

# Review Of Research



## AGING, EXERCISES AND PHYSIOLOGICAL CHANGES

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### ABSTRACT

*It is true that some physiological changes reach their peak in the certain age and thereafter there is gradually decreasing with increase of age. Many research work shows that exercise can delay those physiological changes and bring in favour if it is done regularly. It has been proved that a well planned training schedule has a very positive effect on aging. As we know that due to aging there are many changes in our body. However, the various physiological functions reach their peak somewhere between the ages of 20 and 30 years. Research shows that most systems of functions reach their peak, will level off for a period of time before gradually*

*decreasing with age. The number of research indicates that exercise may retard or slow down the rate of decline that is associated with aging. However, some of the physiological changes accompanying the aging process as follow: decrease of muscle size, strength, lean body mass, basal metabolic rate, maximal heart rate, overall heart size, cardiac muscle strength, maximal stroke volume, maximal cardiac output, maximal blood vessels, maximal O<sub>2</sub> uptake, vital capacity, maximal expiratory ventilation, pulmonary diffusion capacity, reaction time, movement time, body density, flexibility, elasticity of lung tissue and chest wall. There are increases of blood pressure, percentage of fat, ratio of residual volume to the total lung capacity but the capillary density of muscle become unchanged. Moreover, many research findings proved that a prescribed cardio respiratory endurance exercise that is training adaptation in the aged considering with four basic factors such as intensity, duration, frequency and mode of activity can bring about significant changes like increase of stroke volume, at sub standard sub maximal workloads, blood volume, total haemoglobin, oxygen pulse, vital capacity, maximal oxygen uptake, physical working capacity and decrease of resting systolic and diastolic blood pressure, heart rate at a standard sub-maximal workloads, ENK abnormalities etc. A recent Swedish study found that physical activity was the number one contributor to longevity, adding extra years to the life.*

**KEY WORDS:** *Aging, Physiological changes, Exercises.*

### **INTRODUCTION:**

Aging and ultimate death seem characteristic of all living organisms. The mechanisms underlying the aging process are not well understood. In consequence, most biological functions show a progressive, age-related deterioration. It is observed that as we aged there are a lot of changes taken place. Basically most of the functions decreases with increase of ages, few remain unchanged and a very few increases. Many research work shows that exercise can delay those physiological changes in favour if it is done regularly. It has been proved that a well planned training schedule has a very positive effect on aging. As we know that due to aging there are many changes in our body. However, various physiological functions reach their peak somewhere between the ages of 20 and 30 years. Research shows that most systems of functions reach their peak, will level off for a period of time before gradually decreasing with age. The number of research indicates that exercise may retard or slow down the rate of decline that is associated with aging. However, some of the physiological changes accompanying the aging process as follow: decrease of muscle size, strength, lean body mass, basal metabolic rate, maximal heart rate, overall heart size, cardiac muscle strength, maximal stroke volume, maximal cardiac output, maximal blood vessels, maximal  $O_2$  uptake, vital capacity, maximal expiratory ventilation, pulmonary diffusion capacity, reaction time, movement time, body density, flexibility, elasticity of lung tissue and chest wall. There are increases of blood pressure, percentage of fat, ratio of residual volume to the total lung capacity but the capillary density of muscle become unchanged. Moreover, many research findings proved that a prescribed cardio respiratory endurance exercise that is training adaptation in the aged considering with four basic factors such as intensity, duration, frequency and mode of activity can bring about significant changes like increase of stroke volume, at sub standard sub maximal workloads, blood volume, total haemoglobin, oxygen pulse, vital capacity, maximal oxygen uptake, physical working capacity and decrease of resting systolic and diastolic blood pressure, heart rate at a standard sub-maximal workloads, ENK abnormalities etc. A recent Swedish study found that physical activity was the number one contributor to longevity, adding extra years to the life.

### **OBSERVATION:**

Person gets older; there is a decline in muscle size. As people get older, there is also a parallel decrease in muscle strength, which probably results from the decline in muscle size. The decline in strength is a gradual one following the age about 35 to 45 years. With advancing age, there is a general trend to accumulate an increase in body fat. Lean body mass decreases. Like muscular strength changes in lean body mass with age also parallel somewhat the increases and decreases in muscle mass. Therefore, part of the decrease in lean body mass with age is due to the decrease in muscle size along with the decline in calcium and phosphorus content of the bones. The amount of the decline in the lean body mass as one gets older can also be controlled somewhat by their eating and exercise habits. Basal metabolic rate decreases gradually with increase of age. The rate of decline from the age of 3 to 80 years is around 3 percent per decade. Between the ages of 20 and 30, this decline apparently indicates an improved metabolic efficiency. There is good evidence to indicate that pulmonary function is impaired with advancing age. This is evidenced in various pulmonary tests that show a decrease in vital capacity, a decrease in maximal expiratory ventilation, a decrease in pulmonary diffusion capacity, and an increase in the ratio of residual volume to the total lung. This increase in RV/TLC is the result of a gradual increase in the residual volume with advancing age while total lung capacity remains relatively unchanged. When an

individual gets older their overall heart size becomes smaller. The left ventricular cavity may especially decrease in size as a result of reduced activity and in the physical demands of increasing age. There is a reduction in the size of the cardiac muscle cell along with a progressive decrease in cardiac muscle strength. With advancing age, maximum heart rate decreases gradually. In addition maximum stroke volume, cardiac output, and blood flow are all decreased with age since the capacity density apparently does not change significantly with age. There is gradual decline in  $\text{Vo}_2$  max with increasing age. Heart rate, stroke volume, lung ventilation, lung diffusion capacity for oxygen and utilization of oxygen by the tissues also reduced with advancing age may contribute to a decline in  $\text{Vo}_2$  max. Reaction time and movement time slow down with increasing age. Recent evidence indicates that excessive activity of nerve cells may have beneficial effects in preventing cognitive decrements in performance with increasing age. Body density decreases with increasing age which means that elderly people especially those over 40 years of age much more prone for bone injury than young people whose bones have obtained full growth and maturity. This is due to a decrease in minerals i.e. calcium and phosphorus found in the bone which makes the bones less dense, more porous and harder to heal from an injury. Although everyone is different, the decline in calcium and phosphorus generally starts in the early forties. Studies have shown that extra intake of the minerals may actually slow down or reduce their loss. Studies also indicate that physical activity apparently has beneficial effects on cubing mineral losses. Anyway there are some extra advantages of a reliable physical wellness schedule: Increased quality – Exercise improves solid quality and the nerves that are utilized to lift substantial articles. This doesn't really imply that an individual will get greater; muscles can end up more grounded without expanding recognizably in size. Improved vitality – With improved blood stream, less fat, and less pressure hormones in the circulation system, the body is more liberated to lead its every day tasks. At the point when the body doesn't need to put as a lot of work into capacities, for example, breathing and siphoning blood through the heart, individual feels the extra vitality. Higher charisma – Many more established grown-ups have detailed an increasingly hearty drive for sex after a steady exercise schedule. Protection from ailment – The body is better ready to avert maladies of different sorts when exercise is embraced consistently. Protection from physical mishaps – most of wellbeing conditions in the senior network happen as an immediate or circuitous consequence of a fall. Physically fit more established grown-ups are less inclined to fall or harm themselves during routine exercises. Better stance – People who exercise by and large have more equalization and will have a simpler time keeping up great stance due to the quality of their bones and muscles. Improvement in constant conditions – People with conditions that may somehow impair them or intensify physical or mental issues may see their quality and stamina improve through exercise, with a decrease in side effects identified with issues as shifted as bone thickness misfortune, joint inflammation, Alzheimer's infection, gloom, and nervousness. Diminished circulatory strain – Exercise lessens pulse, and can even help individuals with analyzed hypertension experience less side effects. Notwithstanding these physical advantages, practice offers some key mental advantages too: Improved mind-set – Exercise is notable to be a general state of mind enhancer. Expanded center – If the body is fit as a fiddle, the psyche is greatly improved ready to concentrate on errands. What's more, once more, practice is additionally a notable impediment to Alzheimer's sickness and general dementia. Less pressure – Exercise enables the body to work off pressure, which has the additional advantage of disposing of the pressure hormones that can prompt heart issues. At long last, enhancements in physical and mental wellbeing can prompt some huge advantages in different territories of a more seasoned individual's life, particularly by delaying their capacity to live freely. Thusly, this more prominent autonomy keeps up physical and psychological well-being. So, the impacts of activity are more all encompassing than even a few specialists

acknowledge, and recalling this can keep an individual propelled as individual start their activity schedule

## DISCUSSION:

The more seasoned individual can adjust and build up their physical working limit now and again the same amount of as the youthful can. The Centers for Disease Control (CDC) report that the two ladies and men get extraordinary advantages from exercise and normal physical action. Stamina and quality normally decline in a great many people as an element of age, yet as indicated by the CDC, the greater part of the diminishing originates from dormancy. 33% of men and half of ladies matured 75 or more established, for instance, take part in no physical action by any means. Likewise, the World Health Organization has recognized physical dormancy as the quantity of four reason for death on the planet. A senior's physical movement doesn't need to be strenuous so as to bring incredible outcomes – as long as it is done consistently, indeed, it very well may be genuinely moderate. Additionally, in the event that anyone not keen on running, at that point the person might be happy to hear that muscle reinforcing exercises are viewed as similarly as significant as cardiovascular exercises. Solid quality keeps up balance in the body, decreasing pressure hormones and muscle versus fat mass, the two of which help to cultivate cardiovascular wellbeing. More grounded muscles additionally lessen falling dangers and keep seniors increasingly autonomous on an everyday premise. It appears that the older person can adapt and follow essentially the same sort of conditioning programs that are designed for young adults. While there is no available evidence to indicate that physical exertion, regardless of age and sex, can physiologically harm to injure a normal, healthy person, it should be obvious to the exerciser that they should take it relatively easy during the early part of the conditioning program and warm up gradually and slowly with stretching exercises. This is to avoid the possibility of pulled muscles and stiffness of the joints. However, isometric exercises results in uncommonly high blood pressures. Because of this, and its implications, isometric type exercises are not recommended for the older people and especially people with cardiovascular diseases. It should be pointed out that this type of high blood pressure also results from dynamic type arm work performed above the waist or in work activities around the house such as snow shoveling or digging in the garden. The training can bring about a significantly improved cardio respiratory system as reflected in increase of stroke volume, at sub standard sub maximal workloads, blood volume, total haemoglobin, oxygen pulse, vital capacity, maximal oxygen uptake, physical working capacity and decrease of resting systolic and diastolic blood pressure, heart rate at a standard sub-maximal workloads, ENK abnormalities etc. The basic principles and guidelines for constructing an individualized cardio respiratory exercise program are the same for all ages and sex regardless of their physical condition. It is essential that before attempting any exercises program, a physical examination is must. This is especially true for those people who are over 30 years of age and have been living a sedentary life with very little activity. To prescribe a cardio respiratory endurance person can exercise the following four basic factors which to be considered- intensity, duration, frequency, mode of activity. Intensity is the rate of doing work. In other word it is the pace at which physical activity is done. The intensity of work can be expresses in several ways including such as a percentage of maximum heart rate, a percentage of maximal oxygen consumption, number of calories consumed, in METS. During sub maximal aerobic work, it has been well established that heart rate increases linearly with energy cost of oxygen up taken of the work. A sufficient amount of cardio respiratory endurance can be accomplished by training at somewhere between 60 and 90 percents of maximum heart rate. This represents a maximum oxygen uptake level of 50 to 80 percent. The lower heart rate figure of 60 percent of maximum represents a maximum threshold level for which it must reach in order for improvements

to take place. Training at levels below this apparently results in little or no cardio respiratory improvements. The duration and the intensity of the work are interrelated. For example, research shows that improvements in cardio respiratory endurance about 15 to 20 percent can be noticed with high intensity while heart rates about 85 to 90 percent of maximum work lasting for only 5 to 10 minutes per day. However, low intensity while heart rates around 65 to 75 percent of maximum work shows little about 5 percent or no improvement for this period of time. More recent research has shown that continuous training at a low intensity while heart rates around 65 to 75 percent of maximum level for duration between 30 to 60 minutes per day will result in significantly greater improvements than training at low intensity for short periods of time. If a 65 years old man in training such as by walking at threshold level of 70 percent of his maximum heart rate, then he would need to get his heart rate up to at least 105 beats per minutes and keep it for a minimum of 30 minutes in duration. At the same time if a 45 years old man is training at a threshold level of 90 percent, then he would have to get his heart rate up to 162 beats per unit and hold it there for only a period of between 5 to 10 minutes in order to accomplish cardio respiratory endurance benefits. Frequency is the number of times a motor stimulus i.e. repetition is given. In cyclic activities like swimming, running, etc., there is no frequency of stimulus as there is only one long duration stimulus. In interval and repetition methods, it is the number of repetitions. In weight training, it is the number of repetitions of an exercise. Frequency of stimulus and intensity are interdependent. Frequency of exercise is related to the intensity of exercise as well as its duration. Research indicates in that four work outs per week are better than three, and that five are even better than four. Similar training effects can be obtained from three work outs a week by increasing the duration of each work outs by 5 to 10 minutes. Two work outs a week are not effective for training the cardio vascular system even though they will maintain a level of fitness one it has been reach. Adults should be encouraged to begin and progress slowly. In general, it is agreed that activities of moderate to high energy expenditure involving the entire body such as walking, jogging, running, swimming, hiking, bicycling, canoeing, cross country skiing, game type activities as basket ball, tennis, soccer and aerobic dancing produce the best improvement in cardio respiratory fitness. However, in some cases problems are seen for exercises in the aged people. These certain physical problems such as sore muscles, skin splints and side ache. These problems are not serious and can usually be taken care of at home by using fairly simple remedies. Adults who experience any abnormal heart action such as irregular, fluttering are skipping pulse, sudden rapid heart rate, sudden slowing of pulse during exercise or pain or pressure in chest, arm or throat should cool down and stop exercise immediately. They should be checked by a physician prior to resuming exercise. Those who get dizzy or light headed or feel sudden in coordination or confirm should stop exercising immediately and lie down or put their hand between their legs until the symptoms pass. Their symptoms should be checked by a physician prior to resumption of exercise.

## CONCLUSION:

It is concluded that physiological changes with aging is a natural process. There is no controlling over is but what the exercise can do i.e. delaying the process and prevent the instant severeness. As we aged there are deterioration of muscle size, strength, lean body mass, basal metabolic rate, maximal heart rate, overall heart size, cardiac muscle strength, maximal stroke volume, maximal cardiac output, maximal blood vessels, maximal  $O_2$  uptake, vital capacity, maximal expiratory ventilation, pulmonary diffusion capacity, reaction time, movement time, body density, flexibility, elasticity of lung tissue and chest wall. There are increases of blood pressure, percentage of fat, ratio of residual volume to the total lung capacity but the capillary density of muscle become unchanged. Moreover, many research findings proved that a prescribed cardio respiratory



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