individualized Education Plan (IEP) or Individual Family Service Plan (IFSP) and how it relates to physical activity. Physical activity should be flexible and appropriate for every child you care for. Resources are able to help you with appropriate activities and materials so that all children can participate in physical activities. (Darlene Tanck, Dolly's Daycare, Merrill, Teresa Storm, Tender Times Child Care, Amery, John Ratey, MD. Harvard Psychiatrist, Verna Drake, Westby Day Care and Learning Center, Westby, Wendy Eagon, University Children's Center, Menasha)

Cultural competence

One of the most important concepts in cultural competence is to honor the individual. (Darlene Tanck, Dolly's Daycare, Merrill, Teresa Storm, Tender Times Child Care, Amery, John Ratey, MD. Harvard Psychiatrist, Verna Drake, Westby Day Care and Learning Center, Westby, Wendy Eagon, University Children's Center, Menasha)The best way to be sure to honor the culture of each child is to get to know each family by constantly communicating about the progress and needs of each child and understanding the values of each family.

Ways to get to know the culture of each family and how each physical activity is viewed include:

- Ask questions about physical activity in interviews and conferences.
- To have an item "All about me" in your CV. Include parts to ask how active the children and their family are. Include pictures of physical activities to promote those activities in your classroom and home.
- Do a demonstration and show physical activity. children can share a game or activity they do with their families at home. You can learn new games and activities as well. (Darlene Tanck, Dolly's Daycare, Merrill, Teresa Storm, Tender Times Child Care, Amery, John Ratey, MD. Harvard Psychiatrist, Verna Drake, Westby Day Care and Learning Center, Westby, Wendy Eagon, University Children's Center, Menasha, April Orth, April's Child Care, Salem)

Tools included

Language development chart
Use this chart to refresh your movement vocabulary so you can teach children how to communicate about movement and physical activity. (April Orth, April's Child Care, Salem)
Family engagement
Plan evenings with family that focus on activity and physical development. this will give you an opportunity to learn how active lifestyles can fit into the family culture in your program. (April Orth, April's Child Care, Salem)
Commitment of communities
Collaborate with the local children's museum to promote physical activity. consider exhibitions designed to educate families about physical development and the promotion of physical activity. (April Orth, April's Child Care, Salem) "At our parents' events, we always involve a moving activity. The best thing so far was that

the fathers did a pole dancing rhythm. "- (Verna Drake, Westby Day Care and Learning Center, Westby) (April Orth, April's Child Care, Salem) We had a father who is a teacher in a public school, and a "Family Evening Evening" came. We have various sectors set up for active participation, which include the strain sector, the course of obstacles, family drag or war, throwing and filling the bucket. We have a large number of participating families. "- (Wendy Eagon, University Children's Center, Menasha). Garrow, J.S. & Webster, J., 1985. Quetelet's index (W/H2) as a measure of fatness. *Int. J. Obes*., 9(2), pp.147–153. Freedman, D.S., Horlick, M. & Berenson, G.S., 2013. A comparison of the Slaughter skinfold-thickness equations and BMI in predicting body fatness and cardiovascular disease risk factor levels in children. *Am. J. Clin. Nutr*., 98(6), pp.1417–24.

Maximum oxygen consumption (VO2 max) in children and adults

Physical efficiency (aerobic fitness) can be defined as: "physiologically as the maximum oxygen uptake (VO 2 max), as the highest degree to which skeletal muscle cells can utilize oxygen for the energy needed to move, or it can be described in functional terms such as gait to cope, time taken to ride a bike, run, or swim a long distance.Maximum oxygen consumption (max VO2) is the highest rate in which an individual can consume oxygen during exercise, the capacity to perform various exercises and is widely known to most young people. (American College of Sports Medicine 1995).

It has been documented by various authors that most children and adolescents can exercise to the point of fatigue without demonstrating a VO2 max (Armstrong et al. 1995). The appropriate term to use with children and adolescents is the amount of oxygen taken in during a physical test, to understand the true existence of a high VO2 max.

All determinants that make a difference from one person's aerobic physical efficiency to another appear in the same way without differences as in children and adults. The additional dimension encountered in children is the increase in physical efficiency both functionally and physiologically.

When VO2 max is expressed in relation to body mass, no significant changes are observed. This has been seen in a study in years in pediatrics of boys, when their typical values during routine testing were 50-52 ml-kg-min. 20% lower than men. (Thomas 2005). This has come from several factors such as: the small size of the sample selected, changes in body composition as well as sex may be responsible for the VO2 max differences in children.

Aerobic physical efficiency during childhood and adolescence

Data from European countries show that VO2 in boys has a progressive increase with respect to chronological age. Data for women show a similar trend around

the age of 13-14 years. Boys' data show an increase in Vo2 max around the age of 11-17 / 18 years. In all studies covering the age of 13 years and 14 years show a greater increase in VO2 max. The data for girls are less clear, showing a progressive increase around the age of 11-13 years and then around the age of 14 there is a decrease in VO2 max. A British study in girls found a 45% increase in VO2 max in 11-17 year old (Armstrong and Welsman 2001). In Amsterdam from a study of the Dutch health institution in women was observed increase in the ages 13-16 years, but also a decrease of only 2% from the age of 14-16 years. (Kemper 2004).

Aerobic physical efficiency over a lifetime
The main determinants of the development of VO2 max in relation to the increase of body mass of children are:

- increase in the amount of "motor" exercises, skeletal muscles
- relative decrease in the oxidation activity of enzymes within skeletal muscle cells.

At the same time, according to the concept of symphysis development, all the factors responsible for determining the changes of VO2 max should constitute a matter, ie a problem. And this, is not a biological reasoning for a part of the system to possess a greater increasing or more advanced functional capacity during biological development in other systems. As a result of the growth of the child, we also have an increase in their aerobic power. Between the ages of 6 and 12, VO2 max in boys more than doubles from 1.2 L-min to 2.7 L-min, while the mean values in girls are about 200 ml min lower than that of men of the same chronological age. During puberty the increase of VO2 max is accelerated because of the influence of the anabolic testosterone, while in women we have the highest peak (Thomas 2005). The peak of VO2 is closely related to body size described by its association with body mass or stature with correlation coefficient r = 0.70 (Armstrong and Welsman 1994). Thus, the peak of VO2 max in relation to increasing age is reflected by growth and transition from childhood to adolescence. Studies generally confirm a stability of age-related VO2 max in boys, while studies in girls unequivocally show a progressive decline in age-related VO2 (Van Mechelen and Kemper 1995). Boys demonstrate higher VO2 than girls during childhood and adolescence, and the differences between them are even greater during puberty (Armstrong and Welsman 2000; Malina and Bouchard 1991). Past studies show that VO2 max depends on chronological age and body mass. Gender differences during childhood and adolescence are attributed to various factors including physical activity, body composition, and hemoglobin concentration in the blood. Boys are more

physically active than girls (Armstrong and VanMechelen 1998), but evidence of physical activity in young people shows a low VO2 (Morrow and Freedson 1994). Usually, boys have a relatively larger muscle mass than girls in childhood, but the differences between them are not very noticeable until adolescence. Between the ages of 5 and 16 we have an increase in muscle mass of boys by about 42-54% of body mass, while in girls we have an increase in muscle mass by about 40-45% between the ages of 5 and 13 and then we have a decline during adolescence. Girls have more fat mass than boys during childhood and in adolescence we have a 25% increase in body mass, while in men we have a decrease of about 12-14% (Malina and Bouchard 1991). These large changes in body composition during puberty, contribute to the difference in VO2 peak between the two sexes during this period.

Aerobic physical efficiency and connection to physical activity

In children, the problem of exercise-health relationship and the relative impact on physical efficiency and activity are less clear. Given that exercise-favored diseases occur in adulthood, the link between exercise in childhood and the positive health effects possible are many or we can say undocumented by scientific studies because of this period. Physical efficiency and physical activity are two completely different definitions or pillars both operationally and mechanically where "Physical efficiency describes how well an individual can perform an exercise and physical activity describes the amount of movement that an individual engages in a given day." .

It is widely accepted that creating a habit of physical activity of any kind is important for the health of children both in the present and in the future (Thomas 2005).

An important question in this regard can then be identified; is how much daily physical activity contributes to the efficiency of motor skills in children? This issue has almost always been in the context of aerobic physiological efficiency (how much daily activity affects VO2 max). In reviews of 10 studies published by Morrow and Freedson (Morrow and Freedson 1994) it was found that, in only about half of these reports (physical efficiency and physical activity) as an important relationship, and even those same studies there was a low correlation (r = 0.20). They therefore suggested three possible explanations:

- Physical activity has not been accurately measured in these studies.
- Young people have a high level of aerobic physical eficenses
- There is no truth to the existence or at least there is a very limited relationship between physical activity and physical eficenses in youth.

It has been observed that there is no significant relationship of aerobic or anaerobic physical eficenses with physical activity in the study of Armstrong et al (Thomas 2005). The correlation coefficient ranged from -0.13 to + -. 0.16 in boys and by -. 02 -, 04 to girls. Exercise studies during puberty have failed to show an increase in aerobic physical efficiency with increased physical activity, possibly since growth exceeds exercise stimulus (Weber, Kartodihardjo, & Klissuouras 1976).

But, before and after aerobic training during puberty has been found to result in increased aerobic physical efficiency (Shephard 1992). From these data it is difficult to master an effective argument in the range of regular daily activity of children and the effect of aerobic physical eficenses. We know that physical activity, as a behavior is difficult to measure precisely, due to two major differences (error and individual variations).

This will affect the relationship of other variables like aerobic physical efficiency, overweight. The relationship between physical activity, aerobic physical efficiency, and overweight can be viewed in a variety of ways. One possible direction of causation may be that low level of physical activity leads to a lower level of eficenses and a reduced sensitivity to metabolic hormones, especially insulin. However, both overweight and low cardiorespiratory efficiency are factors that affect insulin sensitivity in an unfavorable way, and it can be difficult to tell what comes first. Another possibility is that dietary behaviors and physical activity may not be balanced for other reasons and therefore cause overweight. This can lead to an even higher degree of physical inactivity, which can result in a reduced level of cardiorespiratory eficenses.

From all these studies we conclude that to understand the relationship between physical activity, aerobic physical efficiency, and overweight, it is important to have knowledge about the current level of objectively measured physical activity among children and adolescents.

However, a reasonable case for promoting exercise in children to reduce future health risks may be made on the grounds that:

- Activity and fitness can originate from childhood in later years (adults)
- Disease processes (atherosclerosis, osteoporosis, obesity, and hypertension) often have their origins in the pediatric years.

Aerobic efficiency assessments

Included in motor fitness efficiency is aerobic efficiency defined as - "a health component of motor fitness efficiency related to the ability of the circulatory, respiratory, and oxygen supply systems during sustained physical activity." (US Department of Health and Human Services 1996). (MÁRIO C. MARQUES et al.,2012)

Direct measurement of maximal oxygen volume (VO2max) is the most objective and accurate way of assessing aerobic efficiency (cardiorespiratory). This is a test that requires expensive special equipment and is therefore rarely used in large epidemiological studies. This has resulted in the development of indirect tests that either require a maximum job or a job below the maximum. The most used ways of exercising are treadmill or walking and ergo meter.

Correlations between directly and indirectly measured aerobic efficiencies were found to be r = 0.9 for maximal analyzes and r = 0.6 for sub-maximal analyzes (Andersen et al. 1987).

In the lab, we can measure children's aerobic efficiency using the treadmill or bicycle (ergo meter). Treadmill testing is usually more preferred, especially for younger children.

Field aerobic tests, such as 1.0-mile (1600 m) jogging / walking, have been widely used to assess the adequacy of cardio breathing in children 5 to 17 years of age (Physical best program Program 1998, 1994, 1997, 1987).

In Canada and Europe, the multistage 20-meter test, developed and devised by Leger et al ¬ (Leger et al. 1998), is a very popular alternative for assessing the aerobic efficiency of children (8 - 19 years old). For this test, children run at a 20-meter round trip. Speed is determined using a signal emitted from a pre-recorded tape. Initially the pace is 8.5 km-h and the speed increases every 0.5 km / h every minute until they so the children cannot keep pace.

Another test used to measure maximum aerobic capacity is the Andersen test, where individuals run (in two parallel lines 20 m apart) from another line where they run back and forth and at each line touch the floor. After 15 sec and with the signal falling the subjects should stop as fast as possible (about 2 steps) and with the whistle falling the running continues again for 15 seconds. This procedure is followed for 10 min. Subjects run as fast as they can cover the longest distance possible during the 10-min test period, and this distance is the result of the test.

Measuring fat and its distribution in relation to health

The relationships between body weight, obesity and health have been extensively studied. Although the primary role of adiposes is to replace triglycerides, they play a more complex role, in the production of many hormones, prohormones, cytokines, and enzymes with autocrine, paracrine, and endocrine actions or actions. In the state of obesity, the production of proteins derived from adipose tissue is increased, causing significant health consequences. There are regional differences in protein production in adipose tissue. Expansion of adipose tissue deep in the organs has negative effects on the body on hormonal functions and metabolism which contribute to the development of diseases and other chronic

health problems. The American Heart Association has stated that obesity is the leading cause of coronary heart disease in different individuals (Eckel and Krauss 1998). The World Health Organization (WHO) and the National Institutes of Health (WHO) in the United States has stated that obesity as a chronic disease is a major risk for the progression to type 2 diabetes, for the occurrence of various cancers as well as some psycho-social problems in industrialized countries showing a particular concern regarding fat in the part of the abdomen (NHLBI 1998, WHO 1998).

The negative effects of obesity and obesity are likely to begin in childhood and adolescence. Recent surveys confirm that the prevalence of overweight and obesity has increased in the United States (Mokdad et al. 2003; Ogden et al. 2002), while the trend indicates more and more of an increase in this problem worldwide (WHO 1998). The obesity epidemic may soon thwart all efforts to date to prevent various diseases and this may have an impact on the cost to health care. There is an urgent need, a strategy for managing this risk to the population including identifying those with excess adipose tissue that may impair health and quality of life. Obesity is a lifelong health problem related to specific issues related to age, maturity and race or ethnicity. Considering the physiological and health consequences of connective tissue distribution, we should also take the most common measures available to assess the negative consequences.

Measurement of obesity

Obesity is a medical problem. People who are overweight or obese (severely overweight) are more likely to develop health problems than people who have a healthy weight. Getting more calories (energy measurements from food or drink) than your body needs results in weight gain. Large amounts, foods with low nutritional values, and an inactive lifestyle are factors that lead to obesity. (© Copyright 2022 David Carlson, M.D. All Rights Reserved. Website by I.T. ROADMAP.)

Losing even 10% of extra weight has been shown to have good health effects. A slow weight loss (about 1 kg per week) is most beneficial in keeping the extra weight away for a long time. Simple lifestyle changes such as reducing the amount of food, stopping overeating, eating a healthy diet (especially fruits, vegetables and whole grains), and regular exercise are ways to maintain healthy weight. .(© Copyright 2022 David Carlson, M.D. All Rights Reserved. Website by I.T. ROADMAP)

Obesity is a disease which prepares the ground for many different diseases that affect the digestive system, hormonal system, respiratory system, heart and blood vessels. It occurs when the amount of energy received through food exceeds the amount of energy burned by physical activity. Diseases like heart disease, high blood pressure, diabetes, high cholesterol, respiratory disorders, joint diseases,

menstrual disorders, infertility, impotence, gallstone disease, stone formation, some cancers are some of the diseases that have direct link to obesity. Obesity can be defined as a disease which shortens human life and negatively affects the quality of life. According to studies done, over the last twenty years obesity has had a drastic increase and continues to spread as if it were an epidemic. Our country is also affected by this epidemic.

2. Methodology

Objectives

Measurement of body mass index in children by the method (BMI) weight / height2. Measurement of maximum oxygen consumption VO2 max by indirect measurement, Comparison of BMI between boys and girls and maximum oxygen consumption.

Purpose

Comparison of data obtained from tests obtained from maximal oxygen consumption and measurement of body mass index in children aged 6-7 years to highlight the difference or not of these abilities between the two sexes.

Sample selection

An investigation was conducted in three 9-year schools in the city of Tirana, the total number of children = 277 (boys n = 140, and girls = 137), 1st grade.

Tools and methods

The indirect measurement test in the Andersen Test field was used to measure VO2 max and the weight and height of children were used to measure the body measurement index, from which the BMI (kg / m2) was derived by means of the formula weight / height x height. A total of 260 children participated in the VO2 max test and a total of 275 children in the BMI test.

Hypothesis

Knowing that at this age the body changes are not very noticeable between boys and girls, we hypothesize that the body mass index will be approximately the

same while in terms of the level of maximum oxygen consumption boys will have it higher knowing that are more active than girls.

Statistical processing

Table 1 gives a clear overview of the total number n = 277 as well as the gender composition in each test, i.e. variable. Out of the total number of children, boys n = 10 and girls n = 7 did not take the test for health reasons in the Vo2 max test and boys n = 2 for the BMI test.

A total of 260 children participated in the VO2 max test and a total of 275 children in the BMI test.

SPSS 17.0 program was used to perform data analysis. The test data of the respective variables are encoded and placed in the program database and from where they are used: descriptive analysis (total number of children for both boys and girls for VO2 max & BMI tests as well as the representation of children who do not have perform testing for each variable for both boys and girls), averages in frequency or percentage of data, standard deviation as well as the minimum and maximum of results achieved during testing. Relevant test tables and graphs have been constructed for this data.

TABLE 1. Participation in testing

Gender			Vo2max	BMI
Boys	N	Present	130	138
		Absence	10	2
Girls	N	Present	130	137
		Absence	7	0

Below we present the protocols for eVO2 max testing and BMI measurement.

Test protocol

Anthropometric measurements; Height / Weight

Purpose: To determine body height.

Procedure: Length is the measurement of the maximum distance from the floor to the highest point of the head when the child is facing forward. Shoes should be removed, feet together, and arms released adjacent to body.(Dr. C.Ashok,. 2008) The heels, buttocks and shoulders should be supported against the wall during the measurement.

Estimation: In centimeters for the measured length.

FIGURE 1. Measurement of weight and height

Purpose: To determine body weight.

Procedure: The child stands almost motionless with the arms outstretched. Excess shoes and clothes should be removed.

Assessment: Kilogram for weight measurement

Maximum oxygen consumption (Andersen test)

Purpose: Estimation of maximum oxygen consumption

Equipment needed: Meter and flat floor

Procedure: In a gym with a wooden floor, two parallel lines are placed about 20 meters apart. Children should be well informed about the testing procedures, and they should do a body warm-up for about 10 minutes before the test. Children should run from one line to another where they have to touch the floor with one hand at the end of the line, turn and continue running again.(Toftager, M., Christiansen, L.B., Kristensen, P.L. *et al.*) After 15 seconds of testing the leader drops the signal (whistle) and the children should stop as soon as possible (about 2 steps) and wait for another 15 seconds. This procedure should be followed for 10 min. (Ahler T, Bendiksen M, Krustrup P, Wedderkopp N. Aerobic fitness testing in 6- to 9-year-old children: Reliability and validity of a modified Yo-Yo IR1 and the Andersen test. Eur J Appl Physiol 112: 871–876, 2012). They should not have a verbal encouragement. The children must be divided into pairs where one will compete while the other will count the laps.

Assessment: Children should run as fast as they can to reach a distance as large as possible during the 10 min running test and this distance will be the test result. (J. Jarani, A. Grøntved, F. Muca, A. Spahi, D. Qefalia, K. Ushtelenca, A. Kasa, D. Caporossi & M. C. Gallotta (2016) Effects of two physical education programmes on health- and skill-related physical fitness of Albanian children, Journal of Sports Sciences,) At the end each formula will be applied to each child; VO2max = 18.38

+ (0.03301 * distance) - (5.92 * sex) (boys = 0; girls = 1) (r = 0.84) (J Sports Med Phys Fitness)

3. Results

Table 2 presents the data on the mean age for boys 6.8 years (std +/- 0.36) as well as for girls 6.7 years (std +/- 0.37) participants during the tests performed. The number of participants for boys is N = 140 and for girls N = 137. The table also shows the age distribution for boys and girls in the two values (lowest and highest) where for boys the average is 6.8 years old. - 6.9 years old and for girls 6.7 years old- 6.8 years old.

TABLE 2. Average age for boys and girls

Gender		Test Value = 0					
						95% Confidence Interval of the Difference	
		N	Mean	Std. Deviation	Std. Error Mean	Lower	Upper
Boys	Age	140	6.890	0.36	0.03	6.830	6.949
Girls	Age	137	6.761	0.37	0.03	6.699	6.823

(Elham Asa'di, Khalil Motallebzadeh 2013)

Table 3 presents the data for participation during the tests performed for Vo2 max where it is seen that participants present during the tests were for boys Nr = 130 and Nr = 10 of participants who did not take the test and for girls Nr = 130 and Nr = 7 who have not conducted testing. The reasons for not taking the test were: absence from school on the day the test was taken and health reasons.

TABLE 3. No. of Vo2 max participants

Gender			Vo2max
Boys	N	Valid	130
		Missing	10
Girls	N	Valid	130
		Missing	7

Table 4 presents the data for participation during the tests performed for BMI (body mass index) where it is seen that participants present during the tests were for boys Nr = 138 and Nr = 2 of participants who did not take the test and for girls Nr = 137.The reasons for not taking the test were: health reasons and absence from school on the day the test took place.

TABLE 4. No. of participants in BMI

Gender			BMI
Boys	N	Valid	138
		Missing	2
Girls	N	Valid Missing	137 0

Table 5 shows the weighted averages for both boys and girls. For boys the weight is 27.2 kg (std +/- 6.4) and for girls 24.4 kg (std +/- 4.5). The table also shows the weight distribution for boys and girls in the two values (lowest and highest) where for boys the averages are 26.2 kg - 28.3 kg and for girls 23.7 kg - 25.2 kg.

TABLE 5. Average weight (kg) for both boys and girls

Gender		Test Value = 0					
						95% Confidence Interval of the Difference	
		N	Mean	Std. Deviation	Std. Error Mean	Lower	Upper
Boys	Weight	138	27.251	6.35	0.54	26.183	28.320
Girls	Weight	137	24.480	4.53	0.39	23.714	25.246

(Elham Asa'di, Khalil Motallebzadeh 2013)

Table 6 shows the averages for height (m) for both boys and girls. For boys the height is 1.25 m (std +/- 0.05) and for girls 1.22 m (std +/- 0.07). The table also shows the distribution of height for boys and girls in the two values (lowest and highest) where for boys the averages are 1.24 m - 1.26m and for girls 1.21m - 1.24m.

TABLE 6. Average height (m) for both boys and girls

Gender		Test Value = 0					
						95% Confidence Interval of the Difference	
		N	Mean	Std. Deviation	Std. Error Mean	Lower	Upper
Boys	Height	138	1.248	0.05	0	1.239	1.257
Girls	Height	137	1.224	0.07	0.01	1.212	1.235

(Elham Asa'di, Khalil Motallebzadeh 2013)

Table 7 presents the averages for BMI (body mass index kg / m2) for both boys and girls. For boys BMI is 17.4 kg / m2 (std +/- 3.03) and for girls 16.3 kg / m 2 (std +/- 2.27).

The table also shows the BMI distribution for boys and girls in the two values (lowest and highest) where for boys the average is 16.8 kg / m2 - 17.9 kg / m2 and for girls 15.9 kg / m2 - 16.7 kg / m2.

TABLE 7. Average BMI (kg / m2) for both boys and girls

Gender		Test Value = 0					
						95% Confidence Interval of the Difference	
		N	Mean	Std. Deviation	Std. Error Mean	Lower	Upper
Boys	BMI	138	17.352	3.03	0.26	16.843	17.862
Girls	BMI	137	16.292	2.27	0.19	15.909	16.676

(Elham Asa'di, Khalil Motallebzadeh 2013)

Table 8 shows the averages for Vo2 max measured in (m) for both boys and girls. For boys Vo2 max so running in (m) is 730.3 (std +/- 127.8) and for girls 705 (std +/- 118.7). The table also shows the distribution of Vo2 max for boys and girls in the two values (lowest and highest) where for boys the averages are 708.1– 752.5 and for girls 684.4– 725.6

TABLE 8. Average Vo2 max for both boys and girls

Gender		Test Value = 0					
						95% Confidence Interval of the Difference	
		N	Mean	Std. Deviation	Std. Error Mean	Lower	Upper
Boys	Vo2max	130	730.308	127.87	11.21	708.119	752.497
Girls	Vo2max	130	705.019	118.72	10.41	684.418	725.621

(Elham Asa'di, Khalil Motallebzadeh 2013)

4. Conclusions

1. There is no noticeable difference in this age (6-7 years) between boys and girls in terms of height where for boys the height is 1.25 m (std +/- 0.05) and for girls 1.22 m (std +/- 0.07).
2. There is a greater value in terms of boys when measuring body weight

approximately 2.8 kg where for boys the weight is 27.2 kg (std +/- 6.4) and for girls 24.4 kg (std +/- 4.5).

3. When measuring the body mass index, it is noticed that boys have a higher BMI knowing that the values in weight are higher where for boys BMI is 17.4 kg / m2 (std +/- 3.03) and for girls 16.3 kg / m 2 (std +/- 2.27).
4. It is noticed that during the test of VO2 max measurement boys ran more than girls where for boys running in (m) is 730.3 (std +/- 127.8) and for girls 705 (std +/- 118.7).
5. In conclusion at this age there is no noticeable difference in body mass index between boys and girls, but in terms of testing the measurement of maximum oxygen consumption boys have higher values than girls where boys 42.48 ml / kg / min and girls 35.7 ml / kg / min.

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