



Medical Devices

Lecture 9 - Stress Management

Scientific Stress Management

- Organizational Disease
- Stress Management for Managers and Biomedical Engineers
- The Physiological Component
- The Human Energy System
- Stress: Symptoms and Control



"My doctor told me to avoid any unnecessary stress, so I didn't open his bill."

Organizational Disease

Major signs and symptoms of biomedical engineering organizational disease:

- Low Productivity
- Low Cooperation
- High Turn over
- Apathy and Low morale
- Duplication and Waste
- Deficit (over Expenditure)
- Non Competitive Results
- Customer Complaints
- Poor Quality of Work
- Poor Image (Internal and External)
- Lack of Participation
- Lack of Creativity
- Lack of Innovation
- Lack of Progress

Organizational Disease

Etiology of major organizational diseases:

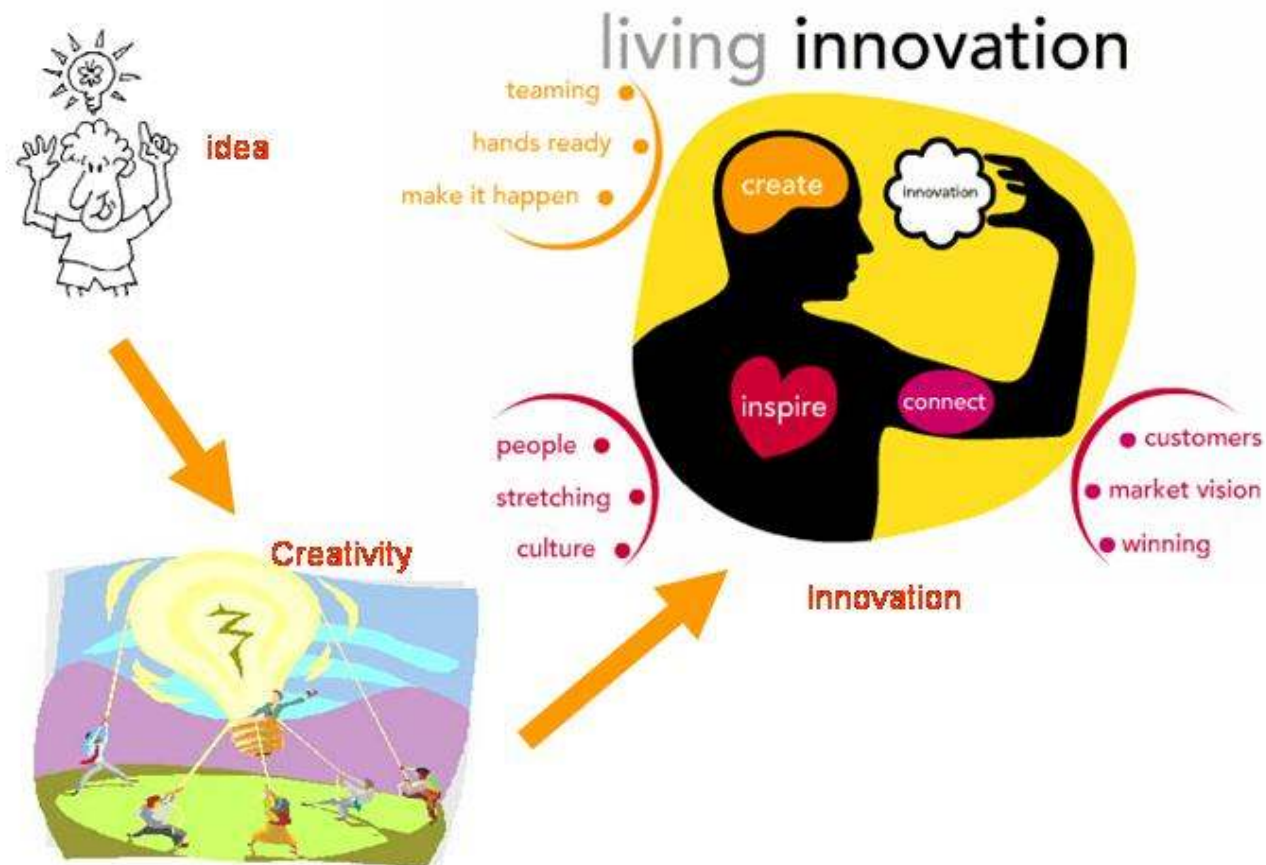
- Lack of Clear Objectives at All Levels
- Lack of Incentive
- Lack of Clear Responsibility and Authority
- Lack of Defined Chain of Command
- Lack of Accountability
- Lack of Progress Monitoring
- Job Insecurity
- Lack of Fair Performance Evaluation
- Lack of On-the-Job Training
- Lack of Participation
- Lack of Planning

Organizational Disease

The Human Factor:


What can we say about all people?

- ❑ *Rational behaviour is predictable*
- ❑ *Self satisfaction is a universal motivator*



Organizational Disease

How To Deal With Peers:

- ❑ *Mutual respect*
- ❑ *Assertive but not stifling* 
- ❑ *Flexible*

Organizational Disease

How To Motivate Subordinates:

- ❑ *Incentives*
- ❑ *Communication*
- ❑ *Listen*
- ❑ *Respect*
- ❑ *Appraise performance*
- ❑ *Participation*
- ❑ *Promote suggestion*
- ❑ *Support*

Organizational Disease

How To Deal With Your Boss:

- ❑ *Creative*
- ❑ *Respect*
- ❑ *Can do attitude*
- ❑ *Be motivated*
- ❑ *Provide questions and answers*

Organizational Disease

How To Improve Morale:

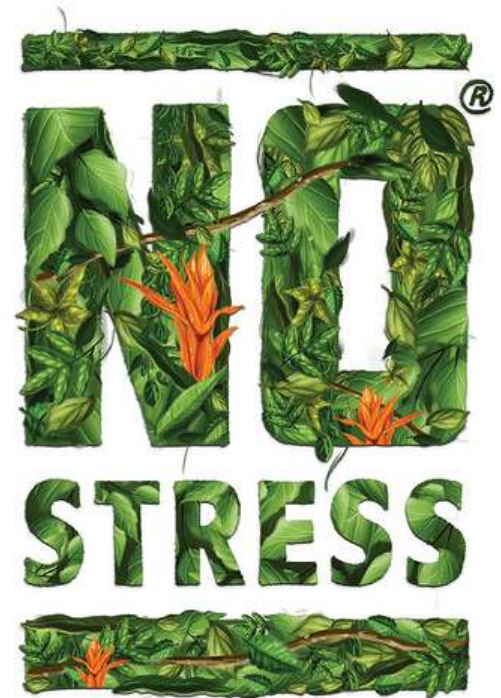
- ❑ *Eliminate uncertainty*
- ❑ *Fair performance rewarding system*
 - *Reward excellence*
 - *Encourage average performance to improve*
 - *Get rid of perpetual incompetence*
- ❑ *Define roles*
- ❑ *Delegate*
- ❑ *Foster focus on organizational missions (goals)*
- ❑ *Identify problems and treat them*
- ❑ *Practice what you preach*
- ❑ *Increase communication and understanding*
- ❑ *Resolve conflicts*
- ❑ *Encourage participation*

Stress Management

If you cannot manage yourself, then do not expect to manage others.

Questions:

- ❑ Is it really possible to use the mind to be an effective performer, manager, scientist, labourer, writer, engineer, accountant, etc.?
- ❑ Is it really possible to use the mental process and methods to heal body illness?
- ❑ Is it really scientific to use the mind to rest, relax and become peaceful and happy?
- ❑ There are thousands of scientific studies that have concluded attitudes, moods, mind, factors, etc., with success in mental health, career and other parts of their lives.



Stress Management

Mind Over Matter Used In Stress Management



- Recent research results have provided major insights as to how the mind can control our life, career, health, body, etc.
- Information Theory: The information theory is a conceptual framework of information based on biological, psychological, mind and body, personality development, and evolution of human consciousness.
- Information Transduction:
 - ❑ key concept in mind and body communication
 - ❑ has been used in actual killing of disease
 - ❑ the laws of biology, physiology are all descriptions of different levels of information transduction
- State-dependent memory learning and behaviour:
 - ❑ Pavlovian conditioning
 - ❑ learning behaviour and a state dependent memory (accident, bad and good memories)
 - ❑ state dependent memory
 - ❑ behaviours are impacted by learning
- Mind/body communication and impact interaction

Stress Management

Neuropeptides

- ❑ Neuropeptides are informational substances.
- ❑ Endocrine and immune systems are all carriers (channels) or vehicles for neuropeptide information messengers.
- ❑ Limbic system – a mediator of emotional behaviour, brain stem, spinal cord, GI system, sexual system, endocrine system, immune system are all locus of neuropeptide activities.
- ❑ Neuropeptides through channels, communicate and regulate mind and body activity.
- ❑ Virtually any cell or pattern of cells in the body can receive information from the neuropeptide system which has appropriate receptors.



Stress Management

How Energy Connections Create Good Management

- Oxygen is the most important substance that fuels our body.
- Increasing oxygen in the body system is the key to energy, thus positive power.
- Oxygen is breathed from air and combined with glucose in the cell, produces high energy molecules, adenosine triphosphate (ATP).
- ATP is the real source of body energy.
- When there is sufficient oxygen in the body, glucose and oxygen produce 36 ATP molecules. This is called effective (elegant) energy production in the cell.
- Under insufficient oxygen in the cell, glucose instead ferments and produces only two molecules of ATP and lactic acid.
- The field of lactic acid in the body drains energy.



"STRESS"

THE CONFUSION CREATED WHEN
ONE'S MIND OVERRIDES THE
BODY'S BASIC DESIRE TO CHOKE
THE LIVING DAYLIGHTS OUT OF
SOMEBODY WHO DESPERATELY
NEEDS IT !

Stress Management



What Causes Insufficient Oxygen?

Everyone breathes. this should provide sufficient oxygen – RIGHT?

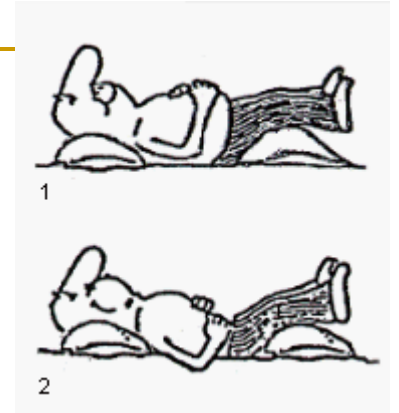
WRONG!

- Stress reduces oxygen by tensing muscles, reducing blood flow, thus reducing oxygen.
- Lifestyle habits can reduce oxygen. For example:
 - ❑ smoking destroys lung tissue, thereby reducing the amount of oxygen.
 - ❑ not knowing how to breath properly.
 - ❑ physical activity.
 - ❑ high cholesterol build-up by eating inappropriate food.
 - ❑ eating too much salt increases blood pressure and reduces blood flow.
 - ❑ many other factors.

Stress Management

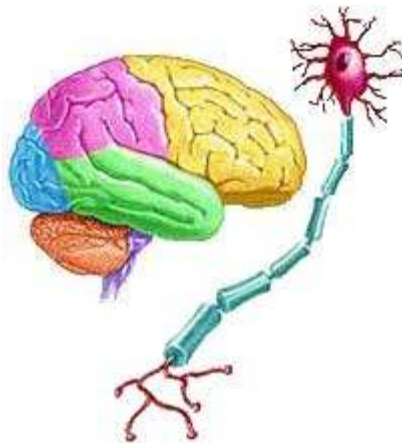
Breathing To Increase Energy & Relaxation

- Decide to dedicate 10-15 minutes every day for your health.
- Lay on the floor or sit in a comfortable chair and relax in a quiet place.
- Close your eyes and breath slowly through your nose.
- Raise your shoulders to allow even more oxygen to enter your lungs.
- Hold your breath for a count of 4 seconds.
- Exhale slowly through your mouth.
- As you exhale, relax your shoulders and drop the muscles in your upper body.
- Say (or think), "It is alright to give myself this time each day. It is essential that I recharge myself. The more oxygen I take in the healthier, more vital and more productive I feel."
- With your eyes closed, take further deep breaths and continue to exhale as outlined above.
- With eyes closed, scan every muscle in your body and relax them.
- You will notice that, for each breath, you will feel more comfortable and relaxed.



The Physiological Component

- The primary physiological component for creative management is the brain.
- The most important organ for creative managers is the brain.
- The brain can not function well without adequate blood circulation.
- Blood circulation depends on the Heart; therefore, we begin with the heart...



The Physiological Component

What is Heart Disease?

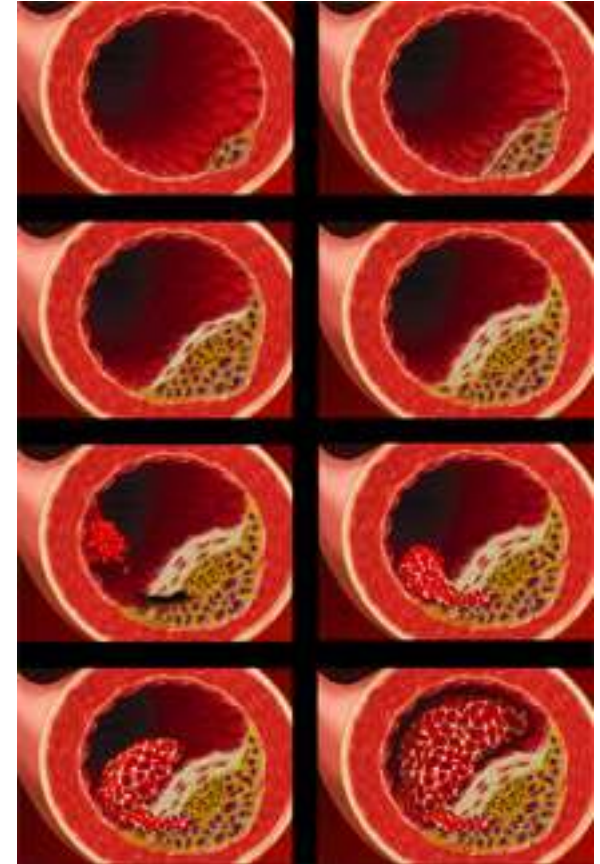


- When the Heart becomes starved for oxygen:
 - ❑ A Heart attack occurs if prolonged.
 - ❑ Angina is experienced if short term.
- Blockages form in the arteries that bring blood to the heart (coronary arteries).
- Main coronary arteries:
 - ❑ Right coronary artery
 - ❑ Left anterior descending artery
 - ❑ Circumflex coronary artery
- Causes of blockages
 - ❑ Fat
 - ❑ Cholesterol
 - ❑ Stress
 - ❑ Cigarettes

The Physiological Component

Blockage Formation

- Blockages are formed when coronary artery lining is damaged.
- Body repair mechanism is composed of cholesterol, collagen and other materials.
- Layer after layer are formed, creating obstacles to blood flow.



The Physiological Component

What Damages the Coronary Artery Lining?

- High blood pressure
- High blood cholesterol
- Excessive dietary cholesterol and fat
- Smoking

The Physiological Component

Lifestyle Impact on Coronary Artery Disease

- Response to stress can affect:
 - ❑ Coronary spasms
 - ❑ Blood clot formation
- Cholesterol leads to coronary arteriosclerosis
- Nicotine injures lining, resulting in arterial constriction
- Crack, cocaine and amphetamines lead to arterial constriction, clot formation, plaque hemorrhage
- Excess exercise when there are lots of coronary artery plaques

The Physiological Component

Emotional Stress

- Acute vs. Chronic
- Fight or Flight response to stresses:
 - ❑ Physical stress
 - ❑ Emotional stress
- Fight or Flight response through:
 - ❑ Direct connection – Sympathetic nerve system
 - ❑ Secondary effects ex. Adrenal gland
- Chronic stress effects:
 - ❑ Arterial constriction in the legs, arms, heart
 - ❑ Muscle aches
 - ❑ Heart attack
 - ❑ Spasm

The Physiological Component

Recipe to Improve Heart Disease

- Effective stress management
- Diets low in fat and cholesterol
- No smoking
- Moderate exercise

The Physiological Component

Breathing Techniques

- Used for relaxation
- Has significant effects in reversing heart disease
- Decrease sympathetic nerve stimulation
- Diaphragm/abdomen breathing is best
- Deep breathing can reduce harmful effects of stress

The Human Energy System

Human Being as a Living Energy System

- The principles of quantum physics apply to the human system as they apply to other systems of the university.
- We know that the body is made up of muscles, tissue, cells, blood, bones, etc.
- All of these elements are made up of atoms.
- Since every body cell is made up of atoms and every atom is made up of quantum energy, one could conclude that the body is made from quantum energy or electromagnetic energy.



The Human Energy System

Quantum Physics

- Sub-atomic world building blocks are called superstrings (a quantum physics hypothesis).
- Each superstring is many billions of degrees smaller than the atom.
- These superstrings are vibrating strings of energy (energy string).
- Everything in the universe consists of these vibrating energy strings.
- The world at the sub-atomic level (superstrings) is:
 - ❑ vibrating strings of energy
 - ❑ differing from one another only in the level and condition of the vibration
 - ❑ all energy in the universe is interconnected at the sub-atomic level
- Since the human body is made up of atoms, every cell in the body is a tiny package filled with electromagnetic energies.
- The basic fundamental level of the body is electromagnetic energy. If the universe is made of the same electromagnetic superstring, then there is always interaction.
- Action potential is the manifestation of such energy. This is why we can record:
 - ❑ Electrocardiogram (ECG)
 - ❑ Electroencephalograph (brain wave representation) (EEG)
- human beings are primary energy systems and a healthy mind and body is the balance between energy fields in each individual.

The Human Energy System

Life As An Energy Concept

- Quantum physics provides an understanding of nature's most fundamental building blocks being superstrings of energy.
- The universe and everything within it is a cosmic network of vibrating energy strings.
- These energy strings are all linked in a web of relationships. The fields impact on each other. (example: MRI).
- The universe, at sub-atomic levels, is only vibrating strings of energy differing from one another in their level and condition of vibration. Thus, all energy within the universe is interconnected.
- Can this be a thermodynamic law in which we can convert energy forms, but we can not create them?

The Human Energy System

Energy Communication

- All energy communicates with each other at the substance level. This is made evident by consciousness of photons (communication with each other).
- Superstrings of vibrating energy can communicate like photons (example – biofeedback).
- Why can biofeedback detectable changes be measured in response to what mental (brain) status is? Mind and body communicate. Measurements can be made in:
 - ❑ changes in blood pressure
 - ❑ changes in skin temperature
 - ❑ changes in muscle tension
 - ❑ physical status changes by simple, mental communication.

The Human Energy System

Thoughts As Energy

- The brain, through energy, communicates with the body.
- Energy consciousness is the same as energy awareness.
- The quantum physics theory: Energy consciousness can be defined as the sum of all levels of awareness.
- The energy consciousness includes, but is not limited to:
 - ❑ ego
 - ❑ characteristics
 - ❑ thoughts
 - ❑ actions
 - ❑ meditative states
 - ❑ hypnotic states
 - ❑ higher consciousness (awareness)
- Energy awareness (consciousness) is everywhere including:
 - ❑ cells
 - ❑ inanimate objects
 - ❑ living cells
 - ❑ thoughts

The Human Energy System

Energy As Thought

- The level of energy awareness (consciousness) directly determines how well one's life unfolds.
- At the sub-atomic level, the body is connected to the universal web of energy.
- Physicists claim that there is no fixed reality, rather a series of probable waves and an infinite number of events that can occur.
- Reality becomes dependent on the choices one makes.
- The human being is not just an observer, but a participant observer in one's own life.
- You can communicate positive messages to your body, or you can send non-caring messages.
- Positive messages are powerful.
- Lack of adaptation of positive messages leads to entropy (systems decay) over time.

The Human Energy System

The Placebo Response

- There are many recorded cases of expected happenings which the scientific community has not been able to answer such as:
 - ❑ unexpected illness
 - ❑ miracle cures
- Scientists describe such events as placebo because medical experts and other scientists have not been able to understand it until recently.
- Case histories:
 - ❑ Mr. Wright
 - ❑ Norman Cousins

The Human Energy System

Cancer And The Immune System: Mr. Wright

- Dr. Philip West had recorded that Mr. Wright had advanced terminal cancer. X-rays and nitrogen mustard would not be helpful as huge tumour masses (orange size) had formed on his neck, axillas, groin, chest and abdomen. Enlarged spleen and liver. Thoracic duct was obstructed. Every day, up to 2 litres of milky fluid was drawn from his chest.
- Mr. Wright overheard the doctor's discussion that a new drug called Krebiozen (subsequently shown to be useless) was being administered as a potential form of treatment for some patients. Mr. Wright was not included in the 12 selected cases for the use of the drug.
- Mr. Wright begged his doctors and asked for this golden opportunity. His doctor reluctantly accepted to put him in the experiment. After a few injections, the doctor met him walking on the ward. The tumour mass had melted and Mr. Wright had become fully active.
- Two months later, conflicting reports began to appear in the news. Clinical reporting indicated no positive results from the treatment. Mr. Wright heard the news. He soon became despaired and his cancer returned. He was re-admitted to hospital and died two days later.

The Human Energy System

Norman Cousins

- Norman Cousins had a personal experience with mind/body healing. At the age of 10, he was sent to a tuberculosis sanatorium for 6 months. He was placed with a group of boys and soon become convinced that the power of mind would overcome his disease.
- He thought positively and overcame the disease.
- He has since written several books and become the editor of one of America's leading publications, The Saturday Review. He became a professor at UCLA and wrote, "Anatomy of an Illness," and "The Healing Heart."

The Placebo Connection

- Dr. Henry Beechers in the 1950s viewed, documented and concluded that 35% of patients with a wide variety of post-operative pain found significant relief with placebos (inert medication or sugar pills).
- Other studies have revealed a placebo effects of up to 50%.

The Human Energy System

Conclusion

- All of these indicate that there is a common underlying mechanism or process that accounts for mind/body communication and healing, regardless of the problem, symptom or disease.
- The same mechanism is the cause of success in management, business, career development in some and failure in others.
- Positive thinking is an example of such mind/body/body/reaction experience and success.

Stress: Symptoms and Control

Symptoms can be classified as:

- Physical
- Behavioural
- Emotional

Effective control of stress is possible.

Stress: Symptoms and Control

Stress - Physical Manifestation

- Skin oiliness
- Cold extremities
- Sweaty hands
- Burping
- Frequent or increased urination
- Diarrhea
- Tense (tight muscles including face)
- Acidic stomach
- Heart palpitations
- Flushing
- Trembling (shaking) hands
- Pain in lower back, neck, tooth ache
- Increased blood pressure
- Tiredness (exhaustion)
- Dryness (mouth and throat)
- Shortness of breath
- Shallow breathing

Stress: Symptoms and Control

Stress - Behavioural Manifestation

- Grinding (teeth, jaw)
- Nail biting
- Talking difficulties
- Resorting to (smoking, drinking, drugs, etc.)
- Eating disorders (too much or too little)
- Sleep problems
- Playing with hair, pounding, tapping
- Foot jiggling
- Clutching objects or humans tightly
- High pitched voice
- Unprovoked anger or laughter
- Loss of enthusiasm
- Isolated and withdrawn

Stress: Symptoms and Control

Stress - Emotional Manifestation

- Depression
- Boredom (I don't care)
- Fear, anger
- Lack of emotion
- Crying, hiding
- Nightmares
- Apathy
- Resentment
- Powerlessness
- Loneliness
- Irritability

Stress: Symptoms and Control

Stress Control

- Find the root cause of your stress. Decide if you have the ability to solve the problem:
 - ❑ if not, let it go.
 - ❑ if yes, formulate a goal.
- Focus on your goals.
- Know that sorrow and happiness:
 - ❑ will end
 - ❑ are manifestations of chemical (neuropeptide) molecules of thoughts
- Share your concerns.
- De-emphasize yourself. You are not the centre of the world.
- Accept failure.
- Do physical activity and get your heart rate 70%-80% of your max.
- Breath properly. Concentrate on the breathing only.