

**NPTEL**  
**NPTEL ONLINE CERTIFICATION COURSE**

**Course Name**  
**Stress Management**  
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**Lecture 18: Other Relaxation Techniques**

Hello everybody welcome to the third module of the fourth week on stress management in today's session we are going to discuss.

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**OUTLINE**

- **OTHER RELAXATION TECHNIQUES**

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The different relaxation techniques other than the relaxation techniques that we've already discussed in the previous section.

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## STRATEGIES FOR RELIEVING STRESS

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So for strategies for relieving stress today we shall discuss.

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**DIFFERENT RELAXATION TECHNIQUES**

- Biofeedback mechanism
- Diaphragmatic breathing
- Yoga and stretching
- Mindfulness
- Tai Chi

A small circular inset image in the bottom right corner shows a person with dark hair, wearing a white shirt, looking towards the camera.

The bio feedback mechanism the diaphragmatic breathing yoga and stressing mindfulness Tai chi along with some very few techniques that we generally practice for relaxation in the previous section we have talked about a progressive muscular relaxation autogenic training as well as breathing techniques now in today's session we are going to talk to start with bio feedback mechanism.

(Refer Slide Time: 01:11)

## BIOFEEDBACK

- The use of **electronic instruments** to monitor and physiological changes mostly regulated by **the Autonomic Nervous System**
- Biofeedback – awareness of how to change physiological activity for improving health and performance



What is biofeedback my feedback is nothing but the use of biological measures to provide a feedback to the individual about his physiological state so it is the use of electronic instruments to monitor physiological changes mostly regulated by the autonomic nervous system we already know that the during stress there are changes in the autonomic nervous system primarily the sympathetic nervous system and these machines these measures bio feedback measures what they are technically used to do is to make the individual more aware of what change is happening.

Because of stress and how to change the physiological activity for improving health and performance so basically the bio feedback mechanisms are just measures so very often if you are told that you are breathing fast now you need to breathe slowly just focus on your breathing and try to calm down a little that is also a feedback that you are getting from the outside world from somebody else and that will help you to control your breathing the moment you start and focus on your breathing and try to calm down it will come down in this case the biofeedback tools are the biofeedback techniques take the assistance of several instruments to start off with.

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- instruments measure physiological activity such as *brainwaves, heart function, breathing, muscle activity, and skin temperature*
- These instruments rapidly and accurately *'feed back'* information to the user



What these instruments do as they measure the physiological activity such as brainwaves heart function breathing muscle activity and skin temperature now these instrument rapidly and accurately so basically on the real time itself it provides feedback to the individual and this feedback is al information that is provided to the individual and he has taught several techniques to come the calm himself down in the step in a stressful situation that will actually help him to these techniques once taught we can actually help the individual to practice by himself without the guidance of a trainer. Later on in future ex stress-induced situations.

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## DIFFERENT INSTRUMENTS USED IN BIOFEEDI

- Electromyograph (EMG)
- Feedback Thermometer (Thermistar)
- Electrodermograph - Galvanic Skin Respo Recorder (GSR)
- Electroencephalograph (EEG)
- Electrocardiograph (ECG)

So the different instruments that I used in biofeedback are electromyography so that is EMG the feedback thermal thermometer or the thermostat the electro dermal graph or the GSR which is which we commonly known as galvanic skin response recorder at the GSI the electroencephalograph on the easy and the electrocardiograph or the ECG most of you are comfortable and frequent with these numbs their names and you probably have come across the ECG EEG and the EMG earlier.

Now how are these instruments used to give feedback so what it does is these instruments generally measure the basal recording and when an individual is in stress and after that after that training is given to the individual and to reduce the stress so there can be several techniques taught and thereafter again a recording is taken and the individual is shown how it is reducing after he employs these relaxation techniques.

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- instruments measure physiological activity such as *brainwaves, heart function, breathing, muscle activity, and skin temperature*
- These instruments rapidly and accurately **'feed back'** information to the user



So basically when we were talking of the different instruments trying to measure the physiological activity.

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### DIFFERENT INSTRUMENTS USED IN BIOFEEDBACK

- Electromyograph (EMG)
- Feedback Thermometer (Thermistar)
- Electrodermograph - Galvanic Skin Response Recorder (GSR)
- Electroencephalograph (EEG)
- Electrocardiograph (ECG)



We see that EMG actually measures the muscular activity and what it does is it records the electrical activity produced by the skeletal muscles now EMG can be of two types primarily surface EMG and intramuscular EMG so surface EMG is a non-invasive technique a non-invasive technique is well the individual does not have to get up at any now no needle prick into his body or no other invasion is done so it is a superficial surface technique where the electrodes are placed on to direct muscle action potentials from underlying skeletal muscles.

That initiate muscle contraction we already know that during a stressful situation there is muscular contraction and the EMG electrodes are placed on those muscles which we think that in this stressful situation which is actually contracting so the bio feedback trainers what they do is they use these electrodes and place it on those particular areas of the body and that response the recordings are shown to the individual and then after that when the technique of relaxation are coming down is practiced and the individual strain after that again a feedback is given from the recordings to the individual to show that if you actually employ these techniques it is going to reduce your muscular contraction.



One of the muscle groups that is related to mental stress is the trapezius muscles. The trapezius muscle is this muscle group that goes down from the nape of the neck to the back so it spreads on both the sides and it is actually the what known as what is what we call as some muscle back muscles now we know that when we are stress the back muscle style now this can be experimentally verified to our experimental show too so that is what about feedback trainer does when he uses the EMG to show that this is how the muscles contract.

So the electrodes are placed if its surface electrodes in its place on the muscles group on the skin above the muscle group and then these recordings are shown to the individual and then after that the feedback is given to the individual enough to that of a after training again we see that these muscles can be relaxed through several techniques now that brings us to the feedback thermometer or the thermostat we are familiar with the thermometer.

And we know that it is it the unit of measurement is generally Celsius and Fahrenheit in this case to the feedback thermometer measures in the Fahrenheit and Celsius but it is a little different as in what it does is it measures the skin temperature through RT do not die diameter so that is how the skin temperature is reflected nowhere the temperature sensitive resistor is actually attached to the two or the fingers to a toe or a finger and we actually different mechanisms are at work physiological mechanisms are at work for different physiological changes.

We already know that and so the regulation also requires learning or picking up different skills for example say the hand warming is actually involves arterial vasodilatation while hand cooling involves arterial vasoconstriction so the Gaia feedback trainer who is using a thermometer thermostat or biofeedback thermometer actually shows the individual that the changes that are happening and the again there is a training and then you get to see the different changes otherwise.

Now these all these instruments of biofeedback are also used for research to find out that these individual body parts be it muscles the skin B is the changes in the cardiac response all these are actually related to stress that is how we know but in this case what the biofeedback training does

is it actually gives the individual the input that you can control the your physiology by bringing about some changes in the way you deal with the stressor.

So dealing with the stressor in this case would be something like employing some training activities or some relaxation techniques and these techniques once taught can be practiced by the individual by himself or herself when he is alone so they have this biofeedback is actually a tool to assist the individual some input to know how he is performing in a in a chronic in a stressful situation.

Now that brings us to the galvanic skin response recorder which is a measurement of the thermal activity in the body so the GSR is also with the help of we use electrons for GSR and then again it is it measures skin electrical activity by using electrodes placed on the hand or the wrist and it has been seen that stress and even cognitive activity actually brings changes in the sweat glands and that actually reduces the resistance between the that actually affects the conductance how it actually affects the resistance between the two electrodes.

And that is how the feedback is created by the or the measurement that is it in by the GSR galvanic skin response recorded now this is very effective in treating anxiety disorders for excessive sweating in social anxiety and other stressful situations and it increases the clients awareness of their emotions I am undergoing anxiety it is how we feel that anxiety how it is expressed who our bodily changes the individual is made to made aware through the GSR and many a times this is also a part of the lie detector or the polygraph.

Polygraph is nothing but an accumulation of several of these techniques that provide information about the physiological changes that the body is going through so polygraph includes the GSR now coming to the EEG the electroencephalogram EEG is a very interesting test what it does is a tool it actually measures the brainwaves and what that is generally an easy cap and there are several channels so there are electrodes that is fixed in the cap and it can be a dry electrodes or wet electrodes which is used with the use of a liquid and it is the cap is put on the individual.

So it can it can have several channels or several electrodes so it could be a 64 channel EEG it could be 256 channel EEG which measures the work of these electrodes is to measure the electrical activity in the between the nerve cells so this easy is very often used with sleep disorders epilepsy but how does it how is it used in stress we see that there are we already know that there are different forms of brainwaves that travel when there is a new runner impulse.

So the neuronal impulse actually travels as brain waves so between here these electrodes capture the changes in the brain waves and these are these bring about so these record the different types of brain waves that are formed during different situations and research shows that during the during stress there is a particular form of brain wave that is found more in the frontal lobe this EEG techniques or EEG feedback is used for ADHD or attention deficit hyperactivity disorder stress-induced acute stress disorder and also in post-traumatic stress disorder and also for migraine and generalized anxiety.

Now this easy as a feedback mechanism actually is used more for research then for the than for and for training the individual to learn because EEG is not you cannot see the individual to explain it is tough to explain to the individual the changes at real time that requires a little bit of training to understand the graphs but it is a very helpful technique that can be followed to actually see the amount of to explore the cognitive activity in the brain to also primarily to the arousal systems the attention and the arousal systems of the brain.

Now that brings us to ECG which we are familiar with and ECG is actually measuring the heart's ability to respond to stress in a clinical environment that is how a stress ECG is done and it uses electrodes placed on the torso so above out of the body the wrist and the legs to measure the electrical activity in the heart and it acts measures the inter beat interval so what is done in stress is there is something called heart rate variability and HRV or heart rate variability is actually is assessed in stress measurement and this information can also help the trainer to train to understand whether there is more amount of variation between the in the beat interval in the individual undergoing stress.

And in this way that relaxation techniques will help the individual to do better and his cardiac ability will be more controlled now we are using different I am talking of different instruments being used in bio feedback then why am I not talking of these as measures separately and why am I talking of this in the relaxation techniques the main the primary reason being that the core of all these techniques is to provide an input to the individual to bring about a change in his physiology.

And once the individual is aware that he can bring about some change with some training or with the application or the employment of certain techniques certain trainings then he will have more control he will have this sense of control this perception of control over the situation and that by itself reduces stress and anxiety.

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## DIAPHRAGMATIC BREATHING

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So that brings us to diaphragmatic breathing okay which is another technique for relaxation diaphragmatic breathing or it is all is different from thoracic breathing and in thoracic breathing what happens is when we breathe in we are actually breathing from our chest so it is like so this the chest inflates the diaphragm does not so then the diaphragmatic breathing is different in the sense that this is more of abdominal breathing and it is like expanding the belly rather than the

chest so what is done is the individual breathes in from the belly from the stomach so this can be practiced either by sitting down in a relaxed position in a relaxed posture or by lying down and you can actually first and foremost it is important to identify between thoracic breathing and abdominal breathing.

So that is diaphragmatic breathing and thereafter practice this for a certain amount of time so it is breathing from the stomach so is like so your stomach goes in and then after that you hold the breath for a while and then release it and then it inflates your belly so this technique is a very good technique for relaxation and you can actually practice it several times of the day but definitely with no rush or no nowhere to hurry to.

So taking sometime in your hand yoga and stretching again are a very common way to deal with stress so there are different kinds of yoga and I will just mention some of the names.

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- Different types of yogas include:
- Prana yoga
- Brahma yoga
- Kriya yoga
- Raja yoga
- Hatha yoga (involves stretching)



Prana yoga Brahma yoga Kriya yoga Raja yoga and Hatha yoga Hatha yoga involves stretching exercises and it has been seen.

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## Research in Yoga...

- Asthma – breathe more comfortable, Quality of life improved (Manocha et al, 2002)
- Helps in reducing stress and Anxiety (Smith et al, 2007)

### **Yoga involves deep slow breathing and activation parasympathetic nervous system**

- Pranayama – regulating breathing
  - Decrease in respiration rate, oxygen consumption, CO2 elimination
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That it Yoga is very effective for individuals suffering from asthma and it makes breathing more comfortable and also improves the quality of life in fact Yoga has also been seen to reduce stress and anxiety and there was a very famous study by Smith at all in 2007 mentioning this yoga also involves sleep breathing and many of us are aware of it it's known as pranayama and these pranayama techniques actually regulate breathing and they bring in the decrease the respiration rate oxygen consumption and carbon dioxide elimination.

So what it does is it conserves the energy within the body it trains the body to conserve the energy so this way yoga and stretching if these exercise our exercises are followed then it also helps in relaxation.

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## **MINDFULNESS**

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And that brings us to mindfulness.

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## MINDFULNESS

- **Mindfulness** → focusing attention at the present moment
  - Paying attention to each moment → living in the "here-and-now"
  
  - **Mindlessness** → going through life ignoring the present moment
  - Focusing on the goal instead of experience
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Now what is mindfulness is focusing attention at the present moment so it is focusing attention on the here and now and what it is different from mindlessness which is focusing going through life without focusing on the present moment that is it focuses on the goal rather than the experience most of the times many people complain of not being happy how because they are or rather why it is because they are talking of when they talk of whatever has happened and when they are looking ahead what are the things that may happen to them.

But what is actually happening to these individuals is they are not realizing or experiencing the moment now so many times these individuals complain again another after a few years about how they wasted the time then and how that time was not good so if you do not experience if you do not live in the moment if you do not live in the here and now then it is you will lose out on many things and this is a technique that is used for also reducing stress.

So some of the tenets of mindfulness are to recognize the emotion present acknowledge the emotion except the feelings and sensations that the body is undergoing and recognize that this is a passing mental state say if an individual is feeling that oh god I am going through a panic



attack I am I think I will faint so the individual first has recognize the emotion okay I am going through certain changes acknowledging it accepting the feelings and sensations okay.

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## Major tenets of Mindfulness

- To recognize the emotion present
- Acknowledge the emotion
- Accept the feelings and sensations that the body is undergoing
- Recognizing that this is a passing mental state

Mindfulness Based Stress Reduction (Zinn and Santorelli, 1979)



This is what is happening but I am watching myself as another person going through these changes and ending finally telling himself that well this will pass this is just another state which will pass very soon in panic attacks what we generally train the individual is that you have to just calm down for a while and do not worry this is going to go this is just for a few minutes.

Now this imagine yourself watching a horror movie it is the same experience if you are right into the movie imagine were seeing yourself with the protagonist walking down the horror palace or house haunted house and then you will start feeling the same emotions of fear that probably the actor is trying to depict the moment you watch that individual from outside as in you start saying that oh this actor is performing well and this is the light and sound techniques have been wonderfully employed and the camera work is really good you will not feel scared so you are not detaching yourself from that state and recognizing this as a passing mental state.

So some of the training techniques used for mindfulness is mindfulness based stress reduction and this is wonderful technique that is used for reducing stress.

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## Tai chi

- Self paced gentle physical exercise and stretching
- Originally formed for self defense – Chinese tradition
- Involves a series of movements performed in a slow, focused manner
- It is accompanied by deep breathing



Another technique that is really popular is the Tai Chi which is basically a Chinese form of traditional Chinese form of self-defense and it is it involves self is gentle physical exercise and stretching which is a continuous movement so it involves a series of movements performed in a slow and focused manner and it is also accompanied by deep breathing Tai Chi is also very effective in stress reduction.

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## Other Techniques

- Music and relaxation
- Owning a pet
- Pursuing a hobby

Some of the other techniques being using of using music for relaxation now they are also you can use music with guided imagery I have spoken about guided imagery in the imagery in the previous section and owning a pet so having a hobby owning a pet these are also some of the techniques that you can employ to reduce stress. Thank you.