NPTEL

NPTEL ONLINE CERTIFICATION COURSE

Course Name

Stress Management

By

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Lecture 19: Exercise and Health

Hello and welcome to the fourth module of strategies for relieving stress.

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In today's section we are going to talk about a very important topic primarily health and exercise.

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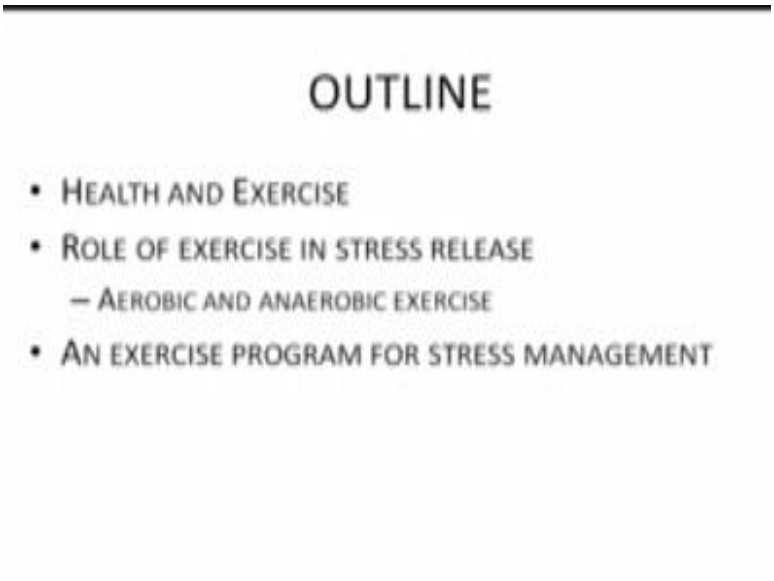

So today's lecture will focus on the role of exercise and stress release the two types of exercise aerobic and anaerobic exercises and we will discuss about an Aerobe an exercise program for stress management.

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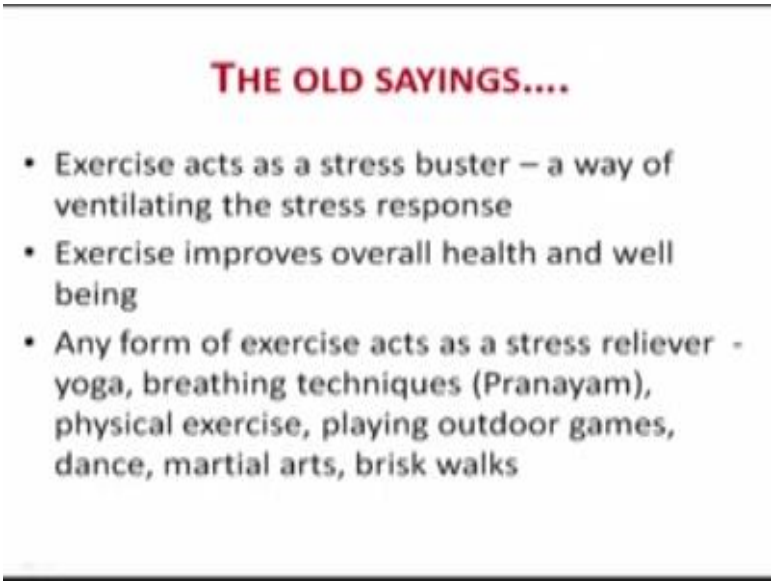

Now we all know that exercise is important for health we have been hearing since a childhood days that yes if you exercise you are fit and your mind is fit and your body is fit but why is it important why is exercise important what is the physiology behind it, we know that exercise acts as a stress buster it is a way of ventilating the stress response it improves overall health and well-being and any form of exercise acts as a stress reliever, so we have often heard the adult say that you can do yoga or meditation if there are people who are really disturbed many people suggest that meditation would be a good way of calming yourself down will you release stress. Also playing outdoor games, dance, different types of martial arts and brisk walks help with stress so what exactly does exercise do to the brain.

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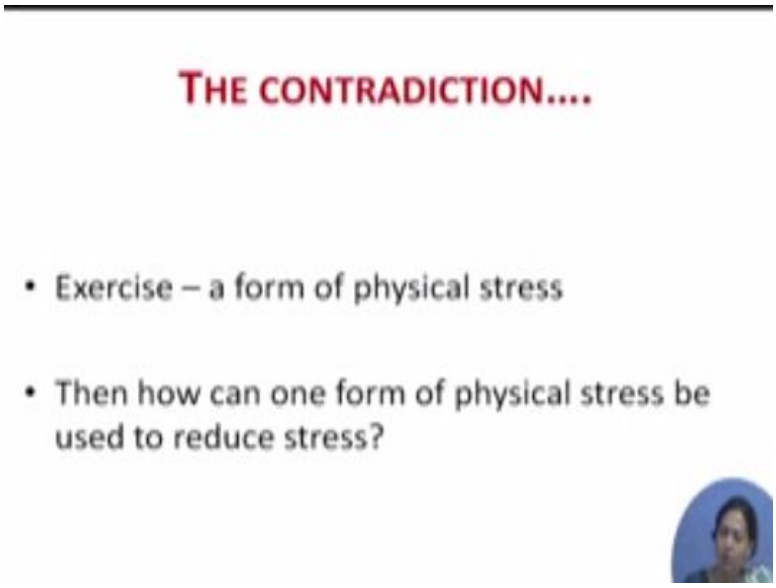

This is a huge contradiction about exercise in the brain now before we get on to what exercise does the brain we must discuss that whether exercise is a form of physical stress then how can exercise again a form of stress reduce another form of stress, so why and why do we use exercise to reduce stress so is there any mechanism different that is happening differently in the brain during exercise as compared to a stressful situation. It is not for to an extent it is not we will see what the differences are.

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Exercise uses the stress products increased heart and respiratory rates, blood fats, muscle tension now these things happen in stress also but exercise uses these products for the positive quality to enhance a positive quality of help so they are not able to affect health negatively and exercise redirects your attention from stressors to the exercise system specifically and it involves focus purposeful behavioral decisions this is very important. Exercise helps us to be more determined more in self-control having self-control.

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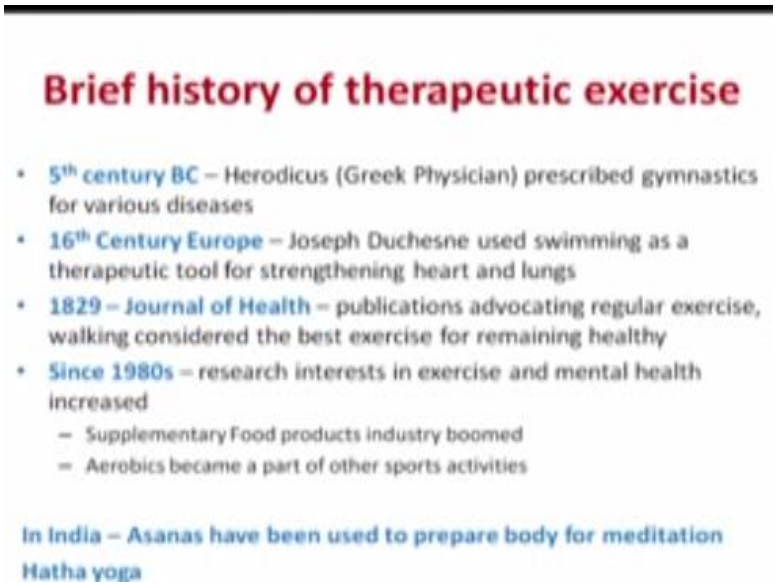

Now talking about the history of therapeutic exercise it has been used for a long, long time to cure illnesses, now that may come as a surprise but it is very true so during 5th century BC Herodicus a Greek physician prescribed gymnastics for various diseases, in the16th century Europe Duchene used swimming as a therapeutic tool for strengthening the heart and lungs infact till today we often see people suggesting that if anybody has asthma a good exercise would be swimming.

In 1829the journal of health there were several publications advocating regular exercise walking and in fact it was walking was considered the best exercise for remaining healthy since the 1980 research interests in exercise and mental health increased one of the reasons being that there were a lot of supplementary food products in the market and various companies and various both stars also started promoting these products as a means of keeping healthy and aerobics became a part of many other sports activities.

So that way individuals who were not sports stars also started in getting involved with exercise in India exercise has been a part of our math logical system also Asanas have been used to prepare the body for meditation and primarily mean Hatha yoga, so if anybody is aware of the Vedic texts you will see that these often talk about exercise for cleansing the body and the mind. Before we get into other forms of meditation.

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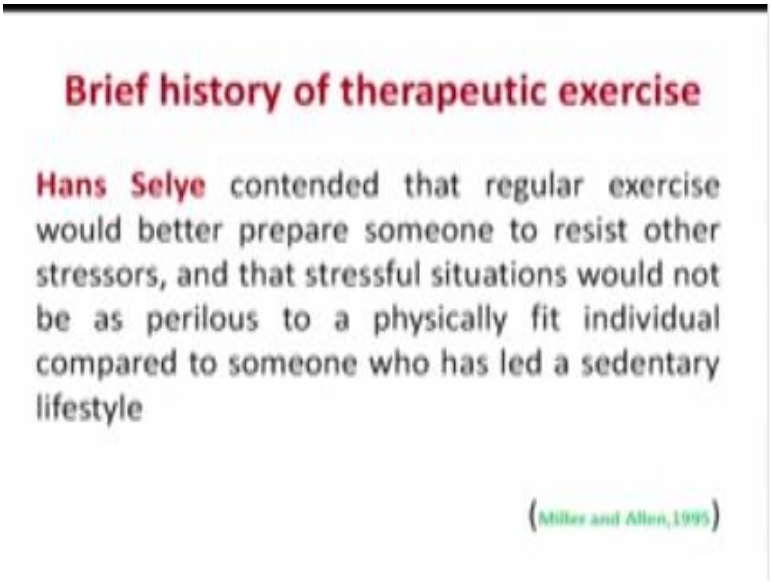

Now that brings us to Hans Selye again we just cannot leave Han Selye when we are talking about stress and hence Selye contended that regular exercise would better prepare someone to resist other stressors and that stressful situations would not be as perilous to a physically fit individual compared to someone who has led a sedentary lifestyle so it as Hans Selye points out it is not only the physiological factors.

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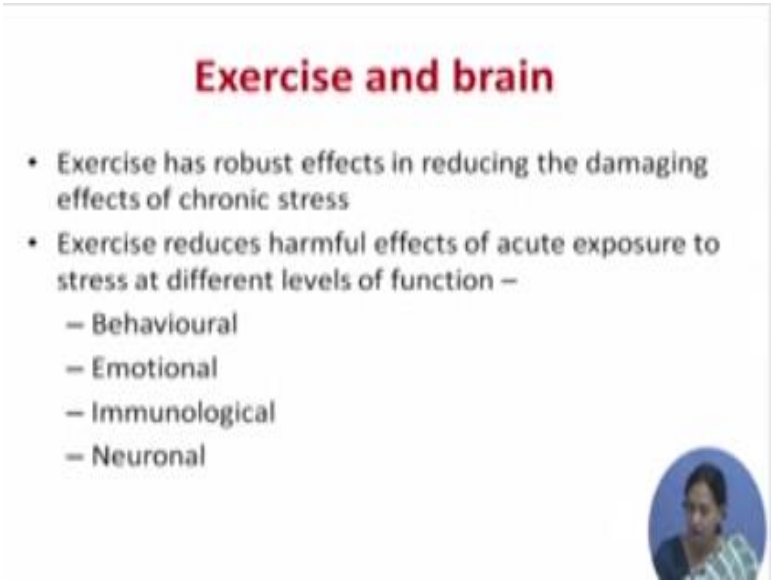

That are that should be address but it is also the psychological well-being that improves with exercise and we see that exercise reduces harmful effects of acute exposure to stress at different levels of function behavioral, emotional, immunological and neuronal.

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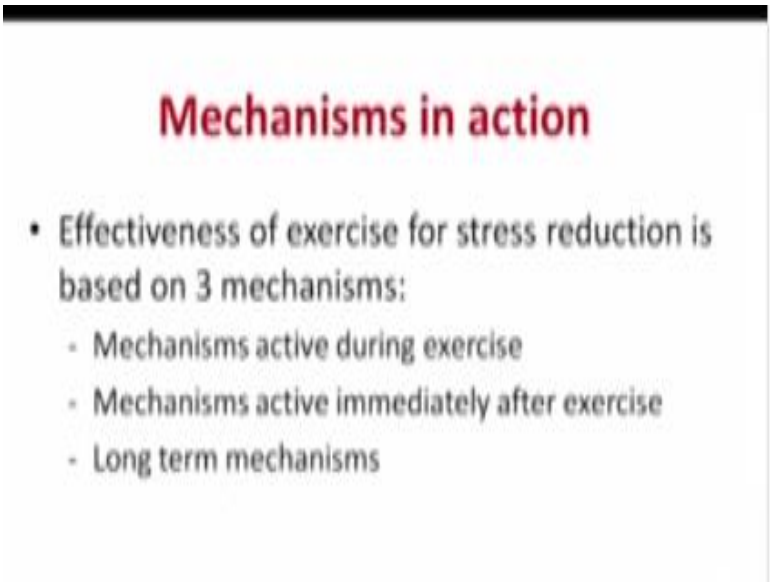

So this is more of lectures so how do we actually see what are the mechanisms in action during exercise so there are three ways that stress is reduced during exercise, one is immediately there are some mechanisms that are active during the exercise period some there are some short-term effects right after exercise and some long term mechanisms that come into play and these primarily involve the overall psychological well-being of the individual.

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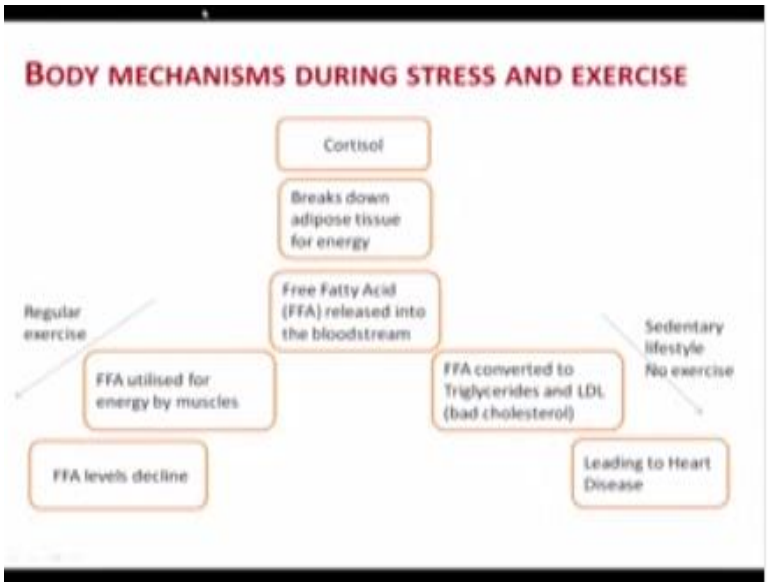

Now getting to the body mechanisms during stress and exercise what actually happens is Cortisol we know that the role of Cortisol in stress, now Cortisol rates down adipose tissue for energy that happens during a stressful situation and free fatty acid or FFA is released into the bloodstream now if the individual has no exercise and there is leads a sedentary lifestyle then the FFA is converted to triglycerides and LDL which is bad cholesterol.

And this may lead to heart disease on the other hand the regular exercise by regular exercise this FFA or free fatty acids is utilized for energy by muscles so if an individual is active then this FFA is utilized for energy and the finally the FFA levels decline, now why the question then arises why does what happens within stressful situation the individual actually moves around and does something as a fight-or-flight response.

That is also a part of the regular exercise so earlier as we were talking of in the previous sections that earlier in when man had to do take several measures for survival then you know these

changes in the brain system would be helpful to create more energy for the muscles but if these days the threats are not for survival amazingly so what happens is so this there is no exercise and there is no free of a fight-or-flight response most of the times that is required during a stressful situation and the FFA is converted to triglyceride and LDL.

So in this way basically this FFA in used in a positive way in regular exercise so as we were discussing right now that do the mechanisms differ during a stress response and during an exercise response the body limb mechanisms generally not so the initial mechanisms are the same but the body physiological changes are the same but in through exercise we are using it in the mechanisms in a positive way to give energy to the muscles and on the other side if there is no exercise if there is a sedentary lifestyle. Then these may cause several other psychosomatic illnesses or physiological illnesses.

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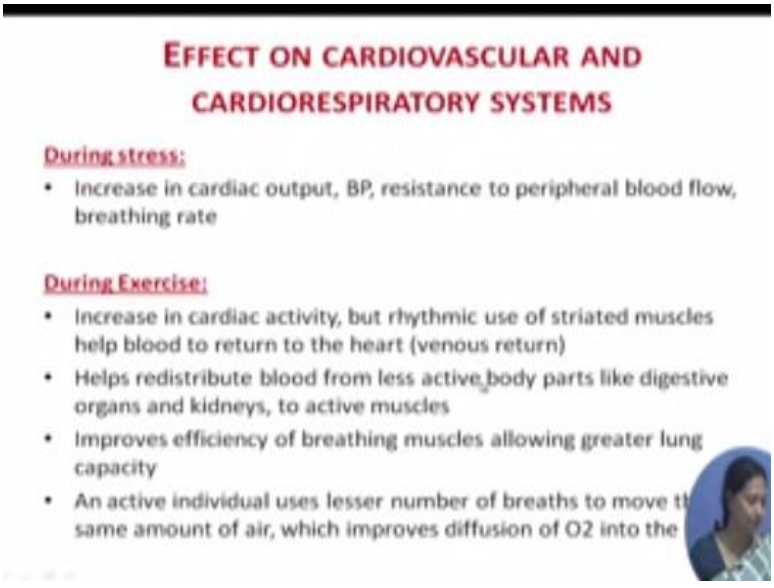

So now that brings us to the cardiovascular and cardio respiratory systems and the effect of exercise on these systems so during stress what happens is if there is an increase in cardiac output, blood pressure resistance to peripheral blood flow and breathing rate we know we know

all this, now what happens during exercise during exercise there is an increased cardiac activity but the rhythm accuser striated muscles help the blood to return to the heart.

So there is this is known as a venous return so this is helps the heart to jest and helps a circulatory system now if it redistributes blood from less active body parts like digestive organs and kidneys to active muscles, so again the blood body circulation is more active the heart is being able to pump the blood better and it improves the efficiency of the breathing muscles allowing greater lung capacity.

So the one can once when we do cardio vascular exercise you can your breathing becomes more controlled so if a person say I will give you an example of a person who Is not used to exercise and who has to run for a while and in comparison to a person who is into regular exercise he will be panting more for breath than the exercise that the guy who is into exercise daily.

Now this is because the efficiency of the lung has also increased you to exercise and an active individual uses lesser number of breaths to move the same amount of air so there is this shortness of breath or shallowness of breath is reduced by regular exercise, in this case we are actually talking of cardiovascular exercise we will discuss about cardiovascular exercise later and this improves the diffusion of oxygen into the lungs.

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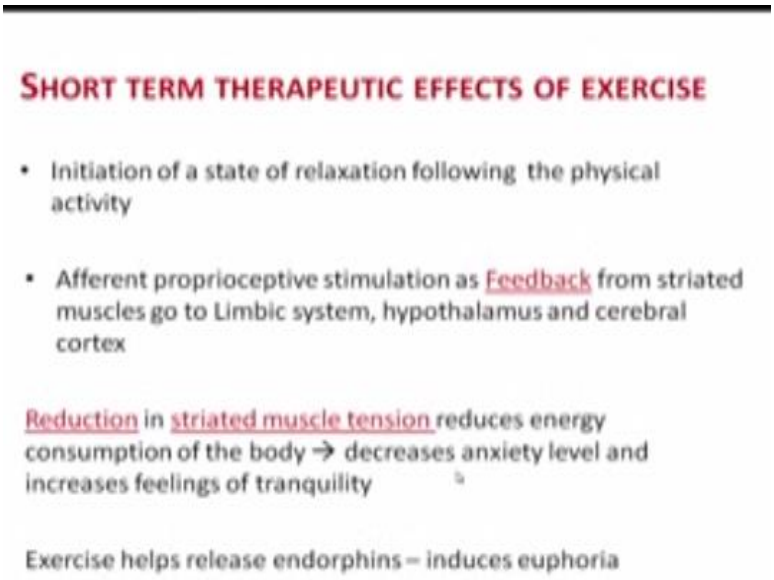

So some of the short-term therapeutic effects of exercise initiation of a state of relaxation following the physical activity and there is a progress effective its stimulation has feedback so from the muscles there is a feedback I have been talking about this earlier also that this there is an input from the muscle groups that go to the brain to the limbic system so that is the emotional center of the brain the hypothalamus and the cerebral cortex are the thinking centers of the brain so it goes to the new emotion there is an input from these muscle groups that go to the emotional centers of the brain and the thinking centers of the brain and it tells us that well this you are relaxed now so there is nothing to get as it is there is nothing to get hyper you are in control and this reduces the energy consumption of the body.

So their muscle tension releases decreases and reduces energy consumption of the body and finally that decreases the anxiety level and increases feelings of tranquility, so I hope you understand this, this is like a loop feedback loop that works so when there is anxiety there the muscles also get tightened that feedback goes to the brain that are this is an anxiety provoking situation this is a stressful situation and the brain starts working and the blood is move to all the muscles for fight or flight response.

And there are there's the HPA axis into action and there are other systems other brain systems into action and the emotional system so emotional centers are into action and that makes that

triggers the fear response or the flight response so now what in by exercise what happens is these figures are not brought into action immediately so the feedback after exercise when there is after short-term exercise there is the sense of tranquility and relaxation.

That is because the feedback from these muscle groups go to the emotion centers and go to the thinking centers and it tells these centers that no your body is calm it is there is nothing to worry you find so the brain interprets these messages and tells the body again okay to relax the muscles get more relaxed and after that, that decreases the anxiety level and brings about the tranquility, so basically you know we discussed about the biofeedback system so it is similar.

The biofeedback system also once that input is received that I can control it goes to the brain and brain tells are you can control so the anxiety goes down similarly through exercise also a similar function occurs, exercise also helps the release of endorphins, endorphins are a type of substance that induces euphoria so when a person is depressed several times many of my students know this that I often tell them you need to go for a brisk walk of the 2.2 in our Institute we have an area called the 2.2 which the students are familiar well and I often tell them you go for a walk just listen to some music go for a brisk walk so the exercise also reduces depression and anxiety in this way by releasing endorphins.

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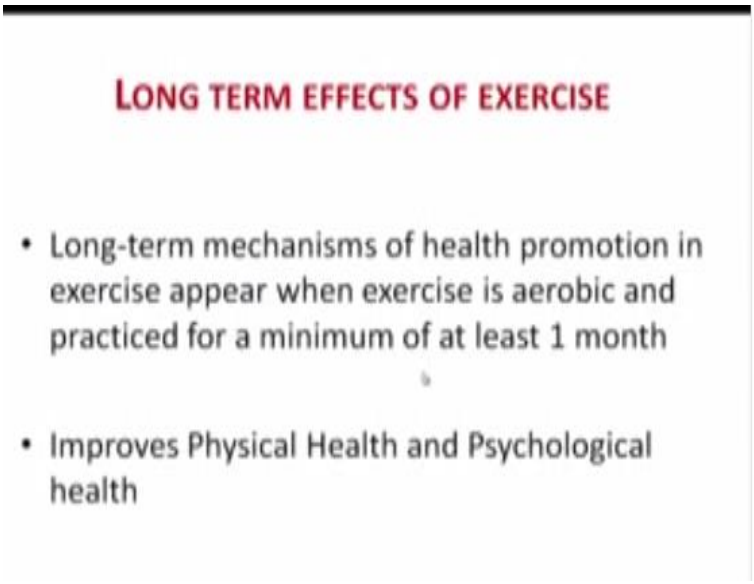

Now long term effects of exercise long-term mechanisms of health promotion in exercise appeared when exercise is Aerobic and is practiced for a minimum of at least one month so we often say that you know if you try to judge the effects of exercise long-term effects of exercise like exercise is introducing my depression exercises in reducing my stress level it will not do for you know unless you really practice it for a consistent amount of time.

There is an immediate effect that is true but for long-term effects you need to be consistent and like if you mission to reduce weight you cannot just do exercise for a week and say my weight is not reduced, so similarly with the psychological and physiological benefits now long-term effects one of the long-term effects of exercises is improves the physical health and psychological health.

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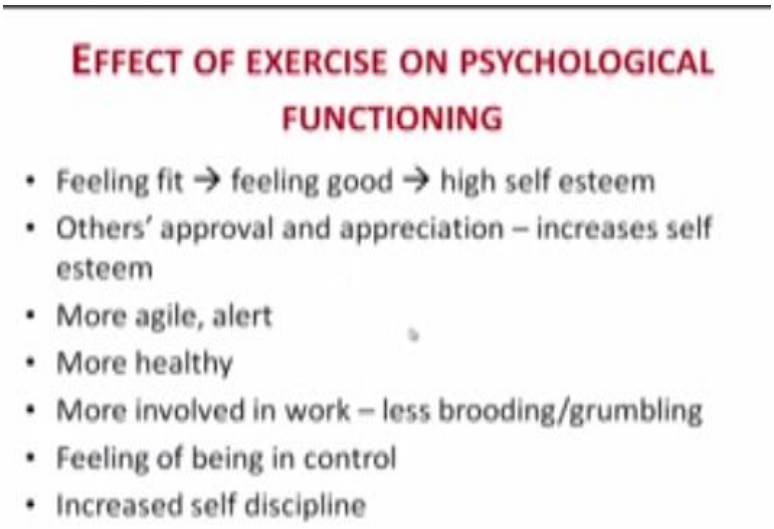

So what are the psychological functioning is that are affected by exercise, so we start feeling fit once you are feeling fit you feel good and once you happy once you are feeling good you will have a positive self-esteem and a high self esteem of you will have more confidence once you exercise your body will be more agile and you will look more fit even in appearance and present ability and that also brings in approval and appreciation of others now that also increases self-esteem primarily self-esteem is why personal appraisal and by others appraisal feedback from others so exercise helps you to helps your muscles to be more toned helps you to be more controlled more composed and more focused.

So you have a sense of confidence and the others appreciation also increases your self-esteem you are more agile and alert and more healthy definitely with exercise can your more involved in work you are less brooding and grumbling I will just give you an example for this many times if you are asked to just get up go to the third floor and bring something say if you are if you sitting in the ground flow you have to have been asked to go to the third floor and get something if you lead a sedentary lifestyle you will this will be pretty distressing to you.

Oh! God I have to go again and all the stairs and get that why do I have to move this is exhausting so what even if you do not see these things aloud but these things will be playing in your mind and that will be distressing you even when you do not realize it sometimes we do

sometimes we do not realize it but they think about a person who is very fit and who exercise daily who plays daily for that person to just jump up and go and get a thing it will not be ill not need to think too much about the behavior pattern.

So he will not he will have less complaints about the behavior and that itself will also reduce the brooding and the grumbling and also exercise also increases the sense of being in control so I can you will have less aches and pains you will be more confident and this sense of control right I can I can deal with myself I can deal with things better and of course if you are practicing a consistent exercise routine then you will definitely be more self disciplined.

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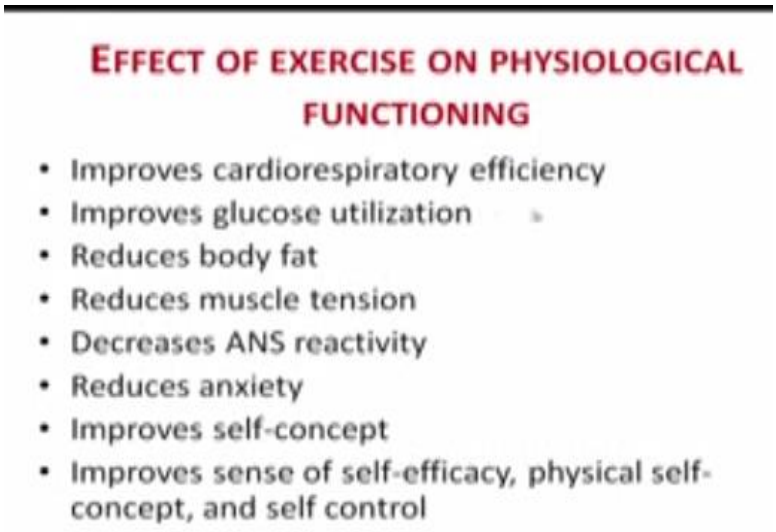

How does it affect the physiological functioning it improves the cardio respiratory efficiency we saw that so the there is less shortness of breath, there is more blood circulation, it improves the glucose utilization of the body gives you energy and the glucose is metabolized and it gives you energy now even for diabetic patients that is why exercise is very often suggested advised it reduces the body fat that by itself will make you if your muscles are toned you will feel more confident reduces muscle tension decreases ANS autonomic nervous system reactivity.

But this means is immediately the response of the sympathetic activation system being in the synthetic acquisition system becoming activating immediately like if there is the slightest of reasons there is hype for anxiety provoking anxious individuals the individuals become hyper-vigilant startle responses are more now these reduce when there is more of exercise it reduces anxiety, it improves self-concept, it improves the sense of self-efficacy physical self concept and self control.

And one more thing that we are right now working on and we have seen that exercise also helps to improve the attention of an individual, so you focus more on things once you exercise.

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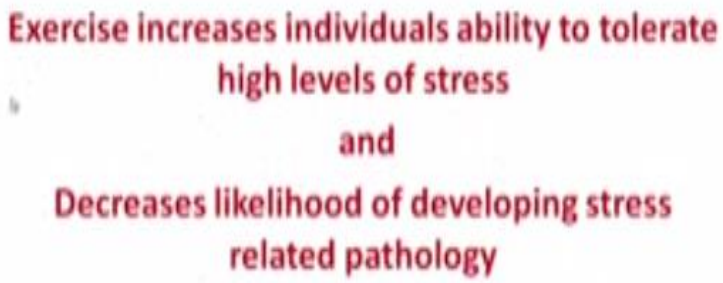

So this is a study that is being conducted by me currently so exercise increases individuals ability to tolerate higher levels of stress high levels of stress and decreases the likelihood of developing stress-related pathology, so we definitely see the need for exercise.

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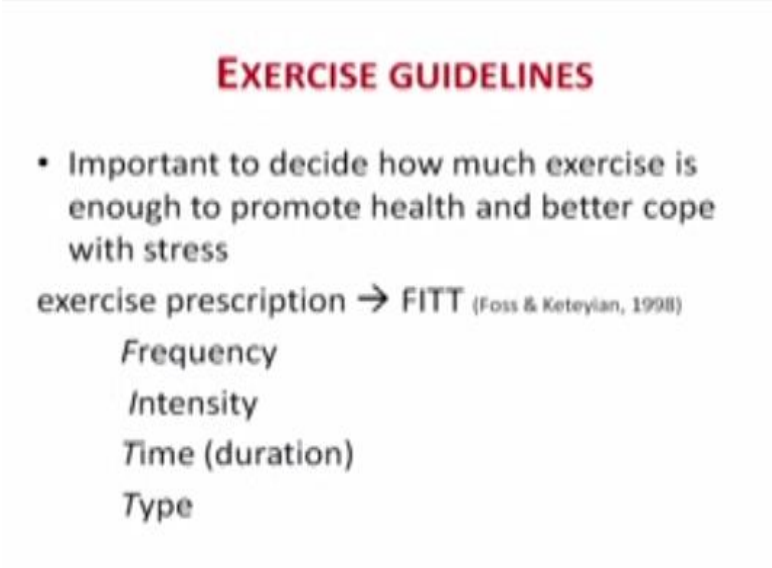

Now that we are confident that exercise is important people have told us so and we have learned about the theories and the basic physiology and psychology behind it, now there are some things that you must remember before you get into an exercise program so what are the guidelines it is important to decide how much exercise is enough to promote health and better cope with stress so when we are talking of exercise Foss and Keteyian in 1988 gave a prescription they said that it is important to address the frequency, the intensity, the time and duration and the type of exercise. Here we will discuss some of the types of exercise.

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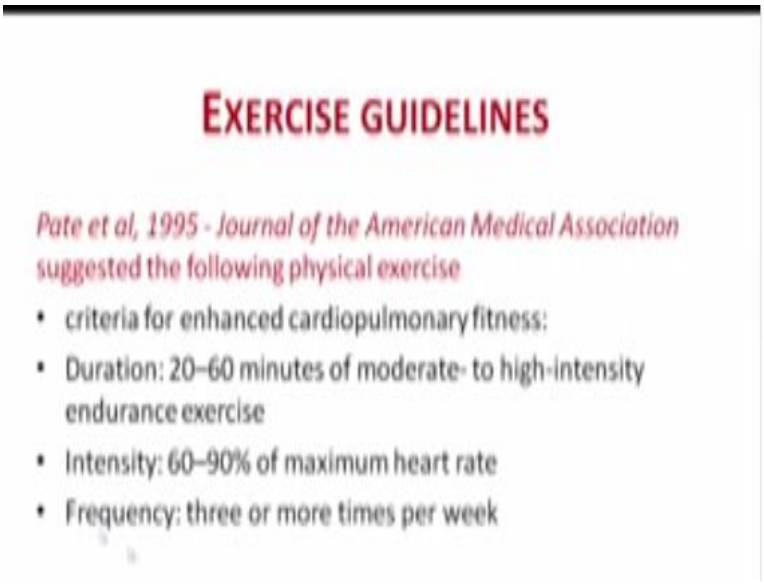

So Pate et al in 1995 in the Journal of American Medical Association suggested the following physical exercise he said that criteria for enhanced cardiopulmonary fitness so increasing the lung capacity and also the improvement of the cardio vascular system that is the heart and the lungs the exercise should be of 20 to 60 min of moderate to high intensity endurance exercise so it is in intensity of sixty to ninety percent of maximum heart rate.

And the frequency should be three or more times per week now here we are talking about primarily aerobic exercise, so it exercise should not leave you completely breakfast then that will not help that will not work for you so each individual needs you can talk to a trainer and this you need to decide on your exercise protocol in fact you can also read up on it and create your own protocol.

So to start off with we have seen that walking is a very good form of exercise you could start with walking and do it for a couple of weeks and then see what difference does it make now you could start with a brisk walk.

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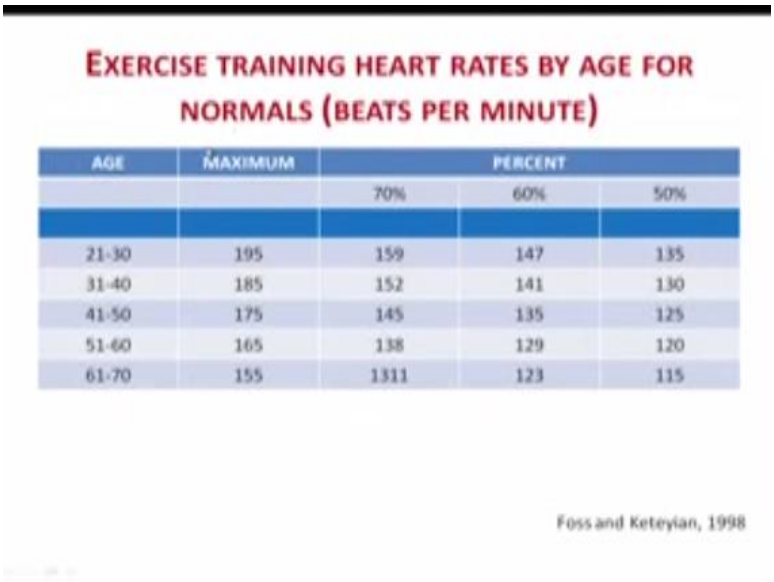

Now exercise training heart rates by age for normal so I have given these rates so you can see that if you want to increase your heart rate an idea would be to start with fifty percent increase and then if you are within this age group of 21 to 30 so you should have if there is a fifty percent increase so you should have a heart rate of around 135 when you are exercising that is first stress reduction and then you can gradually go up to 147 and 159. But it is advisable not to cross this in fact fifty percent would be good enough to start with.

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So now that brings us to the two types of exercise that is aerobic and anaerobic exercises you all must have heard of aerobic exercises being cardio vascular exercises so we will start off with anaerobic exercise.

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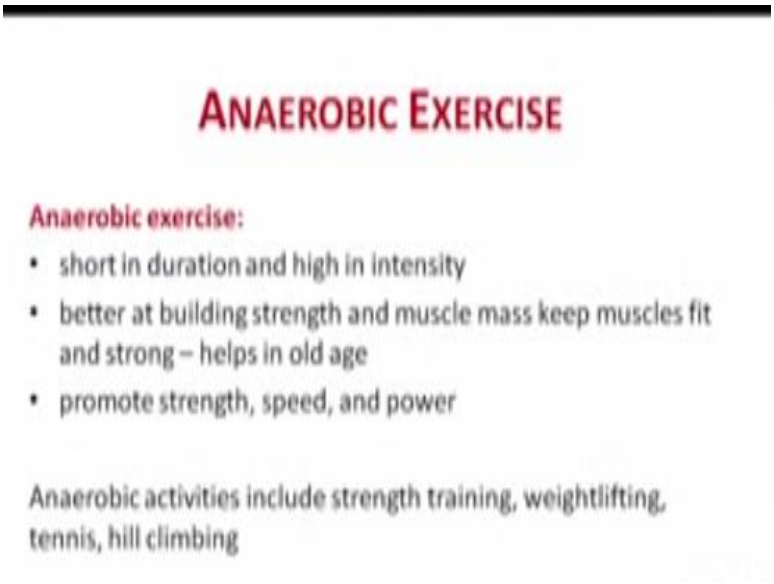

An anaerobic exercise is something that is short in duration and high intensity so it is better at building strength and muscle mass and it keeps the muscles fit and strong it is very important long-term effects being it is very important in old age it helps the muscles to be more stronger even in old age and it promotes strength speed and power several athletes and weight builders they are weight trainers they generally do these sort of exercise.

So you will find weightlifters boxers and also individuals who are into high stress games like tennis is doing a lot of anaerobic exercises so it actually strengthens the power increases the power and these include anaerobic activities include strength training weightlifting tennis and hill climbing, so these are working directly on your muscles but when you are talking of stress it is advisable to start with aerobic exercise.

Anaerobic exercise can be followed later but to start with aerobic exercise which is exercised with air or oxygen so this is also known as cardiovascular exercises so it is rhythmical the in rhythmic in nature it is low intensity exercise for long duration, so it is actually increasing your endurance capacity so it lasts for around 15 to 20 minutes or longer you can start with 15 minutes

of walking and then you can build it up and then you can make it into brisk walk and then you can start jogging and running.

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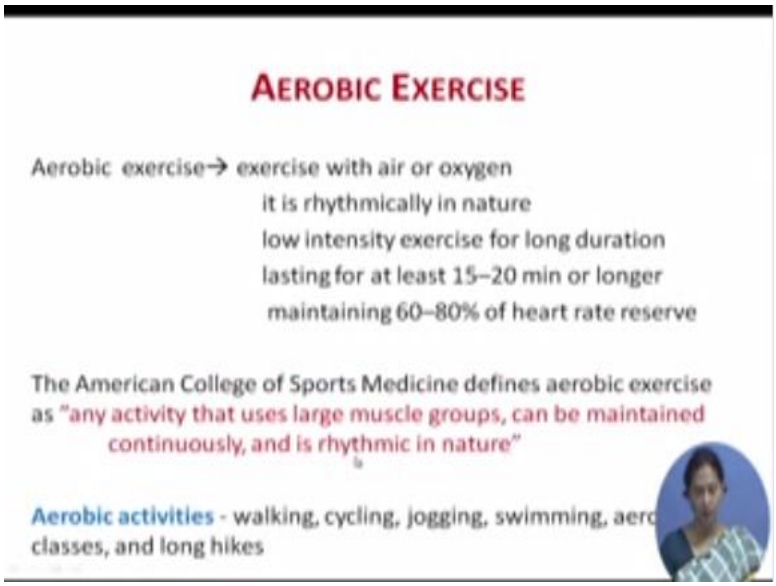

And it is maintaining it should maintain around sixty to eighty percent of heart rate reserve so it is advisable that you do not go beyond this seventy percent of eighty percent mark the American College of Sports Medicine defines aerobic exercise as any activity that uses large muscle groups can be maintained continuously and is rhythmic in nature, so this sense of movement this sense of continuous movement we have spoken about movement in Tai Chi also.

In the previous section in this case also when we are talking of in aerobic exercise this rhythmic movement this more of continued for a longer duration actually increases the endurance of the body and it helps that it improves the cardiovascular and the respiratory systems so what are the aerobic exercises walking cycling, jogging, swimming and aerobic classes and long hikes so in the West many people go for country walks.

Now in our in India you could try out something that is not those 20 was but you could go for long hikes and a little maybe a little incline so long walks would be a good idea, so many times

regarding aerobic exercise when I talk about cycling, walking etc many times many students tell me of course Mam I do cycle to class, so I am doing exercise so why would I need to our maybe I walk to class.

So many of you may be walking to your classrooms or maybe you are going to your departments or going to your job taking a small walk or maybe traveling by cycle, now the point is that here in this case this is not a good idea what I am talking about when I say you need to exercise the reason being that.

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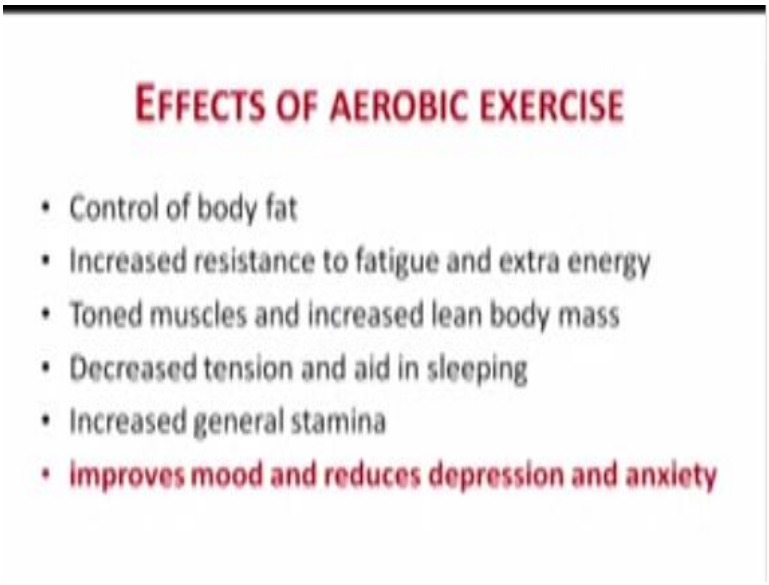

You are not doing it for exercise sake so you are not focused on the exercise now let us see so when you are exercising you need to do it for the sake of exercising so that is very important we will come to that also, so effects of aerobic exercise it controls body fat increases resistance to fatigue and extra energy tones the muscles and increase lean body mass decreases tension and aids in sleeping increased general stamina. And it improves mood and reduces depression in anxiety this is very, very important.

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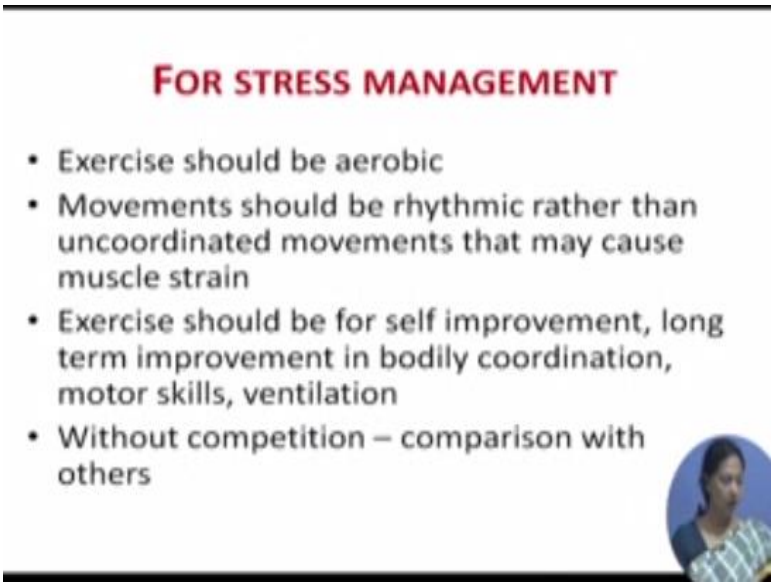

Now we seen this for stress management exercise should be aerobic movements should be driven a rather than uncoordinated movements that may cause muscle strain this is very important, exercise should be for self-improvement long-term improvement inwardly coordination motor skills and ventilation and exercise with the should be without competition it should not be like okay he can run so much in five minutes I need to do the same or he is doing this treadmill at nine kilometers per hour I need to do the same.

It is not for comparison it is not for competition it is for yourself it is for yourself development so you charter your own program you started today it helps.

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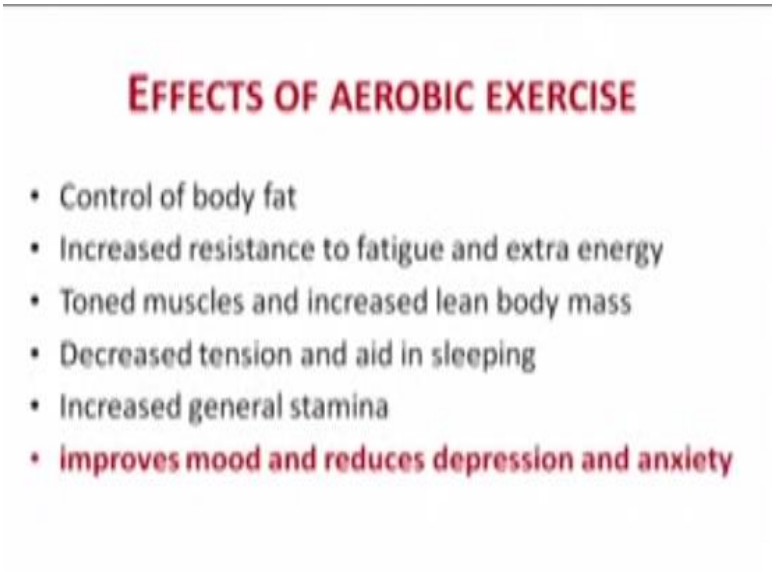

As it says it helps with self improvement and.

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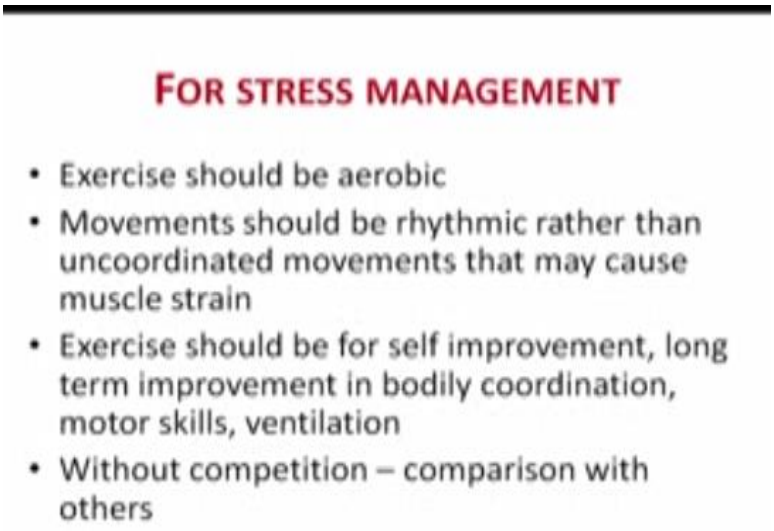

It helps with bodily coordination and it also helps with ventilation what exactly do we mean by ventilation, so when we are angry you can take that out through exercise it would be a positive way of using your anger towards of physical activity so instead of many times they feel like just going and kicking the door or boxing the door boxing the world so instead of that you can actually take our vent your emotions through exercise, exercise is a very good way of ventilating your emotions now in one more thing that is very important I should mention before we conclude today's session is that before exercise and after exercise one very important thing especially aerobic exercise one very important thing is required that is warming up and cooling down your body.

So if you do not do the warm-up or stretch exercises its stressing before do you start your exercise regimen and if you do not cool down your body after you finished your exercise regimen then that exercise will not be effective also it will also bring in more of muscle cramps you should prepare your body to get him to cardiovascular exercise through stretching and after the exercise is over you need to cool down.

So that your body mechanisms physiological anxiety ins stressors that were induced that the body comes down the sympathetic activation system is the reduced and sympathetic nervous system is less activated it is reduced and your body is prepared to remain calm but agile for the next part of the day, so this is please remember that warming up and cooling down is very important before you do any exercise program so or rather it should be, induced into the exercise program.

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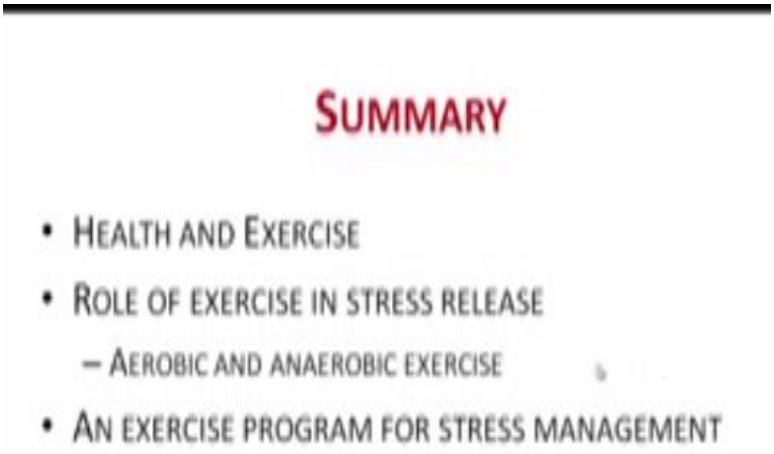

So this brings us to the summary of today's session we have discussed about exercise and health and the role of exercise in stress release aerobic and anaerobic exercise and an exercise program for stress management, thank you.