
UNIT 14 CONCEPT OF FAMILY LIFE

Structure

- 14.1 Introduction
- 14.2 Repetitive Motion Injuries
- 14.3 Upper Body Risk Factors
- 14.4 Lower Body Risk Factors
- 14.5 Seating
- 14.6 Eyes and Vision
- 14.7 Let Us Sum Up
- 14.8 Check Your Progress Exercise
- 14.9 Answers to Check Your Progress Exercise

 **NOTE**

Ergonomics refers to the study of work and its environment in order to improve efficiency.

14.1 INTRODUCTION

Today, changes in technology, changes in the way we perform work, and where and how we work are occurring at a rapid pace. Nowhere is the change more evident than in the use of computers.

This new technology has brought on new demands for information as well as new and more sophisticated computing systems. Today, almost every one of us interacts with computers on a daily basis to create new things and ideas, to produce documents, to correspond with friends and associates, and to retrieve information. Along with the expanding use of this technology have come reports about adverse health changes for computer users.

Here we will examine the factors that may impact your health and performance while using a computer.

Whether you use a desktop computer in an office or a portable computer in an alternative setting, you make choices that can either improve or decrease your performance and comfort.

By thoughtfully reviewing the layout of your workplace and your equipment, you can mostly identify what is wrong and begin to develop improvements to make computer use more rewarding and less physically demanding.

Or, do certain tasks or pieces of furniture and equipment stand out as awkward, difficult, even painful to use? Use your common sense to eliminate the barriers to performance that you find. Also, in this unit will examine many possible solutions to common challenges in work area setup.

Health and safety issues associated with computer use exist in many degrees. In some cases, the designs of the equipment or procedures present you with a nuisance. In other situations, the work area design may cause discomfort or short-term pain. A well-designed work area is only part of the solution. You must also contribute by using proper work habits and techniques. In the worst case, poor workplace design and /or improper use may contribute to injuries.

Objectives

After studying this unit, you will be able to:

- understand the disorders associated with the overuse of human joints,
- enumerate the upper and lower body risk factors,
- discuss proper posture and seating arrangements while working on a computer, and
- describe the ill-effects on eyes and vision on prolonged exposure to computer screen.

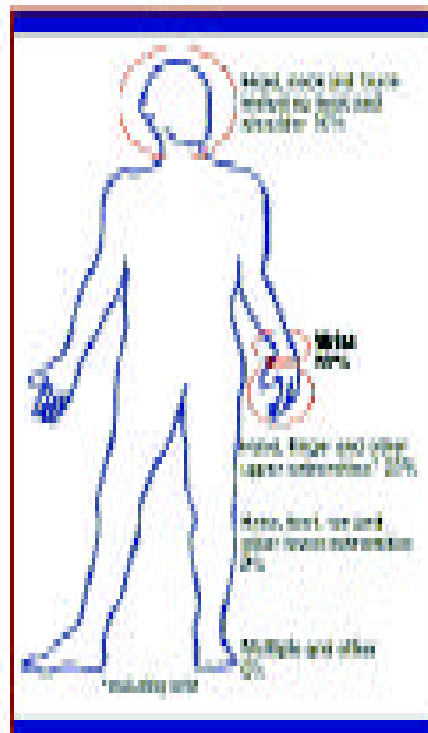
 **TIPS**

Most of your inconveniences are because of your ignorance, be a little aware of your self while working on your computer and you would immediately come to know of most of the disturbing elements, which could then be easily removed.

14.2 REPETITIVE MOTION INJURIES

Repetitive Motion Injuries (RMI, also known as RSI, CTD, CTS) are a class of injuries and illnesses that result from weeks, months or years of overuse of human joints. Connective tissues can become sore and sometimes unusable from repeated exposure to

micro-trauma. Because of the slow onset of symptoms, people sometimes ignore the condition until the symptoms become chronic and permanent injury occurs.



RMI is a disorder that is based upon the time, amount and severity of your exposure. RMI disorders occur gradually over a long period of exposure to low-level harmful conditions. A brief exposure to these conditions would not cause harm. But a prolonged exposure may, in some people, result in reduced ability to function.

Not all pain will result in long-term disability. Muscle pain often develops after exerting yourself in ways that the body is not accustomed. Luckily, muscles heal very quickly, and even extreme muscle pain will usually diminish within a few days when managed properly.

However the main thing to note is that there are some parts more vulnerable than other parts.

As shown in the figure, wrist has 53% of the total damage/ risk, while neck, head & back injuries are 16% more likely.

Other parts like hands, fingers and knee, foot, toe etc. have comparatively lower damage risks.

Figure 14.1 shows a very common wrist repetitive motion injury:

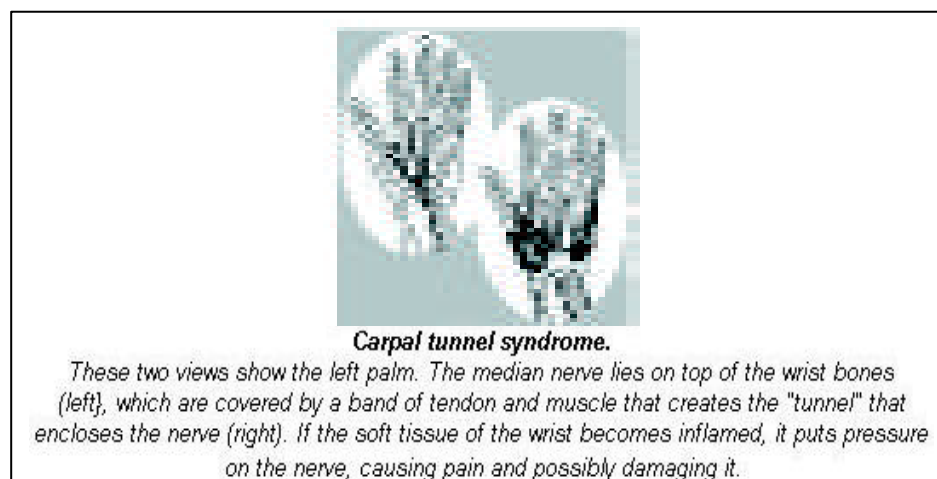


Figure 14.1: Wrist Repetitive Motion Injury

14.3 UPPER BODY RISK FACTORS

The main vulnerable parts in the human upper body are the neck, wrist and back. There fore particularly while typing/using the mouse you should be very particular about your posture. First, we talk about the wrong postures and the problems posed by them, then we will come to the right postures.

WRISTS

Incorrect Posture



Figure 14.2: Typing at a keyboard on a desk

Typing at a keyboard on a desk is a common work posture for many computer users as shown in the Figure 14.2. In this position it is difficult to maintain the wrist is in a neutral posture, because the forearms sag as they tire and this puts the wrists into greater wrist extension. Also, most users have to work with their elbows flexed, which can compress the median and ulnar nerves at the elbow and restrict blood flow to the hands. Working with the forearms sloping up increase muscle loads in the upper arms, shoulders, and neck. Working in this position for more than 3-4 hours invariably leads to muscle fatigue.



Figure 14.3: Typing on a conventional articulating keyboard

Typing at a keyboard on a conventional articulating keyboard tray can increase postural problems for users. Working with the keyboard more steeply angled on the tray is a common work posture for many computer users as illustrated in Figure 14.3. In this position it is also difficult to maintain the wrist is in a neutral posture, because the forearms sag as they tire and this puts the wrists into greater wrist extension. Studies have failed to show that conventional keyboard trays substantially improve wrist posture.

Correct Posture



Figure 14.4: Ideal typing posture

In the ideal typing posture, both static and dynamic muscle loads are minimized. This posture is achieved when the keyboard is below seated elbow height and the keyboard

base is gently sloped away from the user so that the key tops are accessible to the hands in a neutral posture as depicted in Figure 14.4. In this position, the arms, shoulders, neck and back can relax, especially during brief rest pauses. Also, in this slightly reclined sitting position, the low back rests against the lumbar support of the chair, the elbow angle is opened to promote circulation to the lower arm and hand, the abdominal angle, and the 'popliteal' angle (behind the knees) are opened to promote blood circulation. The feet rest firmly upon the floor.

BACK

The spine is one of the most important organs that needs to be taken care of. Right and wrong postures have their effects not only on wrist and hands but a tremendous effect is on the back also, so due care must be taken. The Figure 14.5 shows the right and wrong postures as far as back is concerned.



Figure 14.5: Right and wrong postures of back

14.4 LOWER BODY RISK FACTORS

The lower body even though may not seem to be in direct participation when working on computers. Nevertheless its importance is not secondary in any way whatsoever to any other portion of the body.

LEGS

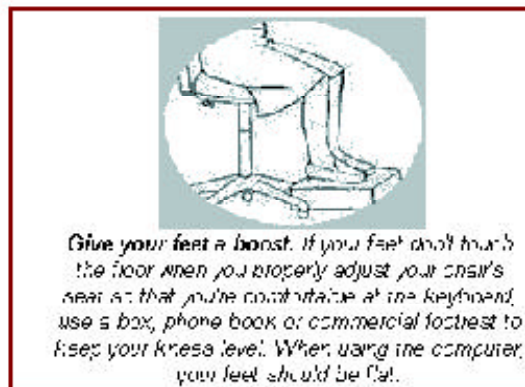


Figure 14.6: Right posture for Legs

You should make sure that your legs are comfortable while you are working on the computer for long durations.

Generally, if you are a little aware, you can know yourself in the beginning itself whether your sitting position is right for your body or not.

Depending on your height you might need to keep some extra footrest underneath your feet to support your seating.

LOWER BACK

Wrong Posture

The posture depicted in the Figure 14.7 is a classical example of how slowly and gradually the lower back pain develops in computer users.

TIPS

- √ Use a chair that provides lumbar (lower back) support - if adjustable, adjust to maintain an erect sitting posture
- √ Ideal chairs can be easily raised or lowered, and have 5 wheel legs for safety
- √ Keep feet planted firmly on floor or footstool to counterbalance forces on lower back.



Human back is very agile and is unaffected in long run by such positions but repetitive and prolonged strain of this sort can damage the discs in the backbone badly and permanently.

You should take care that while working on the computer the monitor should be placed at such a distance so that you don't have to crouch to look at it as depicted in Figure 14.7.

Right Posture



Figure 14.8: Correct Posture of Lower Back

The Figure 14.8 depicts the correct posture as far as the lower back support is concerned.

You should make sure that the chair you are using provides a back that is according to your height so that its back aligns with your lower back.

Also, the vertical height above the ground is equally important, and should be according to your height. The chair should be well cushioned for added comfort. You should not sit in one position for prolonged periods rather you should keep on changing your positions or keep taking rest after short durations of time.

14.5 SEATING

The human body was designed to move. One of the most important aspects of a good sitting habit is movement. Standing up from your chair and frequently adjusting your sitting posture can be one of the best methods to guard against injury and fatigue. The best chair design in the world will not force good posture or prevent the need for the human body to move.

Adjust the Height

Your feet should rest comfortably on the floor or, if necessary, should be supported by a footrest as illustrated in Figure 14.9. For most people the knees should be at a level equal to or slightly lower than the hips. Adjust the chair height to attain a natural inward curve of the spine and optimize the comfort of your lower back. If the chair is too low, your lower back will flatten or round out. If the chair is too high, your feet, and therefore your back, are unsupported. An ideal chair height for your reference is shown in the Figure 14.9. Circulation to the lower leg can also be compromised if the chair is too high.



Figure 14.9: Ideal sitting posture

Check the Length of the seat pan

There should be 2-3 inches between the back of your leg and the seat of the chair. This will allow for a natural bend in your knees. If the seat pan is too short, it can create pressure points and discomfort in the back of the thigh. If the seat pan is too long, you will not be able to sit back in the chair. Some chairs have adjustments that shorten or lengthen the seat pan if necessary. Lumbar pillows can also be used as a method to improve the fit of a seat pan that is too long.

TIPS

Giving rest to your eyes:

- After a while of working on the computer you should take a break by closing your eyes for a few moments.
- You should regularly look up and away from the screen and focus on a distant object (more than 3 meters from you) such as a picture or out of the window.

Adjust the lumbar support

The curve of the backrest should support the natural curve of your back. You should not feel too arched, nor should you feel unsupported. If your chair does not provide sufficient lumbar support, you might be able to use a lumbar pillow or towel roll to improve the fit.

14.6 EYES AND VISION

Using computers for extended periods can cause visual discomfort, headaches and vision challenges. It is very unlikely that you will suffer permanent changes or damage to your eyes. Rather, you may experience these symptoms whenever you use a computer intensively for periods of a couple of hours or longer; the symptoms will diminish soon after you stop working on the computer. Typical symptoms of vision challenges include:

1. **Eye strain** refers to ocular fatigue, eye discomfort and headaches associated from intensive use of the eyes. Common causes include:
 - glare on the computer screen,
 - poor visual correction (out of date eyeglass prescription),
 - reading small character sizes on the screen,
 - poor contrast between text and background on the monitor,
 - noticeable screen flicker, and
 - dry eyes.
2. **Blurred vision** can be caused by normal physiological changes in the eye (i.e. aging or disease). It can also be caused by constant focusing on objects within 12" of the eyes, which often occurs when reading in low light.
3. **Dry and irritated eyes** occur when there is insufficient fluid in the eyes to keep them moist. Eyes are kept moist and refreshed by a normal blink reflex, which is

present from birth. Blink rates vary with different activities and can become slower when concentrating. Eyes can become red and itchy. Common causes include:

- reduced blinking when using the computer, and
- air movement that is noticeable in the face area.

If you feel your eyes become dry or tired with computer activities, remember to take frequent vision breaks. Breaks can include momentarily closing your eyes or looking away from the screen. If your eyes tend to feel dry or you wear contact lenses, eye drops of an artificial tear substitute may also help prevent or relieve symptoms.

14.7 LET US SUM UP

In this Unit you learnt about the various health related issues while using computers. The term that is coined for this discipline was Ergonomics. You were taught about the upper and lower body parts, seating, eyes and vision and the work layout. As the use of computers is increasing in every field these days, these issues should be kept in mind and incorporated religiously by every individual who is using computers in his habits. Computers provide you with tremendous benefits in all walks of life, but their prolonged usage can also lead to physiological deformities in your body therefore Ergonomics is something that everybody should be aware of and incorporate in their lives today in order to remain healthy and still be avid computer users.

14.8 CHECK YOUR PROGRESS EXERCISE

1) What is Ergonomics?

.....
.....
.....

2) What is the main cause of lower back pain?

.....
.....
.....

3) What effects can prolonged exposure to computer screens have on your eyes?

.....
.....
.....

4) Explore the various Ergonomic computer equipments available in the market.

.....
.....
.....

14.9 ANSWERS TO CHECK YOUR PROGRESS EXERCISE

- 1) Ergonomics refers to the study of work and its environment in orders to improve efficiency.
- 2) The main cause of lower back pain is the wrong posture, restitive and prolonged strain in the long run.
- 3) Prolonged exposure to computer screen can cause visual discomfort headaches vision challanges, eye strain, blurred vision etc.
- 4) This is a practice exercise. Try doing it yourself.