Man In India, 98 (1) : 167-174

PENCAK SILAT PHYSICAL TEST (ASSESMENT METHOD FOR INDONESIAN MARTIAL ART)

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This study aims to: (1) produce a physical testing tool for martial arts fighter, (2) know the validity, reliability and norms of physical test pencak silat for adolescent fighters. This development study refers to the steps developed by Borg & Gall that are grouped into 6 procedures. The result of this research is physical test of pencak silat for adolescent fighters, consist of 8 test items: (1) flexibility (sitting and range), (2) speed (30 meter sprint), (3) arm strength (push up 30 seconds), 4) leg strength (sit-on test), (5) side-step, (6) standing-jump strength, (7) anaerobic resistance (300 meters run) and (8) aerobic endurance multi fitness). This test is valid and reliable with $p < 0.05$. This martial art pencak silat test is an alternative that is used to measure the physical ability of the competing juvenile athlete. The result of this research can be concluded to test pencak silat feasible for use.

Keywords: assesment; physical condition; adolescent; martial art.

1. INTRODUCTION

Pencak Silat is a martial art that grows and develops in Indonesia. Pencak silat has been competed in national, regional and international events, including sea games and asian games. To show good performance requires physical skills, techniques, tactics and intelligence in the game. The following explanation describes the importance of scientific collaboration in order to solve problems whose scope can not be solved by using only one scientific study. Scientific linkages that will be discussed in this study with respect to martial arts who are in the scope of sports science as well as a source of the emergence of problems that will be in the search for the solution and physical tests that are in the scope of tests and measurements. In the field of sports, tests and measurements are one of the most important scholars in order to support sports coaching [8]. The goal of the coaching sciences itself is in order to foster athletes in order to achieve the desired peak performance. There are several aspects that need to be done in order to achieve the achievement of athletes peak performance. Among them are physical aspects, techniques, tactics and mental [4]. Physical aspects are the main foundation that needs to be improved in order to develop other aspects. The stronger the physical foundation, the greater the potential for developing technical, tactical, and psychological attributes [1]. Thus, coaching on the physical aspects can affect the appearance of the technique, tactics, and mental exercise of a sportsman.

The objectives of this study were teenage athletes of the match category. In human growth, adolescence is in the second phase after an early age and can not be said as an adult age. We define adolescence as the second stage of life, ages 10

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to 22, when young people experience significant biological, psychological, and social changes necessary to prepare for adulthhood [12]. The period of adolescence is more difficult to define in chronological years, because it varies in both its onset and its termination. Its onset is generally defined as the onset of puberty, when the secondary sex of development and sexual reproduction becomes possible, and its termination as the completion of growth and development processes, such as attaining adult height. For most girls, adolescence ranges from 8 to 19 years and for most boys from 10 to 22 years [7].

The phase of teenagers is a phase where still not able to master and function maximally physical and psychological functions. However, it should be emphasized that the adolescent phase is a very potential phase for development in the cognitive, emotional and physical spheres [18]. Therefore, with regard to physical, it is necessary to do coaching at the age of adolescents so that later when adolescents adolescents are ready to perform physical tasks like adults and can reach the desired peak achievement. After physical coaching, to determine whether the physical guidance is increased or not, then required a test that can be used to determine the success rate of coaching is done. Related to that matter, the problem that exist at this time is not yet compilation of physical test of adolescent martial arts category. In fact, the test is something that is very important to know the status of an athlete's physical condition. In addition, the norms of physical tests have not been prepared so that decision-making on test results can not be done. On the basis of that, then this research is very important to do in order to support the peak performance of an athlete of martial arts, especially for the age of teens category of match.

2. METHODE

This development study refers to the steps developed which are grouped into 6 procedures, which is a summary of 10 procedures that have been simplified according to the needs of researchers. 6 steps are: information gathering, analyzing the results of information, initial product development, expert validation and revision I, product trial and revision II, and preparation of the final product and implementation [9]. The trial of the product was divided into small-scale trials involving nine college coaches and large-scale trials involving 20 coaches. The data of physical test was 88 athletes of pencak silat with the age 14-17 years old (42 male and 46 female). Data analysis for instrument validity and reliability used Pearson correlation calculation.

3. RESULTS AND DISCUSSION

In this discussion will be shown the results of the preparation of physical tests pencak silat adolescent category, the norms of physical tests along with the validity and reliability of test instruments. In order to prepare the physical test instrument, expert judgment is required in a Focus Group Discussion (FGD) forum, followed

by the preparation of norm of physical test and validity and reliability test by using mathematical calculation from the physical test result data of adolescent martial arts athletes. this is a complement of previous research which resulted in the compilation of mature pencak silat physical test categories: Flexibility using side split, sprint speed 40 meters, arm power using 30 seconds push ups, abdominal strength using sit ups, back strength using back up, leg power using standing triple jump, agility using shuttle run, anaerobic resistance using 300 meter sprint, and aerobic endurance using bleep test [17].

3.1. Result of Focus Group Discussion (FGD). The results of FGD are as follows: flexibility, test instruments used are sit and reach; speed, test instruments used are; run 30 meters; arm muscle strength, test instrument used is push up 30 seconds; strength of limbs, test instruments used are wall sit test; agility, the test instrument used is a side step; power limbs, test instruments used are standing broad jump; anaerobic endurance, the test instrument used is a 300 meter run; aerobic endurance, the test instrument used is multy fitness test.

3.1.1. Flexibility

Flexibility refers to the range of motion around a joint. Improving flexibility is a fundamental element of a young athlete's training program because of its excellent flexibility enables the athlete to perform various movements and skills and prevent injury [2]. Flexibility is divided into two namely, static flexibility and dynamic flexibility. In static flexibility is determined by the size and range of motion of one or several joints. While the dynamic flexibility is a person's ability to move at high speed [3].

Flexibility is one component of physical condition that has an important role for athletes and non-athletes. Similarly, in the match martial arts match category must also have good flexibility. With the support of good flexibility a fighter will be able to do the movement as much as possible to carry out attacks (punches, kicks, catches, clipping or slamming) as well as avoidance of the opponent. Without the support of flexibility, of course, a silat athlete can not perform the movement freely because it is disturbed by the limited range of motion.

3.1.2. Speed

Speed is the ability of a muscle or group of muscles to respond to stimuli in as fast as (as short) as possible. Speed as a result of the combination of the length of the leg swing and the number of steps. The long swing movement and the number of steps are a series of synchronous and complex movements of the neuromuscular system. Teen age is an age that can be done coaching associated with increased speed. Some experiments on boys and girls aged between 7.6 and 10.3 years have shown a significant improvement in running performance (up to 18%), but without an increase in VO2 max (Mocellin and Wasmund, 1973) [5].

Speed is one of the basic components of bimotor needed in the sport of pencak silat, especially pencak silat tanding category. Any sporting activity whether game, race, or match always requires a speed biomotor component. So also in sports martial category pencak silat.

The rate of a person's speed is determined by several factors, determined by heredity, reaction time, strength, speed technique, muscle elasticity, muscle type, concentration and will. In sports 100 m sprint performance is dependent on multiple factors and we have categorized them based on environmental, mechanical / equipment, biomechanical and psycho-physiological labels [13]. In addition to these factors the type of muscle also affects the rate of speed a person has. Pencak Silat is one sport that requires speed especially in the category of match. Attacks that are either kicks, punches, cuts or some other attack techniques must be done quickly so that the opponent can not anticipate the attack carried out.

3.1.3. Strength

Strength is the ability of a muscle or a group of muscles to overcome a burden or prisoner. Physiological understanding, strength is the ability of neuromusculer to overcome the resistance of external load and internal load. Muscle strength is the ability of a group of muscles to fight loads in one effort. Strength improves as muscle mass increases with age. Peak strength is commonly attested by age 20 in women and between ages 20 and 30 in men [7]. The benefits of strength training for athletes include: improving muscle and tissue skills, reducing injuries to sportsmen, improving performance, rehabilitating muscle strengthening and helping to learn or master the technique [3]. Strength is among the most important components for almost every sport. Strength training aims to increase the athlete's competition performance by: (a) enhancing the neural component of muscle contraction, and (b) augmenting the muscle-fibre size [8]. During adolescence, static and explosive strength and also speed of limb movement are clearly related to the maturity status. From the ages of 13 to 14 years, early maturers perform, on average, better than late maturers. However, it is difficult to conclude that there is a causal influence of maturity on motor ability, because other factors, such as height and weight, can confound the results [10]. Strength is an indispensable biomotor component to increase muscle endurance in overcoming the burden during sporting activities. Physiologically, strength is the ability of neuromuscular to overcome the load resistance to overcome the burden of external load and internal load. The benefits of strength training are to improve muscle and tissue ability, reduce and avoid injury, improve performance, therapy and rehabilitation of muscle injuries and assist in mastery of techniques. Thus, strength is also a very important biomotor component in martial arts sport. Especially the match category. In the end, strength is one component that can affect the

improvement of the achievement of a martial arts athlete category of course in this case need support from other things such as engineering skills, tactics and psychology is mature.

3.1.4. Agility

Having a good agility for a pesilat is very beneficial because a fighter will be able to attack, avoid or do both at once well. That's because agility is an important component needed by almost all sports including martial arts. Agility itself is a combination of several other physical components such as speed, coordination, flexibility, and power [11]. The lively person is a person who has the ability to change the direction and position of the body quickly and accurately, without losing balance and awareness of his body position while in motion [14]. Thus, having good agility for a competitor is a very important thing.

3.1.5. Power

Power, defined as the rate of doing work [15]. To measure the power usually the tests performed are standing broad jump or vertical jump test. In a martial arts sparring sport, power is a much-needed thing when attacking. Power relates to power and speed. Neither in the sport of martial arts martial category. Attacks must be strong and fast in order to produce a quality attack and certainly not easily anticipated by the opponent. With regard to power, there are many studies related to the power itself. Some of the things that are commonly discussed in the study are related to how to increase power, furthermore, connecting the biomotor power with the ability of someone to do something, and so forth. As one example related to it is related to the research which resulted in a conclusion that in order to improve the power of limbs of adolescent pesilat can be used alternative exercise model that is pliometric exercise [16].

3.1.6. Endurance

The term endurance or durability in terms of the ability of muscle work is the ability of muscles that work in a certain time. Muscular endurance means the ability to maintain muscle in the fight of the load [14]. In the world of sport is known as the ability of organs organs to fight fatigue during activity or work. Fatigue is always associated with length of work (duration) and work intensity. The longer the duration of the exercise and the higher the intensity of work that can be done by an athlete, then the sportsman is said to have good resilience. Resilience is influenced by several factors: the central nervous system, the willingness (motivation) of the athlete, aerobic capacity, anaerobic capacity, reserve speed, intensity, frequency and duration of exercise, heredity, age and sex [3]. By having good endurance integrated with other biomotor components, a fighter will be able to defend himself from a significant loss of fatigue. Sparring martial arts is a sport

that requires endurance in long-lasting burden rnagka. Such conditions would be advantageous for a competitor to defend themselves during a match.

3.2. Result of validity and reliability test

Intake of physical test data conducted, used to test the validity and reliability of the instrument as well as used to compile the norm of physical test instruments martial arts martial category. Test the validity and reliability of the physical test instrument of adolescent martial arts martial category using pearson correlation calculation.

Taking physical test data for reliability test is done twice (test-retest) with the same test instrument and research subject. To find the value of these two tests searched by using spss application 16. The results of validity and reliability testing instruments for adolescent boys and girls that include the kelility (sit and reach), speed (30 meters), arm strength (push up 30 seconds) , leg strength (side sit), standing arm power, anaerobic resistance (300 meters run), and aerobic endurance (multy fitness test) are valid and reliable with p <0, 05.

3.3. Norms of all the test

The overall norm of the test is set to 5 standard scales. The test should be carried out in its entirety, so that the number of test items that the athlete should be performing is 9 {skeletal test, speed test, arm strength test, limb strength test (two tests of right leg strength test and left limb strength test), agility test, power limbs, anaerobic endurance tests and aerobic endurance tests}. The minimum value that the athlete obtains on each test item is 1 maximum 5. The number of test items is calculated 9. Furthermore, the minimum value the athlete obtains for all test items is 9 and the maximum is 45.

From the above explanation can be searched range (R) to compile the norm of the test as a whole. The calculation is as follows:

R = Maximum value - Minimum value
R = 45-9
= 36

Many classes are set 5, so that the length of the class (p) = 36/5, ie 7.2. From these calculations can be compiled a range of test scores that can be used for athletes son and daughter as the following table:

TABLE 1: TABLE OF NORMS ALL THE TEST

Putra Dan Putri	*Kategori*
37,8 S/D 45	Very Good
30,5 S/D 37,8	Good
23,4 S/D 30,5	Medium
16,2 S/D 22,4	Less
9 S/D 16,2	Very less

4. CONCLUSION

From the research and development that has been done by going through several stages, finally this research and development produce several things, among them is to produce: first, the composition of physical test of adolescent martial pencak silat which amounted to 8 test items. The test items are: (1) flexibility, the test instruments used are sit and reach; (2) speed, the test instrument used is; run 30 meters; (3) arm muscle strength, test instrument used is push up 30 second; (4) leg strength, test instrument used is wall sit test; (5) agility, test instrument used is side step; (6) power limbs, test instruments used are standing broad jump; (7) anaerobic endurance, the test instrument used was a 300 meter run; (8) aerobic endurance, the test instrument used is multy fitness test. Item test can be used to know the status of physical condition of adolescent martial arts athletes with age range 14-17 years.

In addition, the physical test items are also equipped with the test norms as the coach's decision on the test results.

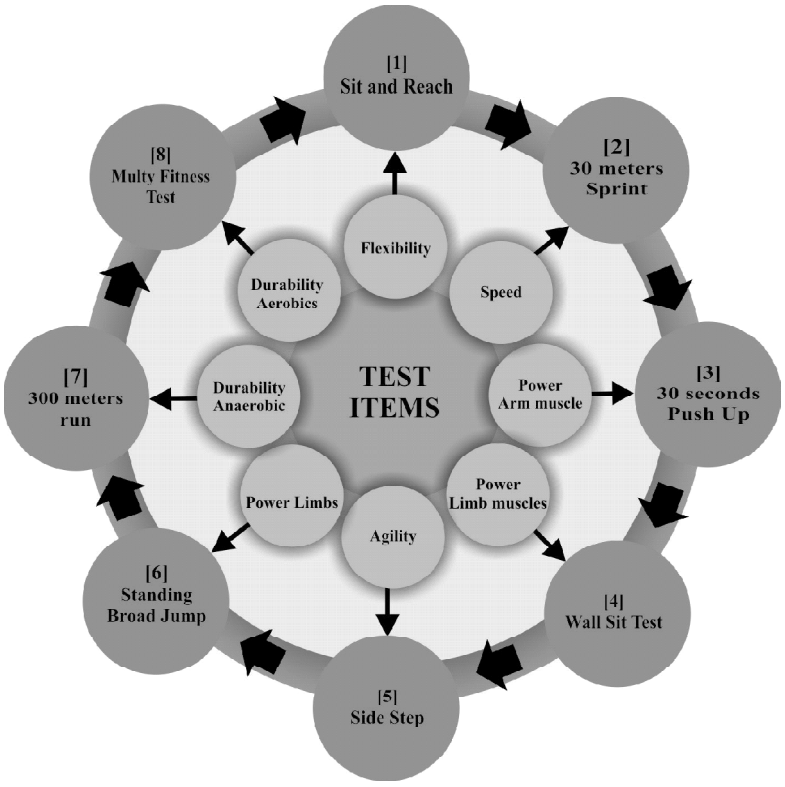

Figure 1: Figure of test items and the flow of physical test execution

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