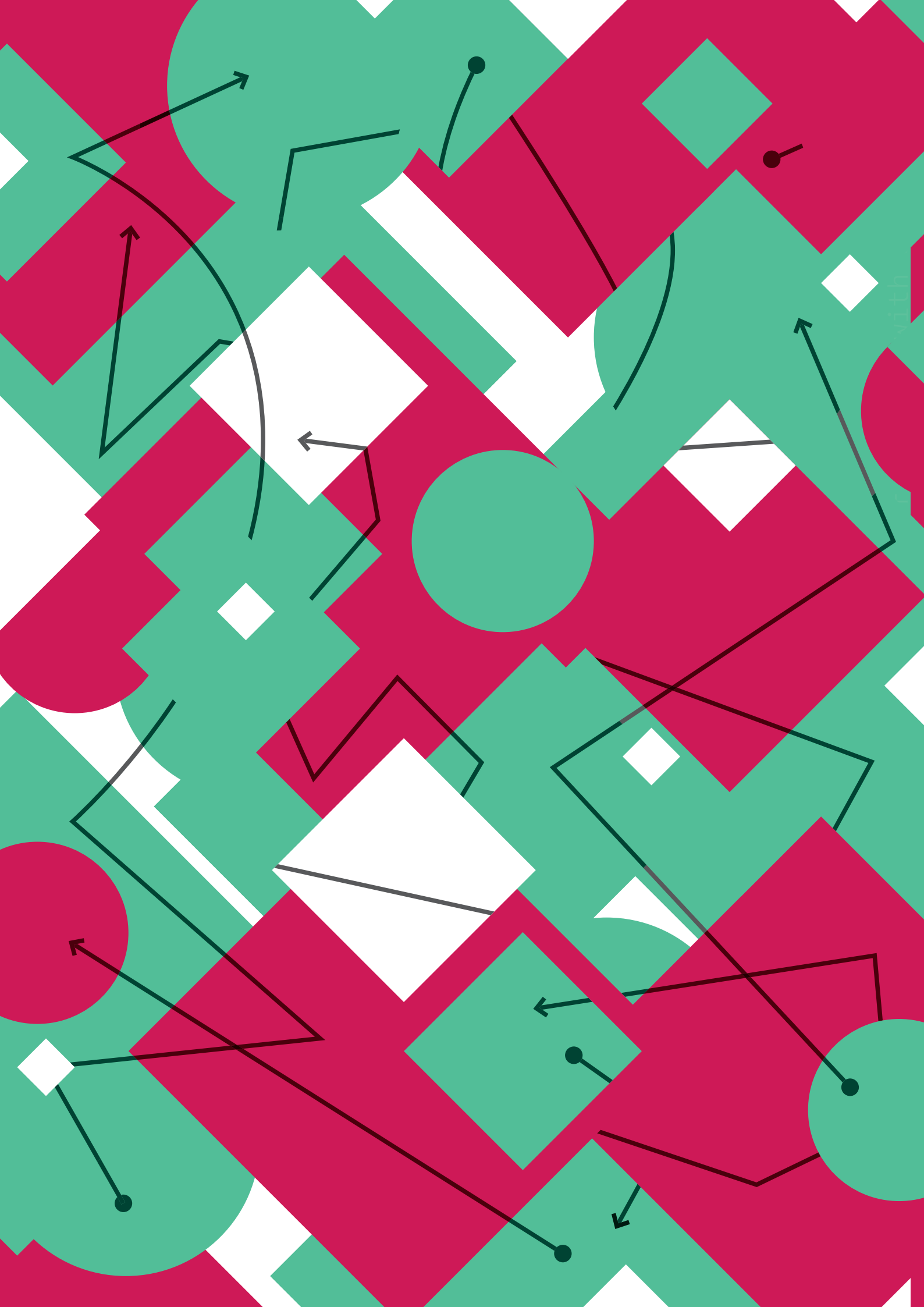






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INTRODUCTION

Based on a number of scientific researches, we can quite confidently say, that regular physical activity is getting more and more important during aging. This also applies to people with disabilities. Maintaining physical fitness through daily exercises is easy and safe way of preserving motor and cognitive skills. Many physical problems, that we associate with aging, are the consequences of lack of physical activities. Different movement activities ensure adequate physical fitness. The American College of Sports Medicine defined health-related physical fitness as a set of five different measurable elements: cardio-respiratory form, muscular strength, muscular endurance, body composition and flexibility. Walking with poles, strength exercises with elastic bands and exercises for flexibility with poles give an ideal combination that meets all the basic requirements of physical fitness related to health.

European sports network
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persons with disabilities

NORDIC WALKING

Nordic Walking was developed from Cross-Country Skiers' off-season training activity. It can be seen as enhanced walking where the object of the activity is to involve muscles in the upper body to add greater intensity to the level of exercise; all while reducing the impact on the legs compared with running.

Nordic Walking is an effective way of walking with help of poles. The movements of the arms, legs and body during walking with poles are equivalent to the rhythm of movements while walking firmly without poles.

While performing Nordic Walking the arms and legs move in cloister and swing forward and backward. By making use of the arm movements and a good Nordic Walking technique, almost all muscles of the body are trained.

In order to obtain good training results it is very important to learn this rhythm before going to walk with the Nordic Walking poles. The swing of the arms and the powerful placement of the pole, influence the length of the strides. A small arm swing means a limited pelvis rotation and shorter stride length. When the pole movement is bigger, the length of stride will also increase as well as the rotation in the pelvis and in the higher parts of the upper body. By making use of the arm movements and a good Nordic Walking technique, almost all muscles of the body are trained and is considered a "total body workout".

Nordic Walking should be practiced for relatively long periods, i.e. between half an hour and two hours at a time. The pace should be steady and the heart rate should rise to between 120 and 150 beats per minute.

Nordic Walking has rapidly increased its' popularity and today Nordic Walking is a well-known fitness sport all around the world. Over 6 million people are walking with poles every day keeping fit!

Training effects of Nordic Walking

The first scientific training studies on Nordic Walking were published in 1992. During a period of 12 weeks scientists from Winscoin, US, have studied the effects of Nordic Walking on aerobic and muscular endurance and on mental wellness among 86 women at the age of 20-50 years, whose average fitness was on a average level (VO₂ max 34-37 ml/min.kg). The participants were divided into three groups (Nordic Walking, normal walking and a non training group). The two training groups walked for 30-40 minutes 4x per week, on a speed of 70-85% of the maximum heart rate. In both training groups the endurance and the maximal walking time increased. The VO₂max

improved 3 ml x minute (7%) in both groups. Muscle power increased with 37% in the Nordic Walking group and 14% in the normal walking group. The muscle power was measured by 2 standardized power tests.

The studies showed that the most important difference between the Nordic walkers and the normal walkers was the obvious change in mental wellness. Depression, tiredness and feeling of irritation decreased. These effects were most probably ascribed to the enthusiasm of the Nordic Walkers and their reaction on this new popular way of fitness.

Summarizing scientists conclude that the training effects of Nordic Walking on the cardiovascular system and endurance system are equivalent to a firm walking training. However, Nordic Walking offers these positive changes already at a lower speed and shorter walking distance. This happens because the cardiovascular exertion in Nordic Walking is bigger than in normal walking.

Physiological effect of Nordic Walking

From the above information and also from other scientific researches, it is obvious that Nordic Walking gives following physiologic changes:

- It increases energy expenditure of the body with approx. 20% compared with walking without poles at same speed.
- The increased energy expenditure is the result of a higher used muscle mass during exercise.
- The above mentioned changes are individually differing and seem to be depending on walking speed and applied technique. If the speed is high, there is less time to push off efficiently with the poles and as a result the employment of the trunk and arm musculature will be less.
- The increased energy expenditure and the matching higher heart rate indicate that there is a bigger effect on the cardiovascular system. This is desirable for persons who have difficulty to reach their training heart rate during walking. Instead of running they can start walking with poles and have the positive effects on the posture and movements of the body (considering the overburden on knees and joints).

The benefits of Nordic Walking

The benefits of Nordic Walking have been confirmed through numerous University studies and include:

- Heart rate 5-17 beats per minute higher (for example in normal walking heart rate is 130 beats/minute and in Nordic Walking 147 beats per minute i.e. increase is 13%).
- Energy consumption increases when using poles by an average of 20% compared with ordinary walking without poles.
- Up to a 46% increase in energy consumption (Cooper Institute research, Research Quarterly for Exercise and Sports 2002 publication).
- Releases pain and muscle tension in the neck/shoulder region.
- The lateral mobility of the neck and spine

increases significantly.

- The muscles most actively involved are the forearm extensor and flexor muscles, the rear part of the shoulder muscles, the large pectoral muscles and the broad back muscles.
- Does not aggravate joints and knees.
- Reduces the load on knees and other joints.
- Consumes approximately 400 calories per hour (compared with 280 calories per hour for normal walking).
- Poles assist with safety on slippery surfaces.
- Nordic Walking is great for individuals who relate to the following:
 - Are seeking a unique cross-training activity.
 - Can't jog or run but want the same benefits.
 - Want to lose weight/size faster for better health.
 - Suffer balance, stability or mobility problems.
 - Have movement restriction and painful joints.
 - Need a safe and effective form of rehabilitation exercise for many conditions.
 - Need more than just a walk.

STRENGTH TRAINING

Strength training as a form of exercise gets little to no attention compared to cardiovascular training. Most people know that walking is an essential part of maintaining good health; strength training is often acknowledged as a beneficial thing to do for optimal health, but not essential enough to regularly incorporate into their exercise routine.

Strength training, by definition, is a concerted effort to use resistance or weights to work a muscle group. Many people falsely believe that being active, such as standing and moving during a shift at work, or doing house work, is enough effort to keep muscles healthy and strong. Being active is beneficial to the body, but it takes a focused effort to work muscles by either using weights, or your own bodyweight, to get the benefits of strength training.

The benefits of strength training are much too important to omit when committing to a healthy lifestyle, and many of these benefits cannot be accomplished with cardiovascular training alone. A well-designed strength-training program can provide the following benefits:

- Increases muscle mass, and muscle burns more calories than fat. Even at rest, your body will burn more calories if you strength train regularly. As muscle mass increases, metabolism increases, making it easier to maintain a healthy body weight. If you don't intentionally rebuild muscle through exercise, every ten years you will need to eat 150-450 less calories each day to maintain your current weight.
- Helps to slow down or halt muscle loss that accompanies aging. A typical adult loses about one-half pound of muscle per year after the age of 20, which means you feel less energetic and generally weaker.
- Slows bone loss that accompanies aging and increases bone density.
- Maintains or increases joint flexibility.
- Helps to manage or reduce pain from ailments such as arthritis and old injuries.
- Improve fitness variables such as glucose metabolism, blood pressure, muscle strength endurance, body composition and even insulin sensitivity.
- Improves your mood. Research from Harvard University found that strength training is very effective at reducing depression in older adults (Singh, Clements, & Fiatarone, 1997).
- Improves brain function. Coordination required to strength train keeps your brain active.
- Enhances appearance.
- Improves balance and decreases your risk for injury.
- Helps you sleep more soundly.
- Allows you to do activities you otherwise could not do.

GYMSTICK

Gymstick is a functional resistance training tool, developed originally in Finland in 2003. The idea was to combine two fitness tools together: the exercise stick and exercise band and the result was the Gymstick fitness tool.

The Gymstick uses three-dimensional movements that create resistance in your upper body, core, and lower body in one fluid movement.

Gymstick is a versatile fitness tool, which will help you to improve your muscular condition, fitness and mobility. It is also suitable for improving your health, as well as preventing possible injury.

Gymstick workouts are very effective, because they are comprehensive and do not just focus on the body's large muscle group, but also on the so-called postural muscles, which help you to maintain a good posture. The workouts also teach you how to control your body and improve muscular coordination, reaction speed and balance.

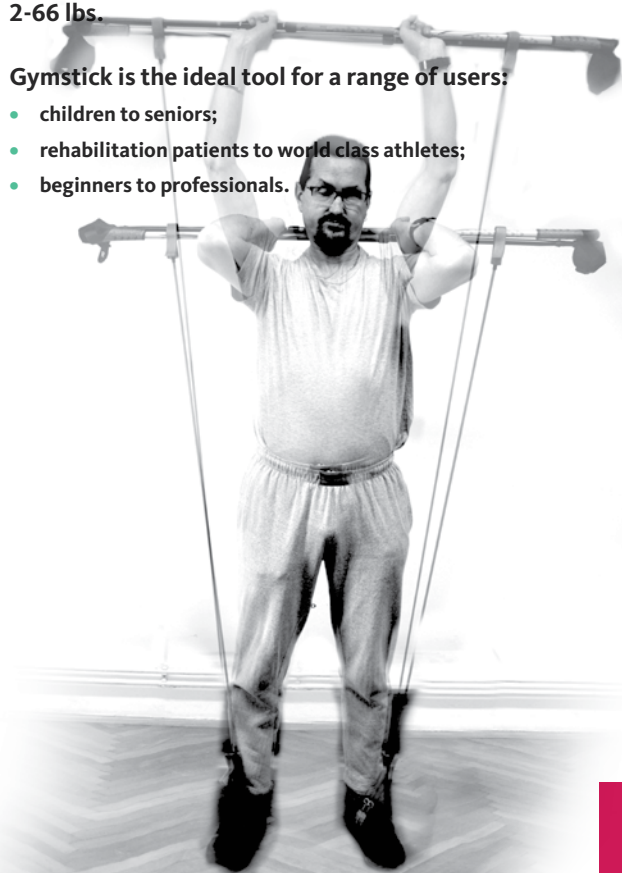
Gymstick does more than replicating weighted exercises, it provides resistance in virtually any direction and in any position. Each exercise will improve:

- core strength,
- balance,
- posture,
- coordination,
- muscle strength,
- and endurance.

It is a complete full body workout and it is available in five different resistance levels ranging from 1-30 kg / 2-66 lbs.

Gymstick is the ideal tool for a range of users:

- children to seniors;
- rehabilitation patients to world class athletes;
- beginners to professionals.



Why Gymstick?

- Resistance can be adjusted quickly and effortlessly while performing exercises. With the Gymstick, transitions between exercises are quick and simple.



- The resistance can be micro loaded to ensure the correct amount of tension is used, which is important for older adults who often don't like or cannot increase weight used unless very small increments are provided.
- When using free weights, poor technique is common, whereas with the Gymstick the angles of movement are more guided.
- Improved muscle strength and endurance, balance, joint stability, coordination and postural awareness.
- The Gymstick not only strengthens the large muscle groups, but also smaller and often weaker muscles around the joints e.g. rotator cuff muscles.
- Reduced risk of injury because the exercise bands are pulled from below the centre of gravity.

Advantages of Gymstick training

- You can adjust the resistance quickly, even during the exercise,
- small injury risk because the resistance are pulled from under your center of gravity,
- improves all the physiological qualities.

NORDIC WALKING GYM

With Nordic Walking Gym exercise bands we can modify our walking, cross country or alpine poles into a Gymstick exercise bar in just a few seconds by attaching the NW Gym bands on them. The combination of poles and bands will allow you to perform a complete workout improving your muscle strength, balance and mobility. You can choose to exercise in between your walking program in the open air or at home. This allows you to do both walking cardio exercise and muscle condition training anywhere, anytime!



The Nordic Walking Poles with NWG provide you with:

- A new way to workout inside and outside.
- A total body outdoor & indoor fitness tool.
- A new revolutionary innovation to old Nordic Walking.
- A perfect equipment for group training and rehabilitation.

Reasons to use Nordic Walking poles with NWG

1. The poles with NWG include two separate fitness tools which allow you to use them for aerobic Nordic Walking and to accomplish your training with muscle condition resistance band exercising anytime, anywhere.
2. You are able to perform a muscle condition exercise in the middle of your Nordic Walking exercise - train in the nature and also at home, alone or in a group.
3. You can perform cardio exercise, muscle condition exercise, flexibility exercise and co-ordination & balance exercise with same equipment.
4. The exercise bands can be changed in order to increase or decrease the resistance.

GNW PROGRAM - WHO IS IT FOR?

The program is intended for those who are attracted to this kind of physical activity, but especially adapted for persons with disabilities.

Persons with disabilities are those who deviate from the expected features and capabilities defined in a particular environment, and require extra attention and care, like ¹:

- Persons with acquired brain injury (ABI),
- Persons with intellectual disabilities (ID),
- Visually impaired,
- Hearing impaired,
- Persons with speech and language disorders,
- Physically handicapped persons,
- Long-term sick persons,
- Persons with learning difficulties,
- Persons with emotional and behavioral disorders,
- Persons with autism spectrum disorders,
- Talented person.

The program was developed by the Centre Naprej as part of rehabilitation programs to include users who all experienced severe brain damage.

WHY GNW PROGRAM FOR PEOPLE WITH DISABILITIES OR FOR PERSONS WITH ABI?

Good physical condition allows welfare. The results of a systematic and continuous work is also a consequence of mental attitude to live a healthy and active, which also increases confidence. Being fit does not mean only physical ability, but it touches all areas of our lives. It helps to purify negative patterns, traumas from past, frustrations and focus on what really counts in life. Physical activities are critical to maintaining an active and independent lifestyle. A man aged between 30 and 70 years losses about a quarter of his muscle strength. Those who experience 90 years more than half. Movement is the key to maintaining the health, welfare and working capabilities.

Physical/sport activity may be an important factor in the social life of a person. It allows him to have fun in the company of others, make acquaintances and friendships, and feel part of the group.

All individuals with special needs can have a variety of problems in the field of physical disabilities. Despite this, they must be physically active within their capabilities, because the lack of movement leads to new complications that prevent a better quality of life. By people with traumatic head and brain injury, which usually occurs as a result of a traffic accident, fall, etc., the basic physical exercises affect the improvement of motor functions, functions of the locomotor system, relaxation of muscle tone and stimulate the equilibrium reaction.

Walking is man's elemental movement and efficient movement workout. It is suitable for all people who can walk. Is a completely natural and safe recreation that can be performed anywhere, anytime. It does not require expensive equipment or special facilities, but only the time and the will. Regular walking improves both mental as well as physical health as it strengthens each and every muscle in the body, while not overload the joints. In addition, the body after thirty minutes of walking begins with the secretion of serotonin, the hormone of happiness, and endorphin, and thus largely contributing to a good and a lot less stressful mood. Due to release tension, walking has a beneficial effect on sleep.

The first step towards improving the efficiency of walking, is walking with poles (more commonly known as Nordic walking). Poles have always been a device for walking. The sticks evenly distributed loads which occur during walking. Part of the weight that would otherwise put pressure on the hips and knees, is on the hands. Thus, at each step, we are strengthening the hands. The intensive work period also strengthens the cardio-respiratory function.

1 https://sl.wikipedia.org/wiki/Osebe_s_posebnimi_potrebami

Poles provide additional stability when walking, which is especially important for people with impaired balance.

However, only aerobic exercise, such as walking, is not sufficient to prevent the loss of muscle strength. Without strength training, the muscles become still weaker, and less functional. Effective training has a duration of not more than twenty minutes and requires little effort. The key is to use the exercises in which muscles work against an external resistance, and to include all parts of the body. Methods of strength training include the use of free weights, fitness equipment, rubber bands, balls and exercises with its own weight. To avoid injury, start slowly and dive intensifying load.

Poles also serve as requisite and support for exercises for flexibility. The combination of walking with poles, exercises for power with elastics and exercises for flexibility with poles, gives an ideal combination, which meets all the basic requirements of natural (physical) fitness related to health. The American College of Sports Medicine has defined adequate physical fitness related to health, as a set of five different measurable elements.

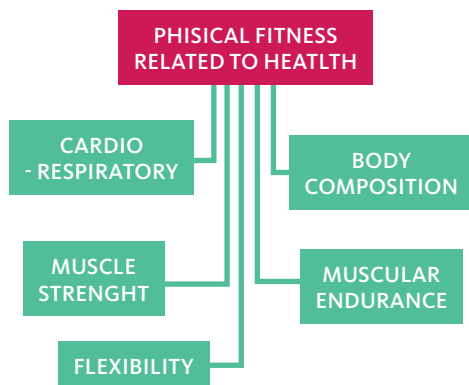


Fig. : Physical fitness related to health ²

Cardio respiratory capacity is defined as the ability of the heart, circulatory and respiratory system that efficiently supplies the active muscles with oxygen at the time of continuous muscle activity.

The structure of the body, usually refers to the percentage of muscle, bone and fat mass in the body. Normally we monitor the percentage of fatty tissue.

Physique is an organism's ability to perform activities requiring a high level of generation of muscular force. Muscle endurance is the ability of a muscle or muscle group to perform repeated muscular contraction for a long time, or to retain a high level of development of muscular force for a long time.

Especially important is to maintain muscle mass, that is, if it is inactive, subjected to rapid atrophy. Both parameters can be in dealing with the physical form and health considered together as muscle strength. Mobility is the ability to perform large amplitude

movements in a certain order or a certain plane. All of the above mentioned areas effectively improve due to appropriate exercise at all ages.

² (Vir: American College of Sport Medicine)

ACQUIRED BRAIN INJURY - ABI

An acquired brain injury refers to any type of brain damage that occurs after birth which is neither due to hereditary disposition nor to degenerative processes, such as ageing, nor to a birth trauma (Antal et al., 2011).

It most commonly leads to alterations in the activity of the nervous system. These alterations may affect all kinds of areas, such as cognition, faculty of speech, language, judgement, information processing, the ability to think abstractly, bodily functions and psycho-social behaviour.

Possible causes of acquired brain injury may include:

- airway obstruction or constriction
- near-drowning accidents
- compressed thorax
- electric shock or lightning stroke
- traumatic injury of head and/or neck
- craniocerebral trauma with or without skull fracture
- blood loss due to open wounds, jammed arteries due to blows or shocks
- heart attack, stroke, arteriovenous malformations (AVM), aneurysm, brain surgery
- infectious diseases, intracranial tumours, metabolic disorders
- meningitis, some sexually transmitted diseases, AIDS, insect-borne diseases, brain tumours, hypoglycemia, hyperglycemia, hepatic encephalopathy, uremic encephalopathy, seizures
- substance abuse, alcohol abuse, lead poisoning, carbon monoxide poisoning, toxic chemicals, chemotherapy (in rare cases).

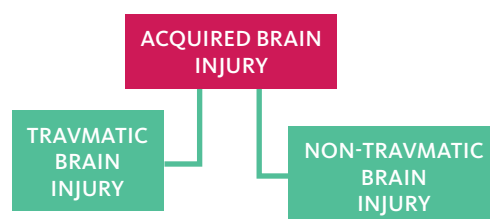
ABI often requires rehabilitation in various areas of functioning with different needs for rehabilitation at various points in the recovery process.

Structure of all included users/persons served in Center Naprej

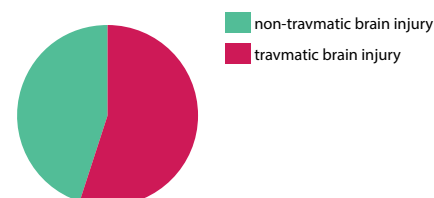
The average age of the users of the Centre Naprej is 47,81 years. The oldest user is a man - 81 years and a woman - 76 years. The youngest man is 23 years old and a woman is 30 years. According to fact, that we include markedly more men than women, there is also a broader age range for the included males (58 years) than women (46 years). The difference is 12 years.

On average, the women are 5 years older. The average age of women is 51 years. The average age of men is 46.5 years (Milič, M., Vešligaj Damiš J., Majcenovič Cipot D., 2016).

Types of ABI – Traumatic or Non-traumatic

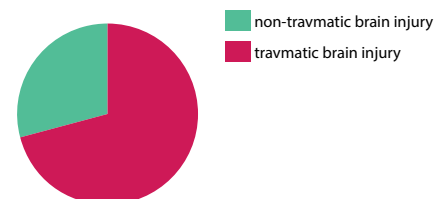


The ratio of users according to traumatic brain or non-traumatic brain injury:

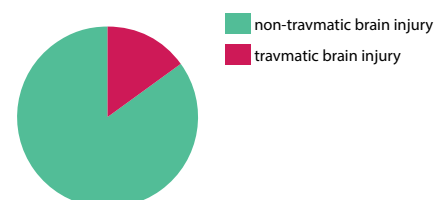


Of the 69 enrolled users, 55% experienced a traumatic brain injury and 45% non-traumatic brain injury.

The ratio of men users according to traumatic brain or non-traumatic brain injury:



There are markedly more injured men due to traumatic injuries - 71% of all.



For women users this ratio is completely reversed and is in favor of non-traumatic injuries. 85% of all women underwent non-traumatic injuries.

EFFECTS OF ACQUIRED BRAIN INJURY

Patients with acquired brain injury do not form a homogeneous group and, therefore, do not have a uniform disability profile. According to severity, localisation and extent of the brain injury, different impairments may be observed. Among the most common impairments are (Antal et al., 2011):

Cognitive impairments

Cognition

Brain injury may result in the following disorders:

- Difficulty differentiating and integration disorders (perceiving, imagining and combining shapes) affecting different sensory organs and modalities.
- Visual-spatial impairment.
- Disordered visual perception.

Thinking skills

Disordered perception and process of thinking, reduced thinking speed, mental flexibility and intellectual performance.

Ability to act and to plan

Patients with acquired brain injury often have difficulty planning and organising activities. They do not only have problems initiating an activity, but they often require detailed instructions before they are able to carry out a specific action. There are often deficits to maintain an action-guiding plan and to sequence information in order to give it meaning.

Attention and concentration

Individuals with reduced concentration perceive difficulty in concentrating on a task for a longer time and risk being distracted by surrounding stimuli. Furthermore, problems may arise when having to focus on two or more sources of stimuli at a time.

Memory

Memory functions include storing, short- and long-term retaining and recalling different kinds of information (factual knowledge, personal experience, future appointments, etc.).

Impairments of speech and language

Our world is being dominated by communication and language processes, individuals with speech and language disorders have to face serious problems caused by demands in these fields as well as by communication needs. Furthermore, psycho-social consequences have to be considered as well, as they may affect the individuals concerned to the same extent as their families.

Aphasia: language disorder arising as a consequence of acquired brain injury. The aphasic disorder may affect any language modality (speaking, understanding, writing and reading).

Dysarthria is an impairment of speech due to a

disorder of the motor system. Unlike aphasia, there is no disorder of a higher-level overall cognitive system.

Patients suffering from **apraxia of speech** have big problems pronouncing sounds correctly. Apraxia of speech affects temporal and local coordination of movements when speaking. Single sounds are left out, added or replaced with others.

Movement disorders

Movement disorders include paralysis, disordered motor coordination, but also involuntary movements interfering with the natural movement pattern.

Motor disorders such as plegias, pareses and ataxias are among the most frequent neurological problems.

Sensitivity disorders

Sensitivity refers to different kinds of perceiving and interpreting stimuli. Sensitivity disorders include disordered perception of touch, temperature, position, movement and pain.

Affective changes und general character changes

Brain injury is often associated with personality change. On the one hand, the observed character changes may be of psycho-physical origin, on the other hand, they may as well be a mental reaction to the injury.

The following changes may occur:

- Premorbid personality traits may become more marked following brain injury, e.g. an accurate and reliable working method may develop into pedantry.
- Lacking awareness of being impaired is a burden for the social network.
- Changes in terms of drive may become evident as a lack of drive, increased drive or in terms of control of the drive.
- Flattening emotions become visible when patients seem indifferent and not emotionally involved
- Emotional lability means that people cannot control their emotions any more. Loud laughter or hard crying occur without any external cause.
- A lot of patients complain about increased irritability and fits of aggression.
- Among the most frequent mental disorders following brain injury are, among others: adjustment disorders, affective disorders, phobias and somatoform disorders.

The aim of rehabilitation after acquired brain injury is to help the injured reclaim his independent life with minimal assistance and support; rehabilitation is therefore a process of active learning³.

3 (Grabljevec, 2014)

REHABILITATION THROUGH SPORT FOR PERSONS WITH ABI

Sport activities represent an efficient rehabilitation method for persons with disabilities. Through regular sport activity persons with disabilities can achieve greater quality of life and improved social inclusion.

Sport is an area of human activity, which is important for all and has enormous potential to bring people together and reaching out to all, regardless of age, social status, disability, race, sex. The basic goals of sports activities are the optimization of psychosomatic status of the person, the efficient exploitation of free time, the implementation of preventive health measures, improving of health and general well-being and recovery.

Sports rehabilitation activities represent important and effective method of rehabilitation, which positively influences the individual's health, both physically and psychosocially. With regular implementation of sporting activities we provide to our users higher quality of life and greater social inclusion. With the help of sports rehabilitation activities we achieve improvement in motor, physical, psychological, cognitive, sensory and other abilities of persons with ABI, strengthen their social skills and social integration.

Sports rehabilitation provides strengthening and relative normalization of inlet nerve impulses of leading veins from muscles and joints. With synthesis of exercises the central brain structures, that are responsible for the activities of the movement, are activated. In this way the alleviation of pathological reflexes and acceleration of development of new physiological movement patterns are enabled. With the physical point of view we can strengthen and improve cardiovascular ability, physical strength and endurance, breathing capacity, musculoskeletal and immune systems, maintain maneuverability, stability and coordination, develop neuromuscular mechanisms in healthy parts of the body due to the compensation of lost functions, etc. In the context of sports rehabilitation activities individual goals of users may also tackle the control of body weight and body contouring.

From the psychological point of view the sport can represent mental calmness and relaxation or fun and activation. Sport has a positive effect on self-esteem and sense of self-worth; it could represent the frame for personal creativity, the method for exercising personal desires and achieving a sense of inner balance, satisfaction and synergy with nature and the form of establishment.

For our users sport is also an important factor in their social life. They learn to cooperate, to strive for a common goal, connect with others and be tolerant, to follow the rules, subordinate to leaders,

experience victory and accept defeats. At the same time they gain experience that are useful in other life situations.⁴

The need of training for wheelchair users

- There are huge number of reasons why wheelchair users should engage in fitness training:
- fun in the movement,
- preservation and improvement of health,
- better fitness in the everyday life,
- confirmation of achievements by competition ...

Who keeps him or herself physically fit, can master many things easier and faster, will also influence the heart circulatory system positively or controls his or her weight.

With the fitness training three areas are distinguished: cardio training, coordination training and weight training. The cardio training causes an improvement of the circulatory system, the coordination training aims at a gain of the sensorimotor abilities. The weight training, which is more important when getting older, causes a strengthening of the musculature and ligament structures.

Effects of the weight training:

- invigoration of the musculature,
- easier changes from the wheelchair into the car, onto the bed, onto chairs or benches,
- dismantling of tension by consistent and adjusted training,
- improvement of the posture,
- increase of the body perception,
- rise of the osseous density as an osteoporosis prevention,
- positive effects on cartilage layers by movement.

⁴ <http://www.ski-simulator.com/progressive-rehabilitation-of-neuromotor-dysfunction-new-form-of-physical-therapy-eng#sthash.MQJrOKNP.dpuf>

GYMSTICK NORDIC WALKING – ADAPTATIONS FOR PERSONS WITH DISABILITIES

Adjustments to the program in terms of age

Implementation of the program is not limited by age, it can be implemented in all stages of life. Therefore it is wrong to think that this kind of physical activity can not be carried out by elderly.

Aging is a gradual reduction of biological functions, and the ability of the organism. During this process an individual is facing deterioration of his working, reproductive and creative functions. During aging changes can be seen at the level of cells, tissues and the organism itself. Many years of research confirmed the fact, that in the process of aging regular and balanced aerobic physical activity has a significant impact on the preservation and enhancement of physical and mental abilities. So it is never too late to start with exercising regularly.

Regular exercise can effectively reduce or prevent a number of functional problems associated with aging. Strength training helps to delay the reduction of muscle mass and strength, which is typical for aging. This type of exercise improves the bone structure, and thereby reduces the risk of osteoporosis, improves the balance and thereby minimizes the risk of falling, consequently associated with injuries and fractures, and also improves flexibility and range of motion. Physical activity has a favorable effect on the cardiovascular and respiratory systems. Regular exercise is also connected with the maintenance of cognitive function, reducing depression and improving self-esteem. In addition to these, regular physical activity enriches the elderly with positive emotion and welfare, reduces nervousness and mental stress, maintains the mental and spiritual balance, improves sleep, maintains and creates new friendships⁵.

Adjustments to the program in terms of sex

This program is suitable for both men and women and there is no need for adjustments regarding sex.

Adjustments to the program in terms of different limitations (physical, cognitive, sensory ...)

There are also no restrictions in terms of physical, cognitive and sensory deficits. Quite the contrary - appropriately selected physical activities that improve flexibility, muscle strength, aerobic capacity and other physical aspects, allow better rehabilitation of people with various deficits. For the implementation of the program for persons with different limitations two conditions must be provided: trainers must know the particularities of the population they are dealing with and must be specially trained to adapt the exercise to the remaining physical and cognitive abilities of users. Therefore an individual training can be accomplished, completely balanced on the personal aims.

An important part is also risk assessment of the program because in every training there must be full safety measures provided for all included.

⁵ Telesna aktivnost starostnikov (Aleksandra Saša Horvat) http://www.dmsbzt-sg.si/2011/images/stories/A.Horvat_Telesna_aktivnost_starostnikov.pdf

Nordic Walking Poles

Nordic Walking poles differ from regular trekking or alpine skiers poles in one main area: the grips and straps. The Nordic Walking straps stay wrapped snugly round the hands and are clipped to the slimmer grip of the pole. This allows the pole to be swung from the hand, with the downward pressure from the arms quickly applied to the pole when it reaches the desired position. Carbon is best for pole composition but it costs more and other compounds are entirely suitable for the recreational Nordic Walker.



Picture: Gymstick Nordic Walking poles

Select the correct Length of Poles

To choose the right length poles, first determinate the proper pole by multiplying your height by 0,68 or by referring to the chart down. As a rule of thumb, the elbow should be at 90 degree angle to the surface when the pole is in a relaxed grip on the ground. For beginners it is recommended to start with a shorter pole.

Use the following table to select the correct length of the poles

6'5"	200	135
6'3"	190	130
6'1"	185	125
5'11"	180	120
5'9"	175	115
5'7"	170	110
5'5"	165	105
5'3"	160	100
5'1"	155	
4'11"	150	
4'9"	145	

Nordic Walking Gym

The Nordic Walking Gym are available in any of the three resistance levels below:

1. Light/Green - for rehabilitation workouts and exercise for the elderly. The resistance of green exercise bands ranges from 1 to 10 kg.
2. Medium/Blue - for junior athletes and women who want to start exercising. The resistance of blue exercise bands ranges from 1 to 15 kg.
3. Strong/Black - for fit women, men who want to start exercising, and athletes. The resistance of black exercise bands ranges from 1 to 20 kg.

How to use the Exercise Bands

Transforming the poles to a Gymstick and adjusting the resistance

1. Take bands from handbag.
2. Put the poles next to each other, handles pointing to opposite directions, with the paw-part extending further out than the handle of the other pole.
3. Tighten the poles to each other with the Velcro.
4. Set the loops on both feet, in the middle of the sole, roll the elastic band around the bar (both poles) a couple of times and you are ready to begin a Gymstick exercise routine.
5. In the beginning of each movement the exercise band must be straight but not stretched. You can increase the resistance by rolling the bands around the poles and decrease the resistance by releasing the bands from around the poles.
6. When you have adjusted a suitable resistance, remember to grip the stick with a relaxed but firm grip to avoid slipping.
7. Do not stretch the bands over four times their original length when exercising

Appropriate clothing and footwear

In order to feel good during the training and to obtain safety we have to pay special attention on proper footwear and clothing. We should never put on new pair of shoes or hiking boots for the first long hike. Footwear must be suited to activities carried out in nature. We can use running shoes, trekking shoes or light hiking boots. Hiking boots shouldn't be too high, as this prevents proper technical implementation of Nordic walking. It is important that the shoe offers good support and has non-slip soles.

We can engage in GNW in all seasons, but we must always dress according to the weather conditions, because the cold contributes to exhaustion. In the case of variable weather conditions, we have to wear several layers of clothing, which can be, if necessary, removed. Clothing should be light, sporty. Too loose clothing can hinder us in the activities. If we are too hot and we face excessive sweating, we need to make sure, our body gets enough fluids. In the backpack, which should not be too heavy, we carry only the necessary things. We have to make sure, that our back and neck are protected from the cold and wind. Therefore, we should have a spare T-shirt to be able to change clothes.

The importance of implementer's / trainer's preparation for the implementation of the program

The program implementers should be familiar with the basic technical elements of Nordic walking and basic principles of strength training. They need to learn to perform strength training with Gymstick and how to properly dose and increase load at training. The most appropriate persons to conduct the program are the ones, who work with users every day and are familiar with their abilities, limitations, skills and qualities.

Evaluation of the program - effectiveness testing

If you can measure it, you can manage it!

To assess the effectiveness of the program we have selected a set of tests:

1. Senior Fitness Test
2. The Berg Balance Scale
3. Tanita Body Composition Monitor
4. Self-assessment after each training session.

We will use retest method (retesting or repetitive method) with the expected time interval of 8 weeks.

Description of Tests:

1. SENIOR FITNESS TEST

Fitness is very important for those in their senior years. Older adults need to have adequate strength, flexibility, and endurance to accomplish everyday tasks. Assessing these components of fitness can detect weaknesses which can be treated before causing serious functional limitations.

The Senior Fitness Test was developed as part of the LifeSpan Wellness Program at Fullerton University, by Dr. Roberta Rikli and Dr. Jessie Jones. As such, the test is sometimes known as the Fullerton Functional Test. It is a simple, easy-to-use battery of test items that assess the functional fitness of older adults. The test describes easy to understand and effective tests to measure aerobic fitness, strength and flexibility using minimal and inexpensive equipment.

The Senior Fitness Test Kit is suitable for fitness professionals, health care professionals, physical therapists, and therapeutic recreation specialists who work with seniors.

The individual fitness test items involve common activities such as getting up from a chair, walking, lifting, bending, and stretching. The tests were developed to be safe and enjoyable for older adults,

while still meeting scientific standards for reliability and validity. Here is a list of the tests, with links to more details for each.

- Chair Stand Test — testing lower body strength
- Arm Curl Test — testing upper body strength
- Chair Sit and Reach Test — lower body flexibility test
- Back Scratch Test — upper body flexibility test
- 8-Foot Up and Go Test — agility test
- Walk Test (6 minutes) or Step in Place Test (2 minutes) — The walk test is used to assess aerobic fitness unless the person uses orthopedic devices when walking or has difficulty balancing, in which case they do the step in place test..⁶

2. THE BERG BALANCE SCALE (BBS)

The Berg Balance Scale (or BBS) is a widely used clinical test of a person's static and dynamic balance abilities, named after Katherine Berg, one of the developers. For functional balance tests, the BBS is generally considered to be the gold standard. The test takes 15–20 minutes and comprises a set of 14 simple balance related tasks, ranging from standing up from a sitting position, to standing on one foot. The degree of success in achieving each task is given a score of zero (unable) to four (independent), and the final measure is the sum of all of the scores.

The Berg Balance Scale is used by physiotherapists and occupational therapists to determine the functional mobility of an individual. This test can be administered prior to treatment for elderly individuals and patients with a history of but not limited to stroke,⁷ Multiple sclerosis, Parkinson's disease, Ataxia, vertigo, cardiovascular disease and respiratory disease. The Berg Balance Scale Test can be administered every few months of treatment to determine if the treatment was effective for increasing the patient's functional mobility (a difference of 8 points is considered a significant change).

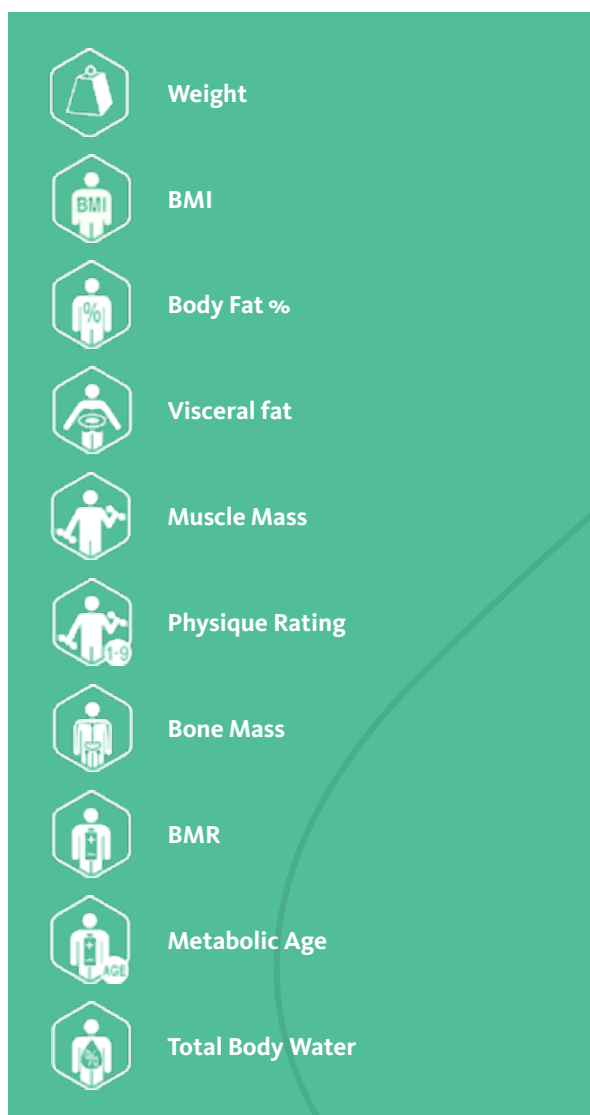
3. TANITA BODY COMPOSITION MONITOR

Tanita uses the latest advanced bioelectrical impedance analysis (BIA) technology to analyse and measure your body composition. Tanita monitors bring you fast, accurate body composition results. This gives you a true indicator of your inner health and, when monitored over time, can show the impact of any fitness regime or weight loss programme.

With Tanita you can find out exactly what you are made of, set your goals to help you achieve your optimal fitness level and improve your health and wellbeing.

⁶ (<http://www.topendsports.com/testing/senior-fitness-test.htm>)

⁷ (https://en.wikipedia.org/wiki/Berg_Balance_Scale)



4. SELF-ASSESSMENT OF PARTICIPANTS IN THE PROGRAM

Centre Naprej formed a self-assessment form for participants in the program that is completed by each participant after every training session. The form includes a self-assessment of six different aspects on a scale from 1 to 5:

- motivation,
- mood,
- cooperation,
- the desire for progress,
- the difficulty of the exercises,
- physical well-being.
- Through self-assessment participants will be encouraged to:
- learn to appropriately assess his/her own activities,
- appropriately assess his/her mood in a given situation,
- be motivated for cooperation in exercises,
- improve self-regulatory skills,
- being actively involve in the program,
- improve their own self-efficacy.

WORK/TRAINING PLAN

Nordic walking (walking with poles)

Walking is a fundamental human movement. With the sticks we can walk easier and increase its effectiveness. In our case, we do not use techniques of the original Scandinavian Nordic walking, which emphasizes the sporting items such as long rocking step, a strong support to the bars and long discharged propulsion. The purpose of the Nordic walking program is the use of sticks to increase the effectiveness of conventional walk purchased the capabilities of the exercising. This is a trend that has developed with the expansion of Nordic walking around the world and is sometimes called the American Way of Nordic Walking.

Methodical process of learning the basics of Nordic walking techniques (photos for each item)

1. Learning Nordic walking rhythm without poles. When walking in the normal rhythm, we prolong step and highlight the work period. While walking, we change a couple of times walking pace from slow to vibrant steps.
2. Learning Nordic walking rhythm with sticks without belts. Learning the proper rhythm continue using sticks that we keep in the middle of the length and do not use belts to fasten our hands.
3. Learning Nordic walking rhythm with sticks in the normal position. Once we have mastered the rhythm of walking without poles, place strips on the arms and let them to the ground. While moving, the stick themselves will be driven into the ground. When driven into the ground, our weight is on them, and we push.
4. Hardening technique of Nordic walking. Nordic walking technique we practice mainly by walking and the implementation of various technical elements, such as walking uphill, walking downhill, walking with parallel setting sticks, walking with one stick.

Training forms

Training adapted to the exercising.

For one, that are less capable, are suitable shorter walks without a specific strain. We can make an intervening rest period.

For one, that are more advanced, are suitable hikes to 1 hour and longer hikes that last several hours. We can add different elements of of orientation in nature.

In the most advanced, it can be used form of interval training varying degrees of difficulty in walking on the plane to a fast walk uphill.

Controlling Intensity of Exercises & Energy Expenditure Intensity of Exercises and Heart Rate

When going out for Gymstick Nordic Walking, it might be a good idea to measure the intensity of exercises so that you can see if the desired training effects can be reached and over exertion is avoided. The best way to observe this is to measure the heart rate and to observe of subjective feelings. order to obtain improvement of the aerobic fitness level (cardiovascular), the intensity of a training has to be approximately 60-85% of the maximal heart rate in proportion to the person's age (for healthy people). For improvements in rehabilitation or for persons with heart diseases or muscular diseases, a lower level is sufficient.

The maximal aerobic endurance diminishes the older the person is getting. This is approx. 10% per decennium. For an optimal training it is important that the level of heart rate during the training matches the duration of the training. For not active middle age and older persons it is sufficient when during a Nordic Walking training of 30 minutes, the heart rate is on a level of 60% of the proportional age matching maximal heart rate.

Training heart rate is the heart rate during the training. The heart rate is influenced by the contents of the chosen exercise as well as other factors like intensity, coordination, technique and skills play a big role.

Rest heart rate is the lowest heart rate measured during a phase of complete rest. The rest heart rate can be influenced by drinks that contain caffeine (coffee and cola), stress and circumstances in different surroundings like temperature, height etc. The most reliable way to measure the rest heart rate is to measure the pulse early in the morning immediately after waking up, before getting up from the bed. The lower the rest heart rate is, the better the condition.

Maximal heart rate (HRmax) is the highest heart rate that is reached during a maximal exertion. Maximal heart rate is influenced by age, quality and quantity of training, medicine and genetic factors. The HRmx can only be measured in specialized laboratory or testing institutes.

We should be aware of the fact that the heart rate, as well as in rest as during physical exercise, will be influenced by certain medicine like medication for heart diseases, high blood pressure, diuretics, asthma, thyroid gland diseases and medication for psychological diseases. The most well known medication are the beta blockers that are used for hypertension and heart diseases. Beta blockers lower the heart rate in rest as well as during exercise. There are also medicine that increase heart rate. However, it is unfeasible to mention all medicine that have

influence on heart rate in this manual.

If you want to be informed more about this medication, you can look into enclosures of medicine or medical encyclopaedias. The effect of medication on heart rate is often depending on the doses. Persons who use regular medication influencing the heart rate, must consult the family doctor before starting any exercising.

Estimation of maximal heart rate (EMH)

Often it is not possible to do a maximal test under supervision of medical and physiological specialists. The maximal heart rate can be valued with help of age via underneath mentioned formula:

$EMH = 205 - 0,5 \times \text{age (in years)}$

E.g. : the maximal heart rate of a person of 40 years old is $205 - 20 = 185$ beats per minute

Training of heart rate

The measured HRmax is the base for most of the accurate training heart rates. When the formula of the estimated HR max is used, the aimed training heart rate in Nordic Walking is also an estimation. However, this estimation is becoming more accurate when a person's subjective feelings in training intensity are taken into consideration. A light training should feel light, an average training should feel normal and a strenuous or powerful training can be experienced as heavy. During a normal training, the participant will sweat but will never get out of breath.

LIGHT INTENSIVE TRAINING (50-60% of EMH)

Training on this level meets the level of daily activity and keeps the general fitness. It improves the fitness of beginners and persons who are in bad condition. It contributes to a healthier lifestyle and wellness.

NORMAL TO LIGHT TRAINING (60-70% of EMH)

Training on this level has positive effects on health and is very suitable for reduction of weight. It increases circulation, enlarges endurance of musculature and surrounding weave and improves energy metabolism.

NORMAL TO STRENUOUS TRAINING (70-85% of EMH)

Training on this level increases fitness of the cardiovascular system and improves endurance. During the training at this level a person is still able to talk and can train for a longer duration. This level is preparing the body to a more powerful training and increases the tolerance of lactic acid.

POWERFUL TO MAXIMAL TRAINING (85-100% of EMH)

Muscular fatigue and exhaustion are possible when

training on this level. It is a combination of aerobic and anaerobic training and leads to building up lactic acid in the circulation system. This training aids the tolerance of lactic acid and improves explosivity and speed. This training is important e.g. for (top)athletes who want to improve their endurance.

Usually exercise in the first two levels of intensity is sufficient for remaining healthy.

EXERCISES WITH NORDIC WALKING POLES

1. WARMING UP WITH THE POLES



1.1. DINAMIC ROWING - IMPROVES THE COORDINATION OF ARMS AND LEGS

- Hold the poles horizontally in front of the body.
- Start rowing - swing poles down to the left, while pushing the bent left knee towards right arm.
- Change sides: arms go right down, right knee bent to the left.



1.2. STEP

- Place the feet on shoulder width
- place both poles to the ground a bit wider shoulder width
- step out or jump to the left with left leg, right leg goes after left leg
- change sides: step out or jump to the right with right leg, left leg goes after right leg



1.3. WIND MILL – IMPROVES SHOULDER AND ARM MUSCLES

- Place the feet on shoulder width
- Grip the poles with both hands in the middle
- Bring the poles with stretched arms in front of the body
- Rotate your wrists to the left and then to the right



1.4. HELICOPTER – FOR THE MUSCLES OF THE TORSO

- Place the feet on shoulder width
- Grip the poles with both hands from both ends
- Bring the poles with stretched arms above your head
- Rotate your torso from hips up to the left and then to the right. Make sure that your back is straight. Keep your hands above your head the whole time.



1.5. STANDING TRUNK ROTATION

- Place the feet on shoulder width
- Hold the poles above the head, the arms wide as far as possible
- The palms of the hands are pointing forward
- Bend, while the arms stay as wide as possible, with stretched back, from side to side (without rotation or bending the upper body).



1.6. SHOULDERS BACK AND FRONT

- Place the feet on shoulder width
- Hold the poles above the head, the arms wide as far as possible
- The palms of the hands are pointing forward
- Pull the shoulder blades together. Hold for a few seconds.
- Arms (still stretched) forward slightly and hold for a few seconds. Repeat the exercise.

2. STRENGTH EXERCISES



2.1. STRONG CALVES

- Place the feet on shoulder width
- place both poles to the ground a bit wider shoulder width
- raise up on toes (both feet at the same time) - keep your back straight
- hold the position for a few seconds, then back down on heels. Repeat the exercise.



2.2. ENERGY FOR THIGHS

- Place the feet on shoulder width
- Hold the poles vertically behind your back in the shoulder width, palms facing up
- Keep your back straight, squat like you gonna sit on poles, but not too deep - thighs and calves mustn't form a right angle. Hold for few seconds.
- Stand back up then repeat exercise.



2.3. STRONG BUTTOCKS

- Place the feet on shoulder width
- Place both poles to the ground a bit wider shoulder width
- Hold pelvis in front/up and your back straight (lean forward against the poles)
- Transfer the weight to the left leg, then kick with your right leg to the back (but don't straighten your right leg).
- Go back to the starting position, weight to the right leg, then kick back with the left leg.



2.4. STRONG BACK

- Place the feet on shoulder width
- Hold the poles above the head, the arms wide as far as possible
- The palms of the hands are pointing forward
- Lift your left leg and hold for a few seconds.
- Back to starting position, then lift right leg and hold.

3. STRETCHING EXERCISE WITH POLES



3.1. CALF STRETCH

- Place the feet on shoulder width, the knees and toes pointing forward.
- Take a small step backwards with one foot.
- Give pressure / stretching to the back foot / calf by pressing the heel towards the ground and bending knee at the same time.



3.2. THIGHS

3.2.1. HAMSTRING POST

- Place the feet on shoulder width, the knees and toes pointing forward.
- Place one leg in front and lean with your body weight against the poles. Lift your toe while making an active stretch in your knee (absolutely no overstretching), bend the upper body forward.



3.2.2. QUADRICEPS STRETCHING

- Feet on shoulder width, knees and toes pointing forward.
- Use the poles for stability by gripping them both with one hand, in front of the body.
- Grip with your free hand the ankle of the same side leg and feel the stretching. In order to stretch more, you can push pelvis forward.



3.3. SHOULDERS, CHEST AND ARM STRETCH

- Place the feet on shoulder width
- Hold the poles behind the head, the arms wide as far as possible
- The palms of the hands are pointing forward
- Pull the shoulder blades together. Hold for 30 seconds.

4. FUN EXERCISE



4.1. STEAM LOCOMOTIVE

- Stand one after the other in a small interval.
- Hold the poles of your predecessor at the back end while holding your poles at the front end.
- All of you must step with the right leg and left arm forward.
- Continue with the left leg and right arm forward.
- The leading person is directing the pace.
- Back leg must always be stretched to the full extension.



4.2. BUNNY JUMPS

- Draw a starting line and stand behind it.
- Place the feet on shoulder width
- Place both poles to the ground a bit wider shoulder width
- Squat and jump ahead as far as you can. Measure your jump.
- The exercise is more fun, if more people participate.



4.3. SLALOM

- With branches, sticks or hats mark the zigzag slalom course.
- You can drive slalom between the trees in the forest.
- If there is more participants, you can also place live slalom course. Anyone who has already traveled the route, stands in front as a living barrier.

EXERCISE WITH NWG BANDS



1. GOOD MORNING

- Position the stick on the back of the shoulders.
- Keep your knees bent for the duration of the movement.
- Lower your back to horizontal level before lifting yourself up.
- Use the hip joint.
- Roll the exercise band around the stick so that they are not too loose when you bend down.
- Hold your breath when bending down.



2. TRICEPS PUSH

- Narrow grip of the Gymstick.
- Start extension from the back of your neck, use the full range of motion.
- Try not to move your upper arm during the exercise.
- Elbows should not spread to the sides, but stay close to your head for the whole exercise.



3. BACK SQUAT

- Set the loops on both of your feet.
- Roll the exercise bands around the stick.
- Squat and position the stick on the back of the shoulders.
- Keep your heels on the ground for the duration of the movement.
- Keep your back straight.
- Pick a spot on the opposite wall and concentrate on it when squatting.
- Hold your breath when descending.



4. BICEPS CURL

- A shoulder with underhand grip.
- In starting position elbow should be slightly bent (hardly noticeably), muscle flexed.
- At the end of exercise elbows are allowed to move a bit forwards.
- Stiff upper body.
- Use the whole range of motion on the biceps.



5. UPRIGHT ROW

- 10 to 20 cm wide overhand grip.
- Gymstick travels close to the body.
- Elbows »lead the row.
- At the end of the exercise elbows are only slightly above shoulder level.
- Good posture.



6. FORWARD PRESS AND LEG BACKSTEP

- Place the feet on shoulder width, back is straight.
- Take a step forward with your right foot, exercise bands are on your sides.
- Poles positioned in front of you at pelvis height.
- Press forward and up and simultaneously step back with your left foot to the full extension.
- Switch sides.



7. BAR ROW WITH ONE HAND

- Knees bend, straight back.
- Upper body bent forward.
- Row with mainly with shoulders.
- Pull Gymstick close to your pelvis with an overhand grip.
- Roll exercise bands below your knees.
- Bring shoulder – blades close to each other at the end.



8. MILITARY PRESS

- Grip slightly wider than shoulders.
- Straight back and good posture.
- In the starting position Gymstick can be on your chest or shoulders.



9. EXERCISES FOR BALANCE

9.1. Forward press and leg kickback

- Take a step forward with your free foot; exercise bands are on your sides.
- Gymstick position on your chest; exercise bands set to rear foot.
- Simultaneous press forward and kickback.
- Pivot foot bent slightly from the knee (balance).



9.2. Forward press and leg kickback (both bands are on one leg)

- Take a step forward with your free foot; exercise band is on one leg.
- Gymstick position on your chest.
- Simultaneous press forward and kickback.
- Pivot foot bent slightly from the knee (balance).

GYMSTICK NORDIC WALKING COURSE

Depending on the basic skills of the participants, 6 to 7 lessons are advisable. After this, participants can choose if they want to practise Gymstick Nordic Walking independently or if they want to continue exercising in groups. Here below you will find a suggestion for the courses:

Lesson 1 – Nordic Walking (if there is new participants and not familiar with Nordic Walking):

- Introduction, explaining how to use the strap and how to remove the asphalt paws – 5 min.
- Warm-up exercises focused on mobility of spine, shoulders and hips etc. – 5 min.
- Learning the correct way of stretching – 5 min.
- Normal walking, dragging the poles and exercising the cloistering walk.
- Important is that the right rhythm is found. 15 min.
- See to the correct positioning of the pole and teaching the correct angle of poles in order to learning the correct technique – 5 min.
- Getting used to the technique that is learned today – 15 min.
- Cooling-down – 5 min.

Lesson 2 (This can be the first lesson if the participants are familiar to Nordic Walking):

- Learning the correct way of using Nordic Walking poles for walking exercises – 5min.
- Warming-up – 5 min.
- Getting used to Nordic Walking rhythm while walking, the instructor corrects if necessary – 20 min.
- Learning the correct way of using Gymstick Nordic Walking poles for resistance training. Converting the poles to a Gymstick bar and adjusting the resistance – 5-10 min.
- Gymstick muscle condition exercise . using Nordic Walking Gym - 15 min.
- Cooling-down – 5 min.

Lesson 3:

- Subsequent discussion and controlling the Nordic Walking technique, without instruction – 5 min.
- Warming-up – 5 min.
- Now start with forward positioning of the pole, swing of the pole – 5 min.
- Start with extra accent on holding the pole till the hip and over the hip – 5 min.
- Getting used to technique during a walk – 15 min.
- Gymstick muscle condition exercise. using Nordic Walking GYM bands - 15min.

- Cooling-down and pointing out that it is necessary to practise also independently – 5 min.

Lesson 4:

- Warm-up in: each participant performs his/her favourite exercise - 5 min.
- Nordic Walking – practical experience - 10min.
- Gymstick muscle condition exercises 1. - 15 min.
- Nordic Walking – practical experience - 10min
- Gymstick muscle condition exercises 2. - 15 min.
- Cool-down– participants as instructors - 5 min.

Lesson 5:

- Warm-up – 5 min.
- Teaching the perfect total movement of Nordic Walking with full back swing + getting used to technique while walking - 25 min.
- Gymstick muscle condition exercise 3. – 25min.
- Cool-down with extra motivation for independent practising – 5 min.

Lesson 6 :

- Subsequent discussion and control of techniques – 5 min.
- Warm-up – 5 min.
- PowerHill Training – 45 min.
- Walking up and down a hill (gently sloping) – 6min / low intensity Gymstick muscle condition exercises – 8min.
- Walking up and down a hill (gently sloping) – 6min / medium intensity Gymstick muscle condition exercises – 8min.
- Walking up and down a hill (gently sloping) – 6min / hard intensity Gymstick muscle condition exercises – 8min.
- Cooling-down with extra motivation for independent practising – 5 min.

The lesson may consist only of some stages of the intensity.

Lesson 7 :

- Warm-up with “final touches” – 5 min.
- Test of skills “show your Nordic Walking techniques” - 10 min.
- Nordic Walking during which individual corrections can be given – 25 min.
- Gymstick muscle condition exercise – participants as instructors – 15min
- Cool-down - 5 min.

FITNESS FOR WHEELCHAIR USERS

Reasons for the need of fitness training for wheelchair users

There are huge number of reasons to work out:

- fun in the movement,
- preservation and improvement of health,
- better fitness in the everyday life,
- confirmation of achievements by competition,
- and a lot more.

The human body reacts to stresses and strains by adaptation. This can be relaxation of the musculature in the negative sense, and strenghtening of the musculature in the positive sense. With sensible load applied muscles, ligaments, tendons or cartilages react with growth and strenghten the body and the person becomes more efficient. An appropriate individual training program is important that roTECTS against strains or injury. Only with an incorrect load or overloading one must expect injury or impairment of the structures.

An important reason for the physical fitness is the everyday life. Who keeps him- or herslef physically fit, can master many things easier and faster, will also influence the heart circulatory system positively or controls his or her weight.

Weight training for wheelchair users

With the fitness training three areas are distinguished: cardio training, coordination training, and weight training. The cardio training causes an improvement of the circulatory system, the coordination training aims at a gain of the sensomotor abilities. The weight training, which is more important when getting older, causes a strengthening of the musculature and ligament structures. In this case we want to look closer to the effects and the correct implementation of the weight training.

Effects of the weight training:

- invigoration of the musculature,
- easier changes from the wheel chair into the car, onto the bed, onto chairs or benches,
- better stabilization of the joints by a well trained musculature,
- dismantling of tension by consistent and adjusted training,
- improvement of the posture,
- increase of the body perception,
- rise of the osseous density as an osteoporosis prevention,
- positive effects on cartilage layers by movement.
- With the Gymstick we have a training device which perfectly fits for an adjusted training and supports all positive effects of the weight training. With the Gymstick the weight training is very well meterable. Therefore an individual training can be accomplished, completely balanced on the personal aims.

Special Exercises for wheelchair users



SIDE RAISE (DELTOIDEUS SIDE)



TRUNK ROTATION AND TRICEPS PRESS



**TRUNK ROTATION - ABDOMINAL MUSCLES
(USING STICKS)**



PUSH AND PULL THE STICK



ROTATE AND SWING YOUR BODY



SWING FROM SIDE TO SIDE



ROTATE WITH ARMS AND SHOULDERS

Special Exercises for
wheelchair use

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SELF - ASSESSMENT
BEFORE / AFTER TRAINING

ATTACHMENT :

Name and surname:

Date																				
Motivation for exercising (grade 1 - 5)																				
Mood (grade 1 - 5)																				
Cooperation (grade 1 - 5)																				
Desire for progress (grade 1 - 5)																				
Difficulty of exercises (grade 1 - 5)																				
physical well-being (grade 1 - 5)																				
Blood pressure systolic (upper)																				
Blood pressure diastolic (lower)																				
Heart rate																				

TANITA BODY COMPOSITION MONITOR

Tanita uses the latest advanced bioelectrical impedance analysis (BIA) technology to analyse and measure your body composition. Tanita monitors bring you fast, accurate body composition results. This gives you a true indicator of your inner health and, when monitored over time, can show the impact of any fitness regime or weight loss programme.

With Tanita you can find out exactly what you are made of, set your goals to help you achieve your optimal fitness level and improve your health and wellbeing.

With Tanita you can measures:



Weight



BMI



Body Fat %



Visceral fat



Muscle Mass



Physique Rating



Bone Mass



BMR



Metabolic Age



Total Body Water

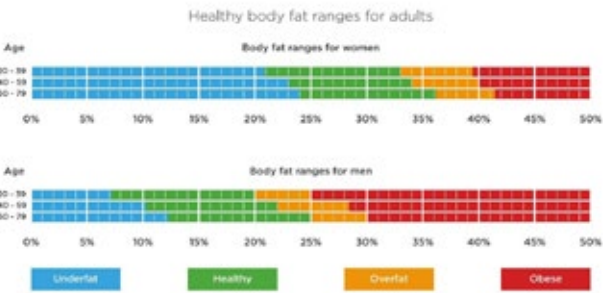
Body Fat Percentage and Body Fat Mass

Body Fat Percentage is the proportion of fat to the total body weight. Body Fat Mass is the actual weight of fat in your body.

Body fat is essential for maintaining body temperature, cushioning joints and protecting internal organs.

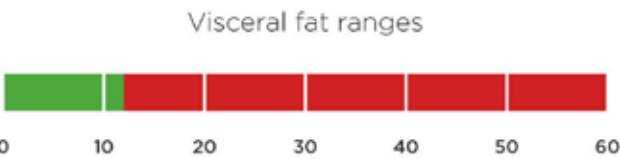
The energy, or calories, our body needs comes from what we eat and drink. Energy is burned through physical activity and general bodily functions. If you consume the same number of calories as you burn, all the calories are converted into energy. But if you consume more than you burn, excess calories are stored in fat cells. If this stored fat is not converted into energy later, it creates excess body fat. Too much fat can damage your long-term health. Reducing excess levels of body fat has been shown to directly reduce the risk of certain conditions such as high blood pressure, heart disease, type 2 diabetes and certain cancers. Too little body fat may lead to osteoporosis in later years, irregular periods in women and possible infertility.

It is important to check your body fat results against the Tanita healthy body fat ranges. These measurements are available for everyone from age five to 99 years.



Visceral Fat

Visceral fat is located deep in the core abdominal area, surrounding and protecting the vital organs. Even if your weight and body fat remains constant, as you get older the distribution of fat changes and is more likely to shift to the abdominal area. Ensuring you have a healthy level of visceral fat directly reduces the risk of certain diseases such as heart disease, high blood pressure and may delay the onset of type 2 diabetes.



Healthy 1 - 12

Indicates you have a healthy level of visceral fat. Continue monitoring your rating to ensure it stays within the healthy range.

Excessive 12 - 59

Indicates you have an excess level of visceral fat. Consider making changes in your diet and/or increasing the amount of exercise you do.

Muscle Mass

The predicted weight of muscle in your body. Muscle mass includes the skeletal muscles, smooth muscles such as cardiac and digestive muscles and the water contained in these muscles. Muscles act as an engine in consuming energy.

As your muscle mass increases, the rate at which you burn energy (calories) increases which accelerates your basal metabolic rate (BMR) and helps you reduce excess body fat levels and lose weight in a healthy way.

If you are exercising hard your muscle mass will increase and may increase your total body weight too. That's why it's important to monitor your measurements regularly to see the impact of your training programme on your muscle mass.

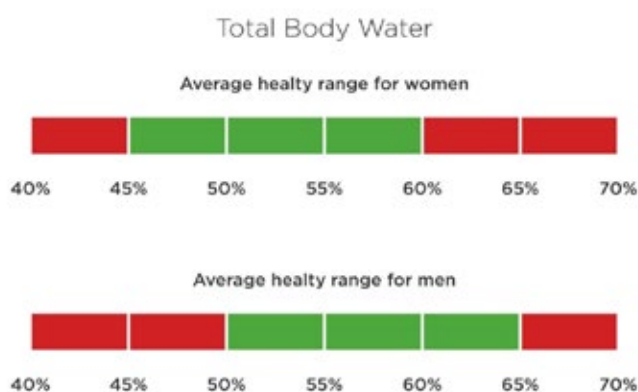
Total Body Water

Total Body Water is the total amount of fluid in the body expressed as a percentage of total weight. Water is an essential part of staying healthy. Over half the body consists of water. It regulates body temperature and helps eliminate waste. You lose water continuously through urine, sweat and breathing, so it's important to keep replacing it. The amount of fluid needed every day varies from person to person and is affected by climatic conditions and how much physical activity you undertake. Being well hydrated helps concentration levels, sports performance and general wellbeing. Experts recommend that you should drink at least two litres of fluid each day, preferably water or other low calorie drinks. If you are training, it's important to increase your fluid intake to ensure peak performance at all times.

[Read all about body water.](#)

The average TBW% ranges for a healthy person are:

Female 45 to 60% Male 50 to 65%



Bone Mass

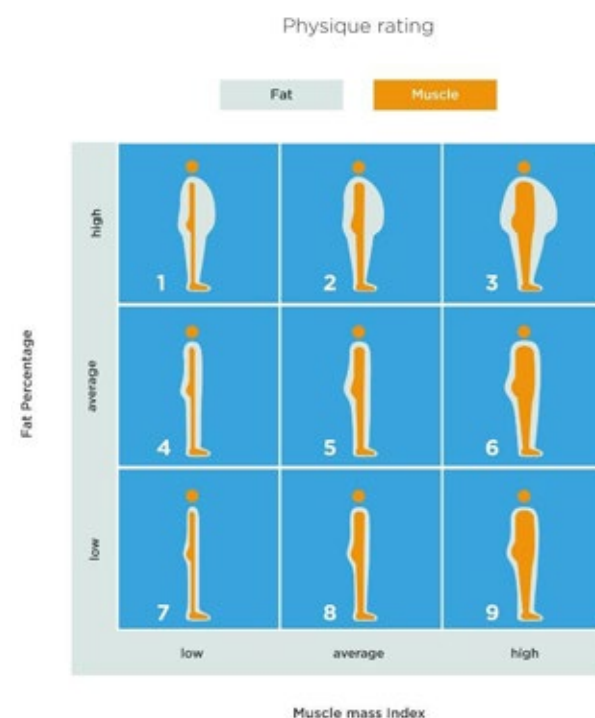
The predicted weight of bone mineral in your body. While your bone mass is unlikely to undergo noticeable changes in the short term, it's important to maintain healthy bones by having a balanced diet rich in calcium and by doing plenty of weight-bearing exercise.

You should track your bone mass over time and look for any long term changes.

Physique Rating

Assesses muscle and body fat levels and rates the result as one of nine body types.

As your activity level changes the balance of body fat and muscle mass will gradually alter, which in turn will affect your overall physique.



Basal Metabolic Rate (BMR)

The daily minimum level of energy or calories your body requires when at rest (including sleeping) in order to function effectively.

Increasing muscle mass will speed up your basal metabolic rate (BMR). A person with a high BMR burns more calories at rest than a person with a low BMR.

About 70% of calories consumed every day are used for your basal metabolism. Increasing your muscle mass helps raise your BMR, which increases the number of calories you burn and helps to decrease body fat levels.

Your BMR measurement can be used as a minimum baseline for a diet programme. Additional calories can be included depending on your activity level. The more active you are the more calories you burn and the more muscle you build, so you need to ensure you consume enough calories to keep your body fit and healthy.

As people age their metabolic rate changes. Basal metabolism rises as a child matures and peaks at around 16 or 17, after which point it typically starts to decrease. A slow BMR will make it harder to lose body fat and overall weight.

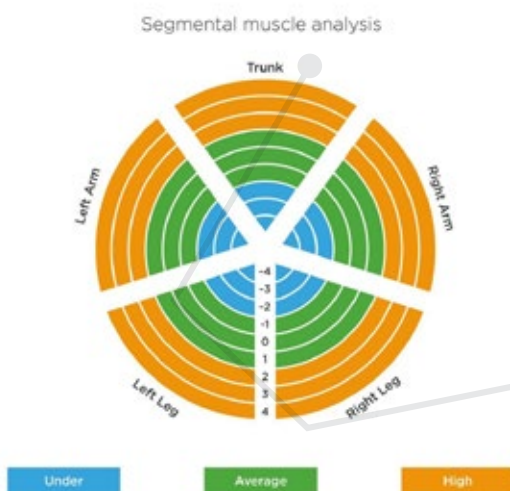
Metabolic Age

Compares your BMR to an average for your age group.

This is calculated by comparing your basal metabolic rate (BMR) to the BMR average of your chronological age group. If your metabolic age is higher than your actual age, it's an indication that you need to improve your metabolic rate. Increased exercise will build healthy muscle tissue, which in turn will improve your metabolic age. Stay on track by monitoring regularly. Segmental Muscle Mass

Muscle mass rating for five body segments: the core abdominal area and arm and leg.

Monitoring the muscle mass of each of your arms and legs and core abdominal area will help you see and understand the impact of your training programme over time. You can also use this information to correct muscle imbalances and avoid injury.

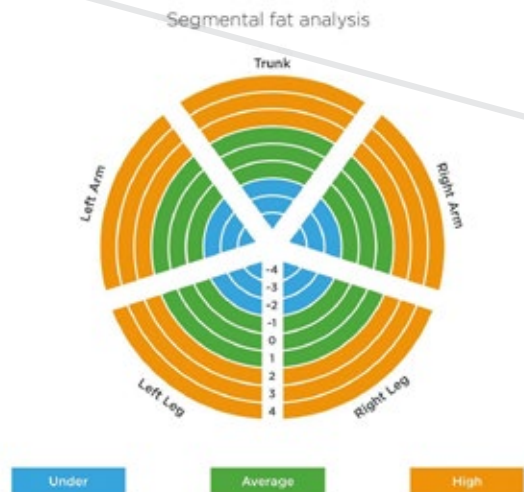


Segmental Body Fat Percentages

Body fat percentages for five body segments: the core abdominal area and each arm and leg.

Monitoring the body fat percentage of each of your arms and legs and core abdominal area will help

you see and understand the impact of your training programme over time.



Body Mass Index

A standardised ratio of weight to height, used as a general indicator of health.

Your BMI can be calculated by dividing your weight (in kilograms) by the square of your height (in meters).

BMI is a good general indicator for population studies but has serious limitation when assessing on an individual level. For more information on the limitations of BMI click [here](#) link to beyond bmi page on professional site.



Muscle quality

Muscle quality indicates the quality / state of the muscle which changes according to factors such as age and fitness.

The muscles of young people or those who exercise regularly are normally in a good state. The state of muscles deteriorates in elderly people and those who do not get enough exercise. Innerscan Dual Body Composition Frequency analyser RD-953, uses 2 different frequencies to measure bioelectrical impedance and these results are used to evaluate the muscle state using the muscle quality table.

Muscle Quality table

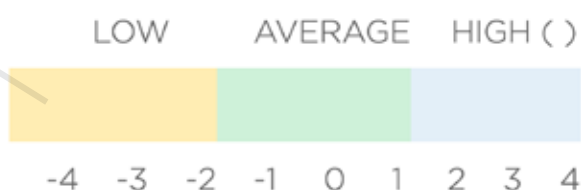
Male age	18-29	30-39	40-49	50-59	60-69	70-79	> 80
High quality	> 74	> 73	> 70	> 64	> 56	> 46	> 39
Standard	49-73	47-72	44-69	39-63	33-55	25-45	21-38
Low quality	< 48	< 46	< 43	< 38	< 32	< 24	< 20

Male age	18-29	30-39	40-49	50-59	60-69	70-79	> 80
High quality	> 68	> 70	> 69	> 67	> 61	> 54	> 50
Standard	48-67	48-69	45-68	41-66	34-60	26-53	22-49
Low quality	< 47	< 47	< 44	< 40	< 33	< 25	< 21

Muscle quality score

The muscle mass is assessed for persons 18 years and older.

Muscle mass is judged by calculating the amount of muscle mass against the persons height and then the amount is classified. The RD-953 displays the muscle mass judgement as a muscle score. The larger the number, the more muscle mass a person has.



This attachment's source is Tanita's official web site.
More information available at www.tanita.eu



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