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Original article

AN INVESTIGATION OF SOME MOTORIC CHARACTERISTICS OF NATIONAL ELITE WRESTLING ATHLETES

MURAT TUTAR¹, TURKER BIYIKLI², CENK ILDEM³, MIRAY ILHAN¹

Abstract

Aim. This study reveals the data of the analysis of the motoric characteristics of thirty National A wrestling athletes, ten Greco-Roman, ten freestyle and ten female.

Methods. The study included 10 national wrestling athletes, 10 freestyle and 10 female National A wrestling athletes.

Results. These data show a high level of training of the athletes and confirm the specificity of these tests for single fights. The applied tests are informative for the estimation of the functional state of athletes. The dynamics of their results gives the necessary information to predict the success of athletes and can be used in monitoring their condition.

Conclusions. As a result of the tests performed in elite athletes, it is recommended to give special exercise movements for muscle groups with muscle imbalances.

Keywords: wrestling, strength training, posture analysis, stability, agility, anaerobic power

Introduction

Greco-Roman wrestling is a style of wrestling practised in Olympic and international amateur competitions. In Greco-Roman wrestling, the legs may not be used in any way to obtain a takedown and there may be no below-the-waist holds. The other rules and procedures of Greco-Roman wrestling are the same as those of the other international amateur style, freestyle wrestling. Greco-Roman wrestling originated in France in the early 19th century, imitating classical Greek and Roman representations of the sport. It became a favourite in the Scandinavian countries, and from 1912 to 1948 Swedish and Finnish wrestlers won many Olympic titles, after which the Soviet Union and other countries came to the fore (Britannica).

While the vast majority of sports played today were created or completed their development in the 19th and 20th centuries, it is undoubtedly true that in ancient times our ancestors began to compete with each other in primitive sports as a means of passing the time and having fun. It is not known which were the first sports developed in our earliest civilisations, but records from that time tell us that the most famous sports were not running, wrestling and martial arts involving kicking and hitting. As time went on, sporting competitions became increasingly organised with actual events celebrating sporting competitors and offering spectators an easier way to follow various types of sports. The best example of this revolution in organised sports is the first Olympic Games in BC. While there was only one event (foot race) in this influential competition, subsequent Games expanded to include many more types of sports such as boxing, wrestling, javelin, discus throw, equestrian, show jumping and more. Sporting records from that time are numerous, from pictures and textual records recorded in Greece, Egypt and Rome to the mention of wrestling in the Bible (History of Sport, 2022). Wrestling stands out as having the longest history among sports. Many wrestling styles have developed until modern times. However, many wrestling training types have also been included in the literature.

In this study, some motoric characteristics of national wrestlers who adopted Greco-Roman style and Freestyle wrestling, which emerged in the historical process of wrestling, were analysed and the results were shared. Wrestling is probably the oldest of all sports and is depicted in cave paintings dating back 15,000 years. It was a sport practised in many ancient societies. (History of Wrestling & UWW, 2023) The first wrestling matches were probably part of military training. The ancient Greeks were the most prolific wrestlers and elevated it to a physical art form. They understood that wrestling was like playing chess with your body, using techniques and movements to outwit your opponent and dominate him in the process. The Greeks also created the Olympic Games, and wrestling was one of the few events included in the first Games in the eighth century BC. (David G. Curby & Guillaume Jomand, 2015)

Then with the fall of the Greek Empire in the 5th century AD, the Olympic Games ended and sport ceased to be an art (returning to its more militaristic beginnings). In time both styles spread throughout the Roman Empire and beyond. When the Olympics resumed in 1896, one of the first sports offered was wrestling (Origins of Wrestling)

The first International Federation for the development of wrestling and weightlifting was founded in Duisburg in 1905 by the Deutsche Athleten-Verband (DAV). A committee was then formed consisting of the following members: Mr Monticelli (ITA), brothers van Elst (NED), Mr Koettgen (GER) and Mr Stolz (GER). The aim of the Federation was to

¹ Istanbul Nisantasi University Sport Sciences, Istanbul, Turkey; Corresponding author: murat.tutar@nisantasi.edu.tr.

² Marmara University of Sport Sciences, Istanbul, Turkey.

³ Wrestling Trainer, Turkey.



organise the World Championships. The first International Wrestlers' Association (Internationaler Ring Verband) was founded in 1912 on the eve of the Olympic Games in Stockholm. The organising committee of the Olympic Games entrusted the Swedish Athletic Federation with the task of organising a congress to prepare the statutes and wrestlers' rules of an international governing body. Two Hungarians were temporarily elected: Dr Péter Tatits as President and Mr Mor Csanádi as Secretary General. It was decided that the first congress of the International Wrestlers' Union would be held in Berlin in 1913 (A Brief History of Wrestling, 2023).

During the Antwerp Olympic Games in 1920, the IOC recommended the establishment of independent Federations for each sport. The International Amateur Wrestling Federation (IAWF) was thus founded in 1921 during the IOC Olympic Congress in Lausanne. The statutes of the nineteen National Federations and the IAWF were approved on this occasion. The new Federation assumed the responsibility of introducing two styles of wrestling and made some corrections to the existing rules (Jiminez, 2018). The Greco-Roman World championships were organised in Helsinki (1921) and Stockholm (1922). The creation of the IAWF legitimised wrestling in the eyes of the IOC, National Olympic Committees, National Wrestling Federations, governmental and non-governmental organisations and public opinion worldwide. In 1952, Roger Coulon was elected President of the FILA and in 1954, at the congress in Tokyo, the Federation: International Amateur Wrestling Federation.

In 1956, during the Olympic Games in Melbourne, new FILA board members were elected: Mr. Vehbi Emre (TUR), Mr. Arvo Himberg (FIN), Mr. M. Mackenzie (GBR), Mr. Ichiro Hatta (JPN), Mr. A. Katouline (URS), Mr. Albert de Ferrari (USA), Mr. Mihaly Matura (HUN), Mr. Anselmo Baficio (ITA), Mr. M. Ratib (EGY), Mr. Per Strömbäck (SWE), Mr. Jules Perrel (NED), Mr. M. Pascal (FRA), Mr. Milan Ercegan (YUG) and Mr M. Hergl (GER). In 1965, Mr Coulon moved the FILA headquarters to Lausanne, making FILA the first International Federation to settle in the Olympic capital. In 1967 Roger Coulon founded GAISF (General Association of International Sports Federations) to allow International Federations to better communicate and control the development of the international sports movement. During the sixties FILA showed creativity in various areas and especially in its organisation. There was a certain improvement in the exchange of information with the National Federations: The FILA Bulletin began to appear, wrestlers' licences were introduced and a good qualification system for referees was established. In 2002 FILA entered a new era with the election of its new President, Mr Raphaël Martinetti (SUI).

"Welcome to the New World of Wrestling" and created a modernisation strategy to promote wrestling worldwide (A Brief History of Wrestling, 2023).

Wrestling Training

Wrestling, widely recognised as the world's oldest competitive sport, has featured in every Olympic Games since its ancient conception. In the modern Olympics, there are two styles of wrestling - freestyle and Greco-Roman. Although the rules are almost identical, Greco-Roman wrestlers must not use their legs to trip or lift an opponent or to attack the opponent's legs. For both disciplines, successful wrestling training should develop a high level of anaerobic power and excellent strength endurance in both arms and legs. In bouts lasting up to a maximum of 5 minutes (depending on age and level), wrestlers may accumulate high levels of blood lactate due to frequent bursts of intense activity and minimal rest periods (Şahin, 2018). Anaerobic endurance and capacity are probably more important for the wrestler than pure aerobic endurance. Aerobic power is average in national wrestlers, although values as high as 70mls/kg/min have been recorded in elite level wrestlers. An important aspect for wrestlers is weight management. (Baechle & Earle, 2000)

Rapid weight loss to make a weight category has profound negative effects on the physiology of the wrestler, especially in relation to strength endurance. Both nutrition and training techniques can help to minimise any necessary weight loss in the first place and also to minimise the negative effects of rapid weight loss (Yıldırım, 2007). Strength training will obviously play an important role in a wrestler's overall training plan (Bompa, 1999; Haff & Nimphius, 2012). However, a bodybuilding approach is not the most effective use of training time and can result in significant weight gain. Maximal strength training is more sport specific and is not associated with significant hypertrophy. It can also be translated into strength endurance and power endurance, two physical attributes that are crucial for high levels of performance (Anderson & Jacky, 2022).

Objectives

Of the study was to show the development of 30 male and female wrestlers with similar training experiences through strength training.

Methods

The study included 10 national wrestling athletes, 10 freestyle and 10 female National A wrestling athletes.

Results

1. Posture and Anaerobic Analysis

Posture is defined as the combination of the positions taken by the joints in every movement of the body. Muscles, ligaments and joints work in harmony in every movement of the body. Therefore, any disorder in posture prevents the

athlete from performing the movement at a correct angle with the correct joint range of motion. Movements that cannot be performed at the correct angle with the correct range of motion provide disadvantages to the athlete in competitions. Posture has a special importance especially in sports requiring high level skill or contact sports (Heyward, 2014). Wrestling is in the class of sports that require both high-level skill and contact. In addition, wrestling is a sport branch that requires grasping, intense power and uses all extremities of the body. Correct posture for such a sport branch has an important role in reducing muscle ligament and tendon injuries, maintaining balance and stabilisation and increasing the agility of the individual (Üzer, 2020).

One of the tests applied to Grokoromenian style wrestlers is the anaerobic test. Anaerobic capacity is the total amount of energy from the anaerobic (oxygen-free) energy systems, i.e. the combined output for the ATP, phospho-creatine and lactic acid systems. The anaerobic system is maximally stressed during short periods of high-intensity activity (usually between 30 seconds and a few minutes), and most of the following tests are performed in this time frame. A related measure is anaerobic threshold or lactate threshold measurements (Anaerobic Capacity Fitness Tests, 2023).

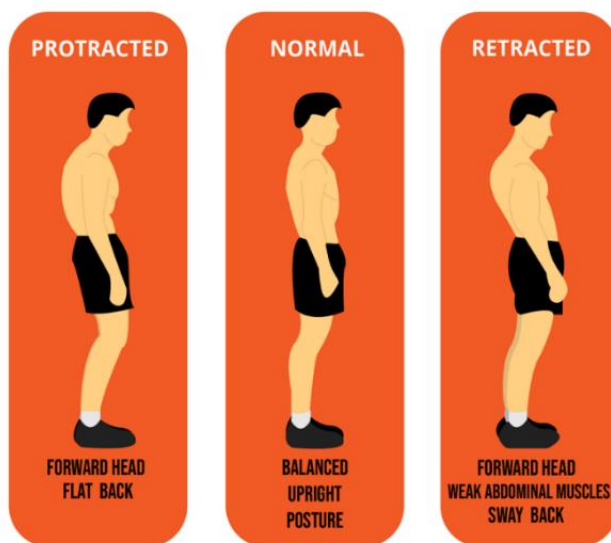


Figure 1. Posture

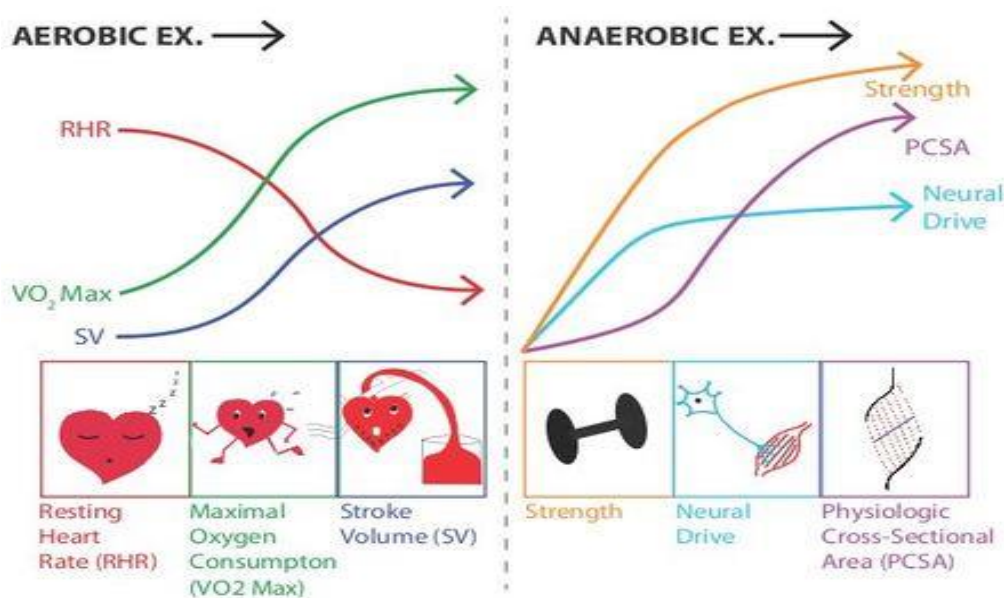
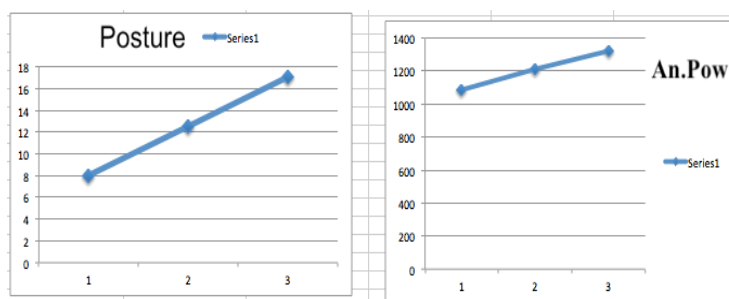


Figure 2. Aerobic-Anaerobic

The graphs below are given in the form of averages of the teams' athletes participating in the 2022 Serbia world championships.

Posture/Alignment			Anaerobic POWER(AV PEAK)		
JAN	MAY	AGU	JAN	MAY	AGU
8	12,5	17	1081w Relative Peak P. 14.2	1209w Relative Peak P. 15.9	1318w Relative Peak P. 19.05



Graph 1. Posture/Allignment and Anaerobic Power

The graph above shows the posture measurements of the wrestlers in the left graph and anaerobic tests in the right graph.

2. Balance and Strength Analysis

The flamingo test can be used to determine the static balance ability of athletes. A reliability coefficient below the confidence limit of 0.70 was reported for the test. The balance material used for the test is a 50 cm long, 5 cm high and 3 cm wide wooden beam. This beam was fixed with two wooden supports 15 cm long and 4 cm wide. In order to make the test more reliable, a non-slippery and flat floor should be used where the balance material can remain stable. The athlete stands on the balance material with the selected foot and receives support from the test administrator and can hold on to him/her in order to maintain his/her balance and take the correct position before the test. The athlete then bends the free foot behind the knee and holds it with the hand in the same direction. When the athlete is ready, he/she releases the helper's hand and the stopwatch is started at the same time. Each time the athlete loses his/her balance (contact with the ground, dropping his/her foot) the stopwatch is stopped and restarted when the athlete is ready. Within 60 s, the total number of balance losses is recorded (Wood, 2008).

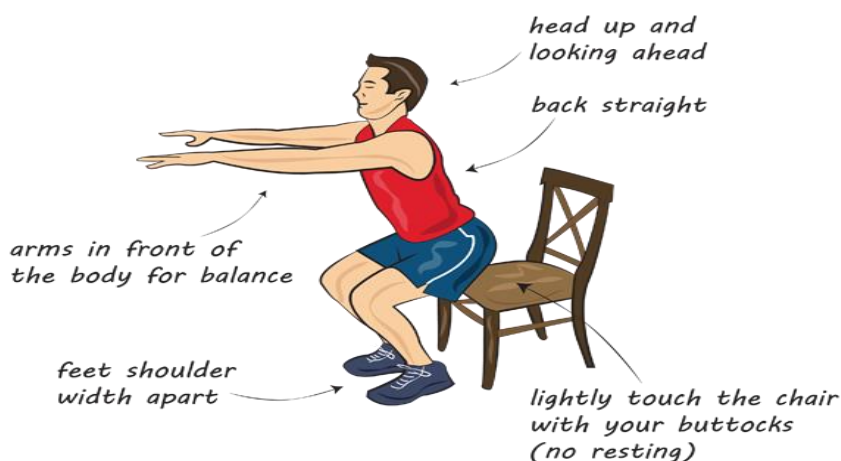
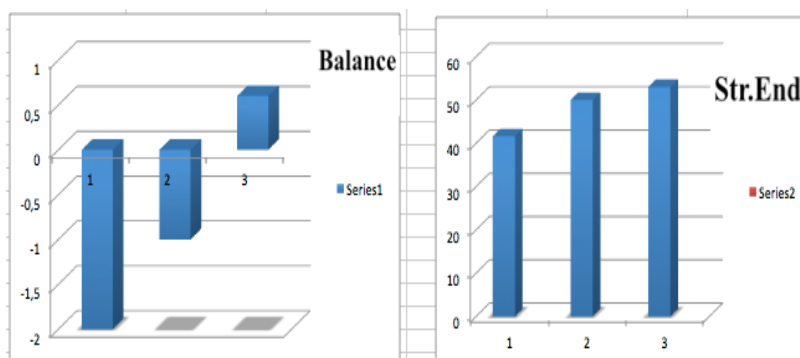


Figure 3. Balance

BALANCE(error score)			Strength Endurance(reps)		
JAN	MAY	AGU	JAN	MAY	AGU
2 er	1 er	0,6 er	41,6	50	53



Graph 2. Balance and Strenght Endurance

3. Agility Test Analysis

Agility is the ability to rapidly change body position or body orientation. This ability is measured by tests that require the subject to turn or start and stop. Agility is also affected by balance, coordination, position of the centre of gravity, running speed, acceleration and dexterity. There is a school of thought that agility tests should include a response to a stimulus, an element of agility that is well perceived in the field. Without the response stimulus, it is a change of direction test (COD). Agility is always a difficult area to test. The agility demands for different sports are very specific in terms of rotational speed and direction and often involve extra factors such as controlling a ball or holding a bat. Many agility tests involve complex movements and what is actually measured may not be clear, and a good score may hide deficiencies in some aspects of agility. The ability to change direction quickly (COD) is only one component of agility, and you can separate turning ability from running speed by additionally calculating the COD deficit. When testing agility, you need to decide which aspect of sport-specific testing you want to investigate. There are many agility tests to choose from. Some research suggests that turning at 90 degrees, for example, is very different from turning at 120 degrees, and that being good at one does not mean you will turn well at the other. It is also possible to turn in one direction, e.g. turning left will be worse than turning right, and turning on one foot is different from turning on the other. The agility test should not take too long to reduce the contribution of anaerobic capacity. Tests should also not include longer straight sprint distances to reduce the influence of sprint speed. You should be careful in the interpretation of agility tests, as you need to know exactly what they are measuring. It is better to break down the agility movements you want to measure into individual factors and measure each one separately, such as left turn, right turn, turn at different angles, etc. It is often easier to do the tests yourself, as differences in the surfaces used often make it difficult to compare with other norms. Agility can be improved by practising for a sport in particular, but also by improving certain individual elements of speed, balance, power and coordination. (Tipane, 2021)

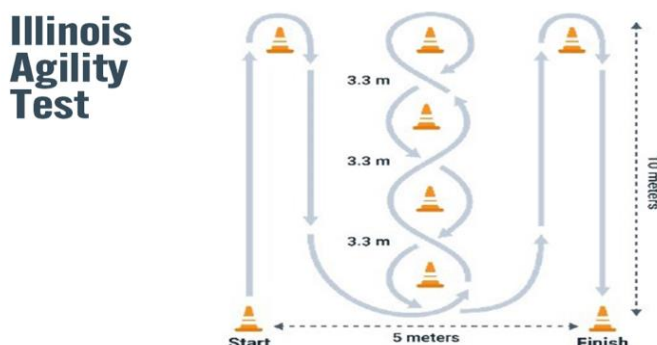
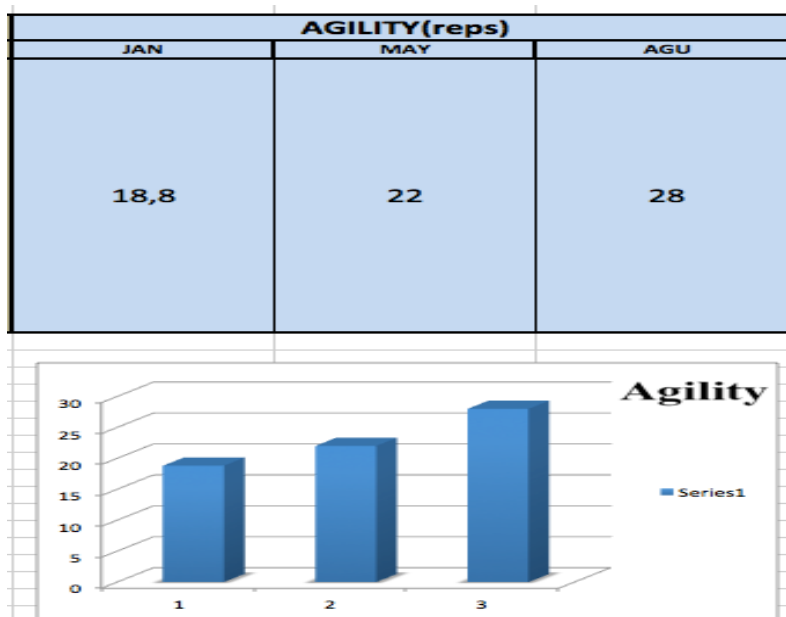
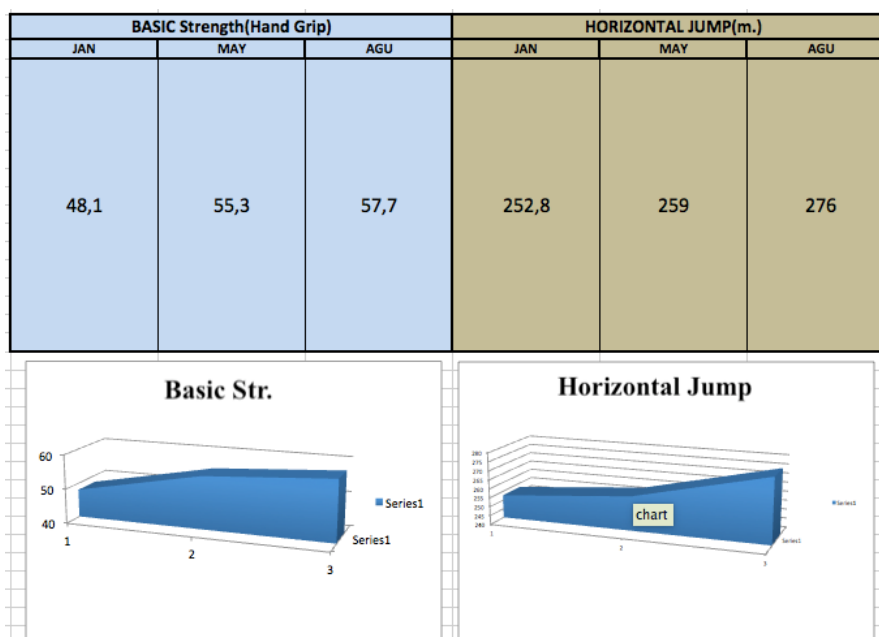


Figure 4. Illionis agility test



Graph 3. Agility

4. Basic and Horizontal Jump Tests Analysis



Graph 4. Basic strength and horizontal jump

Horizontal Jump: The standing long jump, also called the broad jump, is a common and easy to perform test of explosive leg strength. It is one of the conditioning tests at the NFL Combine. The standing long jump was also once an event at the Olympic Games and has also been an event in Gymnasium competitions in the United Kingdom and part of the strength quadrathlon and jumping decathlon assessment. The purpose of this test is to measure the explosive power of the legs. This test was performed with the hand dynamometer method.

5. Static Squat Test and Fat Mass Analysis

Static Squat: The purpose of the static test: To evaluate lower body muscular endurance.

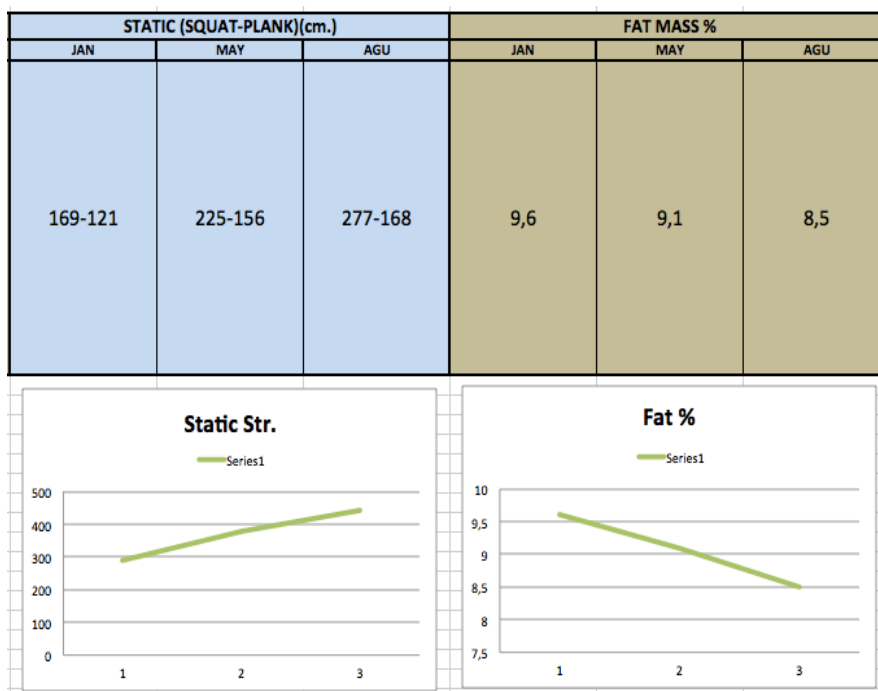
Equipment required:

- Wall.
- Stopwatch

Test procedure:

- The client stands on two feet with his back against a wall, hips and knees at a 90° angle
- Tell the client to lift one foot 5 cm off the floor and hold it as long as possible.
- The timing starts when the foot is lifted and ends when it touches the floor.

Fast Mass: Wrestling or other weight athletes usually regulate their weight according to their weight with as high conditioning and muscle ratios as possible. At this point, you can often come across athletes with a really high fat rate but a very high muscle rate. In general, if you are doing a sport that involves high-paced athleticism such as football, you want your fat percentage to be around 10-12%. However, if you are a weight athlete, you may want to be in the shape and weight required by your branch.



Graph 5. Static (Squat- Plank) and Fat Mass %

Conclusions

In 2022, in January-May-August, all physical fitness parameters showed a linear positive progression and the most significant improvement was observed in posture, anaerobic power and acute recovery quality. These observations and study results set an example for future studies.

As a result of the 360° analysis, the common dysfunctions are as follows;

Overactive Soleus, Latissimus Gastrocnemius, Biceps Femoris (short head) Tensor Fascia Latae, Hip Flexor Complex, Abdominal Complex (rectus abdominus, external oblique

Underactive: Anterior Tibialis, Gluteus Maximus, Erector Spinae, Med. Gastrocnemius, Med. Hamstring, Gluteus Medius/Maximus, Gracilis, Popliteus

Lateral subsystem disorder, altered reciprocal inhibition of the hip joint, (psoas)

Biceps Femoris Short Head tight (Left ankle and knee dysfunction)

Latissimus Dorsi tension posterior oblique system disorder (hamstring tension)

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