Chapter I

INTRODUCTION
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Those who think they have no time for bodily exercise will sooner or later have to find time for illness. Edward Stanley. Fit people make a fit nation. Fitness is that state which characterizes the degree to which a person is able to function more efficiently. Fitness is an individual matter. It implies the ability of each person to live most effectively within his potentialities. Physical fitness as defined by the World Health Organizations is “the ability to perform muscular work satisfactorily” The purpose of physical fitness is to create a consciousness and enthusiasm amongst the people and to stimulate their interest for physical welfare, which will in turn help them to lead a more healthy living. The physical fitness is also expected to assess factors such as speed, strength, endurance and agility which make a person physically efficient.

In Past Time: How to Use Exercise to Maintain Fitness That the benefits of Exercise are exercise really necessary for good health? Testimonials to exercise are not lacking among the sages of the past. About 100 BC Cicero observed that “exercise and temperance can preserve something of our strength in old age.” Aristotle stressed the need for exercise to maintain “a healthy mind in a healthy body.” In the Mishneh Torah, the twelfth century Jewish Scholar and Physician, Rabbi Moses Maimonides, strongly recommended daily exercise and warned that “anyone who sits around idle and a takes no exercise will be subject to physical discomforts and failing strength. Early in the eighteenth century, the renowned British Physician, Thomas Addison, said “exercise ferments the humors’, casts them into their proper channels, throws off redundancies, and helps nature in these secret distributions without which the body cannot subsist in its vigor or the soul act with cheerfulness”. In 1799, the Englishman, Thomas Easton evaluated the lifestyles of 1712 people over one hundred years of age in a book on human longevity and concluded; It is not the rich and the great, nor those who depend on medicine, who become old; but such as use much exercise for the idler never attains a remarkable great age.

In 1864, an English Physiologist, Edward Smith, performed the first systematic studies on the physiologic and metabolism responses to exercise. He reported a higher mortality rate among people in sedentary occupations compared with those who were physically active. In the United States exercise and fitness were popular with the founding fathers, among them Benjamin Franklin, John Quincy Adams, and Thomas Jefferson. Jefferson was particularly enthusiastic about walking, “habituate yourself to walk fast without fatigue,” he wrote. All these early but astute observations have been confirmed by modern science. Archaeological and anthropological studies on early and primitive humans, current epidemiological studies, clinical and physiological research, and animal laboratory studies all point to the same conclusion: regular exercise improve the quality and perhaps, even the length of life; conversely, physical inactivity has many deleterious effects on the body.

Status of Health and Fitness of School Going Students of India because of Routine in Indian schools lacks adequate play time and fitness regime for students. A survey by Edu Sports has found that two out of five school going kids don't have a healthy body mass index (BMI) and 50% of our children lack adequate lower body strength. The health and fitness survey covered over 1.48 lakh students from across 87 cities and 26 states over the academic

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year 2014-15. Edu-Sports are India’s first physical education and school sports enterprise. They tested students on sprint capacity, flexibility, upper body strength, abdominal-strength and BMI. Some schools were found to offer three or more physical education periods per week while most offer just two. The study found that students from schools which offer more than three periods are fitter and healthier. Sharing the sixth annual survey exclusively with TOI, Saumil Majmudar, CEO of Edu-Sports, said the annual survey has become more representative as there is significant increase in number of schools, cities and states where study was conducted and it broadly covers public schools in urban and semi-urban localities.

What is the Cause of the overweight and obesity problem? Obesity and Its Dangerous Points that Obesity has become a major health, social and economical burden of today’s world (James et al., 2004). It has now been well established that obesity directly increases cardio metabolic risk by altering the secretion of adipokines and, indirectly, by promoting insulin resistance and its associated metabolic disorders, such as Type-2 diabetes. Moreover, obesity causes additional health problems as it is closely associated with the development and progression of coronary heart disease, certain forms of cancer, respiratory complications (e.g. obstructive sleep apnoea) and osteoarthritis (Kopelman, 2000). Both overweight and obesity appear to be associated with low aerobic capacity and impaired endothelial function (Watts et al., 2004). Endurance training improves both aerobic capacity (Rognmo et al., 2004; Wisloff et al., 2007) and endothelial function (Wisloff et al., 2007; Meyer et al., 2006), and is now increasingly recommended in the prevention and treatment of overweight and obesity (Haskell et al., 2007). It has been known that endurance exercise training, decreases cardiovascular risk, but an optimal training programme has not yet been identified. Similarly, criteria for the minimum protective exercise programme against overweight and obesity have not been established. Although the recommended exercise intensity spans the range 40–90% of VO2max (maximal oxygen uptake), most studies indicate that high-intensity exercise, i.e. toward the upper end of the range, results in larger aerobic and cardiovascular adaptations (Dubach et al., 1997; Hambrecht, et al., 2000; Lee et al., 2003), and many rehabilitation programme advocate the use of low-to-moderate-intensity exercise.

People vary in the amount of physical activity they need to control their weight. Many people can maintain their weight by doing 150 to 300 minutes (2 hours and 30 minutes to 5 hours) of moderate-intensity activity per week, such as brisk walking. People who want to lose a large amount of weight (more than 5 percent of their body weight) my need to do more than 300 minutes of moderate-intensity activity per week. This also may be true for people who to keep off weight that they’ve lost. If we live in a developed country where the average income is high, it is impossible to ignore the collective and entirely justifiable hysteria about fat. There is story after story about how our population is getting more obese. And this does not apply just to adults, for children and even infants are becoming obese too. Government are being urged to tackle the problem, to give it a much greater priority, because the human cost of obesity is enormous.

Obesity and its interpretation that overweight is defined as a body weight that exceeds the normal or standard weight for a particular person based on height and frame size. These standard weights were established in 1959 but are still widely used. New weight and height tables were introduced in 1983, but their introduction was Controversial because many experts believed the weight allowance were liberal. Many professional health organizations refused to accept the newer tables. Weight values in the standard tables are based solely on

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3 Manash Pratim Gohain, 2 out of 5 Kids have unhealthy Body Mass Index, says study, (Delhi: TNN | Nov 26, 2015), 03.46 AM IST.

4 [http://pilates.about.com/od/whatispilates/a/whatspilates.htm](http://pilates.about.com/od/whatispilates/a/whatspilates.htm)
population averages. For this reason, a person can be overweight according to these standards and yet have a lower than normal body fat content. For example, football players frequently are found to be overweight according to standard tables, yet many are typically much leaner than people of the same age, height and frame sizes that are of normal weight or even underweight. Still other people are within the normal range of body weights for their height and frame size by the standard tables and yet are obese.  

Obesity and Physical Activity showed that there continues to be significant public health concern about the high rates of overweight and obesity. These concerns stem from the consistent association between excess body weight and numerous chronic diseases, including heart disease, diabetes, and various forms of cancer. Moreover, excess body weight has been shown to negatively influence musculoskeletal health and may limit physical function. Thus, there is a need for effective interventions to reduce body weight in those individuals who may already be overweight or obese. Physical activity can be an important component of lifestyle interventions for weight loss. Thus, it is important for clinicians, health care providers, and health-fitness professionals to recognize the influence of physical activity on body weight and to understand recommendations that can affect physical activity behaviour. A conceptual model illustrating the potential pathways by which physical activity may influence energy balance and, thus, influence body weight regulation and related health.

There have been a number of recent systematic reviews of the literature that provide a comprehensive understanding of the influence of physical activity on weight loss. For example, the Advisory Committee for the 2008 Physical Activity Guidelines for Americans reviewed the published scientific literature to summarize the influence of physical activity on change in body weight. This literature review was limited to studies that examined physical activity with no prescribed change in energy intake or other dietary modification. Results of this review concluded that physical activity, performed for a minimum of 150 minutes per week at a moderate-to-vigorous intensity (e.g., brisk walking), would reduce body weight by 1% to 3%.

What is the main reason to not reduce stubborn fat easily? Stubborn fat is a slow-metabolized adipose (fat) tissue. To burn fat, a natural hormonal process has to take place. When a fat-burning process is activated, the adrenal hormones (adrenaline and noradrenaline) bind to special receptors in the fat tissues. There are two major groups of receptors in the fat tissues, alpha and beta. The beta-receptors are the more active ones, which respond to the adrenal hormones. Fat burning occurs when the adrenal hormones activate the beta-receptors in the fat cells. If these receptors are not activated, no fat will burn off.

Stubborn fat has a lower ratio of beta-receptors to alpha-receptors. As a result, it's metabolized slowly and does not respond to the adrenal hormones. To make matters worse, stubborn fat has more estrogen receptors in the tissues. Estrogen (the female hormone), once bound to the receptors, causes even more fat gain.

There's much more to it, but I don't want to make this too complicated and scientific. So for now, let's just say that stubborn fat presents three major problems: It doesn't have a high enough ratio of beta-receptors to alpha-receptors, so doesn't respond to adrenal fat-burning stimulation. It has more estrogens receptors, which accelerates fat gain. On top of all this, stubborn fat doesn't have a healthy blood circulation. These slowly metabolized fat.

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tissues have fewer blood vessels than a normal fat tissue, and consequently this fat is slower to metabolize, and therefore more stubborn or difficult to remove.7

Physical Fitness and Its Important: Physical Fitness Physical fitness is the body’s ability to function efficiently and effectively. It consists of health-related physical fitness and skill-related physical fitness, which have at least 11 different components, each of which contributes to total quality of life. Physical fitness also includes metabolic fitness. Physical fitness is associated with a person’s ability to work effectively, enjoy leisure time, be healthy, resist hypokinetic diseases, and meet emergency situations. It is related to, but different from health, wellness, and the psychological, sociological, emotional, and spiritual components of fitness. Although the development of physical fitness is the result of many things, optimal physical fitness is not possible without regular exercise. The health-related components of physical fitness are directly associated with good health. The five components of health-related physical fitness are body composition; cardiovascular fitness, flexibility, muscular endurance, and strength. Each health related fitness characteristic has a direct relationship to good health and reduced risk of hypokinetic disease.8

Physical activity provides many benefits that can positively affect children’s health, their mental and social well-being, and their performance in the classroom. First and foremost, physical activity can greatly benefit children’s health. In the U.S., childhood obesity has become a major concern. Since the early 1970s, average weight has been steadily increasing among children from all socioeconomic levels, racial and ethnic groups, and regions of the country. Recent data shows that 17% of US children and adolescents are now overweight (at or above the 95th percentile of gender-specific body mass index for age growth charts). If a more inclusive definition of overweight were applied to children, it’s likely that 50% or more of children in the US would qualify! The rate of childhood obesity is a true crisis. The increase in childhood overweight has been accompanied by higher levels of weight-related conditions such as Type 2 diabetes, high blood pressure, sleep apnoea, gallstones, and depression. The incidence of type 2 diabetes among adolescents, though still not high, has increased by a factor of more than 10 in the past two decades.6 For children born in the U.S in 2000, the lifetime risk of diabetes is estimated to be about 1 in 3 for males and 2 in 5 for females.

Less than a generation ago, “type 2” diabetes was called “adult onset” diabetes because it was unknown in children. It is now increasingly common in children under the age of 10. Physical activity can play a key role in combating the growing epidemics of obesity and diabetes. It contributes to weight loss and helps prevent obesity. It strengthens muscles and makes them more flexible. It strengthens the capacity of the lungs to breathe. In addition, it may help reduce the risk for heart disease, Type 2 diabetes, and certain cancers. Prevention is the key to avoiding the onset of inactivity-related conditions and diseases. While exercise is an important antidote to overweight and obesity, as well as depression and low self esteem, preventing these problems from occurring in the first place is an even better strategy. The experience of most adults will confirm that it is easier to keep moving than to get moving after long periods of inactivity. It is easier to maintain a healthy body weight than to fight back against overweight and obesity.9

Physiological Adaptations to Exercise Training defined that Basic physiological function both at rest and during exercise changes substantially with physical training. In this

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8 Life style for Health, Fitness and Wellness, Healthy People 2010: National Health Promotion and Disease Prevention Objectives, (United State of America, 2010), Page 7.
9 Kutz David et.al., Activity Bursts the classroom for fitness, (Teacher Manual, 2008), Page 2.
section we investigate how women adapt to chronic exercise, emphasizing area in which their responses might differ from men’s. Body Composition: With either cardio respiratory endurance training or resistance training, both women and men experience -Losses in total body mass, Losses of fat mass, Losses of relative fat and Gains in FFM.

The magnitude of the change in body composition appears to related more to the total energy expenditure associated with the training activities than to the participant’s sex. Significantly more FFM is gained in response to strength training than with endurance training, and the magnitude of these gains is similar between sexes. Bone and connective tissue undergo alterations with training, but these changes are not well understood. In general, animal studies and limited human studies have shown an increase in the density of the weight-bearing long bones, primarily in growing animals and in children and adolescence. This adaptation appears to be independent of sex. In adult weight bearing exercise is critical for maintaining bone mass and density.  

How to Reduce Weight or Fat? Why Fat reduce at this Age stage answered that the assessment of children’s body composition is problematic, and although there is some evidence to suggest that north American Children are getting fatter, data on British children are sparse. Armstrong and Colleagues assessed 357 boys and 350 girls, aged 11 to 16 years and according to the criteria of the RCP, 13% of the boys and 10% of the girls could be classified as overweight. The magnitude of the problem of children’s over fatness can be put into perspective when one realize that obesity acquired in childhood is highly predictive of obesity in adult life. It appears that the later into adolescence the individual remains obese, the greater the persistence of obesity into adulthood. Abraham and Norsieck concluded that the risk of an obese adolescent becoming an obese adult is 63% to 72%.

Fat: Digestion, absorption and utilization: In the process of digestion fat are broken down to their constituent components i.e. glycerol and fatty acids. The two enzymes which aid in the digestion of fat are gastric lipase present in gastric juice and pancreatic lipase poured into the small intestine from the pancreas. For enzyme action fat need to be dispersed or mixed in water. You know fats are insoluble in water. A secretion from the liver called bile helps in fat digestion by breaking fat into small droplets. There fat droplets are then dispersed in the lipid digestion juice and are easily acted upon by enzymes. Since bile is not present in the stomach, the action of gastric lipase is not very significant. This is the reason why fats are chiefly digestion in the small intestine where pancreatic lipase breaks them into glycerol and fatty acids aided by the action of bile. The end products of fat digestion i.e. glycerol and fatty acids present in the intestine move into the intestinal cells. The fatty acids cannot enter intestinal cells as such bile salts play an important role in fat absorption by dispersing the fatty acids into small tiny water-soluble units called micelles which can easily move into the intestinal cells. Fatty acids and glycerol then get transported from the intestinal cells to blood circulation. They do not travel directly into bloodstream but first enter the network of vessels (present in the villi of the small intestine) called lymph vessels. Then fatty acids from the lymph vessels enter the heart and from there move into the blood. Blood then carries them either to the adipose tissue where they are stored as concentrated sources of energy or to cells where they are broken down to provide energy (in a similar fashion as glucose and amino acids).

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Fat depots and Adipose tissue depots defined that fat depots can broadly be functionally and anatomically grouped into lower body fat, upper body subcutaneous fat, and visceral/intra-abdominal fat. In normal weight adults, upper body and lower body subcutaneous fat comprise the majority of total body fat.\(^{13}\)

Lower body fat is anatomically designated as adiposity below the inguinal ligament and the posterior superior iliac crest. Potential subdivisions of lower body include gluteal, subcutaneous thigh and calf fat, as well as adipose tissue found between muscles, also known as “marbling”. Although leg fat in general is not associated with increased cardiovascular risk, increased marbling is linked to metabolic abnormalities. In our opinion, marbling of muscle with adipose is another form of ectopic fat. Upper body subcutaneous fat includes deep and superficial truncal fat, arm and breast depots. The two anatomically distinct abdominal adipose tissue depots are the superficial and deep subcutaneous fat.\(^{14}\)

The body’s cells need a constant supply of energy to function or for muscles to contract. This energy is found from the food we eat. The food we eat is stored either as a chemical component called A. T.P. (Adenosine triphosphate), in a different way in our bodies. (ATP is used for immediate cellular function and muscular contraction).

Let us follow the diagram

\[
\text{Eat} \quad \downarrow \\
\text{Carbohydrate, Fat, Protein} \\
\downarrow \\
\text{Digested and form} \\
\downarrow \\
\text{Glucose, Fatty acids, Amino Acid} \\
\downarrow \\
\text{Used as fuel in two ways} \\
\downarrow \\
\text{Produce ATP or Stored for later use}
\]

If stored for later use: (Carbohydrate) Glucose: Stored as glycogen, Fatty Acid: Body Fat (adipose tissue) and Protein: Seldom used for energy. It is mainly used for growth or repair of cellular structures.

What is ATP? It is a complicated chemical structure. It is made up of a substance called adenosine plus three groups of atoms called the phosphate group; generally this is referred to as the body ‘energy source. Adenosine- \([P]=\text{Adenosine} \[P] \text{[P]}\). The bond between the P is a high energy bond, while the bond between Adenosine and \([P]\) is a low energy. Energy production happens when the high energy bond is broken between the \([P]\) This release energy for immediate use. ATP is stored in cells. Sometimes you will find more ATP in certain cells where the most metabolic activities are taking place. ATP releases the energy but this is only available for a few seconds, therefore, the body has the ability to resynthesized ATP for constant use. If there is a muscular contraction, the muscle will need a lot of ATP to function. For effective muscular contraction over a period of time, the body requires constant supply of ATP. ATP is resynthesized in three ways: Phosphagen Systems, Anaerobic Production and

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Aerobics Production. During anaerobic production ATP are formed from carbohydrate in a fast process, whereas during the aerobic system from carbohydrate and fats in a slow process.

**Phosphagen Systems**

- Creatine Phosphate (CP)
- Phosphate high energy bonds are broken down
- Energy which produces ATP

Creatine Phosphate (CP) are limited, therefore, the supply via this way is very restricted to muscles. Although this is immediately available for short bursts of high energy activities

**Anaerobic Production of ATP**

Anaerobic means without oxygen. During this production, the metabolic pathway is as follows:

- We eat Carbohydrate
- Digested and form Glucose
- Stored in the body as glycogen is released to from ATP

This Process of Anaerobic Glycolysis (Conversion Glycogen to ATP) happens very quickly and is effective when large bursts of energy over a longer period of time are needed.

These energy pathway releases 3 ATP what is not broken down to ATP is broken down to Lactic Acid. Glycogen is broken down to

| 3 ATP | 2 Lactic Acid |

The lactic acid is considered as waste material because it accumulates and leads to muscles fatigue.

Waste material is supposed to be removed by the circulatory systems, but can fail to keep up with the demand. This is when we experience that in the muscle which can lead to temporary muscles fatigue.

**Aerobics Pathway:** This energy pathway is for sustained activities over long periods of time. The word aerobics means oxygen, and this pathway constantly requires this for
energy release. The oxygen is broken down by the carbohydrate (glucose or glycogen) to form the followings

\[
\text{Glucose} + \text{O}_2 \rightarrow 36 \text{ATP} \quad \text{Co}_2 \quad \text{H}_2\text{O}
\]

This process takes place in specialized cell structure called mitochondria. It is clear that this process produces most ATP but this pathway depends on the supply of \( \text{O}_2 \) to the mitochondria by the cardio respiratory system. Obviously, the more effective this system is, the more effective the aerobic pathway will be. The aerobics Pathway can also break down fatty acids (stored from fat)

The Following will happen:

\[
\text{Fatty Acid} + \text{O}_2 \rightarrow 36 \text{ATP} \quad \text{Co}_2 \quad \text{H}_2\text{O}
\]

It is obvious that fatty acids supply the highest energy (most ATP is Produced)\(^{15}\)

Metabolic Effect to body weight and Composition that Physical activity and endurance exercise play an important role in the maintenance of proper body weight, body composition, and appetite. As we know, physical inactivity promotes obesity; physical activity promotes weight reduction and simply put, exercise increases caloric expenditure and promotes the breakdown of fat stores. The breakdown of fat is increased during endurance exercise through the associated increased secretion of adrenaline and other hormones and reduced secretion of insulin. These hormonal changes promote the breakdown of fat stores (the fat being released into plasma in the form of free fatty acids) that are subsequently oxidized for energy production. The resulting increases in levels of plasma-free fatty acids provide an important source of fuel during mild to moderate endurance activity. Increased levels of circulating free fatty acids may persist for hours following exercise

Appetite suppression often occurs with regular endurance exercise and is believed to be related to the elevation of adrenaline levels, related hormones and fat breakdown. Changes in body composition usually induced by endurance training consist of a decrease in total body fat with no change or slight increases in lean body tissue.\(^{16}\)

Burning Body Fat: Fat requires oxygen to be burned, so only aerobic exercise—bicycling, walking, running will make a dent in body fat. Exercising at light to moderate levels burns a significant percentage of fat, although you never use fat exclusively. Exercising at light to moderate levels burns a significant You can generally exercise longer if working low to moderately hard, so total calories and total fat expended can be higher than with high-


intensity workouts, especially if you are new to the world of exercise weight training and other aerobics activities, such as fast sprints, also work to improve the body’s lean-to-fat ratio. Weight training, including your abdominal routine, builds muscle. Muscle tissue burn more calories than fat tissues. The more muscle you have, the more calories you will burn, even while sitting. And since nearly half of those calories are fat, you will burn more total fat. High-intensity workouts improve your ability to utilize oxygen during intense exercise, again increasing the use of fat as a fuel.\footnote{Kurt Brungardt, \textit{The Complete Book of Abs}, (United State of America: Villard Books, 1998), Page 25.}

Prevalence of obesity or overweight among child or adolescents that the prevalence of obesity among children and adolescents is increasing at an alarming rate. If current trends continue, this epidemic will likely pose an unprecedented burden on youth, their families and our health care system. It is important to understand how sensible lifestyle choices such as regular exercise can enhance the health and well-being of obese children and adolescents. While aerobic exercise has traditionally been recommended for obese youth, a growing body of scientific evidence indicates that resistance training can be a safe, effective, and enjoyable method of exercise provided that appropriate training guidelines are followed and qualified instruction is available. In addition to favourable changes in body composition, regular participation in strength-building activities gives obese youth a chance to experience success, feel good about their performances, and gain confidence in their abilities to be physically active. Moreover, participation in resistance exercise gives youth with a high percentage of body fat a chance to be exposed to a form of exercise that can be carried over into adulthood.

In this paper, we will discuss the potential benefits of resistance training for obese youth and describe program design considerations for designing resistance training programs for obese children and adolescents.

The prevalence of obesity during childhood and adolescence has reached epidemic proportions worldwide.\footnote{Kurt Brungardt, \textit{The Complete Book of Abs}, (United State of America: Villard Books, 1998), Page 25.} This unabated epidemic is occurring in boys and girls across all socioeconomic strata and it appears that obese children and adolescents are at high risk for becoming obese adults.\footnote{Kurt Brungardt, \textit{The Complete Book of Abs}, (United State of America: Villard Books, 1998), Page 25.} These trends have led some observers to predict that the overall adult life expectancy will decrease due to the increased prevalence of obesity-related co-morbidities such as type 2 diabetes, cardiovascular disease and cancer.\footnote{Kurt Brungardt, \textit{The Complete Book of Abs}, (United State of America: Villard Books, 1998), Page 25.} Today, childhood obesity, with its associated co-morbid conditions and its likelihood of persistence into adulthood, is considered a critical public health threat for the 21st century.\footnote{Kurt Brungardt, \textit{The Complete Book of Abs}, (United State of America: Villard Books, 1998), Page 25.} Learning how sensible lifestyle choices, such as regular exercise, can improve the body composition and enhance the health and well-being of obese children and adolescents is a growing area of interest among health and physical education teachers, researchers, health care providers, and government officials. While both normal weight and obese youth have traditionally been encouraged to participate in aerobic activities such as walking and cycling, over the past two decades a compelling body of evidence has accumulated to indicate that resistance training can be a safe, effective and beneficial method of exercise for all youth regardless of body size.\footnote{Kurt Brungardt, \textit{The Complete Book of Abs}, (United State of America: Villard Books, 1998), Page 25.} Research into the effects of resistance exercise on normal weight and obese children and adolescents has increased over the years, and the qualified acceptance of youth resistance training by medical and fitness organizations has become almost universal.\footnote{Kurt Brungardt, \textit{The Complete Book of Abs}, (United State of America: Villard Books, 1998), Page 25.} This paper discusses the potential benefits of youth resistance training and provides program design considerations for developing resistance training programs for obese children and adolescents. For the purpose of this paper, the term “obese” refers to youth (both children and adolescents) with a body mass index (BMI [weight in kg/height in m\(^2\)]) equal to or greater than the 95th percentile of the age- and gender-specific BMI distribution.\footnote{Kurt Brungardt, \textit{The Complete Book of Abs}, (United State of America: Villard Books, 1998), Page 25.} The term “at risk for obesity” is defined as a BMI at or above the age- and gender-specific 85\(^{th}\) percentile but less than the 95th percentile. The term “resistance training” is defined as a specialized method of physical conditioning that involves the progressive use of a wide range of resistive loads and a variety of training modalities to increase one’s ability to exert or resist force. The term “children” refers to boys and girls who
have not yet developed secondary sex characteristics (approximately age 11 in girls and 13 in boys) and the term “adolescence” refers to the period between childhood and adulthood and includes girls 12 to 18 years and boys 14 to 18 years.\textsuperscript{18}

Reduce weight overweight to normal weight. Its Improve Child overall development through by Along with its roles in helping to keep children healthy, prevent chronic conditions, and develop an active lifestyle, physical activity has many other benefits. It can reduce the effects of stress, while at the same time stimulating brain activity and increasing the ability to concentrate. Reducing stress can make it easier for children to develop physically, mentally, intellectually, and socially. Ultimately, this may help them perform better in the classroom. In addition, exercising in a group setting with other children can instill a sense of belonging. It can also help them develop important life skills such as taking turns, sharing, and cooperating with others. This in turn can have a positive effect on the classroom environment\textsuperscript{19}

How to Manage Weight and Fat in the Body that Effective weight control involves multiple techniques and strategies including dietary Therapy, Physical activity, behaviour Therapy, Pharmacotherapy and Surgery as combinations of these strategies. Relevant treatment strategies can also be used to foster long-term weight control and prevention of weight gain. Some strategies such as modifying dietary intake and physical activity can also impact on obesity-related comorbidities or risk factors. Since the diet recommended is a low calorie, it not only modifies calorie intake but also reduces saturated fat, total fat and cholesterol intake in order to help lower high blood cholesterol levels, the diet also included the current recommendations for sodium, calcium, and fibre intakes. Increases physical activity is not only important for weight loss and weight loss maintenance but also impacts on other comorbidities and risk factor such as high blood pressure, and high blood cholesterol levels. Reducing body weight in overweight and obese patient not only helps reduces the risk of these comorbidities from developing but also helps in their management.

Weight management techniques need to take into account the needs of individual patient so they should be culturally sensitive and incorporate the patient’s perspectives and characteristics. Treatment of overweight and obesity is to be taken seriously since it involve treating an individual’s diseases over the long term as well as making modifications to a way of life for entire families.

Below Table Illustrates the therapies appropriate for use at different BMI levels taking into account the existence of other comorbidities or risk factors.

\begin{table}[h]
\centering
\begin{tabular}{|l|c|c|c|c|}
\hline
A guide to Selecting Treatment & BMI Category \\
\hline
Treatment & 25-26.9 & 27-29.9 & 30-34.9 & 35-39.9 & \geq40 \\
\hline
Diet, Physical Activity and Behavior Therapy & With Comorbidities & With Comorbidities & & & \\
\hline
Pharmacotherapy & & With Comorbidities & & & \\
\hline
Surgery & & & With Comorbidities \\
\hline
\end{tabular}
\end{table}

\textsuperscript{18} Avery D. Faigenbaum, “Resistance training for obese children and adolescents”, Research digest: president council on physical fitness and sports, (Washington D C: 2007), Series 8, Page 3.

\textsuperscript{19} Life style for Health, Fitness and Wellness, Healthy People 2010: National Health Promotion and Disease Prevention Objectives, (United State of America, 2010), Page 7.
Note: Combination Therapy with a low-calorie diet (LSD), increases Physical Activity and Behaviour therapy provide the most successful intervention for weight loss and weight maintenance.\textsuperscript{20}

How to Weight Loss through Physical Activity defined as this increase in energy expenditure comes about not just from the direct effect of physical activity on metabolic rate but also from the persistent elevation of metabolism following physical activity. In a research study, Ward and Bar or estimated that a 30-kilogram child with an energy expenditure of 7500 kJ/day can increases her or his daily energy expenditure by 20% to 25 % through 40 to 50 minutes of jogging or swimming. Such an increases in daily energy expenditure, without increases in energy intake, would results in a 1-kilogram fat loss within 23 days. Although the definitive study of the effect of physical activity and exercise intervention on energy intake has yet to be carried out, the weight of available evidence suggests that only very small changes in energy intake accompany exercise training. The mode and volume of physical activity described in the cardiopulmonary fitness section can also be recommended in this context\textsuperscript{21}

Aerobics Exercise Examples of aerobics exercise are walking, jogging, swimming, cycling, rope-skipping, dancing, ball games and racket games (such as badminton, basketball, football, squash, tennis). They are classified as aerobic activities because they work the larger muscles in the body, particularly those in the lower limbs. They can also be done fairly continuously or repetitively, and at a reasonably high intensity using up large amounts of oxygen and energy. Aerobics Exercise are also the most effective exercise for reduction of obesity(over fatness), and are safe, if done properly, For these reasons judicious aerobics exercise are usually the most highly recommended of all the exercise. They are suitable for everyone, including patients with cardio-respiratory problems, e.g. those in cardiac rehabilitation programme.\textsuperscript{22}

Aerobics for Child suggested that Aerobic exercise Health expert’s advice that children get a total of at least 1 hour of aerobic exercise a day. It should be preceded by a warm-up, and followed by a cool-down. For the purpose of ABC for Fitness, aerobic exercise is any activity that increases breathing and heart rate. Under ideal circumstances, you should aim for at least 30 minutes of aerobic activity during the school day. In addition, you should include a brief warm-up prior to each activity burst, and cool-down when the activity burst is completed\textsuperscript{23}

Why Chosen Aerobic Fitness Programme rather than any other answered is when we are concerned with body composition, and in particular body fat content, not exceeding the recommended maximum level of intensity of physical activity is important. Exercising at intensities that elicit heart rates higher than 80% of Maximum may be counterproductive. Such high intensity exercise is significantly supported but anaerobic metabolism with a built up of lactic in the muscles the high anaerobic content will probably restrict the duration of the exercise and, in addition, because fat cannot be metabolized an aerobically, there will be an increased reliance on glycogen stores as the major stores as the major sources of energy. To increases lean body mass in line with a reduction in body fat; it is advisable to supplement


\textsuperscript{21} Ekta Gothi, Fitness and Health Education, Page 39.

\textsuperscript{22} C. K. Giam et al., Sports Medicine, Exercise and Fitness, (Singapore: PG Publishing Pvt. Ltd, 1988), Pages 11-12.

any aerobic exercise programme with a muscular fitness programme such as that described in
the muscle fitness section.24

Swiss or Gym Ball Exercise balls are available in a variety of sizes, making them
ideal for people of all body types. For obese people, using an exercise ball may be more
comfortable than other forms of exercise, particularly for those who have trouble bending and
twisting. If you need to drop a significant amount of weight, an exercise ball is a good tool for
getting started. Talk to your doctor before beginning a new exercise routine. Using an
exercise ball for 15 minutes allows a 300-pound person to burn nearly 100 calories, which
aids in weight loss when balanced with a low-calorie meal plan. If your size interferes with
full range of motion, using an exercise ball helps increase flexibility, which makes it easier to
incorporate additional exercise ball moves into your routine. If you don't like exercise, a ball
may be more fun than traditional forms of exercise, increasing the chances that you'll use it.
Sitting on an exercise ball strengthens and tones your core muscles, which improves balance
for other forms of exercise.25

Swiss Ball Exercise Importance is the ball can improve muscle strength and
endurance in all of the major muscle groups. Training with the ball can improve muscle tone,
increase muscle endurance and strength, restore or improve flexibility, enhance spinal
stability, complement your resistance and aerobic training programs, help you lose weight,
and improve your balance, posture and coordination. Due to the Stability Ball’s popularity
within the rehabilitation and fitness industry, they have also made their way into the private
sector. While the initial home use was directed toward rehabilitation, the stability ball is now
used by many as a chair for their office, for regular strength training, flexibility training and
for relaxation. Most at home users employ them regularly to keep their core functioning at an
optimal level.26

Pilates Exercise- Pilates is appropriate for everyone, from beginners to professional
athletes, from teens to seniors. The original mat exercises have evolved into hundreds of
exercises ranging from basic stabilization moves to a complicated, choreographed series of
poses. The circulation throughout the joints, further decreasing painful areas. For this reason,
Pilates is the perfect rehabilitation program for a number of conditions. Are you an office
worker or student who suffers from chronic neck or shoulder pain? Pilates can alleviate that.
Strengthening the upper back with exercises such as single leg kicks, double leg kicks,
swimming, or swan dive movements can improve posture and decrease the muscle tension
that causes these symptoms. Proper placement of the shoulder in its socket will reduce
common shoulder problems and pain caused by overuse. If lower back pain your concern,
Pilates can help this as well. Weak abdominal muscles, poor core stabilization and tight hip
muscles are often the root cause of low back pain. Pilate’s exercises such as the stomach
series, bridges, and teasers will help to strengthen the core and decrease lower back pain.
Some of these exercises are more advanced, however, and can increase back pain if not
performed correctly.27

Pilates Exercise Effect to Body weight and Fat. It is well established that exercise can
help in weight loss, but is any exercise good for weight loss? Some regimes like Pilates and
Yoga have been known for their benefits in elements such as increasing flexibility, improve
posture, toning the body and improve joint mobility. Some Studios and techniques do

26 Richard A. Dicenso, Stability Ball Training – Benefits of Exercising with a Ball, 2015, Shapefit.com
advocate that Pilates will help you to lose weight. The question here is how far is that true and does it worth adding some Pilates in your workout. Pilates exercise will help in burning some calories: Pilates is a form of exercise and as any exercise it will help in burning some calories. Pilates exercises mainly target the back, abdominal and hip muscles and they use the body’s own weight and resistance to work the specific muscles. Exercises are meant to be performed slowly and in a controlled fashion. In its theory, it teaches the body how to use its own mechanisms to recruit the ‘core’ muscles throughout the body. It is advocated by Pilate’s fanatics and experts that it changes the shape of the body; for the best always. Toning the muscles in areas such as hips and abdomen can give the flat tummy effect and also take inches of the hips and waist. These areas also appear firm.

Pilates and weight loss: Some experts suggest that the link of Pilates with weight loss is just a miss-presentation of the product. In simple words Pilates is not an efficient tool for losing weight. In terms of science there is not a lot of information available. Pilates has been researched in terms of its rehabilitation/treatment role in different conditions like back pain, however, there is very little in terms of weight loss. Can be used for losing weight provided that…One study suggests that one hour of Pilates exercises can use between 241 to 421 kcal. The amount of calories used will depend both on the individual and the intensity of the exercise, so we will treat this as an average guide rather than a stepping stone. Even so, it is clear that it in comparison to other forms of exercise it is not the most calorie efficient.

New trend Machine Pilates widely used Pilates, broadly, is similar to yoga, but with less time spent on any given movement, resulting in more movements per session and without chanting. There is a focus on stretching, breathing, and core muscle workout. The stretching and movements help move lymph to the core. The focus on breath and core helps the body process lymph. The added use of 'machines' may help reduce the effects of gravity as some exercises can be performed when the person is horizontal. For example, using a 'jump board' can mimic rebounding exercises without quite as much gravity pulling the weight of the body down toward the feet and knees, because the person is horizontal while 'jumping'.

Floor Gymnastics Exercise: The USA Gymnastics Fitness Program is designed to supply year-round fitness curriculum to meet the needs of any gymnastics club, physical education class, or group fitness plan. It can be staged alone or incorporated into existing programs or camps. The program focuses on core gymnastics moves built upon the fundamentals of fitness – cardiovascular exercise, movement, strength training, flexibility and nutrition – and features three fitness levels: beginner, intermediate and advanced. This year’s program includes new measurement metrics so that you can track the physical progress of each participant. All exercises are designed to condition and meet the needs of children performing at any level of fitness. The levels allow components of the program to be used from rec. to team and for children to advance within the program based on their development. Refer to the “Determining levels of fitness” section on page 7 to learn which level of exercise to use for each participant.

Gymnastics and Its Importance to reduce weight are competitive gymnasts have some of the slimmest, most carefully-honed bodies in sports. Female gymnasts, in particular, have tiny figures. However, competitive gymnasts begin training in childhood, train many hours a day and follow strict diets. So, does gymnastics help you lose weight if you’re not training at a competitive level? The answer depends on your overall balance of diet and exercise, and whether or not you're prepared to spend a lot of time in the gym. Calories Burned through


29 http://en.wikipedia.org/wiki/Pilates

Gymnastics: Gymnastics is classified as a moderate calorie-burning exercise. This means a 155-pound person burns roughly 298 calories per hour doing gymnastics, versus about 334 calories for an hour of brisk walking at 4 mph and 446 calories per hour of jogging, according to the Harvard Heart Letter. This means if you want to do gymnastics specifically for weight loss, you'll need to devote more time to exercise and be content with slow, gradual weight loss. Also, if you don't have access to a special gym or training centre, coaching and equipment, it probably isn't a practical choice for weight loss.31

A person who weighs 120 pounds will burn between four and five calories per minute while doing gymnastics, according to Jeane Eddy Westin's book "The Thin Books." However, the number of calories you can burn depends on how much you weigh. Westin says to add 5 percent more calories for each additional 10 pounds you weigh over 120 to figure your individual per-minute burn. Fat Loss through the amount of fat you burn doing gymnastics is related to how many calories you burn. MayoClinic.com says that one pound of fat is equal to 3500 calories. Additionally, in order to start burning fat, you have to burn more calories than you take in. That means paying attention to your diet as well as to the length of time that you work out. Otherwise, you'd have to spend enough time doing gymnastics to burn thousands of calories just to get rid of one pound of fat.32

The Benefits of Gymnastics Most everyone recognizes the value of physical activity in our daily lives. Children are no different. The CDC's National Center for Health Statistics clearly shows that children are becoming more overweight and our population as a whole is becoming more obese. A gymnastics club provides children with a comfortable place that encourages physical activity. Here at Gymnastics Michiana, our focus on fun, safety, and personal progress stimulates children of all ages to participate in physical activities specifically geared towards strength, coordination, and flexibility - all of which can help these young athletes whether or not they choose to continue with gymnastics or switch to any other sports-related activity. Below are some common questions parents first have when considering gymnastics for their children.

How can gymnastics help my child physically answered is Gymnastics can endow children with great physical benefits. From muscle strength and balance to healthy bones and flexibility, gymnastics provides and exciting option for parents who know the value of a full-body workout. Every part of the body is used when doing gymnastics.33

Aquatics or Water Exercise: Forms of Aerobics Exercise: There are different kinds of aerobics performed on the floor like low impact aerobics, high impact aerobics and no impact aerobics. Some are vein details below. Low impact aerobics have aerobic movement (Movements involving large muscle groups used in continues rhythmic activity) in which at least one foot contacts the ground at all times. This type of exercise evolved to decreases the lower leg overuse injuries associated with high-impact classes and is ideal for special populations, such as elders, pregnant women and overweight individual. Aqua aerobics is the performance of aerobics exercise in water. It’s also known as aqua-fit or water aerobics, aqua aerobics exercise can be performed as a special segment of workout or as a warm-up to the rest of the water activities. The body will warm up quickly as it vigorously burns calories and increases the cardio-respiratory strength and endurance; aerobics water workout incorporate variety of rhythmic body movement and dance steps performed in the water34

33 http://www.gymmichiana.com/benefits.html
Aquatic Exercise and Its importance that the overweight and obese adults may have functional limitations that result in difficulty performing traditional weight-bearing activities. Aquatic exercise is a commonly recommended alternative due to the potential therapeutic qualities of water, which include reducing the weight and stress placed on the body. However, limited data support the idea that aquatic exercise is superior to traditional forms of physical activity for overweight and obese adults. Within the context of a comprehensive intervention that included a recommendation to reduce dietary intake, the weight loss achieved with aquatic exercise was similar to the weight loss achieved with land-based activity such as brisk walking. However, water-based activity may pose unique barriers including access to a pool, comfort of the participant in water, and body image factors related to clothing for the water. Thus, rather than recommending aquatic exercise broadly for overweight and obese adults, the decision to engage in water-based rather than land-based activity should be determined by clinical need and the participant’s preference.\(^{35}\)

Loss weight With Water Aerobics The weight loss aspect of water aerobics is mostly focused around two key components, which are as follows: the lack of physical exertion required to succeed, and the reduced risk of injury. Think about jumping in water again. You jump up with ease. Now think about the process of jumping outside of water. Not nearly as easy is it? If you have a medical condition that hinders your physical ability, then jumping outside of water may even be impossible. Thankfully, the buoyancy of Water makes it so that everyone can exercise and see results. In a matter of only a few weeks you will start to feel and look slimmer. Not only that, but by hopping on a set of scales you will find out that you are thinner! Yes, weight loss is not a magical process. You will have to look at your diet too. But water aerobics makes for an extremely easy and fun way to burn calories.

How many calories can you burn in water? According to mayo clinic, one hour exercise will burn approximately: 402 calories for someone 160 pounds (73 kg), 501 calories for someone 200 pounds (91 kg) and 600 calories for someone 240 pounds (109 kg)

If weight loss is your main goal, and you treat water aerobics as your primary exercise and put your energy into it, then you could easily burn even more than the stated amounts. To put into perspective, assume you burn 500 calories per hour and perform water aerobics for four hours per week. This equates to 2000 calories burnt every single week. That’s over 8000 calories in a month. Guess what? It only takes a 3500 caloric deficit to lose one pound- and we haven’t even touched the caloric intake from your diet! So you could easily find yourself losing well over two extra pounds per month, just by performing water aerobics four times a week. Not too shabby for such a fun and easy form of exercise.\(^{36}\)

National Perspectives of This Research: National Curriculum for Child Health is Nevertheless the changing treads of human mortality and morbidity in the 20th century necessitate a close look at the way adults involve themselves in physical activities and whether there are lessons to be learned, at least from a health perspective, for children’s education and lifestyles. It is now well documented that the major public health problems of our society are degenerative, or lifestyle, problems rather than infection diseases. If this is the case, it has important implications for the process of educating children about life style and health habit. Recently evidence on physical activity and health from epidemiology, medicine


and public health, has the wider community sought to bring about a greater emphasis on preventing medicine. If so has the physical education profession changed to accommodate this? 37

Fitness Rehabilitation Programme in India In sports, it is very important to provide the right guidance at the right age. Milkha sure fit programme has carefully structured those elements into an enjoyable and doable programme which will be taken to kids across the-country."We look forward to a country which will lead to healthier, fitter kids and hopefully a lot more talented sportsmen. This will also complement in their academic performance as a healthy mind sits in a healthy body," he added. Milkha Sure fit Fitness programme will leverage a scientific approach to sports which will bring transition in a child from basic fundamental movement skills to functional sport skills and create the love for sports. As a part of the programme, children will be trained in exercises and activities relevant to the appropriate sport to which they qualify. Regular workshops and trainings will be conducted within the school premises and existing sports trainers and coaches in schools will be further imparted 30-40hrs of training. 38

STATEMENT OF RESEARCH PROBLEM

Effect of Rehabilitation Program on Overweight School going Students of Gujarat

DELIMITATIONS

The studies were delimitation in the following ways, which was being taken into consideration during the research study. The following delimitations were recorded for this study.

- The Sample of this study was being delimited from the different school of Gujarat
- Seventy five overweight students from different schools of Gujarat state were delimited for this study. The selected students were belonging to Bright International School, Bright Victory School, Pinnacle Public School, Gymnastics Club of Naroda and Veer Savarkar Swimming pool.
- The sample of this study was delimited based on purposive random sampling technique.
- Training schedule for this study was kept of 6 month only
- This study sample was delimited those who were between 12 to 15 years age.
- Overweight of the subjects was determined based on the body Mass Index percentile of the subjects. The subjects who were having 85th to 95th Body Mass Index percentile were considered as overweight for the purpose of this study.
- The subjects were divided into five groups. Each group consisting of fifteen, Experimental group I, Experimental group II, Experimental group III, Experimental group IV and control group V.
- Only Four different Rehabilitation Program, namely, Aerobics Fitness Rehabilitation Program, Swiss ball and Pilates Exercise Rehabilitation Program, Gymnastics Floor Exercise Rehabilitation Program, Aquatics Exercise Rehabilitation Program were selected for this study.
- Only the following weight and fat related variables were delimited for this study:

37 Ekta Gothi, Fitness and Health Education, Page 31.

38 The Times of India, “Milkha Singh kick starts fitness programme for school children”, (PTI Apr 1, 2015, 02.56PM IST.
Weight and fat related variables

1. Weight
2. Fat Percentage
3. Fat Mass
4. Fat Free Mass
5. Lean Body Mass
6. Body Mass Index Percentile
7. Chest Girth
8. Belly Girth
9. Hip Girth
10. Thigh Girth

LIMITATION

The study was limited in the following ways, which were taken into consideration at the time of findings of this study. Since the researcher has done this work single handed, he had to limit the study as follows:

- The investigator was not taken into consideration of the past experiences of the subjects in exercising.
- The climatic conditions, diet and other daily routines of the subjects was not controlled in investigation.
- Geographical and Natural situation was considered as limitation of this research study.
- Different cast and family back ground and religious of the overweight students was considered as limitation of this research study.
- The economical and social background of the overweight students was not taken into consideration.
- The investigator was not taken into consideration of the past life style, food habit, Physical exercise practice, heredity of the subject in this research study.
- The Rehabilitation programs conducted places e.g. (gym, indoor, outdoor, swimming pool, rehabilitation centre, Aerobics centre,) was considered as limitation
- The researcher was not consideration of the sample adipose tissue distribution pattern in this research study.

OBJECTIVE OF THE RESEARCH

The research work was carried out with the following objectives in perspectives

1. The main objective of the research was find out which training program was best for the overweight students to reduce weight and to become fit and free from diseases.

2. To study the effect of different types of Rehabilitation Program (RP) on overweight school going students.

HYPOTHESIS

On the basis of literature reviewed and scholar’s own understandings of the problem it was hypothesized that the Aerobic Fitness Rehabilitation Program (AFRP) will have greater influence of the recovery in selected variables of overweight school going students of Gujarat
DEFINITION & EXPLANATION OF TERMS

Physical Fitness
The United States President’s Council on Physical Fitness and sports defined the terms physical fitness as “the ability to carry out daily tasks with vigour and alertness without undue fatigue, with ample energy to enjoy leisure time pursuits, and to meet unforeseen emergencies (Clarke 1971).”

Training
Training is a pedagogical process which makes possible the achievement of high standard performances without any physical or mental damage, through the planned systematic development of certain specific skills, physical capabilities and the adaptation of the organism. Training is defined as “a systematic process of repetitive, progressive exercise or work, involving the learning process and acclimation.”

Lean Body Mass
The Body weight minus the weight of the body fat.

Body Composition
Body Composition is the proportion of the lean body mass and depot fat, and it is one of the most important morphological features characterising human organism.

Aerobic Exercise
Aerobics means ‘with oxygen’. Aerobic exercise is designed to produce a sustained increase in heart rate and whose energy cost can be met by the body from aerobic sources, that is, from increased oxygen consumption.

Pilates Exercise
A system of exercises using special apparatus, designed to improve physical strength, flexibility, and posture, and enhance mental awareness.

Swiss Ball Exercise
An inflatable vinyl or rubber ball, used in exercise training, rehabilitation, and sports to treat low back pain or to strengthen the muscles of the abdomen and chest.

Gymnastics Floor Exercise
In gymnastics, the floor refers to a specially prepared exercise surface, which is considered an apparatus. It is used by both male and female gymnasts. The event in gymnastics performed on floor is called floor exercise.

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44 http://www.oxforddictionaries.com/definition/american_english/Pilates

45 http://medical-dictionary.thefreedictionary.com/Swiss+Ball

46 https://en.wikipedia.org/wiki/Floor_%28gymnastics%29
Aquatic Exercise
Aquatic Physiotherapy refers to the special practice of physiotherapy, with therapeutic intent toward the rehabilitation or attainment of specific physical and functional goals of individuals using the medium of water.\(^{47}\)

Overweight and Obesity
What is the BMI Percentile? For children and teens, after BMI is calculated, the BMI number is plotted on the CDC BMI-for-age growth charts (for either girl s or boys) to obtain a percentile ranking. Percentiles are the most commonly used indicator to assess the size and growth patterns of individual children in the United States. Percentiles are used for children and teens because the amount of body fat differs between boys and girls and body fat also changes with age. The percentile indicates the relative position of the child's BMI number among children of the same sex and age. The growth charts show the Weight Status Categories used with children and teens: Underweight, healthy weight, overweight, and obese.\(^{48}\)

Adapted from the Centers for Disease Control website (accessed by L. Meier 10/14/10)

<table>
<thead>
<tr>
<th>Weight Status Category</th>
<th>Percentile Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under Weight</td>
<td>Less than the 5(^{th}) percentile</td>
</tr>
<tr>
<td>Healthy Weight</td>
<td>5(^{th}) percentile to less than the 85(^{th}) percentile</td>
</tr>
<tr>
<td>Overweight</td>
<td>85(^{th}) to less the 95(^{th}) percentile</td>
</tr>
<tr>
<td>Obese</td>
<td>Equal to or greater than the 95(^{th}) percentile</td>
</tr>
</tbody>
</table>

Rehabilitation
Knowingly or unknowingly such as act may enhance the rehabilitation process. As a matter of fact, rehabilitation is the restoration of an injury part to normal or near to normal function.\(^{49}\)

SIGNIFICANCE OF THE STUDY

This study was significant in the following ways:

- The study will significant in determining effect of all different Rehabilitation Program on overweight school going student on following aspects such as reducing weight, becoming fit, free from various diseases, poor posture, stiffness, misconception of fitness and health and will get proper knowledge of fitness through this research study.
- The study will significant in determining effects of Aerobics Fitness Rehabilitation Program on overweight school going student
- The study will significant in determining effects of Swiss ball and Pilates Rehabilitation Program on overweight school going student.
- The study will significant in determining effects of Gymnastics Floor Exercise Program on overweight school going student.
- The study will significant in determining effects of Aquatics Exercise Program on overweight school going student.
- The study will significant in determining effects on overweight school going student through recovery of fitness.

\(^{47}\) World Confederation for Physical Therapy, Terminology in aquatic physical therapy, (United of Kingdom, 2010): http://www.wcpt.org

\(^{48}\) http://www.cdc.gov/healthyweight/assessing/bmi/childrens_BMI/about_childrens_BMI.html

• Physical Education teacher and coaches may successfully impart rehabilitation program, as incorporated in this study, so that rehabilitation in weigh and fat related variables can exhibit their talent in right place.

• This study will also enabling the overweight to realise their level of weight and fat then after rehabilitated weight and fat and become aware while exhibiting skill performance in actual competitive situation.

• It will improve confidence and enthusiasm of overweight students by reducing weight.

• It will improve wholesome development and physical movement knowledge by this research study.

• It will reduce obesity risk through this Rehabilitation Program on overweight sample of this research

• It will maintain previous fitness through this Rehabilitation Program of overweight students.

• It will improve awareness of fitness and body weight by this research.