

Physical Fitness Profile of Le Parkour Practitioners

EXERCISE AND
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ORIGINAL ARTICLE

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ABSTRACT

The aim of this study was to evaluate physical fitness of Le Parkour practitioners in the city of Curitiba-PR. 13 male subjects (19.46 ± 2.82 years) who have been practicing the activity for more than six months participated in the study. Anthropometry and tests of physical fitness (back-and-forth 20-meter running, 1-minute abdominal, flexion and extension of the arms, vertical and horizontal push, sit-and-reach test and Wingate) were performed. The results were analyzed using descriptive statistics (mean and standard deviation) and are classified based on the reference tables for each test. After evaluating the VO_{2max} , 53.85% of the practitioners were considered "low fitness" and 46.15% presented adequate cardiorespiratory fitness. Regarding strength /abdominal resistance, 46.15% of subjects were classified as "low fitness" and 53.85% as "recommended range". The peak power and average power were considered as "regular" in all subjects. The fatigue index was greater than or equal in 54% of subjects. Flexibility was assessed as "low fitness" in 69.23% of the sample. Assessment of strength / endurance of upper limbs presented 84.62% in the "recommended range". The results from this study suggest that Le Parkour, as an acyclic activity with emphasis on jumping and activities of strength in arms, led best values on tests of dynamic horizontal, vertical and strength of upper limbs. Meanwhile the other variables were below average, which should be considered in the prescription of exercises and the monitoring of individuals during the activity's practice. Further studies with larger samples and training control Le Parkour practitioners are suggested.

Keywords: physical fitness, Le Parkour, physical assessment, health.

INTRODUCTION

Le Parkour is characterized by the practice of efficient actions which use the body dislocation from one point to another, passing urban or natural obstacles in a fluid manner and with minimum movement interruption, enabling the whole development of body and mind⁽¹⁻³⁾. It can be considered a sport, art, philosophy, having as motivation the human need to escape from risk situations, using techniques which try during the progression the maximum movement economy as well as minimum of interruption^(1,3,4).

This method first appeared in France in the 80's decade and was used as grounding to international military training, allowing the rational use of energy, with time gain and effort economy when facing obstacles intrinsic to the adversities in combat or rescue^(1,4,5). In Brazil, this practice has been spreading, mainly among younger subjects, thank to the internet and recent action movies⁽¹⁾, as has happened in Europe and the USA⁽⁶⁾. There is no space limitation for this practice nor need of structure or accessories; therefore, it has become an important instrument in the prevention and fight against sedentarism, since the increasing urban development of contemporary society, lack of suitable physical space, increasing popularity of different electronic games as well as technological era are factors which stimulate physical inactivity in this age group.

In Le Parkour, the body is the only tool, demanding adaptations

of the organism concerning physical fitness components related to health as well as sports performance⁽⁷⁻¹²⁾. In this activity, physical fitness can be developed outdoors, through natural activities such as walking, running, jumping, cat crawling (quadrupedal move), climbing, balancing, throwing, rising, defending and swimming^(1,4,5).

However, the Le Parkour practice is relatively new in Brazil and little known among the Physical Education professionals. Similarly to what occurs in other extreme sports⁽¹³⁾, which present acyclic behavior, there is lack of parameters for the required physical capacities during the activity, making it difficult to prescribe exercises and follow-up of individuals who wish to start practicing Le Parkour. The absence of specific literature as well as lack of scientific data on the factors which affect performance of its practitioners and also on which variables are able to contribute to the physiological characterization of this activity evidence the need of investigations on this topic. Thus, the aim of this study was to evaluate physical fitness of Le Parkour practitioners in the city of Curitiba-PR.

MATERIAL AND METHODS

Study participants

Descriptive and transversal research of the Le Parkour practitioners in the city of Curitiba-PR. 13 male subjects (19.46 ± 2.82 years), intentionally selected participated in this study

Inclusion criterion adopted was to have practiced the activity for over six months.

The participants were told about the research aims, as well as its volunteer participation character. All participants or their legal responsible ones signed the Free and Clarified Consent Form. This research was approved by the Ethics in Research Committee of the Federal University of Paraná, fulfilling the resolution number 196/96.

Instruments and procedures

The participants were interviewed so that their general characteristics and time of Le Parkour practice were collected. Body composition and physical fitness of the individuals were evaluated in three phases, with an interval longer than 48 hours and shorter than a week. On the first phase, stature, weight and aerobic capacity were verified. On the second phase, flexibility, strength/endurance of upper limbs, vertical jump, abdominal strength/endurance and horizontal jump tests were performed. On the third phase, the Wingate test was performed.

Anthropometric evaluation used the following instruments: a digital scale brand name Tanita, calibrated and checked, with 0.01g resolution and 0 to 136kg scale, for determination of body weight; a 3-meter long flexible metal measuring tape with 0.1 cm resolution attached to the wall, for stature measurement. Body mass index (BMI) was calculated from these measurements, through a body mass quotient/ (stature)⁽²⁾, where mass was in kilograms (kg) and stature in meters (m). The results were classified by age group, having the table of the World Health Organization for individuals older than 20 years as guidance⁽¹⁴⁾.

Aerobic capacity of the individuals was assessed through the back and 20-meter forth running aerobic test validated in Brazil⁽¹⁵⁾. The test consisted in running steady distances of 20 meters, where the individual touches the line marked on the ground and returns to until the exit site, following the rhythm determined by a sound signal. The test was conducted until exhaustion and interrupted when the individual did not follow the sound or did not reach the line marked in the two-meter distance, for two consecutive times. The rhythm between the signals increases according to the phase change. The equations for VO_{2max} calculation ($ml.kg^{-1}.min^{-1}$) were used according to age, as shown in table 1. In order to facilitate the analysis of the proportion of subjects with low aptitude, they were grouped in two categories (low aptitude or within recommendation) based on the classification by Boldori⁽¹⁶⁾. The 'mean' and 'low' categories were termed 'low aptitude', while the 'excellent' to 'good' categories were termed 'within recommendation'. The cohort point for the 'within recommendation' category the VO_{2max} value equal to or higher than $43ml.kg^{-1}.min^{-1}$.

Box 1. VO_{2max} prediction equations in $ml/kg/min$ in the aerobic 20-meter back-and-forth running test.

$$y = 31.025 + 3.238X - 3.248A + 0.1536A \times \text{Individuals}$$

y = VO_{2max} in $ml/kg/min$; X = velocity in km/h (in the reached stage); A = age in years.

Abdominal strength/endurance was determined and classified by the one-minute abdominal test⁽¹⁷⁾, in which the individual lays down on supine position on the mat placed on a flat surface, with

fingers tied behind the head, flexed knees, feet on the ground and apart at shoulder distance. The flexion movement is performed as many times as possible, and the number of repetitions performed correctly during one minute is recorded. The individuals classified as "average" or "fair" were considered as having "low aptitude". Those assessed as 'excellent' or 'mean' were grouped in "within recommendation". The minimum values recommended for the abdominal test in one minute considered in this test were of 38 repetitions (15 to 19 years) and 33 repetitions (20 to 29 years).

Strength/endurance of upper limbs was assessed by the arm flexion and extension test. The individual performed the movements from the laid position, at ventral decubitus, hands and feet tips on the ground, extended arms along the body and at shoulder width. The thorax should touch the floor at each movement and the arms should extend on the way back, keeping trunk and legs aligned. The exercise was performed until exhaustion, and only the correct repetitions were considered.

Flexibility (posterior thigh and trunk) was assessed by the sit-and-reach test on Wells bench. The subject started the test at sitting position with extended knees, shoulder flexion at 90° and right hand resting over the left one (palms facing down). The test consisted in flexing the trunk to reach the widest range of motion (in centimeters). The evaluator held the subject's knees to avoid flexion during the test performance. This procedure was repeated three times and the longest measurement was recorded.

The results of upper limbs strength and flexibility followed the same classifications proposed by Nahas⁽¹⁸⁾, grouping them in two categories (low aptitude and within recommendation). The results classified as 'risk condition' or 'low aptitude' were considered 'low aptitude'; while for 'within recommendation' the results classified as 'athletic condition' or 'within recommendation' were grouped. Minimum values of 23 repetitions (15 to 19 years) and 22 repetitions (20 to 29 years) were considered as recommended for arm flexion/extension. Concerning flexibility, the 29cm (15 to 19 years) and 30cm values (20 to 29 years) were considered.

Lower limbs strength/power was assessed by the vertical thrust and by the horizontal thrust test⁽¹⁹⁾. On the first test, the subject started at standing position, body along the wall, feet parallel and upper limbs at shoulder flexion of 180° . The initial value considered (reference) was the extreme rest point of the distal phalange of the dominant hand on the measuring tape attached to the wall. The test consisted of three jumps on side of the wall (approximate distance of 30cm), always with the dominant hand. The difference between the first mark (steady) and second mark (jump) was recorded. On the second test, the subject stayed behind a starting point (line), agreeing with the zero mark of the measuring tape attached to the ground. After the command, the subject performed a horizontal jump, at the most distant point as possible. Three trials were performed. The Mark reached by the posterior part of the foot on the measuring tape was recorded. It has not been found in the literature classification for subjects older than 18 years. The results of the vertical and horizontal thrust test were presented with the aim to demonstrate the practitioners' profile in strength/power of lower limbs, due to the large number of jumps performed by the Le Parkour practitioners.

Power and anaerobic fitness of lower limbs were evaluated by the Wingate test, performed in a bicycle with mechanical braking. The load used was of 0.075kp/kg⁽¹⁹⁾. Trunk elevation from the seat was not allowed during the test. The computer system of the cycle ergometer provided data on the generated power at every five seconds of test, recognizing the minimum power and peak power. Mean power was calculated through the ratio between the sum of the powers during the entire test (5, 10, 15, 20, 25 and 30s) and the number of recordings (six). The fatigue index was calculated through the following formula: (peak power – minimum power) x 100/peak power⁽²⁰⁾.

Data analysis

Data analysis was presented through descriptive statistics. Data were analysed by the Statistica 5.5 statistical package.

RESULTS

The general characteristics of the 13 participants are presented in table 1. Mean age of practitioners was of 19.46 ± 2.82 years, ranging between 16 and 25 years. All subjects presented BMI suitable for their sex and age (table 1).

The results of the physical fitness test of the Le Parkour practitioners are presented in table 2.

Table 1 - General and anthropometric characteristics of the Le Parkour practitioners.

Variables	X	CI 95%
Age (years)	19.46 ± 2.82	(16 – 25)
Stature (m)	1.74 ± 0.05	(1.68 – 1.87)
Weight (Kg)	64.38 ± 6.75	(55.4 – 74.1)
BMI (Kg/m ²)	21.24 ± 2.07	(18.30 – 25.05)

Table 2. Means and standard deviations of the physical fitness tests of the Le Parkour practitioners.

Variables	X	CI 95%
VO _{2max} (ml.kg ⁻¹ .min ⁻¹)	44.21 ± 5.60	(36.60 – 53.60)
Abdominal (repetitions/ min)	35.92 ± 5.44	(27 – 46)
Arm flexion (repetitions)	28.54 ± 5.87	(16 – 37)
Vertical jump (cm)	55.96 ± 5.31	(48 – 64)
Horizontal jump (m)	2.53 ± 0.21	(2.24 – 2.88)
Flexibility (cm)	23.54 ± 8.32	(11 – 34.5)
Peak power (W)	653.42 ± 129.31	(459.06 – 795.71)
Peak power (W/kg)	10.09 ± 1.32	(8.21 – 12.01)
Mean power (W)	504.35 ± 72.70	(384.87 – 592.34)
Mean power (W/kg)	7.87 ± 0.63	(6.85 – 8.86)
Fatigue index (%)	47.13 ± 13.29	(17.54 – 59.74)
Instant max power (sec)	6 ± 1.63	(4 – 10)

After the VO_{2max} value of each subject was classified (ml.kg⁻¹.min⁻¹), 53.85% of them were classified with 'low aptitude' and 46.15% presented suitable cardiorespiratory aptitude (figure 1). Abdominal strength-endurance was classified as 'low aptitude' in 46.15% of the subjects and 53.85% of them presented values within the 'recommended range' (figure 1). Peak power and mean power were considered as 'average' in all individuals. Mean fatigue index was equal or higher in 54% of the subjects (figure 1).

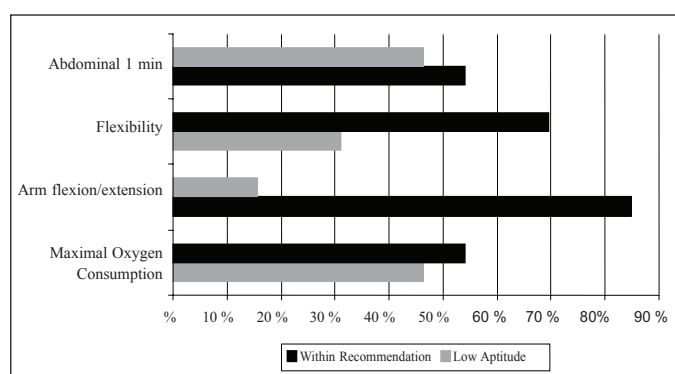


Figure 1. Percentage distribution of the practitioners with low physical fitness and within the recommended range.

Flexibility was classified as 'low aptitude' in 69.23% of the sample. In the evaluation of strength/endurance of upper limbs it was observed that 84.62% were in the 'recommended range' (figure 1).

Concerning the peak power, it was observed that 53.85% obtained classification between 'fair and average' and 46.15% between 'good and very good'. In the mean power, 69.23% of the subjects were classified as 'fair and average' and 30.77% obtained values considered 'good'.

DISCUSSION

This study had the aim to evaluate the physical fitness of Le Parkour practitioners in the city of Curitiba-PR. A relevant component in the physical assessment is the maximal oxygen consumption. Considering the sample studied in the present study, seven out of the 13 Le Parkour participants were considered with VO_{2max} below the recommendation to age and sex. In that case, the VO_{2max} assessment demonstrated that aerobic aptitude in this activity does not seem to be well developed, since about 50% of the individuals assessed obtained values below the recommendation to the general population. This episode was probably due to the fact that the VO_{2max} is not a key-variable in the development of this activity.

Regarding the anaerobic fitness, the Le Parkour practice presents the characteristic of performing vertical and horizontal jumps along a path, as well as high intensity and short duration actions while passing obstacles⁽²⁻³⁾, evidencing the need to be anaerobically fit. In the present study, the anaerobic fitness was assessed through explosive strength of lower limbs, using the horizontal and vertical thrust test and the Wingate test.

The results of the horizontal thrust test found for the participants of the present study were higher than the ones found for male elite athletes practitioners of orientation of the Military Units of Santa Maria-RS, with mean age of 30 years, who presented horizontal thrust mean in 2.20 ± 0.22m. A similar result was obtained with futsal athletes, in the under-17 category, between 16 and 17 years of age, who presented horizontal thrust of 2.16m and for the under-19 category, 18 years of age, whose values were of 2.15m⁽²¹⁾. Concerning the vertical thrust, the results found for the Le Parkour practitioners in the present study were higher than the ones of Street Skate practitioners with a minimum of two years of practice, whose mean value was of 46.7 ± 8.3cm⁽²²⁾. It suggests that the Le Parkour practice develops power of lower limbs associated with upper limbs.

The Wingate test presented values for peak power (w/kg) lower than the ones found in juvenile basketball (12.54 ± 2.25); soccer (11.25 ± 2.49); volleyball (10.32 ± 2.16) and futsal athletes (10.33 ± 1.05)⁽²³⁾. A similar situation occurred with the fatigue index, which suggests that the Le Parkour practice alone cannot improve anaerobic fitness indices. Some authors have also evidenced that even in sports with predominance of anaerobic metabolism, such as soccer and basketball, the VO_{2max} values are higher than the ones from the general population, but lower than in sports predominantly aerobic, such as marathon runners^(24,25).

Trunk anterior flexibility is an important component of the clinical and of physical fitness examinations used as an indicator of vertebral function. This component can be assessed through the sit-and-reach test⁽²⁶⁾. In the Le Parkour practitioners flexibility was assessed and classified as 'low aptitude' in 69.23% of the participants. Thus, this variable does not seem to be very developed in the Le Parkour activities.

Another crucial component to physical fitness is muscular strength, considered by many specialists as a special characteristic both to sports performance and to physical exercises prescription^(8,9,27,28). The results concerning strength/endurance of upper limbs found for the Le Parkour practitioners were the ones which presented the best physical fitness indices. However, abdominal strength/endurance was within the 'recommended range' in only 53.85%, the rest of the group presented unsatisfactory results.

The majority of the variables was below the physical fitness levels of athletes in general. Sports training many times does not exist, since the majority of the practitioners does not have specialized follow-up. Thus, the lack of parameters for the physical capacities required during Le Parkour practice makes the designing of training methods as well as control of the involved

variables difficult. The same situation occurs in other acyclic sport modalities, such as surfing⁽¹³⁾.

This study presented limitations regarding the sample size as well as the lack of training control for its practitioners. Since it is a new activity among adolescents and young adults in Curitiba, the time of practice set to select the individuals for the present study (over six months), despite having excluded the beginners, it may be still insufficient to promote higher aptitude in some variables. Nevertheless, it is believed that the results found may bring important information to the understanding of the physical fitness levels of the practitioners of this activity, especially considering the lack of scientific data on this practice. Further studies with larger samples and training control of the Le Parkour practitioners are suggested.

CONCLUSION

The evidence presented in this investigation suggests that the Le Parkour practice provided greater development of upper limbs, which may be attributed to the predominance of jumps and activities to pass urban or natural obstacles with wide use of the arms during its practice. However, the remaining variables did not present values above the population mean, which should be considered by the physical educator when prescribing other complementary exercises with the aim to promote health. Le Parkour practice does not seem to require great physical fitness in its practice, suggesting that it can be performed by any individual within his/her physical conditions and limitations.

All authors have declared there is not any potential conflict of interests concerning this article.

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