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INFLUENCE OF AN ONLINE FITNESS PROGRAM ON CHRONIC, NON-SPECIFIC LOW BACK PAIN – CASE STUDY

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The aim of the thesis was to study the influence of an online fitness program on chronic, non-specific low back pain in a physically inactive female with chronic pain and a history of severe, recurrent major depressive disorder by conducting a 10-week-long online exercise program. The objectives of the thesis related to the experienced levels of pain and disability, lumbar movement control and the tactile acuity of the low back pain. The design of the research was a case study.

The concepts of chronic pain and associated factors, pain and disability assessment tools, evidence-based physiotherapy practice, online fitness programs and case study design are defined in the theoretical framework. The case study is being referred to the theory throughout the theoretical framework.

As a conclusion of the study, the online fitness program seemed to have only a little effect on the pain level, a small effect on level of disability, and no effect on lumbar movement control nor tactile acuity of the low back.

CONTENTS

1 INTRODUCTION

Low back pain is the most common condition affecting people worldwide by causing activity limitations and work absences. The condition increases and peaks in the ages between 35 and 55, and it is more common among women than men. (Kaplan et al. 2013, 166; Meucci, Fassa & Faria 2015, 1.) It is estimated, that 5 to 10 % of low back pain cases develop into chronic state leading into lengthened sick leaves and economical distress due to high treatment costs (Meucci, Fassa & Faria 2015, 1). According to Lehtola (2017), 85 % of chronic low back cases are non-specific in their type.

Simultaneously, health and wellness concept is one of the biggest trends of the early 21st century. People worldwide consumed total of 552,23 billion euros on health and wellness services and products in 2016, and the consumption is expected to grow up to 706 billion euros by 2021. (Weinswig 2017.) One field of the concept is online fitness programming, which aims to provide ready-made exercise programs to consumers via internet. In 2017, the consumption of online fitness programming was 0,76 billion euros, and it is expected to grow up to 2,3 billion euros by 2022 (Website of SBWire 2019).

This thesis examines the influence of an online fitness program on a 29-year-old female, who has had low back pain for the last 15 years without any pathological cause. The thesis considers chronic pain in a pervasive way, covers the physiotherapeutic examination methods, and addresses the evidence-based practice methods when treating clients with chronic, non-specific low back pain. In addition, the thesis is written in an understandable manner, thus the readers, who are lacking deeper understanding and knowledge of pain chronicity and associated topics, are able to read and understand the thesis more properly.

2 AIM AND OBJECTIVES OF THE THESIS

The aim of this thesis is to study the influence of an online fitness program on chronic, non-specific low back pain in a person, who has had chronic pain for 15 years, does not have a former gym exercising background, and has been diagnosed with severe depression in 2006, but is currently in the remission phase. The study is done in a form of case study.

The research questions in this case study are as follows:

1. How the online fitness program affects the level of pain?
2. How does the examinee experience the level of disability?
3. How does the online fitness program affect the examinee's ability to control lumbar movements?
4. How does the online fitness program affect the tactile acuity of the low back area?

3 CHRONIC PAIN

According to the International Association for the Study of Pain (Website of IASP 2017), pain is an unpleasant, subjectively felt sensory and emotional experience, that is associated with actual or potential tissue damage, or described in terms of such damage. Depending on the pain duration, pain can be divided into three phases. The first phase is acute pain, where pain is experienced less than six weeks. The second phase is sub-acute pain, where pain is experienced more than six weeks and less than 12 weeks. The third phase is chronic pain, where pain is experienced more than 12 weeks. (Website of Käypä hoito 2017.)

In case of low back pain, the pain can be divided into three categories according to its specificity. In the first category, the pain is caused by a possible severe disease or specific back illness, for example a metastasis or an ankylosing spondylitis. These conditions may cause severe symptoms, and a surgical operation may be required. In

the second category, the pain occurs due to nerve root dysfunction, such as sciatica, and conservative treatment is adequate in most cases. In the third category, the pain is caused by a non-specific back condition, for example a movement control impairment in one or more directions. The treatment for non-specific back conditions is focusing on increasing physical activity, mobility, movement control and muscle strengthening, as well as on educating the patient about pain. (Website of Käypä hoito 2017.)

Low back pain is a global burden for all. It is causing activity limitations to people worldwide, and even though several risk factors have been identified, such as obesity, age, depressive mood and occupational posture, the reason for low back pain onset remains obscure creating challenges in making diagnosis. (Kaplan et al. 2013, 165-166.)

The condition increases and peaks in the ages between 35 and 55, it is more common among women than men, and it is estimated, that 5 to 10 % of low back pain cases develop into chronic state (Kaplan et al. 2013, 166; Meucci, Fassa & Faria 2015, 1.). According to Lehtola (2017), 85 % of chronic low back pain cases are estimated to be non-specific in their type. Prolonged pain and disability lead into lengthened sick leaves, thus imposing economic burden on individuals and families, as well as on communities, industry and government (Kaplan et al. 2013, 166).

3.1 Changes in the brain

Neuroimaging studies have showed a number of structural and functional changes within the brains of the people, who are suffering from chronic musculoskeletal pain. It is also believed, that these changes may contribute to the development and maintenance of the chronic pain state. (Wand et al. 2010, 15.) These changes also affect the cortical homunculus, that is the virtual body existing in the brain above the ear (Butler & Moseley 2013, 23).

The cortical homunculus (figure 1) consists all the parts of the body, even the non-existing ones, and all the parts of the body have sensory receptors. Rather than considering the actual location of one sensory receptor, the brain maps it onto the soma-

tosensory cortex. The more sensory receptors there are in the specific part of the body, the more mapped sensory receptors there are on the surface of the cortex resulting in a larger representation of that specific body part in the cortical homunculus. Thus, the larger the representation, the more sensitive body part. (Website of Society for Neuroscience 2017.)

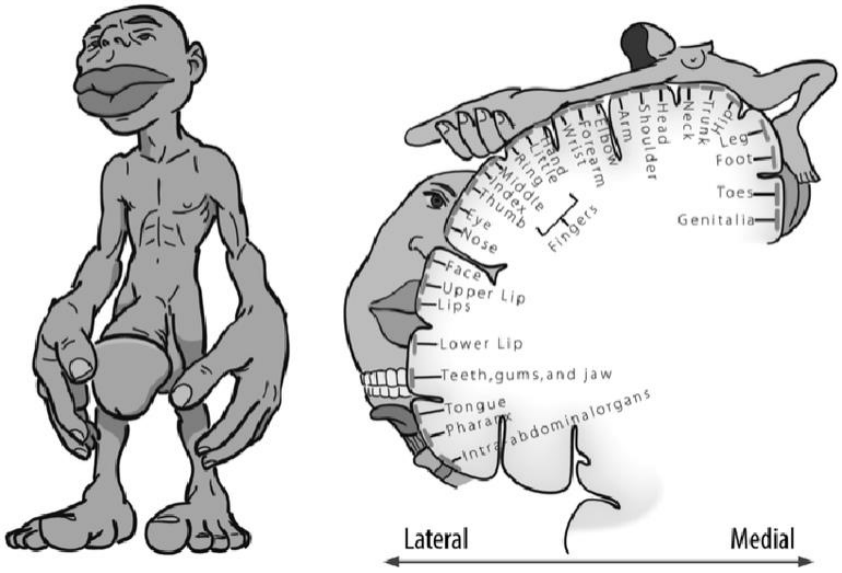

Figure 1. The cortical homunculus and the somatosensory map (Løseth, Ellingsen & Leknes 2013, 11).

Related to the cortical homunculus and altered pain perception, some people are more sensitive to have a centrally disturbed pain modulation, i.e. central sensitization, and it is often diagnosed in people with fibromyalgia and whiplash (Lidbeck 2016, 4). In the normal pain modulation, when a pain impulse is received by the brain via spinothalamic tract, i.e. the ascending pathway, a large part of the brain, including the somatosensory cortex, is activated to process the impulse. Because pain is subjective, and it is affected by multiple factors, such as mood, beliefs and attitude, the brain's pain processing may result either in inhibiting or augmenting the nociceptive transmission, of which the latter one leads in pain sensation in the affected body part via descending pathway. (Website of UCL 2018.)

In central sensitization, the normal pain process is altered, because the functioning of inhibitory mechanisms is impaired, and descending and ascending pathways are overly activated. This results in hypersensitivity of the central nervous system and

augmented nociceptive transmission, thus leading into pain chronicity. (Nijs, van Wilgen, van Oosterwijck, van Ittersum, & Meeus 2011, 413.)

3.2 Psychological and psychosocial factors in chronic pain

A human being can be seen as a psychophysical entity, which means the psychological factors affect the physical factors and vice versa. Therefore, pain can affect emotional health in a decline way, and declined emotional health, likewise, may contribute to and intensify chronic pain conditions. (Parlikar 2010, 37.)

Based on Linton's and Shaw's article (2011, 701), when a person experiences pain, the experience is influenced and shaped by the earlier pain experiences. How the psychological factors influence pain, can be examined by dividing the pain experience in sequence processes.

The first sequence process is initial awareness of the noxious stimulus. In this process, the person gives attention to the stimulus. This may increase or decrease the pain intensity depending on how alert the person is. A person with a chronic pain condition tends to be vigilant about the stimulus, that commonly results in intense pain. (Linton & Shaw 2011, 702.)

In the second sequence process, the person processes the stimulus cognitively, that is how the person interpret the stimulus. This process plays the key role in unusual pain experiences, such as light touch is causing severe pain, or severe injury is not causing any pain. The interpretation process is based on the earlier pain experiences, and the process contains also several emotional processes, and it sets the stage for behaving. In addition to interpretation, the cognitive process includes also beliefs and attitudes, expectations, cognitive sets and emotion and their regulation. (Linton & Shaw 2011, 702-704.)

Beliefs and attitudes provide a shortcut in the interpretation process, because they work in an automatic setting due to assumptions about pain and it´s meaning based on the previous experiences. It has been studied, that the development of chronic

pain and long-term disability is caused by certain beliefs, such as the ideas of hurt being harmful, and pain being a signal to stop. Expectation towards pain is a significant determinant in the cognitive process. If the person has unrealistic thoughts about the recovery time, this may generate further negative cognitions and motivate behaviors, which may then influence pain and disability. (Linton & Shaw 2011, 702-703.)

Cognitive sets, or cognitive patterns, help the person in pain by providing a framework. For variety of reasons, some people use cognitive sets, that misrepresent what is actually happening and what may happen in future. One example of this kind of pattern is called pain catastrophizing, which can be defined as an exaggerated and negative orientation towards pain, where a minor and neutral event is irrationally made into a catastrophe. Misrepresentative cognitive sets make treatment more difficult, and they increase the risk of developing persistent pain and disability. (Linton & Shaw 2011, 703-704.)

Pain often affects emotions and their regulation in a negative way. Emotional stress is one of the most disruptive features of pain, and it typically includes anxiety, fear, anger, guilt, frustration, and depression. The way these emotions are regulated by the person in pain, impacts the pain experience, treatment outcome and development of chronic pain and disability. (Linton & Shaw 2011, 704.) Edwards, Dworkin, Sullivan, Turk and Wasan (2016, 72) support this statement by noting that, several studies have shown, that a person with a chronic pain condition has an increased risk of mood or anxiety symptoms.

The third sequence process is about activating the most suitable coping strategy in regard to the noxious stimulus, if it is considered as a threat. The strategy is learned, and it involves integration of emotional, cognitive, and behavioral processes. (Linton & Shaw 2011, 704.)

The pain experience can be considered as a set of behaviors consisting of emotions and feelings, taking medicine, seeking care and other learned behaviors. The set of behaviors forms pain behavior, that is a coping mechanism for a person in pain. Pain behavior affect the pain chronicity in a reinforcing or lessening way. (Linton & Shaw 2011, 704-705.)

Related to pain behavior and coping mechanism in chronic pain conditions, a psychological factor called ‘self-efficacy’ has been studied more and more in recent years. The term refers to an individual’s belief in their ability to influence or exercise control over events affecting their life. (Website of Cambridge dictionary 2018.) According to Hartvigsen et al. (2018, 2363), several studies have found a consistent association between self-efficacy and impairment and disability, pain severity, as well as affective distress, thus showing potential importance in pain chronicity. A Chinese multisite cross-sectional study by Shizheng et al. (2018, 736) found also, that self-efficacy plays an important role in increasing and protecting quality of life in patients with chronic, non-specific low back pain.

Psychosocial factors refer to factors, that have a combined influence of psychological factors and surrounding social environment (Website of Oxford Dictionaries 2018). Recent reviews and meta-analyses highlight the importance of focusing on the role of psychosocial factors in chronic pain conditions. It has been studied, that these factors have an influence in shaping pain experiences and treatment outcomes. In case of low back pain, psychosocial variables such as low job control, job dissatisfaction, minimal social support, and depression are strongly associated with the condition. (Edwards, Dworkin, Sullivan, Turk and Wasan 2016, 72.)

In order for healthcare professionals to identify different factors behind an individual’s problem, for example back pain, a flag system was developed. At first, the concept of red flags was introduced in 1994. The purpose of the red flags is to indicate potential patho-physiological factors, for example spinal malignancy, that require urgent medical or surgical opinion. Secondly, in 1997, the concept of yellow flags was introduced in order to detect the potential psychological factors. In 2000, the concept of yellow flags was re-conceptualized in order to distinguish an individual’s concerns about their personal wellbeing from work related concerns. The new concept included yellow, blue and black flags, where yellow flags were more clinically-focused and blue and black flags occupationally focused. In 2005, the flag system was finalized with the concept of orange flags to indicate abnormal psychological factors existing in one’s life. (Gray & Howe 2013, 380.)

The concept of yellow, blue and black flags is indicating the psychological and psychosocial factors potentially hindering an individual's recovery, thus causing work absences and enforcing their pain chronicity. The yellow flags refer to 1) attitudes and beliefs, such as thoughts of pain being harmful and rest being best for recovery, 2) behaviors, such as prolonged resting and fear-avoidance behavior due to catastrophizing thoughts about pain and movement, 3) compensation issues, for example a history of claims due to another injury or earlier episode of back pain, 4) diagnosis and treatment, such as dissatisfaction with earlier treatment outcomes and diagnostic language being too hard to understand, hence causing catastrophizing thought in the individual, 5) emotions, like anxiety, stress, bitterness, and depression, and 6) family support, for example the spouse's attitudes and beliefs towards the individual's pain. Both the blue and black flags refer to work related factors, but with a distinction of blue being more related to how an individual perceives their work environment, for example do they feel stressed, unsupported, or being demanded too much, and the black flags are representing objective workplace conditions, such as legislation restricting options for return to work. (Gray & Howe 2013, 380-382.)

When assessing the possible yellow, blue and black flags, Nicholas, Linton, Watson & Main (2011, 745) recommend focusing more on identifying which variables, i.e. the flags, are the central ones in an individual's problem. Giffourd (2013, 118-119) suggests a combination of clinical assessment and a use of screening questionnaire. Even though the combination may require more time and skills from the therapist, the accuracy is improved, quantitative information and interview data can be integrated, and by the two-step process of first using the questionnaire and then doing the clinical interview, the therapist can focus on identifying the central variables during their clinical interview.

Considering this case study, there are a considerable amount of psychological and psychosocial factors possibly affecting the examinee's pain. In the initial physiotherapy assessment (appendix 1), the examinee told she was diagnosed with severe, recurrent major depressive disorder (F33.2) in 2006, she is living alone with her son of 7 years of age, and she does not have a permanent job.

4 CHRONIC NON-SPECIFIC LOW BACK PAIN– CNSLBP

Chronic, non-specific low back pain (CNSLBP) can be defined as pain, that has occurred more than 12 weeks and does not have any known pathoanatomical cause. The pain occurs posteriorly in the pelvic girdle area. (Website of Käypä hoito 2017.)

In this case study, the examinee has had pain on both sides of the spine on the L3-L5 level for the past 15 years. Based on the initial physiotherapy assessment, the pain is caused by a non-specific back condition due to over-activity in hamstring and rectus abdominis muscles, weakness of m. gluteus maximus and medius, weakness of m. transversus abdominis and iliopsoas leading to lumbar movement control impairment to the flexion, extension and rotation directions. In addition, the examinee has altered body awareness (appendix 1).

4.1 Evidence-based physiotherapy practice

According to World Confederation of Physical Therapy (Website of WCPT 2018), physiotherapy is a field that focuses on identifying and maximizing quality of life and movement potential within the areas of promotion, prevention, intervention and rehabilitation encompassing physical, psychological, emotional, and social wellbeing. In mental health problems, physiotherapy brings physical and mental aspects together by promoting functional movement and movement awareness, as well as promoting physical activity and exercises with the aims of optimized wellbeing and increased level of empowerment in the individual having mental health problems.

High-quality physiotherapy is based on scientific evidence, clinical expertise and the values, goals and circumstances of a client (Kisner & Colby 2012, 13). It is an approach, that integrates the scientifically proven external evidence with physiotherapist's clinical expertise and with consideration of the client's preference. Evidence-based practice (EBP) was developed to ensure the consistency and quality of treatment and patient care. (Littlewood & May 2014, 1; Shurlock-Evans, Upton & Upton 2014, 208.)

Figure 2. Evidence-based practice (Website of University of Wyoming 2019).

Different clinical questions require different types of scientific evidence, thus multiple research designs have been developed. As an example, a randomized controlled trial is usually the most appropriate design to look for, when the research question is about an intervention's effectiveness. However, clinicians are often busy, and therefore the strongest form of scientific evidence, i.e. a systematic review, in which several studies have been summarized and appraised, offers a quick overview of the topic. (Littlewood & May 2014, 1-2.)

Clinical expertise consists of different components (Overholser 2010, 131). A four-year-long project was done by the Finnish Association of Physiotherapists (FAP) together with several Finnish Universities of Applied Sciences and the Physiotherapy Department at the Faculty of Sport and Health Sciences of the University of Jyväskylä in order to define the concept of core competence. One object of the project was to describe the core competences of physiotherapists. (Hynynen et al. 2017, 4.)

Hynynen et al. (2017, 13-15) have listed seven core competences of a physiotherapist. The competence in physiotherapeutic examination and clinical reasoning is related to the physiotherapist's knowledge and knowhow, the physiotherapist's problem-solving skills, as well as the physiotherapist's ability to 1) analyze and assess the findings of the physiotherapeutic assessment, 2) to draw a conclusion based on the findings, and 3) to consider not only the client's values, goals and experiences, but also the opportunities and limitations imposed by the society and environment, that affect the client.

Teaching and counselling competence relates to the physiotherapist's ability to promote functioning, health and work ability by applying different techniques, such as manual, verbal, digital, guidance and counselling. The guidance may be offered to the client, their relatives and for instance other health care professionals. The objective of guidance is to support the client's motivation towards physiotherapy in order for the client to achieve a permanent change in their functioning (Hynynen et al. 2017, 16).

Therapeutic competence includes the areas of performing a physiotherapeutic examination, creating a plan for physiotherapy, and implement the plan with the regard of the environment, in which the plan will be implemented. The implementation may contain various therapeutic methods, such as exercising, manual and physical therapies, as well as guidance and counselling. Both the planning and the implementation shall be based on scientific evidence. (Hynynen et al. 2017, 17.)

Technological competence relates to the physiotherapist's ability to utilize technical devices in physiotherapeutic examination and possibly in the implementation of physiotherapy. Technological competence is also about guiding, promoting and motivating the client with the help of a technological device. (Hynynen et al. 2017, 18.)

Ethical competence is related to the physiotherapist's ability to identify and confront demanding situations requiring ethical reflection. The situations may be for example about meeting every individual on an equal footing, making ethically justified choices, and justifying their own actions. (Hynynen et al. 2017, 19.)

Accessibility competence relates to the physiotherapist's ability to assess accessibility issues in multiple environments, as well as to draw up a renovation plan in order to promote the client's functioning. Accessibility may refer for example to automatically opening doors, adjustable kitchen furniture, ramps and assistive devices. (Hynynen et al. 2017, 19-20.)

Social competence is related to the physiotherapist's level of participation in social activities, and the level of monitoring and responding to changes in society. The competence is also about being aware of the general major development trends oc-

curring in occupational life and functional environment, as well as having the basic knowledge of the social and health services' operational and decision-making structures. (Hynynen et al. 2017, 20.)

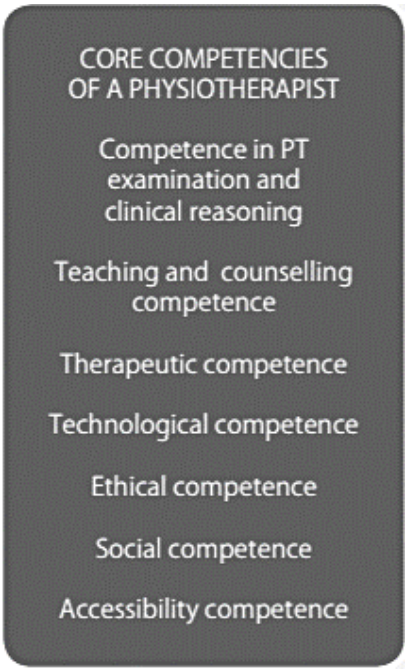

Figure 3. Core competencies of a physiotherapist (Hynynen et al. 2017, 10).

Clients are interested in their treatment and the available treatment options (Website of WCPT 2019). Clients' values, goals and circumstances are associated with treatment outcome, duration and higher appreciation of the received care, thus showing its importance in EBP (Bastemeijer, Voogt, van Ewijk & Hazelzet 2016, 872).

4.2 Patient management model

A patient management model (figure 4) was developed to assist therapists to follow the evidence-based practice process. The model has five phases, which each helps practitioners in incorporating the ongoing process of clinical decision-making and application of evidence. The model aims at a meaningful functional outcome, and therefore the re-examination and re-evaluation process occurs throughout each phase. The phases of the model are 1) performing a comprehensive examination, 2) evaluating the collected data, 3) making a diagnosis based on impairments on body structure and function, activity limitations and restrictions in participation, 4) establishing a

prognosis and plan of care based on agreed goals, and 5) implementing appropriate interventions. (Kisner & Colby 2012, 15.)

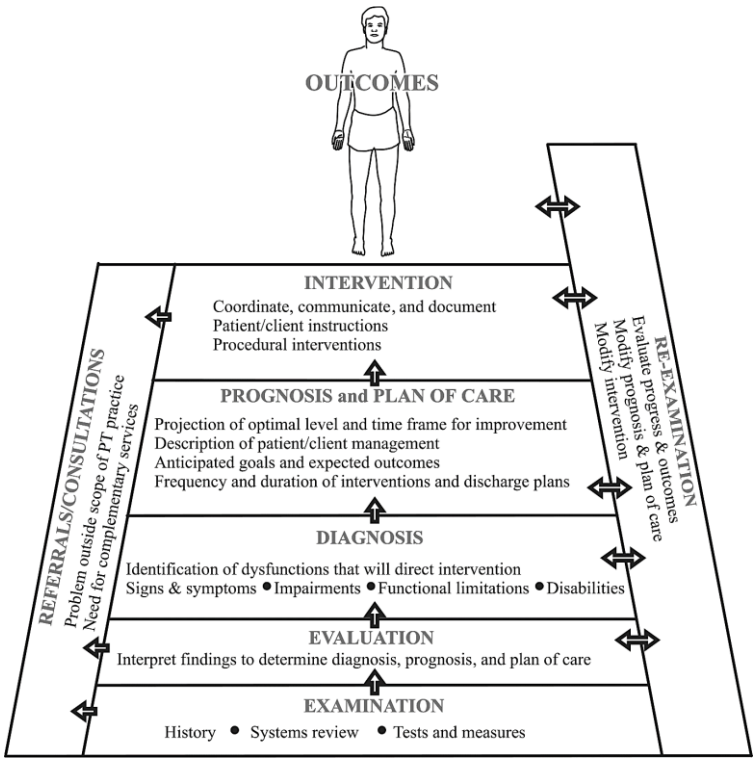

Figure 4. Patient management model (Kisner & Colby 2012, 15).

4.2.1 Physiotherapy examination

According to Magee (2014, 1), a thorough musculoskeletal physiotherapy examination consists of the patient's health history, observation, examining movements, performing special tests, studying reflexes and cutaneous distribution, performing joint play movements, palpation and diagnostic imaging. In addition, physiotherapy examination should also contain screening of the body systems, that may be relevant in the development of the current problem (Kisner & Colby 2012, 16). However, according to Käypä hoito (2018), diagnostic imaging does not appear to be beneficial, and may, on the contrary, be detrimental in patients with non-specific low back pain with no symptoms referring to any severe disease or specific back illness.

Throughout the examination, the therapist makes a series of clinical decisions in order to shape and guide the examination process. The meaning of thorough examination is to formulate a physiotherapeutic diagnosis and determine whether these prob-

lems can be appropriately treated by physiotherapy interventions. If not, a referral to another healthcare professional or resource is made. (Kisner & Colby 2012, 16.)

Health history of the patient refers to an overview of subjectively and objectively gathered current and past information about the patient's present condition, general health status, and why the patient has sought physiotherapy services. The information can be gathered from patient databases and self-reports, as well as by interviewing the patient, their family or other relevant individual involved in patient care. (Kisner & Colby 2012, 16.) Reliability is ensured, if the patient health history is inclusive and well documented (Magee 2014, 1)

The more health-related risk factors there are identified from the health history, the more important it is to screen the related body systems, i.e. perform a systems review. The purpose of the systems review is to detect abnormalities or deficits requiring further or more specific testing by the therapist or another healthcare professional. (Kisner & Colby 2012, 17.)

Specific tests and measurements provide in-depth information about impairments, activity limitations, and participation restrictions. These definitive tests are decided during the examination and they should either support or reject the hypothesis formulated during the health history and body system screenings. (Kisner & Colby 2012, 18.)

Pain is difficult to be measured with a fixed measurement tool with reference values because of its versatility and subjectivity. In a clinical setting, the ways of measuring pain should be quick to administer, simple, and easy for the client to understand. (Younger, McCue & Mackey 2009, 39-42.) Numeric rating scale is a numeric version of the widely used Visual analogue scale (VAS), that is a unidimensional measure for scaling the intensity of pain in adults. The measurement is done by the respondent selecting a number between 0 and 10 that best describes their pain intensity. Number 0 reflects to no pain, whereas number 10 reflects to the worst possible pain. The NRS has high test-retest reliability and its construct validity is shown to be high. (Hawker, Mian, Kendzerska & French 2011, 241.)

In addition, according to Dansie & Turk (2013, 19), it is essential to assess chronic pain in a multidimensional way, because chronic pain experience is shaped by a myriad of biomedical, psychosocial and behavioral factors. Psychological and psychosocial risk factors are also shown to increase the level of disability.

The Roland-Morris disability questionnaire is a tool to measure the experienced level of disability in people suffering from low back pain. The original version of RMDQ is a 24-item questionnaire divided into sections of physical ability, pain frequency, sleep and rest, psychosocial, household management, and eating. The measurement is done by presenting the respondent 24 statements, which they either agree or not. Agreed statements are ticked, and the score is based on the ticked statements. The RMDQ has good internal consistency and test-retest reliability. (Stevens, Lin & Maher 2016, 116.)

Due to the large amount of people having non-specific low back pain (NSLBP), there is a high priority to identify different clinical subgroups for the condition. One subgroup is considered to consist of people with movement control impairment (MCI). MCI is defined as a direction-specific impairment of active, lumbar spine movement control during functional activities, such as sitting, standing and twisted positions. The impairment is provoked either by flexion, extension, rotation or multidirectional movements. It is suggested that approximately 30 % of NSLBP patients have MCI. (Luomajoki 2010, 4-7.) Six-item movement control impairment test battery (Six-item MCITB) is a valid measurement tool with substantial reliability when assessing MCI. The items of the test battery consider all the movement directions, and less than 2/6 positive results is considered as normal movement control (Luomajoki 2010, 46).

The correlation between movement control and tactile acuity is strong (Gutknecht, Mannig, Waldvogel, Wand & Luomajoki 2015, 722). According to Catley, O'Connell, Berryman, Ayhan, & Moseley (2014, 985), tactile acuity is described as the extent to which an individual can discriminate small structural details in objects touching their skin. The ability to discern the small details correlates to the size of representation of the specific area, i.e. where the tactile stimulus is given, in the cortical homunculus.

A cheap and easy way to measure tactile acuity is using Two-point discrimination (TPD). (Luomajoki 2010, 18.) In a TPD assessment, a handheld measurement tool, such as a discriminator or paperclip, is used by placing the tool on a specific area of skin, e.g. on low back area in case of low back pain. The result is a TDP threshold measured in millimeters. (Cashin & McAuley 2017, 186.) In the dissertation of Luomajoki (2010, 42), the average TPD threshold on healthy controls was 44 mm (40-48 mm), whereas the study group's average TDP threshold was 60 mm (57-64 mm). TPD is considered as a reliable measurement tool, but its validity is difficult to assess due to lack of standardization and recommendations regarding to the technique, number of trials, tools and procedure (Adamczyk, Luedtke & Szikszay 2018, 110; Cashin & McAuley 2017, 186).

In this case study, the information about the examinee's health history was gathered only by self-reporting and interviewing the examinee due to inaccessibility to patient databases. Based on the examinee's health history and studies related to chronic pain and psychological and psychosocial factors, a systems review was performed not only to the musculoskeletal system, but also to the cognitive and social / emotional system in regard with behavior / emotional stressors of the examinee. The tests and measurements performed in the examinee's initial physiotherapy examination consisted of functional and specific tests with the aim of either confirming or refuting the examinee's eligibility, thus the tests were decided beforehand. Four tests, i.e. the objectives of this thesis, were chosen to be re-tested in the second physiotherapy examination of the examinee (see appendix 1).

4.2.2 The IFC model and evaluation

The ICF refers to the International classification of functioning, disability and health developed by the World Health Organization. The ICF model (figure 4) substituted the dated International classification of impairments, disabilities and handicaps (ICIDH) in order to emphasize more on how people affected by health conditions live rather than concentrating on the disease itself. The ICF model was designed as a companion to the International statistical classification of disease and related health

problems (ICD), which serves as the foundation for classifying and coding medical conditions worldwide. (Kisner & Colby 2012, 5.)

The classification includes health and health-related domains, and as the individual functioning and disability are contextual concepts, the ICF also includes a list of environmental factors (Website of WHO 2018). All the elements of the IFC model are interrelated have an impact on each other (Kisner & Colby 2012, 5).

The ICF model is divided into two broader concepts of 1) functioning and disability and 2) contextual factors. The concept of functioning and disability is about the individual, and it is subdivided in components of 1) body functions and structures and 2) activities and participation. Body functions and structures relate to issues of the body systems and anatomical features, whereas activities and participation relate to difficulties of executing tasks and participating in social activities. The concept of contextual factors relates to the individual's entire background in regard to their life and living situation. The concept is subdivided in components of 1) environmental factors and 2) personal factors. Environmental factors relate to the factors that are associated with the physical, social and attitudinal environment in which the individual is living. The environmental factors can be divided further into facilitating and hindering factors. Personal factors relate to the individual's non-health condition features, such as age, gender and education. (Kisner & Colby 2012, 6.)

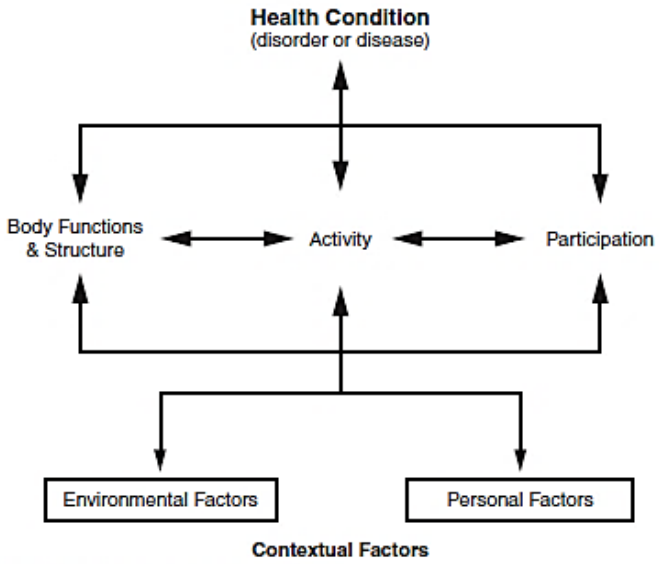

Figure 5. The IFC model (Kisner & Colby 2012, 5).

In the evaluation process, the physiotherapist interprets and synthesizes the gathered data, and considers the patient's impairment, activity / functional limitations, and participation restrictions, i.e. the factors described in the IFC model. Thus, the IFC model provides physiotherapists a tool for patient-centered clinical decision making. (Atkinson & Nixon-Cave 2011, 417-419.)

In this case study, the ICF model was not considered in the physiotherapy assessments due to the purposes of the examinations. Yet if the examinee was a physiotherapy client, the ICF model would have been used as seen in figure 6:

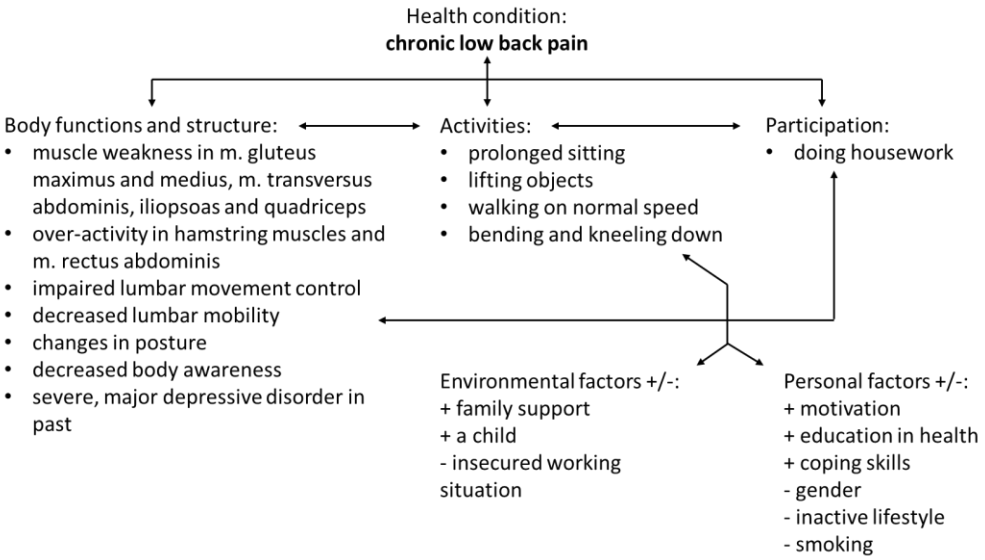

Figure 6. The ICF model of the examinee as a physiotherapy client.

4.2.3 Physiotherapeutic diagnosis

Developing a physiotherapeutic diagnosis is the third phase of the patient management model, and it is based on the patient's health history, a systems review, diagnostic tests and the interpretation of collected data. Physiotherapeutic diagnosis, as a term, may refer to either a process or a category within a classification system. It is an essential part in patient management, because the physiotherapy prognosis, plan of care and interventions are based on the physiotherapeutic diagnosis. (Kisner & Colby 2012, 20.)

The diagnostic process focuses on the consequences of a disease or a health disorder, and by the process, the therapist can identify the discrepancies and consistencies between the current level of patient's performance and the desired level of function, and the patient's capacity to achieve the desired level. The diagnostic process is based on the data collection, analyzing the relevant data and generating a working hypothesis, organizing and recognizing the cluster of data, formulating a diagnostic hypothesis and subsequently classifying the data into categories. (Kisner & Colby 2012, 20.)

The diagnostic category, i.e. the clinical classification, is a grouping that identifies and describes clusters of physical findings, such as signs and symptoms of body function impairments, restrictions in participation and the extent of disability. In addition, it also describes the impact of a condition on function at the body system level, as well as at the level of the whole patient. Patients, who are diagnosed with different health conditions, but have similar kinds of impairments may be classified by the same diagnostic category, and one patient can be classified by multiple categories based on their impairments. As an example, a patient could be classified by the diagnostic categories of impaired posture and impaired muscle performance. (Kisner & Colby 2012, 20-21.)

In the case study, the physiotherapeutic diagnosis was based on the patient's health history screening, a systems review of musculoskeletal and cognitive and social / emotional systems, specific tests regarding to lumbar movements and mobility, muscle strength and body awareness, and the interpretation of collected data.

4.2.4 Prognosis and plan of care

A prognosis is a prediction of the expected optimal level of improvement in a patient's function, and the length of time needed to reach that optimal level (Website of WCPT 2018). According to Kisner & Colby (2012, 21-22), making a prognosis may be challenging, because it is affected by the therapist's ability to make clinical decisions. In addition, factors such as complexity of the impairment and pain chronicity, as well as patient's motivation and extent of support influence the expected outcomes

making it possibly even more difficult to predict the optimal level of function and the time needed.

The plan of care is a part of the prognosis. It includes the goals, the expected functional outcomes, the predicted level of improvement and time needed, specific interventions, and their frequency and duration, and specific discharge plans. (Kisner & Colby 2012, 22.) The plan of care is developed in collaboration between the patient and the therapist in order to make patient-centered goals that target a specific area for improvement, are measurable and assignable, as well as realistic with the available resources in regard with for instance physical, personal and financial. The goals should also be time-bounded. (Quinn & Gordon 2015, 146.)

Due to the purposes of the physiotherapy examinations in this case study, not a prognosis nor plan of care was developed.

4.2.5 Intervention

Intervention is the fifth phase of patient management model, and it is referring to any interaction a therapist has relating to a patient's care. Intervention can be divided into three essential areas consisting of 1) coordination, communication and documentation, 2) procedural interventions, and 3) patient-related instruction. Each area affects the other, and therefore absence of one of the areas could affect outcomes adversely. (Kisner & Colby 2012, 23.)

The area of coordination, communication and documentation refers to physiotherapist's being the coordinator of physical therapy and services, who communicates verbally and through written documentation with all people involved in the patient's care. In practice, it refers to for example writing reports of evaluation, plan of care and discharge summaries, designing home-exercise programs, keeping records, and participating in team meetings. (Kisner & Colby 2012, 23)

Procedural interventions refer to functionally relevant exercises and adjunctive modalities, such as electrotherapy. Procedural interventions are based on sound evi-

dence, they are identified in the plan of care, and their purpose is to reduce or eliminate functional deficits and participation restrictions, as well as reduce the risk of future dysfunction whenever possible. (Kisner & Colby 2012, 23-24.)

According to the systematic review by van Middelkoop et al. (2010, 35), the most promising conservative intervention treatments for CNSLBP are multidisciplinary, behavioral and exercise therapy treatments. In the review, the multidisciplinary treatment consisted of at least one physical dimension and one psychological, social or occupational dimension, whereas behavioral treatment included operant, cognitive, and respondent treatments or a combination of these treatments focusing on the modification of behavior, cognition, or physiological reactivity. The exercise therapy treatment referred to a series of specific movements aiming at training or developing the body or to promote better physical health. Recent review regarding to exercise and physical activity by Gordon & Bloxham (2016, 13) suggests, that rather than specific exercise program, a general exercise program combining muscular strength, flexibility and aerobic fitness would be more beneficial for rehabilitation of CNSLBP.

According to Käypä hoito (2018), rehabilitation of chronic low back pain should be intensive and executed by a multidisciplinary team, that consists of a physiotherapist, an occupational therapist, a psychologist and a doctor. Based on the studies, gradually increasing, guided therapeutic exercising alone decreases pain and improves functional ability in patients with chronic low back pain. Mobility- and stretching exercises, as well as therapeutic exercising together with back massage, alleviate pain and increase functional ability on some level. Apart from physiotherapy, but as an essentially important part of comprehensive rehabilitation of chronic low back pain, Käypä hoito (2018) also recommends cognitive behavioral therapy methods to be used as a part of the rehabilitation. Through cognitive behavioral therapy, the patient can learn various means to control their pain- and stress reactions, for instance relaxing methods, increase their social skills, as well as to deepen their understanding and knowledge of one’s own actions and their causal connections.

Foster et al. (2018, 2368), recommend similar type of rehabilitation for chronic low back pain as Käypä hoito and other sources. They highlight the importance of educa-

tion and self-management, and physical and cognitive behavioral therapies, but also suggest some forms of complementary medicine, such as acupuncture, massage and mindfulness-based stress reduction.

Prescribing therapeutic exercising and giving dosages for them are highly dependent on the individual's needs. However, it has been studied, that at least muscle strength training done in 2-3 series of 8-12 repetitions of one-repetition maximum (1RM), core stability training and aerobic exercising have moderate to strong evidence in chronic low back pain rehabilitation. (Website of Fysisk aktivitet i Sjukdomsprevention och Sjukdomsbehandling 2019.)

Considering the case study, along with chronic, non-specific low back pain, the examinee has also been diagnosed with severe, recurrent major depressive disorder (F33.2) in 2006, and the examinee is currently in remission (F33.4). Several studies recommend physical exercising as a part of depression rehabilitation. Based on a meta-analysis by Kvam, Kleppe, Nordhus & Hovland (2016, 67), physical exercise is an effective treatment for major depressive disorder and could be a viable adjunct to depression medication. A systematic review by Schuch, Dunn, Kanitz, Delevatti & Fleck (2016, 40), supported the idea by concluding, that physical exercising is a potential treatment for depression. According to Käypä hoito (2018), patients with depression may benefit from physical activity done in groups and on a regular basis, thus physical activity can always be recommended as a supplementary part of the rehabilitation, unless there are medical contraindications.

The website of Fysisk aktivitet i Sjukdomsprevention och Sjukdomsbehandling (FYSS 2019) recommends aerobic and/or muscle strength training for people with depressive disorder to reduce depressive symptoms and to improve the quality of life. Muscle strength training should be accompanied with aerobic exercising to reduce the increased risk of cardiovascular disease due to depression. The recommended dosage for moderate intensity aerobic exercising (40-59 % of VO2max) is to exercise at least for 2,5 hours per week divided in 3-7 exercise sessions, and for high intensity aerobic exercising (60-89% of VO2max), the recommendation is to exercise at least for 75 minutes per week divided in 3-5 sessions. The dosage for strength training is

to include 8-10 movements in the exercise program, that is done 2-3 times a week with the intensity of 2-3 series of 8-12 repetitions of 1RM.

There are a few smaller studies done about the effectiveness of basic body awareness therapy (BBAT) in people with depressive disorder. As examples, a randomized controlled study by Gyllensten, Ekdahl & Hansson (2009, 2) found BBAT to have a positive effect on people with depressive disorder when used as an intervention method, but also in the long term for individuals, who suffer from somatic symptoms along the depressive disorder. An empirical study by Danielsson & Rosberg (2015, 12) found a similar type of effect, and support an idea of using BBAT as an adjunctive method in depression rehabilitation.

Patient-related instructing, or patient education, is about asking, listening, explaining and teaching, as well as activating the patient to participate in the rehabilitation process. As examples, it refers to therapist asking relevant questions, explaining the interrelationships among pathology and impairments and activity limitations, and instructing the patient in multiple ways, such as guiding verbally and giving written instructions. The purpose of patient education is the patient to learn about their impairments and functional deficits, and how to reduce them in order to get better. (Kisner & Colby 2012, 24-25.)

In recent years, the use of pain neuroscience education (PNE) as a part of physiotherapy treatment in chronic pain patients has increased. The purpose of PNE is to educate people with chronic pain about the neurophysiology of pain and the biopsychosocial interactions. The education is done interactively and in a patient-centered manner. (Wijma, van Wilgen, Meeus & Nijs 2016, 368.) According to a systematic review by Louw, Zimney, Puentedura & Diener (2016, 332), current evidence is supporting PNE to be used as a part of the rehabilitation in people with chronic, musculoskeletal disorders. It has shown to be reducing pain, improving one's knowledge of pain, lowering disability and improving function, as well as reducing psychosocial factors, enhancing movement, and minimizing the utilization of healthcare.

Psychoeducation is a widely used form of patient education in the rehabilitation of people with depressive disorder. The purpose of psychoeducation is to increase one's own and their families' knowledge about the disorder itself, but also how to cope with and manage the disorder in everyday life. (Website of Mielenterveystalo 2019.) According to a systematic review by de Souza Tursi, von Werne Baes, de Barros Camacho, de Carvalho Tofoli & Juruena (2013, 1019), psychoeducation is an effective method for improving the clinical course, treatment adherence, and psychosocial functioning of people with depressive disorder.

In this case study, no interventions were made due to the aim of the study. But if one was to be made, the intervention methods would focus on improving muscular endurance, core stability and aerobic fitness, as well as increasing body awareness and the examinee's knowledge about pain chronicity, psychological and psychosocial factors behind the problem, and how to cope with the disorders in everyday life.

4.2.6 Outcomes

The outcomes of physiotherapy are being assessed throughout the rehabilitation. Areas being assessed are 1) the level of patient's functional ability, such as impairments, functional and activity limitations, participation restrictions and the level of perceived disability, 2) extent of prevention, 3) the level of patient's health and well-being, and 4) patient satisfaction. By re-examining and re-evaluating, the therapist gains information for example about the effectiveness of interventions. (Kisner & Colby 2012, 25-26.)

5 ONLINE FITNESS PROGRAMS

In this case report, an online fitness program is described as a service sold online, that aims at a better physical condition through fixed weight loss and exercise program. The service is depersonalized, i.e. not considering the individual needs, it is easily accessible via internet, and ready-made. The service providers vary from pri-

vate individuals to bigger companies, and there are no educational requirements for providing these services.

In this case study, the service provider is a Finnish, well-known company providing scheduled online fitness programs, i.e. they are launched on a specific date, that combine instructions for weight loss and exercising. These programs can be done either in gym or home settings. The purchasing process is simple: once the purchase is made, the customer gets a login link, and through the link, they can download the program and additional information relating to nutrition, stretching and motivation, warming up and commonly asked questions. The downloaded material, as well as the exercise videos offered to the customers in the service provider's website, instruct the customers through the chosen program, and additional instructing and coaching are available via a closed Facebook group created specifically for the customers, who have purchased the same program.

6 CASE STUDY

A case study is a qualitative research method, that aims at gaining in-depth understanding of specific situations and meaning for those, who are involved. A case study can examine for example an individual, groups or events. (Hancock & Algozzine 2016, 9-10.)

This case study was done in order to define the influence of an online fitness program on an individual, who does not have a strong background of being physically active, and who is suffering from chronic, non-specific low back pain. The underlying cause of the interest in this topic is related to the popularity of online fitness programs and the growing amount of people having CNSLBP.

6.1 The research process

The research process begins with the researcher identifying the topic or question or questions of interest, then determining appropriate unit to represent the topic, and

after a thorough analysis of the information about the topic, the researcher defines what is already known. Further information about the research question is gathered as long as it is necessary to adequately define the case, and therefore the time needed may vary from a couple of hours to a few months. The research process ends with the researcher writing a report of the outcomes. The case results are commonly presented in a narrative way, and the report typically consists of illustrative descriptions of the case's key aspects. (Hancock & Algozzine 2016, 11.)

The research process of this case began with considering the background and reading theory about CNSLBP, which rose a couple of research questions. Based on the questions, the relevant pain and disability assessment measurements with good reliability and validity were chosen, and an additional form of exercise diary was designed (appendix 2). The next step was to choose and purchase an online fitness program. The randomly chosen online fitness program was a 10-week-long exercise program divided in three parts, and it was intended to be done in a home setting (appendix 3). After the purchase, the last step was to confirm the examinee's eligibility to participate in this case study by performing a physiotherapy examination.

After confirming the eligibility, the schedule of the study was made, and all the material related to the program, as well as the login details both to the service provider's website and Facebook group were given to the examinee. In order to maintain the reliability of the study, no additional information nor pieces of advice were given to the examinee at any time during the study.

The exercising part of the study was conducted within ten weeks of time and between November 20th 2017 and January 28th 2018. During the ten weeks, there was planned 30 exercises, of which 17 were performed and 13 were not performed due to two separate low back pain episodes.

The second physiotherapy examination was performed after the program was carried out by the examinee. The results of the case were analyzed, and they are presented in the next chapter.

6.2 Reliability and validity of the assessment tools used in this case study

Reliability is a meter for a measurement's consistency. It includes 1) over time reliability, i.e. test-retest reliability, that measures the consistency of a measurement over time, 2) across items, i.e. internal consistency, that measures for example the consistency of people's responses across the items in one, multiple-item measurement, and 3) across different researchers, i.e. inter-rater reliability, that measures the extent of consensus between researchers' judgments about a certain study subject. Both test-retest and internal consistency are measured by using Pearson correlation coefficient, i.e. Pearson's *r*, that measures the linear correlation between two variables. If Pearson's *r* value is 0.80 or greater, then a measurement's test-retest and internal consistencies are generally considered as good. Inter-rater reliability can be assessed by using Cronbach's α or Cohen's κ depending whether the judgments are quantitative or categorical, or intraclass correlation coefficient. (Website of BC Open Textbooks 2019.)

Validity refers to the extent to which a measurement is well-founded in measuring what it is intended to measure. Validity is a judgment consisting of different types of collected evidence, such as 1) construct validity, that relates to assessing a measurement tool's suitability to measure the phenomenon being studied, 2) content validity, that refers to whether a measurement tool covers all areas thought to be necessary in measuring the phenomenon or not, 3) face validity referring to a measurement tool to be valid, because it seems valid without scientific justification, and 4) criterion validity, in which a comparison is made between a certain measurement tool and other measures or outcomes, i.e. the criteria, that are already being thought as valid. (Website of BC Open Textbooks 2019.)

6.2.1 Numeric rating scale – NRS

In this case study, NRS was planned to be assessed before and after each individual exercise sessions for three times a week throughout the 10-week-long exercise program via the additional exercise diary. The purpose of NRS was to assess how the

online fitness program influences the experienced level of pain during the whole study.

In chronic pain conditions, the test-retest reliability of NRS is considered as adequate with a Pearson's *r* value of 0.63, if the measurement is done only once a week. If NRS measurement is done at least twice a week, it increases the test-retest reliability to an excellent level with a Pearson's *r* value of 0.79-0.92. The highest test-retest reliability of NRS with a Pearson's *r* value of 0.95 is gained by taking four assessments daily for seven days. Both internal consistency and inter-rater reliability of NRS are considered as good with a Cronbach's α value of 0.84-0.98 regardless of the assessment times and frequency. (Website of Shirley Ryan AbilityLab 2019.)

NRS is considered to have an excellent criterion validity with a Pearson's *r* value of 0.80-0.88 between NRS and four other pain rating scales. The construct validity is also thought to be on an excellent level, as it correlates with VAS with a Pearson's *r* value of 0.94. In one research, the face validity of NRS was considerate as moderate when compared to four different pain rating scales. (Website of Shirley Ryan AbilityLab 2019.)

Based on the available clinimetric properties, NRS is a valid measurement tool to asses pain intensity. By assessing NRS for three times a week for 10 weeks of time, the assessment tool's reliability should be confirmed. (Website of Shirley Ryan AbilityLab 2019.)

6.2.2 Roland-Morris disability questionnaire – RMDQ

In this case study, RMDQ was planned to be assessed before and after the 10-week-long exercise program. The purpose of RMDQ was to assess how the online fitness program influences the experienced level of disability. Based on the appraisal by Stevens, Lin & Maher (2016, 116), RMDQ has a good test-retest reliability with a Pearson's *r* value of 0.83-0.91. The internal consistency of the measurement tool is also considered as good with a Cronbach's α value of 0.84-0.96.

RMDQ is considered to have moderate criterion validity with a Pearson's *r* value of 0.50-0.60 between RMDQ and two other self-reported disability questionnaires (Stevens, Lin & Maher 2016, 116). The construct validity of RMDQ is evaluated as good with a Pearson's *r* value of 0.70-0.85 between RMDQ and two pain rating scales (Website of Shirley Ryan AbilityLab 2019).

Based on the available clinimetric properties, RMDQ is a fairly valid and reliable measurement tool to assess the level of disability (Stevens, Lin & Maher 2016, 116; Website of Shirley Ryan AbilityLab 2019).

6.2.3 Six-item movement control impairment test battery

In this case study, Six-item movement control impairment test battery (Six-item MCITB) by Luomajoki (2010, 30-36) was planned to be used before and after the 10-week-long exercise program. Less than 2/6 positive results is considered as normal (Luomajoki 2010, 46). The purpose of the test battery was not only to confirm the examinee's eligibility, but also study how the online fitness program affects the lumbar movement control.

The inter-rater reliability of the Six-item MCITB was assessed as good to substantial by using Cohen's κ with a value of 0.47-0.72. The test-retest reliabilities of the test items of prone knee bend and sitting knee extension were assessed as acceptable with a Pearson's *r* value of 0.71-0.78. (Luomajoki 2010, 39.)

Regarding to validity, due to the lack of standard movement control, the sensitivity and specificity can not be tested. When compared to other studies and healthy controls, the Six-item MCITB was the first to show a clear difference in the performance of the test battery. (Luomajoki 2010, 46.)

Based on the available clinimetric properties, the Six-item MCITB is a valid measurement tool with substantial reliability when measuring movement control impairment (Luomajoki 2010, 39, 46).

6.2.4 Two-point discrimination

In this case study, Two-point discrimination (TPD) was planned to be assessed before and after the 10-week-long exercise program. In the dissertation of Luomajoki (2010, 42), the average TPD threshold on healthy controls was 44 mm (40-48 mm). The purpose of TPD was to assess how the online fitness program affects the tactile acuity of the low back area.

In smaller, individual studies, TDP has shown to have moderate inter-rater reliability with an ICC value of 0.56-0.66, and excellent test-retest reliability with an ICC value of 0.90 (Cashin & McAuley 2017, 186). The validity of the TDP is difficult to assess due to the lack of standardization and recommendations regarding to the technique, number of trials, tools and procedure (Adamczyk, Luedtke & Szikszay 2018, 110).

Based on the available clinimetric properties, TPD is a reliable tool in measuring tactile acuity of the low back area (Adamczyk, Luedtke & Szikszay 2018, 110; Cashin & McAuley 2017, 186).

7 RESULTS

Results summarizes the collected information and its use to address the research questions of the study. Typically, the results are presented within the text, but for instance in case of large amount of information, the results can also be summarized in tables and figures. (Hancock & Algozzine 2016, 86.)

7.1 Level of pain

The examinee was asked to estimate their level of pain before and after an individual exercise session. The numeric rating scale estimation was marked in the exercise diary by the examinee.

11,7 % of the exercise sessions (two sessions) led into increase in pain, whereas in the rest 88,3 % of the exercise sessions (15 sessions), the level of pain stayed on the same level as estimated before the individual exercise session.

7.2 Level of disability

The examinee was asked to estimate their level of disability during both the initial and the final physiotherapy examinations. The level of disability was estimated by Roland-Morris Disability Questionnaire.

In the initial physiotherapy examination, the result of RMDQ was 7/24. In the final physiotherapy examination, the result of RMDQ was increased by two items compared to the first estimation, thus resulting in 9/24.

7.3 Lumbar movement control

The lumbar movement control was evaluated during both the initial and the final physiotherapy examinations. The examinee's lumbar movement control was evaluated based on the Six-item movement control test battery.

Less than 2/6 positive tests is considered as normal. In the initial physiotherapy examination, the result of the test battery was 5/6. In the final physiotherapy examination, the test result remained the same.

7.4 Tactile acuity of the low back area

The tactile acuity of the low back area was evaluated both in the initial and the final physiotherapy examinations. The tactile acuity was examined by two-point discrimination performed in the pain site.

The average TDP threshold in healthy controls is 44 mm. In the initial physiotherapy examination, the result was 59 mm. The result remained the same in the final physiotherapy examination.

8 CONCLUSION

The effect of the online fitness program on the level of pain remains unclear. The program seemed to have only a little effect on pain level within one individual session, but on the other hand, 13 individual sessions were not performed due to two pain episodes. The online fitness program seemed to affect the level of disability in an increasing way. Neither the examinee's lumbar movement control nor tactile acuity of the low back were affected by the online fitness program.

9 DISCUSSION

The topic of the thesis is a personal interest of mine. As a graduating physiotherapy student, who has also a strong interest towards and knowledge of muscle strength training, as well as a fairly long history of combining exercising and nutrion in a goal-directed way, I find these online fitness programs somewhat problematic. In my opinion, even though the idea is respectable, I find the biggest problem of the fitness programs to be the fact, that their target group seems to be physically inactive people, who are often inexperienced with muscle strength training and the movement techniques. The reasons, why I find it as the biggest problem, is the increased risk of injuries due to false techniques, maintaining the motivation, and the inability to critically analyze the information given by the service providers.

As I got familiar with the content of the fitness program, I found some of the exercise movements very difficult to understand even when seen from a video. There were also movements, that I could not figure out the point of. In addition, there were a few false pieces of information related to stretching and aerobic exercising. One option for the thesis could have been making a critical analysis of the content of an online

fitness program from a physiotherapist's point of view, but I found it pointless without the chance of making a change, as the problem would have most probably been with finding a service provider, who was willing to let their service product to be critically analyzed.

Along with muscle strength training and online fitness programs, I have also a special interest towards chronic pain. Due to the complexity of pain chronicity, the increasing amount of people suffering from chronic pain conditions, the global burden of low back pain, and the growing interest towards the concept of health and wellbeing, I found it extremely interesting to study the relation between chronic pain and the concept in some way. The chosen way was to study, how an online fitness program affects a physically inactive individual, who has a long history of chronic pain.

Considering the content of the thesis, the wide extent of chronic pain and the purpose of writing in an understandable manner, I think I managed to cover most of the important topics and present them in a way, that is easy to understand and easy to relate into real life. I would have wanted to study more about body awareness and related examination tools, but I decided to narrow down the focus area, because the thesis process was already long due to the vast amount of available material to be read and processed. The process was long also due to the complexity of the topic, and I did feel fairly frustrated with the thesis at times.

The case study was not a great success. I should have planned the study and the used measurement tools more properly, and include for example a motivational aspect to the study. In addition to the motivational aspect, it would be interesting to study also the psychological and psychosocial factors augmenting the examinee's pain behavior during the two acute low back pain episodes. However, I have gained an experience of planning and performing a case study, and I consider it as a positive thing, since I have learned from it.

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APPENDIX 1

PHYSIOTHERAPY PROCESS DESCRIPTION

REASON FOR THE REFERRAL: 1) Assessing the eligibility to take a part in the case study
2) Re-assessing after the case study
EVALUATION DATE: 16.11.2017 and 7.2.2018

THE INITIAL ASSESSMENT BEFORE THE CASE STUDY – 16.11.2017

SUBJECTIVE

The examinee is willing to participate in a case study concerning the influence of an online fitness program on chronic, non-specific low back pain. This physiotherapeutic examination is assessing the examinee's eligibility to take a part in the study.

The examinee is a 29-year-old female, who has a degree in nursing. Currently, she is working as a substitute instructor in child welfare, but is looking for a permanent job related to her own field. The examinee is living in the Pori area alone with her 7-year-old son, with whom she plays a lot indoors. The examinee's level of physical activity is considerably low, and she does not have any hobbies. The examinee has been smoking about 16 cigarettes a day for the last 15 years. She does not consume alcohol at all. The examinee was diagnosed with severe, recurrent major depressive disorder (F33.2) in 2006, and she has since had a medication in order to control the disorder. The examinee is currently in remission (F33.4).

The examinee has had low back pain for 15 years. The pain site is changing, and the pain may occur either on the right or left side, or on the both sides at the same time. The examinee is not experiencing radiative pain, but her buttock area gets numb occasionally. The examinee is feeling the pain on a weekly basis with a rhythm of a few days in pain and a few days without pain. The examinee estimates the typical pain level to be three in the NRS scale, and she is not taking any pain medicine. The

examinee has had a few severe acute low back pain episodes in the history with a pain level of 8 in the NRS scale. During the episodes, she was prescribed muscle relaxants.

The pain is triggered by static positions, i.e. sitting for longer than 30 minutes, and lifting objects. When the pain is on the level of three in the NRS scale, the position of supine lying with knees flexed on stomach may decrease the pain on some level. When the severe pain takes place, pain medication is required.

OBJECTIVE

Posture

Anterior aspect:

Head – mild lateral flexion to l.sin
Shoulder girdle – l. sin acromion is slightly higher than l.dx
Pelvic girdle – normal
Knees – normal
Ankles – l.a. mild inversion
Feet – l.a. longitudal arch lowered, but not flat

Lateral aspect:

Spinal curves – increased cervical lordosis, decreased thoracic kyphosis, decreased lumbar lordosis
Chin – slightly upright
Shoulder girdle – l.a. protracted
Pelvic girdle – posterior tilt
Knees – l.sin mild hyperextension
Ankles – l.sin malleolus is ahead compared to l.sin lateral epicondyle of the knee

Posterior aspect:

Head – mild lateral flexion to l.sin
Shoulder girdle – l.dx shoulder lower than l.sin
Scapular area – l.sin slightly winging, l.a. superior angle of scapula higher than acromion
Pelvic girdle – normal
Knees – normal
Achilles tendons – normal

Testing

Walking on toes
Walking on heels – normal
Minisquat – 50/50, pain on the left side of low back at the end

Lumbopelvic rhythm – altered

Trendelenburg – l.sin Trendelenburg sign

Schober – 21 cm
Thomas – negative, l.sin external rotation in the hip
Faber – negative, l.a tightness but no pain
SLR – negative, l.a. quadriceps pain
M. Transversus abdominis activation – altered
Gluteal-hamstring activation order – l.a. altered

Two-point discrimination – 59 mm

Movement control impairment (Luomajoki, 2010) – 5/6
- Waiter's bow – positive
- Pelvic tilt – positive
- Sitting knee extension – positive
- One leg stance – positive (l.dx 7 cm, l.sin 8,5 cm)

Rocking all fours – positive

Prone knee bend – negative

The Roland-Morris Disability Questionnaire – 7/24

2 CONCLUSION

The examinee is a 29-year-old female, who is experiencing chronic, non-specific low back pain due to over-activity in hamstring and rectus abdominis muscles, weakness of m. gluteus maximus and medius, weakness of m. transversus abdominis and iliopsoas leading to movement control impairment to the flexion, extension and rotation directions. The examinee has also altered body awareness, weakness in quadriceps muscles and tightness in the iliotibial band on the left side. Based on the physiotherapeutic examination, the examinee meets the inclusion criteria of the case study.

THE RE-ASSESSMENT AFTER THE CASE STUDY – 7.2.2018

Re-assessing was done in regard to the research questions of level of disability (The Roland-Morris Disability Questionnaire), lumbar mobility (Schober), lumbar movement control (Movement control impairment by Luomajoki 2010), and tactile acuity of the low back area (Two-point discrimination).

The Roland-Morris Disability Questionnaire – 9/24

Movement control impairment (Luomajoki, 2010) – 5/6

Waiter's bow – positive

Pelvic tilt – positive

Sitting knee extension – positive

One leg stance – positive (l.dx 7,5 cm, l.sin 8,5 cm)

Rocking all fours – positive

Prone knee bend – negative

Two-point discrimination – 59 mm

Test	16.11.2017	7.2.2018
RMDQ	7/24	9/24
MCI	5/6	5/6
TPD	59 mm	59 mm

APPEN
DIX 2

Harjoituspäiväkirja

Päivämäärä: _____
Kellonaika: _____
Harjoitusohjelma, esim. 1A: _____

NRS ennen harjoitusta: 0 1 2 3 4 5 6 7 8 9 10
0 = ei kipua 10 = pahin mahdollinen kipu

NRS harjoituksen jälkeen: 0 1 2 3 4 5 6 7 8 9 10
0 = ei kipua 10 = pahin mahdollinen kipu

Tuliko selkäsi kipeäksi/kipeämmäksi harjoituksen aikana? Jos kyllä, niin merkitse alle liike, sarja ja suoritettu toistomäärä, jolloin kipu alkoi.

Liike: _____ Sarja: _____ Toistomäärä: _____

Omia mietteitä:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

APPEN
DIX 3

The unidentified version of the online fitness program used in the case study. The instructions are in the way they are presented to customers.

10 viikon treeniohjelma / Kotitreenit / 3-jakoinen ohjelma

Treeni 1A – 1-5 viikot: Selkä + rinta + kädet

Liike	Sarjat	Toistot	Ohjeet
1. Ylävartalon nosto ja soutu	3	12	Asetu päinmakuulle niin, että puristat tiukasti sisäreidet ja pakarat yhteen. Suorista kädet eteen ja nosta yläkroppaa ylös - tämän jälkeen vedä kädet taakse kyynärpääjohtoisesti ja lavat yhteen.
2. Punnerrus + kädennosto eteen	3	12	Asetu punnerrusasentoon joko polvet maassa tai ilmassa. Pidä keskivartalo tiukkana. Punnerra tavallisesti alas ja ylös tullessasi nosta vuorotellen käsi kohtisuoraan eteenpäin. Huolehdi, ettei lantio keinu liikkeen aikana.
3. Kulmasoutu (käsipainoilla/pulloilla/kirjoilla/kahvakuulalla tms.	3	15	Seiso lantion levyisessä haarassa, painot käsissä, polvet hiukan pehmeinä ja kippaa ylävartaloa eteenpäin. Lähde soutamaan pai-noja kohti kylkiluita, rutistaen lapoja samalla yhteen. Huolehdi, että kyynärpäät osoittavat taaksepäin.
4. Ojentajapunnerrus	3	12/max	Asetu punnerrusasentoon polvet maassa tai ilmassa ja katso, että kädet ovat hartioiden leveydellä. Kun lähdet punnertamaan alas, huomioi, että kyynärpäät pysyvät lähellä kylkiä ja ohjautuvat taakse. Pidä keskikroppa tiukkana koko liikkeen ajan.
5. Hauis-olkapää-ojentaja-kombo	3	12	Seiso lantionlevyisessä haarassa ja nappaa käteen paino. Tee ensin hauiskääntö, työnnä paino sitten ylös ja dippaa se vielä viimeiseksi pään taakse. Huolehdi, että kyynärpäät pysyvät koko liikkeen ajan lähellä kroppaa.
6. Supernainen	3	12	Asetu päinmakuulle ja ojenna kädet eteenpäin. Purista paka-roita kevyesti yhteen ja tiivistä keskivartalo. Lähde nostamaan samanaikaisesti sekä ylävartaloa, että jalkoja irti lattiasta niin, että pelkästään vatsa ja lantionseutu koskettavat liikkeen ylävaiheessa lattiaa.

Treeni 1B – 1-5 viikot: Selkä + rinta + kädet

Liike	Sarjat	Toistot	Ohjeet
1. Punnerrus + kulmasoutu	3	12	Asetu punnerrusasentoon joko polvet maassa tai ilmassa (haastavampi). Punnerra alas, pidä keskikropan tuki mukana ja ylävaiheessa souda yksi käsi kohti rintakehää. Punnerra sitten takaisin alas ja souda nyt toisella kädellä kohti rintakehää. Vuorottele käsiä jokaisella toistolla.
2. Punnerrus jalat korokkeella tai kontallaan jalat korokkeella	3	max	Asetu punnerrusasentoon niin, että nostat jalat tai polvet (hieman kevyempi versio) korokkeelle - se voi olla mikä tahansa taso, jakkara, steppilauta tai matala pöytä. Punnerra tavallisesti alas ja ylös niin monta kertaa, kuin pystyt. Pidä vatsa tiukkana ja huolehdi, ettei keskivartalo ”romahda” liikkeen aikana, eli selkärangan pitäisi pysyä aikalailla suorana.
3. Käänteinen linkkari	3	12	Asetu lankkuasentoon niin, että kädet ovat hartioiden leveydellä ja työnnät niillä kevyesti kohti lattiaan, jolloin lapojen väli pyöristyy. Lähde sitten kurottamaan ensin toisella kädellä kohti vastakkaista nilkkaa, palaa sitten takaisin lankkuun ja toista sama toisella kädellä. Tue liikkettä vatsalihaksilla ja pidä kroppa tiukkana.
4. Ojentajapunnerrus	3	max	Asetu kapeaan punnerrusasentoon, eli huolehdi, että kädet ovat hartioiden leveydellä lattiassa. Voit tehdä punnerrukset joko polvet ilmassa (haastavampi) tai polvet maassa (kevyempi). Punnerra alas niin, että kyynärpäät osoittavat takaseinään ja huolehdi, että käsivarret ovat koko punnerruksen ajan lähellä kroppaa.
5. Etukyykky + pystypunnerrus	3	12	Asetu lantionlevyiseen haara-asentoon ja nappaa käsiin painot. Käännä painot rinnalle niin, että kyynärpäät ovat painojen alla. Kyykkää alas ja työnnä sieltä ylösnousuvaiheessa painot pään yli. Laske painot harteille ja laskeudu samaan aikaan takaisin kyykkyyn.
6. Ristilinkkari	3	15	Asetu selinmakuulle ja ojenna kädet suoriksi pään yli. Paina alaselän notko kevyesti kohti lattiaa, jotta vatsantuki tulee mukaan liikkeeseen. Lähde rutistamaan vatsan avulla vastakkaista kättä ja jalkaa yhteen (suorana) vatsan päälle. Palauta käsi ja jalka sitten lattiaan ja toista toiselle puolelle.

Treeni 2A – 1-5 viikot: Olkapäät + vatsat + pakara

Liike	Sarjat	Toistot	Ohjeet
1. Timanttipunnerrus (polvet maassa tai lantio ylhäällä, jalat suorana)	3	12	Aseta kädet timantin muotoon niin, että etusormien ja peukaloiden väliin muodostuu kolmio. Voit tehdä punnerruksen joko konttausasennosta (kevyempi) tai sitten lantio alhaalla, polvet maassa. Punnerra rintakehää kohti käsiä, äläkä päästä kyynärpäitä liikaa avautumaan sivuille. Liikkeen tulisi tuntua käsivarsien ojentajalihaksissa.
2. Etukyykky + pystypunnerrus (käsipainoilla/ kahvakuulalla/pulloilla)	3	15	Asetu lantionlevyiseen haara-asentoon ja nappaa käsiin painot. Käännä painot rinnalle niin, että kyynärpäät ovat painojen alla. Kyykkää alas ja työnnä sieltä ylösnousuvaiheessa painot pään yli. Laske painot harteille ja laskeudu samaan aikaan takaisin kyykkyyn.
3. Vipunostot kyykkypidossa	3	15	Nappaa paino(t) käsiin (voit käyttää vastuksena esimerkiksi täytettyä vesipulloa/-pulloja, käsipainoja, kahvakuulaa, kivenmurikkaa, painavaa kirjaa tms) ja asetu seinää vasten kyykkypitoon. Paina ristiselkää kohti seinää ja laskeudu noin 90° kyykkykulmaan. Pidä katse suoraan eteenpäin ja lähde nostamaan painoa/painoja suo-rin käsin rintakehän korkeudelle. Laske samaa reittiä alas ja toista.
4. Pöytäliike	3	12	Istu matolla polvet kevyesti koukussa ja kädet vartalon takana, sormet kohti kantapäitä. Lähde nostamaan lantiota ylös niin, että päädyt liikkeen ylävaiheessa käänteiseen konttausasentoon ja laske lantio sitten alas ja vie se niin lähelle sormia, kuin oma liikkuvuutesi antaa myötä. Älä laske lantiota kokonaan lattiaan, vaan nosta se sitten takaisin ylös ja jää toistamaan liikettä tähän.
5. Pakarapumppaus suorin jaloin	3	15/puoli	Asetu konttausasentoon ja vedä napa kevyesti kohti selkärankaa. Ojenna jalka suorana taakse ja kohti kattoa (älä kuitenkaan notkista selkää), näpäytä lattiaan ja vie jalka vielä sivulle. Tämä on yksi toisto. Toista 15 kertaa per puoli ja vaihda sitten jalkaa.
6. Vino vuorikiipeilijä	3	30	Asetu lankkuasentoon, kädet noin hartioiden levyisessä asennossa. Puske kevyesti kämmenillä kohti mattoa/lattiaa, jotta yläselkä ja lapojen väli aktivoituu ja jotta selkäranka ei ole notkolla. Lähde viemään vuorotellen polvia kohti vastakkaista kyynärpäätä.

Treeni 2B – 6-10 viikot: Olkapäät + vatsat + pakara

Liike	Sarjat	Toistot	Ohjeet
1. Timanttipunnerrus (polvet maassa tai lantio ylhäällä, jalat suorana)	3	12	Aseta kädet timantin muotoon niin, että etusormien ja peukaloiden väliin muodostuu kolmio. Voit tehdä punnerruksen joko konttausasennosta (kevyempi) tai sitten lantio alhaalla, polvet maassa. Punnerra rintakehää kohti käsiä, äläkä päästä kyynärpäitä liikaa avautumaan sivuille. Liikkeen tulisi tuntua käsivarsien ojentajalihaksissa.
2. Etukyykky + pystypunnerrus (käsipainoilla/ kahvakuulalla/pulloilla)	3	15	Asetu lantionlevyiseen haara-asentoon ja nappaa käsiin painot. Käännä painot rinnalle niin, että kyynärpäät ovat painojen alla. Kyykkää alas ja työnnä sieltä ylösnousuvaiheessa painot pään yli. Laske painot harteille ja laskeudu samaan aikaan takaisin kyykkyyn.
3. Vipunostot kyykkypidossa	3	15	Nappaa paino(t) käsiin (voit käyttää vastuksena esimerkiksi täytettyä vesipulloa/-pulloja, käsipainoja, kahvakuulaa, kivenmurikkaa, painavaa kirjaa tms) ja asetu seinää vasten kyykkypitoon. Paina ristiselkää kohti seinää ja laskeudu noin 90° kyykkykulmaan. Pidä katse suoraan eteenpäin ja lähde nostamaan painoa/painoja suo-rin käsin rintakehän korkeudelle. Laske samaa reittiä alas ja toista.
4. Pöytäliike	3	12	Istu matolla polvet kevyesti koukussa ja kädet vartalon takana, sormet kohti kantapäitä. Lähde nostamaan lantiota ylös niin, että päädyt liikkeen ylävaiheessa käänteiseen konttausasentoon ja laske lantio sitten alas ja vie se niin lähelle sormia, kuin oma liikkuvuutesi antaa myötä. Älä laske lantiota kokonaan lattiaan, vaan nosta se sitten takaisin ylös ja jää toistamaan liikettä tähän.
5. Pakarapumppaus suorin jaloin	3	15/puoli	Asetu konttausasentoon ja vedä napa kevyesti kohti selkärankaa. Ojenna jalka suorana taakse ja kohti kattoa (älä kuitenkaan notkista selkää), näpäytä lattiaan ja vie jalka vielä sivulle. Tämä on yksi toisto. Toista 15 kertaa per puoli ja vaihda sitten jalkaa.
6. Vino vuorikiipeilijä	3	30	Asetu lankkuasentoon, kädet noin hartioiden levyisessä asennossa. Puske kevyesti kämmenillä kohti mattoa/lattiaa, jotta yläselkä ja lapojen väli aktivoituu ja jotta selkäranka ei ole notkolla. Lähde viemään vuorotellen polvia kohti vastakkaista kyynärpäätä.

Treeni 3A – 1-5 viikot: Jalat + vatsat

Liike	Sarjat	Toistot	Ohjeet
1. Boksikyykky (korokkeelle) tai tavallinen kyykky	3	20	Asetu kyykkyasentoon - muista hyvä keskivartalon tuki. Lähde kyykkäämään boksille pitäen polvi-varvaslinja samansuuntaisena, yläasennossa ojenna lantio suoraksi. [Vaihtoehtonen liike: Tavallinen kyykky]
2. Askelkyykky eteen	3	20	Lähde tekemään perinteistä askelkyykkyä eteen. Ota tukeva asento ja kyykkää toisella jalalla eteen - ponnista takaisin keskelle ja vaihda jalkaa. Muista pitää polvi-varvaslinja samansuuntaisena.
3. Kapea kyykky (kosketus maahan + päkiöille nousu)	3	15	Asetu lantionlevyiseen haara-asentoon ja nouse päkiöille. Lähde tästä pienestä etukenosta laskeutumaan kapeaan kyykkyyn koskettaen alhaalla koroketta. Pumppaa liikettä ripeään tahtiin - lantiota ei tarvitse ojentaa suoraksi ylhäällä vaan reidet ovat kokoajan pienessä jännityksessä.
4. Askelkyykky ristiin ja taakse	3	15/puoli	Lähde tekemään askelkyykkyä ristiin toisen jalan taakse - muista hyvä keskivartalon tuki. Pidä tukijalan linja hieman ulospäin niin taakse on helpompi askeltaa.
5. Sateenkaari-potku	2	15/jalka	Asetu tukevaan konttausasentoon lattialle, asettaen kädet hartioiden leveydelle ja jalat lantionleveydelle. Ojenna toinen jalka ja lähde piirtämään jalalla sateenkaarta, näpäyttäen päkiällä ristiin taakse, toisen jalan yli. Pidä keskivartalo tiukkana koko liikkeen ajan, äläkä anna selän kaareutua liikettä tehdessä.
6. Leveä kyykkyhyppy	3	10	Asetu lantiota leveämpään haara-asentoon ja käännä halutessasi vielä polvia ja varpaita hieman ulospäin, jos se tuntuu kyykkämisen kannalta paremmalta. Kyykkää alas ja ponnista räjähtävästi ylös, ojentaen samalla lantiota. Laskeudu takaisin kyykkyyn ja ponnista sieltä taas ylös.
7. 1 jalan linkkari	3	20	Asetu selinmakuulle ja paina alaselkää kevyesti kohti mattoa, jotta vatsan tuki tulee mukaan liikkeeseen. Ojenna kädet suoriksi pään yli ja nosta yksi jalka vatsan päälle, rutistaen samaan aikaan yläkroppaa kohti jalkaa. Vuorottele jalkoja liikkeen aikana.

Treeni 3B – 6-10 viikot: Jalat

Liike	Sarjat	Toistot	Ohjeet
1. Leveä kyykkyhyppy	4	10	Asetu lantionlevyiseen haara-asentoon ja nappaa käsiin painot. Käännä painot rinnalle niin, että kyynärpäät ovat painojen alla. Kyykkää alas ja työnnä sieltä ylösnousuvaiheessa painot pään yli. Laske painot harteille ja laskeudu samaan aikaan takaisin kyykkyyn.
2. Etureisinousut	3	15	Asetu jonkin sopivan korkuisen tason eteen (pöytä, sohva, jakkara, tuoli, steppilauta) ja nouse kevyesti päkiöille niin, että kantapäät ovat ilmassa. Nojaa yläkroppaa hieman eteenpäin ja lähde laskeutumaan kyykkyyn ja ylös kuitenkaan täysin polvia ojentamatta. Tason on tarkoitus olla tukenasi liikkeen ajan ja voitkin nojata siihen käsillä aina silloin kuin tuntuu. Pumppaa suht. ripeitä ja pumppaavia toistoja. Jos liikkuvuus sallii, voit koskettaa tason sijasta lattiaa.
3. Yhden jalan lantionnosto korokkeelta	3	12/jalka	Asetu selinmakuulle tason/korokkeen eteen. Nosta jalat korok-keelle ja tuo lantio mahdollisimman lähelle koroketta. Nosta toinen jalka ilmaan ja lähde ojentamaan lantiota kohti kattoa. Pidä keskivartalo tiukkana, äläkä anna selkärangan notkistua liikkeen aikana. Toista ensin toisella jalalla kaikki 12 toistoa ja vaihda vasta sitten jalat toisinpäin.
4. Bulgarialainen kyykky	3	8/jalka	Asetu lantionlevyiseen haara-asentoon jonkin tason eteen (se voi olla mikä tahansa pöytä, tuoli, jakkara, sohva, steppilauta tms) ja nosta toisen jalan päkiä tasolle. Astu maassa olevalla jalalla vielä hieman eteenpäin (askellus saa olla leveä) ja lähde kyykkäämään alas. Huolehdi, että polvi ja varvas menevät kyykätessä samaan suuntaan ja että kyykky olisi maksimissaan 90° syvä. Vaihda kahdeksan toiston jälkeen jalat toisinpäin ja tee sama toiselle puolelle.
5. Askelkyykky eteen + taakse	3	20	Seiso lantionlevyisessä haarassa ja lähde astumaan toisella jalalla ensin eteen askelkyykkyyn ja ponnista siitä suoraan jalka taakse askelkyykkyyn. Jos tämä kombo tuntuu liian haastavalta, tee pelkästään askelkyykky eteen tai taakse. Huolehdi, että polvi- ja varvaslinja pysyvät samaan suuntaan ja että keskivartalo tukee liikettä.
6. Pakarapumppaus suorin jaloin	3	10	Asetu konttausasentoon ja vedä napa kevyesti kohti selkärankaa. Ojenna jalka suorana taakse ja kohti kattoa (älä kuitenkaan notkista selkää), näpäytä lattiaan ja vie jalka vielä sivulle. Tämä on yksi toisto. Toista 15 kertaa per puoli ja vaihda sitten jalkaa.
7. Kurotus varpaisiin	3	20	Asetu selinmakuulle jalat kohti kattoa. Paina alaselän notkoa kohti mattoa, jotta vatsan tuki on mukana liikkeessä, eikä selkä pääse liikaa notkolle. Lähde rutistamaan vatsan avulla yläkroppaa irti matosta ja kurota samaan aikaan käsillä kohti varpaita (tai kevyemmässä versiossa kohti nilkkoja). Rutistus on pieni, minkä takia vatsan aktivaatio on ensiarvoisen tärkeää liikkeen aikana.