

The Effect Of Training Using The Training Mask On The Development Of Recovery Among Athletes

Boumediene, Tarek.^{1*}, Bourenane, Cherif.²

¹ Algiers 3 university, SPMIP laboratory
tarekboumediene6@gmail.com

² Algiers 3 university, SPMIP laboratory
bourenane.cherif@univ-alger3.dz

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Abstract:

This study aimed to prove the role played by the training mask used as a tool to restore the respiratory system and the ratio oxygen saturation in the blood. The experimental method was used on a deliberate sample consisting of (10) ten Kung Fu Wushu athletes (class of senior males) who are healthy and regular in training. They were randomly divided into two equal groups (control and experimental). They were subjected to pre- and post-tests (measurement of oxygen saturation in the blood) by means of an oxymeter. We concluded that the training mask helps improve the percentage of oxygen saturation in the blood. We recommend it in order to develop the functional recovery ability of the athletes.

KEY WORDS: Training Mask; Recovering; Blood Oxygen Saturation; Hypoxia.

المخلص:

هدفت هذه الدراسة إلى إثبات الدور الذي يلعبه قناع التدريب كأداة لتحسين الجهاز التنفسي ونسبة تشبع الأكسجين في الدم. تم استخدام المنهج التجريبي على عينة مقصودة من (10) عشرة رياضيين كونغ فو ووشو (صنف أكابر ذكور) يتمتعون بصحة جيدة ومنظمون في التدريب. تم تقسيمهم بشكل عشوائي إلى مجموعتين متساويتين (ضابطة وتجريبية). تم إخضاعهم لاختبارات قبلية وبعدية (قياس تشبع الأكسجين في الدم) عن طريق مقياس الأوكسيمتر. استنتجنا أن قناع التدريب يساعد في تحسين نسبة تشبع الأكسجين في الدم. نوصي به من أجل تطوير قدرة الاسترجاع الوظيفي للرياضيين.

الكلمات المفتاحية: قناع التدريب، الاسترجاع، التشبع الأكسجيني للدم، الهيبوكسي.

1-Introduction:

* Author corresponding.

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Nations are racing to arm themselves with applied science at all different costs, and perhaps the tremendous progress achieved by the major countries in all fields is mainly due to the use of applied sciences in all fields. Considering education is life, science and its applications are an effective factor for a better life that can be invested to keep pace with existing innovations and requirements as the civilized world progresses steps Wide and rapid towards a huge scientific and technological revolution that led to a change in the concepts of modern education and thus its impact on the field of sports training, by relying on training technology through its technical means to deliver information and develop skills in an effective manner, as well as its ability to provide a suitable environment for flexible and influential education, which It has the greatest impact in improving the level of athletic performance.

Sports training aimed at achieving social construction and establishing a balanced personality to serve society. From a physiological point of view, it is defined (Cazorla & Farhi, 1998) as "a set of exercises adapted to increasing intensity that aim at biological, physical and technical changes in order to reach the maximum possible results". In order to reach these desired results, the sports coach uses modern technology to raise the capabilities of the players to high levels, so he had to be aware of all the developments of the era and develop his cognitive abilities. 500 to 6000 m above sea level by controlling the amount of air that passes through the mask (Porcari & al., 2016 : 380), which may have an effect on the possibility of increasing endurance and improving oxygen maximum (Ramadan & al., 2021 : 1337).

Interest in the idea of hypoxia training has increased after physiological and physical studies on training at heights and its impact on improving the level of physical fitness, which led to thinking about devising training methods that simulate conditions similar to the environment in heights, including the use of a training mask at heights, although some studies deny the full simulation of this. The mask (Porcari & al., 2016 : 379). The working principle of this mask depends on controlling the level of air that escapes from the ventilation openings in it, which leads to a decrease in the percentage of oxygen in the inhalation, forcing the organism to try to compensate for this deficiency by adopting physiological strategies that are different from the norm (Monshed, 2017 : 21).

The study of the functional state of the respiratory circulatory system in athletes is of great importance in order to evaluate and track their training status by knowing what is happening in terms of vital and

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functional processes within the body (Kenny, 2019 : 164), which means an accurate look at the level of the recovery ability of the athlete. The energy consumed during the work period, as well as protein building, are necessary to increase the athlete's efficiency in the short and long term. From this point of view, the period between and after training is considered a period no less important than the training period or the work itself, and this period is not intended to be limited to the training dose, but this period includes the periods between exercises and training doses, and between short and medium weekly pregnancy cycles for several weeks and long during seasons Various training courses (Essam, 2005 : 121).

Through the aforementioned, our study will focus on studying the effect of using a training mask during the sports training process on the recovery ability of athletes, by relying on functional and vital indicators to clarify the extent of change that may occur in the respiratory circulatory system. Therefore, the study was divided into two partial questions :

- Does training using the training mask help in raising the percentage of oxygen saturation in the blood of athletes after partial recovery from physical effort ?
- Does training using the training mask help in raising the percentage of oxygen saturation in the blood of athletes after full recovery from physical effort ?

2- General objective of the study:

The main objective of this study is to pay attention to the effective role played by the training mask in the development of recovery in athletes, in its partial and complete form, so that it is used as a tool to restore the functional systems of the body to their normal state or to reach the ideal in sports performance. This study also illustrates the relationship between training in heights and training using a mask and explains the similarities and differences between them according to previous scientific studies.

We are also trying to find out the extent of the impact of the use of this training device through a time extrapolation of the oxygen saturation ratio in the blood during the time after doing a physical effort. From there, we can confirm the effectiveness of this mask in physiological adaptation and the ability to maintain this level of oxygen saturation in the blood on the part of the athlete, as this

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directly contributes to accelerating the recovery process and improving its quality.

3- Procedural definition of the concepts mentioned in the research:

- **Training Mask:** is training tool that claim to come with some benefits, like improving lung capacity and oxygen efficiency by restricting your airflow as you do physical exertion (Institute for research and well-being of medicine and health sport, 25/12/2022). It covers the nose and mouth and has different sized openings and flux valves. The openings and flux valves can be adjusted to increase the resistance of respiration, making it more difficult to breathe while wearing the mask (Porcari, 2016).

- **Recovering:** according to Bacquaert (2022), is a period reserved for the body to cause higher than normal metabolic activity compared to a period of pure rest, during which all the systems solicited during the effort are restructured. Recovery can begin immediately after exercise or, on the contrary, voluntarily programmed in the form of deferred cycles. Conversely, the physical trainer or the doctor can program periods of overcompensation. During the recovery period, the athlete must not only allow the joints, muscles and tendons to regenerate and recover in good working order, but also allow the metabolism to eliminate any waste and replenish the reserves. This necessarily conditions the establishment of a diet adapted to recovery. Fitness weight should be a good criterion for a well-managed recovery. The body temperature can also be checked by the athlete every morning at rest, when getting up. The heart rate certainly remains the preferred indicator to know the degree of recovery of the body. All athletes must be able to know their basic heart rate and check it regularly (Institute for research and well-being of medicine and health sport, 25/12/2022).

- **Blood Oxygen Saturation:** is the amount of oxygen you have circulating in your blood. The body regulates the amount of oxygen saturation in your blood, because low blood oxygen levels (hypoxemia) can lead to many serious conditions and damage to individual organ systems, especially your brain and heart. Low blood oxygen levels indicate that your lungs and/or circulatory system may not be working as they should. A pulse oximeter reveals your oxygen saturation level within seconds. For most people, a normal pulse

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oximeter reading for your oxygen saturation level is between 95% and 100% (Cleveland clinic, 25/12/2022).

- **Hypoxia:** is a decrease in the amount of oxygen available in a given environment, the decrease in atmospheric pressure in the highlands is the main reason for the lack of oxygen, When atmospheric pressure increases, the percentage of oxygen in the air decreases. The human body begins to feel these physiological effects from an altitude of 1500 m (Hypoxia and cardiovascular and respiratory physiopathology laboratory, 25/12/2022).

4- The methodological procedures used in the study:

4-1 Method and tools:

We conducted a prospective study on (2) athletes from the same sports team who were then excluded from the main study, and after achieving the moderation in the sample, the distribution is normal, then the parametric tests can be applied, as they are in good health and regularly trained with the team. A request to implement a physical effort (medium-intensity running 10 km/h) was applied for a period of 10 minutes, then the percentage of oxygen saturation in the blood was measured using an oximeter of the Alecto type, during the following three periods of time:

* (2-3 minutes) * (4-6 minutes) * (over than 6 minutes), after the results have been recorded. After resting for an hour, the same previous protocol was re-applied and the results were recorded for the second time. The aim is to calculate the degree of validity and reliability in using this device.

Using the test-retest method, we found a reliability of (95%) and a validity of (0.92).

In this study, we used the experimental approach due to its suitability and the nature of the study. The study sample consisted of (10) ten senior athletes (19-20 years), males of the Saleh Bay Club for Kung Fu Wushu, with good health and permanent practitioners of training. They were chosen in a deliberate manner and divided into two groups. equal number (control and experimental) in a random manner, then the extent of their homogeneity was confirmed in this table.

Table N°1: The variance for the homogeneity of the sample

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	Livin R	Statistical significance level	Observation
Age (years)	0	1	homogeneous
Weight (kg)	0.48	0.508	homogeneous
Height (cm)	0.571	0.471	homogeneous
Rest pulse	0.067	0.803	homogeneous
Blood oxygen saturation (%)	0	1	homogeneous
Sleep (hours)	0.122	0.736	homogeneous
Training (years)	0.371	0.559	homogeneous

While the study tools were: (5) five FDBRO Sports Mask, an Alecto oximeter, a medical scale and a measuring tape.

After applying the aforementioned standard protocol on the study sample, the joint training program was launched for all sample members for a period of (30) thirty days, with the experimental group committing to wearing the training mask throughout this period of time at a rate of (30 minutes per session) per day. Then, we immediately carry out the dimensional measurements of the sample, following the same protocol.

The results were statistically processed by calculating the Pearson correlation coefficient, the arithmetic mean, the standard deviation, the Levin test for homogeneity, and the Student T test for two separate samples using the SPSS21 program.

4-2 Presentation and Analysis of Results:

Table N°2: The differences between the pre-measurements of the control and experimental groups

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		Control		Experimental		significance	T calculate	observation
		$\overline{X}$	S	$\overline{X}$	S			
Blood oxygen saturation (%)	+6 minutes	93.8	1.30	93	0.70	0.262	1.20	not significant
	4-6 minutes	97.4	0.54	96.6	0.54	0.05	2.3	not significant
	2-3 minutes	97.4	0.54	96.6	0.54	0.05	2.3	not significant

By comparing the differences between the pre-measurements of each of the control and experimental groups, and by testing the significance of the extent of the homogeneity of the community, we note that all the significance values are greater than (0.05), and therefore the test values indicate the homogeneity of the community, as for the significance of the t-test, all values are completely greater From (0.05) and at the significance level (0.05) and the degree of freedom (8), we find that all significance values are not statistically significant, which confirms that there are no tribal differences in the study sample.

Table N°3: The differences between the pre and post measurements of the control sample

		Significance	T calculate	Observation
Blood oxygen	2-3	0.374	-1	not

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(%) saturation	minutes			significant
	4-6 minutes	1	0	not significant
	+6 minutes	0.621	-0.535	not significant

Through what we notice in the above table that all the significance values (probability values) are completely greater than the level of significance (0.05), as well as the calculated T-value shows that there is no statistical significance for each of the three results (2-3 minutes), (4-6 minutes) and (more than 6 minutes) with regard to the blood oxygen saturation test, which confirms that there are no statistically significant differences in the pre and post measurement for the control group.

Table N°4: The differences between the pre and post measurements of the experimental sample

		Significance	T calculate	Observation
Blood oxygen (%) saturation	2-3 minutes	-11	0	significant
	4-6 minutes	-11	0	significant
	+6 minutes	-8.62	0.001	significant

With regard to the extent of blood oxygen saturation, we note from the comparison of the results obtained that the probability values are smaller than (0.05) and the calculated T value confirms the statistical significance, and from it we can say that the percentage of oxygen saturation or transport in the blood has changed between the pre and post measurement of the experimental group and in favor of the measurement remote.

4-3 Discussion and interpretation of the results:

By analyzing the results of the previous tables and interpreting them, we find that the use of the training mask has contributed to raising the level of oxygen saturation in the blood of the athletes after partial

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recovery (2-3 minutes) from stopping when exerting physical effort, and this is what was explained by (Thiebault & al., 1997), where he explained that the intensity of this response to hypoxia determines the person's ability to adapt to the altitude and that the increase in the respiratory frequency results in shortness of breath and respiratory alkalinity when the duration of residence at the altitude increases, which raises the air capacity when exerting the maximum physical effort to reach 90-120 L/min (Manuelle, 2008), with an increase in the number of red blood cells in the blood (Paula et Niebauer, 2012).

We also find, by analyzing and interpreting the results of the previous tables and their interpretation, that the use of the simulated mask for training at heights has contributed to raising the level of oxygen saturation in the blood of the athletes after full recovery, meaning that the level did not decrease over time, and this indicates the occurrence of a functional physiological spectrum. A permanent increase in the level of oxygen in the blood of athletes, and the inevitable result of this functional adaptation is an improvement in the performance of basal endurance among athletes, and some studies have shown that the use of training in heights is very important for endurance sports such as marathons, long races, and long-distance cycling (weineck, 1983; Balke et al., 1965). Physical effort in a low-oxygen environment leads to an increase in respiratory frequency and an increase in the pulmonary capacity of athletes (Rajaram, 2016).

The main function of red blood cells is the transfer of hemoglobin Hb, which in turn carries oxygen from the lungs to the tissues in the body, but 3% of this hemoglobin leaks through the membranes of capillary vessels to the tissue spaces, and therefore in order for hemoglobin to remain in the bloodstream, it must remain Inside the red blood cells (Guyton & Hall, 2011). But, we must be careful to always have the opinion of a pulmonologist, because certain pneumo-pathologies such as COVID or Asthma can mislead us by signaling a drop in oxygen saturation in the blood, which will give conclusions that are not adequate with the real state of the athlete and his circulatory functional capacity (Haceini, 2022; Djabellah, Zebchi & Rouibah, 2022 ; Lakhdar, Nemroud & Mohamed, 2018).

However, there are other studies that did not reach the same results as this study, and differences were found between the control and experimental groups, but they were not statistically significant (Porcari & al., 2016). A study (Kido et al., 2013) confirmed that only the maximum aerobic capacity and aerobic capacity improve, Arent (2022) confirms that the effects of training masks lie in its control of

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the amount of air one can breathe, while the effects of altitude are on the content of oxygen, carbon dioxide and azote in the air (Institute for research and well-being of medicine and health sport, 25/12/2022).

The use of the training mask as a means of recovery will also have repercussions on other procedures, for example the selection of young talents because it has always been considered that children from high altitude towns are the most favored to become champions in the endurance sports (example of Kenya) (Belmiloud & Haceini, 2021), with that, we will have more efficiency in the selection of young talents, and we will reduce the risk of errors made by national selectors knowing their low experience and scientific knowledge (Alali, 2022 ; Guettaf, Hadj aissa & Baait, 2020). But if the use of a training mask or another technological tool can compete with the traditional method, we will have opened the doors of selection for young talents from coastal cities.

Conclusion:

One of the most important conclusions of the study is that the training mask has a major role in the modern training processes, and the main thing in this study is the importance of using this method in developing mathematical recovery after physical effort. Previous studies its importance in endurance sports.

Also, the coaches must use this device to simulate some commonalities between the effects of training at altitude and training with training mask to save effort and money, as relying on it helps to avoid altitude sickness in some athletes. Thus, establishing the basis for using the mask to improve the level of partial and complete mathematical retrieval.

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