How does physical training affect sedentary long-term unemployed?

An intervention study in association with Halmstad Fastighet AB-Bureau

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Abstract

**Introduction:** Unemployment cause poor health and poor health leads to unemployment. Those who are sedentary and experience unemployment may also experience negative effects on their physical and mental health such as obesity followed by cardiac illness, reduced muscle strength, chronic pain, anxiety and depression. All these factors can be categorised under physical and mental health, which are the essential factors for an optimal work ability.

**Methods:** Our methods were to assess seven subjects (n = 7) of three male and four females, with the mean age of 35 ± 10 (25–54), who were all sedentary and long-term unemployed. These subjects were all part of a project organised by Halmstad Fastighet AB-Bureau (HFAB-Bureau) who they were undergoing education, coaching for employment and learning to apply for job. Our part in this project was to provide eight weeks of physical training to the subjects to reinforce their physical health which in turn supposed to improve their mental health. They were all assessed for grip strength with JAMAR® hydraulic hand dynamometer which represents overall muscle strength, BMI supplemented with waist circumference, blood pressure determination, self-assessing bodily pain with Visual Analogue Scale (VAS), anxiety and depression levels with Hospital Anxiety And Depression Scale (HADS) – a validated self-assessing questionnaire and Work Ability Index (WAI) by answering the self-assessing questionnaire for WAI.

**Results:** T-test shows significance change in perceived pain over eight weeks of physical training as well as correlation between grip strength and perceived pain as well as anxiety and depression. No significant changes or correlations in remaining variables.

**Conclusion:** Physical training contributes to decrease of chronic pain and physical training may give contribution to prevention of depression while increasing in muscle strength.

**Key word:** Unemployment, mental health, physical health, physical training
**Abstrakt**

**Introduktion:** Arbetslöshet leder till ohälsa och ohälsa leder till arbetslöshet. De som är inaktiva och arbetslösa kan också uppleva negativa effekter på deras fysiska och psykiska hälsa som fetma, följt av hjärt- och kärlsjukdomar, minskad muskelstyrka, kronisk smärta, ångest och depression. Alla dessa faktorer som kan kategoriseras under fysisk och psykisk hälsa, vilket är väsentliga faktorer för en optimal arbetsförmåga.

**Metod:** Våra metoder för att bedöma sju deltagare (n = 7) varav tre män och fyra kvinnor, med medelåldern 35 ± 10 (25-54), där alla är inaktiva och långtidsarbetslösa. Deltagarna är en del av ett projekt som anordnas av Halmstad Fastighet AB-Byrå (HFAB-byrån), där de genomgår utbildning, coaching till sysselsättning och att lära sig att söka jobb. Vår del i detta projekt var att bidra med friskvård i åtta veckor för att stärka deltagarnas fysiska och mentala hälsa vilket i sin tur kan ha påverkan på deras arbetsförmåga. Samtliga undersöktes för greppstyrka med JAMAR ® hydraulisk dynamometer vilket motsvarar totalt muskelstyrka, BMI kompletteras med midjemått, blodtrycksmätning, självskattning av smärta med visuell analog skala (VAS), ångest och depression nivåer med Hospital Anxiety and Depression Scale (HADS) och Work Ability Index (WAI).

**Resultat:** T-testet visar signifikans i upplevd smärta över åtta veckors fysisk träning samt sambandet mellan greppstyrka och upplevd smärta samt ångest och depression. Inga signifikanta korrelationer eller förändringar i de återstående variablerna.

**Konklusion:** Fysisk träning bidrar till minskad kronisk smärta, samt att fysisk träning kan ha en preventiv effekt på depression så muskel styrkan ökar.

**Nyckelord:** Arbetslöshet, mental hälsa, fysisk hälsa, fysisk träning
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Introduction

To define health according to World Health Organization (WHO); ‘Health is a state of complete physical, mental and social well being and not merely the absence of disease or infirmity’ (WHO, 2010). Individuals with a lifestyle of small amount of physical exercise are more prone to stress which in period of time can lead to a state of unhealthy living (Logan, Tomar, & Watson, 2008). Moreover an unhealthy living can lead to undesired consequences such as obesity, diabetes and heart diseases (Logan, Tomar, & Watson, 2008). Unemployed people who are sedentary are prone to these factors mentioned above. To understand the relationship between poor health and unemployment it is important to have the perception of participants' financial situation, poor self confidence and the negative effect of long-term unemployment (Bartley, 1994). There are studies indicating that unemployment leads to depression, and further more; poor health leads to unemployment. The unemployed who are already undergoing poor health is more likely to worsen their condition, compared with the "healthy" unemployed (Claussen, 1999, Furumura, et al., 2010).

The association of physical illness with anxiety and depression among adults has been studied and supported among many studies. Twenty eight percent of community-dwelling adults has health problems interfering with their daily activities, moreover 12-42% of these adults have symptoms of anxiety and depression. It has been discovered that factors affecting anxiety and depression are among other things physical health. Meaning physical health needs to be assessed to treat anxiety and depression. (Greisinger, et al., 2010). Several studies indicate that physical activity can reduce anxiety, depression and stress levels (Martinsen & Taube, 2008). There are also physiological, neurobiological and psychological hypotheses which claim that physical activity reduces anxiety and depression levels (Andersson, Kjellman, Martinsen, & Taube, 2008).

The International Association for the Study of Pain (IASP) defines pain as; ‘An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage’ (Bogduk & Merskey, 1994). Pain can be distinguished between acute and long-lasting or chronic pain. The acute musculoskeletal pain can be controlled using painkillers and physiotherapy treatment. The pain that lasts more than three months counts as chronic pain and is often difficult to treat. If a subject is struggling with chronic pain, the key to recovery would be the subject’s self-initiative and will-power to physical exercise, with the advisory role by professionals. However if a subject would struggle from acute pain, the subject would be treated through physical therapy by a professional during the process of recovery treatment, where a physiotherapist or another similar professional would perform exercises on the subject. It is recommended for those struggling from chronic pain to initiate some form of physical activities such as cycling, walking, jogging or swimming with at least moderate intensity (> 60% of VO2 max) and at least 10 minutes a day but preferably more (Börjesson, Karlsson, Knardahl, Mannerkorpi, & Mannheimer, 2008). According to an Internet based study conducted on American citizens, it indicates that unemployment is correlated with chronic pain (Johannes, Le, Zhou, Johnston, & Dworkin, 2010).
The phenomenon of handgrip strength gives indications of overall muscle strength (Andersen-Ranberg, et al., 2006). A study conducted on older adults performing gardening as physical activity showed that grip strength increased with frequent physical activity. This was assessed by using JAMAR® hydraulic hand dynamometer to measure grip strength (Haub, Park, & Shoemaker, 2009). There are studies indicating associations between handgrip strength and mortality among adults, meaning low grip strength is associated with premature mortality (de Craen, Gussekloo, Ling, Maier, Taekema, & Westendorp, 2010 and Ferrucci, et al., 2007). A very recent study shows that adult women struggling with depressive or anxiety disorders have significantly poorer physical function. This was measured with grip strength and lung function. In men, depressive or anxiety disorder was associated with better lung function but not with handgrip strength (van Milligen, Lamers, de Hoop, Smit, & Penninx, 2010).

Blood pressure, measured in millimetre mercury (mmHg), occurs when there are cardiac contractions, pressing blood from the heart to the great artery. The systolic blood pressure (SBP) is the oxygenised blood transferred from the heart to the artery, while the diastolic blood pressure (DBP) is the deoxidised venous blood transfer to the heart. During the cardiac cycle the systolic pressure is the higher pressure and diastolic pressure is the lower. The physical effort, which is higher heart rate and arterial pressure, becomes closer to the systolic pressure and at rest it is closer to the diastolic pressure (Haug, Sand, & Sjaastad, 1993).

The normal rates for blood pressure are for systolic < 130 and < 85 for diastolic. High blood pressure (BP), also known as hypertension is one of the major risk factors for cardiovascular diseases, such as coronary artery disease. The factors causing hypertension are mainly lifestyle factors such as choice of nutrition, obesity and lack of physical training. 25% of the Swedish population suffers from hypertension and the number is growing both locally and worldwide. According to forecasts; in 2025, 30% of the population will suffer from hypertension. There are ways to prevent as well as treat hypertension through physical training, since it has positive effects on lowering the high blood pressure. Activities such as strength training, circuit training moreover other forms of aerobic activities has shown to decrease high blood pressure (Börjesson, Dahlöf, & Kjeldsen, 2008). According to a study on area-level unemployment, there are associations between unemployment and cardiovascular diseases (Naimi, Paquet, Gauvin, & Daniel, 2009).

According to World Health Organization, Body Mass Index (BMI) classification is used to define obesity. Waist circumference is a great supplement to the BMI method, because it takes into account whether the individual has abdominal and central fat. BMI classification in which normal-weight people have a BMI of 18.5-24.9, overweight, those with BMI of 25.0 to 29.9, obesity class I as BMI between 30.0 to 34.9. Men and women with the waist circumference ≥ 94 and ≥ 80 cm respectively are in the risk zone for metabolic complications. If the waist circumference has reached ≥ 102 and ≥ 88, men and women respectively are in great risk zone for metabolic complications related to obesity (Rössner, 2008).

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1 The method of BMI was developed in 19th century and has been used to assess the relative body weight and to compare between individuals. BMI is calculated: body weight in kilograms divided by the square of body height in meters (kg/m²). Disadvantage with the BMI measurement is that it does not take into account age, gender, or whether the individual is physically fit which will result in a remote high BMI.
According to the Finnish institute of Occupational Health: ‘Work ability is about consistency and balance between the resources of the human and work place’ (Tjäder, 2010). The basic and essential factor of optimal work ability is the combination of one’s physical and psychological functional capacity. Other personal factors that contribute to optimal work ability are competence which should under frequent development. One’s values, attitude and motivation regarding their occupation affects one’s work ability, meaning positive motivation and attitude towards your occupation gives you the benefits of a better work ability. These are all the resources of an individual, and it is the responsibility of the individual to maintain these resources. External factors such as work and its sub factors are difficult to change personally (Tjäder, 2010).

Fig. 1: Factors contributing to work ability. Retrieved from Finnish Institute of Occupational Health, 2011
Purpose of study
The purpose of this study was to analyse how physical training affects unemployed, moreover the correlation between mental and physical factors which contributes to unemployment.

Method
Halmstad Fastighet AB bureau (HFAB-bureau), a labour market organisation in association with Halmstad Labour market union (Halmstad Arbetsmarknadsenhet) and the European Union – European Social Fund, is a project dedicated to lead long term unemployed people between ages of 25-64, with different ethnic backgrounds into a life of employment and education. HFAB-bureau also provided this study with participants to run this study on. All the participants were classified as long term unemployed.

Limitations
We have limited our research and study by not immerse into detailed physiological, psychological and biological explanations behind the results and correlations.

Subjects
This study was conducted on seven subjects (n = 7) of three male and four females, with the mean age of 35 ± 10 (25–54) and mean weight of 69 (kg) ± 10 (56-81). The subjects are all unemployed and somewhat recovering from long-term sick-leave. As they are unemployed they have income support. Nevertheless the subjects have different ethnicities. All participants signed an ethical approval on both of the testing occasions of their participation.

Leisure-time and physical activity
The subjects were scheduled for physical activity in for of group-training during eight weeks of time, two hours each session twice a week. There was a 90% attendance in all the subjects over the eight weeks. In favour to make the leisure-time more enjoyable for the participants, they were asked to take part in deciding some of the activities, such as the various types of ball sports. The purpose behind the choices of the activities was for the subjects to reach higher levels of physical efforts than what they were used to. Exceptions were activities such as yoga and tactile massage where the purpose was to introduce them to various types of relaxation methods.

Volume and intensity
All the training sessions at the gym included 10-20 minutes warm up where the subjects could choose between running/walking on treadmill, cross-training and rowing machine. The warm ups for circuit training included 5 minutes intense running in the training room with different dynamic movements made by upper extremities and lower extremities. All the sessions lasted for two hours each. Some sessions were divided into two activities of one hour because of the high intensity of the activities. The choices of these activities are based on recommendations from FYSS 2008 (Bø & Klungland T., 2008, Jansson, Stensvold, & Wisløff, 2008). (See Appendix for schedule and description of activities and weekly plan over activities)
Evaluation methods
All the assessments on both occasions were scheduled three hours before noon. Physical health is in this study assessed through determination of pain, handgrip strength, BMI supplemented with waist measurement and blood pressure. The mental health was assessed through validated questionnaires.

Work Ability
Work ability was evaluated with Work Ability Index (WAI), a reliable self-assessment questionnaire which assesses the work ability of an individual as well as their state of health on physical and mental levels. The primary purpose of WAI was to identify the work ability for staff and personnel at their occupational site; however it is today applied in a variety of other scientific studies. The questionnaire is designed with ten items followed variety of optional answers (de Zwart, Frings-Dresen, & van Duivenbooden, 2002). The answers will thereafter be converted in to scores of 7 to 49, divided in four categories; poor (7-27), medium (28-36), good (37-43) and very good (44-49). Once the work ability is assessed, required actions shall be applied to reinstate, improve, support and respectively maintain the assessed work ability (Morschhäuser & Sochert, 2006). (See appendix for WAI)

Anxiety and Depression
The Hospital Anxiety and Depression Scale (HADS) is a self-assessment questionnaire developed to assess the level of anxiety and depression. The questionnaire is reliable and validated based on fourteen questions, divided in two sections of seven questions aimed to assess depression and anxiety, (Snaith & Zigmond, 1986) and (Martin & McPherson, 2009). The HADS itself was originally designed for patients to assess their level of anxiety and depression whenever convenient. As there are two questionnaires in one, there are also two grading scales for each questionnaire. However both scales have a maximum rate of 21 each. The assessment scale for anxiety is; 0-7 no troublesome anxiety, 8-10 mild to moderate anxiety whereas above 10 is occurrence of anxiety disorder. For depression 0-7 no depression, 8-10 depression, above 10 is risk for depression that may require medical attention. All the participants were asked to fill out the questionnaire, in order to assess their level of depression and anxiety. (See appendix for HADS).

Handgrip strength
To measure the handgrip strength JAMAR® hand dynamometer was utilised. The dynamometer is a valid and reliable instrument that measures in kilograms (KG) and pounds (lb) (Hornby, et al., 2008). The subjects were asked to be seated on a chair in front of a table with straight posture using their dominant arm, with the elbow resting on the edge of the table holding the JAMAR®. Thereafter they were asked to press as much as possible for ten seconds without elevating the arm (de Craen, Gussekloo, Ling, Maier, Taekema, & Westendorp, 2010). The reason of choice for assessing handgrip is because there are studies show that the strength of handgrip is a good indicator for an overall indication for total muscle strength (Andersen-Ranberg, et al., 2006).

Blood pressure determination
Blood pressure was taken primary to observe cardiovascular changes due to the aerobic training. The blood pressure was measured with a classic blood pressure meter also known as
sphygmomanometer. To measure and determine blood pressure the cuff of the sphygmomanometer is pumped with an air pump using a pressure gauge (above the air pump) to read pressure. Stethoscope is an instrument that transmits sound from a nozzle to the user by placing the nozzle on the bend of the arm over the artery. When determining blood pressure the cuff is pumped up to the level that is above the SBP and is higher than the pressure in the artery. There is no sound in the stethoscope till the pressure in the cuff is less than the systolic pressure. During the short part of the cardiac cycle when arterial pressure is higher, blood is forced through the compressed section. Turbulent flow occurs at that point and the sound can be heard in the stethoscope, and SBP can be determined. The primer sound heard corresponds to the SBP and the weakest sound corresponds to DBP. The sound discontinues when the cuff pressure is lower than the DBP (Haug, Sand, & Sjaastad, 1993).

The participants were asked to avoid products containing nicotine and caffeine because of its increasing effects on blood pressure, they were also asked remaining physically calm during the day before the tests started and by being seated while they were awaiting their turn, (Awaisu, et al., 2010) and (Bandyopadhyay, Keong, & Ping, 2010). (See Appendix; reference values for blood pressure)

**Body Mass Index (BMI) and waist measure determination**

To measure BMI the participant’s weight and length needed to be assessed; therefore the participants were all asked to dress down to underwear to retrieve as relevant weight as possible on a digital scale. A height-measure gauge was utilised to assess their heights. There were some guidelines taken under considerations for the height measuring such as holding a straight posture and sustaining the bottom of the chin parallel to the transversal plane. (WHO, World Health Organization, 2010).

The BMI is calculated through BMI formula: \( \text{BMI} = \frac{\text{body weight}}{\text{body length}^2} \), and the results are compared to the given scales by World Health Organization (WHO, World Health Organization, 2010). To reinforce the BMI measurements it was supplemented with waist measurement because the body fat mass is individually allocated. A standard tape measure was utilised to measure the waist, where the umbilicus was set as starting and ending point, (Abramahsson, Andersson, Becker, & Nilsson, 2006). (See Appendix: reference values for BMI and waist circumference)

**Assessment of physical pain**

Pain is always individually experienced and can be difficult to describe objectively. Physical pain was therefore, measured on Visual Analogue Scale (VAS), with a range of 0 to 10 where 0 was ‘no pain’ and 10 ‘strongly felt pain’ (Briggs & Closs, 1999). The subjects were asked to describe their physical pain both by expressing it in numbers on the VAS as well as localising where the pain was/is generated from on an illustration of a human body designed as a questionnaire with alternatives and description of different senses of pain. (See appendix for VAS)
**Results**

Table 1 shows total mean values on group level for all the evaluations pre and post eight weeks of exercise. There was a t-test conducted to observe significant changes over eight weeks of time of the assessments. As shown below there was significant change in perceived pain.

**Table 1**: Overview of the results on group level, pre and post eight weeks of exercise, as well as significant changes over eight weeks of time, conducted with t-test. Significance value (2-tailed), \( p \leq 0.05 \)

<table>
<thead>
<tr>
<th></th>
<th>Pre</th>
<th>Post</th>
<th>Std. Deviation</th>
<th>( t )-value</th>
<th>( p )-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work ability</td>
<td>29.82</td>
<td>32.86</td>
<td>4.23</td>
<td>-1.897</td>
<td>0.107</td>
</tr>
<tr>
<td>Anxiety</td>
<td>8.86</td>
<td>9.29</td>
<td>3.10</td>
<td>-0.366</td>
<td>0.727</td>
</tr>
<tr>
<td>Depression</td>
<td>6.14</td>
<td>6.43</td>
<td>2.63</td>
<td>-0.288</td>
<td>0.783</td>
</tr>
<tr>
<td>Grip strength</td>
<td>20.60</td>
<td>25.70</td>
<td>9.72</td>
<td>-1.400</td>
<td>0.211</td>
</tr>
<tr>
<td>Systolic Blood Pressure</td>
<td>117</td>
<td>115</td>
<td>9.29</td>
<td>0.692</td>
<td>0.515</td>
</tr>
<tr>
<td>Diastolic Blood Pressure</td>
<td>79</td>
<td>78</td>
<td>3.68</td>
<td>0.923</td>
<td>0.391</td>
</tr>
<tr>
<td>Body Mass Index</td>
<td>25.41</td>
<td>25.59</td>
<td>0.77</td>
<td>-0.589</td>
<td>0.577</td>
</tr>
<tr>
<td>Waist circumference</td>
<td>88.29</td>
<td>86.43</td>
<td>3.48</td>
<td>1.410</td>
<td>0.208</td>
</tr>
<tr>
<td>Perceived pain</td>
<td>4.14</td>
<td>2.86</td>
<td>1.11</td>
<td>3.057</td>
<td>0.022</td>
</tr>
</tbody>
</table>

**Spearman’s correlation**

Spearman’s correlation gives us indications of significant correlations between grip strength, anxiety, depression and perceived pain. The correlations are between variables from pre and post eight weeks of exercise.

**Table 2**: Significant Spearman’s correlation between evaluated variables conducted from PASW Statistic 18, SPSS Inc.

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

<table>
<thead>
<tr>
<th>Correlation Coefficient rank, ( r )</th>
<th>Sig. (2-tailed), ( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grip strength ( \text{pre} ) with perceived pain ( \text{pre} )</td>
<td>-0.855* 0.014</td>
</tr>
<tr>
<td>Grip strength ( \text{post} ) with perceived pain ( \text{post} )</td>
<td>-0.561 0.190</td>
</tr>
<tr>
<td>Grip strength ( \text{pre} ) with depression ( \text{pre} )</td>
<td>-0.459 0.301</td>
</tr>
<tr>
<td>Grip strength ( \text{post} ) with depression ( \text{post} )</td>
<td>-0.918** 0.004</td>
</tr>
</tbody>
</table>
**Work Ability**

As shown in table 1, the total mean value of work ability increased from 29.82 to 32.86. However, on group level in females the work ability changed from 29.9 ± 7.6 (21-40) to 31.9 ± 8.3 (21-41), while in males it changed from 29.7 ± 8.9 (20-37) to 34 ± 5.1 (31-40). The graph below will give you a subjective overview pre and post eight weeks of exercise. As seen, five out of seven subjects have had an increase in their work ability. To your right you have reference values for comparison.
**Anxiety and Depression**

The graph below will give you a subjective overview of anxiety and depression assessed from HADS pre and post eight weeks of exercise. The yellow line is a borderline for levels of perceived anxiety and depression.

**Fig. 3.1:** Levels of anxiety for all the subjects

**Fig. 3.2:** Levels of depression for all the subjects

**Rates of anxiety**

0-7 No troublesome anxiety
8-10 Mild to moderate anxiety
>10 Occurrence of anxiety disorder

**Rates of depression**

0-7 No depression
8-10 Depression
>10 Risk for depression that may require medical attention
Handgrip strength

The grip strength measured by JAMAR® hand dynamometer for respectively assessment occasions showed increase in both males and females. The graph below gives subjective indications of the grip strength for the dominant hand for each subject. To view the total mean value for grip strength, see table 1.

Fig. 4: The figures above demonstrate the grip strength for each subject from the first and second assessment occasions. Two of seven subjects did not increase in grip strength, five of seven however did.
Blood pressure

Measurement of arterial BP in which the top blue line represents the systolic blood pressure (SBP) and lower blue line diastolic blood pressure (DBP) before exercise. The yellow top line represents the SBP and yellow lower represents DBP after eight weeks of training. Results showed after the first measurement occasion to one of the participants a low BP, 4 had optimal BP, one had high-normal SBP and normal DBP, and one participant had first degree hypertension (mild). At the second measurement occasion for most of the group BP was unchanged. The people who had high normal SBP and milder degrees of hypertension showed significant differences at the second measurement in which one of those had optimal BP and the other had normal BP.

Fig. 5: Demonstration over the subjects’ systolic and diastolic blood pressure pre and post eight weeks of exercise.
**Body Mass Index**

The graph shows pre and post BMI changes after eight weeks of physical training supplemented with waist circumference. There was an increase in BMI however a decrease in waist circumference.

*Fig. 6: BMI supplemented with waist circumference in centimetres.*
**Visual Analogue Scale (VAS) for perceived pain**

The graph below demonstrates the perceived pain the subjects self-assessed from the visual analogue scale. The pain they experienced generated from their back, neck and shoulders. As demonstrated three out of seven subjects experienced lower and no pain after eight weeks of training. However another three subjects did not experience any changes in perceived pain. The subjects have all been experiencing pain more than three months which in this case means they are suffering from chronic pain.

*Fig. 7: Demonstration over perceived pain assessed with a visual analogue scale, where 0 is no pain and 10 is high level of pain.*
Discussion

Method discussion

Our study was to train long-term unemployed sedentary individuals with different types of physical activities during eight weeks of time, twice a week, two hours per session. The activities were based on the recommendations from FYSS 2008, claiming that physical training have positive effects on muscle strength and reducing effects on, blood pressure, anxiety and depression. These are all factors contributing to mental and physical health. However, the occurrence of the activities were dependent on the availability of the sport premises.

Before the training commenced the subjects were to be assessed for physical and mental health by performing different type of tests. Work ability index, an invention made by the Finnish institute of Occupational Health, assessing one’s ability to work, aimed for employed on working site. Since our subjects are unemployed we believed it would be convenient to assess their work ability since optimal work ability is based are strong mental and physical in synchronisation (Tjäder, 2010). Furthermore, we believed that physical activity could affect their mental health as well as their physical health which in turn would affect their work ability positively.

Since it is stated according to facts that unemployment leads to depression and anxiety, our method for assessing mental health was to allow our subject to self-assess their mental condition by answering HADS questionnaire. To reinforce this statement, our desire was to analyse if physical activity would affect their depression and anxiety levels. Other studies indicate that aerobic training and strength training has reducing effects on depression and anxiety; where the sessions should maintain at least 30-40 minutes, where ours were up to two hours (Jansson, Stensvold, & Wisløff, 2008).

The physical assessments for body strength were performed with JAMAR® hydraulic hand dynamometer which according to many studies gives an indication on total body strength. Therefore, it was important to analyse grip strength to investigate if eight weeks of physical activity would contribute to overall muscle strength. The subjects were told to press the dynamometer for ten second while the tester was coaching them to press. The reason for this is because we believe that by contributing verbal coaching would positively affect the subjects’ self-efficacy, ‘a person's belief in his/her ability to perform a specific task’.

According to a study regarding coaching for athletes it is said that researchers believe coaching will help them develop self-efficacy (Vargas-Tonsing, 2009).

Blood pressure of the subject.s was measured because we believe in the importance for the subjects to be aware of their cardiac condition and how physical training will affect it. Moreover it was important for us to be aware if they were in the risk zone of high blood pressure. If they were to have too high blood pressure we would have to accommodate the physical training to their condition. We believe furthermore that if physical training would to decrease their blood pressure, this would act as a motivation for the subjects to maintain physical training and leave the sedentary lifestyle behind. We believe this because according to earlier studies aerobic training in combination with strength training can affects blood pressure positively, merely a single session is said to decrease blood pressure urgently which is called ‘post –exercise hypotension’, and therefore it is recommended that repeated sessions
of physical exercise can lead to decreased blood pressure. Our leisure-time had aerobic, circuit and strength training scheduled which is said to decrease blood pressure according to studies with 10-20 mmHg within the primary hours of physical training for aerobic training and 3-4 mmHg for circuit and strength training (Börjesson, Dahlöf, & Kjeldsen, 2008).

Body Mass Index in combination with waist circumference, helps us to determine obesity and central obesity moreover to inform our subjects of their BMI levels. Another reason for determining BMI with waist circumference was to analyse if it would be affected with physical activities provided.

The purpose behind assessing physical pain was to analyse if physical training would reduce their sensation of pain. Since the subjects are sedentary we estimated that they were to experience pain, hence the pain assessment. We also associated physical pain with physical illness, since it is an obstacle for optimal work ability. Therefore, we believed if the subjects who went through eight weeks of physical activity would experience a reduction in their previous pain experience.

**Result discussion**

The results below are discussed on group level. The t-test showed significant decrease in perceived pain. This might infer that physical training might have a strong positive effect on decreasing chronic pain. There were significant results from Spearman’s correlation test between grip strength perceived pain as well as grip strength and depression, (see table 2 for significant values). Before the period of exercise the grip strength was on a lower point as the pain levels were higher. This shows that those with lower muscle strength may experience forms of chronic pain. As there were no significant correlation between grip strength and perceived pain post eight weeks of exercise this may indicate that exercise may increase your muscle strength and prevent chronic pain.

As there was no significant correlation between grip strength and depression pre-exercise, there were however significance post-exercise. On group level the subjects were below the rate 7 on the HAD Scale, which means that higher rate of grip strength is correlated with no depression. This may indicate that higher rate of total muscle strength which the grip strength symbolises for; may prevent causes of depression. As we stated before physical activity is said to reduce and prevent depression (Andersson, Kjellman, Martinsen, & Taube, 2008). To clarify a specific matter, it does not nesseserily mean that you are prone to nor suffer from depression if the grip strength is low. Every case is specific and individual.

However there are no significant changes in the t-test regarding the remaining variables. We believe that there are certain factors affecting this matter, such as; if the training period would be extended there might have been a possible chance of significance in the remaining variables. We also believe as for another factor such as observing their daily nutrition would play a matter in their results. Unfortunately they were lacking valuable knowledge regarding healthy nutrition; however they did not stay uninformed regarding nutrition. They were all orally briefed as well as receiving a brochure with general information regarding nutrition and healthy lifestyle, (see appendix for brochure for nutrition and healthy lifestyle). To view blood pressure results many of the subjects were already on normal blood pressure level except for subject number 5 and 7. They both had a decrease in systolic blood pressure after eight weeks of exercise, which may confirm the theories and studies for positive effects on blood pressure.
To generalise all the results, there were more or less changes in all the assessments. There were no significant correlations between work ability index and the remaining variables. We believe that if the amount of subjects were more than seven, we might have seen significant correlations. Furthermore there were increases in work ability, however nothing significant from the t-test. Our belief is; if there were to be an extension in the training schedule it might have affected their work ability more significantly because the essential factors of work ability is mental and physical health, as it is previously stated, we believe that our input of physical training helped them increase their work ability with small proportions, however since our input merely is a part of their daily life we believe other personal matters might have affected their results. According to figure 1 there are other factors that need to be contributed for optimal work ability, and our study only affects the bottom factor.

Regarding anxiety; as facts state, physical training has effects on anxiety, this however did not apply for all of our subjects. Some increased in anxiety while others decreased. for each subject there was an individual change, and each subject live a different life meaning they all differ from each other in daily life circumstances. Having this mentioned, every subject is responsible of their personal resources. Meaning, every subject is in charge of how much effort they put in to contribute to changes affecting their lives.

Even though there was no significant change in grip strength over eight weeks of time there was individual changes. As mention before grip strength measured with JAMAR® gives an indication of overall muscle strength, this gives us a strong belief that our input of physical training contributed with muscle strength and this is shows that they have increased in muscle strength. Muscle strength is related with the muscles cross-sectional area, and if there has been a muscle hypertrophy causing an increase in the cross-sectional area of the muscle then there are possible chances of increase in strength (Verdijk, et al., 2010).

As all the fact state that there are some correlations between physical and mental health, moreover as mentioned before physical and mental health are important factors regarding optimal work ability and employment. To summarise we believe that physical training over a longer period of time may have a positive effect on mental and physical health if the trainee has the will-power to pursue for better health, both regarding physical exercise as well as maintaining healthy nutrition.
References


23


Appendix

Work Ability Index (Swedish translation)
Hospital Anxiety and Depression Scale
Reference values for BMI, Blood Pressure, and Waist Circumference
Visual Analogue Scale for perceived pain (Swedish translation)
Ethical Approval
Schedule and description of activities
Weekly plan over activities
Brochure for nutrition and healthy lifestyle
Work Ability Index (Swedish translation)

Work Ability Index

The Work Ability Index is used for evaluating people’s work capacity.

Tuomi K, Ilmarinen J, Jahkola A et al.
It takes into consideration both the physical and mental demands of the work, as well as the worker’s health state and mental resources. The Index helps to identify sufficiently early those workers and work teams that need support. The necessary questionnaires and follow-up forms are included.


Kan beställas från Arbetsmiljöinstitutet i Finland på Svenska eller Engelska www.ttl.fi

Summing up points
Question 1 – Regarding work

Question 2 & 3 – For physically demanding work, multiply physical requirements (question 2) (1-5) with 1.5 and mental requirements (question 3) (1-5) with 0.5

For mentally demanding work, multiply physical requirements with 0.5 and mental requirements with 1.5

Question 4 Only diagnosed by a physician

Least 5 diagnoses = 1 point, 4 diagnoses = 2 points, 3 diagnoses = 3 points, 2 diagnoses = 4 points, 1 diagnosis = 5 points and no diagnosis = 7 points

Question 5 The lowest value (the lowest value adds up).

Question 6 The value adds up

Question 7 The value adds up

Question 8-10 The values add up and by sum 0-3 = 1 point, 4-6 = 2 points, 7-9 = 3 points, 10-12 = 4 points

Sum

7-27 = Good to work ability
28-36 = Average to work ability
37-43 = Good work ability
44-49 = Excellent work ability
1. Vi antar att Din arbetsförmåga, då den var som bäst värderas med 10 poäng. Vilket poängtal skulle du då ge din nuvarande arbetsförmåga? – Kryssa lämplig siffra (0 betyder att du inte alls kan arbeta nu och 10 att din arbetsförmåga är som allra bäst just nu)

0 1 2 3 4 5 6 7 8 9 10

2. Hur bedömer Du din nuvarande arbetsförmåga vara i förhållande till de fysiska krav arbetet ställer?

mycket god ■
ganska god ■
någorlunda ■
ganska dålig □
mycket dålig □

3. Hur bedömer Du din nuvarande arbetsförmåga vara i förhållande till de mentala och psykiska krav som arbetet ställer

mycket god ■
ganska god ■
någorlunda ■
ganska dålig □
mycket dålig □
4. Markera på listan vilka sjukdomar, skador eller besvär som Du för närvarande har. Obs. Ange både sådant som Du själv anser att Du lider av och sådant som Du fått besked av läkare att Du har:

<table>
<thead>
<tr>
<th>Sjukdom / skada</th>
<th>Ja, enligt min åsikt</th>
<th>Ja, enligt läkare</th>
<th>Nej</th>
</tr>
</thead>
<tbody>
<tr>
<td>Svåter av tidigare olycksfallskada (text: huvud/nackskada, stor brännskada)</td>
<td>☐</td>
<td>☐</td>
<td>☑</td>
</tr>
<tr>
<td>Sjukdom i rygg, leder, muskler el skelett (text: förslitna leder, lin traction, led- el muskelväv, ledningsreumatism, ischias)</td>
<td>☐</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Sjukdom i hjärta / blodkärl (text: högt blodtryck, käräkramp, hjärtinfarkt)</td>
<td>☑</td>
<td>☑</td>
<td>☐</td>
</tr>
<tr>
<td>Sjukdom i lungor (text: astma, svår luftrörsstörning, enfysen)</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Psykiska problem (text: &quot;nervös situation&quot;, depressionsstånd, ångest, svår sömnstörning)</td>
<td>☑</td>
<td>☑</td>
<td>☐</td>
</tr>
<tr>
<td>Sjukdom i nervsystemet (text: öron, ögon, nervsjukskor, parkinson, epilepsia)</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Sjukdom i magen/metabolitstörninger (text: magkatar, magcir, gallsten, lever- el tarmsjukdom)</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Sjukdom i urinvägar el könsorgan (text: sjukdom, inflammationslär, svår detoxikation, nationsstörning)</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Hindsjukdom (text: aktas, porositis)</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Tumör el cancer</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Åmnesomsättningssjukdom/störningar (text: svår övervikt, anorexia, bulimia, sjukdom, struma)</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Blodsjukdom (text: blodkrassvikt/anemi)</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Medfött felt/misbildning som är handikappande</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Annan sjukdom eller handikapp</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>(ange vad: )</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
</tbody>
</table>

5. Hinderas eller besväras du i ditt nuvarande arbete av den/de sjukdomar, skador el besvär som du angivit i föregående fråga? (Du kan kryssa i flera alternativ)

- Har ingen sjukdom, skada el besvär ☐
- Nej, sjukdomen hindrar el besvär inte alls i mitt arbete ☐
- Jag klarar arbetet men får besvär ☐
- Jag är ibland tvungen att minska på arbetstakten el ändra arbetsätt ☐
- Jag är ofta tvungen att minska på arbetstakten el ändra arbetsätt ☐
- Jag klarar endast ett delidsarbete ☐
- Jag är helt oförmögen att arbeta ☐
6. Hur många dagar under de senaste 12 månaderna har du sammanlagt varit borta från arbetet p.g.a. egen sjukdom (sjukskrivning, vård, behandling el undersökning)?

- ingen dag □ 5
- 1-7 dagar □ 4
- 8-24 dagar □ 3
- 25-99 dagar □ 2
- 100-365 dagar □ 1

7. Med tanke på Din hälsa - tror Du att nej, knappast □ 1
   Du kan arbeta i Dit nuvarande yrke kanske □ 4
   även om två år? ja, troligtvis □ 7

8. Har du under den senaste månaden känt att du har mått bra av dina dagliga sysslor?
   Ange med kryss i det alternativ som stämmer bäst.

- ofta □ 4
- ganska ofta □ 3
- då och då □ 2
- ganska sällan □ 1
- aldrig □ 0

9. Har du under den senaste månaden varit pigg och företagsam?
   Ange med kryss i det alternativ som stämmer bäst.

- ofta □ 4
- ganska ofta □ 3
- då och då □ 2
- ganska sällan □ 1
- aldrig □ 0

10. Har du under den senaste månaden känt dig optimistisk inför framtiden?
    Ange med kryss i det alternativ som stämmer bäst.

- ofta □ 4
- ganska ofta □ 3
- då och då □ 2
- ganska sällan □ 1
- aldrig □ 0

(Finnish Institute of Occupational Health, 2010)
**Hospital Anxiety and depression scale (Swedish translation)**

<table>
<thead>
<tr>
<th>Å</th>
<th>Jag känner mig spänd och nervös:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mestadels</td>
</tr>
<tr>
<td></td>
<td>Ofta</td>
</tr>
<tr>
<td></td>
<td>Av och till</td>
</tr>
<tr>
<td></td>
<td>Inte alls</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>D</th>
<th>Jag uppskattar fortfarande saker jag tidigare uppskattat:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Definitivt lika mycket</td>
</tr>
<tr>
<td></td>
<td>Inte lika mycket</td>
</tr>
<tr>
<td></td>
<td>Endast delvis</td>
</tr>
<tr>
<td></td>
<td>Nästa inte alls</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Å</th>
<th>Jag har en känsla av att något hemskt kommer att hända:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mycket klart och obehagligt</td>
</tr>
<tr>
<td></td>
<td>Inte så starkt nu</td>
</tr>
<tr>
<td></td>
<td>Betydligt svagare nu</td>
</tr>
<tr>
<td></td>
<td>Inte alls</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>D</th>
<th>Jag kan skratta och se det roliga i saker och ting:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lika ofta som tidigare</td>
</tr>
<tr>
<td></td>
<td>Inte lika ofta nu</td>
</tr>
<tr>
<td></td>
<td>Betydligt mer sällan nu</td>
</tr>
<tr>
<td></td>
<td>Aldrig</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Å</th>
<th>Jag bekymrar mig över saker:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mestadels</td>
</tr>
<tr>
<td></td>
<td>Ganska ofta</td>
</tr>
<tr>
<td></td>
<td>Av och till</td>
</tr>
<tr>
<td></td>
<td>Någon enstaka gång</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>D</th>
<th>Jag känner mig på gott humör:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aldrig</td>
</tr>
<tr>
<td></td>
<td>Sällan</td>
</tr>
<tr>
<td></td>
<td>Ibland</td>
</tr>
<tr>
<td></td>
<td>Mestadels</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Å</th>
<th>Jag kan sitta stilla och känna mig avslappnad:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Absolut</td>
</tr>
<tr>
<td></td>
<td>Vanligtvis</td>
</tr>
<tr>
<td></td>
<td>Sällan</td>
</tr>
<tr>
<td></td>
<td>Aldrig</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>D</th>
<th>Allting känns trögt:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nästan alltid</td>
</tr>
<tr>
<td></td>
<td>Ofta</td>
</tr>
<tr>
<td></td>
<td>Ibland</td>
</tr>
<tr>
<td></td>
<td>Aldrig</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Å</th>
<th>Jag känner mig orolig, som om jag hade fjärilar i magen:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aldrig</td>
</tr>
<tr>
<td>Ångest</td>
<td>Totalt Å</td>
</tr>
<tr>
<td>--------</td>
<td>-----------</td>
</tr>
<tr>
<td>Ibland</td>
<td>1</td>
</tr>
<tr>
<td>Ganska ofta</td>
<td>2</td>
</tr>
<tr>
<td>Väldigt ofta</td>
<td>3</td>
</tr>
</tbody>
</table>
| D  Jag har tappat intresset för hur jag ser ut:  
  Fullständigt | 3         |            |          |
  Till stor del | 2         |            |          |
  Delvis | 1         |            |          |
  Inte alls | 0         |            |          |
| Ä  Jag känner mig rastlös:  
  Väldigt ofta | 3         |            |          |
  Ganska ofta | 2         |            |          |
  Sällan | 1         |            |          |
  Inte alls | 0         |            |          |
| D  Jag ser med glädje fram emot saker och ting:  
  Lika mycket som tidigare | 0         |            |          |
  Mindre än tidigare | 1         |            |          |
  Mycket mindre än tidigare | 2         |            |          |
  Knappast alls | 3         |            |          |
| Ä  Jag får plötsliga panikkänslor:  
  Väldigt ofta | 3         |            |          |
  Ganska ofta | 2         |            |          |
  Sällan | 1         |            |          |
  Aldrig | 0         |            |          |
| D  Jag kan uppskatta en god bok, ett TV- eller radioprogram:  
  Ofta | 0         |            |          |
  Ibland | 1         |            |          |
  Sällan | 2         |            |          |
  Mycket sällan | 3         |            |          |
| Totalt Å | Totalt D |

Summera alla Å = Angest
Summera alla D = Depression

Ångest
0-7 Ingen besvärande ångest
8-10 Mild till måttlig ångest
>10 Förekomst av eventuell ångeststörning

Depression
0-7 Ej deprimerad
8-10 Nedstämdhet
>10 Risk för depressionstillstånd som kan kräva läkarbehandling

(Deprimerad.net, 2010)
### Reference values for Blood Pressure, BMI and Waist Circumference

*The European classification of hypertension, (Börjesson, Dahlöf, & Kjeldsen, 27. Hypertoni, 2008)*

<table>
<thead>
<tr>
<th></th>
<th>Systolic</th>
<th>Diastolic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimal blood pressure</td>
<td>&lt; 120</td>
<td>&lt; 80</td>
</tr>
<tr>
<td>Normal blood pressure</td>
<td>&lt; 130</td>
<td>&lt; 85</td>
</tr>
<tr>
<td>High normal blood pressure</td>
<td>130-139</td>
<td>85-89</td>
</tr>
<tr>
<td>Level 1 hypertension (mild)</td>
<td>140-159</td>
<td>90-99</td>
</tr>
<tr>
<td>Level 2 hypertension (moderate)</td>
<td>160-179</td>
<td>100-109</td>
</tr>
<tr>
<td>Level 3 hypertension (Severe)</td>
<td>≥ 180</td>
<td>≥ 110</td>
</tr>
<tr>
<td>Isolated systolic hypertension</td>
<td>≥ 140</td>
<td>&lt; 90</td>
</tr>
</tbody>
</table>

*Levels of BMI, retrieved from World Health Organization, (WHO, 2010)*

<table>
<thead>
<tr>
<th>BMI</th>
<th>Nutritional Status</th>
<th>Health risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 18.5</td>
<td>Underweight</td>
<td>Low (but increased risk of other clinical condition)</td>
</tr>
<tr>
<td>18.5–24.9</td>
<td>Normal weight</td>
<td>Normal risk</td>
</tr>
<tr>
<td>25.0–29.9</td>
<td>Pre-obesity</td>
<td>Mild increase</td>
</tr>
<tr>
<td>30.0–34.9</td>
<td>Obesity class I</td>
<td>Moderate increased risk</td>
</tr>
<tr>
<td>35.0–39.9</td>
<td>Obesity class II</td>
<td>Severe increased risk</td>
</tr>
<tr>
<td>Above 40</td>
<td>Obesity class III</td>
<td>Great, extreme risk</td>
</tr>
</tbody>
</table>

*Gender specific waist circumference, retrieved from FYSS 2008 (Rössner, 2008)*

<table>
<thead>
<tr>
<th>Risk for metabolic complications</th>
<th>Waist Circumference (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
</tr>
<tr>
<td>Increased risk</td>
<td>≥ 94</td>
</tr>
<tr>
<td>Very high risk</td>
<td>≥ 102</td>
</tr>
</tbody>
</table>
Visual Analogue Scale for perceived pain

Smärtskala (VAS-skala)

Markera på smärtskalan nedan hur starkt du upplever smärtan.

Smärteckning
Rita in i figuren var du upplever att smärtan finns samt hur du upplever den.
Exempel på hur du kan beskriva smärtan finns längst ner på sidan.

Arvånd markeringarna nedan för att visa i figuren var och hur du upplever din smärta.

<table>
<thead>
<tr>
<th>PU</th>
<th>BL</th>
<th>ST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulserande</td>
<td>Blixtrande</td>
<td>Slickande</td>
</tr>
<tr>
<td>SK</td>
<td>KR</td>
<td>GN</td>
</tr>
<tr>
<td>Skarande</td>
<td>Krampaktig</td>
<td>Gnagande</td>
</tr>
<tr>
<td>BR</td>
<td>MO</td>
<td>TU</td>
</tr>
<tr>
<td>Brännande</td>
<td>Molande</td>
<td>Tung</td>
</tr>
<tr>
<td>ÖM</td>
<td>SP</td>
<td>UT</td>
</tr>
<tr>
<td>Ömmande</td>
<td>Sprängande</td>
<td>Utmattande</td>
</tr>
<tr>
<td>KV</td>
<td>FA</td>
<td>SG</td>
</tr>
<tr>
<td>Kvaljande</td>
<td>Fasansfull</td>
<td>Straffande-grym</td>
</tr>
</tbody>
</table>

(Om Smärta, 2009)
Som människa är det väldigt viktigt att bevara sin kropp och sin hälsa på en god nivå, och med fysisk aktivitet kan man uppnå detta. I åtta (8) veckor framöver kommer vi från Högskolan; Ljiljana Markovic och Milad M. Mahmoudi göra en studie och utföra fysiska aktiviteter två (2) gånger i veckan. Syftet med denna studie är att undersöka upplevda effekter från träning och hur den påverkar den psykiska hälsan. Vi kommer även att utföra tester som mäter din psykologiska hälsa i form utav enkäter, samt utföra fysiologiska tester som vikttagningsmätning, längdmätning, midjemått, blodtrycksmätning, handgreppssyra samt BMI mätning kommer att utföras. Deltagandet inom denna studie är frivilligt och all information under dessa veckor samt framöver kommer att kommersiell användning av data och framöver kommer att hanteras med sekretess, samt att du får när som helst avbryta din medverkan.

Deltagarens namn, Ort och Datum (DDMMÅÅÅ)

…………………………………………………….
Namafförtydligande

…………………………………………………….

Milad Mirza Mahmoudi
_________
milmir06@student.hh.se

Ljiljana Markovic
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**Schedule and description of activities**

**Warm ups**

*Running and walking on treadmill*

Treadmill workout is an effective cardio exercise for large muscles groups. Treadmill exercises are self-administered, meaning the pace and speed can be programmed after personal desire. (Bø & Klungland T., 2008)

*Cross Training*

The cross training machine gives dynamic movements similar to running, biking as well as cross country skiing. Through controlled and smooth movements, cross training is beneficial for the joints; it improves stamina and gives strength. (Bø & Klungland T., 2008)

*Rowing machine*

Rowing machine is form of functional training which also gives conditioning that involves mainly large leg muscles, but also large parts of the back muscles. (Bø & Klungland T., 2008)

*Ball and racket games*

Ball and racket games provide positive cardio effects as well as positive effects on muscle strength and coordination. Due to this fact activities such as football, basketball, badminton, table tennis and floor hockey were scheduled. (Bø & Klungland T., 2008)

*Spinning*

Spinning is another form of cardio training, however it does not require high skills of coordination, therefore spinning is classified as an less requiring aerobic activity, however during a spinning session the pace level and resistance level changes in order to make the session less monotonous. This form of exercise has effects on bone fitness. (Bø & Klungland T., 2008)

*Aerobics*

The aerobic sessions involved novice level of dynamic movements in sync with music rhythm. The dynamic movements involved basic dancing steps as well as combat movements such as kicking and boxing in the air. Aerobics has positive effects on balance, coordination, and cardio. (Bø & Klungland T., 2008)

*Circuit and strength training*

The circuit training sessions involved exercises which benefits strength and condition. To achieve a full body workout the session was designed with six workout stations containing two exercises each, divided in upper body, lower extremities and core exercises. Each exercise remained for two minutes, followed by a one minute break, thereafter moving on to next exercise. The exercises involved;

- dead-lift, squats,
- standing calf-press, step-up on step-up board,
• back raise on Pilates ball, bent over barbell row,
• bench press with barbell or dumbbells, shoulder press with barbell or dumbbell
• crunches, standing bridge,
• biceps curls with dumbbell or barbell, dips

Strength training occurred at the gym where the participants had the opportunity to train with machines, meanwhile also perform functional training exercises with weights and elastic bands. Strength training is a versatile workout which benefits the upper, mid and lower parts of the body. The versatility gives you the opportunity of creativity to perform various types of exercises.

The subjects performed a variety of exercises after instructions, such as squats, lunges, bench press, dead lift, bicep curls. The sessions at the gym were similar to the circuit training; however the subjects performed the exercises three sets of ten repetitions (Bø & Klungland T., 2008).

The purpose behind circuit training and strength training was because of the positive effects it has on blood pressure, anxiety, depression and its propitious conditions for increase in muscle strength. The general recommendations of strength training for elderly people and those suffering from heart diseases are based on scientific evidence mainly from American College of Sport Medicine, American Heart Association US Department of Health and Human Service as well as American Diabetes Association. The recommendations should be at least twice a week, 8-10 exercises all together for different muscle groups and at least one set of exercise with the repetitions of 8-15 repetitions, meaning lighter weights and more repetitions (Jansson, Stensvold, & Wisløff, 2008).

**Pilates**

Pilates exercises gives combination of strength and movement, where the centre of focus is concentration, balance and breathing. The purpose of Pilates is to strengthen the body overall with an emphasis on core strength and stability. This will be achieved through slow dynamic movements with precision while focusing on the inhaling and exhaling. (Bø & Klungland T., 2008)

**Yoga**

Yoga exercises infers to meditate, to control the breathing rhythm as well as standing in different body positions. The aim of yoga is to find inner peace, reduce stress and tension in the body moreover to increase mobility and strength. (Bø & Klungland T., 2008)

**Tactile Massage**

Tactile massage is a newfound Swedish massage method involving soft touches on on the skin. This form of massage is said to work as a rehabilitation technique for stress neutralisation as well as providing relaxation, reduce pain and relieve depression. This works through the reaction of the body giving away endocrin secretion of the hormone ‘Oxytocin’. (Andersson, Törnkvist, & Wändell, 2009) and (Berg & Ågren, 2006)
### Weekly plan over activities

<table>
<thead>
<tr>
<th>Week</th>
<th>Sessions</th>
<th>Activities</th>
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<tr>
<td></td>
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<td><strong>Pre-assessments</strong></td>
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<tr>
<td>1</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Circuit training, kick-boxing</td>
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<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>Strength training</td>
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<td>Circuit training, kick boxing</td>
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<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>Basketball, volleyball</td>
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<td>3</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Badminton, table tennis</td>
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<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>Floor hockey</td>
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<tr>
<td>4</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Spinning, Pilates, tactile massage</td>
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<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>Strength training</td>
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<td>5</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Strength training</td>
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<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>Football</td>
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<td>6</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Yoga, Pilates</td>
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<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>Basketball, football</td>
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<td>7</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Badminton, ball games</td>
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<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>Circuit training, tactile massage</td>
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<td>8</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Ball games, basketball</td>
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<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>Ball games, football</td>
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<td><strong>Post-assessments</strong></td>
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Steg 1: MÅLSÄTTNING
- Vad vill du uppnå och planera hur ska du komma fram till målet?

Steg 2: KOST
- Utveckla en kostplan som är rätt för dig & följ SNR om du är frisk person.
  • Ät fulkornsprodukter
  • Ät regelbundet & varierad
  • Jobba med rätt hållning, stretching & energövningar.

Steg 3: RÖRELSE
- Skapa en personlig träningsprogram för att uppnå ditt mål.
  • Var fysisk aktiv minst 30 minuter/dag.

Steg 4: LIVSSTIL
- Ett balanserad livsstil där du har tid för dig själv, dina närmaste, socialliv och jobb/ karriär är nyckel till optimala hälsa och välbefinnande.

Värderingar efter 4 veckor.

PT: Ljiljana Markovic & Milad Mahmoudi

Brochure for nutrition and healthy lifestyle

Att äta, träna & må bra! 

Att äta träna & må bra!

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