

## Evaluation of Physical Fitness of Sumatera Barat Football Players

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### Abstract

**Back ground:** VO2 max is used to assess the physical condition and progress of an athlete. The higher it is, the better the endurance because the energy production is greater. The VO2 max is linked to the: Maximum Aerobic Power (MAP). Endurance, for an athlete, is the ability to maintain an effort close to MAP for as long as possible. **The purpose** of this look out were: (1) to assess the current status of physical fitness Sumatera Barat football players through VO2 max, (2) to compare football players VO2 max on the standard's VO2 max value. **Research methodology** This is explorative research with mix method qualitative and quantitative study. The sample of this study were 29 football players from SKO SUMBARFA Sumatera Barat. The subjects were taken by random. The data collection technique was Yo-Yo Intermittent Recovery Test Level on the playground. Data were analyzed with descriptive statistic. **The result** showed that 82.75% or 24 subjects from the whole sample have a poor VO2 max. 13.79% have a low VO2 max. 3.44% have moderate VO2 max. The result from the one sample test showed that people have different VO2 max level between them. In add more they were classified under the normal value usual. **Conclusion:** VO2 max is one of the keys to reach the high goals or achievement, all coaches have to train their athletes with suitable programs training in order to expect the high performance.

**Keywords:** vo2 max, physical fitness, performance, fotball

### 1. INTRODUCTION

Physical fitness can be common to several sports. The objective is to increase the different capacities of the body like endurance, strength, speed, VO2 max, sheathing, agility, and accuracy(Siramaneerat & Chaowilai, 2020). Strength is a physical ability that, along with endurance, speed and flexibility, determines the ability to perform(Sumaryanti, Tomoliyus, & Ndayisenga, 2019, Thiele, Prieske, Chaabene, & Granacher, 2020). The effects of physical fitness are still very visible in old age whether someone always doing sports, he can endure fit long more than inactivity human(Renaud, 2010) . The physical fitness has beneficial effects for the athlete(Raiola & Di Domenico, 2021).The physical fitness qualities well defined as: (1) Force: the ability to move a

mass. It can be coupled with speed, (2) Flexibility: amplitude of movement that a joint can achieve, (3) Speed: ability to move in a minimum of time, (4) Resistance: ability to perform very important muscular work for a short period of time, (5) Endurance: possibility of performing continuous effort over a long period of time, (6) Coordination: ability to chain movements to achieve a precise gesture(Granero-Gallegos, González-Quílez, Plews, & Carrasco-Poyatos, 2020). Among the most important physiological performance indicators in football team are speed and velocity at maximal oxygen uptake(Agustiyawan, Wibisono, & Purnamadiyawati, 2020). Some research showed that football player might have different VO2 max regarding to the post play(Granero-Gallegos et al., 2020). Football (soccer) is one of the most

complex sports in the world, where players need technical, tactical, and physical skills to achieve a successful performance, and eventually to win a game, this one can be reached if players did not have enough VO<sub>2</sub> max(Modric, Versic, & Sekulic, 2020). The coach trainers have to make a good management about the physical fitness training and achievement, because every industry need equal service(Ndayisenga & Tomoliyus, 2019)

This systematic overview and meta-analysis assessed the effects of bounce training (JT) on measures of bodily health and athletic performances in staying power runners. The main analyses printed a sizeable reasonable improvement in time-trial performance (i.e., distances between 2 and 5.0 km; ES = 0.88), without enhancements in maximal oxygen consumption (VO<sub>2</sub>max), speed at VO<sub>2</sub>max, velocity at submaximal lactate levels, coronary heart price at submaximal velocities, stride price at submaximal velocities, stiffness, total body mass or maximal strength performance. However, good sized small-to average upgrades have been mentioned for jump performance, rate of pressure development, dash performance, reactive strength, and going for walks economic system (ES = 0.36–0.73; p < 0.001 to 0.031; I<sup>2</sup> = 0.0% to 49.3%). JT is fantastic in enhancing bodily health and athletic overall performance in staying power runners. Improvements in time-trial overall performance after JT may be mediated through improvements in force generating capabilities and jogging financial system(Raiola & Di Domenico, 2021)

Human performance is multifactorial and is determined by various factors of the athlete's environment (medical care and supervision, the quality of physical training, nutrition, technology and doping), by factors physiological (oxygen transport, muscle performance and metabolism, control cardiovascular system or the functioning of the various components of the nervous system), by

biomechanical and tactical factors; and by other factors beyond the athlete's control (genetics, environment and climatic conditions, socio-cultural factors). Factors psychological and neuronal also contribute to the success of sports performance(Bréart, Hermine, Rivière, Rochcongar, & Toussaint, 2018).

The physical factor is the use of the body for performance, physiological measurements of most aerobic energy (VO<sub>2</sub> max) and anaerobic threshold (AT) have frequently been used to reveal the health and training repute of athletes(Edwards, Clark, & Macfadyen, 2003, Trevor, 2020). The athlete will then have to use all of his physiological and muscular abilities to succeed in surpassing himself and performing. These abilities can be distinguished depending on the sport you play. We speak of energy and muscular capacities when the athlete will have to call on his endurance and the aerobic (long distance for example) or anaerobic (short and intense) system. Likewise, we can talk about muscular capacities more related to strength as in weight lifting. If we are talking about physical preparation, it is not for nothing. The body is the tool that will enable performance in a sport at any given time. It should be conceived directly as the hammer that will drive the point home. Obviously when we talk about the physical factors of sports performance, not everyone is born equal. We must take into account the genetic side. A good athlete will stand out by observing and understanding its physical advantages and disadvantages in order to be able to work on them. Thus, we can detect physical qualities essential to performance: Biological qualities such as VO<sub>2</sub> max, percentage of body fat; The energetic qualities which depend on the production and use of energy; Coordinating qualities: the ease we can have in organizing and modulating our motor skills. We can take the example of Lionel Messi who experienced growth problems. Some might have thought that his "small" stature would be a physical disadvantage against his

opponents. He worked on it until he was feared by his opponents. Considered one of the best players of all time. When we hear about technique or technical gestures, we often imagine a footballer with a ball dribbling. Sports technique exists in all areas. Indeed, it consists in mastering the gestures, the postures or the movements which constitute the basis of the practiced sport. As examples we can cite weightlifters who must have a straight back with heels on the ground, runners in running must raise their knees while attacking the ground at the level of the sole of the foot in a rubbing motion.

### **Why this research is important?**

Based on the important of physical fitness on performance, it has found that there is a lack of researches about physical fitness in Medan. However, if there are no more studies linked to the physical fitness of athletes, there is no hope to reach the goals or high achievement. This study will help researchers to know the current status of Medan athletes. The result from the later look out will also help physical education, and coach trainer to know the strong and weak points of their athletes.

## **2. RESEARCH METHODS**

This is an explorative research with mix method qualitative and quantitative study. The sample of this study were 29 football athletes from SKO SUMBARFA Sumatera Barat. The subjects were taken by random. The data collection technique was Yo-Yo Intermittent Recovery Test Level on the playground. Data were analyzed with descriptive statistic.

### **Procedure**

To assess the VO<sub>2</sub> max level of the subjects Yo-Yo Intermittent Recovery Test Level 1 has been applied on the playground. The data were representative in the form of tables, after each mean of the data was compared on normal value to assess if the subjects have a good physical fitness. The level of classification was: excellent (E), very good (VG), good(G), moderate(M), and Low (L), and poor (P).

## **3. RESULT**

The data were represented in the form of table. After recording the data, they ranked well according to the levels

Table 1: FORM YO-YO INTERMITTENT RECOVERY TEST LEVEL 1

<b>No.</b>	<b>Test</b>	<b>Speed / Level</b>	<b>Distance / Meters</b>	<b>Vo2 MAX</b>	<b>Rating</b>	<b>Rangking</b>
	<b>I</b>				<b>Male</b>	
<b>1</b>	59	<b>19.8</b>	<b>2360</b>	<b>56.22</b>	<b>Moderate</b>	<b>1</b>
<b>2</b>	53	<b>19.2</b>	<b>2120</b>	<b>54.21</b>	<b>Low</b>	<b>2</b>
<b>3</b>	53	<b>19.2</b>	<b>2120</b>	<b>54.21</b>	<b>Low</b>	<b>2</b>
<b>4</b>	49	<b>18.6</b>	<b>1960</b>	<b>52.86</b>	<b>Low</b>	<b>4</b>
<b>5</b>	46	<b>18.3</b>	<b>1840</b>	<b>51.86</b>	<b>Low</b>	<b>5</b>
<b>6</b>	44	<b>18.1</b>	<b>1760</b>	<b>51.18</b>	<b>Poor</b>	<b>6</b>
<b>7</b>	43	<b>17.8</b>	<b>1720</b>	<b>50.85</b>	<b>Poor</b>	<b>7</b>
<b>8</b>	43	<b>17.8</b>	<b>1720</b>	<b>50.85</b>	<b>Poor</b>	<b>7</b>
<b>9</b>	43	<b>17.8</b>	<b>1720</b>	<b>50.85</b>	<b>Poor</b>	<b>7</b>
<b>10</b>	41	<b>17.6</b>	<b>1640</b>	<b>50.18</b>	<b>Poor</b>	<b>10</b>
<b>11</b>	41	<b>17.6</b>	<b>1640</b>	<b>50.18</b>	<b>Poor</b>	<b>10</b>
<b>12</b>	39	<b>17.4</b>	<b>1560</b>	<b>49.50</b>	<b>Poor</b>	<b>12</b>
<b>13</b>	36	<b>17.1</b>	<b>1440</b>	<b>48.50</b>	<b>Poor</b>	<b>13</b>
<b>14</b>	34	<b>16.7</b>	<b>1360</b>	<b>47.82</b>	<b>Poor</b>	<b>14</b>
<b>15</b>	34	<b>16.7</b>	<b>1360</b>	<b>47.82</b>	<b>Poor</b>	<b>14</b>
<b>16</b>	32	<b>16.5</b>	<b>1280</b>	<b>47.15</b>	<b>Poor</b>	<b>16</b>

<b>17</b>	32	<b>16.5</b>	<b>1280</b>	<b>47.15</b>	<b>Poor</b>	<b>16</b>
<b>18</b>	32	<b>16.5</b>	<b>1280</b>	<b>47.15</b>	<b>Poor</b>	<b>16</b>
<b>19</b>	30	<b>16.3</b>	<b>1200</b>	<b>46.48</b>	<b>Poor</b>	<b>19</b>
<b>20</b>	28	<b>16.1</b>	<b>1120</b>	<b>45.81</b>	<b>Poor</b>	<b>20</b>
<b>21</b>	27	<b>15.8</b>	<b>1080</b>	<b>45.47</b>	<b>Poor</b>	<b>21</b>
<b>22</b>	21	<b>15.2</b>	<b>840</b>	<b>43.46</b>	<b>Poor</b>	<b>22</b>
<b>23</b>	19	<b>14.8</b>	<b>760</b>	<b>42.78</b>	<b>Poor</b>	<b>23</b>
<b>24</b>	19	<b>14.8</b>	<b>760</b>	<b>42.78</b>	<b>Poor</b>	<b>23</b>
<b>25</b>	19	<b>14.8</b>	<b>760</b>	<b>42.78</b>	<b>Poor</b>	<b>23</b>
<b>26</b>	19	<b>14.8</b>	<b>760</b>	<b>42.78</b>	<b>Poor</b>	<b>23</b>
<b>27</b>	18	<b>14.7</b>	<b>720</b>	<b>42.45</b>	<b>Poor</b>	<b>27</b>
<b>28</b>	13	<b>14.2</b>	<b>520</b>	<b>40.77</b>	<b>Poor</b>	<b>28</b>
<b>29</b>	7	<b>12.3</b>	<b>280</b>	<b>38.75</b>	<b>Poor</b>	<b>29</b>

The result from the table 1 showed that 82.75% or 24 subjects from the whole sample have a poor VO2 max. Regarding to the benefit of VO2 max. the subjects still need cardiorespiratory exercise. VO2max is a performance indicator. The higher its value, the more the athlete is able to maintain an effort of a certain intensity over time. If the athlete increases his VO2max through training, he can run either faster for

the same distance or longer for the same intensity. Some game lake football. Basketball, rugby, and handball more need a high VO2 max. The result showed that 13,79% have a low VO2 max. 3,44% have moderate VO2 max. Based on the benefit of VO2 max on sport performance. Those athletes still in critical level and they need more cardio respiratory programs to increase the performance.

Table 2: One-Sample Test

	Test Value = 0					
	t	df	Sig. tailed)	(2- Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
VO2 max	58.430	28	.000	47.68448	46.0128	49.3562

The result from the one sample test showed that people have different VO2 max level between them. In add more they were classified under the normal value usuals. In the cells are the mitochondria. They are the ones that produce energy in the form of ATP from glucose. But for this to happen, oxygen is needed. This is collected from the lungs by red blood cells and distributed to all cells in the body. During physical exertion, we need more energy and therefore more oxygen. Respiration and heart rate speed up so that more oxygen can be supplied to these mitochondria VO2 max

is used to assess the physical condition and progress of an athlete. The higher it is, the better the endurance because the energy production is greater. The VO2 max is linked to the maximal aerobic power (MAP): Maximum Aerobic Power. Endurance, for an athlete, is the ability to maintain an effort close to MAP for as long as possible. Be careful, however, VO2 max is not everything: two athletes with the same VO2 max do not necessarily have the same level. It must be taken into account that oxygen is not only used by the muscles

but also by other organs like the heart, the brain.

#### 4. DISCUSSION

The result found showed that most of the football athletes or 82.75% has a low VO<sub>2</sub> max. Football game is a sport which needed more endurance then, the football subjects need more training programs in order to reach the performance. Football, also known as soccer, is arguably the most popular sport on the planet. Aside from the Olympic Games, there is no other sporting activity which arouses so much enthusiasm, but players need more training in many various fields like endurance, strength, speed, tactics, and technics (Ibo-Bainguié, 2016). If the football player has a low VO<sub>2</sub> max he can finish the international competition level(Bahtra, Asmawi, Widiastuti, & Dlis, 2020). One study assessed the VO<sub>2</sub> max used three dimensions, they used a collection of bodily and technical tests. The results printed the existence of statistically enormous differences between the recreation booths in vo<sub>2</sub>max, speed 10 meters, ball manage 30 meters X 5 and ball manipulate in a Small space(Abdelatif, Zerf, & Ali, 2020). Specific strength physical training blended to persistence aerobic with ball allows for improvement of physical fitness qualities(Khanfir, Kamoun, Heubert, & Masmoudi, 2014).The result from this study show that those young football athlete still need a suitable training program to increase physical fitness, and they can expect the high performance.

Endurance-type training (low intensity but long duration) causes an increase in the number of mitochondria in muscle fibers and the number of capillaries around these fibers. This type of workout also induces an increase in stroke volume, that is, the volume of blood expelled with each cardiac contraction. These changes allow an increase in the amount of oxygen reaching the muscles as well as a better use of this oxygen by the muscles(Goudiaby Salif, 2008). Thus, the VO<sub>2</sub> max is

increased. Top athletes achieve much higher values. The best long-distance runners have a VO<sub>2</sub> max of 85ml / kg / min, and a few outstanding athletes exceed the 90ml / kg / min mark. The highest value ever recorded is that of Norwegian cross-country ski champion Bjørn Dæhlie, holder of eight Olympic gold medals: 96 ml / kg / min.(Fleury, 2018). The physical fitness assessment was found as a great test to know the current status of athlete(Pasco, 2021). Physical ability of athletes is an important thing of success in sports achievements. Aerobic capability has been customary as its foremost component. Maximal oxygen uptake (VO<sub>2</sub>max) has been regarded with the aid of majority of authors as the pleasant indicator of aerobic potential of an organism, and at the equal time, the fine indicator of an athlete's bodily potential(Ranković et al., 2010). Endurance has a key role in the activity of footballers, coaches often use intermittent exercise for the purpose of to improve the aerobic potential of the players, however these exercises focus only on the physical factor and neglect the technical and tactical factors (physical activity dissociate), this is why we are moving towards a trend of integrated physical preparation based on reduced clearances. The aim of this study is to enable coaches to substitute intermittent exercises with reduced football-specific games in favor of multifactorial training.

#### 5. CONCLUSION

The study was about assessment of VO<sub>2</sub> max of football athletes. The objectives of this study were: (1) to find the current status of SKO SUMBARFA Sumatera Barat, (2) to compare the found out with the normal usuals, (3) how athletes should reach high performance so fast. The result found showed that most of the athlete have a low VO<sub>2</sub> max. Coaches trainers need to improve or to renew their old programs as soon as possible to allow subjects good performance.

#### Conflict of interest

All the researches declared that there is no conflict of interest.

## 6. REFERENCE

1. Abdelatif, H., Zerf, M., & Ali, B. (2020). *Détermination des niveaux de critères normatifs pour l'évaluation des paramètres physique et technique des footballeurs des U17 suivant leurs compartiments de jeu*. (June).
2. Agustiyawan, Wibisono, H., & Purnamadiyawati. (2020). *Effect of Plyometric and Sprint Training on VO2Max in Amateur Football Player*. 30(Ichd), 129–131. <https://doi.org/10.2991/ahsr.k.201125.022>
3. Arshad, M. A., Kalimullah, Khan, S., & Shahid, Z. (2020). High performance organisation: the only way to sustain public sector organisations. *International Journal of Public Sector Performance Management*, 6(6), 806-816.
4. Bahtra, R., Asmawi, M., Widiasuti, & Dlis, F. (2020). Improved vo2max: The effectiveness of basic soccer training at a young age. *International Journal of Human Movement and Sports Sciences*, 8(3), 97–102. <https://doi.org/10.13189/saj.2020.080304>
5. Bréart, P. G., Hermine, P. O., Rivière, P. D., Rochcongar, P. P., & Toussaint, P. J. (2018). *Evolution des performances sportives : apport de l'épidémiologie pour l'analyse des performances sportives et des influences physiologiques, technologiques, génétiques et environnementales sur les progressions humaines au cours de l'ère olympique*.
6. Edwards, A. M., Clark, N., & Macfadyen, A. M. (2003). Lactate and ventilatory thresholds reflect the training status of professional soccer players where maximum aerobic power is unchanged. *Journal of Sports Science and Medicine*, 2(1), 23–29.
7. Fleury, A. (2018). *Les facteurs physiologiques associés à la performance en surf* To cite this version : HAL Id : dumas-01716583 DIPLOME D'ETAT DE DOCTEUR EN MEDECINE Monsieur le Professeur François TISON Monsieur le Professeur Frédéric BAUDUER Monsieur le Professeur Hervé.
8. Goudiaby Salif. (2008). *Profil physique et physiologique des footballeurs de première*. Retrieved from <http://www.beep.ird.fr/collect/inseps/index/assoc/MI08-28.dir/MI08-28.pdf>
9. Granero-Gallegos, A., González-Quílez, A., Plews, D., & Carrasco-Poyatos, M. (2020). Hrv-based training for improving vo2max in endurance athletes. A systematic review with meta-analysis. *International Journal of Environmental Research and Public Health*, 17(21), 1–22. <https://doi.org/10.3390/ijerph1721799>
10. Ibo-Bainguié, J.-E. (2016). *Effets de l'entraînement en musculation sur le VO2max et autres qualités athlétiques chez le footballeur U-19*.
11. Khanfir, M. A., Kamoun, A., Heubert, R., & Masmoudi, L. (2014). L'entraînement combiné de la force et de l'endurance chez de jeunes footballeurs. *Science and Sports*, 29(2), 71–77. <https://doi.org/10.1016/j.scispo.2013.09.005>
12. Modric, T., Versic, S., & Sekulic, D. (2020). Aerobic fitness and game performance indicators in professional football players; playing position specifics and associations. *Heliyon*, 6(11). <https://doi.org/10.1016/j.heliyon.2020.e05427>

13. Ndayisenga, J., & Tomoliyus. (2019). The perception of international students on the facility and sport tourism event management. *Sport Mont*, 17(2), 53–58. <https://doi.org/10.26773/smj.190609>
14. Pasco, D. (2021). Nouvelles formes de pratiques physiques et sportives basées sur le jeu vidéo : quelles perspectives pour l'intervention ? *Ejournal de La Recherche Sur l'intervention En Éducation Physique et Sport -EJRIEPS*, (Hors-série N° 4), 25–28. <https://doi.org/10.4000/ejrieps.6300>
15. Raiola, G., & Di Domenico, F. (2021). Physical and sports activity during the COVID-19 pandemic. *Journal of Physical Education and Sport*, 21(1), 477–482. <https://doi.org/10.7752/jpes.2021.s1049>
16. Ranković, G., Mutavdžić, V., Toskić, D., Preljević, A., Kocić, M., Nedinić-Ranković, G., & Damjanović, N. (2010). Aerobic capacity as an indicator in different kinds of sports. *Bosnian Journal of Basic Medical Sciences*, 10(1), 44–48. <https://doi.org/10.17305/bjbms.2010.2734>
17. Renaud, M. (2010). *Impacts De La Condition Physique Sur Les Performances Cognitives Dans Le Vieillissement Normal Au Département De Psychologie En Vue De L ' Obtention Du Grade De Philosophiae Doctor ( Ph . D . ) Par Mélanie Renaud M . a .*
18. Siramaneerat, I., & Chaowilai, C. (2020). Impact of specialized physical training programs on physical fitness in athletes. *Journal of Human Sport and Exercise*, 17(2), 1–11. <https://doi.org/10.14198/jhse.2022.172.18>
19. Sumaryanti, Tomoliyus, & Ndayisenga, J. (2019). Circuit training intervention for adaptive physical activity to improve cardiorespiratory fitness, leg muscle strength static and balance of intellectually disabled children. *Sport Mont*, 17(3). <https://doi.org/10.26773/smj.191019>
20. Thiele, D., Prieske, O., Chaabene, H., & Granacher, U. (2020). Effects of strength training on physical fitness and sport-specific performance in recreational , sub- elite , and elite rowers : A systematic review with. *Journal of Sports Sciences*, 38(10), 1186–1195. <https://doi.org/10.1080/02640414.2020.1745502>
21. Trevor, S. (2020). Brazilian Jiu-Jitsu Needs Analysis. *International Journal of Sports and Exercise Medicine*, 6(2), 1–2. <https://doi.org/10.23937/2469-5718/1510162>