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Study on the tests used in the triathlon

Estudio sobre los test utilizados en el triatlón

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ABSTRACT

In today's sport, where the physical demands are increasing, a correct preparation cannot be conceived without a rigorous control of it. Tests are used as means of control. These must meet certain conditions, within which is to respond to the characteristics of the competitive activity in which the athlete participates. The condition of specificity to which the control procedures must respond is one of the most important at the time of evaluating the triathlete's performance. In this review we tried to know how this condition is fulfilled in the tests currently used for the evaluation of the triathlete in *sprint distance*. From the theoretical level, the induction and deduction was used, and the documentary review was used empirically. The tests for their study were classified into laboratory tests, field tests and mixed tests. The main conclusion is that there is a predominance of laboratory tests, the tests used are characterized by being parceled where segments of the competition of the triathlete are evaluated and not the competition itself and although efforts are carried out the athlete is not studied in conditions similar to those of competition.

Keywords: triathlon; test; control; performance.

RESUMEN

En el deporte actual, donde las exigencias físicas son cada vez mayores, no puede concebirse una correcta preparación sin un control riguroso de esta. Como medios de control son utilizadas las pruebas o test. Estos deben cumplir ciertas condiciones, dentro de las que se encuentra responder a las características de la actividad competitiva en la que participa el deportista. La condición de especificidad, a la que deben responder los procedimientos de control, constituye una de las más importantes en el momento de la evaluación del rendimiento del triatleta. En esta revisión, se pretendió conocer cómo se cumple dicha condición en los test utilizados en la actualidad para la evaluación del triatleta en la distancia *sprint.* Del nivel teórico, se utilizó la Inducción y deducción y del nivel empírico, la revisión documental. Los *test* para su estudio fueron clasificados en pruebas de laboratorio, pruebas de campo y pruebas mixtas. La principal conclusión obtenida es que existe un predominio de las pruebas de laboratorio, los *test* utilizados se caracterizan por ser parcelados donde se evalúan segmentos de la competencia del triatlonista y no la competencia

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en sí y, aunque se hacen esfuerzos, aún no se estudia al atleta en condiciones similares a las de competencia.

Palabras clave: triatlón; test; control; rendimiento.

INTRODUCTION

The athlete's preparation process is planned by the coach, guided by objectives and goals, which must be met as the pedagogical process to which the athlete is subjected advances. But this planning is not a straitjacket because unforeseen situations may arise that force the coach to reconsider what he initially thought.

Circumstances that can cause the athlete not to be in the sport form expected for the stage or, on the contrary, to be in an optimum state of disposition when the stage does not merit it. In either case, it is necessary to make adjustments in the planning. Adjustments that can only be made if there is adequate control of this.

Call control to the actions that the trainer carries out to gather the greatest amount of information about the way in which the sports preparation of its athletes goes, where it can take into account from the evolution and state of the physical performance, the technical-tactical learnings, the biological or physiological state, the dynamics of loads, among others.

In today's sport, where the physical demands are increasingly greater, a correct preparation cannot be conceived without a rigorous control of it, always on a scientific basis. In addition, "its feedback function guarantees the knowledge about the progress of the fulfillment of the outlined objectives" (Morales and Álvarez, 2003).

Among the most widespread forms of control are "the collection of opinion, the analysis of working documents, observation, measurement and tests" (Mesa, 2006). It is the latter where the athlete's control finds its maximum expression. The periodic application of tests allows the coach to check whether the athletes obtained the expected benefits and thus "evaluate and correct the training performed" (López and Gorostiaga, 2018).

The tests can be classified as pedagogical, physical, theoretical, functional and others. Functional tests allow the determination of parameters of the state of preparation of the athlete. These tests can be applied by direct or indirect methods.

The direct methods are applied in laboratories "and because of their way of execution they provide more exact data with respect to the variable indicator to be evaluated, but it has the disadvantage that their data are obtained in conditions different from those in which the sportsman or woman carries out his or her daily tasks and that they require a high technical-material assurance" (Betancourt and Rodríguez, 2004).

These drawbacks are what make indirect methods, also known as field tests, valid and topical. This type of test has great value, because "despite having a margin of error (10%) they respect in their measurements the environment and the specific conditions in which the sporting activity is carried out. (Betancourt and Rodríguez, 2004).

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Recommendations are frequent, based on the results obtained through the application of general tests, which study the sportsman outside his specific sporting activity, provoking a subjective interpretation of the interpretation of the data.

The high performance sport deserves the presence of tools in the form of measurement or tests that allow the control and evaluation of the level of sports preparation of the athlete with quality and appropriate ranges of variation. The field tests, in addition to being based on the use of medicine, should include control procedures that allow the evaluation of the athlete within their particular sporting activity.

There are authors who have researched the means of control in triathlon. Specifically, the types of tests that are used. Among these, the one carried out by Ansley (2007) can be mentioned. In it he indicates as a conclusion, that the tests used are tests designed for athletes of the specialties that make up the Triathlon. Although some of these have a good correlation with the competitive result, there are some unique aspects of triathlon that cannot be measured by generic protocols.

Ansley, (2007) also regrets that there are few physiological tests designed specifically for triathlon and that these should carefully consider which aspects of performance will be evaluated before designing the test regime.

Other research that reviews the tests used in triathlon are Suriano and Bishop (2010) and Schafer (2011), both with different objectives. The first one, the researchers carried it out with the objective of knowing the physiological attributes of the triathlonist. To this end, they reviewed the tests used to measure the physiological variables studied by them. Moreover, in the second, the author carries out an investigation of the most used tests in German clubs.

These investigations, although they were subsequent to the one carried out by Ansley (2007), likewise reveal the deficiencies in terms of the specificity of the tests used in triathlon. Tests imported from the disciplines that make up triathlon and not from sport are still used.

However, the need for a further review is considered. Of the three papers cited on the subject, the most up-to-date is Schafer's and is eight years old. This was limited to German triathlon clubs. Suriano and Bishop's is nine years old and its main objective was to study the physiological attributes of the triathlete. It is true that he mentions ways to measure these attributes, but it was not the objective of this research, so it does not abound on the subject.

Ansley's corresponds to twelve years ago and focuses his research on transitions. He specifically mentions research that proves the effect of swimming and cycling on his specialty. He also comments on the drafting and prediction of performance in triathlon.

In reviewing recent research on the development of triathlon in Cuba and worldwide, the author found that, in some consultations, researchers use indicators, parameters depending on equipment with specific training conditions, but in none of them has he found a relevant method to apply to the subjects he works with. In any case, the exploratory and comparative study in the works of (Arruti, et al., 2015; Mallol, M et al., 2015; Angosto Sánchez et al., 2016; Bernasconi, E. 2016; Chaverri, D. et al.,

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2017; Dorado, A. C. 2017; Revelles, A. B. F. 2017 and San Román, M. Á. R. 2019) has been very useful.

The condition of specificity, which must be met by the control procedures, is one of the most important when evaluating the performance of the triathlete. For this reason, the aim of this review is to find out how this condition is met in the tests currently used to evaluate the triathlete in the sprint distance.

MATERIALS AND METHODS

In the review, the tests were divided into three types: laboratory, field and mixed tests. The latter are tests that link laboratory tests with field tests. The analytical-synthetic method was used. The review period was extended from 1998 to the present, through the historical-logical method. Studies applying tests to evaluate the performance of athletes competing in Olympic triathlon and sprint triathlon were considered. At the empirical level, documentary review was used.

Laboratory tests

Revised research using laboratory tests includes research by Basset and Boulay (2003). The objective of this research was to verify that, with the use of a simple test, it was possible to obtain an applicable guideline for various training methods. To do this, they used the ergometer cycle and the treadmill to measure maximum oxygen consumption and cardiorespiratory variables. The protocol followed for the race test, on a rolling track, started with five minutes of warm-up at a speed of 3.5 km/h.; the starting speed of the test was 5.5 km/h. with a grade of inclination of 5%. The speed increased every 1.1 km/h. to 13.2 km/h. and the slope increased by 3% every two minutes until exhaustion.

For the test, in the ergometer cycle, the subject is asked to select a comfortable pedal frequency above 60rpm and maintain it throughout the test. The test starts with a four-minute warm-up to 100W value, which increased by 25W every minute until 200W, from which time the increments, would occur every two minutes until exhaustion.

In the Perrey and Rouillon study (2003), laboratory tests were applied to investigate metabolic and physiological responses in a simulated 30-minute baseline test in cycling with self-selected intensity. The determination of the maximum oxygen consumption was carried out with the application of an incremental cycling test, starting with a power of 120 W for men and 80 W for women. This power was increased every two minutes by 20 W and the pedalling frequency remained constant at 80 revolutions per minute.

In order to test whether it is possible to evaluate cycling and running in a single test, Vicente-Campos et al., (2014), applied a double lactate test. To do this, they first perform a submaximal test on an ergometer cycle until they exceed 4 mmol/l lactate. Then, after a break of four minutes, they apply an incremental running test to determine the anaerobic threshold.

Ramos-Campo, Martínez, Esteban, Rubio-Arias and Jiménez, (2016) conduct research with the objective of determining the changes that occur in aerobic performance during the cycling segment, after applying a training program in

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intermittent hypoxia for seven weeks. The evaluations before and after the application of the plan are carried out in ergometer cycle to determine the lactic thresholds.

The protocol followed is a ramp. It begins with 50 watts during warm-up and increases by 50 watts every five minutes. The cadence of pedaling oscillates between 90 and 105 revolutions per minute. In the final 15 seconds of each stage, the heart rate is recorded, the perception of perceived subjective stress is recorded, and a capillary blood sample is taken.

The test is considered as finished when the studied subject cannot maintain the pedalling cadence within the fixed range or when fatigue prevents him from maintaining the stage for five minutes, due to fatigue, and voluntarily asks for the test to be finished. To determine the anaerobic threshold, a constant lactate protocol at 4 mmol is considered. The measured variables are power, heart rate, perceived effort and power relative to weight.

Field tests

Among the field tests, the analysis of the Integral Program of Preparation of the Athlete for triathlon in Cuba is mentioned first. This program constitutes the guiding document by which triathlon coaches support each other in planning the preparation of their athletes. It contains the objectives and tasks to be accomplished for each stage of preparation in each of the categories in which they compete in Cuba.

Within the program, the age group conceived to compete in the sprint distance is 16-18 years old. The preparation instructions are distributed individually for each age group. Thus, the age of 16 is the first to be found for analysis.

Among the pedagogical tests indicated for this age in question, there are a total of five for swimming, at distances of 25 m., 50 m., 100 m., 200 m., 400 m. and 800 m. Of race, they are four to the distances of 400 m., 800 m., 1000 m. and 2000 m. Finally, for cycling there are only two tests. A first test of 50 0m., stopped starting and a second test of 10 km., against individual clock. Each of these tests has an evaluative scale of very good, good, regular and bad that is given according to the time done in each one.

For athletes with 17 years of age; it is indicated that the pedagogical tests indicated are only three. One for swimming at a distance of 1200 m., another for cycling of 35 km. and a third for running of 8km. The evaluation is also granted depending on the time taken in each test, but points are awarded from two to five.

By the age of 18, four tests are indicated. Two for swimming and one for cycling and running, independently. The swimming tests consist of one 75 0m. In addition, the other 4x400m. In the latter, they indicate that the first section must be swam between 30 and 45 seconds of the best result, the second between 20 and 25 seconds, the third between 10 and 12 seconds and the last, swim at 100%. Cycling and running are 20km and 5km respectively and must be done at maximum intensity. The evaluative scale is of good, regular and bad, evaluation that is granted in the same way to the previous years, considering a timetable.

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Suárez, (2016), had the objective of evaluating aerobic capacity in triathletes. According to this author, the 30-minute test proposed by Madsen and Wilkie (1980) was used for this purpose, and then a 200-minute free test was applied. The 30-minute test consists of "carrying out the maximum possible distance within a 30-minute time period" (Suárez, 2016). It also uses a test of 200 m. free at 100 % of the possibilities, with the objective of knowing the differences between the performance of the triathletes studied in long and short distances.

Laboratory and field tests

The classification of laboratory and field tests includes those investigations or projects that use both types of tests to meet their evaluation objective.

These characteristics are found in the research carried out by Hue (1998), which aims to determine which physiological variables accurately predict the time to be performed in an Olympic triathlon. To do so, it submits the investigated subjects to five tests, the first four randomly. All tests are applied at the same time to avoid the circadian effect and the same day of the week to minimize the effect of personal training on the result.

The first test consists of 400 m. of swimming; the second is an incremental test on a rolling track and the third, in an ergometer cycle. The fourth test is 30 minutes of cycling plus 20 minutes of running. Moreover, in the fifth, the evaluation form is 20 minutes of controlled running, maintaining the same speed variation as that of the cycling-racing test.

The swim test is at maximum speed. It measures stroke frequency, stroke length, stroke index and blood lactate concentration. The cycling-race test is submaximal and subjects are instructed to perform the same, at maximum speed. Between cycling and running, the maximum transition time is one minute. The 20-minute race starts at the race speed, maintained during a triathlon, speed that is adjusted every minute at 0.5 km/h to optimize performance. The distance in cycling is measured with a cycling odometer and the race odometer with a track odometer.

For the cycling test, carried out in the laboratory, an ergometer cycle is used and for the race cycle, a rolling track. Here they measure lung ventilation, oxygen consumption, carbon dioxide production, oxygen exchange ratio and carbon dioxide. They also measure respiratory rate, heart rate, ventilation threshold and blood lactate concentration. The latter is also obtained during field tests.

To measure the concentration of lactate in the blood, after swimming, the two samples are taken from the fingertips. For the cycling-race test, a venous catheter is inserted into the subject's forearm before starting the test.

Seeking to verify the predisposition model for the evaluation of talents in short triathlon, Kovárová and Kovár, (2012), apply a test battery. The battery consists of psychological, physiological and anthropometric tests. In those tests where it is necessary to perform one of the activities of which the triathlon is composed, the execution is separate. Triathlon specialties are not combined.

The same year, is the research of Taylor, Smith and Vleck, (2011). These authors examine the relationship between the performance of a simulated triathlon and

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physiological variables, measured during laboratory tests. In the laboratory, they perform two incremental tests. One for cycling and one for racing. And the simulated triathlon is performed in a 25 m. pool and using an ergometer cycle and a mechanical tape.

In order to test the "reliability of performance and its relationship with physiological responses", Taylor, Smith and Vleck (2012) measure maximum oxygen consumption, heart rate, pulmonary ventilation, lactate, among other indicators. Using simulated sprint distance triathlons.

These simulated triathlons consist of 750 m. of swimming in a 25 m. six-lane pool. Cycling takes place in an ergometer cycle, where participants place their own pedals and seats, as well as adjusting the ideal position for them on the bike. The race takes place on a rolling track. With the exception of swimming, the rest of the phases of the simulated triathlon are performed under controlled environmental conditions.

All physiological variables are measured using laboratory instruments.

There are authors who have studied which are the tests used in triathlon. Schafer (2011), who, as part of his research, presents which tests and measurement methods are used in German clubs for athletes of regional and national level. It focuses on sprint and Olympic triathlon, specifically aerobic and anaerobic capacity, strength, technique and flexibility.

According to Schafer, (2011), the tests used in swimming are incremental, consisting of swimming 4x400m. in a 50 m. pool. It begins with a low load, according to the best personal best and increases the speed in each stretch to the maximum effort. Aerobic capacity is determined by calculating the lactate curve, obtained by recording the heart rate and lactate concentration at the end of each leg. With these results, both efficiency and respiratory capacity are evaluated.

Tests are also used in the form of competition, at distances ranging from 200 m. to 1500 m., depending on the level of the test and the age group. In these, only the time is measured and the athletes are valid, to be included, in the regional or national teams.

The 4x400 m. test is also used for the evaluation of the anaerobic capacity. Heart rate and lactate concentration are measured, followed by calculation of the lactate curve and evaluation of metabolic efficiency. They also use tests in the form of competition such as the 50 m. free, the 50 m. back or butterfly and 50 m. free leg. On the evaluation of strength in swimming Schafer triathlon, (2011), mentions that does not find specific tests with this objective.

As far as cycling is concerned, the only scientific test that evaluates aerobic capacity is a gradual test in an ergometer cycle, where women start with a load of 100 W and men with 130 W. This load increases every five minutes until the person evaluated cannot maintain a pedal cadence of 90rpm or stops due to exhaustion. At the end of each load, lactate, heart rate, respiratory gases, pedal cadence and tangential force in both legs are measured.

The evaluation of anaerobic capacity is also evaluated through this test, only the value of the applied load or the amount of it is modified. Shafer, (2011), states that

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the force in cycling is only evaluated by measuring the tangential force on both pedals, while applying the test mentioned above.

The aerobic capacity in the race is evaluated through two laboratory tests. An incremental test and a mobilization test. The incremental test includes a 4x3000m. or a 4x4000m., the selection of one or the other depends on age and performance. As they are incremental tests, the increments are 0.25 m/s. Heart rate, lactate, respiratory gases, length and stride frequency are measured.

The mobilization test is performed after the incremental test by taking a pause. The initial speed is 4.0 m/s for women and 4.25 m/s for men. In addition, it increases 0.25 m/s every 30 seconds until total exhaustion. In addition to measuring and evaluating VO2max, respiratory gases and heart rate, among other variables, are also measured. As in swimming, competitive tests are performed at distances of 1000 m., 3000 m. and 5000 m., which are performed on 400m. tracks, outdoors, in the 200 m. indoor, where only time is recorded.

On the anaerobic capacity Schafer, (2011), indicates that the incremental laboratory test is used, previously mentioned, in which the same variables are measured. In the case of competitive tests, 60 m. and 100 m. sprint are used. Of the force, he mentions that no test is used, although basic evaluations can be made by means of the frequency and length of the stride.

Among his conclusions, this author points out that scientific tests for triathletes were first adopted from the diagnosis of individual sports (swimming, cycling and running). That the evaluation of two or three disciplines, taking variations from different tests takes a long time, which means greater stress for the athlete and requires greater capacity of the institutions to perform the tests.

Researching performance in sprint distance triathlon, Van Schuylenbergh, Vanden and Hespel, (2003), apply different laboratory and field tests. To determine peak oxygen consumption, they used an ergometer cycle test and a treadmill test until exhaustion. In addition, they apply three constant load tests for swimming, cycling and running; in one, they measured maximum stable lactate. In all the tests applied, they record heart rate; power applied in cycling and speed for swimming and running, as well as blood lactate concentration at regular intervals.

The test for cycling is carried out on the bicycle itself on an electromagnetic ergometer. After a warm-up of 20 minutes to 100 W, the power increases every six minutes, by two thirds of the subject's body weight expressed in watts. In this test, subjects use their own pedal cadence.

For the race, the initial slope is 1 %, simulating outdoor conditions. The warm-up speed is 2.5 m/s for 20 minutes. After this time, the speed increases by 0.5m/s every six minutes. In both tests, heart rate, oxygen consumption, carbon dioxide and ventilation are constantly monitored.

Constant load tests are applied in the field. They all start with a 20-minute warm-up at a heart rate between 120-130 beats for swimming and cycling; in the race, the warm-up frequency is between 135-145 beats per minute. In swimming, subjects are asked to maintain a constant maximum speed for 30 minutes. The speed taken as reference is the one maintained between the first 100 meters and 200 meters of the

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race. The subjects are guided in a visual way so that they maintain the speed, if the fluctuations exceed 0,01 m/s the test is stopped.

For the control of the load, in the cycling and running races, the power and speed are chosen respectively. The values chosen are those corresponding to 4mmol/l of the lactate threshold, determined during the tests carried out previously.

RESULTS AND DISCUSSION

Triathlon is a sport made up of five segments and three specialties (swimming / transition 1 / cycling / transition 2 / race). "The order is indicated and the chronometer does not stop during the transitions that make up the whole competition" (Cejuela et al., 2007).

By continuously performing each of the specialties, they influence the performance of the one that happens to you in the order of competition. On this subject, Vlech, Burgi and Bentley (2006), after a study to determine the consequences of swimming, cycling and running performance on the overall result of an Olympic distance triathlon with drafting, concluded that the triathlete can achieve more work in the initial phases of cycling, if in the phase of previous swimming he does it with less performance, which can also influence the race segment.

Investigating the effect of swimming behind another competitor, Chollet et al., (1998), cited in Clemente, (2009), applied two swimming tests: one with drafting and one without. In the results, they found no significant differences between the oxygen consumption of each test [66.7 (1.7) ml/kg x min vs. 65.6 (1.2) ml/kg x min, respectively], the lactate blood concentration was lower in the drafting test [9.6 (0.9) mmol/l vs. 10.8 (0.9) mmol/l, respectively] and the length and stroke index increased significantly while the cycle frequency remained the same.

As part of the analysis of that study it was possible to "observe how the fastest and most muscular swimmers achieved greater gains in performance and stroke index with drafting" Clemente, (2009). Therefore, in swimming, in addition to increasing performance, drafting makes it possible to keep the frequency and length of the stroke stable in the 400 m. of swimming.

On the effects caused by swimming on cycling Peeling et al. (2005), they found that, when performing an experimental triathlon consisting of 750 m. of swimming, 20 km. of cycling and 5 km. of running, if the swimming swims 80- 85 % of the time of a swimming event, the cycling speed was higher than if one swam 98-100 % of the time of the same swimming event. This also influenced the overall result of the triathlon as it was faster when swimming at 80 % than at 100 % of the swimming speed of the test.

The second transition is the most studied. "The transition from bicycle to race induces neuromuscular fatigue in the lower limb" (Aurell et al., 2019). Among these researches we can mention the one carried out by Millet and Bentley (2004), who compared the physiological response in cycling and the energetic cost of running, after cycling in elite triathletes of both sexes. In the results, they found that older elite triathletes are distinguished by having a higher peak power in cycling and a lower increase in the total body energy cost of running after cycling in triathletes and by a higher ventilation threshold in triathletes.

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Another study was the one carried out by Hue et al., (1998), where the biomechanical and cardiorespiratory effects in the standing race after a triathlon race provoked by the segment of cycling were analyzed.

In the results, they found that VO2, VE, VE/VO2, VE/VCO2, respiratory rate and heart rate were higher in the run after cycling than when it was done alone. On the other hand, the biomechanical variables studied (frequency and stride length) showed no modifications in the race after cycling compared to the race alone. This suggests that the initial minutes of the running segment after cycling in an experimental triathlon were specific with respect to cardiorespiratory, VO2 and non-specific biomechanical variables.

The above mentioned researches demonstrate the influence that swimming and cycling have on the specialty that happens to it. Question that affects the final result of the triathlon. Therefore, for a correct evaluation of the performance of the triathlete, it is essential to apply tests that allow the conditions of competition to be reproduced.

Of the tests described in this review, only three cases combine two or three specialties that make up the triathlon. The rest carry out the evaluations, measuring the specialties separately.

Research that combines two specialties does so to evaluate the second transition (cycling-racing). That of Vicente-Campos et al. (2014), uses only laboratory tests and that of Hue (1998), performs cycling in ergometer cycle and running on track, combining laboratory and field tests.

Although they study part of the triathlon, they consider that the results obtained would not be the most real because they obviate the result that can be obtained after performing the swimming segment. It is considered that, in athletes with a high level in the swimming segment, which allows them to leave within the advanced group without demanding the maximum of their potentialities in the water, it could be feasible to make a study of the second transition separately. Because cycling performance would not be significantly affected by previous swimming.

But, on the contrary, when studying athletes with a low level in the three specialties or low performance in swimming, it would not be prudent to evaluate the second transition in isolation. Those athletes with low level in the three specialties, whenever they violate partial in one of the first two segments, will have negative repercussions in the following segments and will be reflected in the total time of the triathlon. And if they are athletes with a low level of swimming, that going out in advanced groups is a challenge, then it is necessary to know which should be the optimal swimming rhythm that allows them to show the maximum of their potentialities in the second transition.

The only research found, which combines in a single test the three specialties of which triathlon is composed, is that of Taylor, Smith and Vlech, (2011). The simulated triathlon they propose combines swimming in a swimming pool, cycling, and running in controlled laboratory conditions.

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This combination seems appropriate to us, only which its realization will not allow to know the real potentialities of the athlete. Although the laboratory allows reproducing the conditions of competition in a controlled way, the truth is that:

> "the athlete accepts much better to carry out the tests in the training field because he is more accustomed to exercise in his environment than in a laboratory" (López and Gorostiaga, 2018).

And it is necessary to point out that the necessary equipment to evaluate their athletes is not always within the trainer's reach.

Along with the proposal of Taylor, Smith and Vlech (2011), we find only two specific proposals for sprint triathlon. Those of the Program of Preparation of the Athlete in Cuba and that of Van Schuylenbergh et al., (2003). These last two, like the rest of the tests described in this review, are characterized by studying the specialties that make up triathlon in an isolated way, taken from the sports in an isolated way and suffering from the specificity that this type of tests need for a better evaluation of the triathlete. These results are similar to those obtained by Ansley, (2007) and Cuba-Dorado et al., (2015). The first indicates that most of the tests applied to triathletes are designed for separate sports. Unfortunately, there are a few physiological tests designed for triathlon. Moreover, the latter refer to the tests used for talent selection, where they also find that situation.

Cuba-Dorado et al., (2015), established the relationship between the talent screening tests of the Spanish Triathlon Federation (FEDETRI) and the results obtained in the Spanish championship. They concluded that the tests established by the FEDETRI "are limited and perhaps come little closer to the competitive reality of triathlon" (Cuba-Dorado et al., 2015), proposing a battery of tests containing those that most closely resemble the competitive reality in triathlon.

This indicates that more specificity is needed in the tests that are used in Triathlon. That allow achieving a better evaluation of the triathlete, specifically of the triathlete in the sprint distance.

It is proposed that, in the review carried out on the tests used in triathlon, it is observed that these are characterized by being divided because they evaluate segments of the triathlonist's career and not the race itself. They are taken from the sporting disciplines that make up the triathlon. Few people are employed to evaluate performance in triathlon distance sprint. There is a predominance of laboratory tests and they do not study the athlete in conditions similar to those of competition.

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