

Differences in morpho-functional characteristics between children's from North (Setif) and South (Ouargla) of Algeria (10-12 years old)

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Abstract

Preparation young athletes, consists of a rigorous control of the particularities of growth, morphological and functional characteristics during the various stages of development of the child. The aim of this study is going to focus on the possible differences between children's living in the north (Setif) and the south of Algeria (Ouargla). The comparison between a population of $n = 100$ children (50 children for each region) aged between 10 and 12 years old all boys. Our comparison is based on the morphological parameters and physical abilities parameters, for the morphological parameters we have chosen; Height, Weight and Kaup Index. While for the physical abilities we have chosen a battery of tests composed of 8 tests as following; 30m set and rolling to assess the capacity of acceleration and maximum speed, Horizontal and Vertical Expansion to assess the Alactic Power, Flexibility test, Medicine Ball Pitching to assess the strength of the shoulder girdle and arm, Shuttle Race 10x5m to assess coordination and the ability to change direction, and Half – Cooper Test 6min to assess the cardio-vascular capacity. After assessing and analyzing we found the following results each region has its own characteristics; The north region is more corpulent according to Kaup index (average $18,38 \text{ kg/m}^2$ Setif. $18,1 \text{ kg/m}^2$ Ouargla), Taller (average 144,36cm Setif, 143,78cm ouergla) and Heavier (average 39,09kg Setif, 38,22kg Ouargla) than the one in the south. In terms of physical abilities, the north region performed better in Medicine ball test, Flexibility test and Half-Cooper test. The south region performed better in both 30m tests, 30m rolling, Sargeant test and shuttle race test.

Key-words : pupils, North and South of Algeria, morphology, physical tests

Introduction :

One of the main conditions for the effectiveness of the system of preparation for young athletes, consists of a rigorous control of the particularities of growth, morphological and functional characteristics during the various stages of development of the child . According to George A. Brooks et al (1996), physical performance in children and adolescents should always be monitored from the beginning of growth, each phase of growth has a very important influence on individual capacity and physical performance.

Mark Jansen's law (Berthollet and Thiebach, 1981) establishes that with each growth spurt, depending on its speed, the sensitivity of the tissues increases, which puts the child and adolescent at risk during excessive training loads. In this field, many researches have been carried out all over the world, the first anthropometric researches on the growth of the different parts of the body were an axiological study carried out by Paul Godin in 1903. The most known study in our country, (Slifi-Halem N. and al. 2011) whose references of the staturo-ponderal growth are still applied by our pediatricians, concerns a french axiological study carried out by M. Sempe and G. Pedron from 1953 to 1974.

The latest guidelines for sports development (website of the Ministry of Youth and Sports) provides for a consideration of the most remote regions of the country, in order to provide them with material and human resources. Allowing them on the one hand to fill the deficit at the level of the installations and the equipment. Opening the way to a greater number of young people of these regions to be able to practice and excel in their favorite sport and why not to assert themselves and emerge as well on the national level as on the international scene. Many of our technicians have always advocated that the southern regions are the reservoirs of sport. Others affirm the opposite, that there are no differences in terms of morphological characteristics and physical abilities. and that it is useless to invest in sport, in the Sahara region.

It seemed appropriate to us to initiate a pedagogical experiment, which will allow us to situate the morphological characteristics and the physical abilities of young children in the South of Algeria, compared to others from a northern region. Assuming that physical aptitudes are potentially linked to the morphological characteristic but also to performance and the latter depends on them, and well before building a detection instrument for a given discipline, we will need a list of these characteristics and these physical abilities

Most of the studies that have been done before, (Mimouni N. and al. 2017, Touabti N. 2015), generally deal with the problem of detecting young talent in sports. Few studies have been done in this sense. A study done on two populations that live in a world that knows no borders, that speak the same language. They do not use the same tools, but they use the same mechanisms. Conscious of this truth, we seek through this work to show the differences that exist between the populations of the North and the South of Algeria in their bodies as well as their physical predispositions. Attempting to deal in depth with this differentiation, evaluating the main morphological characteristics and dimensions of physical ability of each group and comparing them, simple and reliable tests, adaptable for each region.

Differences in morpho-functional characteristics between children's from North (Setif) and South (Ouargla) of Algeria (10-12 years old)

Our sample concerns the age groups of the pupils of the first fundamental level of the national education, namely from 6 to 12 all boys, and targets the children of two wilayas the Wilaya of Setif which represents the North of Algeria and the Wilaya of Ouargla which represents the South of Algeria.

Several questions will then arise and we will have to know:

- What are the differences that exist in terms of morphology and physical ability between children in the North and those in the South?
- What is the best population between them?
- Is it really necessary to invest in materials, sports infrastructures and skills in a region (the South), which only asks for a minimum of consideration and care for these children on the sports level.

Methodology :

We assume that a comparative study between two samples of schoolchildren between the ages of 8 and 12 from two different regions., this will allow us to detect the existing differences between the morphological parameters of the latter, as well as the aptitudes and the physical capacities of each sample. With logical outcome, a dominance on all the plan of the children of the north of the country. The purpose of our research work is to deal with an area that needed to be addressed: the morphological characteristics and physical abilities of Algerian children, and the effective means for their evaluation. Means applicable in schools and usable for survey purposes

Sample presentation : Our study is carried out on a sample of 100 schoolchildren, whose age is between 8 and 12 years (all boys). A group in Setif, composed (50) children, another group in Ouargla, with the same number.

Means and methods of investigation:

Anthropometrical method:

Anthropometry is solicited from a large part to appreciate and control the growth of the child. We must use easily measurable indicators, of great ease and significance. The type of measurement practiced, as well as the techniques vary considerably according to the authors. A large number of authors rely on measurements of height and weight and sometimes of one or three skin folds depending on age; as De Lorenzo A, Andreoli A, et al (1995) used measurements of weight, height and tricipital fold in order to compare these data in percentiles with the American model. In the case of our study and investigation we will proceed to the determination of two anthropometric parameters: height and weight. Weighing is the most common measurement in young children, the determination of height remains the main measure especially in the evaluation of total growth.

1/ Description of measurements:

A/ Weight : The subject, wearing the minimum amount of clothing, stands in the center of the platform. Using a scale, the weight is recorded to the nearest 100 grams. Measurements are taken on the individual standing upright along a flat, smooth wooden board.

B/ Measurement of stature: It is measured on the individual standing with the heels, buttocks and back touching a vertical surface. The head is oriented so that the upper edge of the external ear meatus and the lower edge of the orbit are in a horizontal plane; the heels are together and on the board. The subject takes and holds a deep breath and is then measured to the nearest millimeter.

C/ Method of calculating the physical development index:
Calculation of the Kaup index:
This index measures the state of physical development is that from the weight and height squared by the following formula:

K: Kaup index in kg/m^2 **P:** body weight in kg **T:** height in m^2

For the interpretation of the results we will use the Davenport scale;
Very lean: 1.4 to 1.80 kg/m^2 **Lean:** 1.81 to 2.14 kg/m^2 **Medium:** 2.15 to 2.53 kg/m^2
Corpulent: 2.57 to 3.05 kg/m^2 **Obese:** 3.05 kg/m^2 and over

2/ The physical tests :

We choosed : Sargent test (vertical expansion), Horizontal expansion test(AAHPER), AAHPER-D flexibility test, Medicine ball pitching test, Test to evaluate acceleration speed (30m,Set Position), Action speed evaluation test (30m rolling start), Shuttle race 10X5m (EUROFIT 2006), Evaluation of the cardiorespiratory capacity Cooper test (6 min).

Results :

1. Comparison of averages of the height in both samples :

By comparing the two averages and the two standard deviations we judge that the sample of Setif is slightly big in terms of size compared to the sample of Ouargla.

- Average height in the group of Setif 144.36cm with a standard deviation of 2.28.
- Average height in the group of Ouargla 143.78cm with a standard deviation of 2.62.
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Differences in morpho-functional characteristics between children's from North (Setif) and South (Ouargla) of Algeria (10-12 years old)

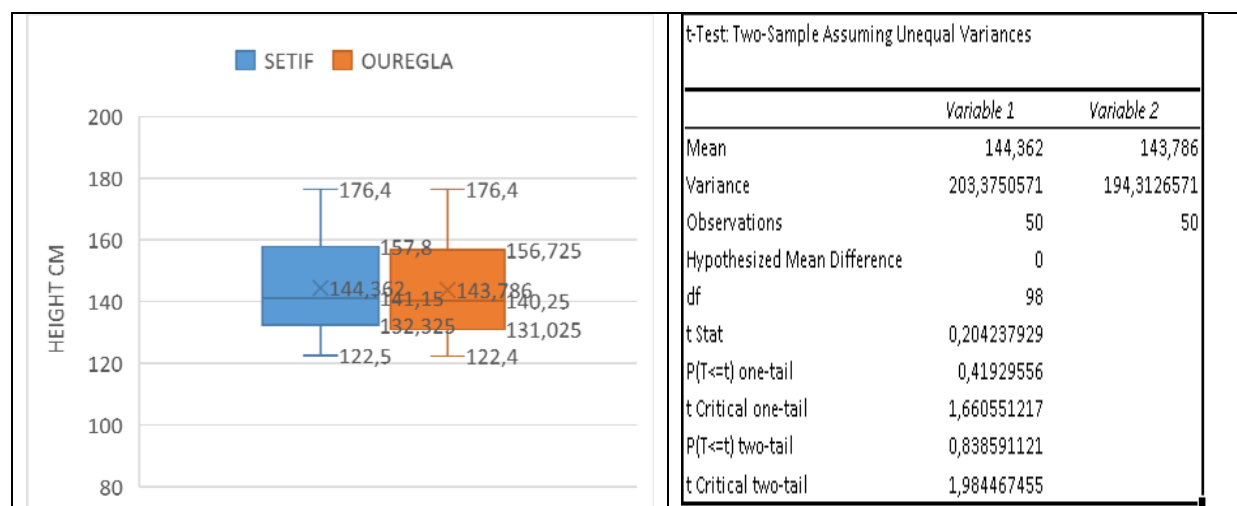
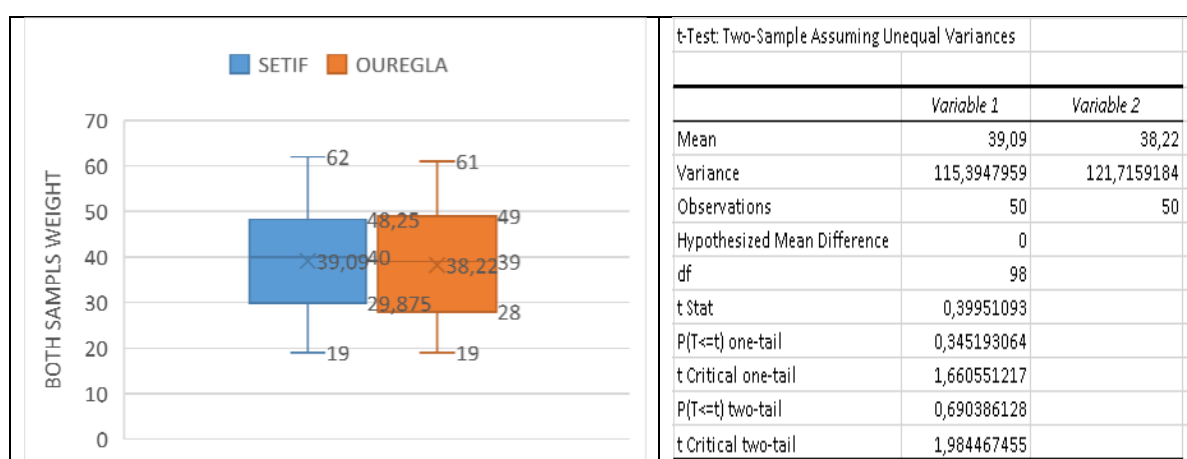


Figure 1 : Average of height of both samples

- According to the statistical results, it is clear that there is a slight difference in favor of the sample of Setif. 144.36cm for the sample of Setif against 143.78cm for that of Ouargla.
- Since the absolute value of the test statistic (0.20) is not greater than the critical two-tail value (1.98), the two populations means are not statistically different.

1. Comparison of averages of the weight in both samples

- Average weight in the group of Setif 39.09 Kg with a standard deviation of 10.74
- Average weight in the group of Ouargla 38.22KG with a standard deviation of 11.03



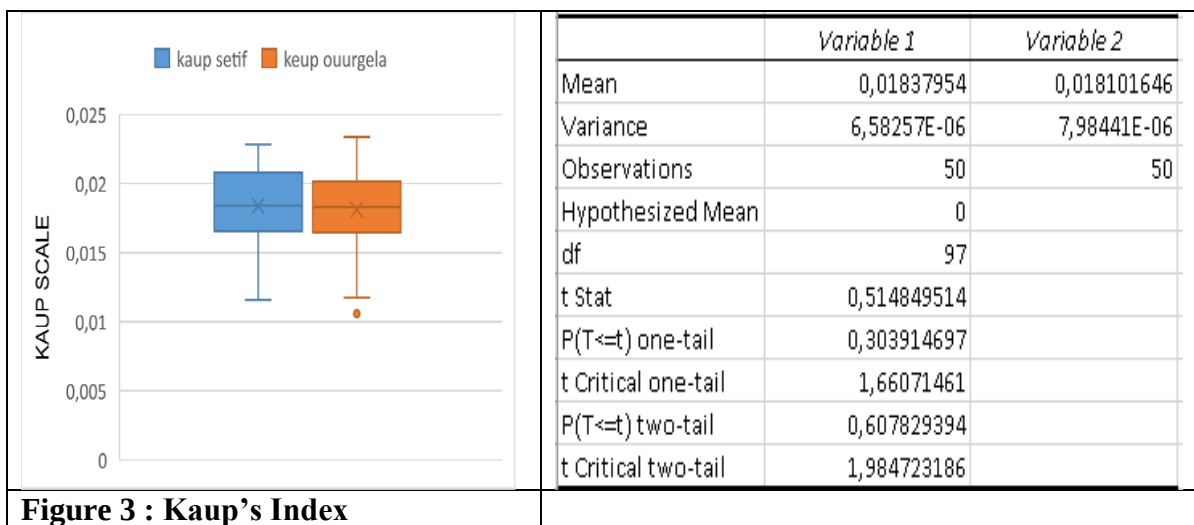
- There is a slight difference in favor of the sample of Setif 39,09 kg against 38,22 kg for that of Ouargla.

- Since the absolute value of the test statistic (0.39) is not greater than the critical two-tail value (1.98), the two populations means are not statistically different.

2. Comparison of Kaup index in both samples

We compared both samples Kaup index by this formula $\text{weight(g)}/\text{Height(cm}^2\text{)}$. Setif sample is slightly more developed than Ouragla's sample.

- Average Kaup index for Setif Sample 18,38 (kg/m^2)
- Average Kaup index for Ouargla Sample 18,1 (kg/m^2)



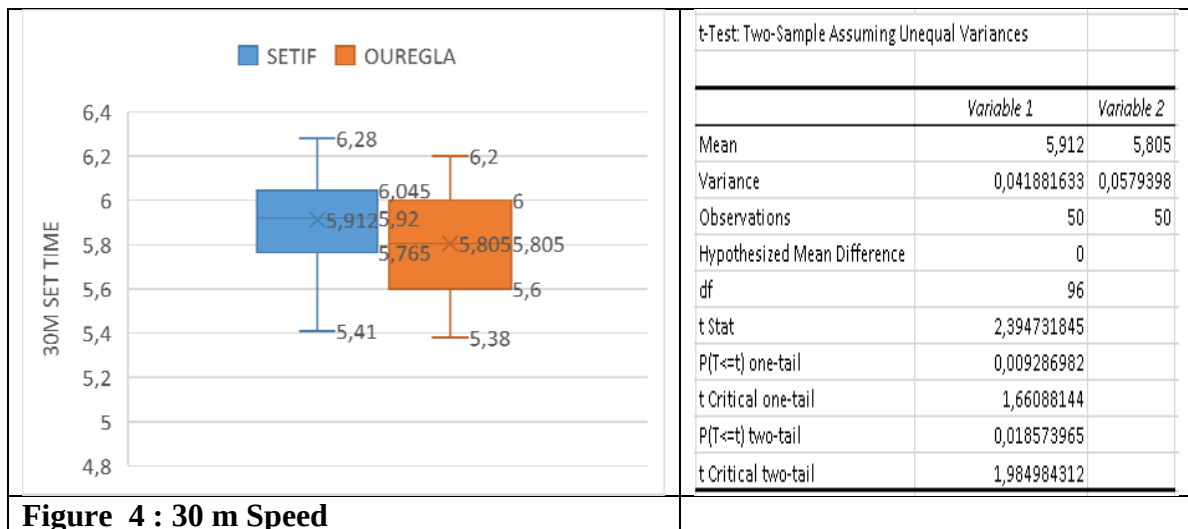
- According to the statistical illustrations and graph above, it is clear that there is a slight difference in favor of the sample of Setif. 18,38 (kg/m^2) against 18,1 (kg/m^2) for that of Ouargla.
- Since the absolute value of the test statistic (0.51) is not greater than the critical two-tail value (1.98), the two populations means are not statistically different

3. Comparison of the average of both Samples 30 m speed test

By comparing the two averages and the two standard deviations we judge that the sample of Ouargla is faster in terms of speed compared to the sample of Setif

- Average 30m Set position for Setif Sample 5.912s
- Average 30m Set position for Ouargla Sample 5.80s

Differences in morpho-functional characteristics between children's from North (Setif) and South (Ouargla) of Algeria (10-12 years old)



- There is a clear difference in favor of the sample of Ouargla 5.80 s against 5.91s for that of Setif.
- Since the absolute value of the test statistic (2.39) is greater than the critical two-tail value (1.98), the two populations means are statistically different.

4. Comparison of the average of both Samples 30m rolling test

By comparing the two averages and the two standard deviations we look that the sample of Ouargla is faster in terms of speed compared to the sample of Setif.

- Average 30m Rolling position for Setif Sample 5.58s
- Average 30m Rolling position for Ouargla Sample 5.43s

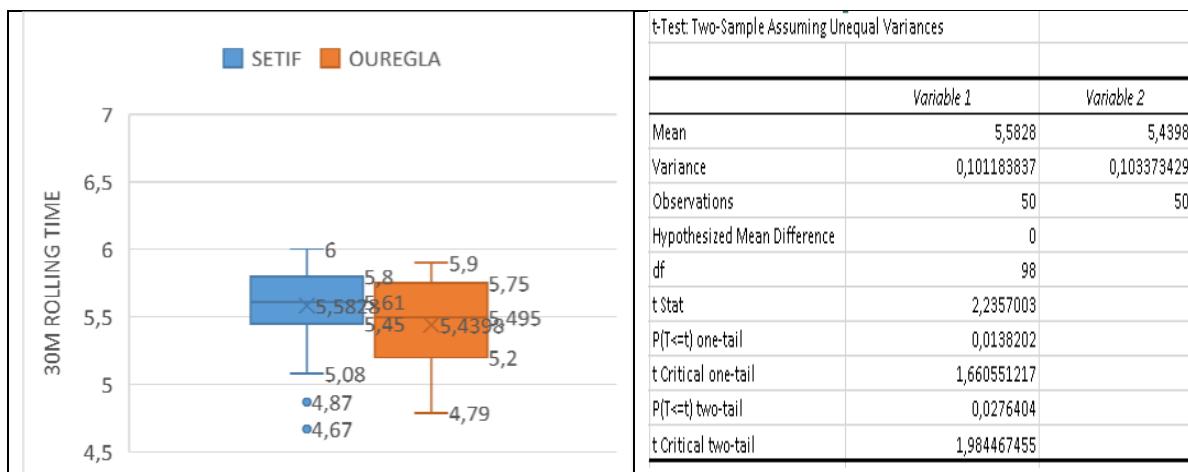


Figure 5 : 30 m rolling test

- According to the statistical results, it is clear that there is a clear difference in favor of the sample of Ouargla 5.43s for the sample of Ouargla against 5.58s for that of Setif.

- Since the absolute value of the test statistic (2.23) is greater than the critical two-tail value (1.98), the two populations means are statistically different.

5. Comparison of the average of both Samples Sargent (Vertical Expansion) test

By comparing the two averages and the two standard deviations we look that the sample of Ouargla is better in terms of anaerobic alactic power compared to the sample of Setif

- Average Vertical Expansion for Setif Sample 24.34cm
- Average Vertical Expansion for Ouargla Sample 26.32cm

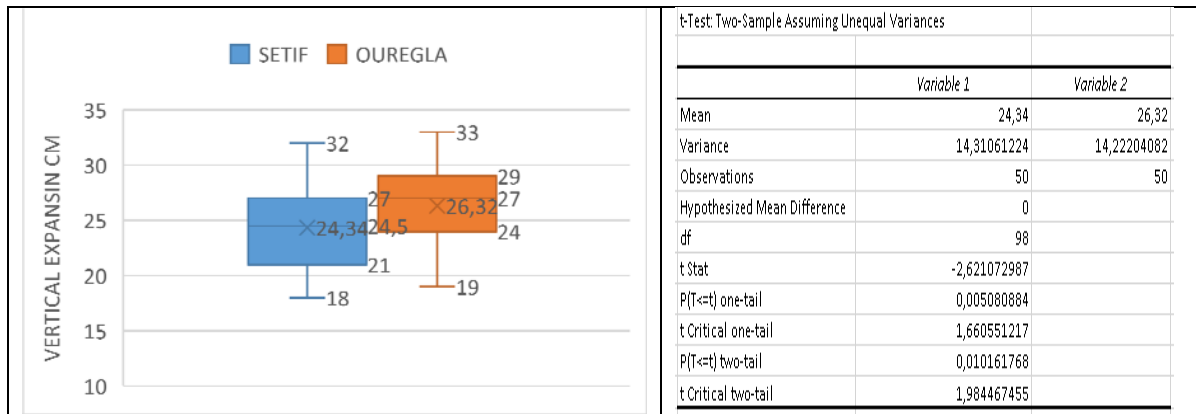


Figure 6 : Sargent test

- According to the statistical illustration, it is clear that there is a clear difference in favor of the sample of Ouargla 26.32cm against 24.34cm for that of Setif.
- Since the absolute value of the test statistic (-2.62) is not greater than the critical two-tail value (1.98), the two populations means are not statistically different.

6. Comparison of the average of both Samples Horizontal Expansion test

By comparing the two averages and the two standard deviations we judge that the sample of Ouargla is slightly better in terms of anaerobic alactic power compared to the sample of Setif.

- Average Horizontal Expansion for Setif Sample 1.60 m
- Average Horizontal Expansion for Ouargla Sample 1.64 m

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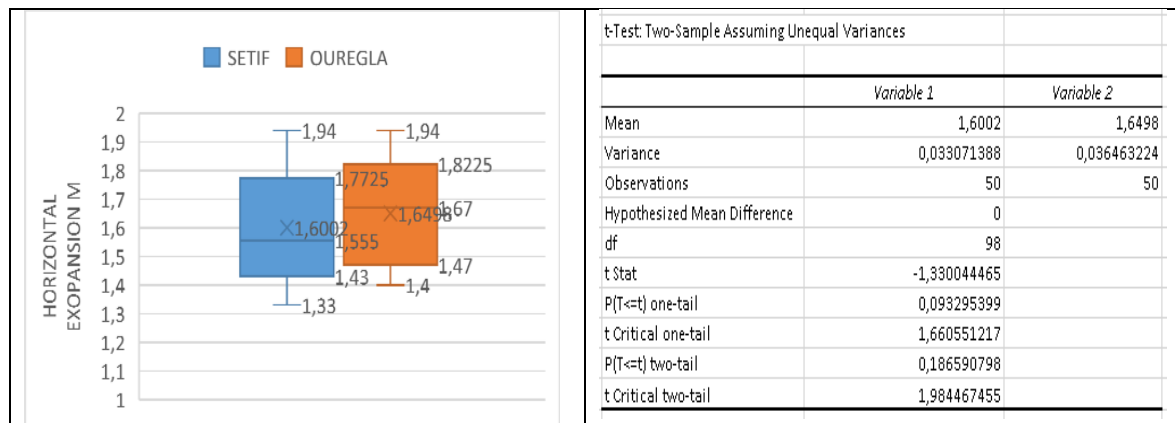


Figure 7 : Horizontal expansion test

- It is clear that there is a slight difference in favor of the sample of Ouargla. 1.64 m for the sample of Ouargla against 1.60 m for that of Setif.
- Since the absolute value of the test statistic (-1.33) is not greater than the critical two-tail value (1.98), the two populations means are not statistically different.

7. Comparison of the average of both Samples Flexibility test

By comparing the two averages and the two standard deviations we judge that the sample of Setif is better in terms of flexibility compared to the sample of Ouargla

- Average Flexibility for Setif Sample 2.28 cm
- Average Flexibility for Ouargla Sample 2.62 cm

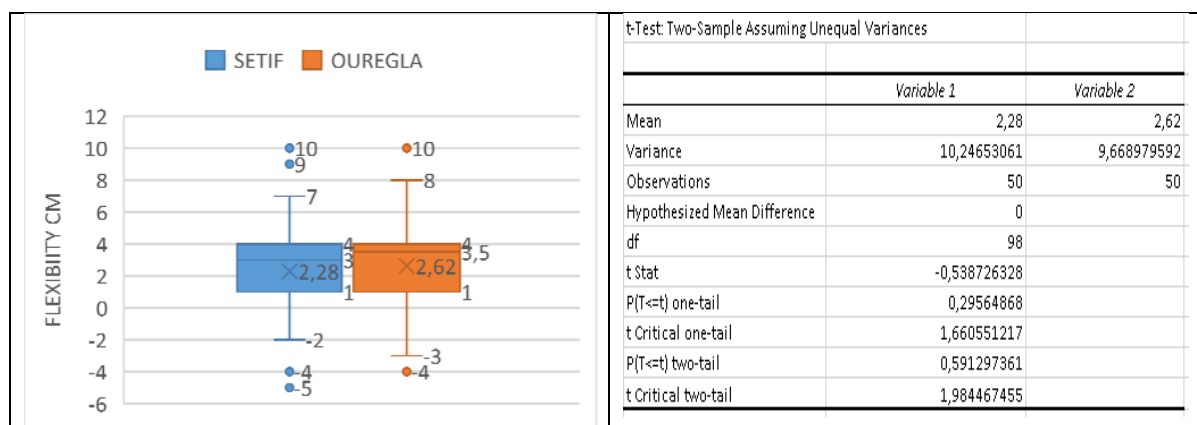


Figure 8 : Flexibility test

- According to the statistical illustrations, there is a clear difference in favor for the sample of Setif against 2.62 cm for that of Ouargla.
- Since the absolute value of the test statistic (-0.53) is not greater than the critical two-tail value (1.98), the two populations means are not statistically different

8. Comparison of the average of both Samples Medicine Ball Pitching test

By comparing the two averages and the two standard deviations we judge that the sample of Setif is Better in terms of strength of the shoulder girdle and arms. compared to the sample of Ouargla.

- Average Medicine ball pitching for Setif Sample 6.014m
- Average Medicine ball pitching for Ouargla Sample 4.8m

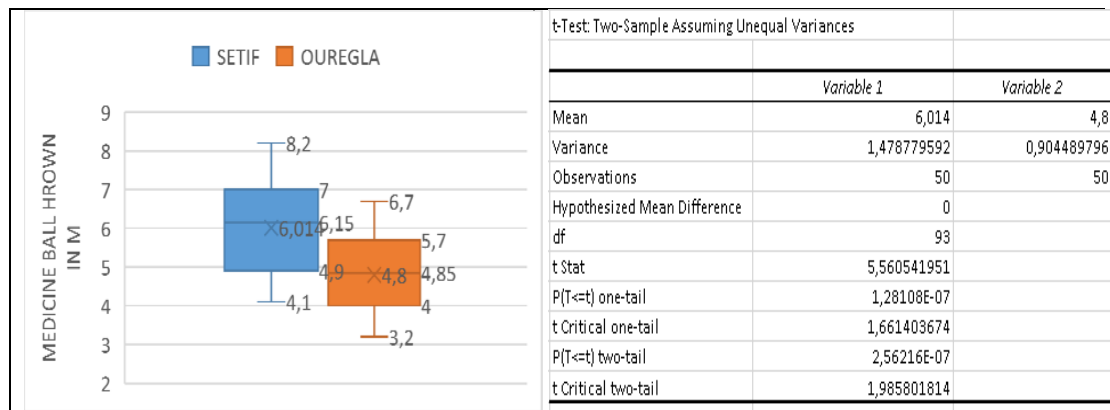


Figure 9 : Medecine ball throw

- According to the statistical illustrations and graph above, it is clear that there is a clear difference in favor for the sample of Setif. 6.014 m against 4.8 m for that of Ouargla.
- Since the absolute value of the test statistic (5.56) is greater than the critical two-tail value (1.98), the two populations means are statistically different.

10 : Comparison of the average of both Samples SHUFFLE test

By comparing the two averages and the two standard deviations we judge that the sample of Ouargla is better in terms of coordination and the ability to change direction compared to the sample of Setif

- Average Shuffle test for Setif Sample 19,75s
- Average Shuffle test for Ouargla Sample 19,41s

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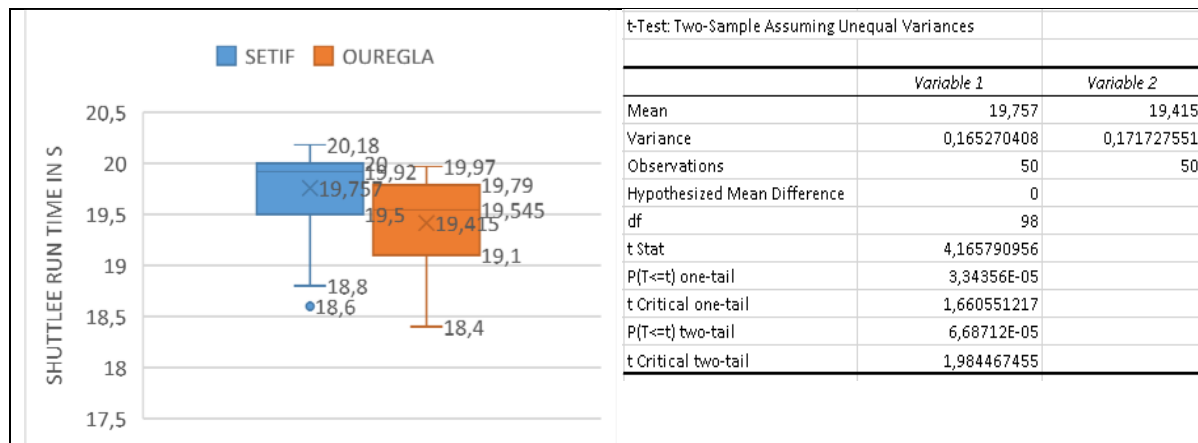


Figure 10 : Shuttle run test

- According to the statistical illustrations and graph above, it is clear that there is a clear difference in favor of the sample of Ouargla 19,41s. For the sample of Ouargla against 19,75s for that of Setif.
- Since the absolute value of the test statistic (4.16) is greater than the critical two-tail value (1.98), the two populations means are statistically different.

11. Comparison of the average of both Samples Half-Cooper test

By comparing the two averages and the two standard deviations we observe that the sample of Setif is better in terms of cardio-vascular capacity compared to the sample of Ouargla.

- Average Half-Cooper test for Setif Sample 1620 m
- Average Half-Cooper test for Ouargla Sample 1596 m

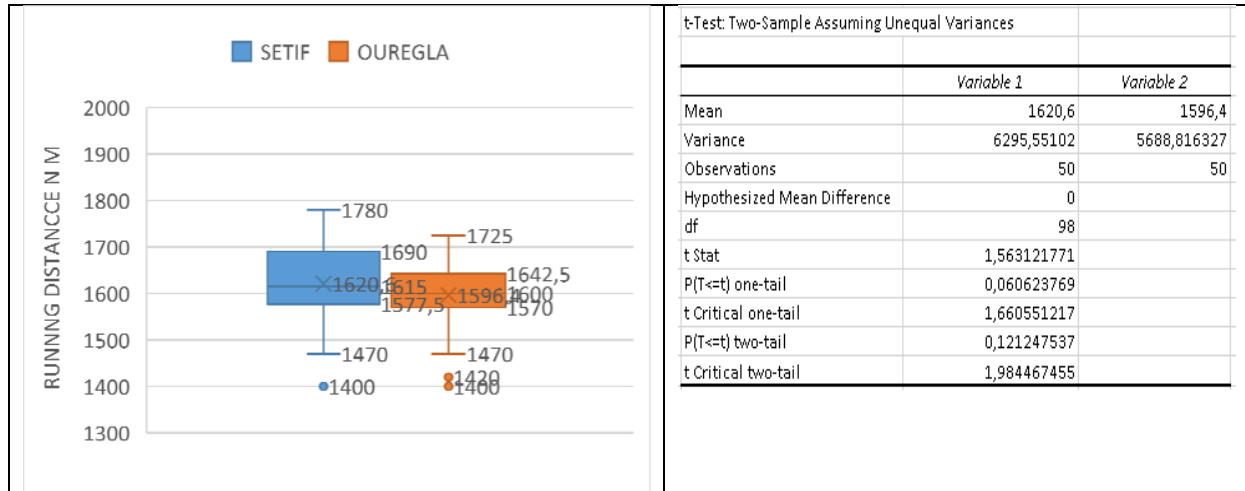


Figure 11 : Half-Cooper test

- According to the statistical illustrations, it is clear that there is a clear difference in favor for the sample of Setif. 1620 m against 1596m for that of Ouragla.
- Since the absolute value of the test statistic (1.56) is not greater than the critical two-tail value (1.98), the two populations means are not statistically different.

Discussion :

- For the general results of the three morphological parameters (Height, Weight, Kaup Index) of our samples, we notice; Setif sample is more corpulent than the one of Ouargla (Sprumont and Thiebaud, 1998).

Sample	Height cm	Weight Kg	Kaup P/T^2 kg/m ²
Setif	144,36	39,09	18,3
Ouargla	143,78	38,22	18,1

For the general results of the physical tests (30m Set, 30m Rolling, Vertical Expansion, Horizontal Expansion, Medicine Ball Throwing, Flexibility Test, Shuttle Test, Half-Cooper Test) of our samples, we notice; Setif sample is better in terms of Flexibility, strength of the shoulder girdle and arms, and cardio-vascular capacity. On the other hand, Ouargla sample is better in terms of the capacity of acceleration and maximum speed, anaerobic alactic power, coordination and the ability to change direction according the study of Durand M. (2001).

Conclusion

Apart from their belonging to the same country, characterized by two different climates, and two different cultures we wanted to highlight the little study previously established, on one region or another ; as well as the importance of the physical aptitudes and the role that their evaluation has for investigation or studies.

Differences in morpho-functional characteristics between children's from North (Setif) and South (Ouargla) of Algeria (10-12 years old)

It emerges that the children of the north (Setif) are more corpulent, prove a clear superiority in terms of cardio-respiratory capacity (Endurance), flexibility, the strength of the extensors of the arms. The children of the south (Ouargla) on their part, they are superior in terms of acceleration capacity and maximum speed, as well as in vertical and horizontal expansion (anaerobic alactic power), coordination and speed of change of direction. All these differences originate in the parent population. The southern region of Algeria is underestimated, and the national sport strategy should reconsider its priorities and take care of this region full of talents just like the north regions. There is a difference between the two populations whether it is on the morphological plan or on the plan of the physical aptitudes, that this difference advantages a population on the other, on certain parameters and vice versa. Moreover, difference is beneficial for the Algerian sport because it reflects a multitude and a richness of morphological and physical profiles that our country has.

It is very important before investing in sports development to conduct large-scale surveys and research, by elaborating growth curves specific to our country and region, as well as a battery of tests that will be conducted by competent educators ; in order to set the correct standards of the performance that goes with our local conditions and environment.

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