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TAKING CARE OF YOUR BACK: AN EDUCATIONAL EVENING FOR SATAKUNNAN SELKÄYHDISTYS

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The purpose of this thesis was to organize an educational evening for Satakunnan Selkäyhditys, held on the 19th of November 2015 in Satakunnan Yhteisökeskus. The evening consisted of theory and practical parts. The aim was to provide information and exercises on how to independently maintain and improve back health for people suffering from low back pain.

Low back pain is a problem for a large amount of the population both in Finland and worldwide. Providing evidence based information for people suffering from low back pain is important in order to get them actively involved in their own rehabilitation. It also gives them tools to improve their functioning during an active phase of the low back pain.

The theory discussed in this thesis involves the functional anatomy of the low back, including the bones, ligaments, and muscles involved in creating movement and stability in the low back region. The evidence for and importance of therapeutic exercising is also discussed, in addition to providing information on ergonomics for low back pain. Risk factors for low back pain are discussed in addition to the most common causes.

The presentation used in the educational evening can be found at the end of the thesis. It includes exercises for relieving and preventing pain, and information on sleeping and sitting ergonomics for people with low back pain.

CONTENTS

1 INTRODUCTION

In Finland, of all the musculoskeletal disorders, back pain is the most common. A large percentage of people go through at least one episode of low back pain during their lives. (Kaila-Kangas 2007, 53.) In 2012, nearly 350 million Euros were used for disability pensions caused by low back pain. Chronic low back pain in particular is a problem affecting an individual from months to years. It has been studied, that 41 percent of Finnish women and 35 percent of Finnish men had had low back pain within the last 30 days when asked about the prevalence of low back pain. There is a wide range of risk factors contributing to developing low back pain. Especially work involving lifting or repetitive movements in addition to bad ergonomics can increase the possibility to suffer from low back pain. (Website of Käypähoito.)

There are many pain creating structures in the back that can trigger low back pain. Knowing these structures is of value in order to be able to treat and prevent low back pain. However, the specific reason for the pain is often not known. Non-specific low back pain is indeed the most commonly encountered, accounting for a large percent of low back pain cases. (Koho 2015, 12.)

An acute phase of low back pain can limit an individual's functioning considerably. Being able to care of your own back, with the aid of position therapy and therapeutic exercises, is important in order to manage the pain. These exercises can be strengthening, stretching, or pain relieving. They are also essential in getting the individual with pain to actively participate and take responsibility in their own rehabilitation. Improving functioning is often the main aim of the exercising. Educating, especially giving specific and clear exercises and instructions helps the individual to reach their goals. (Kisner and Colby 2012, 2; Website of Selkäkanava.) Because self-care and evidence based information is important, for this thesis an educational evening covering these issues was organized for Satakunnan Selkäyhdistys.

2 PURPOSE AND AIM OF THESIS

The purpose of this thesis is to organize an educational evening for Satakunnan Selkäyhdistys (Satakunta Back Association) where the topic of the evening is "Miten huollan selkääni?" (Self-Care of My Back). The aim of this thesis is to give information and provide exercises on how to independently maintain and improve back health for people suffering from the acute phase of chronic back pain. The evening consists of a lecture on exercises for pain relief and prevention, in addition to sitting and sleeping ergonomics for people with low back pain.

3 FUNCTIONAL ANATOMY

3.1 The spine

The low back contains many structures that have the possibility to cause pain (Jenkins 2002, 91). It is important to be aware of the anatomical structures of the back in order to find out the reason for pain and what can be done to improve back health. The human spine has three main purposes, which are moving the trunk, supporting the body and protecting spinal nerve roots and the spinal cord (Cramer & Darby 2013, 30). The spine consists of seven cervical, twelve thoracic and five lumbar vertebrae (Cramer & Darby 2013, 8). There is also a bony sacrum, consisting of five fused segments, and the coccyx, with three to five segments, below the sacrum (Cramer & Darby 2013, 32). The cervical spine (neck) has two natural curves: the upper cervical curve, from the very top of the spine to the second cervical vertebrae (the axis, C2), and the lower cervical curve, which is a lordotic (convex forward) curve from the second thoracic vertebra to up to the second cervical vertebra (Middleditch & Oliver 2005, 3).

The thoracic spine (middle part of the spine) has a curve concave forward, extending from the second thoracic vertebra (T2) to the twelfth (T12) vertebra. This curvature is due to the posterior parts of the vertebra extending further backwards than the other surrounding vertebrae in this area. In the lumbar spine, there is a natural convex curve

forwards extending from the twelfth thoracic vertebra (T12) to the fifth lumber vertebra (L5). In normal spines the shapes of these curves vary and are changed by different pathological changes (disease or injury, for example). (Middleditch & Oliver 2005, 3.)

The lower cervical and lumbar curves are compensatory curves, and develop during the first few months of life. They are important in helping with the shock absorbing capacity of the spine, along with the other curves of the spine. These curves ensure that the compressive forces that the spine receives are also absorbed by other structures of the spine, such as ligaments, rather than only the intervertebral discs (discussed later in this section). (Middleditch & Oliver 2005, 4.)

The lumbar spine has a range of movements available, which vary from one individual to the other. The main movements are flexion (bending forwards), extension (bending backwards), lateral flexion (Bending sideways) and rotation. Flexion direction movement is greater than extension direction movement in the lumbar spine. (McKenzie & May 2003, 104.) Bending forward is the most common movement used in everyday life. There is also distraction and compression of the spine, and all of these movements are affected by the individuals' characteristics. (McKenzie & May 2003, 104.)

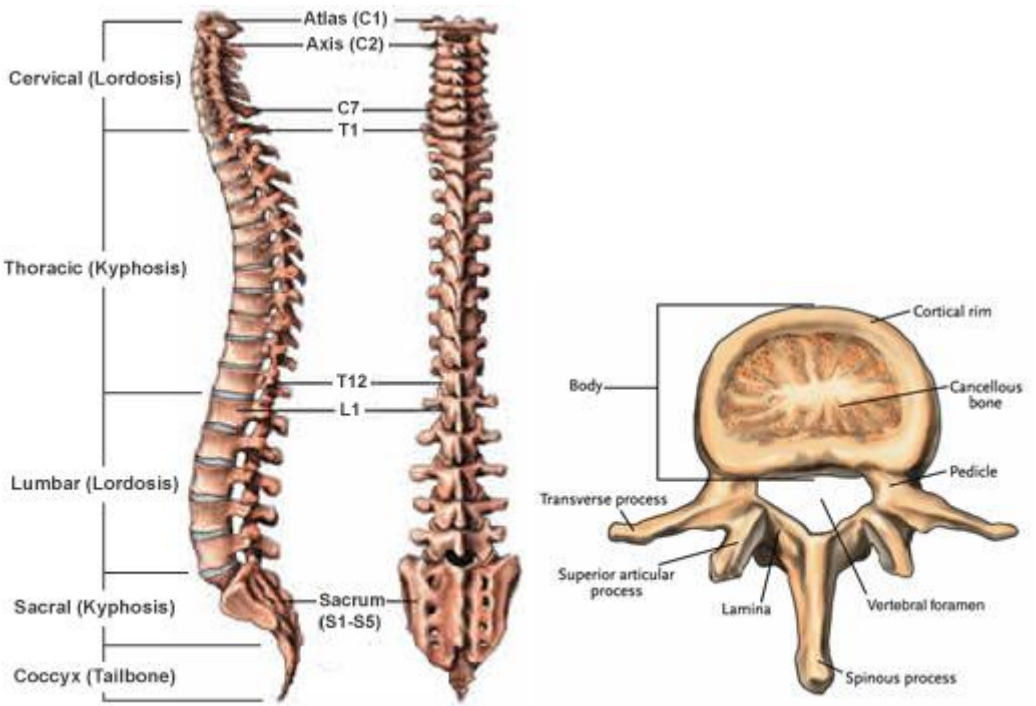

Figure 1. The spine, side and posterior view, and vertebra, view from above (Website of Sonsa).

The vertebrae (24) are bones, consisting of a body, an arch and processes (appendages on the vertebrae) (Tortora & Derrickson 2011, 235). The vertebral body and arch form the vertebral foramen surrounding the spinal cord, shown in Figure 1. Three of the seven processes act as attachment points for muscles, whereas the rest of the processes, together with the vertebrae above and below, form joints. (Tortora & Derrickson 2011, 236.)

The vertebrae's structure also determines how they can support compressive loads and on the other hand give in under excessive loads. During compression, the vertebrae walls are rigid, as the vertebral body supports the weight, whereas the center of the discs (nucleus) are compressed aiding in the absorption of the applied load. (McGill 2007, 36.) The vertebra size changes throughout the spine, with the lumbar vertebrae being the strongest and largest. This is in order to support the weight of the body structures above the lumbar spine. To enable attachment of the large muscles of the back, the spinous processes are also broad and thick. (Tortora & Derrickson 2011, 241.)

3.2 Intervertebral discs

The intervertebral discs are located between the vertebrae throughout the spine, except between the atlas and the axis (first and second cervical vertebras). The functions of the discs include absorbing shock, allowing movement in the vertebral column. In addition to this they form strong joints. (Tortora & Derrickson 2011, 234.) The main components of the discs are the annulus fibrosus and the nucleus pulposus, shown in Figure 2 (McGill 2007, 44). The annulus fibrosus is a ring of fibrocartilage surrounding the nucleus pulposus, which in turn is elastic and soft in nature (Tortora & Derrickson 2011, 234). No definite border can be found between these two structures, but the lamellae (plates of tissue) of the annulus fibrosus are more prominent when moving towards the edges of the disc. Because of the way the plates are oriented, the annulus fibrosus can withstand loads as twisting of the disc occurs. When compression and bending are applied to the intervertebral discs, the nucleus and annulus work together in order to support the load. (McGill 2007, 44.)

The water content of the annulus fibrosus is approximately 60-70 percent, unchangeable with age. On the other hand, the water content of the nucleus pulposus is between 70 and 90 percent, decreasing with age. (Le Maitre et al 2007, 653.) The nucleus pulposus therefore becomes harder and less elastic as we age. Water is also lost from the cartilage during the day, as the discs are compressed with the applied loads. Rehydration of the discs occurs as we sleep, when there is less compression. The discs have no blood vessels, and therefore they get their nutrients and oxygen from the nearby vertebrae. (Tortora & Derrickson 2011, 234.)

Figure 2. Anatomy of the intervertebral disc (Website of Pioneer Healthcare).

3.3 Ligaments

Ligaments act as one of the main structures limiting movement of the spine, preventing excessive extension or flexion of the joint occurring (Waddell 2004, 162). They connect one bone to another, stabilizing joints, and are made of fibrous connective tissue (Colorado Spine Institute; Waddell 2004, 162). Together with muscles and tendons, ligaments provide protection to the spine by acting as a natural brace. (Colorado Spine Institute.) Extension direction movement generally affects the tension of the ligaments which are positioned anteriorly, whereas the posterior ligaments are affected by movement in the flexion direction (Waddell 2004, 162).

Figure 3 shows the several ligaments that support the spine. These are the anterior longitudinal ligament, posterior longitudinal ligament, interspinous ligament, supraspinous ligament and ligamentum flavum. Both longitudinal ligaments start at the base

of the skull and run all the way down to the sacrum. (Colorado Spine Institute). These ligaments help to restrict over extension and flexion in the spine. They are also the primary stabilizers of the spine, attaching to both the annulus and vertebral bodies throughout the spine. The interspinous ligaments connect the neighboring posterior spines, spinous processes, to each other. They protect the spine form excessive extension, as well as controlling the rotation of the vertebras. The supraspinous ligament on the other hand is connects the tips of the spinous processes. It functions as resisting unhealthy forward flexion. (McGill 2007, 63-64.)

The ligamentum flavum is the strongest of these ligaments. This ligament also runs the whole length of the spine, located between and in front of the lamina, posterior to the spinal cord. It is composed of 20 % collagen and 80 % elastin, and functions as preserving an upright posture and preventing canal compression that could occur with excessive extension. Assisting the return of the spine to an upright position from flexion is also one of the ligamentum flavum's functions. It therefore acts as protection for nerves and the spinal cord. (Colorado Spine Institute, McGill 2007, 63.)

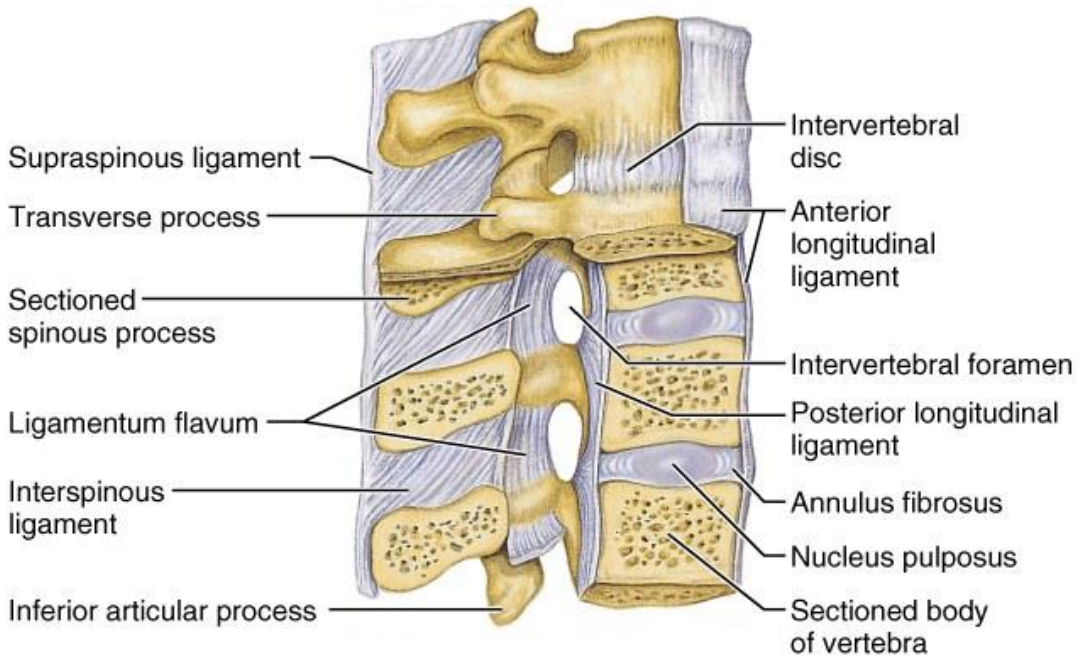

Figure 3. The ligaments of the low back (Website of New Leaf Physiotherapy).

3.4 Muscles

Skeletal muscles maintain and assist movements in the spine. Tendons attach the muscles and bones to each other. Movement is produced by the contracting muscle as it pulls a bone closer to the other. The other bone stays near stationary, as the structures or muscles around that bone keep it stabilized. Often there are many skeletal muscles working together producing the movement. (McGill 2007, 48; Tortora & Derrickson 2011, 367-369.) In addition to producing stability and movement, the muscles of the trunk act as transferring forces from lower to upper extremities (DeLisa et al 2005, 674). The stabilization of the spine depends on muscles actively contracting. The need for muscular control increases if the passive structures of the spine, mentioned earlier, are injured. Due to their attachment to the pelvis, the hip extensors and flexors greatly influence the lumbar spine positioning. (DeLisa et al 2005, 671-672, 674.) The muscles in the hip are important for walking, and play a significant role in the pelvis and trunk stabilization. The gluteus maximus act as an important muscle, being the main hip extensor. (Akuthota et al 2008, 40.) Table 1 lists the stabilizers and mobilizers of the lower back (Norris 2008, 63).

Stabilizers	Mobilizers
Primary stabilizers	Iliopsoas*
Multifidus	Hamstrings
Transversus abdominis	Rectus femoris
Internal oblique	Tensor fasciae lata
Gluteus medius	Hip adductors
Vastus medialis	Piriformis
Serratus anterior	Rectus abdominis
Lower trapezius	External oblique
Deep neck flexors	Quadratus lumborum*
Secondary stabilizers	Erector spinae
Gluteus maximus	Sternomastoid
Quadriceps	Upper trapezius*
Iliopsoas*	Levator scapulae
Subscapularis	Rhomboids
Infraspinatus	Pectoralis minor
Upper trapezius*	Pectoralis major
Quadratus lumborum*	Scalenes

*Can act as both stabilizers and mobilizers in different situations.

Table 1. Showing low back stabilizers and mobilizers (Norris 2008, 63).

The latissimus dorsi, as the most superficial back muscle, also has attachments in the spinous processes of the lumbar spine and sacrum. It can create lumbar extension as it

contracts, anteriorly tilting the pelvis. (Sahrmann 2002, 65.) It often acts as a major stabilizer of the spine. The latissimus is active during lifting and pulling. (McGill 2007, 54.)

The erector spinae (Figure 4) help to pull the spine into an erect position to enable actions such as walking. They act as the main extensors of the spine, also controlling rotation, flexion and lateral flexion of the spine, in addition to preserving the curvature of the lumbar spine. (Tortora & Derrickson 2011, 420.) The erector spinae consist of the iliocostalis, longissimus and spinalis muscles groups (McGill 2007, 51). The iliocostalis, is the most lateral of these three groups, and the longissimus is intermedially placed. They are attached to the thoracolumbar fascia, and to the ribs, but also to the ilium and the lumbar vertebrae. (Sahrmann 2002, 65; Tortora & Derrickson 2011, 420.) Fascia can be described as irregular connective tissue which cover the limbs and body walls, surrounding and supporting organs of the body. It for example fills the gaps in-between muscles, and but at the same time allows for the muscles to move freely. (Tortora & Derrickson 2011, 329.) The thoracolumbar fascia has several significant functions to help stabilize the back. It covers the back muscles, being tensioned by muscles from all directions. Power can be transferred throughout the whole spine through the fascia. Therefore it assists in movements in the spine. (Norris 2008, 40-43.)

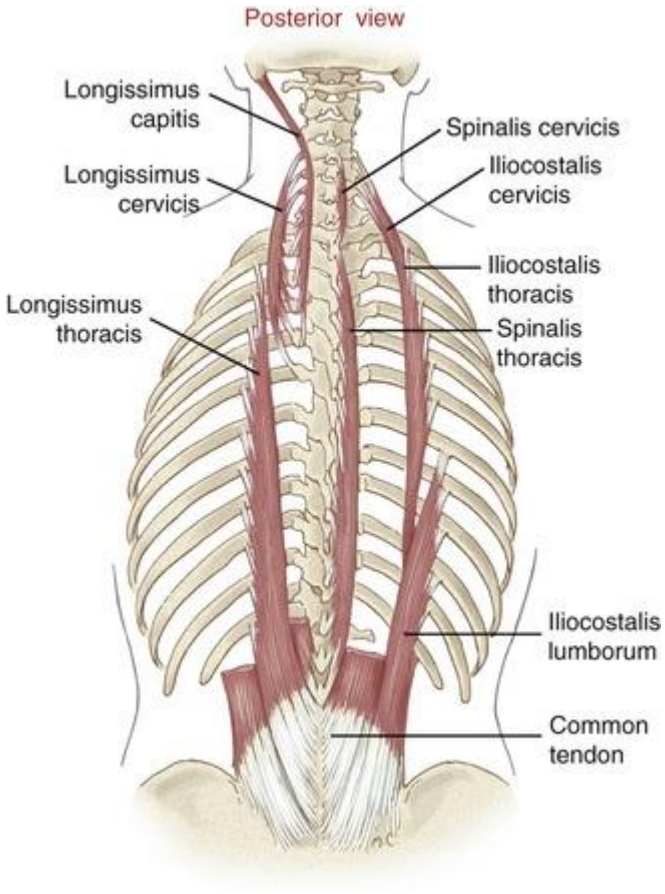

Figure 4. Showing the erector spinae muscles (Website of Clinicalgate).

The multifidus muscle, shown in Figure 5, helps to maintain the curvature in the lumbar spine, and is thick and substantial in this region. It also laterally flexes and extends the spine. (Tortora & Derrickson 2011, 420.) The surface of the sacrum is covered by the multifidi, and it continues superiorly by attaching to the spinous processes of the sacrum lumbar spine, filling the channels between the ilium and the sacrum, in addition to the channels between the lumbar spinous and transverse processes. The multifidus can produce extension with a longer lever arm than the erector spinae muscles. However, the most significant function of the multifidus is control of anterior shear and flexion as forward bending occurs, contracting eccentrically for movement support. It functions as stabilizing the lumbar spine, exerting a compressive force onto it. (Sahrmann 2002, 67: McGill 2007, 52.)

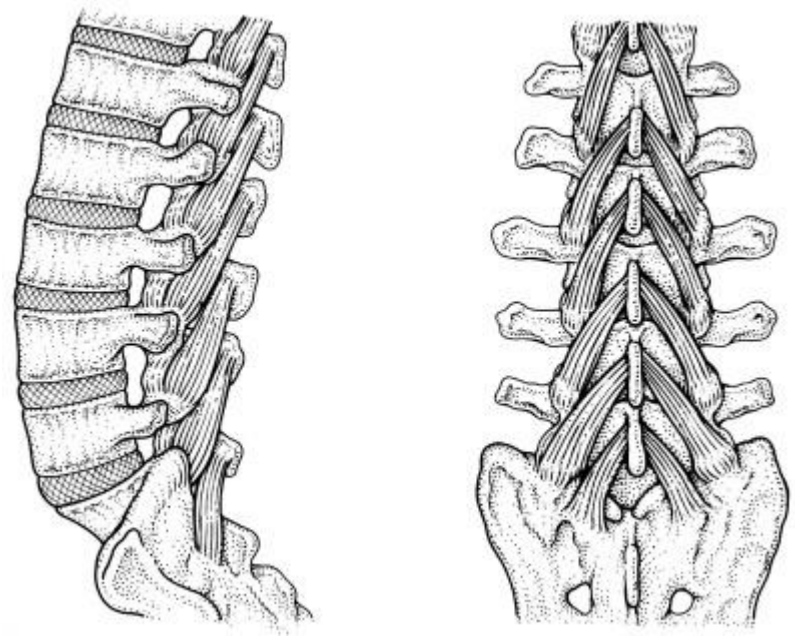

Figure 5. The multifidus muscles (Website of Simple Back Pain).

The quadratus lumborum has an important role stabilizing the spine. It is attached to the transverse processes of the spine and the iliac crest, in addition to having attachments in the ribs. This positioning provides an optimal control of later flexion, in addition to helping in the rotation movement occurring during walking. Contracting eccentrically controls later flexion, whereas concentric contraction aids in controlling returning from the lateral flexion. (Sahrmann 2002, 67-68.)

The iliopsoas, consisting of the psoas and iliacus muscle, flexes the hip, either bringing the pelvis towards the thigh, or the thigh towards the chest. Both the psoas and iliacus have a common attachment in the hip, but originate from different sites (Figure 6). (Sahrmann 2002, 68.) The psoas is attached to the transverse processes and vertebral body of each lumbar vertebra (McGill 2007, 61), whereas the iliacus attaches to the iliac fossa. By compression, the iliopsoas can also aid in stabilizing the lumbar spine. When lying with straight legs, the lumbar spine experiences compression and anterior shear forces due to the pulling of psoas on the vertebra of the lower back. To patients with low back problems, stresses being created by the iliopsoas can contribute to the symptoms. (Sharmann 2002, 69.)

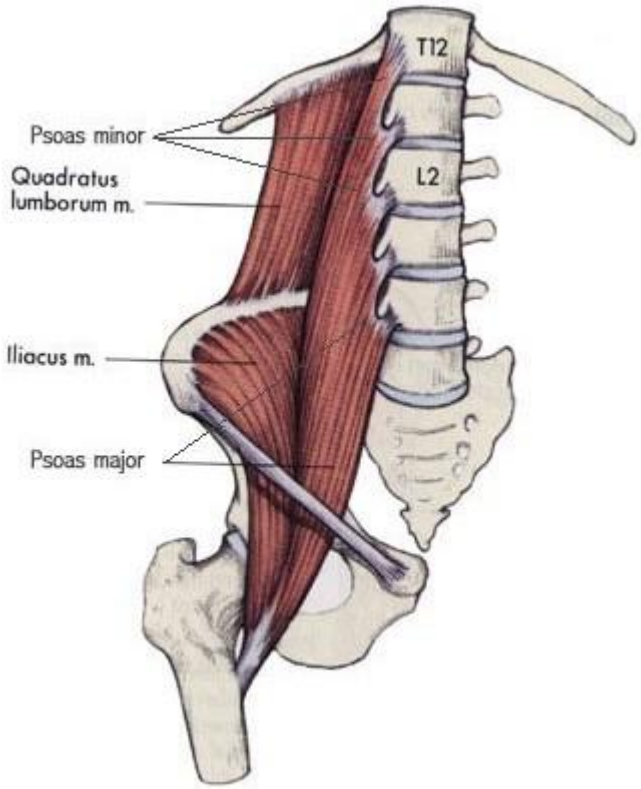

Figure 6. The quadratus lumborum and iliopsoas muscles (Website of Melbourne Osteopathy Centre).

For abdominal muscle performance, the most important factors are achieving control to stabilize the spine, maintaining a proper relationship between the movement and alignment of the spine and pelvis, in addition to preventing excessive compensatory motions and stress of the pelvis as the extremities are moved. The transversus abdominis, shown in Figure 7, originates from the lower six ribs, attaching to the pubic crest and linea alba. It acts as flattening the abdominal wall, also providing lumbar spine stability. This muscle is the first one to activate during movement, and to provide postural stability. If there is a delay in the activation of this muscle, it can cause low back dysfunction because of instability in the lumbar spine. (Sharmann 2002, 69-73.) The external obliques flex the spine, and also act by posteriorly tilting the pelvis. Together with the internal obliques, they also produce trunk rotation and help in stabilizing the lumbar spine, being activated as the spine is under compression. (Sahrmann 2002, 69; McGill 2007, 58.)

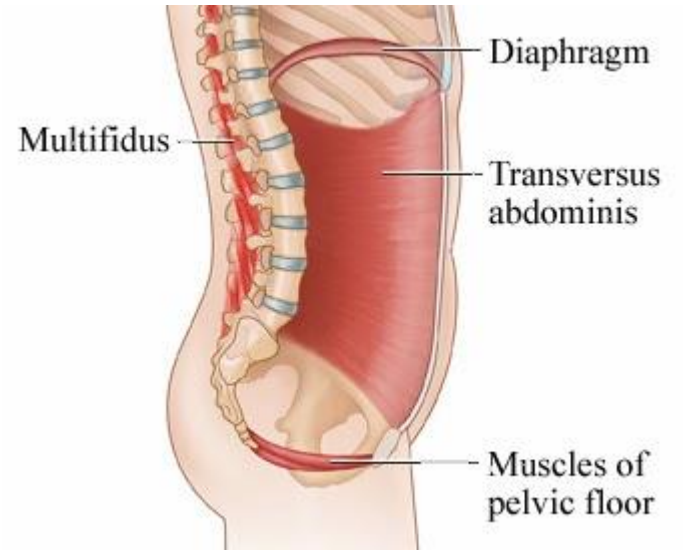

Figure 7. Indicating the position of transverusu abdominis (Website of Kehonhuoltamo).

4 LOW BACK PAIN

4.1 Low Back Pain Definition

Chronic back pain is the leading cause of disability, being the most burdensome issue to health care in the world (Ehrlich 2003, 671; University of South Australia 2013). Most people are likely to have an episode of low back pain at some point in their lives (Balagué et al 2012, 483). Of reported occupational problems, low back injuries account for nearly half of these cases (Gatchel and Schultz 2014, 6). In the western world, low back pain has a big part in sick leaves (University of South Australia 2013). A large percentage of the expenses are because of usage of health care services, early retirement, disability to work and sick leaves (Koho 2015, 12). Low back pain can be described as a localized stiffness, muscle tension or pain between the inferior gluteal folds and the costal margin. This can be associated with or without leg pain (McAuley et al 2008, 257).

4.2 Risk factors

Risk factors indicate the probability of harm coming to someone (Waddell 2004, 92), in this case low back pain. Risk factors of occupational musculoskeletal disorders include individual risk factors, biomechanical factors, and psychosocial factors. Predicting back pain is best done by combining these variables. (McKenzie & May 2003, 32, 36.) Biomechanical risk factors include, for example, variables which increase the repetitive movement of certain body parts and variables which demand bad posture or positions for long periods of time (Hernandez & Peterson 2013, 5). Workers who have heavy or frequent lifting and twisting in their jobs have been reported to have back injuries more commonly. Also sitting for long periods of time can be harmful for the back. (McKenzie & May 2003, 33; Waddell 2004, 103.) Psychosocial risk factors on the other hand include variables such as high work demand and lack of support at work. Individual factors, lifestyle, age and gender also have an effect on the development of different musculoskeletal disorders. (Hernandez & Peterson 2013, 5.) However, the most significant risk factor for back pain is having had back pain before (McKenzie & May 2003, 32).

When dealing with chronic pain, it is important to take into account several interactions between the social, psychological and physiological aspects that have an effect on the patient's condition (Gatchel 2013, 6). Psychosocial factors affecting the development of chronic low back pain include reduced activity (fear avoidance behavior), financial problems, a negative attitude towards low back pain, tendency to depression or social withdrawal, and the thought that low back pain is permanently disabling, in addition to the notion that passive treatment is more useful than active treatment for low back pain. (Samanta et al 2003, 535.) Passive treatment would include manual therapy such as massage and acupuncture for example. Active treatment on the other hand is rehabilitation where the patient is in an active part, doing exercises for example. (Kisner & Colby 2012, 2-3.)

Age has some effect on the occurrence of back pain. The first onset for back pain is usually between the early teens and early 40s. Therefore the possibility to develop back pain is throughout the life. (Waddell 2004, 96.) An individual over the age of 50 is twice as likely to be suffering from chronic pain (Gatchel et al 2007, 583). For older

individuals, a developed back pain is likely to be persistent than that of younger individuals (Waddell 2004, 97). Surveys have shown that the prevalence of back pain is slightly higher in women than men. However, this may because of women being more willing to report symptoms, or better awareness of their bodies and changes happening to them. Overall, disability due to back pain does not seem to be much different between women and men, although different kinds of back pain may be more prevalent in one gender compared to the other. (McKenzie & May 2003, 31; Waddell 2004, 95.)

Genetics can also play a role in developing back pain. Some spinal disorders, for example scoliosis and spondylotlisthesis, in addition to the probability to develop disk prolapses can be affected by genetics. (Waddell 2004, 94.) The physical fitness of an individual may also have some effect on low back pain. Good physical fitness can be especially important in reducing the risk of developing chronic back pain. (Waddell 2004, 98.) It has to be remembered, that loading of the spine can both stimulate growth and repair, but on the other hand also cause damage and deformity to tissues. The risk for developing pain is therefore dependent on the levels of the loading onto the spine, and for example a sudden increase in loading may lead to dysfunction in the spine (Waddell 2004, 101). These individual risk factors do not seem to be strong indicators for developing back pain, as there have been many inconsistent results regarding their effect on developing pain (McKenzie & May 2003, 33).

4.3 Classification

Classification categories of low back pain include osteoporotic collapse, malignancy, sepsis (serious spinal pathologies), nerve root pain (radicular), and non-specific low back pain. Non-specific low back pain is the most common, being the diagnosis for most of low back pain incidences (McAuley et al 2008, 258; O'Sullivan 2005, 3), accounting for up to 90 percent of all low back cases (Manek & MacGregor 2005, 134; Koho 2015, 12). Non-specific low back pain can be described as pains that cannot be connect to any known disease or diagnosis, such as infection, structural deformity and fracture (Balagué et al 2012, 483). Therefore the reason for the pain is unknown. Non-specific low back pain can again be divided into acute, subacute and chronic low back

pain, depending on the time frame of the pain. These will be discussed further below. (Website of Käypähoito 2016.)

4.3.1 Acute LBP

Acute low back pain is pain that usually subsides within a month of its first encounter. 90 percent of these low back pain occurrences are likely to get better within six weeks (Koes et al 2001, 2504). During this period it is important for health care professionals to identify factors of the patient that might indicate a possibility for developing chronic low back pain (Gatchel & Gardea 1999, 149). Acute low back pain is often treated without the aid of laboratories or imaging technologies, if the examination does not bring any reason for this. Only conservative treatment is often necessary. (Website of Käypähoito 2016.) About one in four patients with acute low back pain get recurrent pain within three months of its occurrence, and two thirds get the pain back within one year (Website of Käypähoito 2016). If the pain is present for between one month and 3 months, it is classified as sub-acute low back pain (Website of NINDS).

4.3.2 Chronic LBP

Approximately 40 percent of people going to primary health care are visit a physician because of pain, 20 percent of them having chronic pain (Mäntyselkä et al 2001, 179). Pain can be described as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" (IASP 2005). About 10-45 percent of people suffering from acute low back pain go onto develop chronic low back pain (Balagué et al 2012, 484; Dillingham 1995, 1; O'Sullivan 2005, 3). Chronic pain can be defined as at least 3 months of persistent pain. There can also be pain-free periods with periods of more severe pain spanning over months or years (chronic recurrent pain). For example, in 2003 the American Academy of Pain Management states that about 57 percent of American adults had reported persistent or recurrent chronic pain during the last year. Pain is also estimated to amount to 80 percent of Americans' physician visits, in addition to causing emotional suffering and psychiatric disorders. (Gatchel et al 2007, 581.)

There are psychological factors involved in the transition to the chronic pain phase from acute pain. Fear of movement is one factor which could be important when there has been pain for a longer period of time. (Pincus et al 2006, 4007.) Avoiding movement because of fear of pain or re-injury are related to high levels of disability, even to the extent that pain itself plays a smaller role in the disability than the fear does (Koho 2015, 12).

Chronic non-specific low back pain can also be divided into non-mechanical and mechanical pain, taking into account that some individuals may have both of these. These two groups have separate neurophysiological mechanisms underlying the pain. Individuals with non-mechanical pain have significant pain processing changes. On the other hand, the pain in the individuals belonging to the mechanical pain group is due to peripheral sensation processes. (O'Sullivan et al 2014, 311.)

There are many changes happening in the brain during chronic low back pain, including neurochemical, functional and structural modifications. It has been reported that individuals suffering from chronic low back pain have lower pain thresholds compared to those without it, not only in the lumbar spine, but elsewhere throughout the body. There may also changes in the brain causing psychological dysfunction, decision making changes and cognitive function deficits. (Wand et al 2011, 16-17.) Chronic low back pain has also been associated with altered body image. There are deficits in proprioception (knowing the positioning of your own body parts); trying to find the outline of the back is challenging (Moseley 2008, 242).

4.4 Causes

Non-specific low back pain accounts for about 90 percent of all low back pain cases. (McKenzie & May 2003, 48-49). There are many structures in the lumbar region that can trigger a pain response. These include the vertebras, the intervertebral discs, capsules of the sacroiliac and zygapophyseal joints, connective tissues, muscles, blood vessels, nerves, longitudinal and interspinous ligaments. (McKenzie 2003, 47.) It has been estimated that up to 95 percent of low back pain is caused by sprains and strains

of ligaments, tendons and muscles. This will result in limited range of motion in addition to spasms and localised tenderness. (Gatchel & Schultz 2014, 6.) The source of pain for the leg pain is the compressed nerve roots in the vertebral canal. This nerve root compression may be caused by, for example, a disc herniation. (McKenzie & May 2003, 48.) Specific causes of low back pain include a vertebral bone displacement (spondylolisthesis), disc herniation and disc degeneration (spondylosis) (O'Sullivan 2005, 13).

5 SELF-CARE OF LOW BACK

5.1 Therapeutic Exercise

According to the European guidelines for the management of chronic non-specific low back pain, educational interventions, supervised exercise therapy, cognitive behavioral therapy, back schools, short courses to improve mobilization or manipulation, and biopsychosocial (multidisciplinary) treatments can all be beneficial for nonspecific low back pain management (Airaksinen et al 2006, 193).

It has been studied that brief interventions, medicine and exercise may be adequate for people with low disability and impairment due to chronic low back pain (Airaksinen et al 2006, 193). However, one intervention on its own is unlikely to be efficient in treating chronic low back pain that has been present for a longer period of time, and therefore a more multidisciplinary approach must be used (Airaksinen et al 2006, 194).

After an individual has passed the acute pain stage, the main aim in the rehabilitation is focusing on improving function. Therapeutic exercises are the most used conservative treatment in the world (van Middelkoop et al 2013, 4). Kisner & Colby (2012, 2) describe therapeutic exercise as "the systematic, planned performance of bodily movements, postures, or physical activities intended to provide a patient/client with the means to prevent impairments, improve or restore physical function, prevent or reduce health related risk factors, or optimize overall health status, fitness, or sense of well-being". The benefits for this kind of exercising have been documented widely. It is

important for therapeutic exercise programs to take into account the individual needs of each patient. (Kisner & Colby 2012, 2.) Rehabilitation aims to reduce the symptoms generated by the illness or injury, improving the functional and working condition of the patient, and giving the patient a better chance to deal with the pain and social life. Gradually increased therapeutic exercises reduce pain and improve functional fitness in people with chronic low back pain. (Website of Käypähoito 2015, 14.)

There are physical, social and psychological factors which are important for functioning in everyday life. If one or some of these are impaired, it can have an effect on the individual's abilities to participate in daily living activities. Factors such as balance, cardiopulmonary fitness, coordination, flexibility, mobility, muscle performance, neuromuscular control, postural control and stability, in addition to joint stability affect how an individual functions. (Kisner and Colby 2012, 2-3.)

For low back pain, the therapeutic exercises consist of strengthening, stretching and aerobic exercises (Hayden et al 2011, 2). In the chronic phase, exercises especially include movement and core strengthening. It is important to get the patient actively involved with the treatment quickly as possible. (Website of Käypähoito.) As non-specific low back pains are the most common, it is often not necessary to have an absolute diagnosis in order to choose exercises. However, determining the direction to which the pain is decreased or increased is essential for the rehabilitation. Exercises with extension can help with alleviating pain by decreasing the tension put on nerve roots, activating the gate mechanism by increasing the input of mechanoreceptors, and moving the nucleus pulposus anteriorly. (Weinstein et al 2005, 670.) Flexion direction exercises can be effective in strengthening the gluteus and abdominal musculature, stretching lumbar extensors and hip flexors, in addition to decreasing loads compressing the intervertebral discs posteriorly. (Weinstein et al 2005, 670.)

Exercises improving the strength and endurance of the trunk muscles are important to prevent injury and pain to the low back, helping to stabilize the spine. (Weinstein et al 2005, 671.) Finding the neutral spine position and being aware of the motions of the pelvis and lumbar spine in different positions helps to stabilize the spine. Hip extensors and flexors influence how the lumbar spine is positioned due to how they are attached to the pelvis. Therefore, the flexibility of hip muscles is important to exercise in order

to allow for proper posture and movement independent of lumbar motion. Lack of flexibility can insert excessive stress on the sacroiliac joint and lumbar spine. (Weinstein et al 2005, 672.)

Excessive sitting, for example, can cause tightness in various muscles. Some that are especially affected are the hip flexors, which can shorten when sitting for a long time throughout the day (Link et al 1990, 28). Teaching self-stretching is important to get the patients actively involved in the rehabilitation process (Weinstein et al 2005, 672). It has been studied, that both passive and active stretching help in achieving increased range of motion in the hip flexors (Winters et al 2004, 806). In addition to these, cardiovascular exercises are done to improve overall functioning (Weinstein et al 2005, 670).

For the optimization of motor control, a coordinated activity of the neuromuscular system is need. The transversus abdominis decreases the amount of movement between the vertebrae and improves segmental stability. As it activates, the lumbar part of the multifidus muscle controls the neutral position of the lumbar spine and increases stability. The training of these muscles cannot only be static, but has to also be dynamic. (Paatelma 2012, 4, 6.)

It is always important to give relevant information to the patient concerning low back pain. This can help by making the patient less oppressed and also make them more satisfied with the treatment. Giving useful information to the patient also help in providing initiative for active treatment and self-care, in addition to getting the patient to commit to the rehabilitation. (Website of Käypähoito; Koes et al 2012, 2081.) Self-care exercises, such as relaxing exercises, are important for people suffering from low back pain. These exercises help relax the back and decrease the pain, so that activities can be continued again. (Website of Selkäkanava.)

5.2 Ergonomics

Ergonomics is the study of arranging products, systems and workplaces in order to make them fit the needs of the people using them (Website of Dohrmann Consulting

2014). Taking care of ergonomics is important for maintaining a healthy low back and preventing injury from bad postures or repetitive movements done the wrong way. Ergonomics brings together information from engineering, statistics, anatomy and physiology, in order to achieve as healthy an environment for individual needs as possible. When looking at ergonomics, individual factors, such as strength, size, age, cognitive ability and goals have to be taken into account to get the best results. (Website of Chartered Institute of Ergonomics and Human Factors.)

At work, it is important to be able to change your position regularly to avoid injury through bad posture (Website of Selkäkanava). Posture can be defined as the position where, while lying, sitting or standing, you hold yourself against gravity. The aim of good posture is to be in a position where supporting joints, ligaments and muscles are placed under the least amount of strain, preventing muscular and joint pain. (NHS 2008, 1.) A good sitting position often requires a good support of the lower back, as the structures of the back, especially the intervertebral discs', are under a lot of pressure. Sitting for long periods of time also increases the risk for cardiovascular diseases, obesity and type 2 diabetes. (Website of Selkäkanava.)

5.3 Motivation

Motivation has a big role in the treatment of low back pain, non-dependent on whether it is self-care or following a program developed by health care professionals. In general, motivation for better performance comes with high success and low failure rates. Positive rewards and feelings can motivate to continue with, for example, exercising for low back pain. (Kisner & Colby 2012, 46.) If the patient believes exercising has an effect on alleviating pain, or improving function, it is more likely that they will stick to the program. Ending an exercise session with a positive experience helps the patient to maintain their level of motivation. (Kisner & Colby 2012, 26.) Setting goals and timeframes for the treatment also motivates the patient to participate properly in the exercises and therapy sessions. Goal setting can create a sense of having control, which can enhance commitment and motivation towards getting better. (Website of Infomed.)

6 IMPLEMENTATION

6.1 Educational evening

The educational evening for Satakunnan Selkäyhdistys (Satakunta Back Society) was held on the 19.11.2015 in the community center in Pori (Yhteisökeskus). The topic of the evening was the self-care of your back: acute stage, sitting and sleeping ergonomics. The evening was advertised both in the local newspaper and the website of Satakunnan Selkäyhdistys. There were 7 participants present, ranging in age between 25 and 75, 1 being male and 6 female. The presentation was a combination of a Power Point presentation and demonstrations of exercises and ergonomics, lasting approximately 45 minutes. The presented topic was decided together with the back society and was narrowed down during the autumn.

After demonstrating the proper technique and explaining the reasons for each exercise, I helped the participants repeat the movements. They all tried out all the exercises I suggested, and managed to feel the activation of the muscles in the movements that required this. With the sleeping ergonomics, I explained and showed the correct positions, but the participants did not try them out themselves. They also asked question during and after the presentation, and I was able to answer them sufficiently. I thought the presentation went very well and I could keep the participants interested throughout the educational evening. The chairman of the society mentioned that the normal amount of people present in these educational evenings is between 5 and 15, also depending on the weather and topic.

6.2 Thesis process

In May 2015 I started the initial process of coming up with a topic for a thesis. In September 2015 the topic was decided in more detail and writing of the theory part started. During September and October planning of the practical implementation started and the writing of the theory was continued. The content of the presentation was finalized during the beginning of November, and on the 19th of November 2015 the presentation took place in the Yhteisökeskus in Pori.

During November and December 2015 the writing of the thesis was continued. Because of other tasks and practical issues, the writing of the thesis was not continued properly after this until August of 2016. Finalization of thesis, finishing the writing the theory and discussion was done during September and October of 2016. The thesis process is shown in Figure 8.

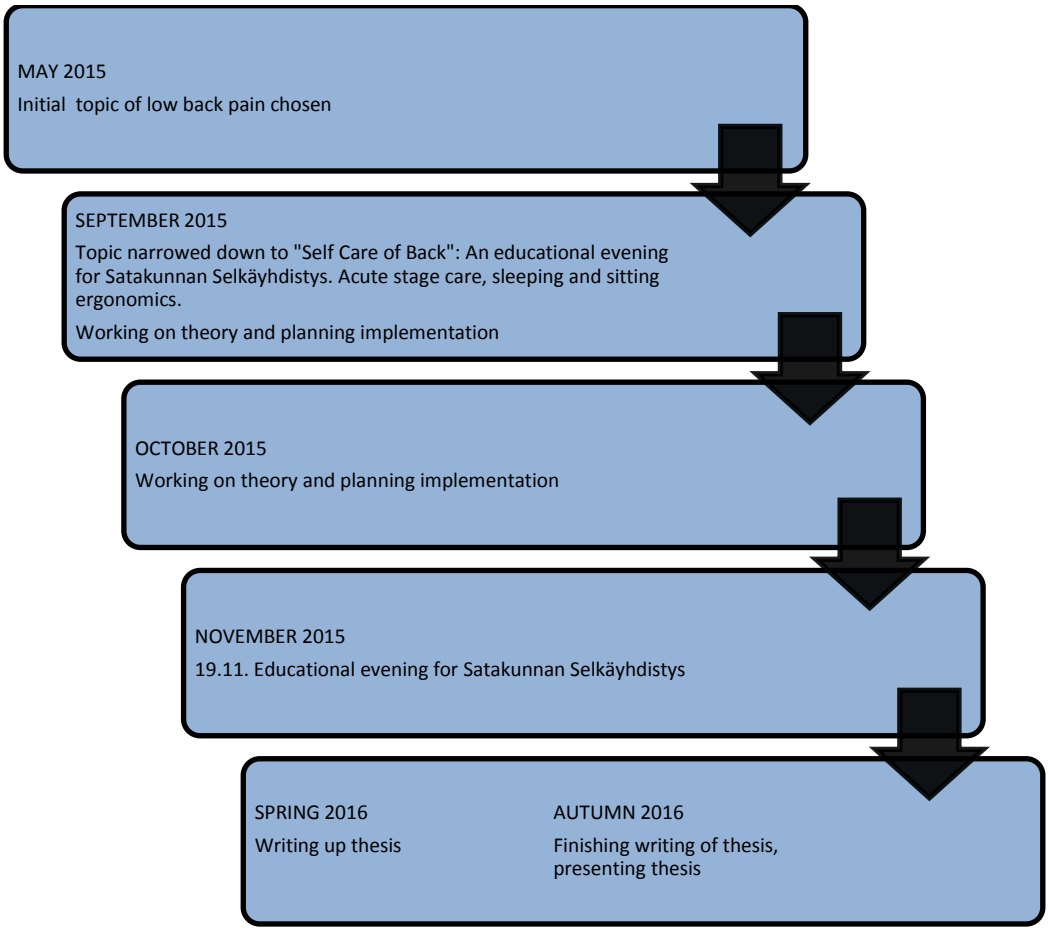

Figure 8. Showing the thesis process.

7 DISCUSSION

The topic for my thesis was suggested to me by a teacher as she had contact to the Satakunta Back Association. In addition to this, another student had previously given

educational lectures to the society earlier the same year. The topics of these lectures were “the role of the brain in prolonged back pain”. Therefore I did not include much theory on chronic back pain or the role of the brain in my presentation.

I had an initial idea of doing my thesis on low back pain. How or what area would be concentrated on was not clear to me. The narrowing of the topic was done together with the teacher and representative from Satakunnan Selkäyhdistys. A few different topic possibilities were discussed, but the self-care of your back was chosen as it was of most interest to me. I also thought it would be the most useful information I could provide to the participants, and give them something they can do on their own after the evening. Including a practical aspect to the educational evening was also particularly important, so that the participants with back pain did not have to sit for a whole hour. Other suggested topics included for example dealing with back pain for young people.

The exercises for this evening were chosen based on a few factors. The website of Satakunnan Selkäyhdistys (2015) was checked in order to find out what exercises they already have given to the members of the society. The website did not have any exercises for care of the acute stage of back pain, and therefore a few of the main exercises for the self-care of the lower back were chosen. These exercises were especially chosen so that they can be done anywhere and without equipment, in addition to be easy enough to do for everyone, no matter what their level of fitness or functionality. Choosing the exercises and finding theory to back them up were the parts of this thesis that took up the most time to do.

I think the length and amount of content of the evening was also good, as it seemed the participants were able to engage and concentrate on the information given for the whole 45 minutes. I think a longer presentation would have been challenging for the participants, as too much information at once may have been too confusing. Not only that, but having only a few exercises could also help the participants try out the exercises at home, which was the whole point of the evening. The participants were well engaged in the activities provided by me.

The sitting and sleeping ergonomics demonstrated during the evening were also partly chosen based on what exercises were already available on the Selkäyhdistys website. The information given on ergonomics seemed to be useful and at least partly new information for the participants, giving them a few new ways to be able to take care of their back pain. Searching for information on ergonomics was fairly easy, and the different sources found all had a very similar basis when it comes to what the correct sitting and sleeping positions should be.

The participants said they enjoyed the evening, and the movements and exercises provided were mostly new to them. I made a questionnaire on paper to give to the participants after the evening, in order to get feedback from them. However, as there were not that many participants, I got information from them verbally and therefore did not use the feedback forms. Looking back, it may have been useful to use the questionnaires in order to get a more accurate picture of the participants, what they liked about the evening and what could be improved.

An idea for the next evenings could be something to do with neck pain, as I was asked two questions about this topic after the presentation. For example self-care of neck pain could be one option. Many of the participants were interested in how they can themselves have an effect on their back pain. Therefore I think another lecture involving self-care of some area of the back would be very useful for the back society. It would also be useful if more people could be informed about the event, as I only had seven people listening. The lecture was advertised both in the local paper and the Satakunnan Selkäyhdistys website, but still some people arriving for the lecture were not clear on whether the lecture was free.

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MITEN HUOLLAN SELKÄÄNI?

19.11.2015

Sam Granlund

SISÄLTÖ

- Akuutin kipuvaiheen hoito
  - PSOAS asento
  - Kyljen rotaation harjoitus
  - Lonkankoukistajan venytys
  - Ojennus harjoitus
- Ergonomia
  - Istuminen
  - Nukkuminen

AKUUTTI JA KROONINEN KIPU

- Akuutti
  - Syntyy mekaanisesta tai kemiallisesta ärsykkeestä
  - Suojelee kehoamme kudosvaurioilta
- Krooninen
  - Pitkäkestoinen kipu
  - Kivun alkuperäinen syy voi olla jo häipynyt, muutoksia aivoissa

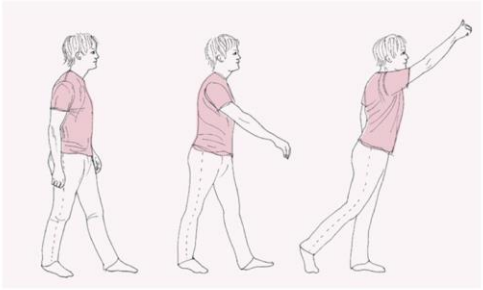
HETI LIIKKEELLE!

- Vuodelepoa ei suositella
- Jos mahdollista, jatka tavallisia päivittäisiä toimintoja
- Liiku kivun sallimissa rajoissa.
- Aktiivinen itsensä hoito
- Lihaskunnon ylläpitäminen ja kehittäminen tärkeää
- Työ ja vapaa-ajan ergonomia myös tärkeitä

Lähde: http://uniikki.fi/helppo-lihasjumppa/

PAINONSIIRROT

- Akuutin kivun aikana
- Selkälihasten aktivointi
- Liikkuvuuden parantaminen ja lihasten lämmitys



Lähde: http://uniikki.fi/helppo-lihasjumppa/

ELINTAVAT VAIKUTTAVAT

- Omasta kunnosta huolehtiminen erittäin tärkeää
  - Lihasheikkouden, erityisesti vatsan ja selän alueella, altistavat selkäkivuille
  - Ruokavalio myös tärkeä
  - Tupakointi vähentää selän kudosten ja nikamien verenkiertoa
    - Kudosvauriot paranevat huonommin vaurioiden synnyttyä
- Vältä pitkään istumista

Lähde: http://www.terve.fi/vallevyn-pullistuma-20015-huolehdi-selkasi-hyvinvoinnista

ISTUMINEN

- Miksi istuminen on pahaksi?
  - Huono istuma-asento huonontaa verenkiertoa sekä vaikeuttaa hengettämistä
  - Hidastaa myös aineenvaihduntaa, joka vaikuttaa verensokeriin sekä verenpaineeseen
  - Lisää riskiä ylipainoon sekä aikuisiän diabetekseen
  - Jo viidessä minuutissa selkää tukevat lihakset rentoutuvat ja väsyvät istuma-asennon ollessa huono
  - Syntyy nivelsiteiden ylikuormittumista ja kipua
  - Istuminen kuormittaa hartioita ja selkää enemmän kuin seisominen

Lähde: http://www.suomimies.fi/tiedostot/1288-ERI-istumiskortti_netti.pdf

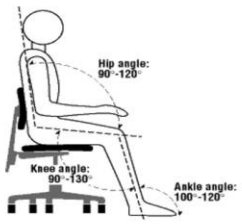
ISTUMINEN

- Pitkäkestoinen istuminen ei ole hyväksi ihmiselle
- Istumista suositellaan vain muutamia tunteja päivässä, max tunti kerrallaan

- Miten vähennän istumistani?
  - Nouse ylös puolen tunnin välein
  - Työskentele myös seisten jos mahdollista
  - Seiso tai liiku kun olet puhelimessa

ISTUMA-ASENTO

- SELKÄNOJALLINEN TUOLI
- Nojatessasi selkänojaan, istu tuolin perällä
  - Tuolin reuna ei saisi painaa polvitaipeita
- Tuolin korkeus kuitenkin niin, että jalat ovat tukevasti lattialla
- Alaselkätuki hyvä hankkia tuoliin ellei siinä valmiiksi sitä ole
- Jos selkänoja säädettävä
  - Kokeile mikä asento sopii itsellesi parhaiten
- Käsinojat siten että hartiat pysyvät rentoina, ja kyynärvarret vaakatasossa



Lähde: http://www.ccohs.ca

Lähde: http://selkakanava.fi/hyvs-tyotuoli-ja-oikea-istuma-asento

ISTUMA-ASENTO

Lähde: http://www.posture-chair.co.uk/

- SELKÄNOJATON TUOLI->
- Tuolin korkeus siten että jalat ylettyvät tukevasti maahan
  - Polvet 90 astetta koukussa
- Lannerangassa pieni notko
- Hartiat alhaalla, olkapäät takana
- Pää suorana lonkka yläpuolella

Lähde: McKenzie, 2012

LYSÄHDYS-YLIKORJAUS HARJOITUS

(MCKENZIE, 2012, 38-40)

- 1. Lysähdä kasaan muutamaksi sekunniksi, lihakset rennoksi
- 2. Ojenna selkä suoraksi
  - Tavoittele niinsyvää lannenotkoa kuin mahdollista (ylikorjattu asento), ja pysy tässä asennossa muutaman sekunnin
- 3. Lysähdä takaisin kasaan
- Asennon vaohtelu tehdään rytmikkäästi
- Toista 15 kertaa
- Voi tehdä kun istuessa tuntuu kipua selässä
- Oikeanlainen istumaasento löytyy kun rentoutat noin 10% ylikorjatusta asennosta

ASENTOHOITO

- Jalkojen nosto ylös, PSOAS-asento
- Makuulla liikkuvuus harjoituksia
- Lonkankoukistajan venytys
- Kivuton liikesuunta
- Jos jokin liike kipeä, jätä se pois väliaikaisesti

PSOASASENTO

- Makaa selälläsi, jalat tuolilla/sängyllä polvet koukussa
- Asento rentouttaa keskivartalon ja jalkojen lihaksia jotka ovat kivun vuoksi jännittyneitä

Lähde: http://www.turunselkayhdistys.fi/Tiedostot/selanleputus.pdf

MAKUULLA LIIKKUVUUSHARJOITUKSIA

Lähde: http://emcphysio.com.au/

- Normaalin liikkuvuuden säilyttäminen / palauttaminen tärkeää selän paranemisen kannalta

LONKANKOUKISTAJAN VENYTYS

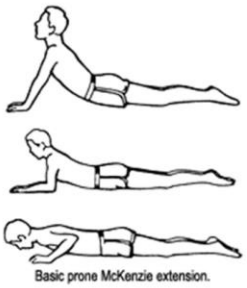
Lähde: http://elamaasikuntoon.com/tag/lonkankoukistajat/

- Lonkankoukistajat lyhenevät liiallisesta istumisesta
- Lantio kallistuu eteenpäin
- Voi aiheuttaa kipua alaselkään

OJENNUS

- Tavoitteena ojennus kivuttomaan suuntaan
- Kun suunta löytyy, 10 toistoa kyseiseen suuntaan
- Joka toinen tunti

Lähde: http://www.physioleeds.co.uk/



Basic prone McKenzie extension.

Lähde: http://www.jpcphysicaltherapy.com/McKenzie.aspx

NUKKUMINEN

- Tyyny aina pään alla, ja pää neutraalissa asennossa
- Samanlaisesti kuin istuessa, tavoitellaan luonnollisen lannenotkon säilyttämistä maatessa
- Selällään ja kyljellään maatessa selkään kohdistuu vähiten painetta
- Patjan oltava tarpeeksi tukeva jotta se tukee selkää ja sen luonnonlista asentoa
- Kylkiasennossa laita lonkat ja polvet koukkuun, päälimmäisen jalan alle tyyny
  - Lihakset rentoutuvat

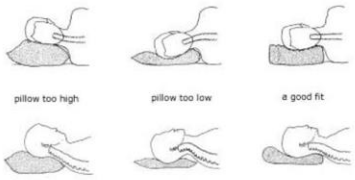
Lähde: http://www.icid.saiah[illegible].uk/

NUKKUMINEN

Lähde: http://selkakanava.fi/

NUKKUMINEN

Lähde: http://flipphysio.com/sleep-ergonomics/



Lähde: http://www.backdesigns.com/

SELÄN HUOLTO JOKAPÄIVÄISESSÄ ELÄMÄSSÄ

- Istu tuolin perällä selkä selkänojassa kiinni
- Vaihda asentoa usein istuessa tai seisoessa pitkiä aikoja
- Nuku patjalla joka antaa selälle tukea
- Liiku

Lähde: http://www.liikuntapalvelut.net/

Lähde: http://ergonomics.ucla.edu/

LÄHTEET

- McKenzie, R. 2012. Kuntouta itse selkäsi.
- NHS. National Health Service UK.
- Selkäkanava.fi
- Posture-Chair.co.uk