

RSI and Display Screen Equipment (DSE)

The term 'RSI' has been replaced by 'CANS': Complaints of Arm, Neck and/or Shoulder. In this leaflet, however, we consistently use the term 'RSI'.

1. Introduction

Repetitive Strain Injury (RSI) is one of the work-related complaints increasingly causing health issues and decreased deployability. This is no different at the University of Twente. All too often, staff members and students have RSI – whether it's in the early or more severe stages – without knowing where to turn with their questions and complaints.

This leaflet provides general information about RSI, working with Display Screen Equipment (DSE) and ways to avoid the onset of RSI, but also includes a list of instructions on how to optimally set up your workstation and information on the RSI policy at the University of Twente and the people and departments to turn to in case of questions. After all, prevention is better than cure.

RSI is an umbrella term describing a variety of complaints. In this leaflet, we will focus on one particular type of complaint, namely the strains on the body caused by long-term DSE work.

2. How do you recognize RSI?

The complaints with RSI are numerous. Examples include pain, hypersensitivity, fatigue, tingling, stiffness, decreased joint mobility, decreased muscular strength, etc. RSI symptoms may be divided into three phases.

Phase 1: less serious

During this phase there is pain and a feeling of tiredness in the fingers, hands, wrists, arms, shoulders or neck after long periods of working. The symptoms are localised and may be accompanied by cramp or a feeling of numbness. However, they quickly subside when you stop working. In your

free time or at night you do not suffer from the complaints. There is therefore a clear relationship between your work activities and the pain, but usually you are able to continue carrying out your tasks as normal.

Phase 2: serious

During the second phase the symptoms continue after you have finished working and may even disturb your sleep at night. It is no longer possible to identify a clear relationship between the symptoms and certain activities. The pain occurs with all sorts of tasks. The symptoms now include tingling, irritation and loss of strength. The pain radiates to other parts of the body.

Phase 3: very serious

In this phase the pain is always present, even when resting or not working. There may be swelling in the arms or the colour of the skin may change. Painful areas may feel cold. There is numbness with a marked tingling sensation. During this phase you are not even able to carry out light work anymore. Even normal jobs around the house become impossible.

Since RSI-related complaints are chronic and may lead to long-term absence, it is important to recognize them at an early stage. Prevention, however, is even better, especially because it is not always possible to resolve the complaints.

3. What causes RSI?

A well-set up workstation is no guarantee for preventing RSI. Many complaints arise due to poor posture and can be enhanced by stress-inducing factors. Therefore, RSI prevention for DSE workers focuses on positively influencing the five factors below which can typically result in the onset of RS if not taken into account:

Work tasks: make sure you have a balanced set of tasks which are sufficiently distributed over the day and allow you to take sufficient control to set your own course. Alternate DSE work with, for example, reading and writing tasks, holding phone conversations and attending meetings.

Alternating sitting with standing during your work is also important. You can do this by going to copy something several times during the day or by walking to a colleague instead of emailing them.

Work hours: make sure you take regular and natural breaks and limit the total number of hours of DSE work to a maximum of six a day. 'Natural breaks' are created when you carry out a varied task (a task involving more than just DSE work). There are three levels of breaks:

- (Very) short periods of rest in between activities (seconds);
- Planned short periods of rest where you leave your workstation (minutes);
- A limitation of the duration for which the work lasts (hours).

Workload: avoid peaks in the workload by anticipating expected periods of heavy workload. The best way to deal with a heavy workload is to give the staff member sufficient possibilities to take control and set their own course. For example, inform colleagues in time if a report needs to be finished or an email needs to be sent. Negotiate your workload limit. It's not a problem to say 'no' if you don't have the time to do a task.

Workstation: make sure you have an ergonomically optimum workstation (this includes matters like good light and the right temperature). An ergonomic workstation includes an adjustable chair and desk. It's important to support your elbows when doing DSE work, so the muscles in your shoulder and neck remain relaxed. A document holder and a desk can be useful tools to aid your work, but software that monitors the intensity of the work you are doing, schedules breaks and provides exercises could be handy as well.

Working method: do your work in the least strenuous manner. To be able to do so, you need to have sufficient information about the optimum use of your workstation. Take on a relaxed posture (sit up straight, with supported elbows, relaxed and straight shoulders and your head in line with the spinal column, not at an angle). Your own responsibility and the activities

in your private life are also important to adopting a good and healthy working method.

4. Setting up your DSE workstation

One of the major errors people make when sitting in front of a display screen is using the wrong posture. Many people sit in a non-ergonomic way, which may lead to complaints of the neck, back and/or shoulders. When working in front of a display screen, there is little variety in posture, causing a static load. This negatively influences the blood flow to the muscles, which in turn may make for aching, hard muscles. Good furniture can limit this static load.

The image on the last page of this leaflet shows the basic principles of a good workstation set-up. The chair and the table need to be adjustable to the individual's height. The height of the chair and the desk need to be attuned to one another.

Good furniture is a prerequisite for working comfortably and healthily, but, of course, you need to know how to use it!

**Workstation with adjustable desk:*

If you have an adjustable desk at your disposal, the procedure to follow is very easy: make sure you sit correctly (see image) and set up the desk so that it is a few centimetres below elbow height. To do so, you should stand in front of your chair and adjust the upper part of the seat so it is the same height as the lower part of your kneecap. Don't forget to take into account the springs of the chair and the effect they have on your posture (when seated, your upper and lower legs are at a 90° angle). Then take a seat and slide back the chair in such a way that the back of your knees still does not have any contact with the front of the seat. Sit straight. Adjust the lower part of the backrest to a height where the outward curve of the backrest is at the same height as the hollow curve of your lower back. The height of the chair is well adjusted when you can slide a fist between the seat and the back of the knee. In addition, there should also be enough room for your buttocks, which is why there should always be room between the backrest and the seat. It is advised to adjust the height of the

desk and armrests so your shoulders hang down slightly during typing. Please note that your forearms should rest on the armrests in this situation. Therefore, the height of the desk should be adjusted in such a way that the keyboard can be used with relaxed shoulders.

** Workstation without adjustable desk:*

If you don't have an adjustable desk, please follow the following procedure: Make sure you sit correctly. If your desk is too high, you need to adjust your chair to a higher position as well. A footrest keeps your legs from dangling. If your desk is too low, it will have to be heightened by using leg risers, e.g. centred wooden blocks.

** Positioning the display screen*

Apart from maintaining good posture, positioning the display screen correctly is also important to avoid health issues. The display screen must be right in front of the user to avoid the user working long hours with a bent head or torso. If the user frequently looks at a paper document, but barely at the display screen, it is recommended to use a document holder. The document holder should be at the same distance as the display screen. That way, your eyes won't have to refocus as often.

How to best position your document holder depends on the way you type. If you look at the document holder a lot, you should place the holder in the middle of your range of vision. But if you look at the display screen more often, it would be better to place the display screen in front of you. If you regularly look at your keyboard, it's best to position the document holder between the keyboard and the display screen. In any case, the document holder and the display screen should be right next to or above each other. The display screen should be designed and able to be positioned in such a way that the viewing angle can be changed to meet the user's needs. The top line in the display screen should be at about eye level.

The display screen should be able to be positioned at a viewing distance of at least 50 cm. The user needs to be able to adjust the viewing distance if necessary.

The recommended viewing distance is dependent on the font size and should be between 50-70 cm for a 15-inch display screen, 60-85 cm for a 17-inch display screen and 19/20/21-inch widescreen, 70-95 cm for a 19-inch display screen and 75-105 cm for a 21-inch display screen and 24-inch widescreen. To avoid sharp contrasts it is wise not to place the display screen in front of a background with a window. Apart from the fact that reflected light from the windows should not show up on the display screen, the above recommendation also leads to the regulations that DSE workstations, in one direction, need to be positioned perpendicular to and at a few metres' distance from any windows.

Having sufficient (day)light surrounding the workstation is another important aspect of ergonomically sound DSE work. To be able to clearly see the information on the display screen, it is important to attune the light in the room to the display screen equipment: no light sources should be reflected in the display screen. In an office with vertical, anti-reflective or translucent blinds, the workstation is easy to set up. The daylight is being regulated by the position of the blinds.

** Working with a laptop*

When you work outside your office, for example when you're working on the laptop on the train or at home, RSI-related complaints increase. Using a laptop is not advisable, because you quickly adopt a non-ergonomic posture where you often move your head towards the laptop because of the display screen being in a lower position than usual. This causes strains on your head and neck. Moreover, as the laptop is a small device, you adopt a more fixed posture, enabling health issues to arise sooner. For these reasons, laptops do not meet the DSE workstation requirements as included in the legislation on working conditions. However, there is an alternative where you can still use your laptop in a way that ticks all the boxes: the laptop workstation. This workstation enables you to quickly and easily raise or lower the position of the laptop, making for ergonomically sound DSE work. Combined with an external keyboard and mouse, you will have a full-fledged workstation.

* *Using a mouse*

In addition to having the wrong posture, another risk factor for developing RSI may be improper use of the mouse.

Below you will find a few causes of possible complaints when using a mouse as well as some tips for how to avoid these complaints.

- try to reduce the use of the mouse by using [keyboard shortcuts](#)
- Make sure your hand bends inward as little as possible;
- Solely moving your wrist is very strenuous. Therefore, when moving a mouse, it is best to use the entire forearm (e.g. by resting your elbow on the armrest without moving and moving the entire forearm). Make sure the forearm is supported by the desk or armrest as much as possible;
- When typing or using a mouse, the wrist is often lifted too much. This is very strenuous for both the wrist and elbow. The more inclined the mouse, the more the hand bends backwards. That's why a good mouse is not too high (maximally 4 cm). In addition, people with small hands may benefit from a wristrest. This prevents your wrist being pulled backwards when using the mouse;
- When the mouse is too sensitive to your touch, you have an increased risk of developing health issues, as the muscles in your arm are constantly tightening to stabilize the arm. Therefore you should avoid using a mouse which is too sensitive. Also, working with a mouse often involves people keeping their index finger at the ready to left-click the mouse, thus lifting the index finger all the time. A better way to use the mouse would be to softly rest the finger on the button.

5. Organizational measures/break schedule

Apart from good posture, breaks, non-DSE tasks and varied work are also important to prevent RSI. The legislation on working conditions stipulates that after two hours at the most, the DSE work needs to be alternated with other tasks or should be followed by at least a ten-minute break. The tasks

need to be distributed over the day as evenly as possible, with the preference to alternate DSE work with other work (e.g. phoning, copying, archiving, attending meetings, etc.) at regular intervals. Short-term heavy workloads cause complaints more quickly than long-term low workloads. Use breaks and moments in which you think about something to relax your muscles. Regularly activate different muscles by doing exercises (shrugging and rotating your shoulders, tilting your head/moving it to the side, stretching, etc.).

To avoid RSI, UT staff members can download the RSI prevention software Workrave. It reminds users not only to take micro-breaks, but also to take rest breaks. In addition, Workrave provides exercises and may restrict you to a daily limit. That way, the risk of you developing complaints of the neck, shoulders, arms or hands is reduced to a minimum. The software can be installed on to UT staff computers (Windows operating system) via the UT ZENworks Application Window. When using your personal computer, you can download and install the software via www.workrave.org.

6. DSE work at home

A correct set-up of your display screen equipment and a good working method are, of course, also important when you work at home. A few simple tips and tricks will help you set up your own ergonomically sound home workstation (e.g. use old catalogues and pieces of wood to increase the height of the display screen and desk, respectively).

7. Where to turn to with questions about RSI?

If you experience pain or other complaints described in this leaflet, you shouldn't wait too long. Acting on your complaints at an early stage will prevent the complaints from increasing; your own measures may even be sufficient. Using the tips contained in this leaflet will get you a long way! But sometimes expert help is needed. Per unit (faculty, service department), questions about RSI and DSE work can initially be presented to the unit's Health, Safety and Environment Coordinator ([VGM](#)). He/she can determine whether your workstation is ergonomically sound and

whether your posture is correct. Dependent on the complaints and the advice, it may be necessary to adjust the workstation.

In case of health issues, the VGM will refer you to the company doctor of the working conditions service for the University of Twente. If you would like to discuss the organization of your tasks in relation to RSI-related complaints, please contact your manager. If you have medical questions, you can go to the company doctor's working conditions surgery hours.

Of course it's about **preventing** complaints. To this end, the University of Twente has developed an RSI policy. Important points of attentions include an overview of the DSE workstations, the adjustment of workstations, information provision to staff members and students, the stimulation of staff members' and students' physical condition, and staff availability to use break software. Please contact your unit's VGM for more information.

Summary

Below you will find a summary of tips to reduce the risk of developing RSI.

1. Sit correctly: use your chair's settings to adjust its height, the backrest and armrests and make sure you sit relaxed;

The result of this is that the chair, due to its support possibilities, takes over the function of several muscle groups. The static load is thus reduced.

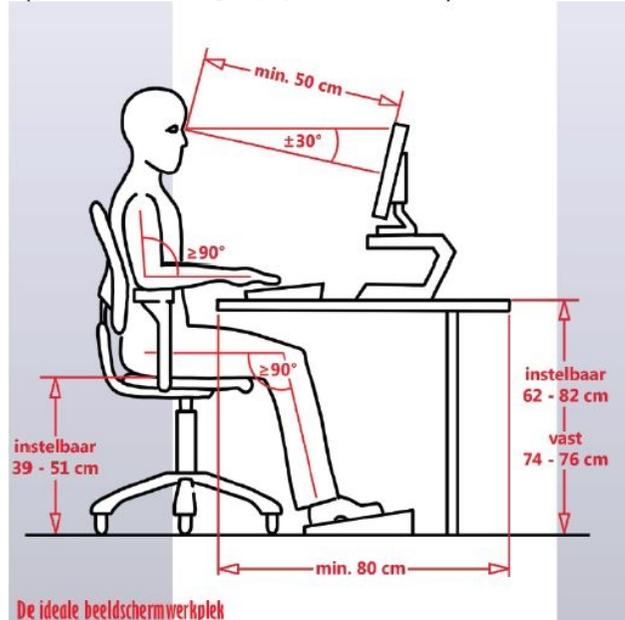
2. Optimize the set-up of your DSE workstation (see image below);
3. If necessary, use aids like a footrest or desk risers;
4. Position the input device(s) you are using (mouse, keyboard) as close to you as possible. Shift the keyboard if you use the mouse a lot and vice versa. Alternate between the input devices as much as possible;
5. Keep your wrist in a neutral position (the hand being the extension of the forearm);
Doing so causes the friction between the tendon and bone structures to be reduced.
6. Plan your work well: avoid peak workloads;
Tension/stress as a result of a heavy workload also influences the muscle tone; reducing tension and stress therefore has a positive effect on the muscle tone. Moreover, severely increased and long-lasting strains on the muscles are prevented.
7. Take regular breaks to do something different from your DSE work and do so for several minutes (at least once per hour), for example by walking to the printer, picking up the post or doing exercises. The exercises should be done at a slow

pace and should not cause any pain. Research has shown that distributing breaks over the day – where each hour of work should contain a break of at least five minutes (preferably ten) – causes less unease and physical fatigue. You can use the RSI prevention software Workrave as a tool to regularly take a break from your DSE work;

By briefly interrupting your DSE work, the static load is lifted, which enables the blood to circulate better. The longer someone types or uses their mouse without a break, the greater the risk of developing complaints.

7. Use a laptop workstation if you work on a laptop. This workstation enables you to quickly and easily raise or lower the position of the laptop, making for ergonomically sound DSE work. Combined with an external keyboard and mouse, you will have a full-fledged workstation;
8. Tips when using a mouse:
 - Where possible, use [alternative keyboard shortcuts](#) instead of the mouse;
 - Operate the mouse with your forearm, not your wrist;
 - Support the arm operating the mouse, e.g. by using the armrest of the chair;
 - The mouse buttons should not be too sensitive, so you can softly rest your fingers on the buttons while working;
 - The mouse should be set in a way that two clicks on the same button are not immediately interpreted as double-clicking;
 - The cord should be long enough, so you can pull the mouse towards you;
 - The mouse should slide smoothly;
 - The mouse should be as compact as possible (< 4 cm);
 - Use a mouse which can be operated by both the left and the right hand.

Tips for setting up your DSE workstation



The ideal DSE workstation, “instelbaar” = adjustable

Position of the seat

- Place your feet flat on the ground or on a footrest;
- Make sure there is a 90° angle between your upper and lower legs;
- Make sure the blood circulation to the upper legs and knees remains intact; this is never the case with a 90° angle. The height of the chair is well adjusted when you can slide a fist between the seat and the lower legs.

The backrest

- The lower back needs to be supported by the backrest at the height of the hollow curve in the lumbar region (belt height);
- Adjust the height of the backrest accordingly.

Armrests

- When your upper arms hang down loosely and your forearms are horizontal, the elbows should only just touch the armrests;
- The upper arms and forearms should be at a 90° angle;
- Relax your shoulders; avoid sitting behind your desk with shrugged shoulders.

Desk

- The height of the chair's armrests should be the same as the height of the desk;
- Adjust the height of the chair if necessary. Use a footrest if your feet are not able to completely touch the floor;
- If your desk is not high enough, desk risers or extendable legs may be a solution. Make sure you have sufficient legroom;
- If you have a drawer unit on castors, make sure you can still freely move your legs under the desk.

Display screen set-up

- Sit down in front of the display screen;
- Position the display screen at some distance (preferably > 3 metres) from the window and perpendicular to it to avoid glare and reflections. Use blinds if this is not possible;
- If you work with a 15-inch display screen, make sure the distance between the screen and your eyes is 50 to 70 cm, (60-85 cm for a 17 inch screen);
- Make sure the top line in the display screen is at about eye level;
- If necessary, use a monitor stand to adjust the height of the display screen.

Keyboard

- Sit down in front of the keyboard and make sure the keyboard is 8 to 10 cm off the rim of the desk;
- Try to keep your wrist straight while typing. Use as flat a keyboard as possible (keep the legs down). Avoid your wrist bending too far backwards, as this could be a cause of complaints. Using a wristrest while typing is generally advised against.

Document holders

- If you need to go through a document to enter information into the computer, use a document holder which can be positioned between the keyboard and the display screen. That way, you won't have to bend your head as much and you will be able to keep a straight posture, thus dramatically decreasing the strains on your neck and back. The holder can also be used if you, for example, need to read documents, and your posture will be much better for using it.

Operating a mouse

- Position the mouse so that it allows you to operate the mouse without stretched arms;
- Operate the mouse from your forearm, not your wrist;
- Support the arm operating the mouse;
- If possible, use [alternative keyboard shortcuts](#).