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EDUCATIONAL PLANNING FOR OBESITY PREVENTION THROUGH PHYSICAL ACTIVITY

PROGETTUALITÀ EDUCATIVA PER LA PREVENZIONE ALL'OBESITÀ ATTRAVERSO L'ATTIVITÀ FISICA

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Abstract
Educational planning is necessary to build a relationship of the subject in relation to multiple educational fields and in this context the family is a fundamental resource, especially when it comes to educating the child in motor activity, necessary for growth, for the body and for the mind. The importance of educating the movement to prevent the phenomenon of obesity involves first and foremost the family and, at the same time, the educational institution through a project that is the founding structure of education. Acquiring physical skills and developing motor skills will make children more aware of their bodies, able to use movement to defeat obesity, but above all it will set in motion a whole series of mechanisms necessary for the development of their own personality.

La progettualità educativa è necessaria per costruire una relazione del soggetto in rapporto a plurimi campi educativi e in tale contesto la famiglia è una risorsa fondamentale, soprattutto quando si tratta di educare il bambino all'attività motoria, necessaria per la crescita, per il corpo e per la mente. L'importanza di educare al movimento per prevenire il fenomeno dell'obesità coinvolge innanzitutto la famiglia e di pari passo l'istituzione scolastica attraverso una progettualità che risulta essere la struttura fondante dell'educazione. Acquisire abilità fisiche e sviluppare capacità motorie, renderà i bambini più consapevoli dei lori corpi, capaci di utilizzare il movimento per sconfiggere l'obesità, ma soprattutto metterà in moto tutta una serie di meccanismi necessari per lo sviluppo della propria personalità.

Keywords: Motor Conduct, Movement, Cognitive Development, Education, Educational Alliance, Learning, Inclusive Planning.

Parole chiave: Condotta Motoria, Movimento, Sviluppo Cognitivo, Educazione, Alleanza educativa, Apprendimento, Progettazione inclusiva.

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Introduction

Obesity word of Latin origin indicates a chubby person, but the Greeks were the first to recognize obesity as a medical disorder. Hippocrates wrote that "corpulence is not just a disease in itself, but the harbinger of others". The obese person was so stigmatized in antiquity that in Greek comedy, he became a real character, a figure object of ridicule, while in Christian times he was singled out as an individual slave to sloth and lust, two of the seven deadly sins. Even in the tradition of Indian medicine, the surgeon Susruta correlated obesity with heart disease and diabetes, recommending physical work to cure its side effects. Since throughout ancient history there have been many famines from which peoples have been afflicted, a fat body was always associated with a situation of abundance of food dictated by well-being, so much so that it became almost a status symbol for European high officials in the Middle Ages. and in the Renaissance. With the beginning of the Industrial Revolution, a strong and muscular body was associated with the military and economic power of nations, but it was only in the modern era thanks to the abundance of food and the emerging well-being, that the human body became un only tall, strong and muscular but also fat, the phenomenon of obesity spreading more and more. According to the World Health Organization (WHO), obesity represents one of the most relevant public health problems. In fact, it has grown exponentially, in fact it is enough to take a look at the numbers to understand how widespread this disease is globally and the problem does not exclusively concern the richest areas of the world. In particular childhood obesity is associated with many serious health problems (Freedman et al., 2005), including psychosocial consequences (Brixval et al., 2012) and increases the risk of noncommunicable diseases in adult life (Dietz & Robinson , 2005). Lack of physical activity associated with an unhealthy lifestyle are the major contributors to obesity (Bondyra-Wiśniewska et al., 2021). This is mainly due to several factors such as the lack of opportunities for motor activity, especially extracurricular. A study by Toporowsky et al., (2015) advocates the cause of the importance of physical activity, in favor of improving motor skills, which transversely develop cognitive and executive skills, such as reading skills. In fact, practicing physical activity during childhood and adolescence guarantees better school results, thus increasing self-esteem and promoting the inhibition of behavior problems (Davis et al., 2015). Despite these results, the school progressively reduces, with increasing age, the time to devote to physical activity, both structured and free. This reduction appears more marked in young people of lower social level and in those living in urban realities (Sothern et al., 2006) Furthermore, physical activity and play promote social and emotional interactions between peers, such as communication skills. , negotiation, cooperation, problem-solving, and self-control (Latino et al., 2020). Unfortunately, there are several barriers and environmental risk factors that limit the opportunities for an active lifestyle:

- more than two hours a day in front of the television;
- restricted play spaces;
- inappropriate use of backpacks, inadequate school chairs that cause a bad posture;
- fear for the health and safety of the obese subject on the part of the parents;
- spaces and lifestyles that limit the possibility of dedicating oneself to walking (Simonelli et al., 2018).

Several factors distinguish overweight and obese children from normal weight: greater difficulty in carrying out physical activity, school absenteeism, school problems, depression, development of delay, allergies, headaches and skeletal problems, joints and muscles. Just as obesity itself is associated with early sexual maturation in females (Gallotta et al, 2020). The consequences of an early maturation brings advantages such as, for example, a higher stature

and a greater tension of the upper limbs, which benefit overweight during physical activities and sports such as: football or volleyball, (Bar-Or & Rowland, 2004) furthermore, an advanced skeletal age and greater bone and muscle density benefit these subjects in activities associated with muscle strength, weight lifting and throwing (Sothern et al, 2016). In fact, motor competence in carrying out different movement tasks refers to the degree of motor coordination and this allows you to practice locomotor tasks such as running, jumping, climbing and manipulation skills that require adequate control such as throwing, catching, kicking. Comeras-Chueca et al., (2022), in their study, compared the skills in overweight and normal weight young people, conditioned by an active video game intervention (AVG) combined with physical activity. This study highlights how physical activity through video games has positive effects on muscle shape and motor competence in children with overweight or obesity. This is important to prevent excessive weight, which in itself leads to a reduction in life expectancy and an increase in disability.

Organization and prevention in Italy

To act effectively against overweight and obesity and to prevent many chronic diseases, the active involvement of sectors of society outside the health system, both institutional and civil society, is necessary, as recommended by the European Union and the World Health Organization (WHO). , through strategies and action plans. Italy, through the national program "Gaining Health" and the national prevention plans, has strengthened the actions aimed at promoting healthy lifestyles, developing an "intersectoral" and "transversal" approach to risk factors, for interventions aimed at both to modify unhealthy individual behaviors, and to create environmental conditions that favor the adoption of correct lifestyles. In the past, the only national information sources were represented by the ISTAT multi-purpose surveys "Health conditions and use of health services", which provided data, including weight and height of minors, reported by parents and not measured directly. In addition, there was a lack of data on other factors that can influence the development of obesity, such as eating habits, motor activity and sedentary lifestyle. Therefore, a crucial element of prevention and health promotion is the development of surveillance systems with national and territorial representativeness which, in addition to defining the priorities for action, makes it possible to have the information necessary for monitoring and evaluating interventions (effectiveness, costs , accessibility, transferability, contrast to inequalities, etc.), the inter-institutional collaboration activated through "Gaining Health" has made it possible to periodically collect information on the lifestyles of the population, through the activation of surveillance systems with national coverage, which now constitute a solid source of data. In particular, the OKkio alla Salute surveillance system, promoted by the Ministry of Health, made it possible to have updated and comparable data on the prevalence of overweight and obesity in childhood, on the lifestyle of children and on school health promotion activities. The need to carefully follow the nutritional situation and lifestyle habits of children was strongly motivated by the direct implications on health, as they represent risk factors for the onset of obesity and diseases in adulthood. “OKkio alla Salute” has not only contributed to the knowledge of the excess weight of Italian children, but has also encouraged the development and awareness of the problem by encouraging the development of actions aimed at promoting health and counteracting the excess weight of children through programs that involved various health professionals and the school sector, throughout the national territory. This organization has proposed to continue to monitor the phenomena not only to allow the construction of temporal trends and the assessment of health results, but also to plan public health interventions that can be effective

in the various age groups and in different conditions. socio-economic. Furthermore, to structure integrated interventions and define the role between institutions, health professionals and the family, intervention chains have been created at both national and regional levels. Precisely to face and contain these phenomena, in recent years, significant institutional interventions have been implemented - also in inter-ministerial collaboration - which have seen in the school the place of election to carry out an indispensable preventive action, for example with educational initiatives health and nutrition education aimed at the younger generations. Coordination between the school system and the regions, in the commitment and effective collaboration between operators of the Local Health Authorities, school leaders and teachers of the classes concerned, with the active involvement of families, can make each intervention more effective. Thus, the "OKkio alla Salute" project, in particular, represents a solid example of multi-year inter-institutional collaboration and the data obtained certainly contribute to providing a detailed vision on the health of children, as well as of Italian schools, giving important support to the development of effective and sustainable health promotion interventions. “OKkio alla Salute” aims to overcome these difficulties and to describe the geographical variability and evolution over time of the weight status of 8-9 year olds, their eating habits, physical exercise habits and favoring school activities. healthy nutrition and physical activity, as school is the place where children spend a long part of the day. It is a surveillance system and, as such, it focuses on factors that can be changed and on information useful for planning prevention activities. In the specific case, especially in consideration of the characteristics of the population under study, surveillance is aimed at collecting a few basic information, through the use of accurate, but simple, highly acceptable and sustainable in practice tools and procedures. Data collection takes place on a regular basis (every two years) on representative samples of the population at the regional level and, in case of their choice, at the level of the ASL. The school was chosen as the place for collecting information, which represents the ideal environment for carrying out surveillance, for reasons of operational efficiency, as the children are concentrated there at the same time, and for reasons of usefulness in view of the necessary interventions that will follow the surveillance. In primary school, the third class was chosen, with children aged 8-9, for several reasons: growth at this age is still little affected by puberty and children are already able to answer some simple questions with precision and reliability. The sampling method chosen is the so-called "cluster" or cluster. This approach requires that the third grades of primary schools (called “clusters”) and not the children individually, are selected from the sampling lists prepared by the Provincial School Offices on a regional basis and / or by the ASL. This type of sampling has several advantages, such as the possibility of concentrating the work of the teams on a limited number of classes compared to the classic method (random or simple random) which, probably, would require surveys in almost all the schools of an ASL. Furthermore, it is not necessary to have a list of the pupils by name (generally unavailable) since all pupils belonging to the sampled class are enrolled in the survey. The main disadvantage is statistical: the children within the clusters have a tendency to "look alike" and, consequently, the variability estimated by the sample is an underestimation of the real variability in the population. This drawback, however, is easily compensated by increasing the number of subjects sampled, in order to achieve.

Results Emerging from the OKKIO Program

The results detected by the “Okkio alla salute” program on the national territory in 2019 show the levels of childhood overweight and obesity in the regions of Italy (Spinelli et al., 2021). The “OKkio alla salute” surveillance system has the main purpose of describing the

geographical variability and evolution over time of the weight status of 8-9 year olds, their eating habits, exercise habits and favoring school activities. healthy nutrition and physical activity, as school is the place where children spend a long part of the day. Like any good surveillance system, it focuses on factors that can be changed and on information useful for planning prevention activities. In the specific case, especially in consideration of the characteristics of the population under study (children aged 8-9 years), the surveillance is aimed at collecting a few basic information, through the use of accurate but simple, highly acceptable and sustainable tools and procedures in the practice. Data collection takes place on a regular basis (every two years until 2016 and subsequently every 3, in accordance with the WHO) on representative samples of the population (8-9 years) at the regional level and, in the case of their choice, at of ASL. The school that represents the ideal environment for carrying out surveillance was chosen as the place for collecting information, both for reasons of operational efficiency, as the children are concentrated there at the same time, and for reasons of usefulness in view of the necessary interventions related to surveillance. In primary school, the third class was chosen, with children aged 8-9, for various reasons: growth at this age is still little influenced by puberty and children are already able to respond with precision and reliability. to some simple questions. The selection is made so that the classes with a higher number of pupils are more likely to be extracted than the classes with a lower number (probability proportional to size method). The weight and height of the children are measured, using high-precision instruments that are the same throughout the country according to WHO guidelines (WHO, 1995), by specially trained health personnel, with the support of the class teacher. To estimate the prevalence of conditions of overweight and obesity, the body mass index (BMI, obtained as the ratio between the weight expressed in kilograms net of the tare weight of the clothes and the square of the height expressed in meters) is calculated. it is suitable for surveillance purposes for the analysis of temporal trends and geographic variability and is widely used internationally. For the definition of overweight and obesity it was decided to use the threshold values for BMI taken from Cole & Lobstein (2012), recommended by the International Obesity Task Force (IOTF), and from 2010 also those of the WHO (De Onis et al., 2007). Information on eating habits, motor activity and sedentary behaviors was collected through 3 questionnaires filled in by the children, their parents and teachers. Further data on the characteristics of the school environment, capable of affecting children's health, were collected through a fourth questionnaire intended for school principals and teachers. “OKkio alla Salute” methodology, as well as the content of the survey questionnaires, was examined and approved by the ISS Ethics Committee. Surveillance data made it possible to estimate, both at national and regional level, the prevalence of overweight and obesity and of some risk factors (for example, consumption of: breakfast, snack, fruit and vegetables, sugary drinks; physical activity , hours spent in front of TVs and other devices with screens, hours of sleep), making comparisons at a territorial level and for other variables. Furthermore, thanks to the participation in COSI (Childhood Obesity Surveillance Initiative), it is possible to compare the Italian data with that of other countries (Spinelli et al., 2021). In order to disseminate the results obtained and increase awareness of the phenomenon among the population and stakeholders, the ISS developed report format for health professionals and schools, summary sheets for decision-makers and communication materials for children and their parents. At national and local level, initiatives have been undertaken to prevent the phenomenon.

Results

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Since 2008, every 2-3 years, the staff of the ASL, specially trained, measure the weight and height of more than 45,000 children of the classes sampled and collect information through the questionnaires filled out by children, parents (about 50,000) and school staff (about 2,500 people). To date, 6 data collections have been carried out (2008-2009, 2010, 2012, 2014, 2016, 2019). All the Regions participated in all the data collections with representative samples at least at the regional level and the rejection rates by the selected schools and parents have always been below 5%. The prevalences of overweight and obesity are presented in the Figure. A downward trend is observed for both indicators: from 2008-2009 to 2019 overweight (excluding obesity) decreased from 23.2% to 20.4% and obesity from 12.0% to 9.4%, using the IOTF threshold values. Males have slightly higher obesity values than females (obese children 9.9% vs obese girls 8.8%). There is a clear geographical trend that sees the Southern Regions have higher excess weight values in both genders. Thus, in 2019, if the prevalence of overweight with obesity in the Aosta Valley was 14.0%, in Campania it reached 44.2% (Epicenter, 2022). Higher prevalence of obesity is also observed in families with more disadvantaged socioeconomic status, when parents are overweight or obese, and among children who have been breastfed for less than 1 month or never (Epicenter, 2022). Using the WHO curves, the prevalences, especially in males, are even higher and, comparing them with those of the other European countries participating in the COSI, Italy presents values among the highest: 41.9% overweight + obesity in children and 38.5% in girls in 2015-2017 (Spinelli et al., 2021).

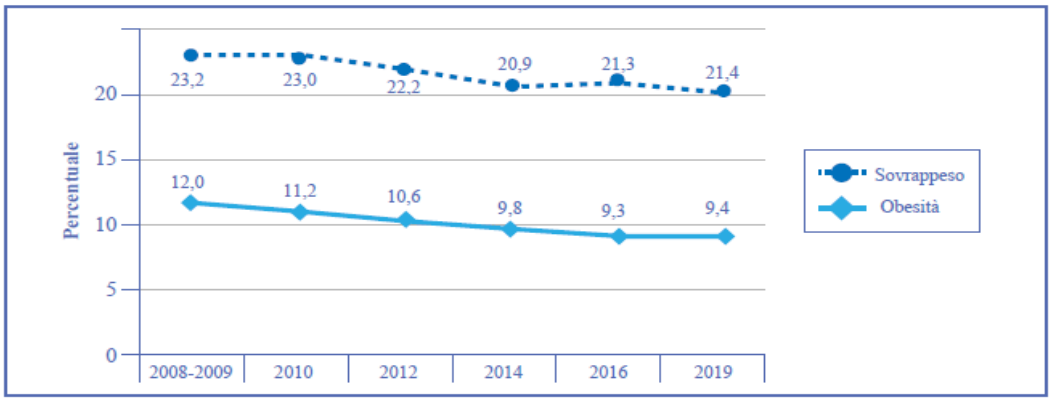

Figura - Andamento della prevalenza (calcolata utilizzando i cut-off dell'International Obesity Task Force) del sovrappeso e dell'obesità nei bambini di 8-9 anni. OKkio alla SALUTE dal 2008-2009 al 2019

Figure-Trend in prevalence (calculated using cut-offs from the International Obesity Task Force) of overweight and obesity in children aged 8-9. Okkio alla salute dal 2008-2009 al 2019

Instead, the indicators referring to physical activity and sedentary lifestyle are almost stable over the years, with a small decrease in the percentage of children who did not carry out any physical activity the day before the survey (20.3% in 2019, compared to 26 % in 2008-2009). Almost one in two children have a TV in their bedroom (43.5%) and spend more than 2 hours a day in front of a TV / tablet / mobile phone (44.5%). Regarding the maternal perception of the state of health of their children, it emerges that 40.3% of overweight or obese children are perceived by the mother as under-normal weight; 59.1% of mothers of physically inactive children believe that their child is exercising adequate physical activity and among mothers of overweight or obese children, 69.9% think that the amount of food consumed by their child is not excessive. Compared to hours of sleep on a normal weekday, a factor indicated in some studies as associated with obesity (Morrissey et al., 2020), 2019 data show that 14.4% of children, according to reports by parents, sleep less. 9 hours per night. As regards the questionnaires completed by the school, it emerges that in 2019 75.4% had the canteen, 42.7%

provided for the distribution of healthy food, 62.7% participation in initiatives aimed at promoting healthy eating habits , involving parents (34.0%). With respect to the promotion of movement, 53.0% of the classes carried out at least 2 hours of physical education per week, with a strong regional variability, 57.4% carried out extracurricular motor activity, 92.6% of the schools provided for activities strengthening of the training curriculum on motor activity and parental involvement had occurred in 18.9% of cases (Epicentro, 2022).). In order to disseminate the results of the data collections, conferences were organized and reports on national data were published and all the Regions and Autonomous Provinces (and also some ASLs) used the report formats received to publish their data which are also available on the site. EpiCentro of the ISS (Epicenter, 2022). To increase knowledge and awareness of the problem and promote healthy lifestyles, in 2010 the "OKkio alla SALUTE Group", in collaboration with the coordinators of the Information and Communication Program in support of the objectives of the Gaining Health Program (PinC), funded by National Center for Disease Prevention and Control (CCM, 2022) of the Ministry of Health, has prepared information material addressed to children, parents, teachers, pediatricians and other professionals dealing with disease prevention and health promotion (Ministry of Health, 2022). Before each collection, all participating schools and classes receive posters structured with a simple and informative language that have as testimonial the Kangaroo, agile animal, naturally nice and with strong characteristics of parenting. The contents have also been agreed with the Italian Society of Pediatrics and with the Italian Federation of Pediatricians. The poster for the school, by means of an inverted food pyramid supported by the image of the Kangaroo, provides information on proper nutrition and promotes physical activity, through clear and pleasant messages for children. The class poster consists of eight cards that provide children with tips on healthy eating, physical activity, and proper use of TV and video games. This tool, placed within the classroom, can support the teacher in encouraging children to deepen the topics illustrated, stimulating their interest in both correct eating habits and a more active lifestyle. In addition, all the free choice pediatricians (PLS) have been sent by the ISS the poster for the clinics, which through the messages of the Kangaroo, aims to stimulate the parents' reflection on the weight status and on the lifestyle habits of their children, soliciting them to deepen the different themes with the PLS. . Finally, each parent involved in completing their questionnaire receives a brochure on obesity prevention and the promotion of healthy lifestyles for the family. On the basis of the information collected, many initiatives have been undertaken at regional and local level to prevent the phenomenon and ensure good health care for obese children. A series of these actions were collected and published in an ISS report (Pizzi et al., 2014). To support professionals in identifying the most effective strategies suited to their context, the "OKkio alla Salute" Technical Committee has carried out, together with the ISS, a review of the scientific evidence on overweight and obesity prevention interventions carried out in the environment. from 2008 to 2012 (Bonciani et al., 2015). Parents do not always have a correct picture of their child's weight status. Furthermore, mothers of overweight or obese children (38%) do not consider their child to be overweight and only 29% think that the amount of food their child eats is excessive. Only 41% of mothers, of children who were physically inactive, believe that their child has little motor activity. Lifestyles are a recognized determinant of chronic noncommunicable diseases and have a major impact on health. Through programs such as "Guadagnare Salute", approved by the Government with a Decree of the President of the Council of Ministers of 4 May 2007 in agreement with the Regions and Autonomous Provinces, and national plans such as (CCM, 2022), Italy has strengthened the actions aimed at promotion of healthy lifestyles, developing interventions aimed at modifying unhealthy individual behaviors and creating environmental conditions that favor correct lifestyles with an "intersectoral" approach. Overweight and

obesity, particularly due to their prevalence among children, represent a major challenge for public health. The problem of obesity does not have the same importance in different regions and in different social strata. The poorest regions and socially weak and less affluent groups are, in fact, more affected by obesity also because they have less access to educational messages and correct information on lifestyles and health. In addition, the poorer classes consume cheaper foods that have lower nutritional quality and high energy density. The opportunities to carry out physical activity or to find types of foods useful for health are not available to some social classes, especially those who live far from inhabited centers.

Definition and Advantages of Physical Activity

Physical activity is defined by the World Health Organization (WHO) as "any form of work produced by the musculoskeletal system that requires a higher energy expenditure than in resting conditions". This category also includes daily activities, such as walking, cycling, dancing, climbing stairs, doing housework. "Exercise, on the other hand, is a sub-category of physical activity, that is a planned, structured and repetitive activity, aimed at improving or maintaining one or more components of physical fitness, such as, for example, metabolic conditioning, muscle mass, strength . The following table summarizes the main terms relating to physical activity / exercise with their corresponding meanings (Table 1).

Term	Definition
Physical activity	Any body movement produced by skeletal muscles that requires energy expenditure
Work out	to exercise Sub-category of planned, structured, repetitive and targeted physical activity which has the main purpose of improving or maintaining physical fitness, physical performance or health.
Aerobic training Programs	Programs based on forms of activity that are sufficiently intense and performed long enough to maintain or improve an individual's cardiorespiratory fitness. In this case, "aerobic" means moderate intensity training. On an individual's personal ability scale, moderate intensity physical activity is usually around 5 or 6 on a 0 to 10 scale. Based on heart rate, moderate intensity physical activity is generally defined as 50 - 70% of your maximum heart rate.
Resistance training	Also called "muscle strengthening activity"; these are activity-based programs that increase the strength, power, endurance and mass of skeletal muscles and involve major muscle groups (legs, back, abdomen, chest, shoulders and arms). The intensity of resistance training is usually defined by the maximum weight that can be lifted by a subject for a single repetition in a given exercise (1RM).
High Intensity Interval Training (HIIT)	It consists of the alternation of short very intense efforts, therefore with a large anaerobic component, followed by less intense recovery periods - generally active - until muscle and / or metabolic exhaustion is reached .
Physical fitness	It is able to measure the body's ability to function effectively and efficiently during the activities of daily living; it includes

	cardiorespiratory fitness, muscle strength, balance and flexibility.

Table 1 Source Oppert et al., (2021).

In the past three decades, the number of obese children and adolescents worldwide has tripled and the prevalence of obese pre-school age has doubled (Singh & Lin, 2013). Lack of physical activity was found to be the major contributor to obesity, however most children and adolescents do not perform the recommended amount of physical exercise (Tomporowsky et al., 2015). This is mainly due to various factors such as the lack of opportunities for activities adapted to this problem in many municipalities and regions, or the structure of the school timetable that requires long periods of sedentary lifestyle during curricular hours. We can even consider environments that promote obesity, causing excessive social costs, thus denying children even the intrinsic need to be physically active (Bayley et al., 1995). Physical activity is essential for proper growth and development (Milteer & Ginsburg 2012). By having overweight boys a higher ratio of fat to lean mass, they exhibit much greater buoyancy than their peers. The last advantage is that, being more thermally insulated from body fat, they have greater resistance for activities in cold water. Despite these advantages, obesity in this population is associated with low levels of physical fitness (Joshi et al 2015), reduced speed and agility (Cliff et al., 2012), a higher metabolic cost and energy expenditure compared to normal weight in the when they perform similar activities (Daniels & Hassink, 2015). Consequently, a highly significant inverse correlation appears between access of weight and good physical condition, especially for what involves agility and walking. On the contrary, body mass and strength are significantly correlated (Yepes et al., 2016). Schultz et al., (2012), carried out a review of the scientific literature identifying musculoskeletal pain in the lower limbs of overweight young people during physical activity (Pearson et al., 2013), and an excess of fatigue and dyspnea during physical activity. exercise, due to the extra energy demand to move excessive body mass (Danford et al., 2015). In fact, although normal and overweight adolescents have in an absolute sense similar cardio respiratory fitness, the functional difficulty observed in overweight is significantly correlated to this increased energy demand necessary to move excess weight, especially detectable in greater oxygen consumption induced by movement. of the lower limbs (Norman et al., 2005). The increased oxygen consumption during physical activity, approximately 50% more than those of normal weight, reduces work tolerance (Maffeis, 2015). Coordination skills and sporting technical skills are also negatively affected by the access of body fat in children and adolescents (Riddiford-Harland et al., 2016). Motor competence in carrying out different movement tasks refers to the degree of motor coordination and this allows you to practice locomotor tasks such as running, jumping, climbing and manipulation skills that require adequate control such as throwing, catching, kicking. Cliff et al., (2013) compared this mastery in overweight and normal weight young people, noting that overweight subjects had significantly less mastery especially in those skills related to antigravity activities at the level of the lower limbs. Indeed, one study found that overweight children had severe difficulties in getting up from a sitting position (Riddiford-Harland et al., 2015). Furthermore, in addition to physiological, metabolic and biomechanical difficulties, overweight young people show psychological problems when they are involved in physical activity (Salvy et al., 2016). In a study examining the quality of life of obese children based on a self-report questionnaire, similar results were found to children dying with cancer.

Physical activity and weight loss

It is known that physical activity is an ineffective strategy for losing weight, since the energy expended increases the sense of appetite and food intake. Compensation with increased food intake is the main cause of the lack of weight loss (Alkahtani et al., 2014). There are many ways in which exercise could potentially change calorie intake, such as exercises that involve an increase in heart rate. Exercise could also alter the preference in macro nutrients and food choices. As expected, the need is to restore short-term energy supplies as soon as possible, following episodes of physical activity (Jakicic et al., 2015). These results are the result of short-term research and this phenomenon has hardly been followed for a long period of activity, which should allow for an increase in energy expenditure and a plateau of appetite stimulation. There is therefore a strong correlation between energy expenditure and increased appetite, and moreover, acute food reactions are often replaced by habits related to regular physical exercise, assuming greater stability in doses and food quality (Stubbs, 2014). Instead, by associating an increase in physical activity and a restrictive diet for six weeks, a significant increase in appetite was noted in obese children (Ling et al., 2014). We must note that the coupling phenomenon does not occur on the contrary, that is, an automatic reduction in appetite has not been demonstrated by reducing physical activity. On the contrary, sedentary subjects tend to increase calorie intake especially by consuming snacks with a high energy density (Lawson et al., 2013). Consequently, sedentary people should be at risk for two reasons: the natural decrease in energy expenditure and an increase in energy income due to the consumption of high-calorie foods. The weakness of the effect of physical activity on increasing appetite generates an optimistic point of view on the role that exercise can have on appetite control and weight gain prevention. From a practical perspective, physical activity can be a successful method for weight loss, but only if it is possible to maintain 100% adherence to the exercise regimes of the training programs. Of course, the choices of food, in quality and quantity, should not be a reward for the work done. On the contrary, the energy expended during the exercise must be correctly considered to evaluate how much food must subsequently be ingested. The choice of food must be controlled regardless of the increase in physical activity as it does not automatically protect against an inappropriate choice of food. . In fact, physical activity cannot be seen as an opportunity to abandon a proper diet, nor to indulge in excessive consumption of food. Furthermore, the appetite response induced by physical activity is not the same from individual to individual and the inter-individual variability in this regard should include a distinction of the sample into subgroups of subjects more or less sensitive to the effects of it on appetite. Scientific studies hardly consider this variable considering the subjects studied as good "responders" and others as "maintainers" (Alberga et al., 2015). In conclusion, there is no doubt that an active lifestyle, even for children and adolescents, contributes to maintaining the state of health, foreseeing disorders and pathologies (Animesh et al., 2015). The association between inactivity and weight gain is certain and there is strong evidence that the loss of the coupling between energy expended and caloric intake is induced by physical exercise. This leads to considering exercise as a method for weight loss. Considering that populations are becoming increasingly sedentary, it is necessary to promote strategies for increasing physical activity. As an obesity prevention strategy, exercise requires total adherence of the participants and in any case further control of the choice of food in terms of low calorie content. It is possible that an overestimation of the energy expended during exercise and an underestimation of the energy introduced with food could lead to an incorrect consideration of the effect of physical activity. Each intervention will be individualized in order to be adequate to the types of response of each

organism, both to the stimulus of exercise and to the structuring of the diet so that the message of the opportunity for physical exercise, in terms of health, is appropriate.

Physical activity interventions in overweight young people

In general, long-distance running activities cannot be sustained by children due to their immature metabolic system (Bar-Or & Rowland, 2004) and being overweight exacerbates this phenomenon (Hay et al., 2016), however young people , both normal and overweight, can deal with relatively large volumes of interval work. Attention can also be refocused on the work to be done after an appropriate recovery (De Bock et al., 2013). While adults can bear the effort more easily, children must necessarily find satisfaction and have fun in order to continue physical activity (Laurson et al., 2015). An essential requirement is to develop muscle strength and endurance that improves performance, reduces the risk of injury (Behringer et al., 2016). Diseases associated with obesity also put overweight young people at great risk during exercise phases. Systemic hypertension and resting pressure are closely related to the degree of adiposity and this problem increases during exercise (Pescatello et al., 2015). Obesity negatively affects asthma therapy in these subjects with serious consequences due to the inflammatory nature typical of obesity (Vanhelst et al., 2015). However, the therapeutic benefits of exercise and protective against inflammatory processes have been demonstrated (Forti et al., 2017). In fact, metabolic diseases develop during childhood obesity and obese subjects are at risk of developing diabetes 2 at a very young age. A strong significant correlation between insulin sensitivity and physical activity has been demonstrated (Brambilla et al., 2017). Recent studies have confirmed this result also in obese subjects, children and adolescents, both with aerobic exercise and with resistance training (Fainganbaum et al., 2013). By improving insulin sensitization and oxygen absorption in skeletal muscles, physical activity has the potential to reduce the incidence of diabetes 2 in children and adolescents (Fedewa et al., 2014). Parents play a fundamental role in encouraging their children to devote more time to movement games. In setting up a physical activity program for this population, the first goal is to convince and motivate individuals to abandon their habits related to sedentary lifestyle.

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