

WALKING - A FORM OF EXERCISE

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Abstract

Walking is a form of physical activity which does not require special skills or equipment and is an excellent physical activity for all, regardless of age, weight, or fitness level. Walking can be qualitatively classified as an active form of transportation, a recreative activity as strolling or hiking, a gym routine as walking on a treadmill, and even an athletic event. Quantitatively walking can be categorised as light, moderate, or vigorous, based on effort intensity. Walking can be an important means of maintaining physical and mental health and well-being. Public green spaces and friendly walking sites play a motivator part in the intention and active behaviour of walking practitioners.

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1. Introduction

Physical activity includes all forms of movement: walking, biking, or skateboarding as forms of transportation, gardening, and other household activities, recreational activities such as playing, dancing, hiking, active breaks during the school or working hours, participation in organized or independent sports activities. Physical activity means any movement of the body with energy expenditure and is different.

Walking is a form of physical activity which does not require special skills or equipment, and can be part of a daily routine. It can be the easiest way to stay physically active and there can be several opportunities to walk during the day. Compared to running, walking is a lower impact exercise that creates less stress on joints; therefore, it is an excellent physical activity for all, regardless of age, weight or fitness level, and the risk of injury is very low (Pop, Ciomag, 2015). Therefore,

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walking is highly recommended to overweight people or those who are unable (mostly sedentary persons) or not allowed to make physical efforts of high or medium intensity.

2. Theoretical framework

Walking can be qualitatively classified as an active form of transportation, in addition to cycling, a recreative activity such as strolling or hiking, a gym routine such as walking on a treadmill, and even an athletic event. Quantitatively walking can be categorised as light, moderate, or vigorous, based on effort intensity. An indicator of these stages is the percentage of the maximum cardiac frequency (% HR):

- Light physical effort – 50-63%;
- Moderate – 64-76%
- Vigorous – 77-93%.

The reference for these percentages is the age-predicted formula: $\text{max HR} = 220 - \text{age}$. This formula is useful for specialists and practitioners to set fitness objectives, but people estimation is less accurate than theory. A study on a group of adults concluded that individuals underestimate moderate and vigorous physical activity (Canning et al., 2014).

Walking can be a very good type of aerobic exercise. From the VO_2 consumption perspective, the effort volume intensity ratio can be classified as follows:

- Cardio-dynamic – not very intense, lasting for 15-20 minutes;
- Moderately intense effort - between 30 min and 60 min;
- Heavy intensity when the aerobic session is between 1-2 hours (Harrison et al., 2015), implicitly exceeding the previous two stages.

The physical activity intensity is important for understanding the requirements for a healthy lifestyle. WHO recommends 60 minutes per day moderate to vigorous physical activities for children and adolescents (5-17 years) and 150–300 minutes of moderate-intensity aerobic physical activity per week, or 75–150 minutes of vigorous-intensity aerobic physical activity (WHO, 2021). It means that every day each adult should have a 45 min activity which brings the HR to around 120 b/min. Is it happening? Globally 25% of adults are not physically active enough and 80% of adolescents do not reach the recommended physical activity level.

Walking speed (or gait velocity) could be expressed in m/s or in m/min. The range for normal walking speed in adults is between 1.2 and 1.4 m/s or an average of 82 m/min (Waters et al.). Al-Obaidi et al. consider a walking speed of:

- 0.82 m/s as slow;
- 1.91 m/s as medium;
- 1.67 m/s as fast.



There are differences in walking speed between men and women, due to the limbs length and body height. Longer steps result in higher speed for men, even if women can maintain the same cadence. The height of a person influences not only the walking parameters, but also the weight. Walking is a body weight bearing activity, therefore, a person with a higher body mass will expend more energy.

Trying to keep our students active during online physical education lessons caused by the COVID-19 pandemic, we proposed them to walk 4 km in an hour, meaning with a speed of 1.1 m/s. Considering the previous classifications, the walking speed is between slow and medium, and also a 60 min physical effort is considered moderately intense for both genders.

The predominance of sedentary activities in a daily life has negative consequences on the overall health. Physical activity positively influences the muscle-skeletal and metabolic systems, as well as the cognitive and social abilities. Physically active persons, especially with a good level of cardiovascular fitness, can improve their learning performance and attention and can avoid anxiety and depression (Ratey, 2021). Consequently, we consider walking to be an important means of maintaining physical and mental health and well-being.

3. Historical perspective

In hunters-gathering tribes, walking was and still is a necessity for providing food and water, and ultimately for survival. One of the last existing tribes of hunters lives in the Kalahari Desert and practices one of the oldest hunting techniques: chasing the prey until it collapses from exhaustion. It can take between 2 and 5 hours over 25-35 km of difficult terrain.

A Romanian traveller walked from his Transylvanian village to Rome in 45 days. It happened in 1896. In the nineteenth century, walking was the normal and most available means of transportation, even in cities. The large number of pedestrians populate the city streets on the way to work places, schools, shopping, or for leisure. Walking between communities located at distances of 4-7 km was common in those days (Pooley, 2020). In the early years of the twentieth century, the competition for travel space between motor traffic and pedestrians began, mainly in city centers. However, in the twentieth century, the percentage of travelers on foot decreased constantly. According to the British National Travel Survey in 1975 (14) around 35% of all trips were on foot, while in 2014 the pedestrian's percentage had fallen to 22 (15).

After the second half of twentieth century, motorized vehicles become increasingly dominant especially in urban areas, pedestrians and cyclists competing for the limited road space (Norton, 2011). The public green spaces in urban areas have a determinant part in citizens intention and active behaviour. Unfriendly sidewalks, a long distance to school or workplace, and a precarious pedestrian safety are the reasons of avoiding walking as a transportation. In more friendly walkable



sites, walking time is greater throughout the day and throughout the week, across gender, age, and body mass index groups (Althoff, 2017).

Walking evolved from the primary form of transportation to an apps-monitored physical activity. After analysing data gathered from 68 million of smartphones with accelerometer apps, resulted that the average American takes 4774 steps daily; English people walk an average of 5444 steps, daily and the average Japanese 6010 steps (Althoff et al., 2017).

4. Types of walking

4.1 Brisk walking is a moderate intensity physical activity and it can be considered a form of exercise as time is practiced regularly and with the intention to build fitness and reduce health risks. For adults under 60 years a pace of 100 steps per minute is considered brisk, while a vigorous walking speed needs a walking speed of 130 steps/min and jogging 140 steps/min. We can conclude that a brisk walking, meaning a moderate physical activity, maintains an average pace of 6 km/h.

The pace can be self-monitored with a pedometer usually incorporated in a smartphone or fitness watch. Studies concluded that the use of pedometers is motivational for adults to increase self-reported walking distances, calories expenditure, step counter, or time spent being physically active (Ogilvie et al., 2007).

The technique of walking as a form of exercise aims the posture, stride, and arm motion. The correct posture is straight with the chin parallel to the ground and the eyes focus ahead. The arms are bended 90° at the elbow, close to the body, moving back and forward in opposition with the feet (right arm with left leg). The leg is striking with the heel, rolling through from the heel to the toe. To walk faster, it is recommended to use the natural stride length and to increase the pace instead to walk with longer steps.

4.2 Nordic walking is an outdoor activity which activates 90% of muscles and is more effective than normal or brisk walking. The characteristic is the use of poles, Nordic walking having some similarities with cross-country skiing adapted to the season and surfaces without snow. The poles activate the upper body muscles, alleviate the body balance, and are a helpful support for walking uphill. This type of walking requires higher energy expenditure, as can be seen in the next table, and the heart rate is also higher with 16 % compared to a normal walk (Jurikova, Kisling, 2020).

Physical activity	Energy expenditure (kJ/h)
Walking speed 3 km/h	700 – 850
Walking speed 4 km/h	800 – 1,000
Walking speed 5 km/h	1,000 – 1,300
Walking speed 6 km/h	1,300 – 1,600
Nordic Walking	1,600 – 2,000



4.3 Marathon walking is a long-distance race. Lately, many amateurs who participate in marathon challenge prefer to walk instead of running, and more and more marathon programs are walker friendly. A marathon race means a distance of 42,195 km and usually requires 6-8 hours of brisk walking (6km/h) to cover it. Those who take part in a walking marathon race or even in a half marathon need endurance, condition, and speed. To obtain a sufficient level of these physical abilities, they need to be trained regularly (four times a week), at least four months. Every month, the goal increasing the ability to walk longer: if after four weeks the goal is to walk one hour at least once a week, after for month the goal will be four hours long walk once a week. For keeping the pace in longer walks, a reserve of water and of energy intake is needed. Also, after the event, even if it is a half marathon, recovery is mandatory.

4.4 Race walking is an Olympic athletic event with a very specialised technique, quite different from normal walking. The basic rules are as follows: the athlete must have all the time one foot in contact with the ground, and the knee of the front leg must be straight, not band, when the body advances over it. In the Olympic Games program, men and women compete in the 20 km short distance race walking, while the long distance of 50 km features only men. Both races are held on the road, sometimes only the finish might be in the stadium.

4.5 A less strict version of race walking is **power walking**. The technique of power walking allows the competitor to bend the knee as time the ground is touched first with the heel, and one foot is in contact with the ground at all times. The walking speed is usually of 7-9 km/h and is considered an alternative to jogging for a moderate physical effort.

4.6 Indoor walking on treadmill is a form of physical activity in fitness facilities, in which the temperature and other environment conditions are constant and controlled. The treadmill gives the possibility to adjust the speed, the inclination, the variation in the effort intensity while on display the cardiac frequency evolution can be monitored. Walking on a treadmill belt is more comfortable for joints than walking outdoors on the sidewalk.

Conclusions

The most common things for teens and emerging adults to cope with stress can be alcohol, tobacco, sweets, consumption of energy drinks, or food abuse, developing addiction over time. A strong correlation between smoking and the avoidance of physical activity was found. Also, the young people who start drinking before 15 years of age have 4 times more chances to become alcohol dependent at some point in their life. At the same time, research demonstrated that dancing, music, drawing and physical activity are triggers for biochemical processes in the brain which are an efficient solution to stress (Milkman, 2017). Therefore, teachers,



educators, and parents must foster a positive change in the students' physical behaviour and walking is a simple way to achieve this goal.

One of the alternatives to spending leisure time in a beneficial way is physical activity, and walking is the most accessible form of physical effort. It can be done in the neighbourhoods, in green spaces, on the treadmill, individually, in small or large fitness groups. The public green spaces and friendly walkable sites in urban areas play a determinant part in citizens' intention and active behaviour.

Authors' Contributions. All authors have contributed equally to this study and should be considered as main authors.

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