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EFFECTS OF STRESS AND VISUAL DISPLAY UNIT WORK ON TENSION-TYPE HEADACHE AND TENSION NECK SYNDROME

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The purpose of this thesis was to create two power point presentations for a project in Soteekki, which is a service centre at Satakunta University of Applied Sciences. The material will be used for prevention of tension-type headache and tension neck syndrome in students starting their studies at Satakunta University of Applied Sciences. The power point presentations provide practical advice and suggestion for how tension-type headache and tension neck syndrome can be prevented by relaxation and ergonomics. The presentations explain how stress and visual display unit work affect tension-type headache and tension neck syndrome. In addition to the topics mentioned above, the theory part aims to explain what tension-type headache and tension neck syndrome actually are, and which are their risk factors.

TABLE OF CONTENT

1 INTRODUCTION

The majority of students at Universities of Applies Sciences in Finland suffer from headache and neck problems. Of women 59% have headaches occasionally, 21% weekly and 6% daily or almost daily. These numbers are slightly lower in men, with 58% having headaches occasionally, 6% weekly and 1% daily or almost daily. Neck problems are nearly as common. Of women 38% experience problems in their neck and upper back occasionally, 25% weekly and 14 % daily or almost daily. The corresponding numbers in men are 36%, 13% and 4%. (Kunttu & Huttunen 2009, 143, 146.) Psychological stress is frequently reported by university students as a triggering factor for a headache attack (Kurt & Kaplan 2008, 49). It is also a risk factor for development of neck pain (Christensen & Knardahl 2010, 168). Computer work is another factor associated with neck disorders (Larsson, Søgaard & Rosendal 2007, 450-451). Due to their high prevalence, prevention of headaches and neck problems is very important. As studying is frequently stressful, and as the use of computers is at increase in today's society, relaxation and ergonomics are well-grounded topics to be discussed.

This thesis is a part of a national project, "To Care, To Dare, To Share -prevention of university student marginalisation 2009-2011". The purpose of this project is to prevent students in Universities of Applied Sciences from quitting their studies or delaying their graduation by improving their well-being. (Nylund 2010, 25.) This thesis contributes to the project's aims by providing material which can be used to educate students about how tension-type headache and tension neck syndrome can be prevented by relaxation and ergonomics.

2 THE AIM OF THE THESIS

The aim of the thesis is to produce two power point presentations. The first one will be about stress management and relaxation, and the second one will be about visual display terminal work. The purpose of the first presentation is to describe the effects of stress management and relaxation, and also suggest how they could be implemented in practice. The purpose of the second presentation is to give instructions about an ergonomic way of working associated with visual display terminal work. The presentations are part of a project in Soteekki that aims to prevent tension-type headache and tension neck syndrome in students starting their studies at Satakunta University of Applied Sciences.

3 THE PROJECT

Soteekki is a service centre in the faculty of social services and health care at Satakunta University of Applied Sciences. It started functioning on April 1st 2008. The services of Soteekki are related to health and well-being and they are offered to enterprises, organisations and private clients. Soteekki aims to enhance entrepreneurship in the area, by developing the students' knowledge and skills in entrepreneurship and supporting the foundation of enterprises already during the studies All the services are produced by students, under the supervision of a teacher. The students in Soteekki are studying nursing, public health nursing, social services and physiotherapy. (Website of Satakunta University of Applied Sciences 2011.) In addition, different types of projects are planned and implemented in Soteekki by students. This thesis, for example, is a part in one of the projects currently being developed in Soteekki.

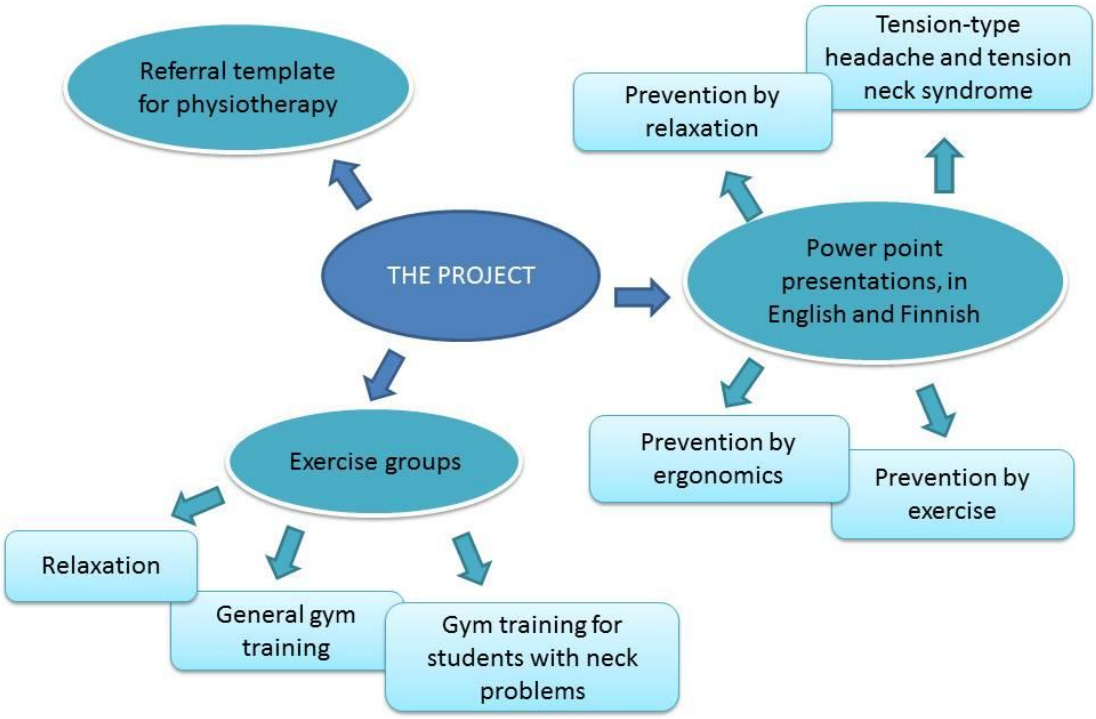
3.1 Description of the project

The aim of the project is to educate students about prevention of tension-type headache and tension neck syndrome. The aim is also to provide the students with means

for taking care of their own health and well-being. In addition, the project strives to develop the cooperation between the student health care and Soteekki regarding tension neck pain and tension-type headache. (Nylund 2010, 25.)

The project contains an information package, which is presented for all the new groups starting at Satakunta University of Applied Sciences. The information package consists of four power point presentations. The first presentation is about tension-type headache and tension neck syndrome in students, the second presentation explains how these disorders can be prevented by exercising physical capacity, the third presentation includes relaxation techniques and stress management, and the fourth one presents proper ergonomics related to computer work. This thesis focuses on the two latter ones. In addition, the students are offered the opportunity to participate in gym training sessions organised by Soteekki. Exercise groups focusing on neck problems and relaxation are offered for students who already have some symptoms of tension-type headache or tension neck syndrome. The content of the group sessions has been planned roughly, therefore leaving space for the students' own creativity. Additionally, it is possible to receive individual physiotherapy for neck problems and headaches in Soteekki by obtaining a referral from the student nurse. (Nylund 2010, 26-27.) Before the implementation of the project itself starts in Soteekki, the project will be piloted by two physiotherapy students (Aaltonen, personal communication on 9.12.2011). The different parts of the project are presented visually in figure 1.

Figure 1.



Janina Nylund planned this project as her thesis in 2010. It is a part of the national project "To Care, To Dare, To Share -prevention of university student marginalisation 2009-2011". (Nylund 2010, 25.) Fourteen universities of applied sciences in Finland are participating in the project, and it is managed by the Diakonia University of Applied Sciences. It is funded by European Social Fund (ESF) and ELY in Northern Ostrobothnia. (To care to share to dare 2011.) This project strives to prevent the students studying at Universities of Applied Sciences from delaying their graduation, or alternatively from ceasing their studies completely. To reach this aim the project is trying to improve the students' well-being. Soteekki is one channel through which this can be achieved in Satakunta University of Applied Sciences. (Nylund 2010, 25.)

3.2 My part in the project

My task in the project is to create two power point presentations for the information package. The first presentation will explain how stress affects tension-type headache and tension neck syndrome. In addition, it will include examples of relaxation and

stress management techniques. The second presentation will include material about the effects of computer work on tension neck syndrome and tension-type headache. It will also include practical instructions about an ergonomic working position. My responsibility is also to translate the two power point presentations produced in Finnish into English. The power point presentations are about tension-type headache and tension neck syndrome in students, and how they can be prevented by exercising physical capacity. In addition, I will translate the power point presentations I produce from English to Finnish.

4 TENSION-TYPE HEADACHE

Headaches occur in 90 percent of the population (Green 2011, 65). Of the patients coming to primary care, headaches are among the ten major complaints (van Ettekoven & Lucas 2006, 983). Headaches can be divided into primary and secondary headaches (Millea & Brodie 2002, 797). Tension-type headache is a primary headache, which means that it is not caused by any organic disease process in the body (Millea & Brodie 2002, 797; Cathcart, Winefield, Lushington & Rolan 2010, 1250). Such an organic disease process could be, for instance, a brain tumour (Cathcart, Winefield, Lushington & Rolan 2010, 1250). Secondary headaches, on the contrary, are symptoms of an underlying disease (Millea & Brodie 2002, 797). Tension-type headache is the most prevalent primary headache (Olesen et al. 2004, 37; van Ettekoven & Lucas 2006, 983; Fumal & Schoenen 2008, 70; Bendtsen & Jensen 2009, 525; Cathcart, Winefield, Lushington & Rolan P 2010, 1250; Crystal & Robbins 2010, 450; Green 2011, 65). Approximately half of all headaches are tension-type headaches (van Ettekoven & Lucas 2006, 983).

4.1 Epidemiology

Depending on the study, the lifetime prevalence of tension-type headache is between 12 and 78 percent (Olesen et al. 2004, 37; Loder & Rizzoli 2008, 88; Bendtsen & Jensen 2009, 526). According to one study, 24-37 percent had tension-type head-

aches several days per month (Bendtsen & Jensen 2009, 526). A study done with Turkish university students found that 23 percent of the females and 22 percent of the males had tension-type headache (Kurt & Kaplan 2008, 47). Generally, it is more common in Europe than in other continents, with some studies reporting a prevalence of 80 percent (Crystal & Robbins 2010, 450). Women are suffering from it slightly more frequently than men (Fumal & Schoenen 2008, 71; Bendtsen & Jensen 2009, 526; Crystal & Robbins 2010, 450). The higher the educational level, the more prevalent is the episodic subtype of tension-type headache (Loder & Rizzoli 2008, 88). The chronic subtype is relatively rare, affecting only up to 3 percent of the population (Fumal & Schoenen 2008, 71; Loder & Rizzoli 2008, 88; Bendtsen & Jensen 2009, 526; Crystal & Robbins 2010, 450). Because of its high prevalence, tension-type headache has higher socio-economic impact than any other primary headache (Olesen et al. 2004, 37; Fumal & Schoenen 2008, 70; Cathcart, Winefield, Lushington & Rolan 2010, 1250; Crystal & Robbins 2010, 449).

Tension-type headache can have a significant impact on quality of life (Cathcart, Winefield, Lushington & Rolan 2010, 1250; Crystal & Robbins 2010, 453). In fact, primary headache is one of the top ten disability causes in the WHO's ranking (Cathcart, Winefield, Lushington & Rolan 2010, 1250). In one study including university students suffering from tension-type headache in Brazil, 33 percent stated that headache reduced their ability to study. Even when not having headache, nearly 25 percent stated that their affective relationships were changed. (Crystal & Robbins 2010, 453.) The chronic subtype is considered to be a major health problem, causing high disability and significantly decreasing quality of life (Fumal & Schoenen 2008, 70; Crystal & Robbins 2010, 453). Despite the fact that tension-type headache is the most common primary headache, it is the least studied one (Olesen et al. 2004, 37; Bendtsen & Jensen 2009, 525).

4.2 Definition

Terms that were used earlier for tension-type headache include tension headache, psychomyogenic headache, muscle contraction headache, stress headache, essential headache, ordinary headache, psychogenic headache and idiopathic headache

(Olesen et al. 2004, 37). The headache is typically perceived bilaterally as a tightening band that reaches from the occiput to the forehead (Millea & Brodie 2002, 797; Loder & Rizzoli 2008, 88; Bendtsen & Jensen 2009, 525). Frequently the pain is also felt in the neck muscles as pressure, tightness or dull ache (Millea & Brodie 2002, 797; Loder & Rizzoli 2008, 88). The intensity of the pain is mild to moderate, and it may last for hours, or even days (Millea & Brodie 2002, 797; Loder & Rizzoli 2008, 88; Bendtsen & Jensen 2009, 525).

The diagnosis of tension-type headache is based on patient history and examination (Loder & Rizzoli 2008, 88). Tension-type headache is lacking specific features. Consequently, secondary headaches might present as tension-type headache. (Fumal & Schoenen 2008, 70.) Presence of a underlying disease should therefore be excluded by a thorough interview (Millea & Brodie 2002, 798). Headache diaries, including consumed drugs, are very useful (Bendtsen & Jensen 2009, 526). Dysfunction of the temporal mandibular joint frequently complicates the headache. The patients should be examined for tenderness in the joint by palpation. (Millea & Brodie 2002, 800.)

A tension-type headache attack lasts from 30 minutes up to 7 days, however in the chronic subtype the headache might be continuous. At least two of the following criteria should be fulfilled in order to make the diagnosis: the pain feels tightening or pressing, it is located bilaterally, the intensity is mild or moderate and physical activity does not aggravate the pain. Either photophobia (sensitivity to light) or phonophobia (sensitivity to sound) can occur, however the headache is not associated with nausea or vomiting. To make the diagnosis tension-type headache, any possible diseases causing headache should carefully be excluded. (Olesen et al. 2004, 38.)

Tension-type headache is divided into three subtypes depending on its frequency: infrequent tension-type headache, frequent tension-type headache and chronic tension type headache. Infrequent tension-type headache occurs at least ten times all together, on average less than once a month. Frequent tension-type headache occurs at least ten times during a period of three months, however it does not occur more than fourteen days per month. Chronic tension-type headache occurs on average at least fifteen days per month for a period longer than three months. (Olesen et al. 2004, 37-38.)

Chronic tension-type headache is more disabling, compared to the frequent and infrequent subtypes, due to its frequency (Bendtsen & Jensen 2009, 525; Green 2011, 73). It is associated with more medication overuse and less response to most treatments (Bendtsen & Jensen 2009, 525; Crystal & Robbins 2010, 449). Additionally, chronic tension-type headache leads to higher socio-economic and personal costs (Bendtsen & Jensen 2009, 525). With proper treatment for chronic tension-type headache, it is possible to reduce the days with headache to less than 15 days per month. However, it is uncommon that the headaches are reduced to less than one day per week. (Crystal & Robbins 2010, 451.)

The abnormal finding in tension-type headache patients that is the most significant is increased tenderness in the pericranial muscles at manual palpation (Millea & Brodie 2002, 800; Olesen et al. 2004, 38; Loder & Rizzoli 2008, 89; Bendtsen & Jensen 2009, 527; Cathcart, Winefield, Lushington & Rolan 2010, 1251). However, it should be noted that in some individuals with headache muscle tenderness is not increased, and on the contrary, some individuals without headache do have increased muscle tenderness (Cathcart, Winefield, Lushington & Rolan 2010, 1251-1252). The neck muscles may also be tender, which might lead to a incorrect diagnosis if it is assumed that a disorder of the neck is causing the headaches (Loder & Rizzoli 2008, 89; Cathcart, Winefield, Lushington & Rolan 2010, 1251). In addition, it can be difficult to differentiate tension-type headache from other headaches, especially migraine (Loder & Rizzoli 2008, 89; Bendtsen & Jensen 2009, 529).

4.3 Mechanisms

What exactly is causing tension-type headache is not yet known, however, there are probably many factors involved (Olesen et al. 2004, 37; van Ettekoven & Lucas 2006, 983; Fumal & Schoenen 2008, 70; Loder & Rizzoli 2008, 88; Cathcart, Winefield, Lushington & Rolan 2010, 1250-1251). Previously, tension-type headache was considered to be purely a psychological disorder (Olesen et al. 2004, 37; Bendtsen & Jensen 2009, 525). In addition, the pain has been considered to originate from ischemia and contraction of the muscles in the neck and head (Bendtsen & Jen-

sen 2009, 527; Cathcart, Winefield, Lushington & Rolan 2010, 1251; Green 2011, 73). In studies it has been reported, however, that the muscle activity in patients suffering from tension-type headache is normal or minimally increased (Bendtsen & Jensen 2009, 527; Cathcart, Winefield, Lushington & Rolan 2010, 1251). It does not seem that increased activity, disturbed metabolism or inflammation in the pericranial muscles is causing the headaches (Fumal & Schoenen 2008, 72). Therefore, tension-type headache is not directly related to muscle contractions (Söderberg, Carlsson & Stener-Victorin 2006, 1320-1321; Cathcart, Winefield, Lushington & Rolan 2010, 1251). Recently, it has been demonstrated that there is a neurobiological basis, at least when it comes to the severe subtypes (Olesen et al. 2004, 37; Loder & Rizzoli 2008, 88; Bendtsen & Jensen 2009, 525).

The mechanisms in the episodic subtypes are thought to differ from the mechanisms in the chronic subtype (Olesen et al. 2004, 37; Fumal & Schoenen 2008, 71-72; Crystal & Robbins 2010, 449). In episodic tension-type headache the mechanisms are likely to be peripheral, in other words myofascial nociception is increased (Olesen et al. 2004, 37; Fumal & Shoenen 2008, 70; Loder & Rizzoli 2008, 88; Bendtsen & Jensen 2009, 527; Green 2011, 73). The peripheral afferent neurons in the muscles of the neck and the head become hyperexcitable, and when activated they cause pain (Loder & Rizzoli 2008, 88). Referred myogenic pain produced by myofascial triggerpoints is a possible cause of the headpain in tension-type headache (Fernández-de-las-Peñas, Cuadrado & Pareja 2006, 633; Fumal & Schoenen 2008, 72). It has been demonstrated that active myofascial trigger points in the sternocleidomastoid, upper trapezius and temporalis are more common in individuals with tension-type headache (Fernández-de-las-Peñas, Cuadrado & Pareja 2006, 668). The myogenic nociception can disturb the pain-modulating mechanisms in the brain, which results in normally innocuous stimuli being interpreted as pain (Bendtsen & Jensen 2009, 529).

In the chronic form the predominated mechanisms are central pain mechanisms (Olesen et al. 2004, 37; Leistad, Sand, Westgaard, Nilsen & Stovner 2005, 71; Fumal & Schoenen 2008, 70; Bendtsen & Jensen 2009, 528; Cathcart, Winefield, Lushington & Rolan 2010, 1250; Green 2011, 73). In other words, the CNS processes pain abnormally (Fumal & Schoenen 2008, 73; Loder & Rizzoli 2008, 88; Cathcart,

Winefield, Lushington & Rolan 2010, 1251). The processing of the pain is increased (Bendtsen & Jensen 2009, 528). In episodic tension-type headache the central pain processing is normal (Cathcart, Winefield, Lushington & Rolan 2010, 1251). One theory is that in chronic tension-type headache the excitability of central nervous system becomes increased due to maintained nociceptive input from pericranical muscles (Söderberg, Carlsson & Stener-Victorin 2006, 1321; Bendtsen & Jensen 2009, 528; Cathcart, Winefield, Lushington & Rolan 2010, 1251). This might explain how the episodic form progresses to the chronic form (Bendtsen & Jensen 2009, 528; Cathcart, Winefield, Lushington & Rolan 2010, 1251).

4.4 Stress

Psychological stress and tender muscles have not been found to be the cause of tension-type headache, however they are clearly associated with it and aggravating it (Loder & Rizzoli 2008, 88). Tension-type headache attacks are frequently triggered by stress or an emotional conflict (Leistad, Sand, Westgaard, Nilsen & Stovner 2005, 64; Fumal & Schoenen 2008, 75; Torelli, Abrignani, Castellini, Lambru & Manzoni 2008, 94; Bendtsen & Jensen 2009, 526; Cathcart, Winefield, Lushington & Rolan 2010, 1250; Green 2011, 73). The exact mechanisms by which stress is related to tension-type headache are not known (Bendtsen & Jensen 2009, 526; Cathcart, Winefield, Lushington & Rolan 2010, 1250). Earlier it was thought that abnormal levels of muscle tension were aggravated or caused by stress, and that this was the cause of the headache attacks. However, most research does not support this hypothesis. (Cathcart, Winefield, Lushington & Rolan 2010, 1250.)

One study investigated the muscle activation and perceived pain in tension-type headache sufferers and healthy controls during cognitive stress, followed by thirty minutes relaxation. The muscle activity increased during stress in both groups, however, no significant differences were found between the groups. The participants suffering from tension-type headache reported higher levels of pain during cognitive stress, compared with the controls. In addition, the ones with tension-type headache did not recover from the pain after the thirty minute rest. Some participants even reported increased pain throughout the rest. In this study, muscle activity was not

found to correlate significantly with the pain responses. In addition to this study, numerous other studies suggest a normal or slightly increased muscular activity in tension-type headache sufferers. Therefore, there is not enough evidence to prove a causal relationship between muscle activity and the pain in tension-type headache. (Leistad, Sand, Westgaard, Nilsen & Stovner 2005, 65-71.)

It has also been proposed that tension-type headache would be a secondary headache, instead of a primary headache. The headaches were suggested to be a result of an individual's difficulty to express emotions. In addition, it was speculated that the individual is having an inadequate relationship between his/her personality and life events, which would also contribute to the pain. Maybe the pain has a purpose? Maybe it is a reflection of a psychological burden? (Torelli, Abrignani, Castellini, Lambru & Manzoni 2008, 93-95.) Additionally, headaches are known to respond strongly to placebo (Kanji, White & Ernst 2006, 149).

The prevalence of psychological disorders are increased in tension-type headache sufferers compared to the unaffected population (Millea & Brodie 2002, 799; Torelli, Abrignani, Castellini, Lambru & Manzoni 2008, 94; Cathcart, Winefield, Lushington & Rolan 2010, 1254; Crystal & Robbins 2010, 452). Anxiety is the most common, followed by depression. In addition, suicidal ideation occurs in some. (Crystal & Robbins 2010, 452.) People suffering from tension-type headache have been found to have more automatic thoughts and alexithymia than unaffected people. Chronic tension-type headache sufferers had more automatic thoughts than those suffering from episodic tension-type headache. (Torelli, Abrignani, Castellini, Lambru & Manzoni 2008, 94.)

Depression and anxiety do have an influence on pain (Cathcart, Winefield, Lushington & Rolan 2010, 1254). They are found to be related to headache activity. (Cathcart, Winefield, Lushington & Rolan 2010, 1254; Crystal & Robbins 2010, 452). Emotional disturbances are therefore risk factors for tension-type headache (Fumal & Schoenen 2008, 75; Torelli, Abrignani, Castellini, Lambru & Manzoni 2008, 95). It has been suggested that depression aggravates central sensitisation in people with frequent headaches (Bendtsen & Jensen 2009, 527). Other risk factors

are poor self-rated health, difficulty to relax after work, and insufficient amount of sleep (Bendtsen & Jensen 2009, 526; Crystal & Robbins 2010, 450).

4.5 Relaxation

Stress being one factor triggering tension-type headache attacks, it is obvious that relaxation is an important component in its treatment (Kanji, White & Ernst 2006, 145; Fumal & Schoenen 2008, 70; Bendtsen & Jensen 2009, 526). Relaxation training provides the patient with a means to consciously reduce stress that either triggers the headache, or is caused by it (Bendtsen & Jensen 2009, 530).

Several studies have found relaxation training to improve tension-type headache (Millea & Brodie 2002, 802; Kanji, White & Ernst 2006, 145; Söderberg, Carlsson, & Stener-Victorin 2006, 1321; Fumal & Schoenen 2008, 78). In one study the improvement was reported to occur in 39% of the participants (Millea & Brodie 2002, 802). Another study investigating the effects of relaxation on tension-type headache also reported encouraging results. The study reported that headache intensity and frequency decreased immediately after the treatments, and these parameters also remained decreased after three and six months. (Söderberg, Carlsson & Stener-Victorin 2006, 1322-1324.) In addition, there are other studies suggest that autogenic training is beneficial for tension-type headache sufferers (Kanji, White & Ernst 2006, 148).

Relaxation training used together with EMG biofeedback has been reported to be more efficient in the treatment of tension-type headache than relaxation training alone (Millea & Brodie 2002, 802; Fumal & Schoenen 2008, 78; Green 2011, 74). Stress management programmes are also having an effect in reducing tension-type headache (Fumal & Schoenen 2008, 78). The effects are comparable with the effect obtained from tricyclic antidepressants (Bendtsen & Jensen 2009, 530). A plausible explanation to why relaxation benefits headache sufferers is that they learn to be in control of their headaches (Söderberg 1327). However, one reference states that non-pharmacological management, including relaxation and stress management, is not highly efficient in the treatment of tension-type headache (Bendtsen & Jensen 2009, 532).

4.6 Posture

The knowledge about whether education about ergonomics is beneficial for reduction of tension-type headache is conflicting. One reference states that ergonomic instructions have not been proved to have a long term effect. (Fumal & Schoenen 2008, 79.) Another, however older, source claims that education about a proper posture improves headache frequency, and that the effect is long-lasting (Millea & Brodie 2002, 803). One study investigated the long term effects of a craniocervical training program on tension-type headache. The emphasis of the exercise program was on motor control more than on muscle strength. The exercise was for the deep cervical flexor muscles and it was performed with a theraband, ten minutes twice a day. The results of the study were very good even at 6-month follow up. The study could not explain the reason for the improvement; "is it the action, or is it the posture?" (van Ettekoven & Lucas 2006, 985-988.)

It is common that persons with tension-type headache have an impaired posture. Especially forward head posture is seen more often in tension-type headache sufferers than in healthy persons. (Fernández-de-las-Peñas, Cuadrado & Pareja 2006, 668; Fernández-de-las-Peñas, Pérez-de-Heredia, Molero-Sánchez & Miangolarra-Page 2007, 37.) However, forward head posture does not correlate to headache parameters in neither episodic nor chronic tension-type headache (Fernández-de-las-Peñas, Alonso-Blanco, Cuadrado & Pareja 2006, 161; Fernández-de-las-Peñas, Cuadrado & Pareja 2006, 668; Fumal & Schoenen 2008, 72). Therefore, it is possible that forward head posture is a consequence of the headache, not its cause. It might be an attempt to reduce the pain (antalgic posture). (Fernández-de-las-Peñas, Alonso-Blanco, Cuadrado & Pareja 2006, 162; Fernández-de-las-Peñas, Cuadrado & Pareja 2006, 671). One study reported that the greater the forwards head posture was, the longer was the headache history (Fernández-de-las-Peñas, Pérez-de-Heredia, Molero-Sánchez & Miangolarra-Page 2007, 37).

Individuals suffering from episodic tension-type headache have been found to have less neck mobility comparing to healthy individuals (Fernández-de-las-Peñas, Cuadrado & Pareja 2006, 670). However, neck mobility is not associated with tension-type headache (Fernández-de-las-Peñas, Cuadrado & Pareja 2006, 670; Fumal &

Schoenen 2008, 72). It is not related to headache intensity, duration or frequency. Therefore, decreased neck mobility is unlikely to be the cause of the headache. Instead, the decreased neck mobility might be caused by an abnormal head posture or the pain. (Fernández-de-las-Peñas, Alonso-Blanco, Cuadrado & Pareja 2006, 161-162; Fernández-de-las-Peñas, Cuadrado & Pareja 2006, 670.)

It is possible that individuals with chronic tension-type headache have musculoskeletal impairments. With the knowledge we have today, it is impossible to determine whether these impairments are a cause or a result of the headache disorder. These findings are results of a study examining craniocervical flexion in chronic tension-type headache sufferers. The individuals with headache obtained lower values from a craniocervical flexion test compared to the control group. The reason for the poorer results in the headache sufferers was not necessarily weakness in the deep cervical flexors. The following possibilities could explain the poor result: the test evoked pain, lack of neck flexibility and motor control dysfunction. Headache intensity and frequency were not found to be associated with craniocervical flexion. (Fernández-de-las-Peñas, Pérez-de-Heredia, Molero-Sánchez & Miangolarra-Page 2007, 37-38.) Another source report that some atrophy can be seen in the deep neck muscles of individuals suffering from chronic tension-type headache, however, it is not determined whether it is secondary or primary to the disorder (Fumal & Schoenen 2008, 72).

5 TENSION NECK SYNDROME

Neck pain is a common disorder (Croft et al. 2001, 317; Walker-Bone, Reading, Coggon, Cooper, & Palmer 2004, 45; Hoy, Protani, De & Buchbinder 2010, 783). Neck pain can be caused by a variety of reasons. It can be related to headaches, disturbances of vision, temporal mandibular joint syndrome, fibromyalgia, inflammatory arthropathies, inflammatory joint diseases and disorders of the upper extremity. Rarely, it occurs as a symptom of infections or tumours in the neck and head. (Guzman et al. 2009, 18.) In addition, injury, for instance whiplash, is also a cause of neck pain. However, more commonly neck pain is associated with a functional disorder.

Disorders of the neck are often associated with continuous and repetitive computer work. (Ming, Närhi & Siivola 2004, 51-52.) Tension neck syndrome is one common disorder that involves neck pain. Other common disorders are for instance cervical syndrome, cervialgia, thoracic outlet syndrome and trapezius myalgia. (Larsson, Søgaard & Rosendal 2007, 456.) In Finland the classification of neck pain is based on an interview, symptoms and clinical findings (Ming, Närhi & Siivola 2004, 51-52).

5.1 Epidemiology of neck pain

Neck pain is a very common disorder (Croft et al. 2001, 317; Walker-Bone, Reading, Coggon, Cooper, & Palmer 2004, 45; Hoy, Protani, De & Buchbinder 2010, 783). The prevalence of neck pain is steadily increasing. (Larsson, Søgaard & Rosendal 2007, 448; Hoy, Protani, De & Buchbinder 2010, 783-784) In the Finnish population neck pain is second on the list of musculoskeletal complaints. (Larsson, Søgaard & Rosendal 2007, 448) Generally, women suffer from neck pain more often than men. (Larsson, Søgaard & Rosendal 2007, 448; Hoy, Protani, De & Buchbinder 2010, 783) The prevalence is also higher in countries with high-income than in countries with low or middle income, and higher in urban areas than in rural areas. (Hoy, Protani, De & Buchbinder 2010, 783) In North America and Europe approximately half of the adult population experience neck pain at some point in their lives. (Hoy, Protani, De & Buchbinder 2010, 785; Lau et al. 2010, 459) Some sources report even higher numbers, up to 70%. (Walker-Bone, Reading, Coggon, Cooper, & Palmer 2004, 45)

Usually the neck pain is first encountered in adolescence, or already as a child (Hoy, Protani, De & Buchbinder 2010, 785). The neck pain tends to return in episodes during the lifetime (Carroll, Cassidy, & Côté 2004, 134; Larsson, Søgaard & Rosendal 2007, 448-449; Hoy, Protani, De & Buchbinder 2010, 785). The prevalence increases with age, and it peaks in the age group 35-49 years. After this point it starts to decline. (Hoy, Protani, De & Buchbinder 2010, 789.)

Computer work is one identified cause of neck pain (Ming, Närhi & Siivola 2004, 51-52; Hoy, Protani, De & Buchbinder 2010, 786). It has been found that neck disorders are the most prevalent in computer and office workers (Larsson, Søgaard & Rosendal 2007, 448-449; Hoy, Protani, De & Buchbinder 2010, 786). Therefore, as the computer use increases, problems such as neck pain also increase (Ming, Närhi & Siivola 2004, 51). Another occupational group where neck pain is common is health care workers (Hoy, Protani, De & Buchbinder 2010, 786).

Neck pain is frequently associated with disability (Carroll, Cassidy, & Côté 2004, 134; Walker-Bone, Reading, Coggon, Cooper, & Palmer 2004, 47; Hoy, Protani, De & Buchbinder 2010, 790). Disability leads to a variety of problems on both personal and societal level. Neck pain can have a significant effect on the individual's functional capacity, and therefore it may reduce workability, and complicate social and physical participation in normal activities of everyday life. (Larsson, Søgaard & Rosendal 2007, 449; Christensen & Knardahl 2010, 162; Hoy, Protani, De & Buchbinder 2010, 790.) For the society neck pain has economic consequences because of sick leaves, retirement and disability pension (Larsson, Søgaard & Rosendal 2007, 449).

5.2 Definition

Tension neck syndrome belongs to the occupational cervicobrachial syndrome, which means that it is often related to work. Other terms referring to tension neck syndrome are fibromyositis, tension myalgia fibrositis and myofascial syndrome. (Mekhora, Liston, Nanthavanij & Cole 2000, 368.) The term tension neck syndrome is used to describe pain and discomfort in the area of neck and shoulders (Larsson, Søgaard & Rosendal 2007, 456; França et al. 2008, 269; Waersted, Hanvold & Veiersted 2010, 8). The origin of the pain is not neurologic or articular. (Mekhora, Liston, Nanthavanij & Cole 2000, 368; França et al. 2008, 269) In order to make the diagnosis, the pain has to be chronic, in other words it has lasted for a longer period than three months. There should not be any history of degenerative processes in the discs, nor injury. (França et al. 2008, 269) In addition to pain, symptoms of the tension neck syndrome include stiffness and constant fatigue of the neck and shoulder

muscles (Mekhora, Liston, Nanthavanij & Cole 2000, 369; Larsson, Søgaard & Rosendal 2007, 456; França et al. 2008, 269). Tenderness of neck muscles elicited by movement or palpation is also a common symptom (Larsson, Søgaard & Rosendal 2007, 456; França et al. 2008, 269; Waersted, Hanvold & Veiersted 2010, 8). Radiating pain from the neck to the head is also a symptom of tension neck syndrome. (Larsson, Søgaard & Rosendal 2007, 456; França et al. 2008, 269) Individuals with tension neck syndrome might also have limited range of motion in the neck in extension, flexion and rotation (França et al. 2008, 269).

5.3 Causes and risk factors

It is not yet known what is the exact pathological cause for neck pain (Mekhora, Liston, Nanthavanij & Cole 2000, 369; Larsson, Søgaard & Rosendal 2007, 458-459; Christensen & Knardahl 2010, 162; Lau et al. 2010, 457). Local muscular processes could play a role in the generation of pain, and many publications are supporting this. (Larsson, Søgaard & Rosendal 2007, 458-459) It has been suggested that the muscles are contracted constantly, which causes the end products of muscle metabolism to accumulate. In addition, the blood flow to the muscles is decreased, which results in lack of oxygen. The pain can result in lack of movement, which has been suggested to cause loss of substances limiting pain in peripheral pathways. This means, that peripheral pain mechanisms would have a role also in the tension neck syndrome, as it has in episodic tension-type headache. (Mekhora, Liston, Nanthavanij & Cole 2000, 369.) Another hypothesis is that sustained muscle contraction leads to a situation where the available energy exceeds the needs of the muscle fibres, which activates the pain. What actually is the stimulus that activates the nociceptors is unknown. Another possibility is that the pain originates from other components than the muscle tissue, for instance from periostea (Ming, Närhi & Siivola 2004, 53; Christensen & Knardahl 2010, 162; Lau et al. 2010, 457). The pain could also originate from tendons (Ming, Närhi & Siivola 2004, 52; Christensen & Knardahl 2010, 162). It has also been suggested that central processing could influence the pain (Larsson, Søgaard & Rosendal 2007, 458-459).

Several studies have reported that computer work is a risk factor for developing disorders in the neck, shoulders and arms (Larsson, Søgaard & Rosendal 2007, 450-451). Computer work requires a static position. Maintenance of such a position requires constant work from the neck, shoulder and upper limb muscles, which results in overloading of muscles and joints. When the tissues are overloaded for an extended period of time ischemic cumulative injuries occur. Finally, this leads to muscle tension, fatigue, weakness and pain. (Ming, Närhi & Siivola 2004, 52.)

It has been proposed that neck pain is not necessarily caused by problems directly in the cervical spine, but the lumbar and thoracic spine could also affect to neck pain. The lumbar and thoracic spine are closely related to the cervical spine biomechanically. In other words, changes in the position of the thoracic spine or the lumbar spine will affect the position of the cervical spine. In one recent study it was observed that individuals suffering from neck pain had a bigger angle in the upper thoracic spine and a smaller craniovertebral angle compared to individuals without neck pain. The angle in the upper thoracic spine was found to predict neck pain better than the craniovertebral angle. The greater the angle in the upper thoracic spine was, the greater was the severity of the neck pain and the disability caused by it. The study was not able to determine, however, whether correcting the position of the thoracic spine would be beneficial in management or prevention of neck pain. (Lau et al. 2010, 457, 461.)

Psychological factors are also likely to play a role in the pain processes (Christensen & Knardahl 2010, 162). Poor mental well-being is strongly connected to experiencing musculoskeletal pain not only in the neck, but also anywhere else in the body (Walker-Bone, Reading, Coggon, Cooper, & Palmer 2004, 50). Therefore, psychological stress is one risk factor for neck pain (Croft et al. 2001, 323; Christensen & Knardahl 2010, 168; Hoy, Protani, De & Buchbinder 2010, 789). For instance high job demands are associated with neck pain (Larsson, Søgaard & Rosendal 2007, 451; Christensen & Knardahl 2010, 168). Additionally, it was found that more divorced and widowed adults were suffering from neck pain compared to single or married adults (Croft et al. 2001, 320). Depression is a significant risk factor for developing pain. According to one study, depressive symptoms are independently predicting an intense or disabling episode of neck pain. (Carroll, Cassidy, & Côté 2004, 137)

However, it should be kept in mind that it is difficult to determine the cause and effect relationship between pain and psychological distress. Psychological distress could, of course, cause pain, but it is equally plausible that chronic pain causes psychological distress. (Croft et al. 2001, 318; Ming, Närhi & Siivola 2004, 53; Walker-Bone, Reading, Coggon, Cooper, & Palmer 2004, 50; Larsson, Søgaard & Rosendal 2007, 451.) In addition, it should be pointed out that the results vary from study to study what comes to the relation between neck pain and social and psychological factors, and methodological shortcomings have occurred (Christensen & Knardahl 2010, 162).

Poor self-perceived general health is also a risk factor for developing neck pain (Croft et al. 2001, 323; Carroll, Cassidy, & Côté 2004, 138; Hoy, Protani, De & Buchbinder 2010, 789). Another predictor of neck pain is previous history of pain (Croft et al. 2001, 323; Hoy, Protani, De & Buchbinder 2010, 789). Women are at higher risk compared to men (Croft et al. 2001, 324; Ming, Närhi & Siivola 2004, 52; Larsson, Søgaard & Rosendal 2007, 448). Alcohol use does not seem to be linked to neck pain (Croft et al. 2001, 324). High body mass index might contribute to the pain, depending on the study (Croft et al. 2001, 324; Ming, Närhi & Siivola 2004, 52). The opinions are divided also what comes to smoking, and the relationship between smoking and neck pain is not yet clear (Croft et al. 2001, 324; Ming, Närhi & Siivola 2004, 53; Hoy, Protani, De & Buchbinder 2010, 789).

5.4 Visual display unit work

In today's society the use of computers is increasing, and so are musculoskeletal problems in the neck (Waersted, Hanvold & Veiersted 2010, 1, 8-9). Several studies indicate that tension neck syndrome would be associated with computer work (Ming, Närhi & Siivola 2004, 52; Larsson, Søgaard & Rosendal 2007, 458-459; Waersted, Hanvold & Veiersted 2010, 1, 8-9). However, there are studies which do not support this observation (Waersted, Hanvold & Veiersted 2010, 1, 8-9). In addition, it has been concluded that long lasting computer work aggravates already existing neck and shoulder pain (Ming, Närhi & Siivola 2004, 52). Working with a mouse clearly in-

creases the risk, especially when using the mouse for longer than 15-20 hours per week. A similar connection was not found for keyboard use. (Waersted, Hanvold & Veiersted 2010, 1, 8-9.)

Limited resting breaks, having the keyboard placed too high in relation to the elbow level and having more than 20° neck flexion are risk factors for developing tension neck syndrome (Waerstad, Hanvold & Veiersted 2010, 9). The use of forearm support has been found to be helpful in some studies (Ming, Närhi & Siivola 2004, 52; Waersted, Hanvold & Veiersted 2010, 9). One study concluded that placing the keyboard below elbow height and having the forearms supported reduced the risk for developing disorders in the neck and shoulder region (Larsson, Søgaard & Rosendal 2007, 450-451).

Persons suffering from tension neck syndrome can receive significant relief from a ergonomic intervention including individual adjustments for height of seat, footrest, keyboard and monitor, distance to monitor and keyboard, and angle of keyboard. (Mekhora, Liston, Nanthavanij & Cole 2000, 372-377; Ming, Närhi & Siivola 2004, 54.) As a consequence of these adjustments the posture becomes more neutral, which results in decreased activity in the shoulder, trunk and neck muscles, and decreased load of the cervical and lumbar spine. This might improve blood circulation, which increases the nutrition and removal of waste products. This in turn reduces fatigue and discomfort of the muscles. Good ergonomics are not beneficial only for the neck and shoulder area, but also for back, arms and eyes. (Mekhora, Liston, Nanthavanij & Cole 2000, 372-377.)

Both biomechanical and epidemiological studies suggest that forward head posture might be a factor causing neck disorders (Szeto, Straker & Raine 2002, 76). Forward head posture is commonly seen in office workers, especially in those with pain in the neck and shoulders. Forward head posture is increasing the loading of the muscles and joints in the cervical spine and thus may cause pain. (Szeto, Straker & Raine 2002, 75; Ming, Närhi & Siivola 2004, 52.) One study investigated whether office workers suffering from neck and shoulder pain were having different postures compared to office workers without pain. The subjects with pain presented with more forward head posture and lower cervical flexion than the pain free subjects. Howev-

er, it is difficult to determine whether the posture is causing the pain or vice versa. (Szeto, Straker & Raine 2002, 75-76, 80-81.)

6 STRESS AND RELAXATION

The autonomic nervous system is associated with stress and relaxation. It regulates the activities of the internal organs by inhibiting or exciting cardiac muscle cells, smooth muscle cells and glands. The function of the autonomic nervous system is usually controlled unconsciously. The autonomic nervous system receives its main input from receptors in the internal organs, the blood vessels and the muscles. In other words, it is monitoring the internal environment of the body. The autonomic nervous system is divided into two parts, the sympathetic and the parasympathetic nervous system. Most, but not all, organs are receiving impulses from both systems. (Tortora & Derrickson 2009, 546-547.)

The sympathetic nervous system is in control during emotional or physical stress. It increases functions that prepare the body for physical exertion, and it reduces energy storing functions. In addition, it stimulates secretion of the hormones adrenaline and noradrenaline, which intensify the effects of the sympathetic nervous system. Together, the activation of the sympathetic nervous system and the release of the hormones cause the so called fight-or-flight response. In other words, the body is prepared for an emergency situation. The fight-or-flight response includes many physiological responses. The heart rate and the force of heart muscle contraction increase, which also make the blood pressure increase. The airways dilate to allow air to move faster in and out of the lungs. The blood vessels supplying the heart muscle, skeletal muscles, liver and adipose tissue dilate. The blood vessels supplying the gastrointestinal tract and the kidneys constrict, which results in slower digestion and urine formation. Additionally, glycogenolysis and lipolysis (processes involved in the body's energy production) start. (Tortora & Derrickson 2009, 547, 560, 669.)

During rest and relaxation the parasympathetic nervous system takes control and the influence of the sympathetic nervous system decreases. The parasympathetic nervous

system supports body functions that restore and conserve the body's energy. It stimulates the muscles of the gastrointestinal tract and the digestive glands. Additionally, it reduces the body functions supporting physical activity. (Tortora & Derrickson 2009, 561.) The body responds to relaxation in many ways. The heart rate and force of heart muscle contraction decrease, which leads to decreased blood pressure. The secretion of saliva and tears increases. The digestion, absorption of nutrients and secretion of urine increases. Finally, the coronary arteries and the airways are constricted. (Payne 1998, 6.)

6.1 Stress and pain

Many connections have been observed between pain and stress. They share common neural, autonomic, endocrine and behavioural features and mechanisms. Stress can affect pain through the central nervous system, but also at peripheral level. Stress releases the hormone epinephrine, which activates sensitised nociceptors. This works also the other way around: nociceptive input can activate the stress system. Stress has been found both to inhibit and facilitate pain. Poor stress coping, daily stress, negative mood states, anxiety and sustained physiological arousal have been found to facilitate pain. The factors found to inhibit pain are typically more intense than the ones increasing pain. In theory, there is possibility that stress actually causes pain. This means that pain would be perceived without peripheral noxious input, and stress would be the trigger for the pain. (Cathcart, Winefield, Lushington & Rolan 2010, 1254-1255.) Stress can present as headaches, muscular disorders, back aches, anxiety, insomnia and restlessness. Long-lasting stress affects the immune system and impairs the body's natural defences, which can results in high blood pressure, ulcers, heart problems and cancer. (Sebelis 2011, 45.)

6.2 Benefits of relaxation

Relaxation techniques can be easily performed even at home (Söderberg, Carlsson & Stener-Victorin 2006, 1327).When relaxation is practised daily it improves our health and protects us from psychosomatic disorders and stress. Relaxation slows down the physiological processes in our bodies. It improves digestion, healing pro-

cesses, efficiency at work and in sports, and it enhances our creativity. In addition, it will increase our inner well-being and decrease fears and anxieties. Positive emotions will replace the negative ones. (Sebelis 2011, 45.)

6.3 Methods

The relaxation methods that will be presented are breathing relaxation, autogenic training and tense-release relaxation, because positive results were obtained when these methods were studied on subjects with tension-type headache (Kanji, White & Ernst 2006, 148; Söderberg, Carlsson & Steiner Victorin 2006, 1322-1324). Especially the effect of autogenic training on tension-type headache has been the focus of several studies (Kanji, White & Ernst 2006, 148).

Breathing is an essential function for our body. It is an automatic process, which means that the individual does not need to focus to breath. The central brain stem (medulla and pons) activate the diaphragm and the costal muscles, which make the ribcage expand. This results in a negative pressure inside the lungs, which makes air flow in. When the diaphragm and the costal muscles relax the ribcage constricts, which makes the air flow out. Breathing is needed to bring oxygen to the body and to remove carbon dioxide. (Payne 1998, 115)

Breathing affects the autonomic nervous system directly. Therefore, physiological arousal can be controlled by breathing relaxation. Breathing relaxation is an easy technique to learn, and it is possible to be practised almost anywhere. When practising breathing relaxation, the breathing should happen at the individual's natural rhythm. The breathing should not be forced or manipulated, but simply observed. It should be avoided to repeat artificial deep breaths. If the exercises are performed too quickly or too deeply there is a risk for dizziness resulted from hyperventilation. It is preferred to breathe through the nose rather than through the mouth, because the incoming air is both warmed and filtered in the nasal passages. (Payne 1998, 115-118, 122)

Autogenic training is a relaxation technique developed by Johannes Schultz (Payne 1998, 156; Kanji, White & Ernst 2006, 145; Söderberg, Carlsson & Stener-Victorin 2006, 1322; Sebelis 2011, 46). He was a German psychiatrist (Kanji, White & Ernst 2006, 145). He developed the technique in the 1920s (Sebelis 2011, 46). Schultz derived the technique from self-hypnosis, when he noticed that some patients were able to reach a light state of trance by focusing on images of warmth and heaviness. He also discovered that this trance like state seemed to benefit the patients' mental health. Schultz decided to call this state autogenic. (Payne 1998, 156.) Autogenic means self-generated (Sebelis 2011, 46). It comes from the Greek words eautos (self) and genisi (birth).

The aim in autogenic training is to teach both the body and the mind to relax (Payne 1998, 157). It seeks to promote healthy responses of mind and body, and to eliminate unhealthy ones. In addition, it promotes greater social and personal effectiveness. (Sebelis 2011, 46.) The autogenic training technique consists of relaxation-inducing phrases with six central themes: heaviness in legs and arms, warmth in legs and arms, regular and calm heartbeat, calm respiration, warmth in the abdomen and cool forehead (Payne 1998, 157; Kanji, White & Ernst 2006, 145; Sebelis 2011, 46).

Edmund Jacobson's progressive relaxation technique lays the base for tense-release relaxation techniques. He noticed that thoughts were connected to the state of tension in the muscle, and that mental images associate with movement caused the muscles to slightly activate. Traditionally the muscles are considered to be constantly slightly contracted, which is called muscle tone. However, Jacobson found that it is possible achieve complete relaxation in the skeletal muscles during rest. Consequently, the aim he set for relaxation training was to eliminate tension completely. Jacobson's relaxation technique consists of contracting and releasing all the major skeletal muscle groups. Jacobson did not favour using suggestions, because in his opinion it was important that the individual makes his own discoveries. This method has been found to reduce the heart rate and blood pressure. However, Jacobson's method is time-consuming. Therefore, there was need for a shorter method. Countless modifications of Jacobson's method have been made. (Payne 1998, 29-30, 37.)

7 ERGONOMICS FOR VISUAL DISPLAY UNIT WORK

The word ergonomics comes from the Greek words ergo (work) and nomos (law). Ergonomics is a field of science which is adapting the tasks, the environment, the equipment and the organisation of the work to the human needs. The aim of ergonomics is to improve safety, health, well-being, efficiency and quality. (Launis & Lehtelä 2011, 19-20; Website of Työterveyslaitos 2011.) To achieve this, knowledge about physiology, psychology and technology is needed (Launis & Lehtelä 2011, 19). Ergonomics is divided into three categories: physical, cognitive and organisational ergonomics. Physical ergonomics focuses on adapting the work environment and equipment to human anatomy and physiology. Cognitive ergonomics strives to adapt systems, user interface and presentation of information to the way the human brain processes information. Organisational ergonomics is about planning the work processes and working times, and developing services, production and cooperation between workers. (Website of Työterveyslaitos 2011.)

7.1 Physical ergonomics

Computer work involves maintaining a static position for an extended period of time. This might cause not only neck and shoulder problems, but also back problems, stomach problems and swelling of the feet. (Launis & Lehtelä 2011, 174.) Many complications can be avoided by a correct working position, well-adjusted chair and table, and correct use of the mouse and the keyboard (Mekhora, Liston, Nanthavanij & Cole 2000, 372-377; Ming, Närhi & Siivola 2004, 54).

Preferably, the chair should be adjustable regarding height of the seat and backrest, and it should have armrests. A support for the lower back assists in maintenance of the lumbar lordosis. (Launis & Lehtelä 2011, 176, 179-180; Website of Ontario ministry of labour 2011; Website of Työsuojeluhallinto 2011.) If one does not have a back support one needs to contract the back muscles constantly to maintain a proper position of the spine. When sitting the spine should be in a neutral position, in other words in the same position as it normally is when standing. Then the vertebras are placed directly one upon another, which distributes the load evenly on the joints and

the intervertebral discs. In order to have a good position in the spine when sitting, one should be seated directly on top of the ischial tuberosities. (Launis & Lehtelä 2011, 175-176.) In addition, the chair should be soft enough (Launis & Lehtelä 2011, 179; Website of Työsuojeluhallinto 2011). Adequate padding reduces the pressure on the ischial tuberosities. However, the padding should not be too soft either. It is recommended that the ischial tuberosities should not sink into the padding more than 4 cm. (Launis & Lehtelä 2011, 179.)

The chair should be adjusted to a height where the thighs are parallel with the floor (Website of Ontario ministry of labour 2011). It is also important that the feet are steadily on the floor (Website of Ontario ministry of labour 2011; Website of Työsuojeluhallinto 2011). Shorter users might benefit from a footrest, which allows the chair to be adjusted to a higher position. The edge of the seat will press into the thighs if the feet are hanging in the air. (Website of Health and safety executive 2011; Website of Ontario ministry of labour 2011.) This might impair the blood circulation (Website of Ontario ministry of labour 2011). If the seat is too low the pressure on the ischial tuberosities will increase (Launis & Lehtelä 2011, 179).

The desk should be approximately at elbow height (Arbetsmiljöverket 2009, 7). The height is good when the elbows are in a 90˚ angle, when typing on the keyboard. The shoulders should be relaxed, and the upper arms should be hanging naturally. The wrists should be straight. A high desk (or low chair) causes the shoulders to raise, which makes the muscles to be contracted continuously. This leads to decreased blood flow and fatigue of the muscles. Additionally, an improper height of the desk might not allow the wrists to be in a neutral position, which causes stress to the wrists and forearm muscles. A low desk (or high chair) forces the user to lean forwards, which stresses the back and arms. In addition, it does not allow the wrists to be in a neutral position. (Website of Ontario ministry of labour 2011.)

The screen should be placed in front of the user (Website of Ontario ministry of labour 2011; Website of Työsuojeluhallinto 2011), 40-70 cm from the edge of the desk (Arbetsmiljöverket 2009, 6; Website of Ontario ministry of labour 2011). The distance depends on the size of the screen (Website of Ontario ministry of labour 2011). The top of the screen should be at the user's eye level (Website of Health and safety

executive 2011; Website of Ontario ministry of labour 2011). This enables the user to keep the neck straight. If the screen is not at proper height the neck muscles need to be contracted continuously to maintain the head position, which is likely to result in discomfort and fatigue. If the distance to the screen is improper, the eyes will tire because of the effort required to focus. Bifocals add some exception to the positioning of the screen. (Website of Ontario ministry of labour 2011.)

Frequently, computer work contains entering information from different paper version documents. These documents should be placed next to the screen in same plane. (Ming, Närhi & Siivola 2004, 54; Website of Ontario ministry of labour 2011.) In this way, head and eye movements are minimised (Ming, Närhi & Siivola 2004, 54; Website of Health and safety executive 2011; Website of Ontario ministry of labour 2011), which decreases fatigue of eyes and muscles (Website of Ontario ministry of labour 2011). An adjustable document holder is very good for this purpose (Ming, Närhi & Siivola 2004, 54; Website of Health and safety executive 2011; Website of Ontario ministry of labour 2011).

When typing on the keyboard, it is important to have enough space between the edge of the desk and the keyboard, in order to be able to support the forearms. (Arbetsmiljöverket 2009, 6; Website of Health and safety executive 2011; Website of Työsuojeluhallinto 2011.) Alternatively, the forearms could be supported on the arm rests. This reduces the loading of the shoulder region. (Ming, Närhi & Siivola 2004, 54; Website of Työsuojeluhallinto 2011.) The keyboard should be placed in front of the user, and one should be able to tilt it to enable typing with straight wrists (Website of Health and safety executive 2011; Website of Työsuojeluhallinto 2011.) It is beneficial to learn to press the keys softly, without using more force than necessary (Website of Arbetsmiljöverket 2011, Website of Health and safety executive 2011.)

The use of the mouse for long periods of time should be limited (Website of Health and safety executive 2011). One way to avoid using the mouse is to use short cuts whenever possible (Website of Arbetsmiljöverket 2011). The grip of the mouse should be relaxed, and the forearm should be supported (Website of Health and safety executive 2011; Website of Ontario ministry of labour 2011). When the mouse is placed close to the user, it is possible to be used with a straight wrist and a relaxed

arm (Arbetsmiljöverket 2009, 7; Website of Ontario ministry of labour 2011; Website of Työsuoheluhallinto 2011). To minimise wrist movement and reduce static loading, the movement should come from the shoulder instead of only from the wrist (Website of Ontario ministry of labour 2011). The mouse should be placed on the same level as the keyboard (Arbetsmiljöverket 2009, 7; Website of Ontario ministry of labour 2011; Website of Työsuoheluhallinto 2011). Objects on the desk should not limit the use of the mouse (Website of Ontario ministry of labour 2011). The user should be sitting upright and close to the desk. This way the mouse does not need to be used with an extended arm. (Website of Health and safety executive 2011.) To prevent overloading of one hand, the mouse could be used also with the other hand (Arbetsmiljöverket 2009, 7). If the user experiences discomfort when using the mouse, another mouse or a different tracking device could be tried (Website of Health and safety executive 2011).

The use of laptops is increasingly common. Its possibilities to be adjusted according to the user are limited, because the screen and keyboard are connected. To prevent problems, a laptop should only be used temporarily, and for short periods of time. (Arbetsmiljöverket 2009, 14.) If one needs to use a laptop for a longer time it would be beneficial to connect a full-sized keyboard to it (Arbetsmiljöverket 2009, 14), or at least place it on a desk with a correct height for typing (Website of Health and safety executive).

A sufficient and correctly placed lighting is very important when working with a computer. One should not work in a dark room for two reasons. Firstly, darkness increases the secretion of the hormone melatonin, which causes tiredness and difficulty to concentrate. Secondly, the contrast between the dark room and the bright screen is tiring for the eyes. (Arbetsmiljöverket 2009, 5.)

The light from the window should be coming from the side of the screen to avoid disturbing reflections (Arbetsmiljöverket 2009, 5; Website of Ontario ministry of labour 2011). The light in the ceiling should be placed above the screen to provide proper lighting with minimal reflection (Arbetsmiljöverket 2009, 5; Website of Työsuojeluhallinto 2011). Even if lighting is important, however, excessive lighting causes glare and reflections (Website of Ontario ministry of labour 2011). Laptops

increase the risk for reflections from lamps in the ceiling, since the screen is facing slightly upwards (Website of Arbetsmiljöverket 2011). The recommended amount of light for visual display terminal work is 500 lx, however it depends on the individual's age and vision (Website of Työsuojeluhallinto 2011). Paperwork might require more light than working with the screen. In this situation, it is recommended to use smaller lamps that light a specific area. (Website of Ontario ministry of labour 2011.)

7.2 Cognitive ergonomics

The devices and programs related to visual display terminal work should meet the individual's capacity to process information. The way of working should also be planned to suit the needs of the individual. The individual's ability to remember and think, and the capability to observe and be alert are important factors to consider in order for the work not to be unnecessarily strenuous. (Website of Työterveyslaitos 2011.)

The human data processing system consists of four parts: sensory organs, central nervous system, motor systems and motor units. Receptors of the sensory organs receive stimulus from the environment. Memory systems in the central nervous system store and process the information. Motor systems coordinate the individual's reactions. The motor units consist of muscle fibres and nerve fibres. Physiological functions and motivation affect how information is received and processed. (Launis & Lehtelä 2011, 110.)

When performing computer work or other activity that requires concentration, for instance reading, there are certain phases that happen relating to information processing. First, there is a stimulus received by the sensory organs, for instance by hearing or seeing. The information is stored by the sensory organs for 0,1-0,5 seconds. If the stimulus is not recognised the memory disappears. If the stimulus is recognised it goes further to the short term memory. The short term memory has limited capacity and it is able to store only 5-6 pieces of information at a time (e.g. numbers, letters and words). If the information is not repeated in 20 seconds it disappears. When the information is repeated many times enough it goes further to the

long term memory. The long term memory has an unlimited capacity to store information. The problem with the long term memory related to performing tasks is usually to recall the information. Information in the long term memory is stored in so called schemas. Schemas include individual experiences and feelings, and typologies about items, environment and events. Schemas coordinate the function of the short term memory and selection of the information to be processed. Information that fits into the schema is more likely to be stored than information that does not. (Launis & Lehtelä 2011, 111-112.)

The short term memory is the most limiting factor in processing information, because it can process only one entity at a time (Launis & Lehtelä 2011, 113.) Information needed for an on-going task is maintained and processed in the short term memory. The short term memory is used for calculating, reading, decision making and problem solving. Performing demanding tasks require a lot from the short term memory. (Website of Työterveyslaitos 2011.)

If information is unclear or confusing more conscious concentration is required. Processing of information requires alertness and concentration. Motivation, feelings and the quantity and quality of information affects alertness and the ability to concentrate. Especially reading or performing tasks that require accuracy require high levels of concentration to receive and process information. Factors disturbing the ability to concentrate are for instance noise, feelings and thoughts that are not related to the task being performed. (Launis & Lehtelä 2011, 113, 115-116.) The short term memory is especially loaded when the work is constantly being interrupted, and when the task is demanding. When the memory is overloaded the amount of mistakes increases and the accuracy and pace of the work decreases. (Website of Työterveyslaitos 2011.) However, too high levels of alertness is not good either. Stress makes it difficult to see and understand entities. When being really stressed, one typically sees only the most important things, but not the whole picture. (Launis & Lehtelä 2011, 116.)

An appropriate system and software helps the user to solve the tasks easily and quickly. (Arbetsmiljöverket 2009, 10). The individual needs and the task requirements should always be considered when choosing a system or software. In addition,

it is important that the user has the adequate knowledge to use the system and the software, or is able to obtain the needed knowledge and skills. (Arbetsmiljöverket 2009, 10; Website of Arbetsmiljöverket 2011.) One should also make sure that the capacity of the system meets the requirements of the software (Arbetsmiljöverket 2009, 11). If the user does not possess the sufficient amount of skills needed to use the system or the software, it becomes a source of stress (Website of Health and safety executive 2011). Stress can also arise when the system or program is not working as it should (Website of Health and safety executive 2011; Arbetsmiljöverket 2009, 12).

7.3 Organisational ergonomics

When working longer periods with the computer, it is important to change the position and have breaks frequently (Ming, Närhi & Siivola 2004, 54; Website of Health and safety executive 2011; Website of Työsuojeluhallinto 2011). It is better to take short breaks frequently than long breaks less frequently (Website of Health and safety executive 2011). Sitting still for long periods of time impairs the blood circulation (Launis & Lehtelä 2011, 178). By having breaks visual and muscular fatigue and discomfort are prevented and reduced (Website of Ontario ministry of labour 2011; Website of Työsuojeluhallinto). During the breaks it is important to move to prevent one-sided loading of the body (Arbetsmiljöverket 2009, 7). Additionally, stretching is recommended during the breaks (Ming, Närhi & Siivola 2004, 54; Website of Työsuojeluhallinto 2011).

One way to have frequent breaks is to make use of the natural breaks the work provides. This means planning the work so that the computer work is interrupted by other tasks. (Website of Arbetsmiljöverket 2011; Website of Health and safety executive 2011; Website of Työsuojeluhallinto 2011.) If there are no such opportunities for interrupting the computer work, one then needs to simply keep a rest break. The need for having breaks is depending on the intensity and type of the work being done. (Website of Health and Safety Executive 2011.) However, one reference reports that having at least one five minute break per hour is helpful to relieve postural and visual discomfort (Website of Ontario Ministry of Labour 2011).

Stress is another problem frequently associated with computer work. However, stress does not arise from working with the computer itself. Usually stress relates to the task being performed. Stress can arise from pressure to meet the deadlines, from an increased work pace or demanding and difficult tasks. (Website of Health and safety executive 2011.)

8 HEALTH INFORMATION

Health promotion aims to maintain and reinforce factors that are protecting our health (Katko et al 2005, 4; Rouvinen-Wilenius 2008, 7). This is achieved by creating possibilities for individuals to take care of their own health already before disorders and disease occurs. Health promotion and prevention of disorders is supported by health communication. Health communication is a means to increase the awareness of health and how health is affected of our choices. (Katko et al 2005, 4.) Health communication aims to create and present possibilities for the individuals to care for and affect their own health. In some cases it also aims to make the individuals change their behaviour and lifestyle. (Rouvinen-Wilenius 2008, 7.)

The material should always correspond to the needs of its target group (Rouvinen-Wilenius 2008, 3). In order to do this, firstly, the target group needs to be defined clearly. Secondly, the aim and the content of the material need to be applied to the environment and life style of the target group. Thirdly, the way to spread the information needs to suit the target group. The information should reach also those individuals who are at risk to be socially excluded. (Katko et al. 2005, 11.) The material should encourage the target group to a behaviour that benefits the individuals' health (Rouvinen-Wilenius 2008, 3). It is impossible to deliver a big amount of messages in one time, so the amount of messages needs to be limited to between one and four. The information should be crystallized and presented in a simple way. To have a real impact on the target group, the communication needs to stand out, draw attention and evoke feelings. (Katko et al. 2005, 8.) It is important that the material is ethically correct. This means, that the information presented should be evidence based or practice

based. The references should be seen in the material, and the aims should be clearly visible. (Katko et al. 2005, 5.)

Health communication is challenging in many ways. It can be difficult to reach the whole target group. Health related information is often perceived as boring, which makes it difficult to arise interest and motivation. Sometimes it is necessary to tell about negative and even frightening things, which is always difficult. Another thing which is also challenging is that people sometimes have wrong beliefs and assumptions concerning health, and it can be difficult to change these beliefs. (Katko et al. 2005, 7.)

9 THESIS PROCESS

The whole thesis process lasted for more than a year, however it was not intensively worked on the whole time. Most of the work was done during autumn 2011. The most time-consuming part was to find and read all the articles and other literature, and to organise the material. Once the theory part was done, making the actual products, the power point presentations, did not require a significant amount of time. When the content of the presentations was ready they were piloted with one person who does not have any professional knowledge in the field. The things that changed after the piloting were related to the language, for example which words to use and how to explain certain things. The content did not change at all. A more detailed description of the process and the timeline can be found in table 1.

Table 1.

November-December 2010	An idea about the area for the topic. Finding and reading articles.
January-May 2011	The project and a specific topic were found. Searching for material and reading the material.
August-September 2011	Most of the material found and read.

October 2011	Signing the agreement. Making the study plan. Starting the writing. Translating two of the power point presentations.
November 2011	Continuing the writing. Returning first version of the theory and receiving feedback. Finding more material and continuing writing.
December 2011	Finalising the theory part. Making the power point presentations. Piloting the presentations and improving them.
January 2012	Translating the power point presentations that were created by me. Creating the layouts for the power point presentations. Finalising the thesis. Presenting the thesis. Maturity test.

10 DISCUSSION

In the end of 2010, when I started thinking about what kind of topic for the thesis would interest me, I knew that I wanted to do something about headaches. At that time I was having headaches almost daily and I had been having them for eight years. I was hoping to understand more about my headaches, and maybe that way be able to help myself, since medical professionals had not been able to help me. I started reading articles about different types of headaches, mostly about tension-type headache and cervicogenic headache. Regarding my symptoms, tension-type headache seemed to fit into the picture better. Now I had the general topic, but I still needed to find a way to link it to the working life. Luckily I had gone to listen to Ja-

nina Nylund's thesis presentation earlier that autumn, and that is how I came across the project.

The following spring was busy at school so I did not have much time left for the thesis. However, by the end of the summer I had gathered most of the material I needed. I used mostly science direct, ebsco and pub med to find the information. I also made use of the school library at SAMK, and google scholar also proved to be very helpful. What I felt was difficult about retrieving information was to know with what words to search. When typing in tension neck syndrome one does not obtain many relevant results. I had to widen up my search criteria, and I ended up using more general articles, for instance about chronic neck pain. About tension-type headache, on the contrary, there was plenty of fresh and good quality information available.

When getting more into the subject I felt that everything does not make sense. What confused me was, that from Nylund's thesis I got the impression that tension-type headache is just a symptom of tension neck syndrome. I did not find this information from the references I used. Maybe some other type of primary headache, like cervicogenic headache, is related to tension neck syndrome. However, I decided to limit myself to tension-type headache, since the thesis is supposed to be specific and it is supposed to go deep into a specific area. In addition, I think that specific types of headaches might not always exist isolated in an individual; it might be possible to have for instance both tension-type headache and cervicogenic headache. (At least migraines and tension-type headaches do coexist in some individuals.) Then it is difficult to determine what is caused by what, and how they affect each other. This was a challenge when considering what to include when producing the power point presentations; it would probably have been a good idea to base the practical part on theory about headaches more in general, and not limit it to such a specific type.

The issue about being specific also challenged me when writing about tension neck syndrome. When I expanded my search criteria to include chronic neck pain it was hard to know what neck pain would be classified as tension neck syndrome, and what neck pain was just neck pain. In my opinion it would have been better to write about the most common problems associated to computer work, instead of focusing on such a specific area. The area could have been expanded at least to include neck pain

or neck problems commonly associated to computer work. The problem was, however, that to write more about both headaches and problems associated with computer work would have been too much for one person to do, since it is required to go deep into each topic. Even with this amount of work that I spent on doing this thesis, I feel that I did not go deep enough into the topic. I would definitely have enjoyed exploring the mechanisms of tension-type headache more carefully. However, this is just a bachelor thesis, and I had to stop writing at some point.

Another problem I had in finding and selecting material was that I did not find much material about prevention of tension-type headache and tension neck syndrome itself. Most studies and articles tell about risk factors and causes, but few tell about the effect of preventing the problems by eliminating those risk factors. When making the power points I simply assumed that elimination of risk factors is beneficial and is giving good results.

One of my personal weaknesses limiting my work was motivation and own interests. I was very keen on learning more about tension-type headache and I did not want to concentrate on anything else. Therefore, the part about tension neck syndrome was heavy and difficult to write. I think it can be seen from my work that the chapter about tension-type headache is done better and more in detail than the tension neck syndrome chapter. In addition, the number of references for tension-type headache is significantly larger than the number of references for tension neck syndrome. Ideally, these two essential parts would have been similar, containing the same amount of information and details, which they obviously do not.

In my opinion, another weakness in my work is that I used plenty of energy for writing the theory part, but when it was time to make the actual product (the power point presentations) there seemed to be no energy and motivation left for that. The product is the most important part of this thesis, and I should have realised that earlier. In the end, the product became more like a burden; it was something I simply had to make. I think it would have been better for me to start to make the presentations in an earlier phase, to maintain the interest and motivation. Of course, a good product needs to have a solid theoretical basis. On the other hand, if the product is not well constructed and attractive the theory loses its meaning in a way. I do not mean that it is about

making the perfect layout, but that the information needs to be presented clearly and logically. However, the layout is important of course, however there are other professionals educated for that purpose.

What I tried to keep in mind when making the actual slide shows was to keep it simple. There was no point in putting all the information that is in my thesis in them, because no one would be able to remember all that afterwards and it would just be boring for the audience. What I tried to do was to pick up the things that are the most important concerning the target group, and crystallise that. I tried to wake the interest of the audience by presenting simple facts such as how stress affects tension-type headache, and why ergonomics is needed. If the students have good reasons to start doing relaxation exercises, or working more ergonomically, there is a possibility that some of them will really do it.

My primary aim when choosing the relaxation methods to be presented was that the methods should be studied and based on evidence. This is how I ended up choosing breathing relaxation, autogenic training and tense-release relaxation. My criteria for the exercises themselves were that they should be simple and easy to perform, and they should also be relatively short in order to fit well into the power point slides. I thought it would not be nice to use five slides for one exercise. What comes to the autogenic training, I did not manage a way to fit it into just a couple of slides. However, I still wanted to include it in the presentation because it seemed to be the one method that had the most evidence concerning treatment of tension-type headache. Instead of having five slides of detailed description about how to learn autogenic training I described the method briefly, and provided some references instead. This method seems to be slightly more complicated than the two others; therefore, it would have been too much to try to teach this method thoroughly when there are several other things that need to be presented. The ergonomics presentation I found more straight forward to make. I tried to choose the most important areas to be discussed, and to present them in a short and clear way. To make the advice more clear, I added some pictures to the presentation.

When making the presentations I constantly kept in mind that there will be physiotherapy students presenting my material; in other word the material does not have to

communicate every detail on its own. To make my idea more concrete I will give an example: I did not explain what “ischial tuberosity” means, because it would have required extra space on the slide. In my opinion it is reasonable to assume that a physiotherapy student knows what ischial tuberosity means, and they could even use this need of explaining the word as an opportunity to practice finding a good sitting posture together with the students.

The translation of the power point presentations was surprisingly time-consuming and challenging. The most difficult thing for me was to find the right words, both in English and in Finnish. Perhaps I was focusing much on details and finding the exact words instead of simply concentrating on communicating the same message. However, I think the translations were useful for practising my language skills.

Piloting the presentations was very important in order to receive a second opinion for my work. I had two criteria for choosing the person for the piloting: he/she should have good English skills and he/she should not be a physiotherapy student. The content did not change at all as a result of the piloting. I only changed the structure of a few sentences to make them clearer. One major limiting factor in the piloting was that it was done only with one person. If I would do the piloting again I would probably choose to do it with 4-6 persons.

There was not much cooperation between me and the other people doing theses related to the project. We were in contact mostly regarding the translations of the power point presentations, since I was the one translating them, and they were the ones presenting them. However, I did not feel that more cooperation was needed. Now that I think about it afterwards, it would probably have been beneficial to discuss together about what would be a good way to construct the power point presentations, and what would be a good way of doing the presentations.

Thinking about the future, it would be interesting to do a quantitative study about the prevalence of tension-type headache and tension neck syndrome in students at SAMK. Specifically, it would be interesting to know if the problems started during the studies, or if they had started already earlier. This could be a good topic for a future thesis. Another question that came up during my thesis process was what impact

relaxation and ergonomics actually have in preventing tension-type headache and tension neck syndrome. I only found research articles about treatment of these disorders, but I did not find any articles addressing the efficiency of prevention.

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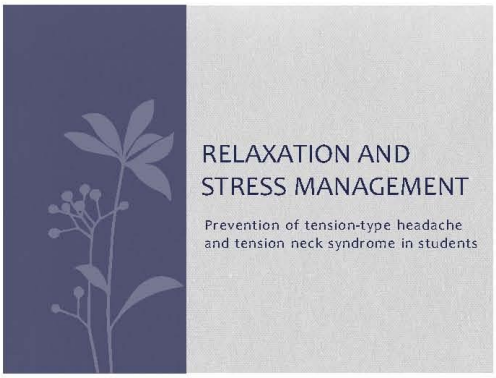
APPENDIX 1



Stress and pain

- Stress and pain are connected
- Stress is a risk factor for having tension neck syndrome and tension-type headache
- A tension-type headache attack is frequently triggered by stress or an emotional conflict
- Daily stress, poor coping with stress, poor mental well-being, negative moods and anxiety are connected to having pain
- Stress can present/appear as headaches, neck or back pain, insomnia, anxiety...
- NOTE: Sometimes it is difficult to determine the cause and effect relationship between pain and psychological stress. Psychological stress could cause pain, but chronic pain could as well cause psychological stress.

The autonomic nervous system

- is associated with stress and relaxation
- regulates activity of internal organs
- is controlled unconsciously by the brain
- receives information from internal organs, blood vessels and muscles
- is divided into two parts: sympathetic and parasympathetic nervous system

The sympathetic nervous system

- is in control during physical or emotional stress
- causes fight-or-flight response
- Physiological responses:
  - heart rate and blood pressure increase
  - blood flow to skeletal muscles and heart increases
  - digestion and urine formation slows down
  - energy production starts

The parasympathetic nervous system

- is in control during rest and relaxation
- Physiological responses:
  - heart rate and blood pressure decrease
  - blood flow to skeletal muscles and heart decreases
  - digestion and urine formation increase
  - energy production slows down

Benefits of relaxation

- Improves health and protects from psychosomatic disorders when practiced daily
- Improves digestion and healing processes
- Improves efficiency at work and in leisure time activities
- Enhances creativity
- Increases inner well-being
- Promotes positive emotions

Tension-type headache and relaxation

- Relaxation is an important component in treatment or prevention of tension-type headache
- Relaxation is a good way to consciously reduce stress
- Several studies have found that relaxation training improves/decreases tension-type headache
- Relaxation methods, that had good results in studies, include breathing relaxation, autogenic training, tense-release relaxation
- Stress management was also found to have positive effects
- The effects of relaxation are comparable to the effect obtained from tricyclic antidepressants

Methods introduced

- Relaxation methods:
  - Breathing relaxation
  - Autogenic training
  - Tense-release relaxation
- Some ideas for coping with stress

BREATHING RELAXATION

Breathing

- Breathing is an essential body function that occurs automatically
- Breathing is needed to bring in oxygen for our body, and to remove carbondioxide
- Breathing affects the autonomic nervous system directly → physiological arousal can be controlled by breathing

Breathing relaxation

- When practicing breathing relaxation it is important that the breathing happens in your natural rhythm
- Simply observe the air flowing in and out, don't try to change your breathing
- If you feel dizzy you are probably breathing too quickly or too deeply (hyperventilation)
- Breathing in through the nose is preferred, because the incoming air is warmed and filtered in the nasal passages

Exercise 1

- Lying or sitting
  - Place your hands on the lower edge of your ribs, fingertips a few centimetres apart. Feel your hands rise and separate as the air flows in, and retract as it flows out.
  - Place your hand over the solar plexus (the soft part between the ribs and the navel) and your left hand over the front of your chest below the clavicle. Notice what happens under your hands when you breathe.

(Payne, R.A. 1998. Relaxation techniques: a practcal handbook for the health care professional. London: Churchill Livingstone. Page 117.)

Exercise 2

Sit comfortably, close your eyes. Let your body lose its tension. Focus on the upper part of your abdomen. Be aware of it swelling and sinking as you breathe. Notice these breathing movements without trying to change them. Allow your breathing to continue on its own, and simply observe it for a few minutes.

(Payne, R.A. 1998. Relaxation techniques: a pracitcal handbook for the health care professional. London: Churchill Livingstone. Page 119.)

AUTOGENIC TRAINING

Autogenic training

- A technique derived from self-hypnosis
- The aim is to teach both the mind and the body to relax
- Keep in mind that this is not a training that can be rushed. The idea is not to "finish" the training but to learn the method.
- Suggested positions: lying on your back, lying back in an easy chair or leaning forward while sitting in a hard chair.
- Before starting the exercise itself, take some time to relax and observe your breathing.

Autogenic training

- The training itself consists of relaxation-inducing phrases that are repeated during the training:
  - My arms and legs are heavy
  - My arms and legs are warm
  - My heartbeat is calm and regular
  - My breathing is calm
  - My solar plexus is warm
  - My forehead is cool
  - I am at peace

Autogenic training

Read more about autogenic training from:

Payne, R.A. 1998. Relaxation techniques: a pracitcal handbook for the health care professional. London: Churchill Livingstone.

http://www.guidetopsychology.com/autogen.htm#1

TENSE-RELEASE RELAXATION

Tense-release relaxation

- This technique consists of contraction and release of the major skeletal muscle groups
- This method teaches you to reduce muscle tension actively and consciously
- When doing the exercise it is important to be just as aware of the release as of the tensing
- Tense at about half of your capacity and maintain breath awareness throughout the tensing and releasing.
- Try not to hold your breath, especially when you are tensing the chest and abdomen.

Exercise

Begin by tensing all the muscles of the face, including the neck and the jaw. Hold for a few seconds and then gently release with full awareness.

Tense the muscles in the right arm, all the way from the shoulder down through the hands. Make sure you don't make a fist, or lift your arm up from the floor. Keep your attention deep inside the arm, not just on the surface. Slowly observe the release.

Tense the muscles in your left arm in the same way.

Tense the muscles of the chest and abdomen, still breathing naturally and gently and slowly relase.

Tense the muscles in your right hip and buttock, then release with full awareness.

Tense the muscles in your right leg from the hip right down to the toes. Do this without lifting your leg up off the floor and keep your attention deep inside the leg, not just on the surface. Release gently.

Tense the mucles in your left hip and buttock, then release with full awareness.

Tense the muscles in your left leg from the hip down to the toes. Do this without lifting your leg up off the floor and keep your attention deep inside the leg, not just on the surface. Release gently.

Now while you're not tensing any muscles, allow your attention to gently drift up through the legs, the abdomen, the chest and back into the face.

Lie still for a few minutes enjoying the feeling of relaxation.

(http://australianschoolofmeditationandyogawe.blogspot.com/2009/02/tense-and-release-relaxation.html)

STRESS MANAGEMENT

How can stress be avoided?

- Learn better ways to manage your time. You may get more done with less stress if you make a schedule. Think about which things are most important, and do those first.
- Find better ways to cope. Look at how you have been dealing with stress. Be honest about what works and what does not. Think about other things that might work better.
- Take good care of yourself. Exercise daily. Get plenty of rest. Eat well.
- Try out new ways of thinking. When you find yourself starting to worry, try to stop the thoughts. Work on letting go of things you cannot change.

How can stress be relieved?

You will feel better if you can find ways to get stress out of your system. The best ways to relieve stress are different for each person. Try some of these ideas to see which ones work for you:

- Exercise. Regular exercise is one of the best ways to manage stress.
- Do something you enjoy. A hobby can help you relax.
- Write. It can help to write about the things that are bothering you.
- Learn ways to relax your body and mind. This can include breathing relaxation or tense-release relaxation, or relaxing exercises like yoga or tai chi.
- Focus on the present. Try for instance meditation or autogenic training. Listen to relaxing music.

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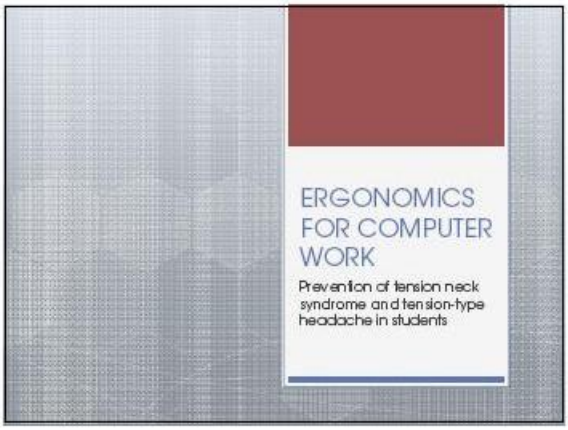
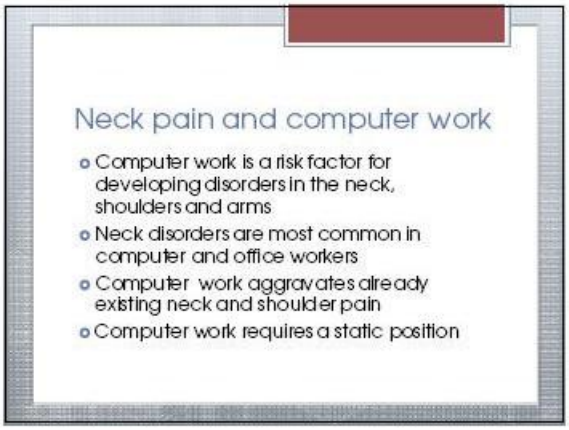
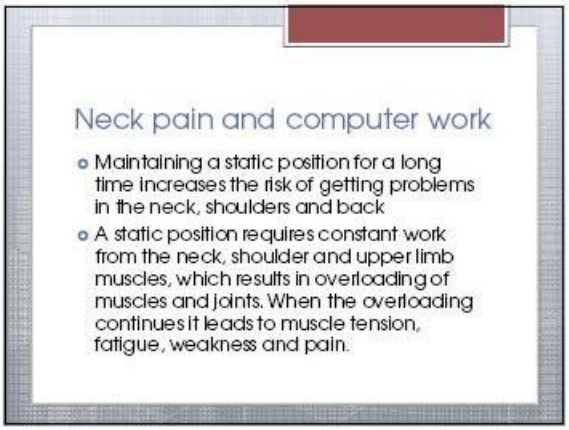
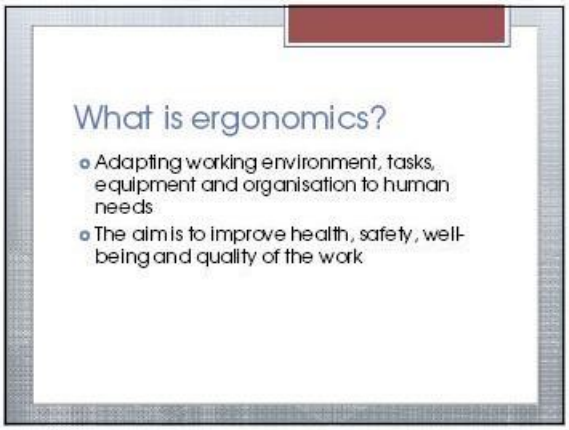
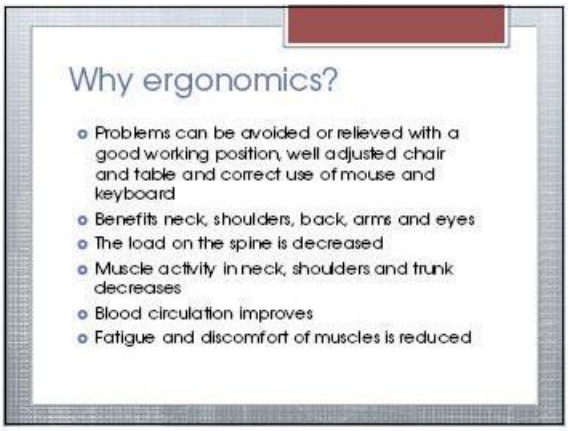
APPENDIX 2

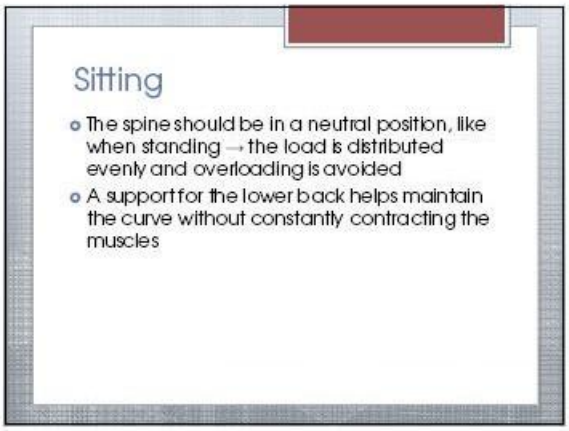

ERGONOMICS FOR COMPUTER WORK
Prevention of tension neck syndrome and tension-type headache in students


Neck pain and computer work
Computer work is a risk factor for developing disorders in the neck, shoulders and arms
Neck disorders are most common in computer and office workers
Computer work aggravates already existing neck and shoulder pain
Computer work requires a static position


Neck pain and computer work
Maintaining a static position for a long time increases the risk of getting problems in the neck, shoulders and back
A static position requires constant work from the neck, shoulder and upper limb muscles, which results in overloading of muscles and joints. When the overloading continues it leads to muscle tension, fatigue, weakness and pain.


What is ergonomics?
Adapting working environment, tasks, equipment and organisation to human needs
The aim is to improve health, safety, well-being and quality of the work


Why ergonomics?
Problems can be avoided or relieved with a good working position, well adjusted chair and table and correct use of mouse and keyboard
Benefits neck, shoulders, back, arms and eyes
The load on the spine is decreased
Muscle activity in neck, shoulders and trunk decreases
Blood circulation improves
Fatigue and discomfort of muscles is reduced


Sitting
The spine should be in a neutral position, like when standing → the load is distributed evenly and overloading is avoided
A support for the lower back helps maintain the curve without constantly contracting the muscles

Sitting

- Sit directly on top of the ischial tuberosities
- The chair needs to be soft enough not to cause too much pressure

Chair and desk

- A good chair is adjustable in height, has arm rests and a support for the lower back
- Adjust the chair so, that your thighs are parallel with the floor, and your feet are steadily on the floor
- Shorter people might benefit from footrests

Chair and desk

- The desk should be at elbow height, or slightly lower, so that elbows are at 90 degrees angle when typing
- When the adjustments are done correctly, you can work with relaxed shoulders and straight wrists

Screen

- The screen should be placed in front of you
- The top edge should be at eye level
- Depending on the size of the screen, it should be 40-70 cm from the edge of the desk
- The most important thing is to keep your neck as straight as possible when working

Document holder

- When typing in information from paper version documents, place the documents next to the screen in the same plane → head and eye movements are minimised
- A document holder is good for this purpose

Keyboard

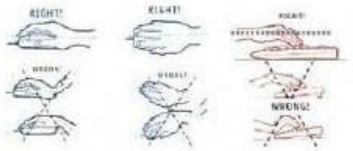
- Support the forearms on the desk or on arm rests → loads the shoulders less
- Type with straight wrists; tilt the keyboard if needed
- Press the keys softly, don't use more force than necessary

Mouse

- Place the mouse at the same level with the keyboard
- Have your forearm supported when using the mouse
- Grip the mouse in a relaxed way
- Sit close to the desk and have the mouse close to you → possible to relax the arm and keep the wrist straight
- The movement should come from the shoulder, not only from the wrist

Mouse

- Limit the use of the mouse as much as possible, e.g. by using short cuts
- To prevent overloading of one hand use the mouse also with the other one



Laptops

- The possibilities for adjusting the laptop are limited, since the screen and keyboard are in one piece
- Use full-sized equipment whenever possible
- When using a laptop for a longer time, connect it to a full-sized keyboard or at least place it on a desk with a proper height for typing

Lighting

- Don't work in the dark
  - Darkness increases the secretion of the hormone melatonin, which makes us tired and less alert
  - The contrast between a dark room and a bright screen is tiring for the eyes
- Reflections should be avoided
  - Light from windows should come from the side of the screen
  - Lamps in the ceiling should be above or slighly behind the screen
  - Laptops increase the risk for reflections, because the screen is often facing slightly towards the ceiling

Lighting

- For paperwork, use a smaller lamp to light a specific area
- Adjust the brightness of the screen to be similar with the lighting in the room

Short term memory

- Is very loaded when performing work that requires concentration and information processing
- Stores and processes information needed for an ongoing task
- Needed for calculating, reading, making desicions and solving problems
- The most limiting factor in information processing
- Can store only 5-6 pieces of information at a time (e.g. numbers, letters, words...)
- If the information is not repeated in 20 seconds it disappears

Short term memory

- High level of concentration that computer work requires is loading the short term memory
- Overloading increases the amount of mistakes, and reduces the accuracy and pace of the work
- Especially overloaded when the work is being interrupted all the time, and when the task is demanding
- Other disturbing factors are noise, and thoughts that are not related to the task

Short term memory

- To avoid overloading:
  - don´t work when you are too tired
  - work somewhere where you are not disturbed
  - focus on one task at a time

Breaks

- Have frequent breaks – frequent short breaks are better than less frequent long breaks
- If possible, plan your work so that the computer work is interrupted by other tasks
- A minimum of 5 minutes break per hour is recommended
- Breaks help to prevent and reduce tiredness of eyes and muscles
- Stretching is recommended during the breaks

Stress

- Stress is often associated with computer work
- Stress can arise from pressure to meet deadlines, or an increased work pace
- Prevent stress:
  - Do the tasks at your own pace
  - Don't leave everything for the last minute

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