

WORK PLACE ERGONOMICS: PHYSIO & OT ROLES



Dr. Lela Mukaruzima (PT) & Epiphanie
Murebwayire (OT)
RMH, Rehabilitation Unit

What is Ergonomics?

- ERGO= “work”
- NOMICS = “Rules or laws”
- It literally means the laws of work



➤ **Occupational Safety and Health Administration (OSHA)** defines ergonomics as the science of “designing the job to fit the worker, rather than forcing the worker to fit the job” (Ho, 2017)



Why Ergonomics?

- ✓ Makes the job safer by preventing/reducing injury and illness related to work
- ✓ Makes the job easier by adjusting the job to the worker
- ✓ Reduces physical and mental stress, hence makes the job more pleasant
- ✓ Reduces absenteeism
- ✓ Enhances employee's productivity
- ✓ Saves money

Consequences of poor work place ergonomics

- ▶ Work related Injuries or illnesses:
- ▶ They may occur due to a one-time event such as a cut/needle prick, fall.....
- ▶ or may be due to repeated exposure to various unfavorable conditions
- ▶ They are also referred to as:
- ▶ Cumulative trauma disorders
- ▶ Repetitive Motion Injuries
- ▶ Repetitive stress injuries
- ▶ Occupational overexertion syndrome.



Repeated movement injuries/Cumulative trauma disorders

- ▶ Are health disorders that occur due to repeated biomechanical stress on the body
- ▶ They involve damage to the tendons, tendon sheaths, bones, muscles, nerves, and ligaments
- ▶ They affect mainly the hands, wrists, elbows, shoulders, neck, back and lower limbs



Risk Factors of poor work place ergonomics

- ❖ Constant repetition of movements/activities:
- ❖ Lifting, pushing, pulling,
- ❖ stacking/loading objects,....etc.

Lifting: objects or patients



- ❖ Static postures: prolonged periods of working positions; standing/sitting
- ❖ Lack of rest/breaks

Cont., Risk Factors of poor work place ergonomics

- ❖ A static working position entails an isometric contraction of different muscle groups also called the core stabilizers/postural muscles, in order to keep the body upright (trunk, shoulder, neck and head).
- ❖ These are mainly the deeply situated muscles, e.g. transversus abdominis, multifidus and the pelvic floor muscles, in the abdomen, back, neck and pelvis respectively, which work as a corset that keeps us from swaying back and forth uncontrollably
- ❖ Therefore, in a static posture there is a risk of blood vessels being squeezed in the muscles, depriving them of sufficient oxygenated blood, eventually causing them to easily fatigue and prone to injury
- ❖ When these muscles are fatigued, they get weak and start malfunctioning, hence, they cease to hold one in a correct posture
- ❖ The result is pain, fatigue, poor balance and coordination!

How much are you sitting?



Historic observations since the 1950s, proved that bus drivers were twice as likely to have heart attacks compared to bus conductors

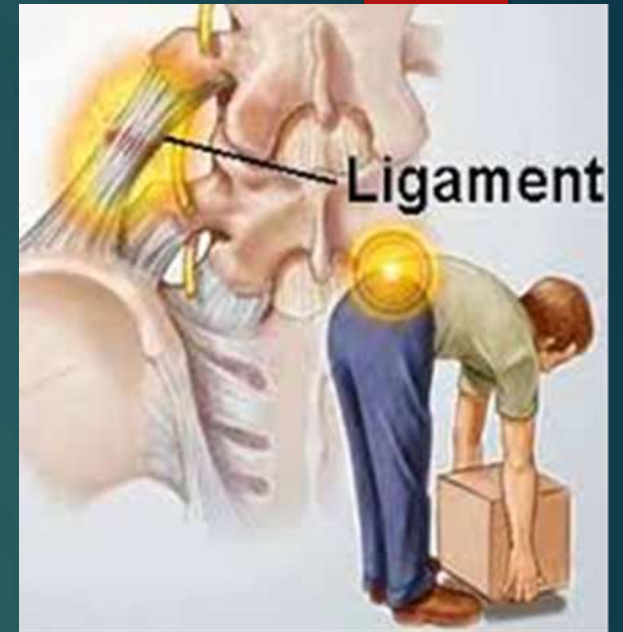
- Sitting is more dangerous than smoking
- Kills more people than HIV (Levine 2015)

Sitting: increases 112% risk of diabetes, 147% cardiovascular events, 90% increase in death due to cardiovascular events (Wilmoth et al 2012)

- ❖ Prolonged sitting is thought to slow the metabolism, which affects the body's ability to regulate blood sugar, blood pressure and break down body fat.

Cont., Risk factors

- ❖ **Awkward postures: improperly designed tools or work areas,** lead to awkward postures e.g.: leaning forward at your desk, typing with wrists at an odd angle, raising shoulders while typing, reaching to use mouse, twisting neck to look at monitor or phone, lifting objects from below the waist or above the shoulders
- **Seek medical attention if you experience these symptoms:**
 - ▶ Tingling or numbness in the hands or fingers
 - ▶ Pain in fingers, hands, wrists, or even shooting up into the entire arms
 - ▶ Loss of strength or coordination in the hands/ upper limbs
 - ▶ Numbness or discomfort in the hands that wakes you up at night

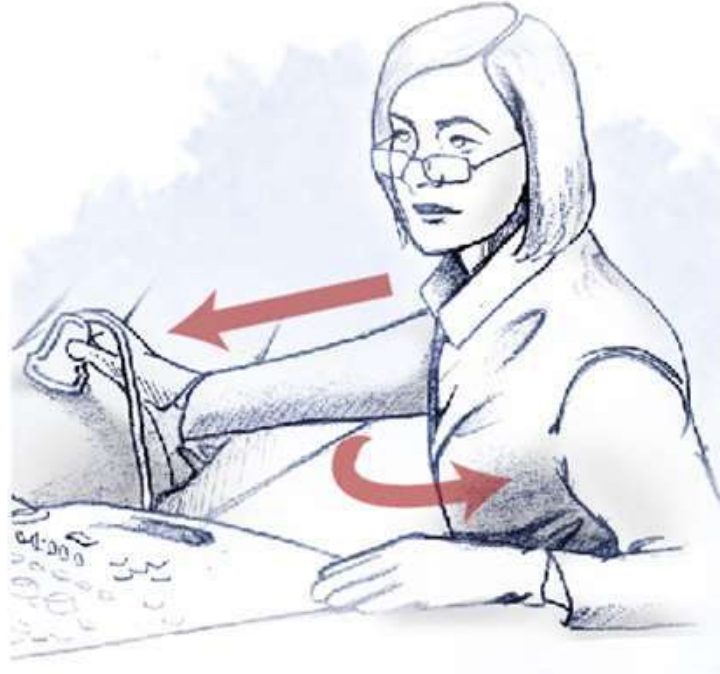


Ex. Awkward postures

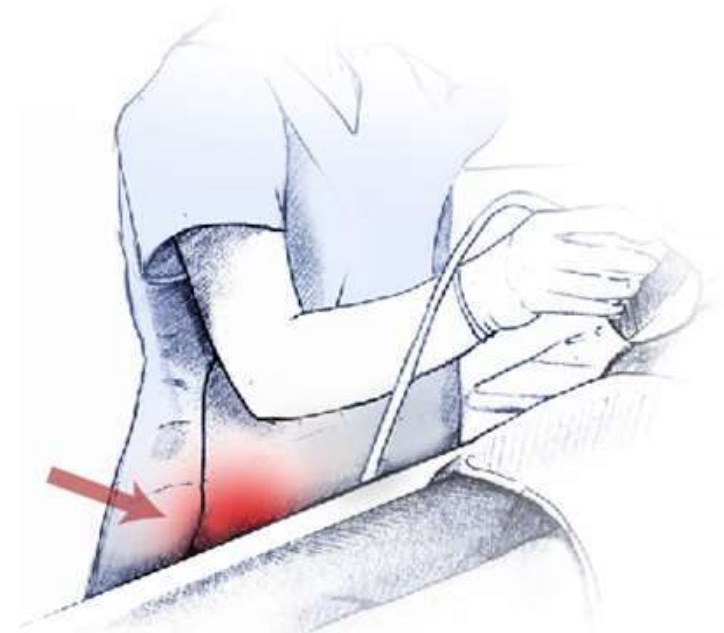
Force is the exertion of physical effort applied by a body part to perform a task.



Repetition is performing the same or similar tasks repetitively, either continually or frequently for an extended period of time without adequate recovery time.



Awkward or sustained postures occur when body parts are positioned away from their neutral position.

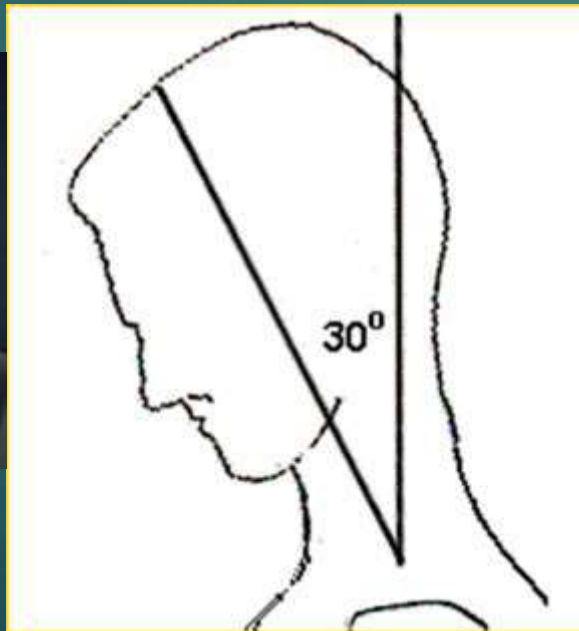


Contact pressure is sustained contact between a body part and an external object.

Figure 3. In sonography, the primary physical risks include: force, repetition, awkward or sustained postures, and contact

Cont. Poor or awkward postures

- Being in these work positions for more than 2 hours a day will increase your risk of NMSD;
 - Back bent forward more than 30 degrees
 - Neck bent more than 30 degrees



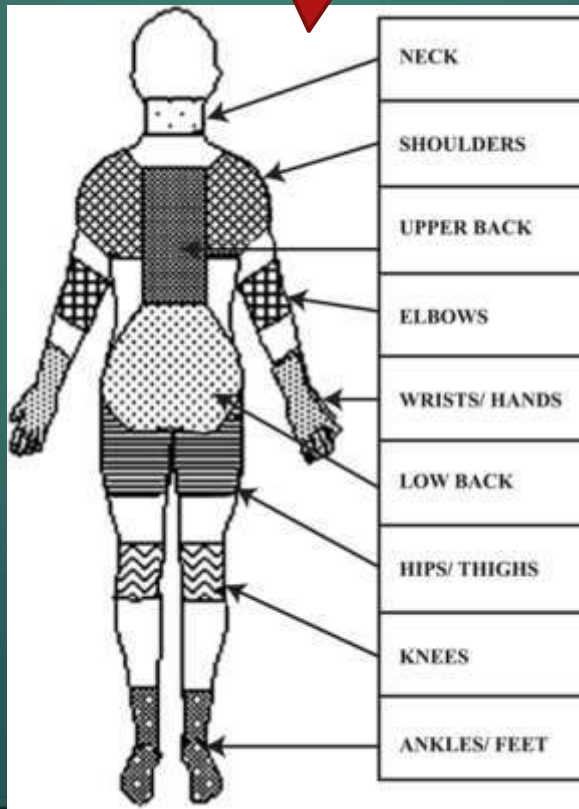
Cont., Awkward Postures/Positions



Effects of Poor/Awkward postures



Frequent or sudden pains in these body parts



Physiotherapy (PT) Intervention

▶ Generally, PTs are involved in maintaining human function and movement to maximize one's potential. PTs also have an important role to play in the primary prevention of diseases/injuries, based on their scope of practice which encompasses health promotion, prevention, treatment, habilitation and rehabilitation (*World Confederation for Physical Therapy, 2017; Kigin, 2009*)

▶ We therefore intervene by:

1. Identifying the problem,
2. The risk factors,
3. And how to address them

Cont.' PT intervention in proper Ergonomics

HOW DO WE DO THIS.....?

- ▶ We are able to recommend work place modifications, ideal work stations, tools or furniture
- ▶ Advise on the ideal working postures, that are less stressful or harmful and how to maintain them
- ▶ We can prescribe the right exercises to strengthen your core stabilizers depending on your occupation or needs

Proper work ergonomics.....

- ❖ **Posture correction in sitting; mainly applies to computer users or office workers**
 - ▶ Practice proper positioning of head, neck, elbows, hips/thighs and the feet,
 - ▶ Exa:
 - ▶ Avoid slumping/slouching your back
 - ▶ Support the lower back
 - ▶ Change positions regularly so that you don't get tired in one posture due to muscle overuse

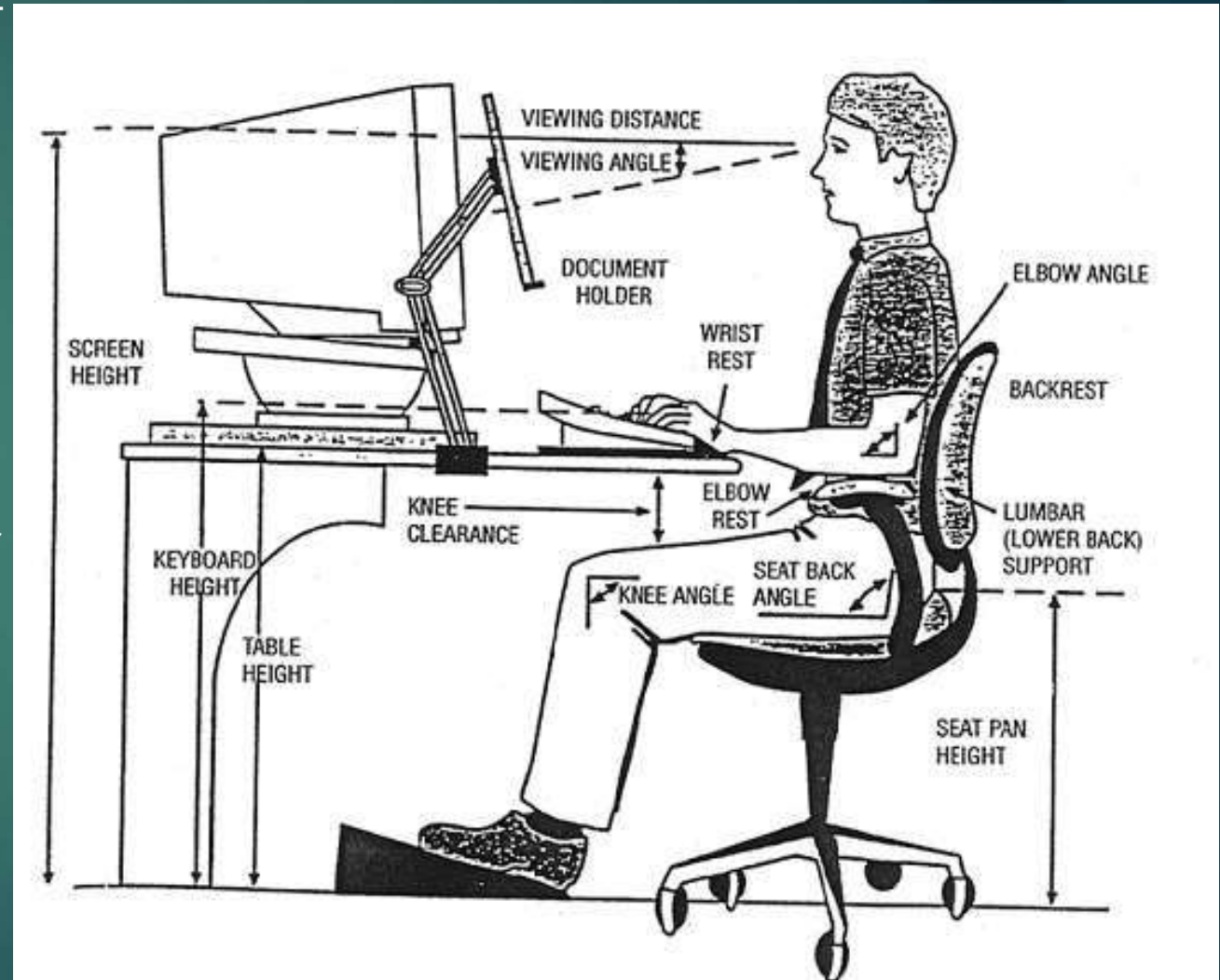


Slumped position

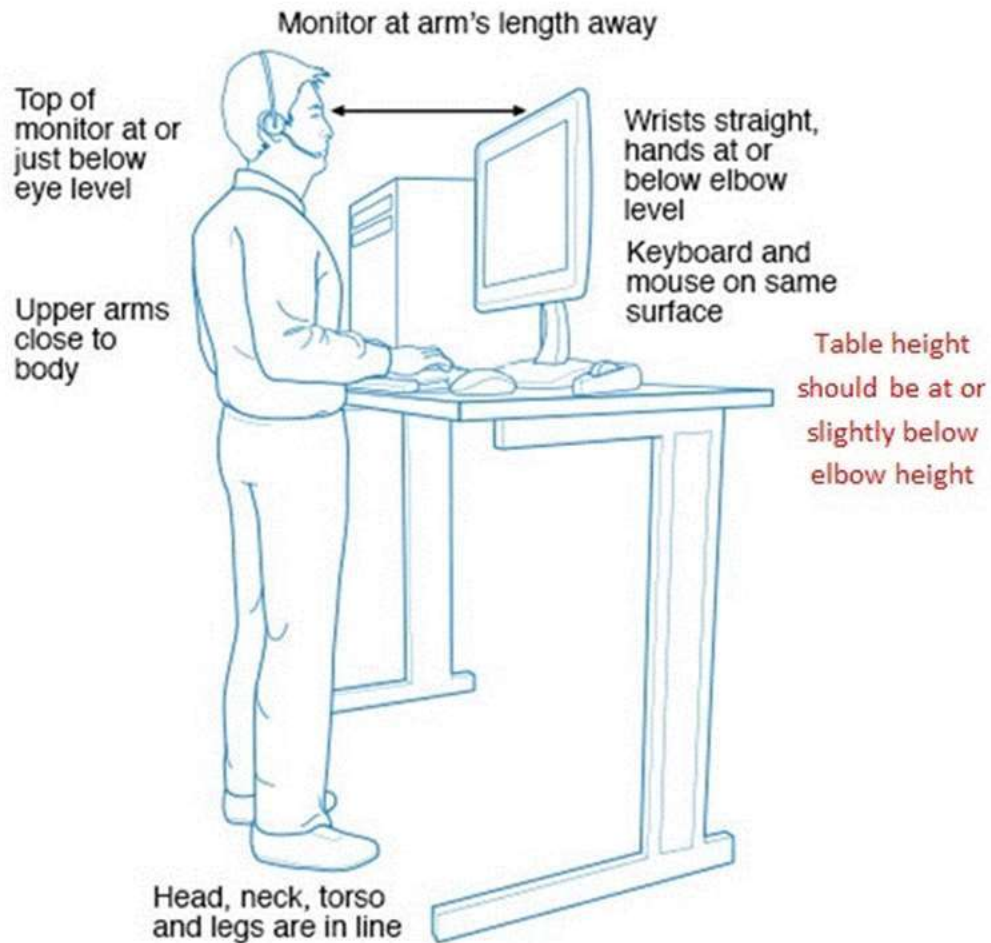


Cont.'..

- Place monitor in front of you, not off at an angle
- Keyboard should be slightly lower than normal desk height
- If it is not low enough, try raising your chair height
- Hold the mouse lightly and do not over strike the key board
- Keep your feet on the floor or use a foot rest to prevent your legs from dangling



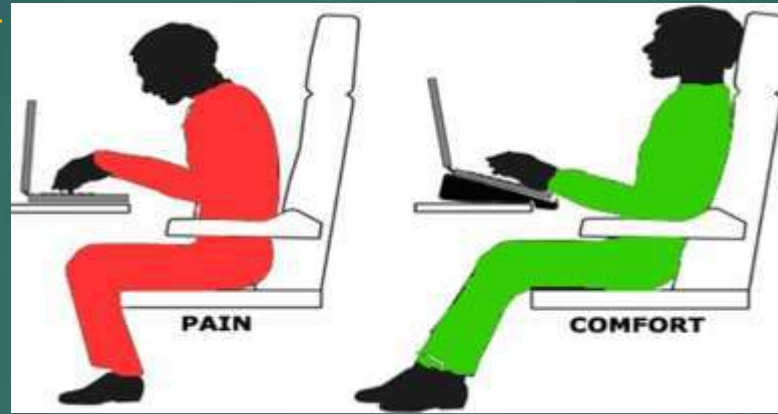
You can also work standing



Cont.'

- Support your arms and elbows when writing or typing to ease the pressure off your shoulders.

- NB. Hanging shoulders put

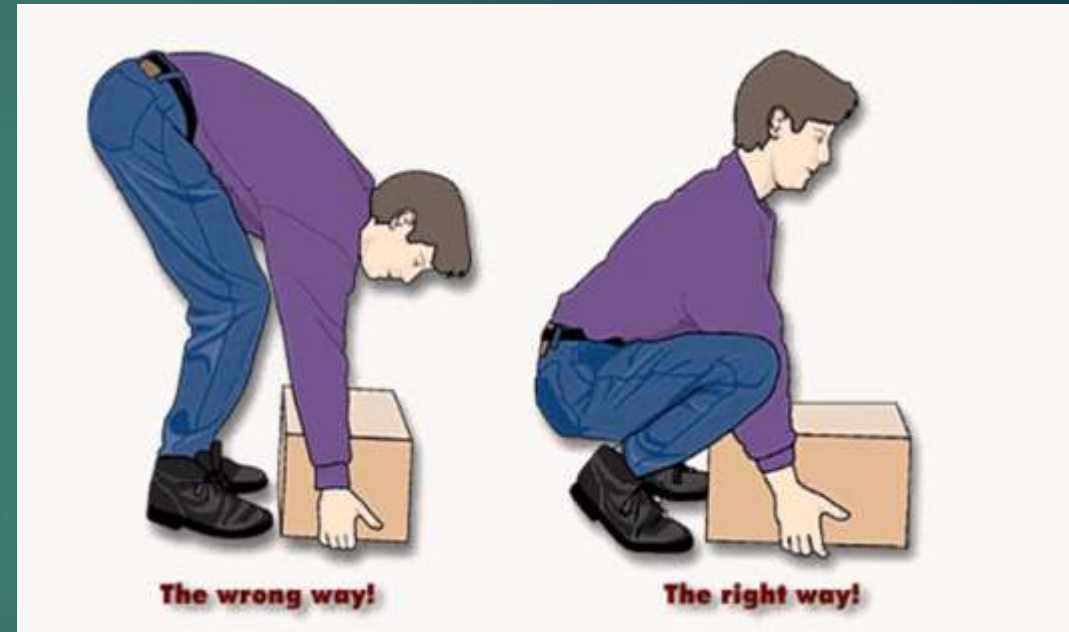


the shoulder muscles causing more

- Give your eyes a break, by staring away from your computer just for a few seconds and frequent blinking to rehydrate your eyes which can be so dry due to prolonged staring at computer screen

Cont.....

- ▶ **Proper handling/lifting:**
- ▶ Squat to lift
- ▶ Avoid bending at the waist
- ▶ Keep your low back bowed in while bending over
- ▶ Keep the weight as close to you as possible, and at waist level



Cont' ...Healthy Breaks

- Frequently take short breaks to stretch and relax

Office Stretching Exercises

Stretching should be performed slowly without bouncing or jerking. As you stretch, the tension should begin to ease. After this, you can gently begin to increase the stretch.



- Hold on to the base of the chair
- Bring ear to shoulder until you feel a slight tension
- Hold till tension begins to lessen and gradually increase the stretch
- Hold for 10 seconds
- Repeat on other side

- Turn your head to the right and look downwards
- Hold for 5 seconds, increasing the stretch slowly
- Hold for 5 seconds
- Repeat on other side

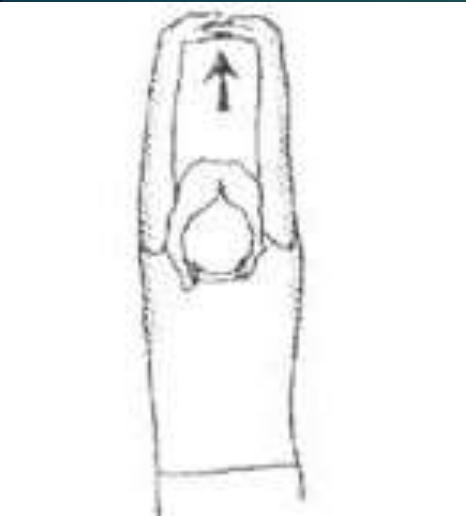
- Interlock fingers and turn palms upwards
- Straighten arms and stretch upwards
- Expand chest by compressing both shoulder blades together backwards
- Hold for 10 seconds

- Interlock fingers and push hands forward with palms facing outwards
- Feel the stretch between the shoulder blades
- Hold for 10 seconds

- Sit upright, tummy in
- Rotate body, bringing arms across
- Keep position for 5 seconds till you feel a gentle stretch on the spine
- Repeat on other side

Hold each stretch for about 5-10 sec

Overhead stretch



Shoulder stretch

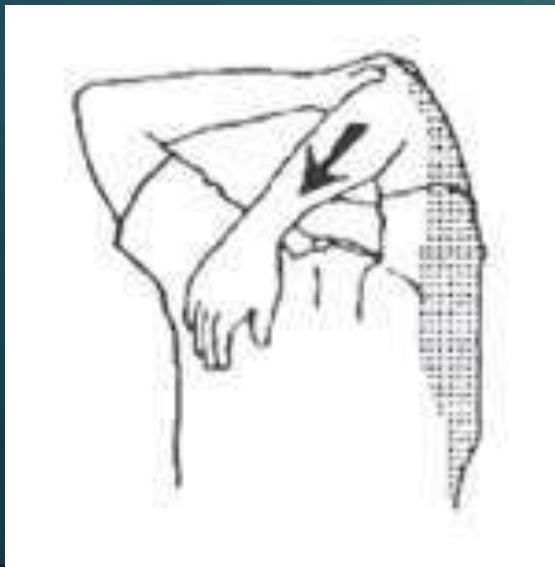


Chest & back stretch; turn elbows back and inwards, with straight arms

Neck and Shoulders



Triceps stretch



← Trunk rotation; sit with feet in front of you, reach one arm across the chair and turn to the same side.

Take Home Messages!

- ❖ THERE IS NO “ONE SIZE FITS ALL”
- ❖ It's not just the furniture! Habits must also change
- ❖ Remember, repeated poor postures or movements, expose your muscles to micro traumas, which gradually develop into serious NMSD that can be quite hard to manage
- ❖ RMI can be caused or made worse by what you do **OFF** the job too
- Therefore, make changes in activities outside of work too if necessary
- ❖ Exercise/physical activity is very import as a lifestyle modification
- ❖ And, its freely available...you don't really need to pay for it, yet it comes with a plethora of benefits!



OCCUPATIONAL THERAPY AND ERGONOMICS

- **Occupations;** refer to the everyday activities (ADLs)
- **Therapy:** Treatment
- **According to the World federation of Occupational therapist(WFOT), occupational therapy “is a client-centred health profession concerned with promoting health and well-being through occupation. *WFOT 2012*)”**

DOMAIN OF ERGONOMICS

1. COGNITIVE ERGONOMICS; concerned with mental processes, such as perception, memory, thinking capacity, decision-making, and motor response, as they affect interactions among humans and other elements of a system (human-computer interaction) mental workload, human reliability/ability to conduct specific tasks with satisfactory performance, this are related to impaired task performance and diminished well-being and productivity,,

ARRANGEMENT OF OFFICE AND STORE



Poor arrangement of workplace



Proper arrangement



2.PSYCHOLOGICAL ERGONOMICS; stress can directly influence a worker's behavior, a prolonged stress can lead to a decrease in cognitive function and human performance.

When assessing ergonomic risk, consider not only the musculoskeletal aspect, but also the psychological impact on your workforce.

3. **SOUND ERGONOMICS** ; Noise is a normal part of work, but excessive noise levels is a major problem for productivity, it affects our concentration, stress levels and our capacity for creative thinking, it can lead to a chronic headaches and can affect the sensory processing

Workspace should reduce harmful sensory stimulation and increase uplifting sensory experiences, light, air quality, are also important considerations to enhance wellbeing and productivity. *J. Kim, R. Dear (2013)*

4.COLOR IN ERGONOMICS; color influence our mood and feelings and can affect perception, can make us feel happy or sad, and they can make us relaxed, these reactions are rooted in psychological effects, (daria V) Choosing the right colors for your workspace can have a big impact on worker wellbeing and productivity. brighter colors can raise motivation. The best work environments combine colors effectively, generally, green is good for productivity, blue for creativity, red for attention and yellow for decision-making.

ERGONOMICS & HUMAN CENTERED DESIGN

- The core is a need of understanding the interactions among humans and other elements of a system.
- The process of designing or arranging workplaces contribute to the compatibility of human needs and well-being in order to ensure that tasks, jobs, environment are designed to make them compatible with abilities of workers ” (International Ergonomics Association, 2016).

THE ROLE OF OT IN ERGONOMICS

- OTs assess the work environment to promote personal occupation/task (*Association of Occupational Therapists (CAOT) 2015*)
- To increase proactive OT prevent work-related injuries, and increasing workers' comfort and productivity
- To help understanding the human body and “how it interfaces with its environment(psychologically and cognitively)

Risk factors of poor work place ergonomics

- **Cognitive;** The person may have difficult maintaining attention and concentration
- **Psychosocial;** The person may be depressed and discouraged, express feelings of failure at being unable to manage daily life/task
- **Productivity;** The person may be unable to do a regular workday because of fatigue, will be difficult to complete regular task due to fatigue.

OFFICE DESIGN

- **Offices, should be well designed and arranged with:**

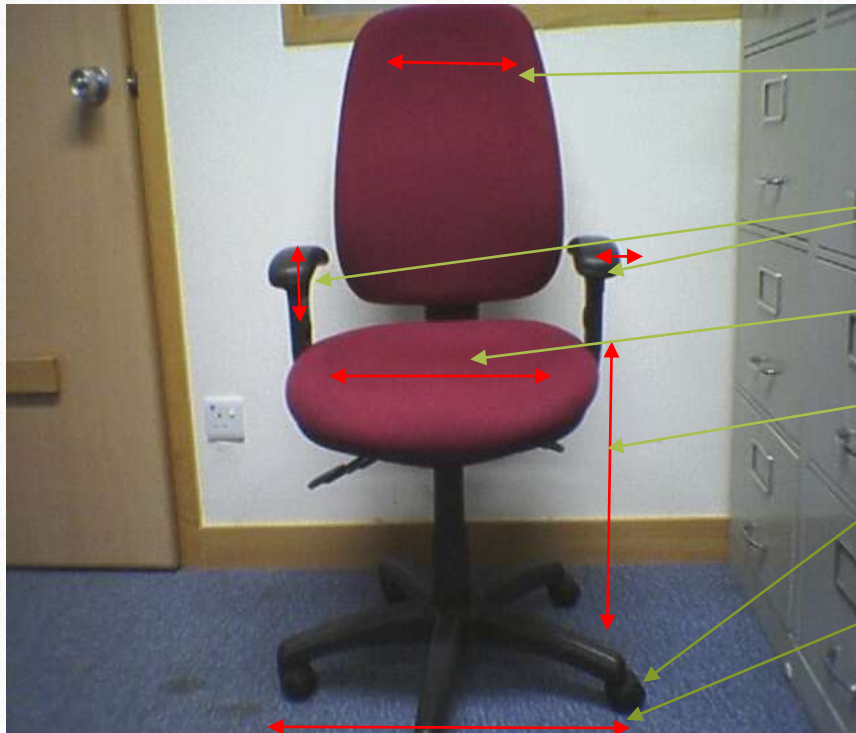
Enough light, good aeration/air (door and window) appropriate which can be opened and closed when necessary, think about the temperature

Placement of socket, computer and accessories, cupboard

Computer table and chair,



SAMPLE OF OFFICE SEAT



- Seat back 350-480mm width
- Min armrest 200mm height
- Max armrest 50mm width
- Min 450mm seat width
- Compressed seat height 400-500mm
- 5prolonged base(castors if necessary)
- 400-500mm base width

-
- Seat height ,seat depth, seat tilt adjustable, backrest fixed, backrest height adjustable , lumbar support fixed, headrest fixed, headrest adjustable.

HANDLING TECHICS

- Example hospital bed should be adjustable to facilitate task to the worker *ex; during client care (dressing or bathing)* , bed with wheel roll is easy in pushing or pulling during task, this will be matching the employee to work-related (*Melbourne2015*)



-
- Road accessibility from one place to another one, this to facilitate people in transportation of objects
 - Ex: transport of object from the store to different wards or departments, from the main pharmacy to the department , from the kitchen to the wards, all this should be designed accordingly to prevent chronic fatigue syndrome(CFS) and injuries, to increase productivity without stress,(Merck1999,2481)

OT INTERVENTION

- The intervention focuses on practices with the aim to ensure ‘appropriate interaction between work, product and environment, and human needs.
- Raising ergonomics awareness program,
- Advocacy on training and implementation of ergonomics in many institutions.
- Use also bio-psycho-social model(medical) and cognitive behavior therapy (medical-psychology)model
- Teach about stress management and relaxation techniques

RECOMMENDATIONS

- "Ergonomics really crosses all aspects of employment design, setting and physical demands of work environment .
- The recommendations and advice will be based on the domain of ergonomics; cognition, sound, psychological aspect, and coloring of the office environment
- computer table placement and cables ,sockets , a combination of this help a worker organize tasks so that he or she can complete a job with less stress.

- ▶ Remember, Covid-19 is also real!,
- ▶ Keep safe, take note



Thank you!

Questions?

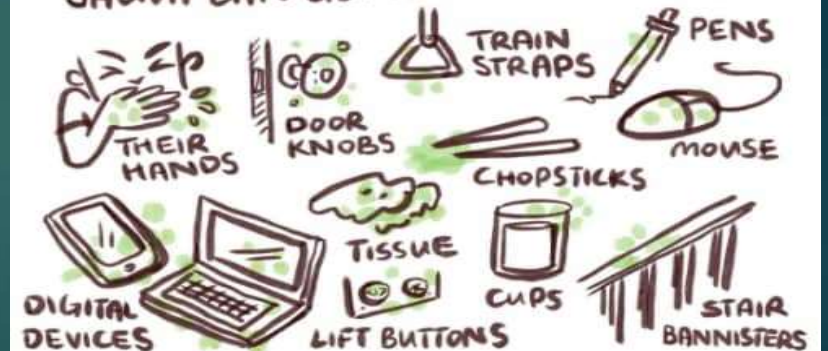


AND IN GENERAL, IT'S A GOOD IDEA TO AVOID CROWDS, BECAUSE YOU DON'T KNOW WHO MIGHT BE SICK.



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HOWEVER, SOMETIMES A SICK PERSON'S SALIVA CAN GET ON OTHER THINGS...



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