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GYMTAIL – EXERCISES FOR BREAKS DURING THE WORK
DAY FOR PEOPLE WITH RHEUMATOID ARTHRITIS

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This Bachelor's thesis is a functional thesis that is based on literature and research. The aim of the thesis was to maintain working ability, increase daily physical activity and improve joint mobility through break exercising among people suffering from rheumatoid arthritis. The objective of the thesis was to gather a package of break exercises done with Gymtail for the Finnish Rheumatism Association. The exercise package is published in the Reuma magazine and is utilized on Keltaisen nauhanpäivä.

Rheumatoid arthritis is the most common disease from the spectrum of rheumatoid diseases. It is an inflammatory joint disease in which the immune system mistakenly attacks healthy tissue; the joints and tissue surrounding them. Decreased working ability is a common issue among rheumatoid arthritis patients. Working disability is the result of the disease in the long term. Patients develop a high risk of work disability from the very beginning of rheumatoid arthritis symptoms of swelling, pain and stiffness of joints.

The final product of this thesis is the leaflet of Gymtail exercises that are designed specifically for working age people suffering from rheumatoid arthritis. This thesis has been done in collaboration with Finnish Rheumatism Association, for which purposes the exercise leaflet is created for.

Gymtail is relatively new exercise tool having features both of resistance band and exercise stick. It is light in weight, small, simple and safe, making it suitable for rheumatoid arthritis patients and for breaks during workdays. Taking breaks for exercising during the workday is an important factor in maintaining working ability and functioning among working age people suffering from rheumatoid arthritis.

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1 INTRODUCTION

This bachelor's thesis is a functional thesis that is based on literature and research, which has a theory and functional part. The background of rheumatoid arthritis, symptoms, treatment, working ability and Gymtail as an exercise tool are discussed in the theory part. The final product of the thesis is the leaflet of Gymtail exercises for working age people suffering from rheumatoid arthritis. This thesis has been done in collaboration with Finnish Rheumatism Association, for which purposes the exercise leaflet is created for.

Finnish Rheumatism Association (Suomen Reumaliitto) is a nationwide community established in 1947, being one of the oldest public health associations in Finland. They offer information, peer support, and activities for tens of thousands of people suffering from rheumatism and other musculoskeletal diseases. They provide service for the nearest of diseased, health care professionals and those who need information about musculoskeletal health. Their work is specialized and professional and have societal influence. As a community of public health and exercise, diseased and disabled, they provide information about musculoskeletal health for whole population and they inspire people to take good care of their musculoskeletal health with healthy lifestyle. Finnish Rheumatism Association consist of 150 member associations with 40 000 members. (Website of Reumaliitto 2018)

Rheumatoid arthritis is a chronic inflammatory disease of joints. Almost one in hundred over 16-year old Finnish suffer from rheumatoid arthritis. In one year, 2000 people get affected by rheumatoid arthritis. Disease is two to three times more common in women than men. Common disease onset age is 60 years, but the disease can start at any age possible. There are 35 000 adult people overall suffering from rheumatoid arthritis in Finland. (Duodecim Terveyskirjasto 2018)

Decreased working ability is common issue among rheumatoid arthritis patients. Working disability is the result of the disease in the long term. Patients develop a high risk of work disability from the very beginning of rheumatoid arthritis symptoms of

stiffening, swelling and experiencing pain in joints. (Sokka 2003) Exercising is one of the main methods of treatment, prevention and rehabilitation of rheumatoid arthritis. (Website of Arthritis Foundation 2018) Studies show that rheumatoid arthritis patients can affect their disease by exercising, since it enhances the mobility and functioning of joints. (Duodecim Terveyskirjasto 2018) Therefore taking breaks for exercising during the workday is important factor in maintaining working ability and functioning among working age people suffering from rheumatoid arthritis. (Website of Arthritis Foundation 2018)

2 AIM AND OBJECTIVES OF THE THESIS

The aim of the thesis was to increase daily physical activity and improve joint mobility through break exercising. This thesis also aims to maintain working ability among working age people suffering from rheumatoid arthritis.

The objective of this thesis was to gather a package of break exercises done with a Gyntail for the Finnish Rheumatism Association. The exercise package is published in the Reuma magazine and is utilized on Keltaisen nauhanpäivä 2019.

3 RHEUMATOID ARTHRITIS

3.1 The concept of rheumatism

The broad spectrum of rheumatic disorders covers more than hundred musculoskeletal diseases and disorders. (Website of the American College of Rheumatology 2017) Rheumatic disorder or more familiarly rheumatism is an umbrella term that is further divided into three main groups; inflammatory, degenerative and soft tissue rheumatic disorders. Inflammatory rheumatic disorders as rheumatoid arthritis and autoimmune disorders of connective tissue are the most significant diseases in their category in

specialized medical care. What comes to public health, an important group is non-inflammatory rheumatic disorders, considered as degenerative in their nature, such as osteoarthritis, spinal conditions and osteoporosis. Classification of soft tissue rheumatic disorders has been somewhat vague, but alteration has occurred ever since fibromyalgia was scientifically determined. Figure 1 and 2 shows the classification of rheumatic disorders and examples some of the most common diseases. (Martio, Karjalainen, Kauppi, Kukkurainen & Kyngäs 2007, 9)

Rheumatic diseases have differences in their genesis, symptoms and treatments. Symptoms can vary from mild and periodical to severe and disabling, which is why diagnostics can be tricky. (Martio, Karjalainen, Kauppi, Kukkurainen & Kyngäs 2007, 7-9) Heritability is not straightforward, yet the inherited susceptibility alternates in different diseases. (Martio, Karjalainen, Kauppi, Kukkurainen & Kyngäs 2007, 12) Not all of risk factors are known, but the lack of exercise, poor physiologic work loading, smoking, obesity and traumas are factors that most likely predispose to illness. (Martio, Karjalainen, Kauppi, Kukkurainen & Kyngäs 2007, 15-16)

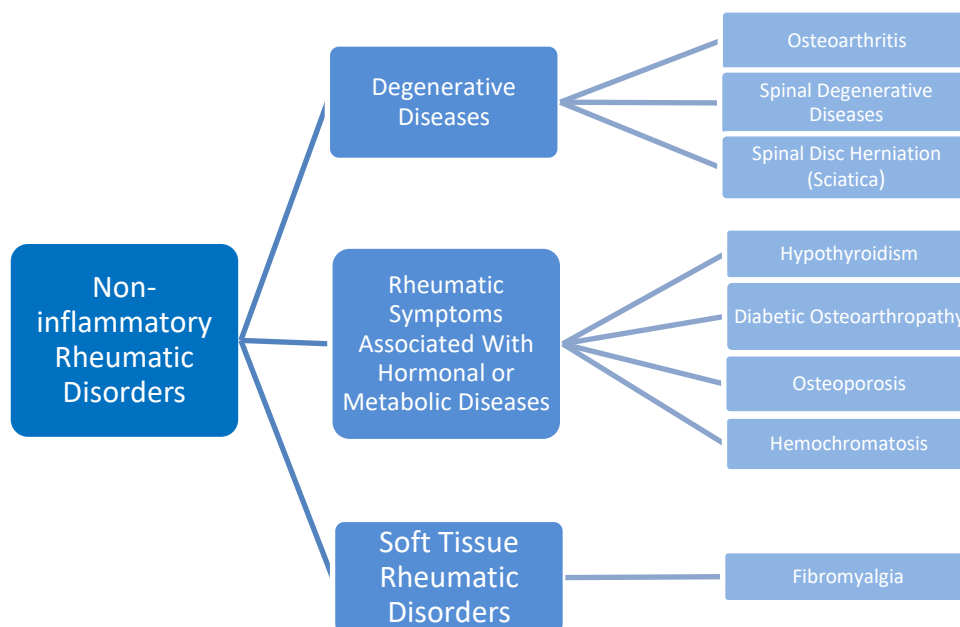


Figure 1. Non-inflammatory Rheumatic Disorders and Soft Tissue Rheumatic Disorders classified in the same category (Martio, Karjalainen, Kauppi, Kukkurainen & Kyngäs 2007, 11)

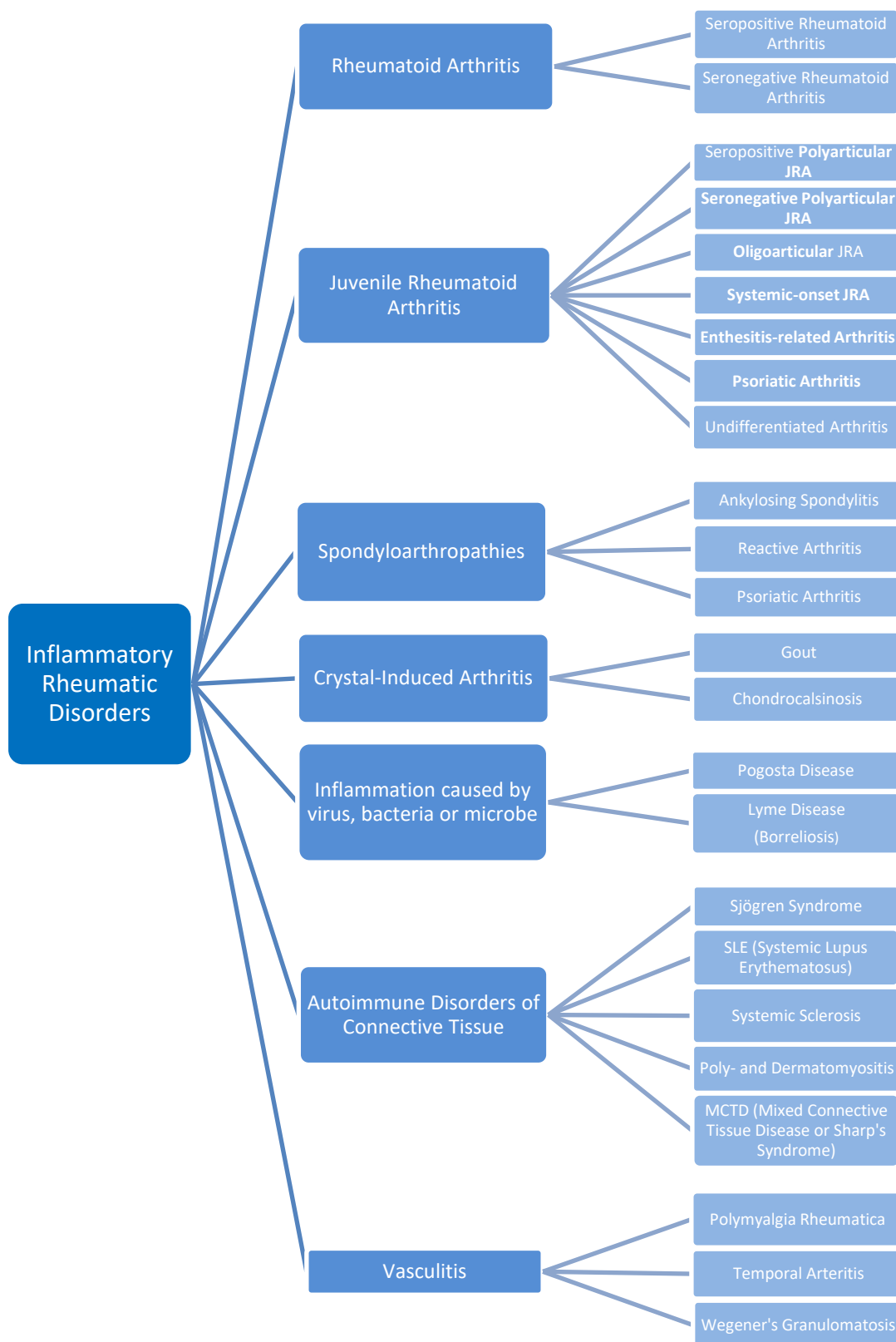
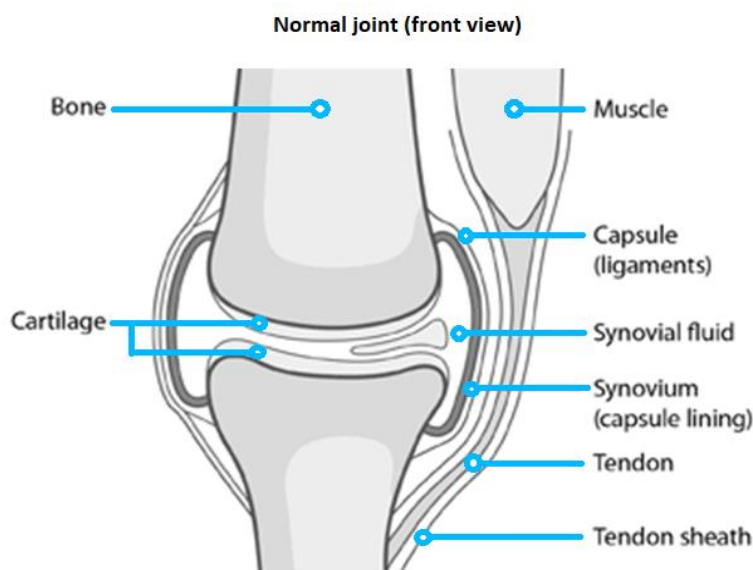


Figure 2. Inflammatory Rheumatic Disorders (Martio, Karjalainen, Kauppi, Kukkurainen & Kyngäs 2007, 11)

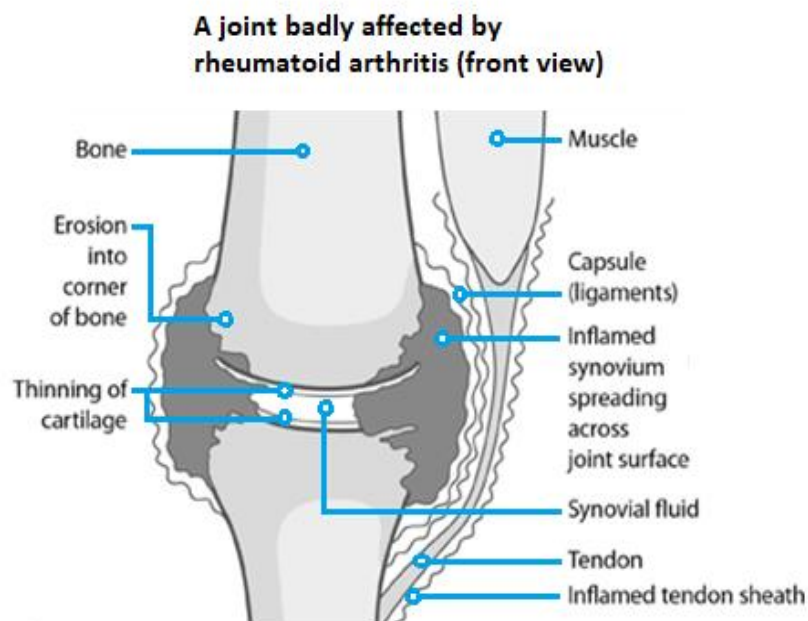
3.2 Pathogenesis

Rheumatoid arthritis is an autoimmune disease, which means that a triggering factor causes the immune system to activate long lastingly in genetically susceptible person. (Martio, Karjalainen, Kauppi, Kukkurainen & Kyngäs 2007, 10-12) Healthy immune system attacks foreign substances like bacteria and viruses in body by creating inflammation. Yet in an autoimmune disease, the immune system mistakenly attacks healthy tissue, which are the joints and tissue surrounding them in this case. (Website of American College of Rheumatology 2018)

When a triggering factor, a component of a virus or bacteria arrives at a joint, it is detected to be a foreign substance on the surface of antigen cell. After that immunological cells react and secrete small molecular proteins called cytokines. Cytokines stimulate the cells of synovial membrane to propagate in the manner of cancerous tissue and to secrete enzymes that break down tissues. Hereby excess fluid form in the joint and the attributes of synovial fluid transform so that the viscosity decreases, which is observed as running-like fluid. As the inflammation process proceeds, cartilage thins out and corrodes. Thin and corroded cartilage leads to bone tissue damage beneath the cartilage. The ability of joint cartilage to reform is poor. (Website of Terveystiete 2018) Picture 1 and 2 show the difference of healthy and affected joint.



Picture 1. Normal joint surrounded by healthy tissues. (Website of Arthritis Research UK 2018)



Picture 2. Far progressed, inflamed joint with bone erosion and thin cartilage. (Website of Arthritis Research UK 2018)

The etiology of rheumatoid arthritis is not entirely known although knowledge of the molecular pathogenesis has increased tremendously during the past two decades. Genetics, environmental factors, cellular abnormalities and the interaction between genes and environment are the identified triggering factors that play a role in initiating the disease. For the most part, the exact cause is unknown. (Weisman 2011, 15)

It has been affirmed through studies of families and of monozygotic and dizygotic twins that genetics have an influence on developing rheumatoid arthritis by 60 percent. (Weisman 2011, 15) People with a genetic marker, the HLA shared epitope, have five times greater risk of developing rheumatoid arthritis than people who do not have the HLA marker. The HLA shared epitope is a gene that has the control over immune responses. There are also other gene markers that have been found to be related to rheumatoid arthritis. STAT4 is a gene responsible for the regulation and activation of the immune system. TRAF1 and C5 are essential genes when it comes to chronic inflammation. PTPN22 –gene is connected to the development and progression of rheumatoid arthritis. It's important to note that not necessary all people with these genes

fall sick with rheumatoid arthritis and not all people who have rheumatoid arthritis have these genes. (Website of Arthritis Foundation 2018)

The main environmental factor is smoking cigarette. Smoking has been found to increase the risk of fall sick with seropositive but not seronegative rheumatoid arthritis. Hart et al. found that the prevalence of rheumatoid arthritis differed from region to region. The higher the prevalence rate, the greater was the amount of air pollution. Environmental factors such as diet, infections, blood transfusions, silica and mineral oils have been studied but the evidence behind is contradictory. (Weisman 2011, 16-17)

Researchers have studied the HLA and PTPN22 markers regarding the interaction between smoking and genetic inheritance. Gene-environment interaction has been found between smoking and the HLA gene, which contributes to seropositive rheumatoid arthritis but not to seronegative rheumatoid arthritis. There has also been found some evidence behind that when there's multiple gene-environment interaction between heavy smoking and PTPN22 it predisposes to higher risk of rheumatoid arthritis. (Weisman 2011, 17)

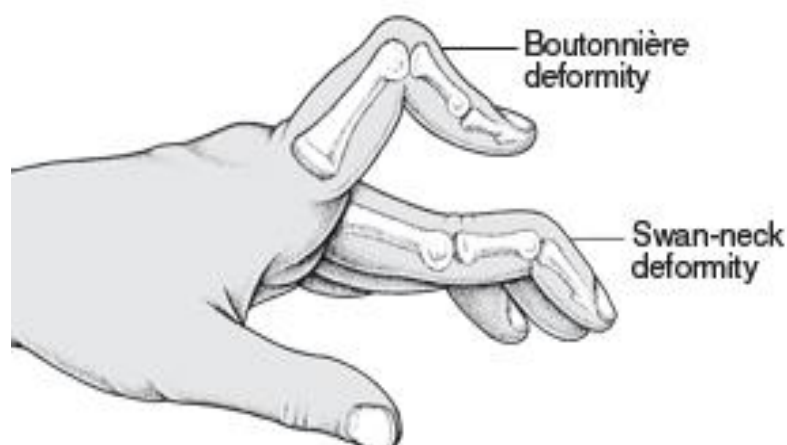
The separation between seropositive and seronegative rheumatoid arthritis is determined by blood tests. Seropositive is more common, about 60-80% of people with rheumatoid arthritis are seropositive, which means that their blood has antibodies called anti-cyclic citrullinated peptides or anti-CCP. These antibodies are produced against proteins that undergo citrullination, a molecular change in structure. In order to be able to diagnose rheumatoid arthritis, patient must also have the symptoms in addition to positive blood test. Seronegative rheumatoid arthritis is diagnosed when blood test indicates the absence of anti-CCP antibodies, even though patient has broad scale of the symptoms of rheumatoid arthritis. (Website of Arthritis Foundation 2018)

3.3 Symptoms and signs

The most common symptoms of rheumatoid arthritis are swelling, pain and morning stiffness in the peripheral joints. At the outset of the disease joint swelling appear only

in a few joint, but eventually is symmetric in its settled form. In the beginning, swelling appears in the upper extremities in over half of patients. (Weisman 2011, 23)

Over half of the rheumatoid arthritis patients experience pain, warmth and swelling in the metacarpophalangeal (MCP) and proximal interphalangeal (PIP) joints often symmetrically. Painless, sudden loss of extension or flexion in these joints indicates tendon ruptures. In addition, the grip strength of hand decreases. As rheumatoid arthritis progresses further, the anatomic disturbances of the integrity of the joint surfaces, ligaments, and tendons cause visible joint deformities like Boutonnière and Swan-neck shown in Picture 3. (Weisman 2011, 25)



Picture 3. Boutonnière and Swan-neck deformities. (Website of Merck Manuals 2018)

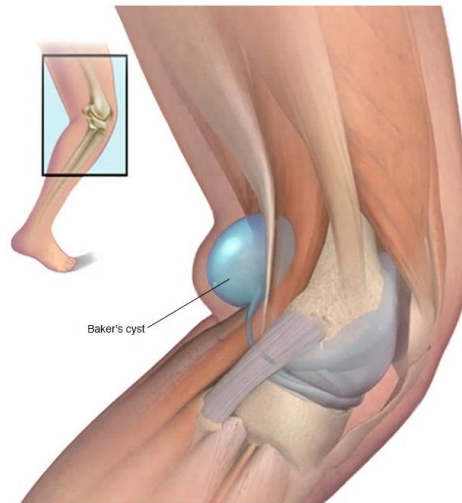
Symmetric pain, swelling and limited range of motion in wrist occur up to half of the patients in the first two years from the outset. Swelling is most noticeable in dorsal direction and over the ulnar styloid. Apparent swelling and thickening of the extensor carpi ulnaris tendon sheath is typical. Ongoing inflammation can cause tenosynovitis, erosions and nerve compression. Tenosynovitis causes pain to occur on the radial side of the wrist and may radiate in to the proximal direction. Chronic inflammation leads to deformities, loss of function and bony abrasion, affecting adjacent tendons so that tendon ruptures. (Weisman 2011, 25)

In the elbow mild erosions are experienced by one-third of patients and severe erosions by 18 percent. Erosions are most apparent in the capitellum, the lateral epicondyle and the olecranon. Mild flexion contractures and nodule formation on the extensor side of the elbow can cause cortical bone erosions in the ulna and radius. They appear like scalloped defects. The valgus angulation may become three times larger than normal and severe flexion contractures occur as the inflammation continues, which leads to functional disability. Compensatory movements of wrist and shoulders are used due to the loss of full extension of elbow. (Weisman 2011, 26)

In the shoulder mild erosions are experienced by 27 percent and severe erosions by 21 percent of patients. Shoulder pain and stiffness occur. Patient experiences difficulties with sleeping. Shoulder range of motion is decreased. Abduction and external rotation of the affected arm is limited. This can affect shoulder joint, rotator cuff muscles and shoulder bursa. As inflammation continues it can cause damage in the rotator cuff muscles and superior subluxation of the humeral head to occur. (Weisman 2011, 26)

Foot and ankle symptoms are experienced by 90 percent of the patients. During walking and weight-bearing pain occurs. Forefoot is usually painful. Swelling of feet is typical and patient may need to increase in their shoe size. Swelling of the soft tissues of the metatarsal-phalangeal joints and synovium can cause the metatarsal heads to spread in lateral direction leading to a light shining between the toes that can be observed. Hallux valgus develops. Paresthesia occurs if synovitis compresses the tarsal tunnel in which the posterior tibial nerve goes through. (Weisman 2011, 27)

Symptoms in the knee are experienced by 70 to 80 percent. Pain occurs during weight-bearing and as the movement of the knee is restricted. Tenacious inflammation emerges with weakness, contractures and walking difficulties. Popliteal or Baker's cysts build up. Picture 4 shows the bulge that cyst causes behind the knee. (Weisman 2011, 28)



Picture 4. Baker's or Popliteal cyst is a fluid-filled cyst that causes a bulge and tightness behind knee. Pain can occur when knee is flexed or extended. (Website of Mayo Clinic 2018)

Hip involvement is experienced by 10 percent of patients who has had rheumatoid arthritis less than 10 years and 40 percent by those who have had it more than 10 years. Symptoms in the hip are usually stiffness and groin pain. Pain can also have reference from the hip to the medial knee. Range of motion is limited by pain and it can affect all directions, starting from the rotation. (Weisman 2011, 28)

3.4 Treatment

The treatment of rheumatoid arthritis is versatile. To the progression of rheumatoid arthritis only medication is proven to have an effect, yet other treatments have a big impact on quality of life and the patient's ability to function. The most important thing in treating rheumatoid arthritis is to eliminate inflammation. In addition, important goals are to relieve symptoms and improve physical functioning. Guidance and patient education, medication, follow-ups, physical therapy and rehabilitation, mobility aids and supports, proper nutrition, social and mental support, surgical care are all aspects of treating rheumatoid arthritis patient. (Martio 2017, 7)

Physical activity is considered one of the main parts of the rheumatoid arthritis treatment. (Website of Arthritis Foundation 2018) Physical activity increases strength,

flexibility and decreases pain and stiffness. Exercising controls body weight, improves circulation and carrying nutrients all over the body. (Newman 2007, 31) Aerobic, muscle strengthening, range of motion and stretching exercises are recommended for rheumatoid arthritis patients. (Website of Terveysportti 2018)

Aerobic exercising should be done three to five times a week at least for 30 minutes per session or divided in 10-minute periods throughout the day. Especially permanent damages of joints in lower extremities should be taken into consideration when planning types and duration of exercise. (Website of Terveysportti 2018)

Muscle strengthening exercises are suggested to include in weekly routine. If there's a need to increase strength exercises are suggested to be done two to three times a week. If maintaining already achieved strength level is the goal, exercising muscle strength is suggested one to two times in a week. (Website of Terveysportti 2018)

Range of motion exercises are done in all directions of joint, moving only as far as it is comfortable. Range of motion exercises reduce pain and stiffness of joints, maintain flexibility and enhance joint functioning. Stretching is similar type as range of motion exercising, but joints are stretched to the point that is only just convenient. Stretching a joint should never cause excessive pain and neither should be bouncing used to increase movement of a joint. Range of motion and stretching exercises are suggested to be done once or two times a day or whenever stiffness occurs. (Shlotzhauer 2003, 100)

Stretching and range of motion are also primary exercises to be done in warm-up phase before any exercise routine. These exercises make muscles ready for exercises that are higher in intensity. Warming up allows the joints and muscles to loosen up at a low speed gradually. Exercising should not be done if joints and muscles remain tight after warm-up. Cool down after exercise allows muscles to relax and lows down the heart and breathing rate back to normal. Cool down also prevents pain and anxiety after work-out. Low intensity and slow-motion aerobic exercising and range of motion exercises are suitable for cool down. (Shlotzhauer 2003, 101-102)

Both exercise and proper rest are crucial in the treatment plan of rheumatoid arthritis. It's important to learn to find balance of activity and rest that suits individual's needs.

(Shlotzhauer 2003, 98) When there's pain, swelling and stiffness in joints, rest is needed. Resting reduces inflammation and fatigue in joints and muscles. Relaxation techniques, different deep breathing techniques, guided imagery and visualization exercises can be helpful tools for relaxing muscles and calm down both the mind and body. (Website of Arthritis Foundation 2018)

Heat and cold treatments are helpful in managing symptoms. Heat treatments, such as hot baths and heating pads are best for alleviating stiff and sore joints and muscles. Heat decreases stiffness by increasing circulation. Cold is beneficial for acute pain, it numbs pain and reduces swelling and inflammation. Combination of heat and cold treatments by alternating cold and heat in the affected area is usually used for sudden outbursts of inflammation. (Newman 2007, 13-14)

Different medications are used to decrease the symptoms and slow down the disease activity. Nonsteroidal anti-inflammatory drugs are taken to ease pain and decrease inflammation. Corticosteroids are used short-term to put the damaging inflammation under control. Disease-modifying anti-rheumatic drugs modify the direction and rate of the disease. Biologics are a medication subset of disease-modifying anti-rheumatic drugs, which address specific parts of the inflammatory process, but they don't dispose of the whole immune response. (Website of Arthritis Foundation 2018)

4 WORKING ABILITY AMONG PEOPLE WITH RHEUMATOID ARTHRITIS

Decreased working ability is common issue among rheumatoid arthritis patients. Working disability is the result of the disease in the long term. Patients develop a high risk of work disability from the very beginning of rheumatoid arthritis symptoms. Prospective studies (Table 1) from Finland, Sweden, Germany, Great Britain and Netherlands show that approximately 25% rheumatoid arthritis patients become permanently work disabled during the first years of the disease. (Sokka 2003)

Table 1. Prospective studies of work disability in rheumatoid arthritis patients including patients of early years of disease onset. (Sokka 2003)

Reference	Year	Number of patients	Mean disease duration (years) at review	% working at review
Kaarela et al.	1987	103	1	69%
Jääntti et al.	1999		20	20%
Borg et al.	1991	83	2	63%
Mau et al.	1996	73	6	51%
Fex et al.	1998	86	7	66%
Sokka et al.	1999	82	10	58%
Albers et al.	1999	186	3	58%
Barrett et al.	2000	160	10	61%
Barrett et al.	2000	134	2	67%
Newhall-Perry et al.	2000	95	1	82%
Paimela et al.	2000	102	7	70%
Young et al.	2002	353	5	60%
Puolakka et al.	2002	80 on combination,	5	80%
		82 single disease modifying anti-rheumatic drug	5	71%
Häkkinen et al.	2003	50	2	68%

High rates of permanent work disability in rheumatoid arthritis patients have been studied and affirmed in various cross-sectional and longitudinal observational studies (Table 2) done both in Finland and USA. Once working disability is obtained by a patient he or she generally never returns to work. Physically demanding job, older age, lower educational level and level of functional disability in everyday activities are risk factors for developing work disability. Younger and well-educated patients who have less physically demanding jobs tend to maintain their working ability better. (Sokka 2003)

Table 2. Cross sectional and longitudinal studies of work disability in rheumatoid arthritis patients. (Sokka 2003)

Reference	Year	Type of study	Number of patients	Mean disease duration (years) at start/at review	% working at review
Yelin et al.	1980	Cross sectional	180	10	40%
Mäkisara & Mäkisara	1982	Cross sectional	405	10	50%
Pincus et al.	1984	Longitudinal 9 yrs	75	11/20	15%
Yelin et al.	1987	Longitudinal 4 yrs	306	10/14	50%
Reisine et al.	1989	Cross sectional	122	NA	57%
Callahan et al.	1992	Cross sectional	175	11	28%
Doeglas et al.	1995	Cross sectional	119	2	58%
Reisine et al.	1995	Longitudinal 5 yrs	392	9/14	66%
Allaire et al.	1996	Cross sectional	469	7	78%
Van Jaarsveld et al.	1998	Cross sectional	211	3	75%
Wolfe & Hawley	1998	Longitudinal 18 yrs	436	5/NA	NA
De Roos & Callahan	1999	Cross sectional	705	11	64%
Chorus et al.	2001	Cross sectional	720	Range 2-32	52%
Sokka & Pincus,	2001	Cross sectional	127	2	90%
Odegard et al.	2003	Longitudinal 7 yrs	159	8/15	60%

In 2000 a study was done by Andersson et al. to explore whether a multidisciplinary team care could preserve working ability in patients with early rheumatoid arthritis. Preliminary data of the study demonstrate that active therapy with DMARDs together with multidisciplinary team care may lower permanent work disability rates in early rheumatoid arthritis patients. The data shows that the number of patients who was on full-time sick-leave decreased from 34% to 14% in a year, and only one of 111 patients retired during that time. (Sokka 2003)

The burden of a chronic disease diagnosis can cause physiological distress and suffering for the patient. Moreover, long-time unemployment can result in to the development of an "unemployed mentality" that also plays a role in patients' distress. To prevent work disability counselling with a social worker, physical therapist, occupational therapist, and a psychologist may be worthwhile in early rheumatoid arthritis treatment. (Sokka 2003)

5 EXERCISE DURING BREAKS

Monotonous working positions during daily work routines cause tension in muscles and the resulting tension causes fatigue in muscles. Taking short breaks for exercise prevents these conditions. Exercise breaks are an excellent reason for interrupting daily work and freshen both the mind and body. The ability to be observant, accurate and high-spirited enhances from physically active breaks. Exercising during breaks increase one's prosperity at work and the outcome of work. Active breaks are also a good way to socialize with colleagues and enhance atmosphere and togetherness at work. (Pesola 2015, 52)

Exercises during breaks at work does not require much time and they are easy to carry out. Simple and light exercises decrease the pressure towards joints and reduce attrition and compression of joint structures. The main goal of this type of exercising is to enhance circulation in muscles and limber the joints and overall body rather than building strength or muscles. "Pumping" type of muscle work is characteristic to exercises to be done during breaks. Pump tenses the muscle and as the pump is released, relaxation of the muscles follows right after. This type of movement improves the metabolism of muscular tissues. It enhances blood circulation in muscle, which allows carriage of oxygen to the muscle and substrate agents to exit better. (Pesola 2015, 52) Pumping exercises are simply dynamic exercises in which the pumping movement influences the origin and insertion of a muscle causing the muscle to lengthen and shorten. Dynamic exercises are great for breaks since dynamic movement acts as counterbalance especially for static work. (Suominen 2011, 16)

In the beginning it is recommended to keep the amount of exercises short. More likely a person is more motivated to do couple of exercises rather than large amount of different exercises that takes longer time. Alternatively, couple exercises take shorter amount of time and are more likely to be done several times a day as the long length of exercises is not disturbing motivation. Regularity is essential in exercising during breaks. In addition, it is easier to evaluate results and effectiveness of exercises when the amount is kept short. As time passes and the technique of exercises is carefully adopted, more exercises can be added to the routine. (Aalto 2006, 79; 102)

Even though stretching is recommended to be done before and after proper exercise routines, it is also noteworthy to take stretching exercises part of the daily routine and work. Stretching affects positively both mind and body, muscle balance and in the long-term to the posture. (Aalto 2006, 124) Short exercise routine that is done during break is started with dynamic, pumping type of exercises proceeding to stretching towards the end of exercise break. The most convenient way to warm up muscles is dynamic muscle work. Properly warmed muscles are more receptive to stretching exercises. (Suominen 2011, 16) Adding calm way of breathing enhances the refreshing effects of exercises and stretching in the whole body. Focusing on breathing calmly and steadily relaxes both mind and body. (Aalto 2006, 102)

6 GYMTAIL

Gymtail is relatively new exercise tool. It has been developed in collaboration with Satakunta University of Applied Sciences and Sampola daytime activity center. (Hanula 2013, 42) The initial idea of Gymtail was developed accidentally in form of speaking by Hanna-Liisa Niemi, who worked in Sampola daytime activity center and studied social studies in SAMK. Her idea was to combine two previously produced goods by the activity center; the resistance band and dog's pull toy. Niemi introduced gymtail to Kati Karinharju, teacher in SAMK, for purposes of testing the tool in sense of exercise. Karinharju became enthusiastic about the tool and developing continued. (Valtokivi 2012, 10) Gymtail ended up as a representative gift of the enterprise of Satakunta University of Applied Sciences because it fits into SAMK's philosophy of

being different from others, it is self-developed and promoting wellbeing. The colors of Gymtail are also SAMK's brand colors; white and turquoise. (Hannula 2013, 42) Gymtail comes in package that includes a leaflet of basic exercises as shown in Picture 5.



Picture 5. Gymtail, its original package and information leaflet with exercises. (Tommila 2013)

Gymtails are handmade and prepared from carpet wefts making it affordable, recyclable and washable fitness tool. The old-fashioned technique that is used in producing is familiar for many. (Hannula 2013, 42) Productization and developing services of Gymtail transferred under Soteekki in the beginning of 2014. (Tommila 2013, 8) Soteekki is student-centered service center owned by Satakunta University of Applied Sciences, which offers social and health care services for private customers, organizations or enterprises. (Website of the Satakunta University of Applied Sciences, 2018)

Gymtail has features both of exercise stick and resistance band. Similar exercises can be executed with Gymtail as they would be with an exercise stick. Gymtail is flexible in its material and therefore resistance is adjustable. Thanks to its length (about 36 cm without stretching the equipment) and braided surface, resistance can be adjusted by different gripping. Braided surface makes it pleasant against the skin and stimulates blood circulation. Gymtail is light in weight, simple and safe, making it suitable for novice. (Tommila 2013, 11)

Gymtail is versatile equipment since it enables various types of exercising. Mobility, stretching and muscle training can all be executed with it. The braided and soft, blood circulation enhancing surface makes it suitable for relaxing exercises as well. (Tommila 2013, 11) Due to its versatility, Gymtail can be used in variable intensities of exercise. It is suitable for both group and individual exercising and it applies all ages from children to elderly. (Hannula 2013, 42-43)

Gymtail is an exercise tool that supports sustainable practices, which intention is to enhance health and wellbeing in the bigger picture. It strives to promote physical activity and functional ability nationwide. (Tommila 2013, 11)

7 EXERCISE PACKAGE

In addition to the theoretical part of this thesis, the functional part and final product of the thesis is the exercise program done with Gymtail. The actual product is a leaflet (Appendix 1). The exercise program is planned in collaboration with Reumaliitto. The program is designed for rheumatoid arthritis patients who are in working life. Exercises are intended to do during breaks at work.

Exercises are based on the main joints that are affected in rheumatoid arthritis: toes, ankles, knees, hip, shoulders, elbows and fingers and muscles that surround these joints. Exercises enhance the range of motion of joints, muscle strength, mobility and overall balance of the body. These exercises are intended to maintain working ability among rheumatoid arthritis patients.

Exercises are simple and the whole program takes approximately 5-10 minutes, thus it is ideal for breaks at work. Repetitions of every exercise are recommended to do 10-20, depending on one's condition and time available. Exercises are done within one's own limit of pain and moving only as far as it is comfortable. Stretching exercise is recommended to do 30-60 seconds with both legs. Over-stretching and going too far in range of motion in stretching exercise should be avoided. Joints are stretched to the

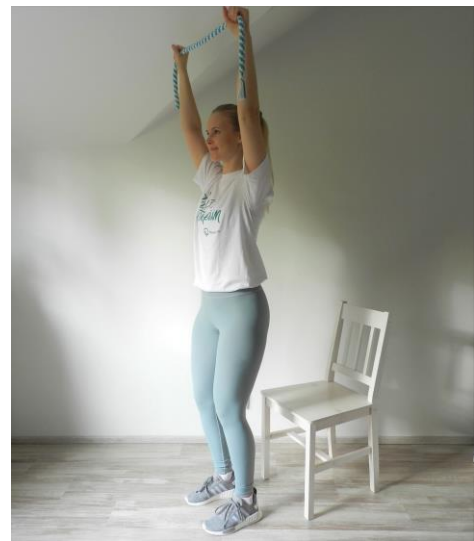
point that is only just convenient. If pain occurs, exercise should not be done. Adding calm breathing in to exercises enhances the benefits.

Exercise program is recommended to do at least once during the work day but having several breaks for exercise may be more beneficial. Taking regularly short breaks for exercise prevents tension and fatigue in muscles. Exercising during breaks is a smart reason for interrupting daily work and freshen both the mind and body. The ability to be observant, accurate and high-spirited enhances from physically active breaks and that way it increases one's prosperity at work and the outcome of work.

1. Standing up and shoulder range of motion

Sit on the edge of a chair in a good posture. Take a shoulder wide grip of your Gymtail. Stand up from the chair and raise the Gymtail up with straight arms. Focus the movement from the shoulders and keep your head and trunk in place. Go as far as it's comfortable. Sit back on the chair and repeat. Combine breathing so that as you stand up breath in and as you go down breath out.

The exercise enhances shoulder range of motion, mobility and strengthens lower extremities.



2. Archer

Stand steadily with a good core stability. Take a slightly wider than shoulder width grip of Gymtail. Pull Gymtail backwards and forwards with alternating right and left hands. As the other hand pulls backwards, the other hand presses forward and stretches shoulder blade. Combine breathing.

The exercise enhances mobility of thoracic spine, shoulder blades and elbow joints.



3. Waking up ankles and toes

Sit in a good posture. Tie the Gymtail hip width around there where your toes begin. Alternatively flex and extend ankles and toes, so that when you extend ankles you flex toes at the same time. As you flex ankles, extend toes at the same time. Repeat these alternatively. Try not to drop Gymtail down.

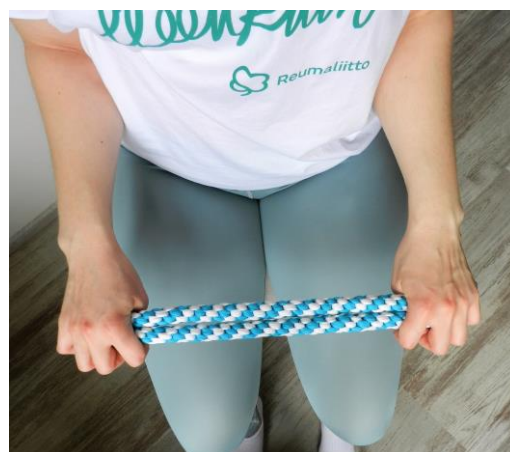
The exercise enhances mobility of ankles and toes and strengthens lower extremities overall.



4. Finger grab

Sit or stand in a good posture. Keep the Gymtail two-folded on your lap or on a table. Grab the Gymtail with your fingers and release it down as you extend your fingers widely.

The exercise enhances mobility of fingers and strengthens the muscles of fingers and palms.



5. Stretch and balance

In standing position put Gymtail around your ankle as a loop and grab from the ends of Gymtail. Activate your core and roll shoulders backwards. Lift your heel towards glutes and knee backwards with the help of Gymtail. Take support from a table or chair if needed. Breathe calmly and deeply in the position for 30-60 seconds.

The exercise enhances the mobility of knees and hips and stretches thighs and hip flexors. The exercise also enhances balance.



8 THESIS PROCESS

Thesis process started in Spring 2016, first as an idea to invent exercises for children and youngsters with Gymtail. The topic changed into adults in Summer 2016 when a meeting with Reumaliitto took place. There was not really a need to plan exercises for children anymore so one of the other ideas was to create exercises for working age people. The exercises were meant to design for Keltaisennauhan päivä, which is a recreational day for working age people with rheumatoid disease. The topic of the thesis was narrowed down into one specific disease from the spectrum of rheumatoid disorders. Based on author's interest, rheumatoid arthritis, as the most common of the rheumatoid diseases was chosen.

Thesis topic presentation took place in fall 2016. Beginning of researching and writing theory occurred in winter time 2016. During spring 2017 thesis process was on hold due to author's long clinical practice abroad. In the fall 2017, theory was continued slowly. In spring 2018 brainstorming exercises occurred, and to gain ideas and insight different kind of exercises with Gymtail were performed and tried out in a rheumatism group in a clinical practice. In summer 2018 most and last of the theory was written and exercises chosen for the package. Exercises were photographed, and the leaflet of instructions and exercises were put together in fall 2018. Final presentation of the thesis took place in the late fall of 2018.

During the thesis process lot of researching was focused on rheumatoid arthritis itself as one of the rheumatoid spectrum disorders and exercising with the condition. Various other important themes were also researched, such as Gymtail as an exercise tool, working ability and working ability among rheumatoid arthritis patients. In the functional part researching was centralized on exercising during breaks. This information was reflected to the background of the disease and joints affected to be able to gather the package of exercises. The most problematic task was to find trustworthy theory about exercising during breaks at work, but luckily quite recent opus by Pesola was found. The Figure 3 shows the progression and timeline of the whole thesis process.

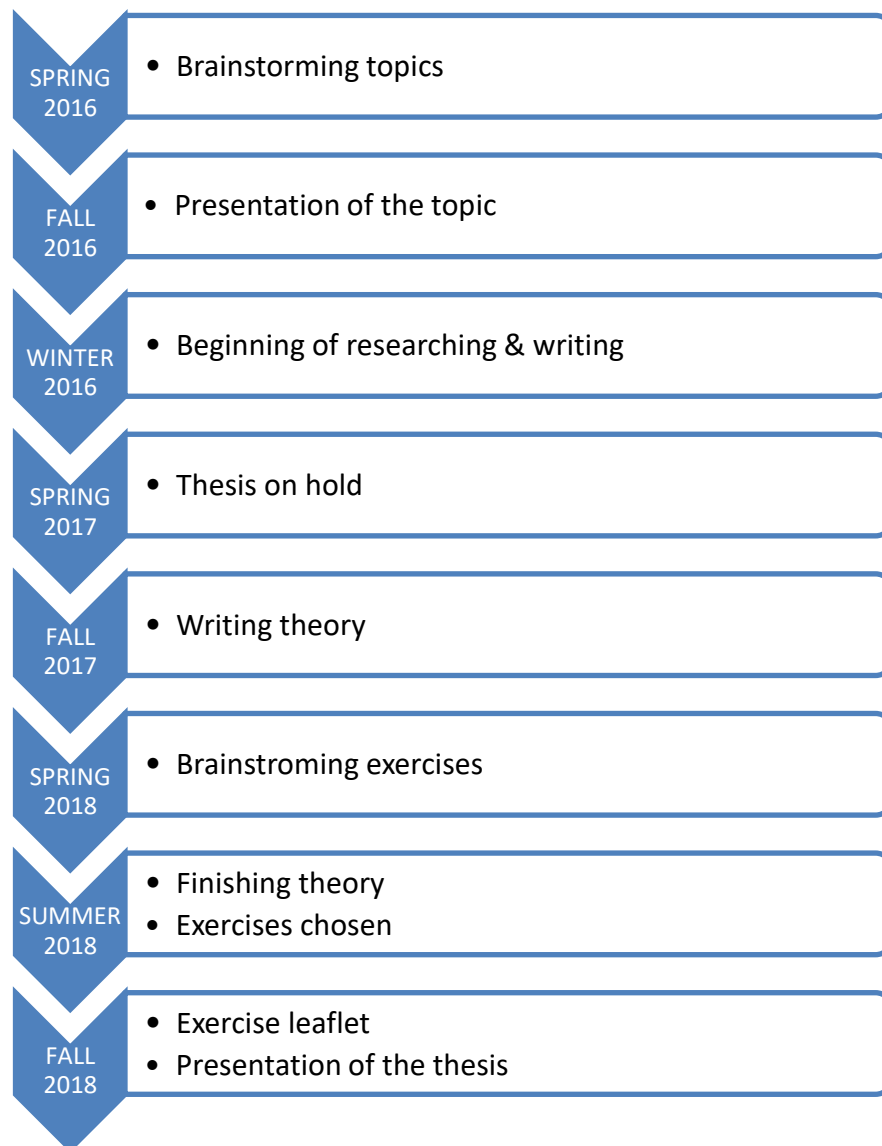


Figure 3. The timeline of the thesis process.

9 DISCUSSION

During the process the author gained knowledge from various themes and gained skills and knowledge that will be useful later in working life. Knowledge was collected and learned about rheumatoid arthritis itself, working ability with rheumatoid arthritis, inflammatory diseases overall, different treatment options, exercises during breaks, inflammation reducing exercising, sustainability and Gymtail as an exercise tool. Skills

of writing, researching, evaluating information, scheduling process, inventing exercises, photographing and putting up the leaflet were all learned and improved. During the process the author got to use creativity when inventing the exercises and making and putting up the leaflet. Exercises intended for this thesis are based on reliable literature and research, which gives it the physiotherapist view point. Every exercise is based on the facts of rheumatoid arthritis and how it affects joints and information about exercising during breaks and how it is recommended to be performed.

The product of the thesis is the exercise leaflet for rheumatoid arthritis patients. The leaflet includes five exercises designed to do during the work day. The leaflet has pictures of every exercise and instructions how to perform them. Leaflet also includes information about Gyntail and exercising during breaks. The product layout was created by using the website of Canva and printed couple copies in printing enterprise to have an actual product in hand. The product layout is put together so that the A4 piece of paper is supposed to fold into 4 in special order. The leaflet is a product that is ready to be used right away in working life for the purposes of Reumaliitto.

In the future there are many interesting and inspiring projects that could be executed with Gyntail. The exercises introduced in this thesis could be tested on rheumatoid arthritis patients for a specific time and evaluate the results and functionality. Based on that information exercises could be rechecked. Since the rheumatoid disorder spectrum is so wide, specific exercises could be invented for other rheumatoid disorders. Exercises with Gyntail could also be created for a specific age group like elderly or children. In addition to these, exercises could be invented for a specific disease other than rheumatoid diseases or for different professions to use during breaks considering the needs and loadings of a profession.

Possibilities, different perspectives and types of projects are many. Respecting sustainability and principles of producing practices of Gyntail, the equipment could also be reproduced as a subsidiary product, for example smaller version of Gyntail. Small Gyntail could be used for hand exercise purposes for rheumatoid arthritis patients. Lastly but very important project would be to renew and put up the websites of Gym-

tail, which were originally done by Tommila's thesis product in 2013, since the websites have been taken down. All exercises that have been invented for Gymtail could be added there and the coming exercises updated once released.

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APPENDIX 1

5. Veny & Tasapainoile!

Tee jumppahännästä silmukka nilkan tai jalkaterän ympäri. Tiivistä vatsan seutu ja tuo olkapäät taakse. Lähde viemään polvea taaksepäin ja kantapäätä kohti pakaraa. Voit ottaa tukea vapaalla kädellä.

Pidä venytys 30-60 sekuntia. Hengitä syvään ja rauhallisesti.

Liike lisää lonkan ja polven liikkuvuutta sekä venyttää etureittä ja lonkankoukistajia.



Tämän esitteen jumppahäntä harjoitteet ovat suunniteltu erityisesti nivelreumaa sairastaville työikäisille ylläpitämään työkykyä. Jumppahäntä on kestävä kehitystä tukeva, matonkuteista punomalla valmistettu kevyt liikuntaväline, joka omaa kuminauhan ja jumppakepin ominaisuuksia.

Toistoja suositellaan tehtäväksi 10-20 ainakin kerran päivässä. Liikkeet tehdään kivun sallimissa rajoissa välttämällä äärivenytyksiä ja -liikkeitä. Lisää rauhallinen hengitys tehostamaan liikkeiden vaikutusta. Harjoitteiden tekeminen vie 5-10 minuuttia, joten ne sopivat loistavasti työpäivän lomaan.

Säännölliset taukoliikuntahetket piristävät sekä kehoa että mieltä. Taukoliikunta ehkäisee lihasten väsymistä ja jännittymistä. Lisäksi tarkkaavaisuus ja työn tulos paranevat.

Esite, kuvat & teksti:
Jasmine Narkko, fysioterapeutiksi



JUMPPAHÄNTÄ

Taukoliikunta
työpäivään!

Reumaliitto samk



2. Jousiammuttaa!

Ota hieman hartioita levempi ote. Lähde kurottamaan toisella kädellä eteenpäin venyttämällä kyseisen käden lapaa kun taas toisella kädellä vastusta viemällä lapaa kohti selkärunkoa. Toista vuorotellen.

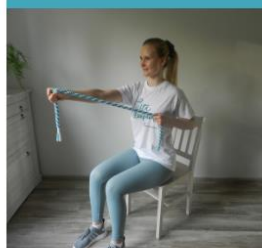
Liike lisää rintarangan, lapojen ja kyynärniveliä liikkuvuutta.



1. Kohoti Tavarasta!

Istu hyvässä ryhdissä ja ota hartioiden levyinen ote. Nouse tuolista samalla tuoden jumppahäntä ylös. Pyri pitämään pää ja keskivartalo paikallaan kun teet liikkeen olkanivelistä.

Liike lisää olkaniveliä liikkuvuutta ja vahvistaa alaraajoja.



3. Herätellään Nilkat & Varpaat!

Solmi jumppahäntä jalkateriesi ympäri kuvien osoittamalla tavalla.

Istu hyvässä ryhdissä ja ojenna polvet suoriksi. Ojenna nilkat ja koukista varpaat samanaikaisesti. Vuorostaan koukista nilkat ja ojenna varpaat. Toista vuorotellen koukistaen ja ojentaen nilkkoja ja varpaita.

Liike vetreyttää nilkkojen ja varpaiden niveliä sekä vahvistaa jalkojen lihaksia.



4. Nappaa & Vapautta!

Istu ryhdikkäässä asennossa. Nappaa sormillasi jumppahäntä ja purista nyrkkiin. Vapautta jumppahäntä suoristaen sormet auki leveästi.

Liike vahvistaa sormiesi ja kämmeniesi lihaksia ja vetreyttää sormien niveliä.