

## Reference Values for the Teaching-Learning-Training Process of the Infant-Juvenile Mozambican Basketball

### Valores de Referência para o Processo de Ensino-Aprendizagem-Treinamento do Basquetebol Infante-Juvenil Moçambicano

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#### Abstract

The reference values are very useful to distinguish, in this case, the performance of coordination of technical skills and motor skills with ball, allowing an evaluation to be performed in order to help in the teaching-learning-training process. The aim of this study was to propose reference values of ball coordination of basketball-specific skills and motor skills for the teaching-learning-coaching process of the Mozambican children and youth athlete. A total of 165 young men and women aged 15 to 16 years old were evaluated, being 99 male (15.7±0.46) and 66 females (15.48±0.50). Of this universe, 30 athletes were an integral part of the national team under-16 teams that participated in the African Championship of Basketball (Afrobasket'2017) being 15 athletes by sex. For the motor skills evaluation (cardiopulmonary resistance), displacement velocity, abdominal strength and endurance, upper limb resistance, upper limb explosive force, static vertical propulsion, vertical propulsion with counter-movement, agility, flexibility; for coordination with ball pass, dribble, throw and defensive lateral slide tests were evaluated. A significant ( $p < 0.05$ ) effect of sex was evident in all tests except displacement velocity and throwing ability. Based on the results found, the reference values of motor skills and basketball-specific skills for the teaching-learning-coaching process of the Mozambican child-youth athlete were established according to gender and it was possible to find the sampled athletes within the proposed cut-off points.

**Keywords:** Exercise. Physical Endurance. Athletes.

#### Resumo

*Os valores de referência são de ampla utilidade por diferenciar, neste caso, o desempenho da coordenação com bola das habilidades técnicas e das capacidades motoras, permitindo que seja feita uma avaliação de forma a auxiliar no processo de ensino-aprendizagem-treinamento. O objetivo deste estudo foi propor valores de referência da coordenação com bola das habilidades específicas do basquetebol e das capacidades motoras para o processo de ensino-aprendizagem-treinamento do atleta infante-juvenil moçambicano. Foram avaliados 165 jovens de ambos os sexos com idade entre 15 e 16 anos, sendo 99 masculinos (15,7±0,46) e 66 femininos (15,48±0,50). Deste universo, 30 atletas eram parte integrante das seleções nacionais de sub-16 que participaram do campeonato africano de basquetebol (Afrobasket'2017) sendo 15 atletas por sexo. Foram avaliadas as seguintes capacidades motoras (resistência cardiorrespiratória), velocidade de deslocamento, força e resistência abdominal, resistência dos membros superiores, força explosiva dos membros superiores, impulsão vertical estático, impulsão vertical com contra movimento, agilidade, flexibilidade); e para a coordenação com bola foram avaliadas as seguintes habilidades técnicas (passe, dribble, lançamento e deslize defensivo lateral). O sexo evidenciou um efeito significativo ( $p < 0,05$ ) em todos os testes, exceto os testes de velocidade de deslocamento e habilidade de lançamento. A partir dos resultados encontrados, os valores de referência das capacidades motoras e habilidades específicas do basquetebol para o processo de ensino-aprendizagem-treinamento do atleta infante-juvenil moçambicano foram estabelecidos de acordo com o sexo e foi possível situar os atletas amostrados dentro dos pontos de corte propostos.*

**Palavras-chave:** Exercício. Resistência Física. Atletas.

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#### 1 Introduction

Basketball, just as other team sports such as soccer, futsal, volleyball and handball, undoubtedly occupies a prominent place within the contemporary movement culture<sup>1,2</sup>. The sport is present in several sociocultural contexts and is manifested in various forms since the school sports, leisure, recreation, inclusion, health, nature until the high performance level<sup>3-5</sup>.

According to Kroger and Roth<sup>6</sup> and Morales et al.<sup>7</sup> the sports initiation process should first of all preserve the characteristics, development opportunities, needs and interests of young athletes. Based on developmental structures to

outline the considerations about the motor learning, teaching the sports teaching methodology, specific characteristics of Collective Sports Games (JEC) in the sports training system, are also key issues for the Teaching-Learning-Training process (T-L-T).

Some authors<sup>3,8,9</sup> highlight specificities of different theories of motor development regarding the aspect of time structure essential for performance levels. They are based on the age ranges as periods or stages sensitive to training or the enlargement of the characteristics of implementation of the action. These preserve the evolutionary phase in which the young people have different characteristics that empower them

with a greater potential to develop themselves in a specific profile. Silva and Greco<sup>10</sup> emphasize that the sports initiation phase is a period that covers the time in which children develop fundamental skills, followed by the sportive skills, and finally when they decide to practice a specific modality.

An adequate planning and systematization of the T-L-T process makes it possible from the parameters interpretation inherent to the sports performance<sup>11</sup>. However, the broad vision of this process begins with the consideration of the sports classification (individual and collective) before the skills, being classified into open and closed<sup>12</sup>. The ability context should be considered also by the sports groupings. JEC can be classified into modalities by participation scope (alternating or simultaneous) and space (separate or common).

The development of the technical skills parameters of JEC, fits the activity and the game situational reality. That is why Benda<sup>13</sup>, concludes that in the sports games the achievement of technical skills depends on the coordinative capacities, which are interrelated in the information receipt from the environment (by means of the senses), which represents an important demand of the analyzers related to the practice context. Open skills are performed on the parameters of drivability pressure typical of JEC (time, accuracy, concurrency, load, organization and variability)<sup>6</sup>, changing and regulating the execution of the action.

In this context, Silva<sup>14</sup> defines the coordination with the ball, as the body control in the basic skills implementation with the ball in situations characteristics of sports games under different conditions of motor requirement. The importance of coordination for the participant to develop appropriate actions, leads to consider this content in the T-L-T process. The coordination travels across the different constituent structures of not only the motor achievement but also the choice of the solution and the ideas organization.

The study of the athletic performance indicators in children and young people has been the object of interest on the part of several investigators<sup>15-23</sup>. The concerns about the pedagogical and didactic-methodological options in planning and systematization of training in the long term lead to the process analyzes not on the results anymore. However, what is expected of this process analysis is the consideration of intra and inter-individual differences existing in the performance of each development stage and among the learning stages to change alteration parameters of the own planning within the same process.

The indication of the reference tables allows to establish a percentile distribution of the population's relative values behavior, and from there to represent in rating scale. In this context, these tables allow detailed reference values for a specific population, position each child or adolescent in terms of percentiles in relation to the studied population. There is some referenced literature in the area<sup>15-17,23,24</sup> which brings reference values for the infant-juvenile population, orienting

its use in the field of Physical Education and Public Health.

In Mozambique, research related to the reference values construction with a focus on the T-L-T process is scarce or almost non-existent. The studies about the infant-juvenile population with reference tables already elaborated report parameters associated to health in the areas of physical fitness, anthropometric and nutritional profile<sup>16,17</sup>. The T-L-T process in basketball has been developed in a disorderly and specific way in a single modality both in school as well as in the clubs. Without reference values for planning and change the process, the young population restrict themselves to specific learning stimuli, exposed to strong pressures of a high performance level, which often reach inappropriate plans for the psychological structure of the age range in question. These factors according to Moreira et al.<sup>25</sup> exert strong pressure that often do not match the cognitive development, social-affective and motor level of the young athlete.

In consequence, it is necessary to develop a proposal for reference values that can assist teachers and trainers in planning and systematization of training in accordance with the possibilities, interests and needs of young athletes, in the same way, serve the detection and identification process of talent in the sport<sup>23</sup>. As a result of this proposal, it will be possible to trace the respective profiles suiting the development programming to the reality of each context and subject.

Silva<sup>26</sup> states that in according to the different strategies and methodologies it is realized that the collective sports teaching should happen through the match capacity building (with the transfer of learning and variation in the teaching of skills), guided incidentally (according to the match situations). Having a reference of values of open skills and their demands for implementation in the open context is showing parameters of scope, objectives for the planning of targeted training and appropriate to the characteristics of the development stages, thus respecting the subject in his or her entirety.

In this context, the objective of this research was to present reference coordination values of specific skills and motor skills with the ball for the T-L-T process in infant-juvenile basketball Mozambican athlete in both sexes.

## 2 Material and Methods

### 2.1 Study Area

The present study was carried out in Mozambique. Mozambique is an African country located in Africa Southeastern. It has a territorial extension of approximately 799,390 km<sup>2</sup> and a population of approximately 28,861,863 million inhabitants, according to data released by the National Institute of Statistics<sup>27</sup>. Being bathed by the Indian Ocean across the East range. To the north, the country borders with Tanzania, to the west with Malawi, Zambia, Zimbabwe and Swaziland, and to the south with South Africa. Mozambique is composed by 11 provinces: Niassa, Cabo Delgado, Nampula, Zambézia, Tete, Manica, Sofala, Inhambane, Gaza, Maputo

Province and Maputo City which has the status of province.

The city of Maputo is located in the south of the country, in the west bank of Maputo Bay, and since 1980 has the status of a province (Portal of the Government of the city of Maputo, 2014), whose territorial extension is estimated at 300 km<sup>2</sup> and a population of approximately 1,101,170 to millions of inhabitants.

## 2.2 Sample

The basketball in Mozambique presents quite specific characteristics, its practice is quite regular in Maputo city, and the clubs seem to have better organization if compared to other regions of the country. The Association of Basketball has an intrinsic relationship with its affiliates (clubs) and organizes the tournaments on a regular basis involving all levels, that is not the case in other regions. This framework of situations is determinant in the composition of national selections from the base teams until the adult teams in all the sexes, where 90% of the selected athletes are from the city of Maputo. The context exhibited motivated the present study in the city of Maputo.

The sample was composed of 165 athletes from the infant-juvenile federated category, with ages ranging from 15 to 16 years in both sexes, being 99 males and 66 females. Of this universe, 30 athletes were an integral part of the national team under-16 teams that participated in the African Championship of Basketball.

Participation was voluntary and with the consent of the respective clubs and coaches. All athletes and coaches were oriented about the procedures to be performed for all the tests implementation. This study complied with all rules established by the Committee for Ethics in Research of the Physical Education and Sports School of the Pedagogical University, being approved by the Protocol CCFEFD002/2018. All tests were applied on the premises of the Physical Education and Sport School.

## 2.3 Instruments

For analysis of the participants motor skills the evaluation protocols of Bosco et al.<sup>28</sup> and Gaya<sup>29</sup> were applied, in the following tests: Vertical thrust (leap from the static position of semi-squat, hands on hips (SF) and counter-movement leap, keeping hands on hips (SCM), withdrawn from the protocol and the strength resistance of abdominal muscles (*sit-ups*); Explosive strength of the upper limbs with the performer standing up (Throwing forward the 2-kg medicinal); flexibility of the extensor trunk muscles (Sit and reach); agility (square test) in seconds; 20-meter running (speed test) in seconds and 12-minute running in meters (cardiorespiratory capacity test).

In the coordination analysis with ball four specific skills were assessed, according to the proposal suggested by Kinkerdall, Joseph and Robert<sup>30</sup>, namely: (i) a test of precision and speed of execution of the throwing to the basket as measured by the maximum number of points, (ii)

accuracy and speed test of pass execution against the wall also measured by the maximum number of points, (iii) an execution speed test and control of the dribble with changes of direction, measured in seconds, and (iv) test of execution speed and quality of the displacements in the lateral slip also in seconds.

Understanding the coordination as the basis of skills a content validity of skills test was performed to find the constraints of requirements of the execution of these skills in situational context of collective sports games. The described tests were submitted to a set of judges in the area of coordination with ball and they were required to identify each pressure constraint of coordination with the ball. It was used a Likert scale for the content validity coefficient analysis (CVC).

## 2.4 Statistical analysis

Initially, a descriptive analysis was performed in the program *Statistical Package for Social Sciences* (SPSS), version 23.0, and counted with the basic measures, i.e., the subjects' mean and standard deviation. In the athletes' classification, percentile values, and quantile measures were proposed (quintile) as a way of establishing the reference values, with the following categories: weak ( $P \leq 5$ ); reasonable ( $P 6-35$ ); good ( $P 36-65$ ); very good ( $P 66-94$ ) and excellent ( $P \geq 95$ ). In this study, once the sample is composed of subject athletes the weak and excellent categories may not be seen as mutually exclusive, but rather, cutoff points of great relevance for the escalation of the samples subjects. The data were checked for distribution normality, as well as the presence of points outside the curve (*outliers*). The assumption of normal distribution of values was verified by the Kolmogorov-Smirnov test. A comparison was made through the Student's t test for independent samples in order to verify differences between genders, and the significance level was maintained in 0.05.

## 3 Results and Discussion

For the purpose of the results contraposition of the average behavior of the sample of athletes, studies were selected with similar designs developed outside the Mozambican context, once in Mozambique gender studies with athletes are nonexistent. Nevertheless, we are aware that, in the socio-economic context, the samples investigated in international level studies are typically different from the population examined in the present study

The results of the comparison of the Student's t test on the effect of sex, in each of the analyzed areas showed a significant effect ( $p < 0.05$ ) in almost all the assessed tests (agility, flexibility, abdominal resistance, the upper limbs resistance, explosive strength of the upper limbs, vertical thrust of limbs, vertical static thrust of limbs with counter-movement, aerobic resistance; and in coordination

with the ball: Pass, dribble and defensive lateral slide) with the exception of tests for travel speed ( $p= 0.76$ ) and throwing ability ( $p= 0.54$ ), in which the sex effect was

not significant. These differences presented influenced the presentation and discussion of results in separate tables between the sexes.

**Table 1 - Reference Values of motor skills of female athletes (n=66)**

Classification								
		Weak	Regular	Good	Very Good	Excellent		
Tests	n	( $P \geq 5$ )	(P6F-35)	(P36F-65)	(P36F-94)	( $P \leq 95$ )	M±Dp	Md
Agility	66	8.3	8.23	7.36	6.72	5.95	7.07 ± 0.77	6.95
Flexibility	66	22	35.5	40	45	46	37.67 ± 6.34	39
RAbd	66	15	27	32	39	40	29.58 ± 6.96	29
RMS	66	9	18	23	36	37	21.26 ± 7.92	20.5
FEMS	66	3.87	5.1	5.81	8.5	8.58	1.49 ± 0.18	5.52
IVMI (SE)	66	22.8	31.9	38.3	44	44.5	6.99 ± 0.86	34.7
IVMI (SCM)	66	26.4	36	42.3	49.1	50.7	7.68 ± 0.95	40.1
RAer	66	600	950	1150	1420	1460	1137.88 ± 228.55	1100

**Legend:** RAbd: Abdominal resistance; RMS: Upper Limbs Resistance; FEMS: Explosive strength of the upper limbs; IVMI: Static vertical thrust and counter-movement; RAer: Aerobic resistance; M: Mean; Dp: Standard Deviation; Md: Median

**Source:** Research Data.

It can be observed in Table 1 and 2, of the motor skills tests, only the flexibility test of the extensor muscles of the trunk (Sit and reach), the girls presented median values higher

if compared to their male peers with a gap of 8 cm of median. In the remaining tests, the results of the median of males was more pronounced than in girls.

**Table 2 - Reference Values of motor skills of male athletes (n=99)**

Classification								
		Weak	Regular	Good	Very Good	Excellent		
Tests	n	( $P \geq 5$ )	(P6F-35)	(P36F-65)	(P36F-94)	( $P \leq 95$ )	M±Dp	Md
Agility	99	6.85	6.13	5.67	5.12	5.1	5.95 ± 0.54	5.93
Flexibility	99	17	29	35	40	41	30.78 ± 7.05	31
RAbd	99	22	30	41	59	60	37.51 ± 12.15	35
RMS	99	10	20	27	40	41	24.16 ± 9.60	23
FEMS	99	4.93	6.61	8.14	9.9	10.05	7.35 ± 1.58	7.25
IVMI (SE)	99	20.5	33.3	43.9	52.9	53.2	37.88 ± 10.12	39.5
IVMI (SCM)	99	26.6	38.85	48.1	58.3	58.9	43.90 ± 9.97	45.2
RAer	99	800	1200	1400	1600	1600	1264.65 ± 286.63	1300

**Legend:** RAbd: Abdominal resistance; RMS: Upper Limbs Resistance; FEMS: Explosive strength of the upper limbs; IVMI: Static vertical thrust and counter-movement; RAer: Aerobic resistance; M: Mean; Dp: Standard Deviation; Md: Median.

**Source:** Research Data.

In the comparison between the sexes statistical significance was found ( $p < 0.05$ ), at the level of coordination with the ball in the execution of the pass, dribble and defensive lateral slide. In contrast there was no significance ( $p = 0.54$ ) at the throwing. The results of the median found give a slight

advantage to the boys, in the dribble difference of the median was 0.15 thousandths of seconds, at the pass the difference of the median was 17 points and the lateral defensive slide the difference of the median of 0.14 milliseconds to seconds respectively, as demonstrated by the Tables 3, 4, and 5.

**Table 3 - Reference Values of specific skills of male athletes (n=99)**

Classification								
		Weak	Regular	Good	Very Good	Excellent		
Tests	n	( $P \geq 5$ )	(P6F-35)	(P36F-65)	(P36F-94)	( $P \leq 95$ )	M±Dp	Md
Dribble (s)	99	20.5	19.2	10.16	9.32	7.69	10.86 ± 3.92	9.52
Pass (p)	99	10	22	48	68	72	38.61 ± 21.60	38
Slide (s)	99	26.3	25.9	11.5	10.68	9.44	12.93 ± 5.06	11.3

**Legend:** (s): seconds; (p): points; n: sample number; M: Mean; Dp: Standard Deviation; Md: Median

**Source:** Research Data.

**Table 4** - Reference Values of specific skills of female athletes (n=66)

Classification								
		Weak	Regular	Good	Very Good	Excellent		
Tests	n	(P $\geq$ 5)	(P6F-35)	(P36F-65)	(P36F-94)	(P $\leq$ 95)	M $\pm$ Dp	Md
Dribble (s)	66	10.45	10.41	9.5	9.14	8.21	9.25 $\pm$ 0.68	9.37
Pass (p)	66	11	19	23	30	31	21.83 $\pm$ 5.46	21
Slide (s)	66	12.85	12.69	11.4	10.41	9.15	11.01 $\pm$ 1.06	11.11

**Legend:** (s): seconds; (p): points; n: sample number; M: Mean; Dp: Standard Deviation; Md: Median

**Source:** Research Data.

**Table 5** - Reference values in both sexes (n=165)

Classification								
		Weak	Regular	Good	Very Good	Excellent		
Tests	n	(P $\geq$ 5)	(P6F-35)	(P36F-65)	(P36F-94)	(P $\leq$ 95)	M $\pm$ Dp	Md
Speed(s)	165	4.96	4.9	3.82	3.4	2.91	3.69 $\pm$ 0.98	3.62
Throw (p)	165	4	10	15	37	38	14.97 $\pm$ 9.15	13

**Legend:** (s): seconds; (p): points; n: sample number; M: Mean; Dp: Standard Deviation; Md: Median.

**Source:** Research Data.

One of the main study limitations, the same is restricted only to the federated basketball athletes' assessment from Mozambique, which makes it impossible the generalization of the results to the rest of the population. However, when it comes to a proposal of reference values for the T-L-T process, the results open the way for future investigations in other modalities practiced in Mozambique so that it is possible to have a scenario of sport, in particular the collective sports. In addition, it should be noted that this is the first study with a methodological approach to the sports teaching, being necessary to propose a tool to help Physical Education teachers and sports coaches. What refers to the necessity of further investigations to establish cutoff points validated to all fields that interfere in the T-L-T process for the high performance sport.

A proper interpretation of the motor skills and coordination assessment of technical with the ball skills requires that the values found in a sample be compared with reference values of a given population or of the same sex, age and in this particular case of the sports training degree. In a way that these values can be used as indicators and serve as basic values for the guidance of the professionals in the T-L-T process. It is also based on the attempt to establish values reached for the planning and training systematization, of the initiation of the high performance level.

The proposal of this research was to present percentile reference values of coordination with ball of the specific skills and motor skill for the T-L-T process of the infant-juvenile basketball Mozambican athlete in both sexes. For the athletes' performance classification, percentile values, and quantile measures were proposed (quintile) as a way of establishing the reference values, with the following categories: weak (P $\leq$ 5); reasonable (P6-35); good (P36-65); very good (P66-94) and excellent (P $\geq$ 95).

One of the findings that emerge from the results of

this study is that the effect of sex was remarkable in the differentiation between male and female athletes in almost all the tests in the two evaluated domains. To this trait of behavior is attached the arrival and transition of puberty, a phase in which higher levels of maturation are observed, variable which is preponderant in somatic growth and the motor skills development. The sexual maturation should be understood as a series of biological changes that lead to a complete status of morphological, physiological and psychological status that occur in a sequential and orderly manner<sup>31,32</sup>. It is desirable to emphasize in the puberty, physical and biological changes denote differently between the sexes, the girls have an increased body adiposity and the boys acquire a relative increase of muscle mass<sup>19,21,22</sup>.

On the other hand, in addition to factors such as the increase of motor proficiency and mechanical efficiency and the ability of the neuromuscular activation, the higher levels of the boys' physical fitness, especially from 12-13 years, can be explained by the occurrence of events of hormonal nature associated with the increase of the muscular mass, especially testosterone and circulating IGF 1<sup>21,22</sup>. A linear increase of the averages of the girls' performance up to the age of 14 years, with evidence of a few steps in many motor tests after the age of 14-15 years has been described as a reflection of an interaction between the biological and cultural factors in girls during adolescence<sup>21,22</sup>. Additionally, it is also likely that a sociocultural gradient characteristic of this population, characterized by repertoires of traditional games and playful activities that vary as a function of sex, in conjunction with the aspects of motivational nature explain partially the differential observed in motor performance between girls and boys

It is presumptive to allege that the gender effect found in this study results from these biological and physical differences, because the results presented by the boys were higher than girls in all the evaluated motor skills, except

for the motor capacity travel speed in which there were no statistically significant differences between the genders, as attested by the tables 1 and 2. Regarding flexibility the girls presented higher values than the boys of the same age when analyzed their median values. The result of our research in this variable contradicts the results found by Verardi et al.<sup>33</sup> In the mentioned study, the boys had a superior performance in the flexibility test when compared to the girls. However, results identified by Dorea et al.<sup>34</sup> and Bustamante et al.<sup>20</sup> in this test corroborate with those found in the present study.

The vertical thrust test (static or counter-movement), which expresses the muscular strength development, the improvement pattern is not uniform in different motor capacity tests. Similar results were found in the study of Carvalho et al.<sup>35</sup>, where in the boys average values higher than in the girls were observed, which seems to occur with the adolescence growth spurt in the boys, while in girls this behavior is clearly not observed. This explanation can sustain the results of the present study in this variable where the boys exhibited higher values when compared to the girls.

Regarding the aerobic resistance test, which expresses the cardiorespiratory capacity development, is one of the major components alongside other motor skills in athletic performance. The values of the present study reveal a performance profile with higher tendency for boys than for girls. These results corroborate with other studies<sup>35-38</sup> where an increase in the scores of the cardiorespiratory endurance test was observed, in boys, probably is the product of the maturation, growth and development processes.

However, Mosqueira et al.<sup>39</sup>, report that the tests that evaluate the aerobic resistance are also influenced by the biological factors interaction (growth of tissue, fat and sexual maturation), cultural changes, social interests, pressure groups and motivational aspects related to body sizes.

In the coordination scope of specific skills with the ball (dribbling, passing, throwing and defensive lateral side), the results of this study demonstrate a significant difference from a statistical point of view between the sexes, at the level of the dribbling, passing and defensive lateral slide with a slight superiority of male athletes. Despite this difference the median values did not reveal a great discrepancy as shown in the Tables 3, 4 and 5. These results corroborate with the values referred to in studies that evaluated the levels of motor coordination and with the ball in children and young people of both sexes<sup>23,40</sup>. Such studies allowed to find out that the advancement of age, growth and biological maturation play a predominant role in the skills differentiation between boys and girls. Allied to these factors, the motor experiences have great interference in motor acquisition.

Malina et al.<sup>21</sup>, highlight that the variability of the maturation process can cause that athletes in the age of sports training of 15-16 years, may present different levels of biological development, with a translation in a physical and motor performance, particularly in tasks that require

speed, agility, explosive strength, muscle strength and muscle endurance. Thus, in a sport like basketball, body mass, height and muscular strength seem to have a decisive role in sports performance. The physical advantages may be reflected in a higher sports performance and, consequently, in their choice for representation in the club or in a country team<sup>35,37</sup>.

#### 4 Conclusion

Of the results found the following considerations emerge: (i) The reference values of motor skills and specific abilities of the infant-juvenile Mozambican athlete were established by sex and will serve to assist the T-L-T process; (ii), it was possible to situate the sampled athletes within the proposed cutoff points; (iii), it was possible to observe differences between the sexes in all tests except in throwing and travel speed tests.

As the references tables construction to the T-L-T process is a procedure supplied by progressive association of knowledge, it is believed that this experience has been a small and stimulating contribution to the continuity of the same. It will be then the task of this study the continuity to find parameters that nourish the T-LT process in the improvement or reference values range of motor skills, especially coordination with ball in collective sports games.

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