P-ISSN: 2394-1685
E-ISSN: 2394-1693
Impact Factor (ISRA): 4.69
IJPESH 2015; 1(4): 45-53

www.kheljournal.com
Received: 10-01-2015
Accepted: 12-02-2015

Samuel Honório
Health Sciences School Polytechnic Institute of Leiria, Portugal, RECI (Research on Education and Community Intervention) investigation centre

Marco Batista
Higher School of Education of Torres Novas, CIFOC, Portugal

Júlio Martins
University of Beira Interior – Covilhã, Portugal (Sports Sciences, Health and Human Development, CIDESD)

João Cardoso
University of Beira Interior – Covilhã, Portugal (Sports Sciences, Health and Human Development, CIDESD)

Dino Pedras
Dino's Health and Fitness Centers

Filipe Soares
Institute of Intercultural and Interdisciplinary Studies of Piaget Institute in Almada, Portugal.

Correspondence:
Samuel Honório
Health Sciences School Polytechnic Institute of Leiria, Portugal, RECI (Research on Education and Community Intervention) investigation centre

Physiological Values in Fitwalking with Biomechanical Movement Analysis

Samuel Honório; Marco Batista; Júlio Martins; João Cardoso; Dino Pedras; Filipe Soares

Abstract
Introduction: We intend to establish physiological values in each training zone of Fitwalking, in gender and ages, and associate these values to colours of effort.
Material and Methods: A sample of 62 athletes subject to five training zones (TZ) relating to elliptical with variable time periods between 20 and 40 minutes.
Results: Were observed differences in intensities where (HR) proved higher, for the training zones where the intensities belonged 75-90%. There was a (HR) average of 132.78 bpm in training (TZ) recovery area compared to the (TZ) aerobic with an (HR) average of 149.47 bpm, strength training indicated a 159.11 bpm HR, training intensive features a 169.07 bpm HR and finally the (TZ) competition indicates an average value of 185.30 bpm.
Conclusions: there are significant differences existing regarding training zones and heart rates between genders, with a progressively increasing in the intensity of HR with a ratio of time spent in exercise of fitwalking, featuring a resistance workout.

Keywords: Fitwalking, Heart Rate, Gender, Age, Biomechanical movement.

1. Introduction
Depending on the characteristics of the exercise, there are different profiles of physiological response to exercise performed in elliptical, primarily determined by the use of lower limbs (LL), upper limbs (UL) or simultaneous the use of LL and UL, by partial body weight support, full or missing the body position adopted. This specific set entails fundamental differences in the amount of muscle mass involved in the exercise, the venous return in the pattern of muscle contraction [3].
The Fitwalking is a process of maintaining our health, promoting the "construction" of muscle at the same time protects the joints (articulations).
Several studies in order to evaluate the physical equipment such as elliptical, from the analysis of various physiological parameters in exercise performed at the same heart rate (HR). Then the protocols used by the authors were composed of 20 minutes and for 40 minutes of continuous exercise. In this sense, the objective of this study was to know the cardiovascular responses to individuals performed by genders, as well as the heart behaviour rate in different training zones of practice, and the knowledge of their condition [1].
Resulting from the popularity of (HR) as an indicator of effort control, this type of information can have a very important role in the prescription of cardiovascular exercise in this specific ergometer [2].

1.1 Fitwalking
In defining the feature Fitwalking as a physical and psychic activity, with functional bases of characteristics of walking, climbing stairs, skiing with the help of support to the upper limbs, and consequently the development of aerobic training [3]. This type of activity calls a referenced as elliptical equipment, where there are certain points of attachment to the optional lower and upper limbs members, depending on the targeted workout. It is assumed as an option to the race and the step and has a big advantage in getting results. However, by choosing this type of physical activity is necessary to take into account some of the aspects referred to according to the Almeidae Araújo (2003) [4].

1.2 Using the elliptical

Posture is one of the relevant factors in the physical practice on the ergometer elliptical, so you should keep your back straight, shoulders back, chin to 90°, the abs tight and support by senior members. We should not lean the torso forward and should always be perpendicular to the ground, if there is a discomfort to the existing position, you can always adapt the machine to the stature of the athlete.

The support must be made in full on the pedal of the elliptical base facing forward. The hips should remain parallel to the shoulders, without disproportionate lateral movements and without the knees to keep in touch or intersect, and not walking with knees in hyperextension due to the natural movement of the exercise [5].

The resistance must be adapted to the speed, insofar as it is increased the resistance training, the speed of past decreases. It may remove their hands of support and makes the movement of the legs with a higher equilibrium concentration of the movement. Walking with resistance implies not make an extra effort in order to compromise the security of osteo -articular knee, hip and scapular-humeral. Not forgetting the musculoskeletal adaptation to exercise, maintaining and experiencing a period of initial adaptation. The centre of gravity must be kept in the same horizontal line.

Several actions can be named as contraindicated use additional weights, compromising stability or athlete or device. Place your elbows on the palm rest, thus changing the centre of gravity, so the posture is modified and ceases to be the most accurate, walking backwards, adjust the resistance of the athlete during the movement, doing stretches on the apparatus. Walking without resistance, the movements are devoid of a primary action and thus there is a possibility of injuries to joints. Follow the procedures that are described in the operating manual, otherwise it should be mentioned the doubts or the supplier of the equipment or guardian or even an instructor of physical activity accredited for this type of equipment.

With regard to clothing, the choice of footwear is often overlooked, which are considered to have little importance. Inevitably there is a mistake here to be perfected. The practice of aerobic activity requires stable, flexible shoes and cushion the impact of past. Regarding the elliptical footwear must provide lateral stability to protect against sprains and maintain perfectly aligned with the base or foot pedals.

Wear light clothing that allows rapid evaporation of perspiration.

1.3 Technical Aspects

The technical aspects are directly related to the positions of body segments on the basis either flat or uphill. Some of the adjustments to be made are directly related to the position of the feet and the height and distance of the palm rest.

In support of hands regarding the position one must be mentioned that in fixed restraints pronation, with the thumb facing inwards and the forearm parallel to the ground.

In the upright position, there is no natural muscle strain or hyperextension of the knee. Walk with strength and using average cadence 55-85 rpm. The techniques used are those of "ground" plane and mountain. In position 2, the positions of the hands are supporting the side, the thumb side up and the forearm parallel to the ground. Feet again, effecting a natural and relaxed position without hyperextension of the knee and chest directed forward. Walk with a low resistance to high. Employ cadences averages 55-85 rpm. The techniques used are the "ground" plane and mountain.

With regard to position 3, the anatomical orientation elbows are beside the trunk and arms parallel to the ground. The handle is made on the palm rest at the top with your thumb on the front end of the support. The cadence is between 55 to 85 rpm. Mountain is the technique applied.

With regard to the position 4, the position of the anatomical elbow, it must be aligned with the shoulder and forearm parallel to the ground. The handle is made to the support hand on the front top with your thumb at the tip. The cadence is between 60 and 80 rpm for the trainer module. The techniques used are "ground" plane and mountain.

Finally the 5-position has improved techniques, either in plan or motor muscle development. Let's positions against walking or running without support, arm movements are made naturally. Consequently arm follows the movement of the lower limb opposite. The rate shown is between 60 and 80 rpm for the trainer module.

From a biomechanical point of view of the movement, Fitwalking program points to during the execution of the exercises, a concentric and eccentric phase of the movement. Described in the following table's share of primary muscles agonists and antagonists, the segments and the degree of angulations' obtained in the joint.

Table 1: Description of Lower Limb Motion

	Lower limbs	Segment's	Primary agonist muscles	antagonist muscles	Degrees
Concentric phase pulling	Foot	Ankle, heel, Phalanges	anterior tibial	Soleus, geminal	124º
Eccentric phase pushing	Foot	Ankle, heel, Phalanges	Soleus, geminal	anterior tibial	90º
Concentric phase pulling	Leg	Ankle, knee, femoral Joint	Biceps femoral, iliac Stitcher, Psoas, psoas small	Quadriceps, Stitcher. Vastus lateralis. Vastus medialis. quadriceps tendon	147º
Eccentric phase pushing	Leg	Ankle, knee, femoral Joint	Quadriceps, Stitcher. Vastus lateralis. Vastus medialis. quadriceps tendon	Biceps femoral, iliac Stitcher, Psoas, psoas small	173º
Concentric phase pulling	Thigh	knee, femoral Joint	Iliac couturier, Psoas, psoas small. biceps femoris	Gluteus maximus, gluteus small	137º
Eccentric phase pushing	Thigh	knee, femoral Joint	Gluteus maximus, gluteus small quadriceps, Stitcher. Vastus lateralis. Vastus medialis. quadriceps tendon	Iliac couturier, Psoas, psoas Small	148º

In the table above, note the angles and muscles described in the sagittal plane, can be observed in the eccentric phase, the foot performs a slight dorsiflexion at an angle of 90° between segments, ankle, heel and phalanx, the primary agonist muscles on this movement as muscular action are geminal and soleus, tibialis anterior and antagonist. The foot, in the concentric phase, performs a plantar flexion in the segments of the ankle, heel and phalanges, forming an angle of 124°, where the primary agonistic muscle action is muscle, tibialis anterior, playing the role of antagonist muscles, soleus and geminal. The concentric phase of the movement, the leg does a pushup giving an angle between segments of the ankle, knee, and hip joint at an angle of 94° as muscular action are the primary agonist muscles, biceps femoris and vastus intermedius; as antagonists, stitcher, straight femoris, vastus lateralis, vastus medialis. The leg in the eccentric phase gives rise to an extension of the leg between the ankle segments, knee and hip joint giving an angle of 136°, as primary agonist muscles quadriceps, stitcher, side vasto, vasto medial, quadriceps tendon, and as antagonists are the Biceps femoral. The concentric phase, the thigh does a pushup creating among segments of the knee, and femoral neck joint in C7 an angle of 137°, as primary agonist muscles, the pelvic couturier, psoas, psoas minor ; as major antagonists gluteus, gluteus small.

Table 2: Description of Upper Limb Motion

	Upper Limbs	Segment's	Primary agonist muscles	antagonist muscles	Degrees
Concentric phase pulling	Forearm	Carpus, elbow, shoulder	Brachioradialis, anterior Brachial, extensor carpus radialis long, short radial extensor carpus	Brachioradialis, anterior Brachial, extensor carpus radialis long, short radial extensor carpus	113º
Eccentric phase pushing	Forearm	Carpus, elbow, shoulder	Brachioradialis, anterior Brachial, extensor carpi radialis long, short radial extensor carpus	Brachioradialis, anterior Brachial, extensor carpus radialis long, short radial extensor carpus	117º
Concentric phase pulling	Arm	Elbow, shoulder, C7 Segments.	Biceps, braquial biceps	triceps	80º
Eccentric phase pushing	Arm	Elbow, shoulder, C7 Segments.	triceps	Biceps, braquial biceps	180º
Concentric phase pulling	Shoulder	Elbow, shoulder	Anterior deltoid muscle	Posterior deltoid muscle	31º
Eccentric phase pushing	Shoulder	Elbow, shoulder	Posterior deltoid muscle	Anterior deltoid muscle	29º

In the table above, note the angles and muscles described in the sagittal and coronal plane; can be observed in the eccentric phase, the forearm performs accompanied a slight external rotation of an extension in the coronal plane at an angle of 117° between the segments, wrist, elbow and shoulder, the primary agonist muscles in this movement as braquiorradial muscular action, brachialis, long extensor carpus radialis, extensor carpus radialis short, as the antagonist braquiorradial and brachialis. The forearm, in the concentric phase, performs a slight external rotation between segments carpus, elbow and shoulder forming an angle of 113°, the agonist muscle action is the same as the bending of the fingers causes a constant force on the same muscles forearm these are working steadily in flexion of the arm to the extension arm so that the hand can squeeze the handle of the elliptical machine. The concentric phase of the movement, the arm does a pushup between segments of the forearm, arm and shoulder forming an angle of 113° as muscular action, the primary agonist muscles are biceps and braquial biceps and as antagonists, triceps . The arm, in the eccentric phase, gives rise to an extension of the arm between the forearm segments, arm and shoulder creating an angle of 117°, as the triceps muscles primary agonists, antagonists are as biceps, biceps. The concentric phase, the shoulder makes a slight medial shortening creating between segments, elbow, shoulder, hip joint, an angle of 31° as primary agonist muscles, muscle, anterior deltoids, as antagonists, the posterior deltoid arises. In the eccentric phase, the segments of the elbow, shoulder, hip joint, agonists, describes an angle of 29° as agonists posterior muscles are deltoid muscle as the deltoid muscle before antagonist.

To determine the exercise intensity at fitwalking a color to various intensity levels was introduced, as shown in table 3.

Table 3: Range of colors used in the measurement mode fitwalking, Pedras (2010) [3].

Index	Fitwalking Description	Intensity	Fitwalking Colours
1	Very Very Low	55%	Soft green
2	Very Low	60%	Green
3	Low	65%	Soft yellow
4	Average Low	70%	Yellow
5	Average	75%	Live yellow
6	Average High	80%	Orange
7	High	85%	Soft red
8	Very High	90%	Red
9	Very Very High	95%	Strong red
10	Maximum	100%	Very, very strong red

1.4 The training zones in Fitwalking

As the fitwalking is a program of phased training with varying degrees of intensity, it is given to instructors after your HR max. Athletes integrate them in certain periods of training. Training zones are mainly responsible in glorify athletes to a good physical condition and safety, while respecting the physical capabilities of each one. The training zone (Recovery) is performed with a level of HR between 55-65% HR max, with a cadence 60-75 rpm. The techniques are (Ready stair climb) and Riding stair climb, while the training period should take place throughout the year and should cover 10% or more of the total duration of training. The techniques are the increase of intensity of Resistance step. In the classification of the Borg scale is between the soft green, soft yellow 55% and 65%. In BG, are very, very low to low.

The training zone Aerobic Training is performed with a HR

max. 65-80%, with cadences from 60 to 80 rpm, with techniques and Ready climb step Riding stair climb, climb Full Free step and step. The training should operate throughout the year and cover 80% or more of the total time of the workout. The techniques of speed increment is the Resistance step. In the classification of the Borg scale is between the soft yellow, 65% orange and 80%. In BS, low to moderate high.

The training zone Power Training is performed with a level of HR between 75-85% HR max, with a cadence 55-75 rpm. The techniques are ready and full step stair climb, climb free step while the training period should take place throughout the year and should cover more than 80% or more of the total duration of training. The growth and development techniques of intensity are the ones in Resistance step. In the classification of the Borg scale lies between the bright yellow in 75% and 85% by soft red. In BS, moderate to high.

The training zone Intensive Training is performed using an FC max. 65-90%, with cadence 60-85 rpm, with techniques Riding Step, step climb Ready, Ready climb stair step, Full step stair climb and Full and Free Free stair and stair climb. The training should operate all year round cover 80% or more of the total time of the aerobic workout. The technique of speed increment is the Interval step. In the classification of the Borg scale is between the soft yellow, 65% red and 90%. In BS, low to very high.

The training zone challenge is performed using an FC max. 80-90%, with cadence 65-85 rpm with the technical Ready for Riding Step, step climb Ready Ready Ready climb stair step, Full step stair climb and Full and Free Free stair and stair climb. The training should happen after consolidation with aerobic base and consolidation of training methods. The development techniques and speed are Resistance step Interval step. In the classification of the Borg scale is between the orange, 80% red and 90%. In BS, high to very high.

2. Material and Methods

2.1. Defining the problem

Define the parameterization of a scale of values in Fitwalking for each training zone linking each one of these with the Borg scale, heart rate, gender and age.

2.2. Objectives

a) Assess the capabilities of the heart rate of gender in each training zone;
b) Assess the capabilities of the heart rate by age in each training zone;
c) Identify the color on athletes such as physical exercise capacity;
d) Check the related color to each training zone as a possible measure of athletes comfort zone;
e) Identify parameters between the Borg scale and training zones.

2.3. Hypotheses

The elliptical is a Fitwalking ergometer used for performing cardiovascular exercise. This type of exercise is particularly appealing due to the movement of low impact and usability of movements of arms and legs Mier Y. C. & Done (2006). Given this fact we formulated the following hypotheses:

Hypothesis 1 - There are significant differences in the parameters of the training zones based on gender.

Hypothesis 2 - There are statistically significant differences in the parameters of heart rate by gender.

Hypothesis 3 - There are statistically significant differences in Borg scale by gender.

Hypothesis 4 - There are statistically significant differences in Borg scale based on age.

2.4 Sample

In assessing this study was performed the analysis of several athletes of 5 gymnasiums. The universe of this sample resulted in 62 athletes, 31 were male and 31 were female with a mean age of 28 years, being the youngest athlete at the age of 18 years and older as the age of 51 years, which were all subject to the practice of the five training zones (TZ) related to elliptic with periods of time varying between 20 to 40 minutes, and subjects related to each training zone techniques, recovery, aerobic training, strength training, intensive training and competition [3].

Table 4: Reference values of participants ages.

Total	Gender	N	Mean	Standard deviation
62	M	31	160.87	17.938
	F	31	157.06	19.117

2.5 Instruments and procedures

For records on HR, 10 Polar brand heart monitors were used, with the help of the Karvonen formula defined by HR training = (HRmax - HRres) x % + HR. HRres.

We also used 10 elliptical KT2 and 10 cans of liquid. For each athlete was made a record in each training zone and recorded the values for the HR, Borg scale and made the registration of the corresponding color.

In biomechanical field, the data of goniometric evaluation were based through cinematic techniques, with getting frames in a sequence 30/seg, in the sagittal plane of motion. Using the Kinovea software, we prepared an analysis of the movement with a focus on lower and upper limbs, the concentric and eccentric phases of the movement, the technical basis of the gesture modality.

2.6 Variables

In the description of the research plan, the target is to establish cause-effect relationships, finding and controlling the external factors that can influence the treatment expected to check the effects Barros and Reis (2003) [7] result. In this study we have an independent variable, physical activity fitwalking and dependent variables: training zones, a color associated with the Borg scale, the Borg scale, heart rate, gender and age.

3. Results

As we study the performance of the physical fitness of athletes, the primary objective of studying this performance of each. After a careful data collection, and observe how the different gender groups performed the activities, then presented our results.

Table 5: Registration of heart rate references.

	N	Minimum	Maximum	Mean	Standard deviation
HR	62	126	191	158.97	18.484

We can see that, by average, the athletes in the activity of fitwalking showed positive results regarding the heart rate. Comparing the results, we found an average of 158, 97 with a minimum registration of 126 bpm and a maximum of 191 bpm.

Table 6: Heart rate regarding athlete's ages.

	AGE	HR
N	62	62
Mean	28,68	158,97
Median	28,50	158,50
Mode	29	152
Standard deviation	6,677	18,484

We note that on mode ages, as average unit characterization exists a value of 152 bpm HR max in the 29 years unit age.
On heart rate can discriminate the relationship with HR max 152 bpm with notes where most athletes. Alternate then with a range of 144 bpm, 156, 160, 168 and 184 bmp. We can put athletes at various levels of fitness, without bleaching the external facts that athletes may be subject at the time of evaluation.

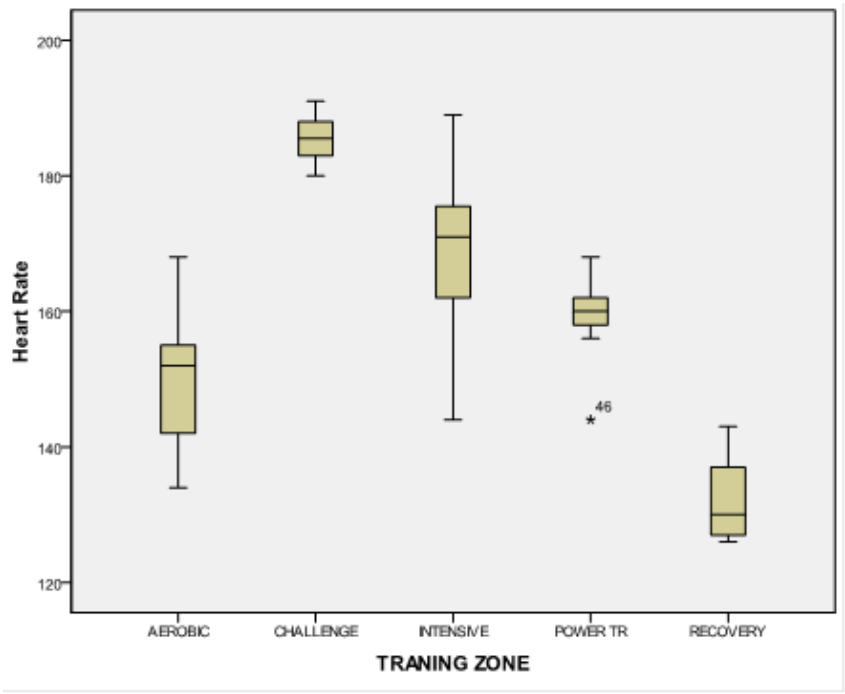

Fig 1: Discrimination of HR by training zones.

The description of the relationship of HR indicates the average number of bpm by TZ. Is also represented in HR max the maximum and minimum values of each TZ bpm. The highest HR values were recorded in the training zones 2 and 3, respectively challenge and intensive.

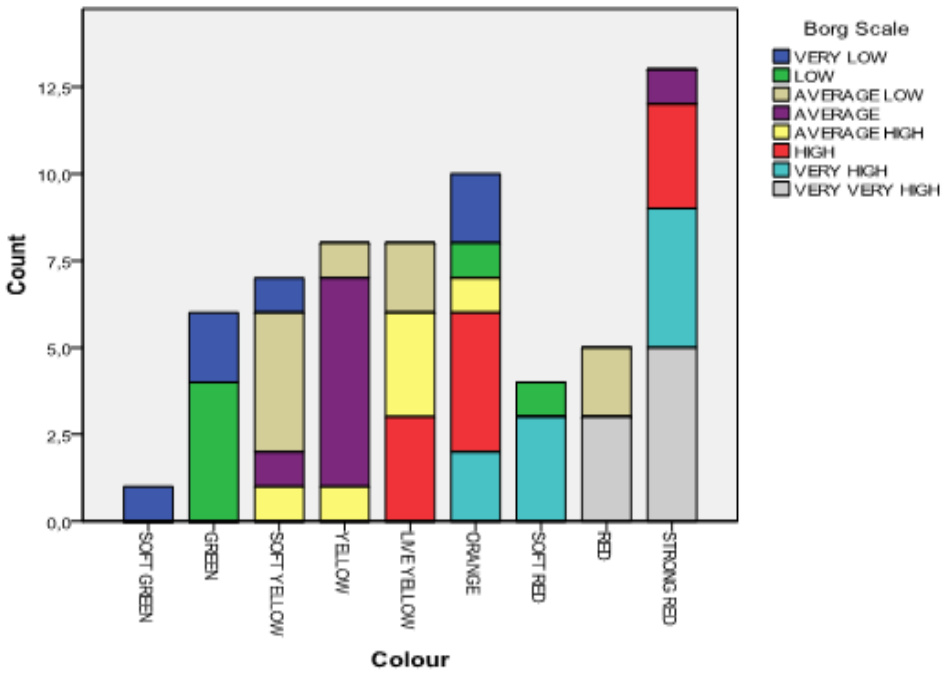

Fig 2: Identification of color on athletes such as physical exercise capacity, described by TZ.

In assessing the composition of colors on the number of athletes we can say that physical fitness is the capacity for provision of allotment of an even significantly higher average just because of certain factors by orange and deep red.

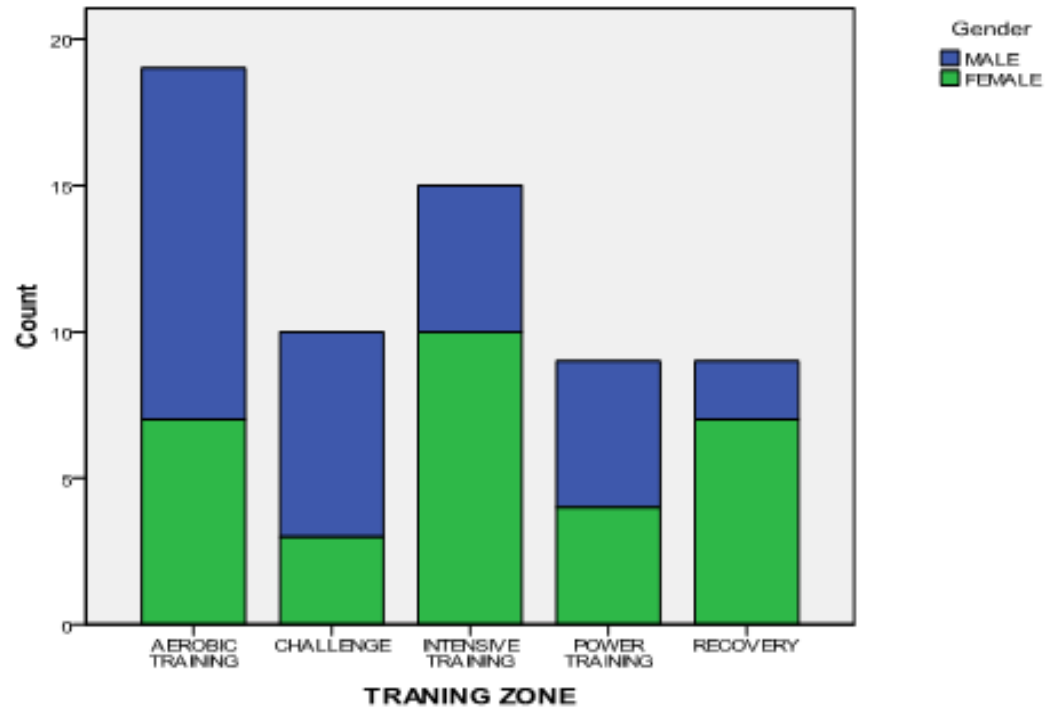

Fig 3: Checking the color on the training zone as a possible measure of the comfort zone of the athletes.

Continuing with the review of the previous table and checking the values for the yellow color where most of the values are null or have low indicators for a number of representative variables and identical to other athletes.

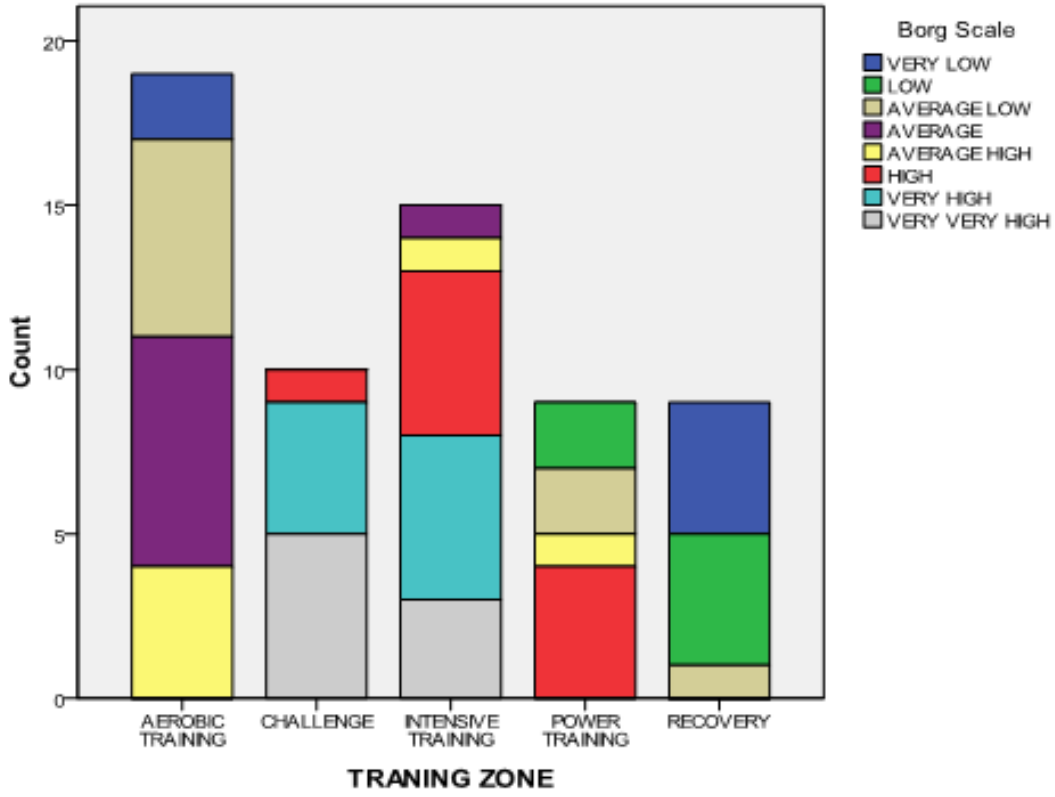

Fig 4: Correlation between training zones and Borg Scale.

As the value of r is negative there is an inverse relationship between variables, the high values of a variable correspond to low values of another variable. Results in a table with three rows appear in each cell, we have a correlation coefficient, where the result of the test of significance of this coefficient and the number of observations used in the calculation of the coefficient. Concluding the analysis of the data obtained it appears that the hypothesis is not null, there is a correlation between the Borg scale, and TZ, since the value of p ("sig 2 -. Tailed") is greater than 0, 0011, concluding the existence of correlation between the variables under study.

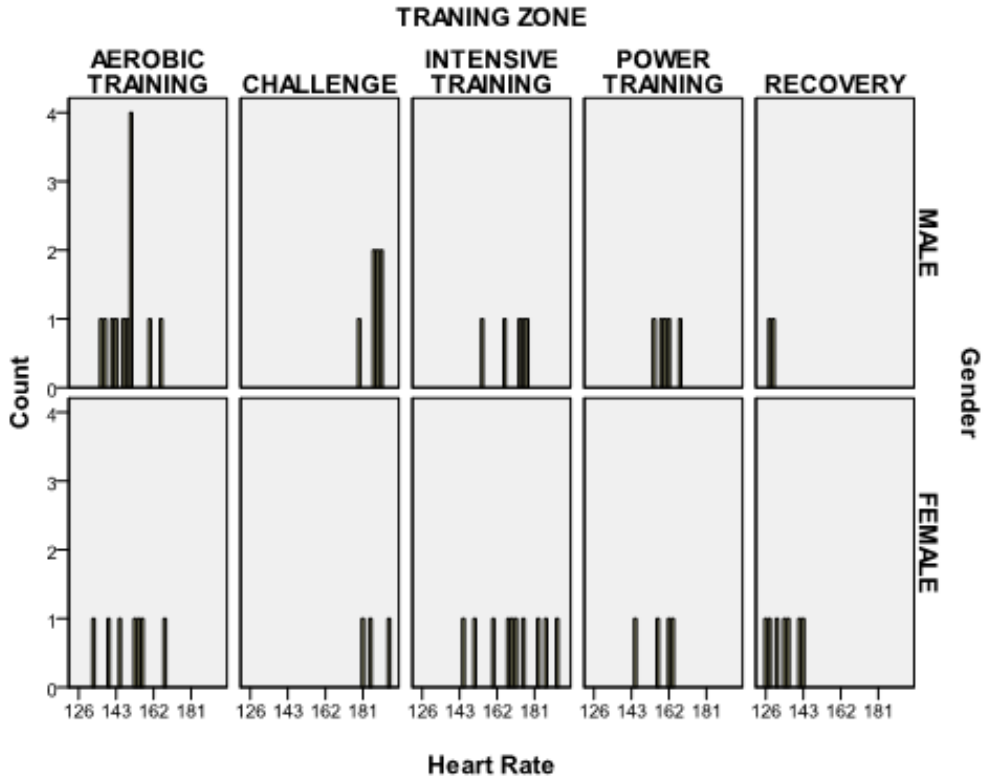

Fig 5: The relationship of gender distribution by training zones.

We can see in particular the same number of athletes, there is a variation in each TZ related to the number counted on various oscillations belonging to gender.

Assessing the particularity of HR max with the gender ratio may note that there is approximate oscillation very similar to each genus and concluded that the level of physical fitness as well as being considered is denoted the high capacity of the athletes in question.

Hypothesis 1 - Athletes who practice this particular physical activity showed significant changes in their abilities HR max;

Without the particularity of baseline HR max is somewhat impossible to make this claim. But listing all data quickly understands the capabilities of the athletes in the study have a high capacity APF for the task they played. Much can be said in relation to the effort applied to the exercise fitwalking, especially as regards the TZ where the physical load is higher. A prolonged and constant pace exercise, like training fitwalking with more than 30 or 40 minutes long, there may be a slow and progressive increase in heart rate, even when not accelerated pace. This fenomenon, known as cardiovascular drift, seems to depend on necessity of heat exchange and results from dehydration and greater diversion of blood to the skin. As the volume of circulating blood decreases the flow in each systole and also falls, to maintain constant cardiac output, it takes a proportional increase of the number of beats.

Hypothesis 2 - There are statistically significant differences in the parameters of the training zones based on gender;

Regarding gender, there are reports in the HR reduction challenges especially women after menopause, which may be related to the reduction of the hormone estrogen, considered a protective factor against cardiovascular level [8] literature. Correspondingly, men are considered more sympathetic dominant than women [1]. Regarding the study does not show the marked differences in values between the sexes, but it is to point out a small difference in HR max in the highest sample values.

Noting an average HR max at 160.87 bpm male gender, while sign 157,06 bpm in females, with a standard deviation of 17,938 and 19,117, based on the variable T -Test on statistical groups .

Hypothesis 3 - There are statistically significant differences in the parameters of heart rate by gender;

The heart rate is influenced by several factors such as: gender, PC, body position and age, the latter being one of the important determinants of HR [9, 10, 11, 12]. Several studies have suggested that PC decreases with aging due to structural and functional changes, such as respiratory neurohormonal changes, decline in cardiac function and atherosclerosis, increased myocardial stiffness, disturbance of the cardiac conduction system and early changes [10, 11, 13]. However regarding the study are not significant differences between the sexes. But existing degrees higher the standard deviation, the male gender is located in the following HR max, bpm there are 4 in 152 athletes in 156 bpm, 160 bpm, 164 bpm, 184 bpm, 187 bpm and 188 bpm 2 athletes. In relation to the female gender values are more homogeneous and there are only three decent registry values that lie 144 bpm in 3 cases, 2 cases in 158 bpm and 168 bpm in 2 cases, without taking into account the TZ variable as factor since there are changes in HR max with presentation of the intensity of physical exertion.

Hypothesis 4 - There are statistically significant differences in Borg scale by gender.

In reading data can nominate a statistical average frequency in the genre of 1.5 to the value of 6 on the Borg scale, and a variance of 0.54 for gender 5,047 Borg scale. In the condition of ages and check the table on the Borg scale in frequency 6 with a description of very low, low and medium high occupies more positions in relation to other values. The highest value with a representative frequency of 10 corresponding to high designation Borg scale.

Table 7: Description of the Borg Scale

Borg Scale			
	Frequency	**Percent**	**Valid percent**
VERY LOW	6	9.7	9.7
LOW	6	9.7	9.7
AVERAGE LOW	9	14.5	14.5
AVERAGE	8	12.9	12.9
AVERAGE HIGH	6	9.7	9.7
HIGH	10	16.1	16.1
VERY HIGH	9	14.5	14.5
VERY VERY HIGH	8	12.9	12.9
TOTAL	62	100.0	100.0

Hypothesis 5 - There are statistically significant differences in Borg scale based on age.

We can say that the Borg scale with the condition regarding age variable Tukey B we can find homogeneous groups as an average of the green with a very low value of 29.75 with a significance level of 0.05, for a number of 24 athletes. The lowest level we find the average corresponding to bright yellow with a value of 27.57 and a number of athletes corresponding to 28, with the highest value found at low to medium yellow color representing a universe of 33.88 and 41 athletes.

Table 8: Correlation between Age and Borg Scale.

Age			
Borg Scale	**N**	**Subset for alfa = 0.05**	
		1	**2**
AVERAGE	28	27.57	
VERY VERY HIGH	29	27.76	
VERY LOW	24	29.75	29.75
AVERAGE HIGH	25	31.36	31.36
HIGH	39	31.46	31.46
VERY HIGH	40	31.53	31.53
LOW	27	31.89	31.89
AVERAGE LOW	41		33.88

Inferential analysis

Data analysis was performed using the "Statistical Program for Social Sciences - SPSS" version 20 software. In every relationship fitwalking directed to exercise, and the differences in the mean values of each dependent variable, depending on the mode of exercise fitwalking were tested by use of simple analysis of variance for independent measures (ANOVA). Multiple comparisons were performed by the Scheffé test. The significance level was kept at 5%. The definition of $p < 0.05$ means a probability of only 5% of the difference found in the study. The lower the p-value, the more likely the study was not significant.

4. Discussion

Here further discussion of the results obtained through the tests implemented on the basis of the aforesaid authors throughout the work. In order to be a meeting with the objectives outlined we follow the order of the hypotheses, while discussing its veracity. The first hypothesis, where athletes who practice this particular physical activity show significant changes in their HR capabilities. The evidence in support of that physical activity has a beneficial contribution to health, but as to the proper amount of respect between physical activity and health is not yet fully defined, although some studies find [5, 15, 16] positive associations between physical activity and the state health goal. Without the particularity of baseline HR max is somewhat impossible to make this claim. But listing all data quickly understands the capabilities of the athletes in the study have a high capacity PC for the task they played.

The second hypothesis asks whether there are statistically significant differences in the parameters of the training zones based on gender. The correlation coefficient in relation to the study does not manifest the marked differences in values between the sexes, but it is to point out a small difference in HR max in the highest sample values. The third hypothesis there is statistically significant differences in the parameters of heart rate by gender. The standard deviation of these two variables shows gender difference by the number of times that there is a significant value for the number of athletes.

For the fourth hypothesis there are statistically significant differences in Borg scale by gender. The results show values ranging between the lowest values, where a sample with the highest number of athletes, the highest value that the exact opposite happens where there is a single, isolated descriptive value.

Finally, the hypothesis five that questions the existence of statistically significant differences in Borg scale based on age. We can say that the Borg scale with the condition regarding age variable Tukey B, found as an average of the green with a very low significance level of 0.05, for a number of 24 athletes homogeneous groups. The lowest level we find the average corresponding to bright yellow with a number corresponding to 28 athletes, with the highest value found at low to medium yellow color representing a universe of 41 athletes.

5. Conclusions

Therefore, tasks that resemble the march may have increased efficiency gain motor control. Burnfield (2010) [18] analyzed the kinematics of the elliptical workout and concluded that this activity and gait have similarities in patterns of movement. There is another study, however, Burnfield *et al*. (2010) [18] point out, based on analyzes by EMG, which during workout on the elliptical activity is compared to the activation of the march. The elliptical workout requires both cyclic movement and the maintenance of postural control, and gait as well as promotes the transfer of body weight to the affected limb, therefore, may have an additional benefit for improving balance. Increments in balance and gait speed are associated with improvement in lower limb strength in several studies, Leurer M. (2006) [19] with a strong correlation between gait speeds, balance. Training with fixed speed with submaximal representative of TZ has progressively increasing intensity field of HR max with a ratio of time spent in exercise fitwalking, featuring resistance training and fatigue, not strength. Therefore, the strength increase was limited, in view of which is an aerobic activity, and not loads (intensity).

The study on physical activity in fitwalking with the characterization of several proxy variables such as gender, age, HR, Borg Scale, and TZ. Characterized the relationship between variables in order to withdraw capacity and characteristics of physical activity. With the support of the Karvonen formula and the statistical analysis software package SPSS 20 was used in the preparation of the graphs of variables. Waiting thereby contributing to a further small quantity of analytical information because some existing resource information fitwalking as physical activity.

6. Acknowledgements

We would like to appreciate all the help of the department heads of all gymnasiums who provided general support.

7. References

1. Zhang J. Effect of age and sex on heart rate variability in healthy subjects. Journal of Manipulative and physiological Therapeutics, 2007.
2. Simpson ME. Walking Trends among U.S. Adults: the behavioral risk factors surveillance system, American journal of Preventive Medicine, 2003
3. Pedras D. Manual Prático de Fitwalking. Coleção Pesquisa em Educação Física, Jundiaí, Brasil, 2010.
4. Almeida MB, Araújo CG. Effects of aerobic training on heart rate. Rev Bras Med Esporte, 2003.
5. Kruger L. Healt-related quality of life, BMI and Phsical activity among adultes (>/=18 year): national physical activity and weight loss survey. Int J Obes, 2006.
6. Mier C, Feito Y. American Alliance for Health, Physical Education, 2006.
7. Barros VG, Reis RS. Análise de dados em atividade física e saúde: demonstrando a utilidade do spss: editora Londrina; Midiograf- Londres, 2003.
8. Shephard R. Aerobic Fitness & Health. Champaign: Human Kinetics, 1994.
9. Novais LD, Sabake DI, Takahashi Y. Avaliação da variabilidade da frequência cardíaca em repouso de homens saudáveis sedentários e de hipertensos e coronariopatas em treinamento físico. Revista Brasileira de Fisioterapia, 2006.
10. Paschoal MA. Variabilidade da frequência cardíaca em diferentes faixas etárias. Revista Brasileira de Fisioterapia, 2006.
11. Davini R. Frequência cardíaca de repouso e modulação parassimpática cardíaca em atletas idosos e idosos fisicamente ativos. Revista de ciências médicas, 2004.
12. Dorney L. The impact of music and imagery on fiscal performances and arousal: studies of coordination and endurance. Journal of Sports Behavior, 2002.
13. Medeiros P. O seu treinador pessoal. Lisboa: a esfera dos livros.
14. Kanagae P. Determinants of self-rate among community-dwelling women aged 40 years and over in Japan. Tokonu Jornal of experimental medicine, 2003.
15. Stewart KJ. Are Fitness, Activity, and fatness associated with Health-related Quality of life and Mood in Older Persons? Journal of Cardiopulmonary rehabilitation, 2003.
16. Taylor AH. Physical activity and older adults: a Review of Health benefits and the effectiveness of interventions. Journal of Sports Science, 2004.
17. Burnfield MJ. Intelligently controlled assistive rehabilitation elliptical training: an analysis of lower extremity electromyographic (EMG) demands with varying levels of motor assistance. RESNA annual Conference, Las Vegas, 2010.
18. Burnfield MJ. Similarity of joint kinematics and muscle demands between elliptical training and walking. Phys Therapy, 2010.
19. Leurer MK. The influence of early cycling training on balance in stroke patients at the subacute stage results of a preliminary Trial. Clinical Rehab, 2006.
20. Borg G. Escalas de Borg para a dor e o esforço percebido. São Paulo. Manole, 2002.
21. Blumenstein B. The augmenting role of biofeedback: Effects of auto generic, imagery and music training on physiological indices and atletic performances. Journal of Spors Sciences, 1995.
22. Bouchard C. Genetics of aerobic and anaerobic performances. Exec. Sport Sci. Rev. Balti9more: Wiliams & Wilkins, 1992.
23. Barata JL. Mexa-se… pela sua saúde: Guia prático de atividades físicas e de emagrecimento para todos. Lisboa: Publicações Dom Quixote, 2003.
24. Billat V. Fisiologia e metodologia del entrenamento. Editorial Paido tribo. Barcelona, 2002.
25. Chan T. An Investigation of Finger and Manual Dexterity. Perceptual Motor Skills, 2002.
26. Chacon-Mikahil MP. Cardiorespiratory adaptations induced by aerobic training in middle-aged men: the importance of a decrease in sympathetic stimulation for the contribution of dynamic exercise tachycardia. Braz J Med Biol Res, 1998.
27. Fleisher LA. Heart rate variability and cardiovascular fitness in senior athletes. Am J Cardiol, 1994.
28. Howley ET. Type of activity; resistance, aerobic and leisure versus occupational activity medicine & science in sports & exercice, 1994.
29. Mota J. A actividade fisica no lazer. Reflexões sobre a sua prática. Livros Horizonte. Lisboa, 1995.
30. Thomas JR, Nelson JK. Métodos de pesquisa em atividade fisica. Porto Alegre: Artmed, 2002.
31. Rennie KL. Effects of moderate and vigorous physical activity on heart rate variability in a British study of civil servants. Am J Epidemiol, 2003.
32. Karvonen MJ. The effects of training on heart rate. Annals of Medicine and Experimental Biology Fenn, 2002.