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## Gym Video Instructions for Youths



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## ABSTRACT

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The purpose of this thesis is to increase youths' knowledge about gym training by video guides. This thesis will provide guidelines to perform safe and effective techniques. Target group for the videos are youths in Lapinlahti and the school staff. The commissioning party for the thesis is municipality of Lapinlahti.

The aim is to create a valuable product for the gym in Lapinlahti to prevent injuries among youth and encourage them to go to the gym. Gym in Lapinlahti is new, so there are not any similar products but same kind of products have been published in Balance Sports Centre, Kajaani. From the authors' point of view, the aim is to develop professional competence as sport instructors by increasing knowledge of gym training among youths, and to develop competence in health promoting physical activity by demonstrating knowledge of muscular anatomy.

The theoretical framework of the thesis will discuss about youths and their guidelines, muscles and gym training. Some terminology will be explained and basics about product development is introduced because this thesis will be carried out as a product development process. The video guides are published in YouTube and there is a possibility to check the videos by scanning QR code. This thesis process started by doing agreement with commissioning party in November 2016 and finished in May 2017.

**Keywords:** gym training, youth, functional thesis, product development, productized thesis

## PREFACE

"T.H.E.S.I.S.

–True Happiness Ended Since It Started."

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## 1 INTRODUCTION

Gym training is getting more and more popular field of sports. More people, despite their goals, are getting in to gym training. (Virtamo 2009, 3.) We, the authors, want to be part of this trend, therefore we created a product which will make gym training more easy and enjoyable.

People from different age groups are going to gym and trying to enhance their fitness levels. Many beginners may have problems with machines or how to do free weight movements correctly. Essentially, there is a lack of knowledge and to prevent injuries and increase people's will to go to gym, the authors of this thesis planned and implemented guiding videos for the gym. (Virtamo 2009, 10.)

In this thesis, gym training in general, basic knowledge about the muscles and recommendations for the target group are introduced. Target group for this thesis is youths. It was chosen because both authors have previously worked with them and are hoping to work with youths in the future. The commissioning party for the thesis is municipality of Lapinlahti.

This thesis process offered an opportunity to gain valuable knowledge about youths and their physical activity when considering future careers. Furthermore, because this thesis is carried out as a functional thesis, product development process plays important role in theory part. The topic of this thesis focuses mainly on creating instructive videos to youths, who are starting gym training or wanting more information about right techniques and training in general.

## 2 MUSCLE ANATOMY

In a human body muscles have many tasks. They generate heat and are crucially involved in homeostasis of body temperature. Muscles help to maintain the right posture by supporting the skeleton and stabilizing joints. However, the main functions of the muscles are to generate force and motion. Muscles are the largest tissue group in human body, approximately half of the total body weight consists only of muscles. Skeletal muscles alone make up to 40% of the body weight and smooth and cardiac muscles add another 10%. (Sherwood 2016, 252.)

### 2.1 Muscular system

There are three different muscle tissue types in human body: cardiac-, smooth- and skeletal muscle. Cardiac muscle is found only from the heart and its primary job is to pump blood through-out the circulatory system. Smooth muscle is found from tubes and inner organs such as esophagus, urinary bladder and stomach. Its contractions will regulate movement of material inside of the body. Third and in our case the most important muscle tissue type is skeletal muscle. They are controlling the body movement and generating force. (Sherwood 2016, 251.)

Every move we make is a result of contraction of a skeletal muscle and they are responsible of both voluntary and reflex movements. Skeletal muscles support homeostasis and creates actions like breathing and swallowing food. Furthermore, skeletal muscles produce heat by contracting and creating movement like shivering when body temperature is too low. (Silverthorn et al 2010, 407-408.)

Every muscle consists of number of muscle fibers (a single muscle cell) and connective tissue. In a skeletal muscle the fibers are parallel to one and other and linked together by connective tissue. In each skeletal muscle is composed of several myofibrils. (Fig. 1) There are two kinds of structures in myofibrils; thick filaments are formed by protein called myosin and thin filaments which are mostly formed by protein called actin. When muscle contracts, the myosin forms a cross

bridges and attaches to actin so the thin filaments are pulled over the thick filaments towards the center and this overlapping makes the muscle contract. (Fig. 2) (Thibodeau & Patton 2010, 208-209).

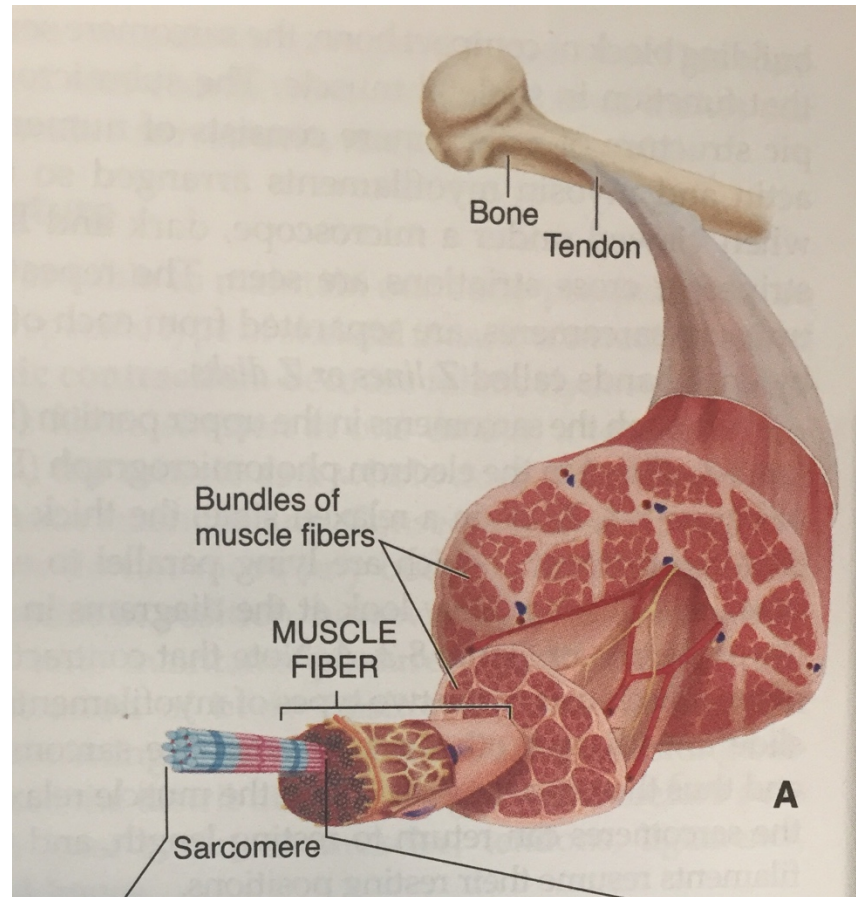


Figure 1. Muscle fibers are formed from actin and myosin. Bundles of muscle fibers form the structure of skeletal muscle. (Thibodeau & Patton 2010, 209.)



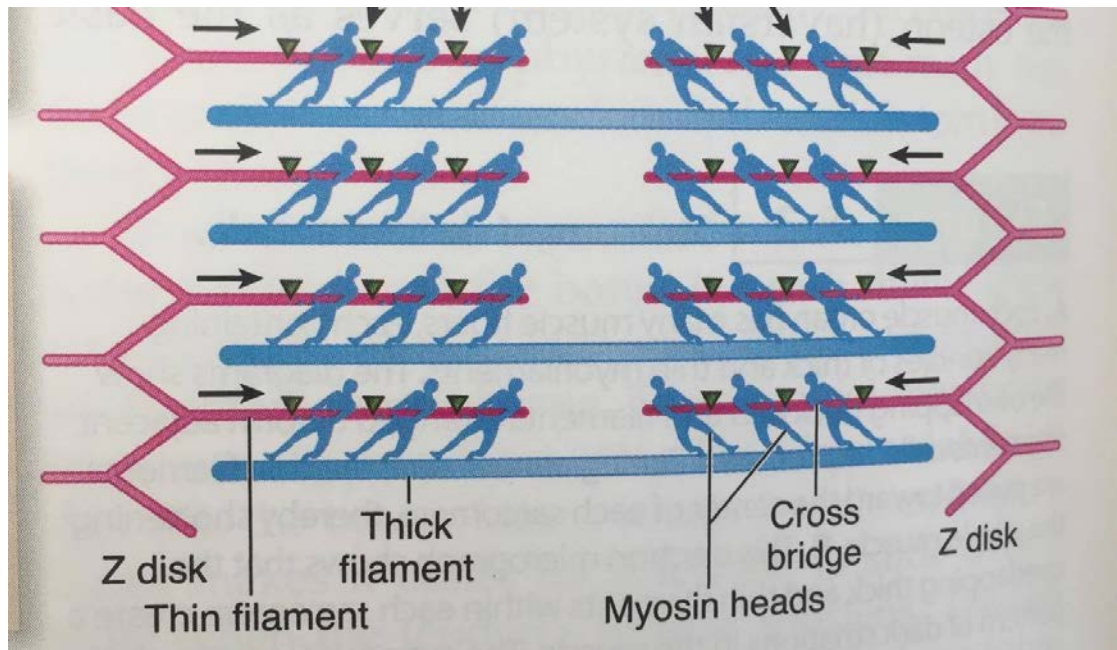


Figure 2. Thick and thin filaments are forming cross bridges and crossing over when muscle contracts. (Thibodeau & Patton 2010, 209).

## 2.2 Functions of muscles

There are two types of muscle contractions, isotonic and isometric. (Fig. 2) Most of the body movements are combination of these two. (Cohen & Taylor 2009, 125). Isometric contraction happens for example when carrying an object and arms are stationary, not lowering or rising. In this action isometric contraction means that tension in the muscle changes, but the length of the muscle fibers remains the same. Isometric contraction happens during static exercises like sitting against the wall. Isometric contractions are important especially in maintaining the body position when walking or running. (Sherwood 2016, 263.)

Isotonic contraction happens when the muscle is producing a movement, for example when walking, lifting weights or dancing. In isotonic muscle contraction tension in the muscle remains relatively same, but muscle fibers are shortening. In isotonic contraction, there are two phases: concentric and eccentric. During concentric phase the muscle fibers are getting shorter and the actual contraction happens. (Thibodeau & Patton 2010, 208-209.) During eccentric phase muscle fibers



are stretched and muscle fibers returns to the starting position. Most of the body movement require both, isotonic and isometric actions. Isotonic contractions create the movement and isometric contractions that happen simultaneously keep the body posture and position correct. (Powers & Howley 2009, 161.)

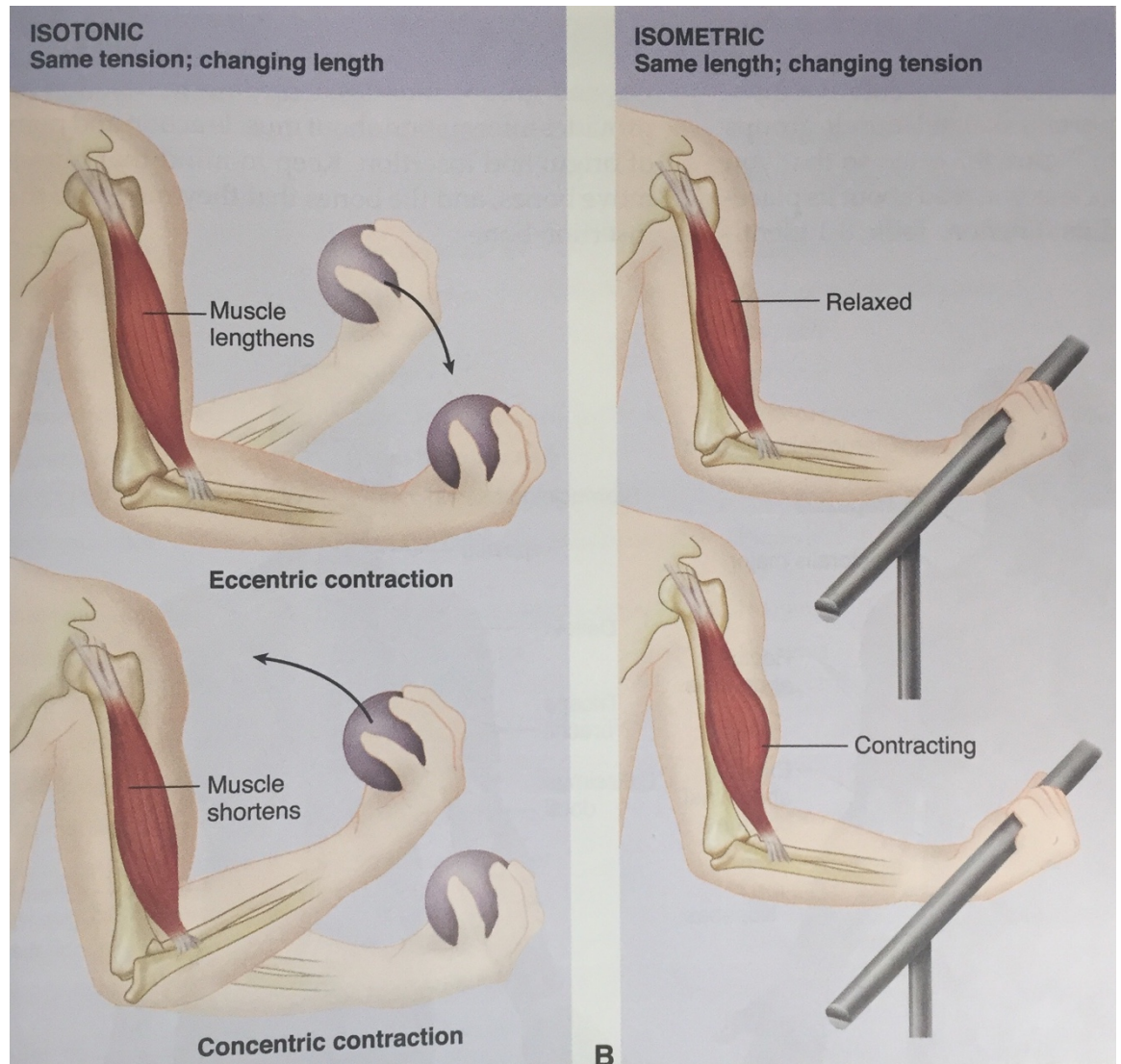


Figure 3. Isometric contraction happens in static exercise and isotonic contraction during the movement. (Thibodeau & Patton 2010, 215).

### 2.3 Skeletal muscle

Skeletal muscles are attached to the bones by tendons. With help of the nervous system skeletal muscles will shorten or in other words contract and because of the attachment to the bones this contraction will generate movement. (Sherwood

2016, 262.) Most of the skeletal muscles are connected to two bones which have movable joint between them. During the contraction one of the two bones is relatively stationary and the other bone is pulled toward the stationary one. This process creates the movement. Muscles attachment point to this more stationary bone is called origin and attachment point to the more movable point is called insertion. Usually attachment between bone and the muscle is indirect. This means that muscle is connected to the bone by tendon, which is extended over the joint and attached to bone. (Thibodeau & Patton 2010, 208-209.)

Usually goal of the strength training is to increase muscle size and force production. Muscle size is increased because of hypertrophy, which occurs as a result of strength training. (Cohen & Taylor 2009 124). When muscle is not being used, muscle mass start to decrease. This process is called muscle atrophy. Age related muscle atrophy, also known as sarcopenia starts to happen around age of 50. (Powers & Howley 2009, 280.)

It is likely that after performing new physical activity there occurs some soreness in the muscles. After 24-48 hours' soreness and stiffness might occur in the muscles as a result of strength training. This is called delayed onset muscle soreness known also as DOMS. (Powers & Howley 2009, 462.) DOMS might vary from very minor tenderness in muscles to pain that limits daily routines. DOMS are relatively common after work outs and and For example, stretching, massage and homeopathy might relieve symptoms of DOMS. (Cheung et al 2003, 146-153.)

### 3 GYM TRAINING IN GENERAL

Nowadays physical activity plays important role in enhancing health and maintaining person's ability to do their daily tasks. (UKK-Institute 2014). World Health Organization (2017) defines physical activity as "any bodily movement produced by skeletal muscles that requires energy expenditure." There are several different recommendations to promote people to do health enhancing physical activities in their daily basis. For example, Finnish UKK-Institute and World Health Organization (WHO) have published few guidelines. Furthermore, organizations like European Union Parliament (2008) and different nations offer guidebooks for health enhancing physical activity, and they usually are quite similar to each other. The goal for these guidelines is to help people to be more physically active and give ideas about the types and amounts of physical activity people need for good health. (Opetusministeriö, Nuori Suomi Ry; 2008, 6).

Both, UKK-Institute and World Health Organization recommend people to do also strength training. Therefore, this section will focus on the reasons why strength training should be part of physical activity sequences and what the recommended frequency is.

#### 3.1 Guidelines and Recommendations

Finnish UKK-institute has carried out a Physical Activity Pie (2009) for adults aged 18-64 (Fig. 4). This Physical Activity Pie is a recommendation for adults and describes how much and what kind of exercises they should do to enhance their physical activity. According to the Physical Activity Pie, adults should exercise by doing moderate-intensity aerobic training at least 2 hours 30 minutes per week. Examples for moderate-intensity exercises are cycling, walking, heavy house and yard work, berry picking or hunting. 1 hour 15 minutes per week is enough, if the training is more-demanding, done in vigorous-intensity level. These kinds of exer-

cises are Nordic walking, stairs and hill climbing, water running, aerobics and running. In addition, everyone needs muscle-strengthening and balance training at least twice a week. (UKK-Institute 2015.)

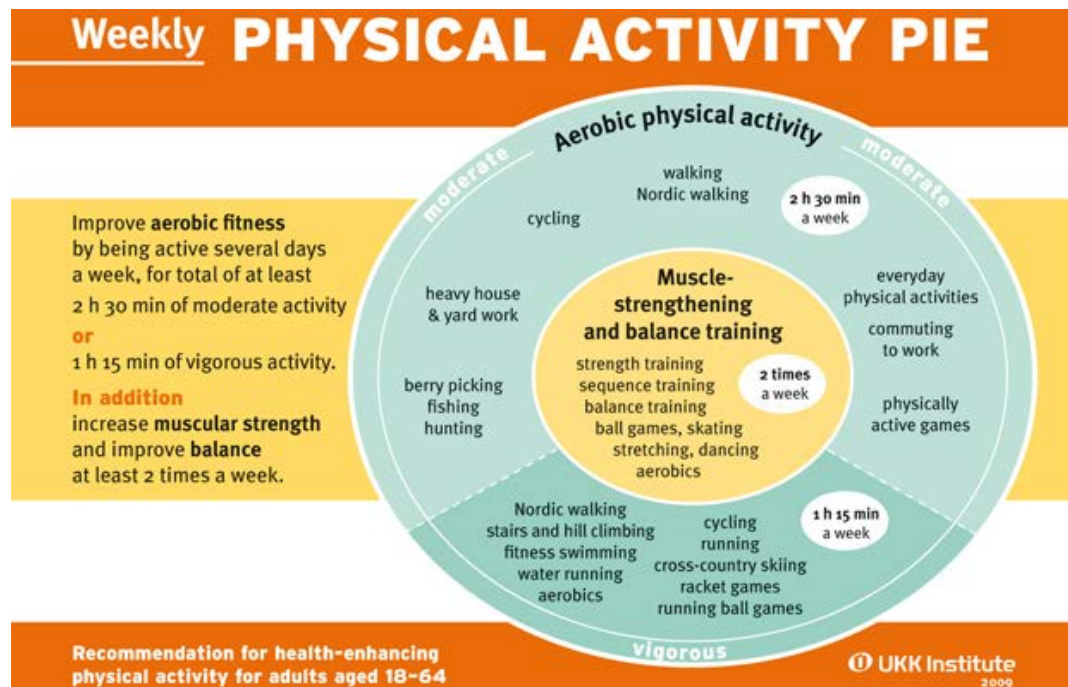


Figure 4. Physical activity Pie for adults aged 18-64 (UKK-Institute 2009).

UKK-Institute has also published recommendations in 2008 for youth, aged 13 to 18. It recommends to move at least 1 hour 30 minutes per day and half of that time should be done in vigorous-intensity level. UKK-institute recommends youth to get out of breathe and raise the heartbeat every day by swimming, skiing, cycling or running. Muscular training like dancing, gym, skateboarding or stretching should be done three times per week. Games and plays are recommended to be done every time when there is a chance. (UKK-Institute 2017.)

According to World Health Organization (WHO), regularly done physical activity reduces risk of coronary heart disease, diabetes, cancers, depression and the risk of falls. It also improves bone strength and functional health. In addition, it is a key determinant of energy expenditure, and thus fundamental to energy balance and weight control. WHO has also made guidelines for youth, aged 5 to 17 and they also courage youths to do vigorous-intensity activities, including those that strengthen muscles, at least three times per week. (World Health Organization 2017.)

Studies have proven that consistent strength training can alter one's body image and enhance self-esteem. (Weinberg & Gould 2011, 407). Strength training should be fun for a young person, so that muscular training would continue through a lifetime. (Hulmi 2016, 66). To have a fun experience, the exercise selection and order should be done right for beginners. (Heinonen et al 1998, 110).

When selecting exercises, customer's needs, baseline and limitations must be taken into a consideration. (Heinonen et al 1998, 110). Exercises should be selected based on person's experience, the amount of time available and wanted goals. (Douillard 1996, 167). A good program includes movements, which are done with machines and with free weights. This improves person's coordination and focuses on many different muscle groups. (Heinonen et al 1998, 110-111.) The exercises for training program should be selected so that muscle balance across joints and between opposing muscle groups can be maintained. (Baechle & Earle 2008, 387).

Exercise order should be taken into a consideration. There are many ways to arrange exercises and there isn't one right way to start. However, to get the most out of it, it is recommended to start from bigger muscles and continue to smaller and from down to up. For example, first leg muscles and gluteus maximus, then abs and back and in the end chest and hands. (Bushman 2011, 123.) Larger muscles spend more energy, so the whole body gets warm in the beginning of the training and there is enough energy and focus to train the largest muscles. (Heinonen et al 1998, 137).

There are also recommendations for exercise sets, repetitions, load and rest time depending on person's goals. (See Appendix 3) Once the goal has been decided, the goal can be applied to determine training volume. (Heinonen et al 1998, 107). Training volume includes the exercises performed, the total number of sets and repetitions performed during a training session. Varying training volume can be executed by changing the number of exercises, the number of repetitions or the number of sets performed per exercise. Changes in training volume can be used to emphasize maximal strength, power, muscular endurance or hypertrophy. (Wilmore, Costill & Kenney 2008, 299-300.) Load is amount of weight lifted (Zatsiorsky & Kraemer 2006, 233) and it can be developed, for example, by varying repetitions,

sets, tempo or rest interval. It is ideal to lift weights with higher load and lower repetitions, if trainer wants to gain muscle size and strength. (Human Kinetics 2017.) More terminology is explained in the next chapter (3.2 Strength training terminology).

### 3.2 Strength training terminology

This section includes definitions for basic strength training terminology. Before starting to exercise at the gym, it is essential to know the basic terminology of strength training. According to Ayers and Sariscsany (2011, 95) understanding the terminology and knowing how to perform the exercise, are the first steps for the successful training program.

#### **Aerobic training**

The UKK-Institute recommends adults to do aerobic training at least 2 hours 30 minutes per week and youths to train 45 minutes in vigorous level. Therefore, it is important to know the term, what aerobic training means. Aerobic training is an activity, which involves large-muscle groups engaged in dynamic movement for prolonged periods of time. Examples of aerobic exercises are walking, running, swimming, dancing and team sports like basketball. (Bushman 2011, 99.) Aerobic threshold is approximately 40 beats below your maximum heart rate. (Moilanen 2008, 21-34). Cardiovascular system and respiratory system work together, energy is supplied by inspired oxygen during aerobic exercise. (Zatsiorsky & Kraemer 2006, 227). Any kind of aerobic training is good way to warm up a body for the actual training. (Bushman 2011, 101).

#### **Anaerobic training**

Anaerobic training consists of high-intensity intermittent sessions of exercise such as weight training. Because of anaerobic training, improvements in muscular strength, power and muscular endurance will occur. Anaerobic training involves short bursts of higher intensity contractions in muscles, at a much greater percent-

age of their maximum contraction strength. Examples of anaerobic exercise include sprinting and weight lifting. It is used to promote strength, speed and power and to build muscle mass. There are two types of anaerobic energy systems, high energy phosphates, adenosine triphosphate and creatine phosphate; and anaerobic glycolysis. If compared to aerobic training, anaerobic exercise burns glycogen to meet its energy requirement while aerobic training burns fat. (Baechle & Earle 2008, 94-99.)

### **Set**

One set is when there are many repetitions right after another without a rest (e.g. 8-10 repetitions = 1 set) (Heinonen et al 1998, 107). The number of sets performed in a workout is related to the training volume. According to Bushman (2011, 124) even one set can provide benefits for beginners but the most recommended variety of sets are two to four sets.

### **Repetition**

Repetition means number of times a movement is repeated within a single set. (Zatsiorsky & Kraemer 2006, 232). One movement includes the eccentric and concentric phase. Number of repetitions in a training program depends on the goal. As the weight increases, the number of repetitions can decrease. For the beginner, the best approach is to establish a target repetition range, and then determine the maximum load that can be handled for the prescribed number of repetitions. (Bushman 2011, 124.)

### **Load**

The load is amount of weight lifted. (Zatsiorsky & Kraemer 2006, 233). A 1-Repetition-Maximum (1RM) load is the highest resistance that can be moved only ones. The amount of weight lifted is dependent on variables such as exercise order, volume, frequency, muscle action, repetition speed, rest period time and training goals. For example, light loads of approximately 45-50% of 1 RM or less may increase dynamic muscular strength in previously untrained individuals, as this initial phase of lifting is characterized by improved motor learning and coordination (Hulmi 2016, 32.)



The same results can be reached in two different ways; training very hard but rarely or training more often but lighter. (Hulmi 2016, 39). For strength training beginners, it has been recommended to train with loads corresponding to 60-70 % 1 RM for 6-12 repetitions. (Hulmi 2016, 152).

### **Rest**

Rest is a time between sets, or between workouts. (Zatsiorsky & Kraemer 2006, 232). The length of rest period influences energy recovery and training adaptation. Resting time depends on the movements and target. (Heinonen et al 1998, 107). If the goal is muscular strength, heavier weights and longer rest periods of two to three minutes are needed. Then again if the goal is muscular endurance, light weights with short rest periods from 30 to 60 seconds are required. As a conclusion, the heavier the weight is, the longer the resting time should be if the goal is to maximize strength gains. (Bushman 2011, 125.)

### **Maximum force**

Muscular force means muscles' ability to work against the resistance. It can be divided into endurance, maximum and speed. (UKK-Institute/LiVe 2017.) Shortly, maximum force is the highest performance given in some motor task, usually in only one repetition. (Zatsiorsky & Kraemer 2006, 230). According to Heinonen et al (1998, 14-116) maximum force is needed in many sports, for example in discus throw, shot put, weightlifting and even in sprint running. Before starting to train maximum force, there should be some base, so that the trainee could avoid injuries. The more person has fast muscle fibers, the more power the muscle can product. Adult women have smaller cross sectional area in muscles than men do so women can produce 20 to 35% less maximum power than men. (Fogelholm et al 2005, 39). Youths, who are starting the strength training, should not focus on the maximum force training until the technique and the endurance training base has been created. (Niemi 2006, 99).

### **Periodization**

The term periodization refers to a division of the training season into smaller and more manageable periods of training. (Zatsiorsky & Kraemer 2006, 97). By periodization, development can be reached. It is divided into macrocycles and microcycles. Macrocycles is an annual plan that works towards peaking for the goal competition of the year, whereas a microcycle is typically one training week. There are three phases in the macrocycle: preparation, competitive, and transition. Each microcycle is planned based on where it is in the overall macrocycle. (Heinonen et al 1998, 112.) Periodization involves shifting training priorities from non-sport-specific activities of high volume and low intensity to sport-specific activities of many weeks to prevent overtraining and optimize performance. (Baechle & Earle 2008, 509).

### **Recovery**

After the training session, person's body starts recovering. Recovery from individual training session is essential if the athlete wants to achieve the maximum benefits from the training session. (Baechle & Earle 2008, 492.) Person's ability to continue exercising is limited by how quickly the muscles recover after a session. During recovery, body returns to its normal, balanced form. Recovery is essential for muscles to grow. (Heinonen et al 1998, 111.)

### **Split routine**

Split routine means that different body parts are trained on different days. (Zatsiorsky & Kraemer 2006, 232). Grouping exercises so that train only a portion of the body, for example upper body or lower body, or certain muscle areas eases recovery phase. For example, if upper body is trained on Monday and on Thursday and lower body on Tuesday and on Friday, there are two or three days of rest between upper or lower body training sessions. (Baechle & Earle 2008, 389.)

### **Training Frequency**

Training frequency means the number of training sessions conducted per day or per week. The frequency of training sessions depends on the intensity and dura-

tion of the exercise, the status of the athlete and the specific sport season. Appropriate training frequency is important, as too much training may increase the risk of injury, illness or overtraining. (Baechle & Earle 2008, 492.)

### 3.3 Structure of Training Session

This section focuses on how training session should be built. In this section warm up, the main exercise and cool down are introduced. To have all three phases in training, and especially a specific warm up, injuries are prevented the best. (Roschinsky 2003, 173).

#### 3.3.1 Warm up

Warm up belongs to every exercise session. The purpose is to warm up the muscles, joints and tendons. It improves general alertness, promotes coordination and quickens circulatory system and metabolism. Generally, the main objective of a warm up is to reduce the risk of an injury. (Heinonen et al 1998, 106.)

Good warm up consists of a minimum of five to ten minutes of low- to moderate-level aerobic activity. It can also include muscular endurance activities with lower resistance and higher number of repetitions, or doing dynamic range of motion exercises. The warm up should be longer, if the intensity of the conditioning phase is high. If the conditioning phase includes for example running, then jogging or brisk walking would be appropriate warm up. Warm up increases body temperature and helps to reduce muscle soreness after training. (Bushman 2011, 101-122.)

As reported by Baechle and Earle (2008, 296-297), the positive impacts of higher body temperature are decreased muscle and tendon stiffness, altered force-velocity relationship of muscle and increased anaerobic energy available. Also, according to Virtamo (2009, 11), having a good warm up reduces the risk of sprains in muscles and support tissue injuries. Along with the positive effects of the warm up

on the physical level, there are also positive effects in psychological areas. Research shows that warm up increases the mental readiness and motivation for the training to come. (Roschinsky 2003, 174.)

Hulmi (2016, 163) recommends that, the warm up before a strength training session should include few sets with lighter weights performed before the weight training exercises themselves. For example, you should perform couple of warm up sets using progressively heavier weights. Short stretching movements can be done during warm up, but they should last maximum five seconds per muscle. (Virtamo 2009, 12). Stretching the muscles in the end of the warm up can help in the actual exercise so that it becomes more fluent, harmonious and training can be done with a higher load. (Roschinsky 2003, 175).

### 3.3.2 Exercise

Depending on personal goal, the actual training program or one single exercise in gym includes usually free weights or weights in a machine, sets, repetitions and the resting time. (Heinonen et al 1998, 133-135). The duration of training session is recommended to be short enough to allow effective training. The relevant strength training session lasts 45-60 minutes. For youth, appropriate training program includes one to three sets of 8 to 15 repetitions. During the first session, it is crucial to pay attention to technique. Sets can be added as a technique of youth improves. (Ayers & Saricsany 2011, 95-100.)

For youth, it is recommended to focus on correct technique and to have a good coordination, not to focus on weights. (Heinonen et al 1998, 128). By controlling the movements and knowing own body and muscles, possible injuries can be avoided and techniques are easy to adapt. (Niemi 2006, 147). When the entire range of motion is learned, the value of exercise is maximized.

Breathing should be taken into a consideration, when performing the strength training movements. (Baechle & Earle 2008, 327-328.) Holding the breath restricts blood flow, which results in high blood pressure responses. (Wilmore, Costill & Kenney 2008, 100-105). But proper breathing keeps joints lubricated. It will affect

to the movement, posture, coordination and the effect of the exercise on the muscles. During the exercise, heart beats faster and the working muscles require more oxygen. Generally, appropriate way to breathe during weight training is to exhale while lifting the load and inhaling when lowering the load. (Baechle & Earle 2008, 328.)

There are different ways of doing the strength training. It can be done as circuit training or station training. In circuit training, the machine or movement is changed after one set and in station training the whole set is done in one place from the beginning till the end. Both methods can include machines and free weights. (Baechle & Earle 2008, 408.) Training with free weights has its benefits, more coordination and balance is needed than when working with machines. However, using free weights is riskier and there is higher possibility to perform the movements with wrong technique. (Powers & Howley 2009, 262). Since this thesis' target group is youth the authors wanted to use mainly machines in the workouts but also introduce some free weight movements.

### 3.3.3 Cool down

The cool down is done in the end of the training session. It accelerates recovery, prevent muscle soreness and long-term damages like incorrect postures or muscular imbalance. (Roschinsky 2003, 179.) It should consist of a minimum of five to ten minutes of low- to moderate-level activity. Cool down provides for body systems to gradually return to its normal condition, pre-exercise level. Heart rate slows down, blood pressure decreases, muscles recover from the actual training. Activities included in cool down are quite similar as in warm up, but the intensity will need to gradually diminish toward resting levels. (Bushman 2011, 107.)

Especially, stretching and different kind of circulations to the trained body parts are good in cool down. (Heinonen et al 1998, 106). Relatively light stretching is good right after exercising but when the muscles are really chilled and reverted, the decent stretching should be done. (Virtamo 2009. 51).

## 4 YOUTHS TRAINING

After consulting the commissioning party and discussing among ourselves, we decided that the specific target group for this product is youths aged 13 to 18. The cooperation gym is located next to a school and students of the school are the main users of the gym. By choosing this target group, we want to create a product designed especially for youths to promote their physical activity and inspire them to use the gym which is easy to access but still lacking customers. Commissioning party also asked if we could bear in mind the school staff and that they could benefit from the product as well.

### 4.1 Benefits and possible risks of gym training

Exercise and physical activity might influence positively not only to youth's health but also to social and mental wellbeing. Physical activity is important in young age since it often promotes healthy life style also in older age. Before puberty, strength training will improve youth's coordination and ability to use muscles simultaneously and muscular strength will also improve. However, there will not be growth in muscles during puberty. After puberty, muscle mass will start to grow as a result of strength training. (Vuori et al 2012, 148-149.) There are some concerns about resistance training during younger years and there might be higher risk for bone or joint injury. (Katch et al 2011, 458). Correctly done strength training will not have any risks to the health. However, during the growth spurt there might occur some soreness in attachment point of tendons. In that case training loads should be adjusted for a period of a time. (Kallio 2008, 73-74.)

Even though there are many researches done about the benefits of exercise and strength training, there are relatively few concerning youth. Health enhancing benefits of training in younger years are difficult to prove right since youths are generally in good shape and they have very few chronic conditions caused by bad life habits. However, over weight and obesity is getting more common among youths

as well as adults and this has negative influence on health overall. Research has shown that this can be improved by training. (Vuori et al 2012, 146-147.)

According to Vuori et al (2012, 146-147), physical activity during younger years has many benefits when considering youths' psychological and social abilities. Furthermore, habits learned during younger years will more likely be part of life-style in older years. Therefore, youths who are physically active, tend to be healthier during adulthood. Exercise and weight training in childhood and adolescent will improve reaction time, accuracy of the movement and neuromotor coordination. (Vuori et al 2012, 148.)

Strength and gym training has also effect on bone mass and density. Bone density increases as an effect of training, especially high-impact sports are beneficial to bones. (Vuori et al 2012, 149). Due to ageing bone density starts to decrease and even though exercising will slow down the process, physical activity during puberty is important factor when developing the bone mass and density. (Cohen & Taylor, 2009, 106).

## 4.2 Safety

Safety is an important issue to consider, since the authors cannot physically be present during the training sessions. Some of the customers might be beginners in gym training and we need to make clear instructions which everybody can understand.

One of the most important things during the research process for our thesis was to make sure that all safety issues are taken under the consideration. Even though gym users are responsible of themselves during their workouts we have to stress the importance of safety in our general instructions. Since the authors are not able to physically be present during the work outs, we need to make sure we choose safe movements and demonstrate them in a proper way. For example, when performing a squat with a barbell it needs to be done so that knees are in 90-degree angle at lowest position. Especially, since the target group is youths and there might be many beginners involved. We are also including machines like Smith and



Back to the exercise to minimize the risk of injury, since proper technique is faster to learn when using machines. (Powers & Howley 2009, 460.)

However, we need to be aware that there might be more advanced gym users in our target group and videos should be beneficial for them as well. This is where the print out guidelines and instructions are handy. Everyone can choose their exercises based on their goals and previous experience. (See Appendices 2 and 3)

Safe use of the machines and free weights is important. When users first come to the gym they should make sure that all equipment are working correctly. Also, maintenance of the gym should make sure that all equipment is in a safe place and in proper condition. Footwear of a trainee should be suitable for gym training, and shoes should be sturdy and fit perfectly to users' feet. (Kallio 2008, 79.)

Warm-up should be done prior to the exercise; proper warm-up is important because it decreases the risk of injuries like strains and pulls. Warm-up activities like running or cycling will increase blood flow to the muscles and temperature of working muscles will increase. (Powers & Howley 2009, 453.) According to Buschbacher et al (2009, 31) stretching should be included to the warm-up, it will increase the range of motion, balance and coordination. However, stretching before exercises that require much strength should be avoided since according to Buschbacher et al (2009, 32) it will influence negatively on force-generating power.

According to study done by Friman & Wesslen (2000), physical activity and exercising during infections should be avoided since physical activity might lower the defenses against conditions like mononucleosis or myocarditis. Infections might affect to nervous system and therefore sports that require high precision should be avoided because of elevated injury risk in joints, tendons and ligaments. If resting body temperature is increased by over 0,5 °C people should avoid physical activity. Furthermore, people with symptoms like sore throat, headache, muscle tenderness, joint pains or malaise should rest at least 1-3 days or until symptom's have disappeared. After the rest period physical activity levels can gradually be resumed to the normal. (Friman & Wesslen 2000, 510-522.)

## 5 RESEARCH TASKS

The purpose of this thesis was to develop video guide for gym, located in the school building in Lapinlahti. The video guide is targeted for the school staff and youths. The purpose for the working life was to create a valuable product which acts as a teaching tool for the school in Lapinlahti. We wanted to create useful and modern video instructions for the users of gym in municipality of Lapinlahti, inside the school building. We want to increase people's knowledge about gym training. Therefore, we planned two training programs and printed guidance to raise gym users' knowledge and to support the research questions. Those guidelines include beneficial and effective movements for youths. (See Appendices 2 and 3)

Our aim is to prevent injuries by guiding customers to do the movements correctly and make people, especially beginners and youth, more willing to go to gym. Therefore, the authors want to develop professional competence as sport instructors by increasing the knowledge of human anatomy, recommendations and principles of strength training. From the Kajaani University of Applied Science's point of view, the aim was to compile a thesis in a modern way.

The research questions of the thesis were:

What is the correct technique in chosen movements?

What are beneficial movements for youths?

What movements should be included in effective workout routine?

## 6 PRODUCT DEVELOPMENT PROCESS

In University of Applied Sciences, there is a possibility to do a functional thesis (Kajaanin ammattikorkeakoulu 2017). Because of the product idea, this thesis is carried out as a functional thesis. Product development process is one form of it. It means that thesis will be a product in the end of the process. It can be published as a book, booklet, portfolio, web page or event and like in this case, as a guiding video. (Gluck 2012.)

Product development process includes six phases, and the first one is planning. The actual launch and mission statements of the product are decided in planning phase. After that is concept development phase, which describes the form, function and features of the product. Third phase is system-level design and fourth is detail design. Finally, there is testing phase and in the end, comes the phase when the product is available for the customer. (Kajaanin Ammattikorkeakoulu 2017). This thesis process included five phases, since there were not enough time, the product could not be tested.

The authors' main target group are youths but our goal is to produce videos and instructions that are useful also to adults as well as to elderly people. Youth are the main target group because the gym is in the same building with a local school. The authors hope that they produced a versatile product that will increase motivation and eventually fitness level among youths in Lapinlahti. These guiding videos are individually behind QR codes, and the codes are attached to the machines in the gym. (See Appendix 4) Videos can also be found in YouTube, so they can be checked already before going to gym, which fastens the actual training session.

By using QR codes the authors hope to raise the interest of youths who are familiar with technology and develop modern ways to learn. Videos will introduce the techniques and tips how to do movements correctly and effectively. With help of research done in advance, the authors and commissioning party chose the movements which are done with free weights and movements done with machine, so customers can create full body work-outs with help of the videos.

The authors wanted to keep the videos short and focus mainly on the technique and provide training plans for different goal by adjusting loading and repetitions. By writing also a theory part for customers and planning two training plans, we managed to have shorter videos. Theory part includes how many repetitions, sets and resting seconds' person needs, if they have some certain goal. (See Appendices 2 and 3) This theory part is printed out and put in the wall at the gym. We hope it raises knowledge about basic gym training even if people is not watching our videos.

### 6.1 Planning the Manuscript

The product development process was divided on three main phases. The first phase was the product manuscript and filming plan. The second phase was the actual filming part and editing of the video. The last phase was publishing the videos in YouTube and putting them behind QR codes.

In the start of the whole process, a schedule for the product development process was planned. It included the schedule for the thesis and important dates like the day when to shoot the videos. Also, the filming plan was done before the filming sessions. The final filming plan included the complete list of movements, correct techniques and used equipment. The authors' expertise about the correct techniques helped during the filming. The authors wanted to save money, so they worked as models and photographers themselves. After the filming, videos were edited and published on YouTube and then QR codes were printed.

In the planning phase, the authors watched numerous videos about gym exercising and tried to get good tips for the videos. The most suitable video guides were found from YouTube and it helped much when deciding how to edit our own videos. Choosing the movements was very simple. There are few new machines in the gym in Lapinlahti and the commissioning party agreed right away which machines would need guides. We chose 15 movements, some of them are done with free weights and some with the machines. The commissioning party wished for

some free weight movements, for example for the abs, because the actual ab machine in the gym is quite old and might get carried out soon. Also, lateral raise, bench press and shoulder press are done with the free weights. Rest of the movements are done with the machines. Even though all the movements are familiar to the authors, it was important to study the movements from decent books and focus on the main points from a beginner's point of view.

When editing the videos, authors used Google and watched YouTube videos for tips, how to make simple and attractive videos for the viewers. Not all the Googled sources were that reliable, but using common sense and asking opinions about the videos from our peers, videos became quite successful. For example, according to Porterfield (2010) the title of the video, the actual content and text boxes inside the video help when trying to keep videos simple and easy to follow. We followed these factors to keep videos as short as possible and attractive enough for the customers. Videos were edited with Moviemaker, which is a video editing software application for Windows computer. Videos and the instructions are only in Finnish, as the main target group for the product and the organization are from Finland. The instructions were supposed to be recorded at first, but we decided to write short and clear instructions in the beginning of the video to make sure that the customers internalize the instructions. If there is a need to watch the videos during the school lessons, there is not any distraction when the videos do not have a spoken voice.

Because the videos can be checked by QR codes, the application authors used was QR Code & Barcode Scanner. The codes can also be read with any other QR code application. The QR codes were printed from the internet ([www.qrstuff.com](http://www.qrstuff.com)). Some extra QR codes were printed for the gym, if the codes get broken or missing for some reason.

## 6.2 Filming

The chosen filming date was 12<sup>th</sup> of April 2017 in the day time. This time was chosen, because of the low rate of customers that use the gym and because the

lightning is better during day time. The gym is reserved for students and for the school during weekdays, so we asked the commissioning party if we can use it then. There was not distraction at all in this way.

The filming was done with authors' camera Panasonic SDR-T70. To avoid filming in many days, authors shot videos few times and without any voice, to make sure that there isn't any distraction while performing the movements. The possible mistakes were checked on right away and filmed them again. The plan helped a lot during the filming. However, the filming took hours and because the authors were freshmen at filming, adjusting the camera took most time during the shooting session.

The authors' expertise of movements helped a lot during the filming. Because the movements were studied beforehand, it didn't take extra time to check whether the movements were done correctly while filming. During the filming the authors reviewed the content, to be sure about the quality of videos. The techniques were checked, and shooting angles switched. Furthermore, the authors stayed on schedule during the filming day.

### 6.3 Editing

Editing the films was the hardest part of the product development process for the authors, because of the lack of practice. The editing started straight away after the filming sessions and continued almost till the end of April. It took much more time and energy than planned. Luckily, the authors managed to finish other parts of the thesis early enough, so there was enough time for the editing. The authors used the Moviemaker program for Windows.

The videos needed to be cut and the instructions needed to be included. The authors read gym guidebooks beforehand to know better how they want to instruct the customers via the videos. The model of each video was following: first there is a title, which is the name of the movement, then the instructions are shown in Finnish and last the movement is done for few times. Some videos included also

photos to give better instructions for the customer, for example, to make sure that the customer knows how to grasp the bar.

#### 6.4 Materials

All the equipment and facilities were authors' own or used for free. For the filming, the authors needed video camera and a tripod. The camera, Panasonic SDR-T70 with tripod was from the authors. The authors handled the video shooting together. Another one was performing and the other one was giving guides and filming. That way there were not any extra resources needed for the filming and money was saved, because there wasn't need for models or videographers. Videos were edited for free with Moviemaker, which is a video editing software application which is pre-installed for Windows computers.

#### 6.5 Distribution

The idea for distribution was to publish videos on YouTube. By downloading them there, they can be shared behind the QR codes. Also, YouTube is free of charge for every user and the authors did not want extra costs for the gym users. The QR codes are in every customer's use, and the teachers at the gym can advertise them, so the videos get visibility by that.



## 7 CONCLUSION

The purpose of the thesis was to create useful and modern video instructions and to increase people's knowledge about gym training. Our purpose was to prevent injuries by guiding customers to do the movements correctly at the gym and make people, especially beginners and youth, more willing to go there.

The guiding videos had to be easy to reach, and the authors wanted to try something modern, so the videos were hidden behind the QR codes. (See Appendix 4) The whole product development process was divided into parts to facilitate the process. Authors struggled with the thesis plan, but had good plan for filming to make it easier and to avoid shooting many times. The editing process wasn't well planned, though the form of the videos was clear. Editing took plenty of time, so the authors could have used professional help with that or do the planning better. The authors had only once used the editing program Moviemaker before. There wasn't a hurry with editing, but with some professional help the videos might have become even better.

The whole process started early enough, but the authors had problems to complete the thesis plan and there were some personal barriers, so authors were little out of schedule. In the beginning of April, authors were able to catch up the original schedule. Because this thesis was done as a pair work, authors had to pay attention working as a team. The authors did the filming together and discussed about the topics together. Making working easier and faster, some of the topics were divided and checked together later during the process. The authors were in touch with municipality of Lapinlahti in the beginning of the process quite much to arrange necessary details and ease the process. The communication with the teacher supervisor was helpful and eased the beginning of the project. The authors had a clear idea about the process from the beginning and it helped and fastened the process in the end.

The authors learned a lot about searching information from different sources and how to recognize a reliable source. By searching information, the authors improved sports specific skills and provided knowledge base. Therefore, in the future

the authors have an opportunity to give their clients more informative and specific answers and advices than before.

During this thesis process the authors have learned much about time management and team work. Authors gained more knowledge about human anatomy and physiology and gym training. Product development process played important part in this thesis and authors learned that planning and scheduling all the tasks well, will make work run smoother throughout the process. By choosing youths as a target group authors hoped to get more information about exercise and physical activity among youths. This goal was reached.

## 7.1 Product evaluation

Filming tasks were divided so that Jasmiina was filming and Suvi was performing the movements. We decided to wear unnoticeable clothes so that the actual movement can be seen well. We noticed later, that black pants were not a good idea. Most of the machines had black pads, therefore the movement and its key points did not see as well as they could have. We did not want to advertise any companies by wearing their clothes, because in this product, money is not involved. The commissioner has copyrights for the videos and so have the authors. The videos can be used as a marketing tool in Lapinlahti, if it is necessary.

By choosing the movements and machines beforehand, we saved time. Also, commissioning party's opinion about the machines, which needed guides, was important and considered when movement were chosen. The machines are Smith, Hack, Back bench, and Cable seated row, Cable pulldown, Leg Curl and Leg extension. The movements done in the videos are a basic squat and lunge squat in Smith, also standing calf raise and bent-over row with the Smith. Basic squat is done in Hack, then bench press, lateral raise, shoulder press and ab crunch with free weights. Lateral pull down and seated row are done with the Cable.

Because the videos were so short, maximum two minutes, we wanted to add short theory part for the customers. The theory part includes how many repetitions, sets and resting seconds' person needs, if they have some certain goal. This theory

part is printed out and put in the wall at the gym. (See Appendices 2 and 3) We hope it raises knowledge about basic gym training even if people are not watching the videos.

One idea what the authors had from the teacher supervisor, was that we could have tested the product with some youth. The tester would have watched the videos and performed the movements after. We didn't schedule testing in our program, so this was left out.

Because the purpose of these guiding videos, was to benefit the commissioner, their feedback would have been an important part of the evaluation. The commissioning party saw the videos and is satisfied. The authors will get more informative feedback in the beginning of May 2017, when the commissioning party starts testing the product and the authors still have time to fix the product, if needed.

The most important goal was to make a product that satisfies the commissioning party and the authors to influence on modern way of teaching. That's why the feedback from the commissioner is important part of the evaluation. There was no possibility to introduce customer evaluation in this thesis, because of the lack of time. By planning and executing the product according to target group, it will serve the target group in best possible way. (Vilkka & Airaksinen 2003, 519). That is why testing with the actual target group is important. If we had done a research about customer satisfaction and learning process, it would have added reliability for the product.

## 7.2 Reliability

To make this thesis as reliable as possible, all the sources were chosen critically. Also, this thesis is written by two different people, from two different perspectives. That adds reliability and each of the authors have critically examined each other's creation. Finally, it was up to the authors to decide the reliability of the sources.

According to Vilkka & Airaksinen (2003, 72), one way how the success of the thesis will be ensured, is using source criticism. Reading proper literature and critical

thinking will help with that. By using known and recognized expert's recent and current source is usually a safe choice. The authors used quite much book sources, which usually have secondary sources, therefore it would have been better to have original sources because secondary choices are usually interpretations of the original one.

The actual product was evaluated during the whole process by the authors. Our commissioning party's and teacher supervisor's evaluation and opinion was important for implementation. The product is now published on YouTube and is found behind QR codes at the gym in Lapinlahti. There were not any trust-worthy researches done about which movements are suitable for specially youths, so the commissioning party's and authors expertise was used when selecting the movements. (See Appendix 1) Although, Ayers and Saricsany (2011, 95) advices youths train firstly with their own body weight. Eventually, the techniques and movements were accepted to be suitable for beginners by the Municipality of Lapinlahti. Very good cooperation with the commissioner supported the ethicality and reliability of the product.

### 7.3 Competences

In Kajaani University of Applied Sciences there are objectives of the Degree of Sports and Leisure Management students. Those competences are health promoting physical activity and coaching, pedagogy and didactics, physical activity, and areas of physical exercise involving leadership and enterprise. The authors developed knowledge in human anatomy, physical activity and management skills during the thesis process. The thesis process deepened the authors' competences almost in every area.

The Health Promoting Physical Education competence deepened during the process. It is a demonstration of the theory part the authors wrote in the thesis. The knowledge about the human anatomy and recommendations for the target group expanded during the process. It is important to understand the anatomy, to know how to train the actual muscle group.

The process widened the authors' expertise of pedagogical and physical competence. This is seen in the videos. The instructions are very clear and understandable for the target group. We also planned a comprehensive sports training program which is suitable for the target group.

In the field of physical exercise involving leadership and enterprise, we developed our competences by producing videos as modern way as possible to promote the role of sport in society. This competence was present during the whole process because the product was planned, executed and evaluated for the municipality of Lapinlahti.

## LIST OF REFERENCES

- Ayers, S. F., & Saliscsany, M. J. (2011). *Physical education for lifelong fitness: The physical best teacher's guide* (3rd ed.). Champaign, IL: Human Kinetics.
- Baechle, T. R., & Earle, R. W. (2008). *Essentials of strength training and conditioning* (3rd ed.). Champaign: Human Kinetics.
- Buschbacher, R. M., Prahlow, N. D., & Dave, S. J. (2009). *Sports medicine and rehabilitation: A sport-specific approach*. (2nd ed.). Philadelphia (Pa.): Wolters Kluwer Health/Lippincott Williams & Wilkins.
- Bushman, B. A. (2011). *Complete guide to fitness & health*. Champaign, IL: Human Kinetics.
- Cheung, K., Hume, P., & Maxwell, L. (2003). *Delayed onset muscle soreness treatment strategies and performance factors*. Sport med.
- Cohen, B. J., Memmler, R. L., & Taylor, J. J. (2009). *Memmler's structure and function of the human body* (9th ed.). Baltimore: Lippincott William & Wilkins.
- Douillard, J., & Pelkonen, P. (1996). *Keho, mieli ja urheilu: Kuntoon ja huipulle mielen ja kehon iloisella yhteistyöllä. [Body, mind and sports: To a condition and to the top with the cooperation of mind and body]*. Espoo: Pelquin.
- EU Member State Sport Ministers. *EU physical activity guidelines recommended policy actions in support of health-enhancing physical activity*. Retrieved 3/25, 2017, from [http://ec.europa.eu/assets/eac/sport/library/policy\\_documents/eu-physical-activity-guidelines-2008\\_en.pdf](http://ec.europa.eu/assets/eac/sport/library/policy_documents/eu-physical-activity-guidelines-2008_en.pdf)
- Friman, G., & Wesslen, L. (2000). *Infections and exercise in high-performance athletes. Immunology and Cell Biology*.
- Fogelholm, M., & Vuori, I. (2005). *Terveysliikunta: Fyysinen aktiivisuus terveyden edistämiseksi. [Health exercise: Health Enhancing Physical Activity]*. Helsinki: Duodecim.

- Gluck, S. (2012). *New product launch strategy. small business*. Retrieved 1/17, 2017, from <http://smallbusiness.chron.com/new-product-launch-strategy-3241.html>
- Hulmi, J., & Aittokoski, T. (2016). *Lihastohtori. [A Muscle Doctor]*. Lahti: Fitra.
- Human Kinetics. (2017). *Defining and Understanding Strength Training Load Progression*. Retrieved 5/2, 2017 from <http://www.humankinetics.com/excerpts/excerpts/defining-and-understanding-strength-training-load-progression>
- Hume P. (2003). *Delayed Onset Muscle Soreness: Treatment Strategies and Performance Factors*. Retrieved 4/14, 2017, from [https://www.researchgate.net/profile/Patria\\_Hume/publication/8075169\\_Delayed\\_onset\\_muscle\\_soreness\\_Treatment\\_strategies\\_and\\_performance\\_factors/links/02bfe5107156c5591b000000/Delayed-onset-muscle-soreness-Treatment-strategies-and-performance-factors.pdf](https://www.researchgate.net/profile/Patria_Hume/publication/8075169_Delayed_onset_muscle_soreness_Treatment_strategies_and_performance_factors/links/02bfe5107156c5591b000000/Delayed-onset-muscle-soreness-Treatment-strategies-and-performance-factors.pdf)
- Kallio, T. (2008). *Kuntoilijan itsehoito-opas. [Self-care guide for trainer]*. Jyväskylä: WSOYpro: Docendo.
- Kajaanin Ammattikorkeakoulu. (2017). *Opinnäytetyö Kajaanin Ammattikorkeakoulussa. [The Thesis Process]*. Retrieved 5/3, 2017, from <http://kamk.fi/Oparipakki-2014/Opinnaytetyo>
- Katch, V. L., McArdle, W. D., & Katch, F. I. (2011). *Essentials of exercise physiology*. (4th ed.). Philadelphia: Wolters Kluwer/Lippincott Williams & Wilkins Health.
- Lasten ja nuorten liikunnan asiantuntijaryhmä/Opetusministeriö, Nuori Suomi ry. (2008). *Fyysisen aktiivisuuden suositus kouluikäisille 7–18-vuotiaille. [Physical activity recommendation for school aged 7-18-year-old]*. Retrieved 4/7, 2017, from [http://www.ukkinstituutti.fi/filebank/1477-Fyysisen\\_aktiivisuuden\\_suositus\\_kouluikäisille.pdf](http://www.ukkinstituutti.fi/filebank/1477-Fyysisen_aktiivisuuden_suositus_kouluikäisille.pdf)
- Moilanen, P. (2008). *Testausopin perusteet [Principles of Physiological Testing]*. University of Jyväskylä. Retrieved 4/26, 2017, from <http://users.jyu.fi/pjmoilan/Opiskelujuttuja/Testausopin%20perusteet.prf>



Montag, H. J., Montag, H. J., Ahonen, J., Asmussen, P. D., & Heinonen, M. (1998). *Lihashuolto: Hieronta, kuntosaliharjoittelu, teippaus ja venyttely*. [Muscle Care: Massage, gym training, taping and stretching]. Lahti: VK-kustannus.

Niemi, A. (2006). *Menestyjän kuntosaliharjoittelu & ravitseminen*. [Success to gym training and nutrition]. (2. laitos, 1. p. ed.). Jyväskylä: Docendo.

Porterfield, A. (2010). *16 tips for successful online video marketing*. Retrieved 4/6, 2017, from <http://www.socialmediaexaminer.com/16-tips-for-successful-online-video-marketing/>

Powers, S. K., & Howley, E. T. (2009). *Exercise physiology: Theory and application to fitness and performance* (7th ed.). New York, NY: McGraw-Hill Higher Education.

Roschinsky, J. (2003). *Fat burning: Exercise & diet*. Aachen: Meyer&Meyer.

Sherwood, L. (2016). *Human physiology: From cells to systems* (9.th ed.). Boston: Cengage Learning.

Silverthorn, D. U., & Johnson, B. R. (2010). *Human physiology: An integrated approach* (5.th ed.). San Francisco: Pearson Benjamin Cummings.

Thibodeau, G. A., & Patton, K. T. (2010). *The human body in health & disease* (5.th ed.). St. Louis, Mo: Mosby Elsevier.

UKK-Instituutti. (2017). *Lasten ja nuorten fyysisen aktiivisuuden suositukset*. [Physical activity recommendations for children and youths]. Retrieved 2/16, 2017, from [http://www.ukkinstituutti.fi/ammattilaisille/terveysliikunnan-suositukset/muut-liikuntasuositukset/lasten\\_ja\\_nuorten\\_liikuntasuositukset](http://www.ukkinstituutti.fi/ammattilaisille/terveysliikunnan-suositukset/muut-liikuntasuositukset/lasten_ja_nuorten_liikuntasuositukset)

UKK-Instituutti. (2017). *Terveysliikunnan edistäminen*. [Health enhancing physical activity]. Retrieved 2/16, 2017, from <http://www.ukkinstituutti.fi/ammattilaisille/terveysliikunnan-edistaminen>

UKK-Instituutti. (2017). *The Sports and Exercise Safety in Finland Program (LIVE)*. Retrieved 4/28, 2017, from <http://tervekoululainen.fi/inenglish>

- UKK-Instituutti. (2015). *Physical activity pie*. Retrieved 4/7, 2017, from [http://www.ukkinstituutti.fi/en/products/physical\\_activity\\_pie](http://www.ukkinstituutti.fi/en/products/physical_activity_pie)
- Vilkka, H., & Airaksinen, T. (2003). *Toiminnallinen opinnäytetyö. [Functional thesis]*. Helsinki: Tammi.
- Virtamo, J. (2009). *Monipuolinen kuntosaliharjoittelu: Voimaa, kuntoa ja kiinteyttä. [Versatile gym training: Strength, fitness and firmness]*. Jyväskylä: Docendo.
- Vuori, I., Vuori, I., Taimela, S., & Kujala, U. (2012). *Liikuntalääketiede. [Sports Medicine]*. (3.-5. p. ed.). Helsinki: Duodecim.
- Weinberg, R. S., & Gould, D. (2012). *Foundations of sport and exercise psychology* (5th ed.). Champaign, IL: Human Kinetics.
- Wilmore, J. H., Costill, D. L., & Kenney, W. L. (2008). *Physiology of sport and exercise* (4th ed.). Champaign, IL: Human Kinetics.
- World Health Organization. (2017). *Global Strategy on Diet, Physical Activity and Health. Physical Activity*. Retrieved 2/16, 2017, from <http://www.who.int/dietphysicalactivity/pa/en/>
- Zatsiorsky, V. M., & Kraemer, W. J. (2006). *Science and practice of strength training* (2nd ed.). Champaign, IL: Human Kinetics.

## Movements instructed in guiding videos

### 1. **Bench Press**

Correct technique:

The movement starts in a lying position, face up and buttocks and back on the bench. Feet are positioned on the ground, but can also be put on the bench, knees are angled. Take a grip of the barbell with a wider than shoulder width grip. Take an overhand grip, in which the bar is locked by the thumb and fingers. Inhale and lower the bar to the chest with a controlled movement. Exhale and extend the arms at the end of effort.

The chosen movement in picture and video is arched-back variation. It is chosen, because this power-lifter style allows lifting significantly heavier weights than other forms (legs on the bench). It also gives more support for the lifter.

Muscles involved:

Pectoralis muscles

Deltoids

Triceps Brachii

Abdominal muscles

Back muscles

### 2. **Bent-Over Row with Smith barbell**

Correct technique:

Stand with the legs slightly apart and back straight next to the Smith barbell. Grasp the barbell with an overhand grip slightly wider than shoulder width and unlock the barbell so that it is ready to use. Inhale and pull the barbell up near the chest, keeping elbows as high as possible. Then lower the bar in a controlled manner back down and exhale.

Muscles involved:

Deltoid

Biceps

Trapezius

Also forearms and core muscles

### **3. Squat in Hack**

Correct technique:

Place yourself into the machine so that your shoulders are under the pads and place both feet parallel to each other and check that toes are pointing the same way with the knees. Unlock the Hack so that it is ready to use and inhale deeply and tense abdominal core muscles, slightly arch the back by rotating the pelvis. Look straight ahead and bend forward from the hips. Remember to keep the back straight and knees and toes pointing same direction in order to prevent injury. Then, straighten the legs and lift the torso to return to the initial position. Exhale at the end of the movement.

Muscles involved:

Quadriceps

Hamstrings

Gluteal muscles

Adductor group

Erector spinae

Abdominal muscles

### **4. Calves in Smith**

Correct technique:

Slide yourself under the bar and stand on the step board. Toes are pointing forward and locate the barbell on the trapezius a bit higher than the posterior deltoid. Rise up on the toes, keeping the knee joint straight or

slightly flexed. When returning to the initial position, heels are over-extended.

Muscles involved:

Gastrocnemius

## 5. Squat in Smith

Correct technique:

Slide yourself under the bar and place it on the trapezius a bit higher than the posterior deltoid. Take a grip of the bar at a comfortable width and place elbows under the bar. Unlock the smith barbell and inhale deeply and tense abdominal core muscles, slightly arch the back by rotating the pelvis. Look straight ahead and place both feet parallel to each other and check that toes are pointing the same way with the knees. Bend forward from the hips and keep the back straight in order to prevent injury. After that, straighten the legs and lift the torso to return to the initial position. Exhale at the end of the movement.

Muscles involved:

Quadriceps

Hamstrings

Gluteal muscles

Adductor group

Erector spinae

Abdominal muscles

## 6. Lunge Squat in Smith

Correct technique:

Slide yourself under the bar and place it on the trapezius a bit higher than the posterior deltoid. Take a grip of the bar at a comfortable width and place elbows under the bar. Stand with the legs slightly apart, front leg is on the step board and the leg behind is on the ground. Unlock the smith

barbell and inhale deeply and tense abdominal core muscles and squat on the front leg so that the forward thigh reaches horizontal or slightly below, use tonic extension to return to the initial position. Exhale at the end of the movement.

Muscles involved:

Gluteus Maximus

Hamstrings

## **7. Leg Raises**

Correct technique:

Lie on the back, knees in a natural bent above the hips. Arms can be extended next to the body or crossed behind the head. Start the movement by breathing out and at the same time lowering the legs near the ground. Inhale when raising legs back up. Keep your abs contracted during the whole movement. To lighten leg raises, do same thing with only one leg and switch the leg after each raise.

Muscles involved:

Abdominal muscles

## **8. Back Bench**

Correct technique:

Take a good position on the back bench so that you face down and locate your ankles behind the pads. Cross your hands next to your chest and start moving your upper body towards the floor. Keep your back straight and back muscles contracted when raising back up.

Muscles involved:

Trapezius

Back muscles, rhomboids

## **9. Cable Pull Down**

Correct technique:

Take a good posture, sit down and adjust the machine so that your thighs fit under the pads. Grasp the bar down from the cable wider grip than your shoulder width. Bring the bar near to your chest and keep your elbows pointed straight down. Squeeze your upper back muscles when pulling down and exhale when returning to the initial position.

Muscles involved:

Latissimus Dorsi

## **10. Cable Seated Row**

Correct technique:

To get started, place your feet on the front platform making sure that your knees are slightly bent and not locked. Lean over as you keep the natural alignment of your back and grab the V-bar so that the palms of your hands face each other. With your arms extended pull back until your torso is at a 90-degree angle from your legs. Back is slightly arched and chest should be sticking out. Contract your back muscles when the bar is in front of you. Breathe out in a pulling phase and then return the V-bar and inhale.

Muscles involved:

Latissimus Dorsi

## **11. Leg Extension**

Correct technique:

Sit on the machine, with both legs positioned under the pad. To maintain stability and positioning throughout the movement, hold onto the handles on the side and pointing your feet forward. Exhale and extend your legs by contracting your quadriceps until they are fully extended. Try to keep the

rest of the body as still as possible to train only hamstrings. Inhale and lower the weight back to the starting position in a controlled movement.

Muscles involved:

Quadriceps

Gluteus Maximus

Calves

## **12. Leg Curl**

Correct technique:

Lay facing down on the bench so that your knees are just over the edge of the bench. Adjust the machine so that the padding is on the low part of your calf muscle, near Achilles tendon. Take a grip from the handles and bend your legs at the knee to bring the padding to touch the back of your legs. Return the weight back to the starting position using a controlled movement. Avoid arching your back to prevent injuries.

Muscles involved:

Hamstrings

Gluteus Maximus

Calves

## **13. Cable triceps**

Correct technique:

Stand next to the cable and grasp the handle with both hands. Inhale and lower the forearms by bending the elbows near the sides. Tense the core muscles and keep back straight. Then return to the initial position and exhale at the end of the effort.

Muscles involved:

Triceps Brachii

Abdominal muscles



#### **14. Lateral raise with dumbbells**

Correct technique:

Stand in a good posture, straight back, thigh core and with legs slightly apart. Arms are hanging next to the body, holding a barbell in each hand. When the posture is good, raise the arms to horizontal with the elbows slightly bent. Return to the initial position.

A lighter version is to bend your hands in 90 degrees and then raise the hands almost the same level with the shoulders. Then return to the initial position.

Muscles involved:

Deltoids

Core muscles to stabilize the movement

#### **15. Shoulder Press**

Correct technique:

Stand and grip a barbell in both hands with the shoulder wide grip. Place the barbell behind your neck and while breathing in, straighten the elbows above your head. Return to the initial position and exhale at the end of the movement.

Muscles involved:

Triceps Brachii

Rhomboids

Trapezius

Deltoids

Printed training program

### **Jalat ja keskivartalo**

15 minuuttia aerobista lämmittelyä (pyöräily, juoksu, soutu). Nopeat (5-10sek) venyttelyt käytössä oleville lihasryhmille.

1. Smith kyykky 3x10 30% max. painoista
2. Smith askelkyykky 3x10/jalka 30% max. painoista
3. Polven koukistus laitteessa 3x10 30% max painoista
4. Selänojennus selkäpenkissä 3x10, 5kg levypainon kanssa
5. Vatsalihakset matolla jalkojen lasku yhtäaikaisesti 3x10

Sarjatauot 2-3 minuuttia

Loppuverryttelyksi 5 minuuttia aerobista palauttelua ja nopeat venyttelyt

### **Kädet ja keskivartalo**

15 minuuttia aerobista lämmittelyä, jossa kädet ovat myös aktiivisena (crosstrainer, soutu). Nopeat (5-10sek) venyttelyt käytössä oleville lihasryhmille.

1. Ylätalja leveällä otteella 3x10 40% max. painoista
2. Ylätalja kapealla otteella 3x10 40% max. painoista
3. Alatalja 3x10 40% max. painoista
4. Penkkipunnerrus hartioiden leveällä otteella 3x10 30% max. painoista
5. Pystypunnerrus 3x10 40% max. painoista
6. Vipunostot sivuille 3x10 40% max. painoista
7. Selänojennus selkäpenkissä 3x20
8. Vatsalihakset matolla jalkojen laskut vuorojaloin 4x20

Sarjatauot 2-3 minuuttia

Loppuverryttelyksi 5 minuuttia aerobista palauttelua ja nopeat venyttelyt

Information table for the customers depending on their goals.  
(Referred from Kunnonsyke, from Vive.)

1. Maksimivoima

Perusvoima -> Lisää voimaa lihasmassan kasvun kautta. Sopii kokeneelle treenaajalle lihasmassan kasvattamiseen.

Maksimivoima -> Lisää voimaa hermotuksen paranemisen kautta. Sopii kokeneelle treenaajalle lihasmassan kasvattamiseen.

2. Kestovoima

Lihaskestävyys -> Parantaa yleistä harjoituskestävyyttä ja asentoa tukevien pienten lihasten voimaa. Kehittää myös lihaksiston paikallista aerobista energianmuodostustehoa. Kuntoilijalle sopiva harjoittelumuoto kestävyyskunnan parantamiseksi.

Voimakestävyys -> Parantaa lihasvoimaa (perusvoima) ja paikallista maitohapon sietokykyä (anaerobinen kapasiteetti). Sopii kuntoilijalle lihaksiston vahvistamiseksi ja kehon kiinteyttämiseksi.

3. Nopeusvoima

Pikavoima -> Parantaa nopeiden lihassolujen hermotusta ja lihasten elastisuutta. Lajiharjoittelua tukemaan.

Räjähtävä voima -> Parantaa hermo-lihasjärjestelmän kykyä tuottaa mahdollisimman suuri voima lyhyessä ajassa. Lajiharjoittelua tukeva harjoitusmuoto.

| Tyyppi          | Toistot | Palautus  | Sarjat | Liikkeet / Lihasryhmä | Vastus / Maksimipainosta |
|-----------------|---------|-----------|--------|-----------------------|--------------------------|
| Perusvoima      | 4 – 12  | 2 – 3 min | 2 – 5  | 2 – 3                 | 50 – 85 %                |
| Maksimivoima    | 1 – 3   | 2 – 4 min | 4 – 6  | 3                     | 90 – 100 %               |
| Lihaskestävyys  | 20 – 30 | 30s       | 3 – 5  | 5 – 8                 | oma keho                 |
| Voimakestävyys  | 10 – 20 | 20 – 45s  | 3      | 8 – 10                | 30 – 80 %                |
| Pikavoima       | 6 – 10  | 2 – 3 min | 3 – 6  | 3 – 5                 | 30 – 80 %                |
| Räjähtävä voima | 1 – 5   | 2 – 4 min | 3 – 5  | 3 – 5                 | 40 – 90 %                |

QR codes for YouTube videos



Kyykky Smith-laitteessa



Vipunosto



Ojentajapunnerrus ylätaljassa



Pystypunnerrus



Penkkipunnerrus



Varpaillenousu Smith-laitteessa



Kulmasoutu Smith-laitteessa



Askelkykyky Smith-laitteessa



Kyykky Hack-laitteessa



Selkäpenkki



Ylätalja



Alatalja





Vatsalihasliike



Polven koukistus laitteessa



Polven ojennus laitteessa