CHAPTER – I

1.1. INTRODUCTION

Today, a growing emphasis on pretty well and have a long life. Gradually more and more scientific evidence tells us the keys to the fitness and exercises to achieve these principles. Today, physical activity is a part of our daily lives, because it is a challenge to moving. There are many small jobs that require physical exertion. Depending on the muscles than the machines we get around, mechanically problem increases. But statistics vaccine that pays off, so his / her doctor will have to wait mobile society has changed. In total, we continued the rest of the total spending their leisure time (including children) and more people have become a national audience. Accordingly, the point of obesity and excess weight, etc., high blood pressure, diabetes, cardiac arrest, to show that the until the final returns. The idea is to get everyone to take action now.

Quality Physical is the human body what fine tuning the engine. It helps us to present to our. Exercise is the best appearance, pleasurable sensation who described the situation that helps us do our best. More specifically, it's leisure time activities enjoyed and urgent demands of the energy, excitement and alertly daily tasks to do."It's an unfit person could not continue the scenario process, stress tolerant, stand up, stand is capable of, and being of good health and it is based on a key."

"Physical exercise undue fatigue or impressive strength and energy to meet the demands of any emergency is a sudden he is on the everyday life of ordinary work without fatigue, which refers to the ability to separate organic." Nixon

"Fitness person can act as any characteristic that is the state. Fitness is a personal thing. That his future most effectively live in ev ery person's potential marks. Functional capacity each other mutual associated with all exercise, physical, mental, emotional and social components, depends." (Kirchner)

Involves the muscles of the body, heart and lung function and physical fitness. Also, what we do with our physical, mental alertness and emotional stability that we have some degree of such qualities in our minds, affects what you can do with exercise controls.
Health and entertainment throughout the ages is approvable. It was fun and enjoyable. It offered youthful cheerfulness and the elderly. Physical activity and movements, is as old as human life. It Health and physical fitness in the lives of men since time immemorial and has a very important role. To the development of the nation and the people who are healthy and physically fit, is in the hands. Everyone wanted to create a happy and efficient living and physical fitness. In order to have a physical to participate in physical fitness activities. Physical function, mental, physical, social and spiritual aspects as well as the opportunities offered by the growth that depends on the personality development of a child is important to the overall growth.

So well planned and properly organized physical education program for school children is very important. Physical activity has played many roles in the struggle for existence of the fighting.

A sport is an activity in our lives where pursuits of different movement achieved through the total exploration of neuromuscular co-ordination. In this modern era, we can see that each and every individual directly or indirectly related to sports. Modern Physical Education commonly known as there is sports where pursuit of discipline freely formed such as biological, social and physical sciences.

Over decades, the society in general has understood the need for keeping fit and health through organized physical activity program. Scientific proof has made with a clear and that unless man engages himself in organized vigorous physical activity program. The real benefits would not come.

Taekwondo is an old and young sport, which is a form of the martial arts, with the development and popularization of taekwondo as well as the international sports exchange of boxing, it gradually developed into a formal event. Taekwondo belongs to the item of competition project in the same field, which is a competition with strength, speed, stamina, skill and intelligence. Therefore, the level of athlete's physical ability has increasingly become the key to ensure the large load exercise intensity for the competitive games in multi period. In order to make the athletes achieve good sports performance, in addition to techniques and tactical training, the fatigue recovery problem of taekwondo athletes' has received more and more attention. Physical fitness is the foundation of taekwondo movement, and physical
deficiencies in Taekwondo will severely restrict technical and tactical level of play. With the improvement of taekwondo competition level, the change of the rules, as well as more attention and investment from the countries, competitions in taekwondo which put forward higher requirements on the Taekwondo athlete's fitness level, are facing increasingly fierce antagonism. Although the research in Taekwondo physical monitoring and training methods is still in weak phase, in training practice, the general coach attaches great importance to taekwondo player's physical ability training.

Many researchers strongly support the regular exercises helps one to keep a fit and Healthy and prevent cardio-vascular diseases. Physically fit person, the heart beats at a lower rate and more blood vessels per beat at rest. As a result of regular exercises and individual’s capacity to use oxygen is improved systematically energy production depends on internal chemical / metabolic change. Health, fitness and performance are poorly connected events. Health is generally defined as freedom from disease, exercise is definitely a man's ability to meet the performance demands of his environment and a better connection.

According to sunderrajan (1983) physical fitness is an intrinsically individualized index. it express the individual bio dynamic potential, comprising functional and metabolic components and growth factors buildup and maintained by exercise.

According to David Lamb, “physical fitness is the capacity to meet the present and potential physical challenges of life with success”.

It can be said that physical fitness is the ability to function effectively and efficiently, to enjoy leisure, to be healthy, to resist disease and to cope with the emergency situations. Physical fitness varies according to the nature of work, individuals size, shape of the body, age and sex. For physical fitness we require an efficient motor mechanism, efficient organic mechanism and an efficient mental functioning. A physically fit individual should possess a sufficient reserve of energy to meet the demands of emergencies in which a person is unexpectedly called upon to perform activities demanding unusual expenditure of strength, strength, energy and adaptive ability under unfavorable environment.

Since Taekwondo was selected to be among the official events in the 2000 Sydney Olympics, its value as a new Olympic event has been recognized and it has
evolved as a martial art sport, undergoing various changes. Since the 2012 London Olympic Games, Taekwondo has shifted from the single-point scoring system to the differential point scoring system, increasing the possibility of quick turnaround of scores. The size of the Taekwondo arena was reduced to 10 (wide)×10 m (long) from 12×12 m. Passive progression of the game was improved to active progression through the application of the 10-sec rule. In addition, the sudden-death system implemented during overtimes was introduced in 2005. Henceforth, the importance of physical fitness started to emerge. In the 2016 Rio de Janeiro Olympics in Brazil, a video replay system will be introduced, and electronic protective gears and headgears will be worn to achieve accurate first judgments. Other trends are expected.

Therefore, the changes in the rules of the game require new skills and trainings, accompanied by adaptations and efforts by coaches and athletes. In reality, leaders are evaluated based on records and prizes achieved through athletic performances. However, many schools and teams do not consider the conditions of individual athletes, thereby causing problems. Most coaches and athletes depend on their skills that pertain to the nature of Taekwondo, based on their experiences, improvement in physical fitness, training for reinforcement of mental power, and amount of training.

In general, annual training of collegiate Taekwondo athletes in South Korea is designed differently depending on the season (in-season and off-season). During the in-season, condition training and skill training are performed for 3–5 h a day, besides attending classes within the semester. During vacation, which is the off-season, athletes perform high-intensity sport training, mostly in camps, focusing on sport-related skills and physical fitness, in preparation for the in-season. Athletes of the Taiwan national team are known for their high-intensity training, conducted 6 times a week, 5–6 h daily, before competitions.

High-intensity training, excessive training, overreaching training and overtraining without appropriate rest periods reduce athletic performance via the accumulation of fatigue and cause sport-related injuries. Therefore, positive effects are likely unexpected from such trainings. On the contrary, individual physical fitness, intensity level, and efficiency should be considered in the training. However, although these factors have been recognized by sports leaders and coaches, they have been overlooked because of issues of practicality.
Considering that Taekwondo is a weight division game, the physical characteristics of athletes are a critical factor of winning or losing. Moreover, the differential point system is beneficial to relatively tall athletes for scoring by attacking the opponent’s face. In addition, low body fat percentage and high fat-free mass, which are body composition factors that can serve as sensitive indicators of athletic performance in weight division events, are common characteristics found in excellent Taekwondo players. These characteristics are also closely related to the physical fitness of athletes. The important physical fitness factors in the sport of Taekwondo reportedly include power, muscular strength, muscular endurance, agility, and flexibility. In particular, muscular functions such as muscular strength and endurance of the lower extremities are important factors for executing a strong and accurate kick. They are considered as training targets of individual athletes because they measure the muscular functions of the lower extremities.

To date, although many studies have been conducted on the positive effects of short- to medium-term training for 1–3 months, no long-term follow-up study and proper evaluation of training efficiency and relevance have been conducted.

Therefore, the goal of the present study was to provide useful information for designing and developing long-term training programs, and basic data for longitudinal studies by identifying changes in physique, physical fitness, body composition, and is kinetic strength of female collegiate Taekwondo athletes with 1 yr of long-term highly intensive training.

The most important success factors in sports include body build, conditioning, technical and tactical skills, mental abilities and the experience of a competitor [1]. Since WTF (World Taekwondo Federation) taekwondo was approved for the Sydney 2000 Olympic Games, it has been the subject of extensive research, where one of the areas of interest is the identification of success factors. Training effectiveness in sport is measured with the best possible performance (result) in the most important competitions. Therefore, many researchers have been interested in establishing success factors in taekwondo. The majority of studies have sought to determine correlations between different indicators and performance in taekwondo, including morphological [2-10], biomechanical [7; 11], conditioning, physiological and psychological indicators [6;8; 12-14] and indicators related to coordination [15]. The aforementioned researchers have found that taekwondo competitors with geomorphic...
body build, high levels of speed, strength, endurance and flexibility, as well as shorter reaction times and proper technique have achieved excellent results. Rarely have several success factors in elite taekwondo competitors been analyzed simultaneously (in terms of medals they have or have not won at the highest levels of competition). In the above-mentioned studies, researchers focus entirely on single factors that were somatic or physiological. The aim of this study was to identify selected success factors of elite Olympic taekwondo competitors within the context of medals that they have or have not won during Polish Junior Championships.

Taekwondo is a martial art originating from Korea to train combat fighting skills of armies and individual warriors. The martial art originated as a national Korean sport in 1971, and in 1972, Kukkiwon became the headquarters of taekwondo. Today, taekwondo, as the representative sport of Korea, and is performed by millions of practitioners in 188 countries around the world. Originally, taekwondo was taught for warfare, self-defense and physical fitness. Taekwondo in the Olympics consist of 3x2-minute bouts with a 1-minute rest period between each bout. Points are given in a taekwondo competition for punches and kicks to the torso and kicks to the head. A match can be won with a knockout or points. Taekwondo competitions include very short periods of burst high intensity actions that are rare, and thus athletes use anaerobic energy pathways, mainly phosphate and lactic acid systems to generate energy for defense and attack (Shirley and Gabriel 2011). Taekwondo is known for its high and fast kicks since it athletes have highly explosive leg power, aerobic endurance and flexibility (Ball et al. 2011). It has been established that taekwondo’s top-level performers require a high fitness level. Aiwa and Pieter (2007) reported that men and women are suggested to differ in physical characteristics believed to be related to sport performance. This phenomenon is termed “sexual dimorphism” (Laskowski 2010). Sexual dimorphism is a more important factor in physical education and sports. The gender-related functional differences ensure equal opportunity for men and women to obtain high scores or make it impossible for women to join in some sport branches (Laskowski 2010).

The aim of this study was to determine gender-related dimorphic differences in body mass index score (BMI), anaerobic power, muscle strength and cardio-respiratory fitness levels of adolescent competitive taekwondo athletes. The researchers hypothesized that there could be gender-related differences in BMI,
anaerobic power, muscle strength and cardio-respiratory fitness levels of adolescent competitive taekwondo athletes.

Health and physical fitness have a vital role in the life of men from time immemorial.

The progress of the Nation lies in the hands of the people, who are healthy and physically fit. Every individual should develop physical fitness for a happy and effective living. In order to get physical fitness one has to involve in physical activities. Physical activity is essential for the development of wholesome personality of a child which would depend upon the opportunities provided for wholesome development of the mental, physical, social and spiritual aspects. Hence a well organized and properly administered physical education program me for school children is very essential. Physical activity throughout the ages has been acclaimed for health and recreation. It provided fun and enjoyment. It also provided youthful exuberance and the elderly care. Physical activity and movements are as old as human existence. It played numerous roles from struggle for existence to struggle for excellence. A sport is an activity in our lives where pursuits of different movement achieved through the total investigation of Neuron – muscular co-ordination. In this modern era, we can see that each and every individual directly or indirectly related to sports. Modern Physical Education commonly known as there is sports where pursuit of discipline freely formed such as biological, social and physical sciences. Over decades, the society in general has realized the need for keeping fit and health through organized physical activity program me. Scientific evidence has made with a clear and that unless man engages himself in organized vigorous physical activity program me. The real benefits would not come.

The Program This program has been developed by an Exercise Physiologist to provide individuals at all fitness levels with a comprehensive exercise program that can be completed at home or wherever you feel most comfortable. It is designed to use your own body weight so very limited equipment is required. The Beginner Program is designed for those who have a basic level of fitness (that is, they are able to walk comfortably for 30 minutes) or those who have completed the prebeginner program. If you are unsure of your fitness level we strongly recommend that you consult your doctor. To start, complete one session of the Pre-Beginner Program and if you find it too easy you may wish to move on to the Beginner Program.
IMPORTANT: Always consult a qualified medical professional before beginning any nutritional program or exercise program. The exercise suggestions are not intended to substitute for proper medical advice. Diabetes WA assumes no responsibility for injuries suffered while practicing any exercise program. If you have any chronic or recurring conditions such as high blood pressure, neck or back pain, arthritis, heart disease etc., please seek your physician’s advice before starting any new exercise program.

Taekwondo, meaning literally ‘the way of the foot and fist’, is a Korean martial art, which first became an Olympic sport at the Sydney Olympics in 2000. A Taekwondo match is 3 rounds of 2 minutes, with a minutes rest between rounds, and takes place on a 10m2 mat. In competition, kicks and punches score points. (When contact is made to the torso (with kicks and punches), or head (with kicks only), and is of sufficient enough force to produce displacement of the body segment). As in most martial arts, contestants are weight matched. In Taekwondo, and more than likely most martial arts, fitness appears to be gained through a traditional combination of running, pad work, technical drills and sparring. Most athletes are reluctant to undergo strength training due to fears of a loss in flexibility, speed and a gain in body mass. The latter point is especially important and provides for a significant barrier, as athletes will often aim to compete at their lowest possible weight in order to fight opponents of lower mass. The aim of this article therefore, is to rationalise the use of Strength and Conditioning (S&C) within Taekwondo, and dispel any myths that prevent this form of intervention. The article further aims to describe and rationalise “gym based” methods to further enhance athletic performance and finally, present the reader with an evidence-based S&C programme.

As with any sport to which S&C interventions are to be implemented, the S&C coach must first undergo a needs analysis to identify the biomechanical and physiological requirements of the sport. Following this, the S&C coach must construct an appropriate test battery to measure the strengths and weaknesses of the athlete against these variables. In addition, it is fundamental to identify mechanisms of injury and rehabilitative strategies. Finally, through consultation with the athlete and sports coach, individual goals must be identified.

This exercise program is tailored to improve both cardiovascular and musculoskeletal endurance and fitness. Exercise programs should contain both light
resistance exercises and exercises that will increase heart rate at a safe level according to your fitness. Increasing your muscle mass helps with the breakdown of fats and the regulation of glucose levels in the blood stream. It also boosts metabolism so even after you finish exercising your body will continue to burn fat. By completing 30 minutes of moderate exercise per day you can:

- Reduce your risk of heart attack and heart disease.
- Reduce your risk of stroke.
- Achieve and manage a healthy body weight.
- Lower your blood cholesterol.
- Lower the risk of type 2 diabetes.
- Lower the risk of some cancers, including colon cancer.
- Reduce feelings of stress, anxiety and depression.

Stretching before and after you exercise is important, is helps to:

- Reduce muscle tension.
- Increase your range of motion.
- Prevent injuries to muscles and joints.
- Reduce your risk of back problems.
- Promote circulation.
- Reduce muscle soreness. Improving flexibility makes exercising and everyday tasks easier by enhancing mobility in your joints and muscles.

1.2 ORIGINS OF TAEKWONDO

Empty-hand fighting did not originate wholly in only one country, but is developed every place humans settled. In each country, people adapted their fighting skill with the dangers in their local environments. As trade and politics brought contact with each other, their various fighting styles influenced each other, the development of entirely different fighting systems.

There are six will establish styles of taekwondo, chug so Kwan, oh so Kwan, and yo do Kwan, the style we practice is ji do Kwan, the school of the way of knowledge.
Ji-means intelligence and knowledgedo-the right way of life to cultivate one's mind Kwan-the spirit of one's mind.

1.3 HISTORY IN THE 20 CENTURY

As we come close 1909 AD with the Japanese occupation of Korea, the practice of military skills declined even further. The Japanese colonial government banned all cultural activates, including team sports and the practice of martial arts, in an attempt to destroy the Korean identity. Some martial arts instructors continued to practice their skills in secrecy, especially in Buddhist monasteries, in remote, mountainous region, and in this way the Korean martial arts war kept alive, other Koreans, studying or working in Japan or china became familiar with karate and kung fu, and began to blend them with their own martial arts despite the ban on Korean martial arts, Japanese karate and Chinese kung fu, following judo, were introduced into Korea in 1943.

In 1945 with the Korea’s liberation from the Japanese, the first of several “khans” it means school were established the live original ones were all established in 1945 and 1946 three more, major ones, were established later, in 1953 and 1954 one of these was oh do Kwan, founded by general choi long hi and an associate, and another was ji do kwan or “Kwan of the way of the knowledge of wisdom” founded by agebangyun.

In 1955, at a conference of Kwan masters, historians and takedown promoters, the name taekwondo was adopted the name was coined and formally suggested by general hi it was adopted because it describes both foot and hand techniques which the Korean martial art employs, and because it similar to the name taekwondo, and therefore stresses continuity in Korean martial arts. not all of the major khans joined together at these time, nor have they since in 1060 four more school were added to the major schools already established in 1961 the Korean taekwondo association (KTA) was formed with general hi elected to be its first president. Most of the major khans, but not all were or are now members.

In 1965, the KTA was recognized by other associations and by the Korean government. It was chosen to be the organization to bring different groups and schools into unity.
In 1966, general hi established the international taekwondo federation, becoming its president. In 1971, Construction began on the kukkiwon (the world taekwondo centre) in Seoul and was completed in 1972. The kukkiwon is a center for the study and promotion of taekwondo it also conducts black belt tests, issue certificate, and conducts world championships which are l.eld every other year the being held in 1973. The kukkiwon first president Dr. un young Kim elected president of the KTA 1972), dissolved the ITF connection with the KTA in the next year, following the first world championships at the kukkiwon (1973) official representing their countries created the world taekwondo federation and elected Dr. un young Kim to be its president for a four year term. The connection between the KTA and the WTF is very close, and The KTA oversees the WTF’s activities.

In 1974, general hi moved his ITF headquarters from Korea to Toronto, Canada his and the ITF emphasis is on self-defense methods, not so much on sport. In 1980, in international Olympic committee (IOC) granted official recognition to the WTF and in 1981, the IOC gave approval for taekwondo to be part of the 1988 Olympic games, held in Korea. After Olympic demonstration sport in 1988, 1992 and 1996, taekwondo became a full medal sport in the 2000 summer Olympic Games held in Sydney, Australia.Todays taekwondo has over 100 million students and practitioners in more than 130 countries. It has no equal in power, technique or mental conditioning.

**Punching and Kicking**

A Taekwondo punch, much like boxing, involves triple extension whereby the ankle, knee and hip extend to generate force from the ground. Via the additional links of the kinetic chain i.e., the trunk, shoulder and arm, they then apply this force to the opponent. The need for this synchronisation can be evidenced from studies conducted by Filimonov et al., 39 and Verkohshansky.123 Filimonov et al., 39 analyzed the straight punch of 120 boxers, ranging from elite to junior ranks. All boxers were instructed to perform a straight right to the head, “maximally fast and powerful”. The results of this study are illustrated in table 1 where it can be noted that elite level boxers predominately generate force from the leg musculature, whereas lower ranked boxers generate the majority of force from the trunk and arms. This finding is corroborated by data acquired by Verkohshansky123 who showed that with mastery in the shot put, (which may be considered biomechanically similar to a straight
punch), the emphasis gradually shifts from the shoulder to the leg musculature. This investigation revealed that for beginners, the correlation between athletic achievements and strength of the arm muscles is 0.83 and with leg strength is 0.37. For highly qualified athletes however, the correlations were 0.73 and 0.87 respectively. As illustrated in figures 5 – 8, triple extensions movements are also required for kicking. The development of this synchronization and use of triple extension based exercises may therefore be considered essential to the generation of force within Taekwondo. Olympic lifts and their derivatives are often hypothesized to provide an appropriate stimulus for motor skills requiring triple extension. Moreover, the 2nd pull position (i.e., power snatch/clean from hang - Figure 9), provides a biomechanical comparison to the punching and kicking start position, therefore sport specificity can be further gained by commencing lifts from this position. To further facilitate the development of optimal synchronisation patterns within the kinetic chain and to assist in the carryover of triple extension based exercises to Taekwondo techniques, a derivative of complex training (referred to as carryover training) is recommended. (See the following references for a review of complex training: Docherty et al., 31; Ebben33). In this context however, the objective is not the potentiating of force (although this may be an outcome), but rather the carryover of neuromuscular stimulus/firing sequence (i.e., generating force predominately from the legs as described by Filimonov et al., 39 and Verkoshansky123). For example, an athlete may perform a set of power snatches (often from the 2nd pull/hang), followed by performing punches to the bag during the rest period. The athlete is encouraged to visualize the carryover and draw comparisons with the two forms of triple extension and in effect, regarding the punch as synonymous with the power snatch. It is important to only perform a few punches (usually 2-3 per arm) and ensure the emphasis lies with power generation with enough rest between reps to minimize fatigue.

**Reactive Strength**

Which describes the stretch shortening cycle (SSC) capabilities of an athlete, may also be considered fundamental to force generation within Taekwondo. It is well documented that efficient SSC mechanics result in enhanced propulsive forces16,19, 20 and conservation of energy17,122,124 and this therefore suggests that within martial arts, this may translate into enhanced power and power-endurance of striking.
As an example, double kick techniques require that following each strike, the leg is quickly driven back down into the ground and then quickly driven back up toward the opponent. Optimization of SSC mechanics dictate that these movements, which, (in the opinion of the author), may be considered biomechanically similar to sprint running (whereby the knee is ‘punched’ forward (figure 7) and then the leg is quickly driven back down into the ground), requires that ground contact be made via a forefoot landing only,\(^58,82\) thus minimizing ground contact time,\(^4,62,84\) increasing energy return (and thus striking force)\(^58,82\) and rate of force development\(^18\) and reducing the duration and metabolic cost of movement.\(^16,17,30,122,124\) Moreover, and as can be noted in figures 5-8, in order for Taekwondo athletes to generate power during a single kick or the first kick in a sequence of successive kicks, they first utilize the SSC mechanism at the front leg (figure 6), whereby they perform a countermovement (and thus incorporate elastic energy) prior to the explosive triple extension. Finally, because Taekwondo athletes attack their opponent from distance (i.e., they stay out of range), the first steps towards their opponent are often short, rapid shuffles and therefore require efficient SSC mechanics. This SSC efficiency however, is a learned ability gained through the generation of muscle stiffness, thereby optimally utilizing the elastic recoil properties of the tendon.\(^4,30,60,62,83,86\) Muscle stiffness however, is under the subconscious control of the nervous system, whereby the Golgi Tendon Organ (GTO) inhibits the generation of high forces (and muscle stiffness) as a protective mechanism against the risk of injury.\(^108\) Through observations made by this author, most martial artists do not train SSC mechanics (enabling GTO disinhibition) beyond that gained from their sports practice. This is illustrated by the fact that the majority of athletes make heel contact, which is suggestive of a prolonged amortization phase and muscle compliance consequent to GTO inhibition.\(^40\) It appears evident therefore that sports practices do not provide sufficient stimulus for this adaptation and that purposeful exercises such as plyometric must be included.\(^85,88,91,102,105,108,111\) For example, Kyrolainen et al.,\(^85\) reported that 4 months of plyometric training, consisting of various jumping exercises such as drop jumps, hurdle jumps and hopping, was required for the disinhibition of the GTO and the generation of muscle stiffness (concurrent with pre-activation tensioning and antagonistic co-contraction). Moreover, as well as takeoff velocity increasing by 8%, energy expenditure decreased by 24% suggesting that adaptations from this plyometric protocol also resulted in a reduction in the metabolic
cost of these movements. It appears apparent therefore that chronic plyometric training is required to not only condition the Taekwondo athlete to increase striking forces of this nature, but also to facilitate them in employing these strikes with regularity (i.e., aid the development of power endurance). Finally, inherent to plyometric exercises is the powerful execution of triple extension (as previously described), so these exercises are also likely to have a carryover to kicking and punching mechanics and striking power. Appropriate plyometric drills include drop lands (figure 11), whereby the body is hypothesized to adapt to high landing forces (eccentric loads) and disinhibition of the GTO is learned. This drill may then be progressed to drop jumps whereby the focus shifts to reducing the amortization phase and ground contact time (GCT) and thus the loss of elastic energy. It may be prudent however, to commence plyometric training with inking/stiff leg hops (see caption 1), which enhance the stiffness of the ankle joint, as overall leg stiffness has been reported to largely depend on ankle stiffness. Of course, the S&C coach must determine safe and conducive plyometric intensities (e.g., drop height). It may be appropriate therefore, to first practice landing drills by jumping up to a box (figure 10) or simply jumping forward along the ground, as the intensity of each is less than when dropping from a box.

Taekwondo (TKD) is one of the most systematic and Korean traditional martial arts and combat sports that has gained an international reputation, and stands among the official Olympic Games’ sports since the “Sydney 2000” Games. The World Taekwondo Federation (WTF) defined TKD as “the right way of using all parts of the body to stop guts and help to build a better and more peaceful world.” In physical aspects, TKD is very different from many such oriental martial arts since it is very dynamic with active movements that include a myriad of foot skills. The development of TKD technical skills and its quality depend on the septic functional and physical preparation. Many studies have focused on the physical and physiological level required to TKD high-performance competition [1-3]. Due to the specify city of combats in TKD (i.e., short bouts of rapid and high-intensity movements separated by less intense movements), several studies showed that TKD requires both aerobic and anaerobic physical tens to be developed [2, 3]. The anaerobic metabolic pathway provides the short, quick, all-out bursts of maximal power during combats, while the aerobic system contributes to the TKD athletes’ ability to sustain power for the total
duration of the combat, to recover during the brief periods of rest or reduced abort
during the combat, and also for an elective recovery between combats. TKD training
for combats should be therefore planned to improve these levels starting from the
young age basing on a progression to meet the physiological characteristics of the
children [4]. Both for young and elite athletes, the use of TKD skills seem to improve
their physical level [3-5]. It is then recommended to include TKD skills in traditional
physical training methods (e.g., high-intensity interval training, speed training…) to
prepare TKD athlete to cope with the metabolic and physiological demands of
competition. Performing TKD skills without septic physical goal appears not enough
to improve all TKD athletes’ physical qualities. Fong and Ng [6] concluded in their
review that typical TKD training might be associated with improvements in anaerobic
tenses, fat reduction and edibility. see authors suggested that habitual TKD training
cannot improve aerobic tenses or muscle strength. Nevertheless, Haddad et al. [5]
have demonstrated that septic TKD technical interval training can be used as an
elective training mode to enhance aerobic tenses in TKD. In this chapter, we
present septic TKD training to enhance physical tenses.

1.4 COMMON TRAINING AND EXERCISES IN TAEKWONDO

Historically, taekwondo was developed following the chronological order of 4
deferent ages: ancient times, middle ages, modern ages and present times. Nowadays.
During Kyorugi competition, the player should wear a protective gear to prevent
injuries and follows the united rules and regulations (Safe Kyorugi and technical
strikes for points). e point means the strikes over the certain strength degree. e
point area and points are as follows [7]: 1- e upper part is 1 point 2- e upper part
using rotation 2 points 3- e Face 3 points 4- e face using rotation 4 points 5-
Additional 1 point when the chief referee calculates the points in the dangerous
situations.

POOMSAE CONTAINING PRACTICABLE TECHNIQUES

This includes practically used techniques only, which are classified into a
series of chigi techniques, a series of makki techniques and a balanced combination of
chigi and makki techniques.
POOMSAE CONTAINING VARIOUS TECHNIQUES

This contains more techniques of chagi and makki than are needed for practical use. Practicable techniques must be selected among them in the course of training.

POOMSAE CONTAINING SIMPLE TECHNIQUES

This is classified into the basic course and the advanced course, in the advanced course, the training of cultivating the inner strength of body by means of controlling the respiration is included. The variations of techniques should be mastered through hard training.

COMPOSITION

The composition of poomsae movements is differentiated according to the proportion of poomsae and technique, hand techniques and foot techniques, and seogi and its moving directions. Except for certain special cases, the poomsae movements are equally distributed among all parts of the body symmetrically between fore and back and between left and right. Therefore, the proportion of foot techniques and hand techniques is the criteria to decide the composition of poomsae movements.

1. Poomsae with the priority on hand techniques
2. Poomsae with the priority on foot techniques
3. Poomsae in which hand techniques and foot techniques are evenly distributed.

1.5 PUNCHING AND KICKING

A Taekwondo punch, much like boxing, involves triple extension whereby the ankle, knee and hip extend to generate force from the ground. Via the additional links of the kinetic chain i.e., the trunk, shoulder and arm, they then apply this force to the opponent. The need for this synchronisation can be evidenced from studies conducted by Filimonov et al., 39 and Verkohshansky.123 Filimonov et al., 39 analyzed the straight punch of 120 boxers, ranging from elite to junior ranks. All boxers were instructed to perform a straight right to the head, “maximally fast and powerful”. The results of this study are illustrated in table 1 where it can be noted that elite level boxers predominately generate force from the leg musculature, whereas lower ranked boxers generate the majority of force from the trunk and arms. This finding is corroborated by data acquired by Verkohshansky123 who showed that with mastery
in the shot put, (which may be considered biomechanically similar to a straight punch), the emphasis gradually shifts from the shoulder to the leg musculature. This investigation revealed that for beginners, the correlation between athletic achievements and strength of the arm muscles is 0.83 and with leg strength is 0.37. For highly qualified athletes however, the correlations were 0.73 and 0.87 respectively. As illustrated in figures 5 – 8, triple extensions movements are also required for kicking. The development of this synchronization and use of triple extension based exercises may therefore be considered essential to the generation of force within Taekwondo. Olympic lifts and their derivatives are often hypothesized to provide an appropriate stimulus for motor skills requiring triple extension.59,66,69,113 Moreover, the 2nd pull position (i.e., power snatch/clean from hang - Figure 9), provides a biomechanical comparison to the punching and kicking start position, therefore sport specificity can be further gained by commencing lifts from this position.

1.6 Physiological Demands of Taekwondo

Scientific data on Taekwondo is scarce and the problem is further confounded by suggestions of Kami et al., 73 who report that due to the new World Taekwondo Federation (WTF) rules, whereby the duration of each round was reduced from 3 minutes to 2 minutes and the competition area from 12m2 to 10m2, each round is likely to be of a higher intensity than those previous to the Sydney Olympics. This may therefore reduce the validity of any existing data regarding the physiological profile and needs of Taekwondo athletes prior to the Sydney Olympic Games. It may be prudent therefore, to consider the existing data in conjunction with empirically similar sports, so as to provide an evidence-based physiological profile of both the athlete and the competition demands. In the opinions of the author, sports such as wrestling, fencing, boxing and mixed martial arts (MMA) provide for a good comparison. In addition, Cordes26 compares boxing with basketball, and therefore this will also be considered. Table 2 illustrates the primary metabolic demands of these sports as described by Ratamess.104 from the information presented above and through empirical observations, Taekwondo involves predominate anaerobic energy contribution and the speed and explosive nature of the sport further suggests phosphate system dominance. In addition, rounds are fewer than boxing (3 vs. 12) and shorter than both wrestling and mixed martial arts (2mins vs. 5mins). Therefore,
aerobic energy system contribution may be minimal and be involved only in ring movement and recovery mechanisms. These findings likely suggest that road running (and any other training modality directed at increasing aerobic capacity) may be detrimental to Taekwondo performance and unfavorably alters energy system adaptations. This is in agreement with Hoffman et al., 65 who analysed basketball competitions over a 4 year period and reported that aerobic capacity had a significant negative correlation to performance. Castagno et al., 23 also found no correlation with VO2max and the ability of basketball players to perform repeated sprints. The findings of these studies are further corroborated by authors who suggest that once an aerobic base is achieved, sport-specific team practices and games are sufficient to maintain aerobic fitness in anaerobic dominant sports. Training programmes therefore need to be directed towards high intensity training such as interval and repetition training. Many athletes however, use long distance running as a means to rapid weight loss (RWL). This however, may be to the detriment of sports performance and perhaps more emphasis needs to be placed on nutritional interventions, (but those based on scientific research). RWL is briefly discussed later in this article. Also of significance, Kezemi et al., 73 reported that during the Sydney Olympics, both male winners and non-winners achieved the highest percentage of scoring in round one (43% and 65% respectively). While this may be explained as tactics, it may also suggest the presence and affect of fatigue and the need to develop the anaerobic threshold capacity and recovery rate of these athletes. In addition, comparing the percentage of points scored in the first round versus the last round may provide a fatigue index similar to that reported following field tests of the anaerobic threshold (e.g. repeated sprint tests). This may be used to monitor progression, however, care should be taken when interpreting the results due to a lack of test reliability and the influence of coach tactics. In summary of the above, interval training may be the optimal intervention to bring about efficacious adaptations within the metabolic system. Anecdotally, sparring may provide the most specificity and result in optimal adaptations in the energy systems for the purposes of competition. However, it is not always reasonable to call on this intervention.

Therefore, again anecdotally, it is suggested that coaches use a ‘5s on, 5s off’ protocol termed as ‘Combat Intervals’. For this, athletes hit the pad for 5s, and then rest for 5s throughout the entirety of a round. This time frame was chosen to represent
the amount of time an athlete may attack for. The pad-man can manipulate each interval by increasing or decreasing the time the athlete is attacking or resting (or both). Empirically, it is challenging for the pad-man to continually use times less than 5s. The pad-man can also change the type of striking combinations between intervals and even attack during the rest period causing the athlete to defend and further increasing the intensity. Finally, it is recommended that the athlete uses 2-hit striking combinations only, thus ensuring a fast and continuing rhythm when attacking the pad. It should be noted that the S&C coach should not be considered responsible for delivering this aspect of training, however, it is important to note that these are suggestions that can be made to the sports coach. The efficacy of combat intervals is currently being investigated within our laboratory to provide a more objective assessment of its validity. Some preliminary findings are illustrated below. Figure 13 illustrates the heart rate (HR) data of two Mauy Thai (a similar martial art) athletes, performing the combat intervals. The first 3 rounds illustrate the warm-up consisting of skipping, shadow sparring and bag work. Following this, athlete A (yellow line) performs the combat intervals for three rounds, while athlete B (green line) holds the pads. For the final 3 rounds, the athletes switch roles. The graph reveals some significant data to validate the use of combat intervals, especially when these results are compared to data attained on athlete A during a laboratory based VO2max test conducted on a treadmill. The laboratory data revealed that athlete A’s HRmax was 190bmp and that his lactate threshold was reached at 178bmp. Interestingly, athlete A reached a HRmax of 197bmp during the combat intervals and the graph further reveals that a significant portion of the combat intervals was performed above his lactate threshold (i.e. above 178bmp or 90%HRmax based on a HRmax of 197bmp) and is therefore likely to positively adapt his anaerobic capacity in line with the demands of the sport.23,15 The higher HR reached during actual performance vs. testing may be due to psychological factors (such as competition arousal and anxiety) and experience reveals that this is not uncommon finding, however, tester error cannot be discounted. In addition, differences in HRmax have also been reported during laboratory based maximal exercise protocols.81 The findings above may also support the use of using live HR feedback devices (as used to attain these results), whereby the athletes’ HR is immediately and visually available to the coach and athlete, thus facilitating the regulation of training intensity and motivation. Additionally, the tracings can be used to monitor athlete progression with respect to
the athlete’s ability to recover from intensive bouts. It is further hypothesised that combat intervals may also aid this fundamental quality. Finally, the graph reveals that even holding the pads creates an intensive workout for the athletes and that the sports coach and S&C coach should be cognisant of this when designing training programmes, as this appears to add a significant amount of volume. This is of additional significance as, in the opinions of the author, these athletes are susceptible to overtraining and this data may help to explain why

**Walking Styles Walk**

A walk should be at a slow pace. Your heart rate should be slightly elevated from resting, but intensity will be about 3 or 4 out of 10. Power Walk a power walk is a walk at a medium pace. Imagine you’re late from your lunch break at work and need to get back to the office. Your heart rate should be elevated and intensity should be 5 or 6 out of 10. Jog a jog is a medium to fast pace. Imagine you need to get across the road at a set of traffic lights and the red man has just begun to flash. Your heart rate will have noticeably increased and intensity should be 7 to 8 out of 10. Run A run is a fast pace. Imagine a bus is approaching your stop and you are 100 meters away and you desperately need to catch it. Your heart rate will dramatically increase and the intensity will be 9 or 10 out of 10.

For resistance training, Time is related to the rest period between sets of exercises. When beginning, start with a rest period of 2 - 3 minutes. It is important to recover your breathing before the next step. As muscle endurance improves the rest period between sets can be reduced to 1 minute. The program has 13 exercises therefore it may take almost 1 hour to complete when 2 sets are performed for the work out when you are first starting. The program can be split into upper body one day, and lower body and core the next day to save time, but then the workouts should be performed 4 to 6 days / week. Each work out must include a cardio activity for a warm up and cool down and stretch. The warm up should be 6 to 10 minutes of mild to moderate continuous movement to increase muscle temperature, and prepare joints for movement. If a cardiovascular (cardio) workout such as walking or biking is performed after your resistance work out a cool down can follow the cardio work out by slowing down the last 5 minutes of activity to bring the heart rate and the breathing rate back to normal levels. A cool down must be performed after a resistance training workout for at least 6 minutes to bring the body back to a resting
state and balance. The cool down could be any continuous activity such as walking outdoors. Inside the house activities any low intensity activity is good such as dancing, housework, or slowly walking up and down the stairs.

**Risk of Injury**

Both Pieter96 and Pieter and Zemper100 found the lower extremities to incur most injuries during Taekwondo. This is no surprise as Taekwondo is largely characterized by kicking.73 According to Bees et al., 14 however, the head and neck appear to incur most of the time-loss injuries (i.e. the athlete must acutely cease both training and competition). In addition, Bees et al., 14 and Kho and Cassidy77 found middle school boys and girls to be more likely to receive head kicks and incur concussions. Moreover, Kho and Watkinson79 reported the roundhouse kicks and axe kick to be the most often implicated in head blows in adult Taekwondo. Finally, Serine and Lieu110 found that thrust kicks (e.g. step side kick and back kick) generate the largest chest compression forces and therefore have the greatest potential for skeletal injury. However, swing kicks (e.g. round house kick and spin round house kick) are faster and have a greater potential for soft tissue damage.110 When interpreting and using this data, it is important to be cognizant of the fact that the WTF have recently decided to award 2 points for head kicks and an additional point for knock downs. This is likely to affect injury rate and one may speculate that injuries to the head and neck will increase along with time lost to this injury. Table 3 illustrates the comparative time-loss injury rates in Taekwondo. It should be noted however, that the data presented in this table are from competitions in which each bout lasted 3 minutes and data was collected previous to the change in points as described above. Both these changes are likely to affect the interpretation of data when attempting to apply the information to training programmers. If Taekwondo athletes are to use punching skills more often, then coaches must also consider the injury implications to the arm, wrist and hand. Again, deductions based on empirically similar sports, in this case boxing, are required as research for this within Taekwondo appears scarce. Within boxing, injury is more likely at the shoulder, elbow, wrist/hand, low back and neck.36 This is corroborated by Cordes26 who suggests that injury occurs primarily at the hand and wrist, followed by the shoulder then elbow. The author is of the assumption that many of the athletes from which this data was gathered were not undertaking efficacious S&C programmers. With this
assumption in mind, strength training may have reduced the incidence of these injuries through its positive adaptations on the structural integrity of all involved joints. For example, as well as an increase in muscle strength, tendon, ligament and cartilage strength would also increase along with bone mineral density.41,43,112 Furthermore, boxers (and more than likely martial arts athletes) tend to use (and therefore develop), the anterior musculature more than the posterior,2 thereby leaving them exposed to muscle strains in the weaker muscles. S&C training can ensure the development and maintenance of proper ratios. Most significantly and pertinent to performance, increasing antagonist muscle strength may increase movement speed and accuracy of movement.70 This has been hypothesised to occur due to alterations in neural firing patterns, leading to a decrease in the braking time and accuracy of the limbs in rapid ballistic movements.70 Therefore strength balance is needed to break the agonists succinctly in rapid limb movements. When one muscle or movement action is stronger than its antagonist’s, performance may be compromised. This is likely to provide the athlete with a greater source of motivation to develop the posterior musculature than that of reducing the risk of injury alone. Moreover, the problem of upper body muscular imbalances may be exacerbated when athletes of this type overemphasize the function of the pectorals.72 However, the athlete should note that power for upper body striking (i.e. punching) is generated via the powerful extension of the ankle, knee and hip (i.e. triple extension).10,39

1.7 The Aim of Taekwondo: Body, Mind & Spirit Working As One

Taekwondo training addresses the whole individual body, mind, and spirit and involves a great deal more than mere physical technique. To be sure, the student of Taekwondo is expected to develop strength, stamina, quickness, flexibility, coordination, and balance. Along with a variety of effective hand and foot self-defense techniques, these physical skills are fundamental to the art, and can be perfected only through dedication and tireless practice. However, the road to true mastery also requires that formidable physical accomplishments be balanced with the equally important mental characteristics of patience, humility, self-control, perseverance, concentration and respect. These too must be practiced faithfully, both in and out of class. Gradually, the lessons of the defang begin to color other aspects of life. Mind, body and spirit become unified and transformed, and living becomes richer and more enjoyable. The study of Taekwondo can improve you as a person. It
will teach you to control your own identity, aggression, temper, and insecurity. It can make you extremely sensitive to your environment so that you cannot be taken unaware, and will help you to truly know yourself so that you will be in full command of your own strengths and weaknesses and able to perceive the strengths and weaknesses of your opponent as well as those inherent in any situation.

**Foundation of Tae Kwon-Do**

Tae Kwon-do is a Korean martial art, which although having roots in the ancient orient, was developed as a modern art from the eight Kwan’s of Korea. Tae Kwon-Do was inaugurated on April 11th 1955 following extensive research and development by the founder. It was introduced into the United Kingdom by Master Rhee Ki Ha in 1967. The TAGB (Tae Kwando Association Of Great Britain) was formed in 1983 and was the founder member of the British Tae Kwon-Do Council (BTC) on April 21st 1988. The BTC is recognized by the Sports Council. The TAGB is a member of Tae Kwon-do international, a world wide body with representation in every continent of the globe. TKD International was inaugurated on November 13th 1993.

**1.8 What Is Tae Kwon-Do**

It is a version of an ancient form of unarmed combat practiced for many centuries in the Orient. Tae Kwon-Do became perfected in it's present form in Korea. Translated from Korean, 'Tae' literally means to jump, kick or smash with the foot. 'Kwon' means a fist- chiefly to punch or destroy with the hand or fist. 'Do' means art, way or method. Tae Kwon-Do indicates the techniques of unarmed combat for self-defiance, involving the skilled application of punches, kicks, blocks, dodges and interception with the hand, arms and feet to the rapid destruction of the opponent. To the Korean people Tae Kwon-Do is more than a mere use of skilled movements. It also implies a way of thinking and life, particularly in instilling a concept and spirit of strict self-imposed discipline and an ideal of noble moral re-armament. In these days of violence and intimidation, which seems to plague our modern societies, Tae Kwon-Do enables the weak to possess a fine weapon to defend him or herself and defeat the opponent as well. When wrongly applied it can be a lethal weapon.
Self-Control (Kuk Gi)

To lose one’s temper when performing techniques against an opponent can be very dangerous and shows lack of self control. To be able to live, work and train within one’s capability shows good self control. This tenet is extremely important inside the Dojang, whether conducting oneself in free sparring or in one's personal affairs. A loss of self control in free sparring can prove disastrous to both student and opponent. An inability to live and work within one’s capability or sphere is also a lack of self control.

Taekwondo and Tradition: The Proud Heritage Of The Hearing Do

Though the name “Taekwondo” was developed in modern times, the origins of the art reach far back into Korean history. During the sixth century A.D., the Korean peninsula was divided into three kingdoms: Silla, Baek Je, and Koguryo. Silla, the smallest, was in constant peril of being overrun by her more powerful neighbors, and in response to this pressure assembled an elite fighting corps chosen from among the aristocracy, known as the Hearing Do or “Flower Youth”. In addition to the regular military training of the day, the Hearing Do subjected themselves to rigorous mental discipline and severe physical hardship in order to condition the body and will to great strength and long endurance. Legend has it that they went into the mountains and along the seashore, studying the fighting styles of wild animals, and adapting the techniques of nature to their own advantage. New movements were added to the existing form of weaponless fighting known as Tae Kyon, popular among the common people. In addition to these new hand and foot techniques, the Hwarang also incorporated into their art certain Buddhist exercises in intense concentration, in order to achieve a harmonious integration of mind and body.

1.9 THE AIM OF TAEKWONDO: BODY, MIND & SPIRIT WORKING AS ONE

Taekwondo training addresses the whole individual body, mind, and spirit and involves a great deal more than mere physical technique. To be sure, the student of Taekwondo is expected to develop strength, stamina, quickness, flexibility, coordination, and balance. Along with a variety of effective hand and foot self-defense techniques, these physical skills are fundamental to the art, and can be perfected only through dedication and tireless practice. However, the road to true mastery also requires that formidable physical accomplishments be balanced with the
equally important mental characteristics of patience, humility, self-control, perseverance, concentration and respect. These too must be practiced faithfully, both in and out of class. Gradually, the lessons of the defang begin to color other aspects of life. Mind, body and spirit become unified and transformed, and living becomes richer and more enjoyable. The study of Taekwondo can improve you as a person. It will teach you to control your own identity, aggression, temper, and insecurity. It can make you extremely sensitive to your environment so that you cannot be taken unaware, and will help you to truly know yourself so that you will be in full command of your own strengths and weaknesses and able to perceive the strengths and weaknesses of your opponent as well as those inherent in any situation.

Very effort is made to assure the safety of all students. Techniques and exercises are introduced in such a way that the student’s progress is smooth, swift and secure from one level to the next. Absolutely no effort is made to force any student so far past his/her physical limits that health or safety is endangered. Rather, through a gradual process of conditioning, the individual’s stamina and strength is increased so that s/he will be able to handle new movements and greater exertion without undue strain. With perseverance and hard work, everyone improves at his or her own rate.

**SPARRING**

Sparring is divided into one-step sparring and free sparring. One-step sparring (Han Bon Kyorugi) consists of two partners exercising pre-arranged, attack and counterattack techniques. Each belt level has three (3) one-step sparring techniques they are responsible for learning. One-step sparring is the first step to Free Sparring. 9 January 2010 Practicing one-step sparring requires a high level of concentration and cooperation on the part of both people. The attacker must perform each attack with proper execution and consistent timing. The defender must react to the attack and counter attack without hesitation. Techniques should be practiced extensively to a point where they develop a sub-motor pattern that reacts out of instinct, without having to stop and think. Key points in practicing One-Step Sparring:

- Balance and confidence cannot be over-emphasized.
- If your block is late follow through with the counter anyway.
- Attackers should always kiap when attacking and defenders should always kihap on counter attacks.
- State of mind--avoid showing fear when the opponent attacks, do not flinch. Apply your techniques with confidence. In free sparring, only light-to-medium contact is made. Protective gear is worn in accordance
with World Taekwondo Federation (WTF) standards. Note: Only Yellow belts and above are eligible to participate in contact free sparring. Hand and foot techniques are executed according to World Taekwondo Federation rules in order to score points against your opponent. Although students are attacking and defending with great speed and power, the emphasis is on controlled techniques, skillful application and safety. Each sparring round is formally begun and ended with a bow of mutual respect.

MEDITATION TECHNIQUES

To start, sit on the floor with your legs crossed, back straight, eyes closed, and backs of your hands on your knees. Breathe in and out through the nose in long, deep breaths. As you breathe in, do not expand the chest; rather, fill your stomach, pushing it forward. As you breathe out, pull your stomach back toward your spine. Imagine your bellybutton traveling forward and backward, away, then toward your spine.

TAEKWONDO AND TRADITION: THE PROUD HERITAGE OF THE HWARANG DO

Although the name “Taekwondo” was developed in modern times, the origins of the art reach far back into Korean history. During the sixth century A.D., the Korean peninsula was divided into three kingdoms: Silla, Baek Je, and Koguryo. Silla, the smallest, was in constant peril of being overrun by her more powerful neighbors, and in response to this pressure assembled an elite fighting corps chosen from among the aristocracy, known as the Hwarang Do or “Flower Youth”. In addition to the regular military training of the day, the Hwarang Do subjected themselves to rigorous mental discipline and severe physical hardship in order to condition the body and will to great strength and long endurance. Legend has it that they went into the mountains and along the seashore, studying the fighting styles of wild animals, and adapting the techniques of nature to their own advantage. New movements were added to the existing form of weaponless fighting known as Tae Kyon, popular among the common people. In addition to these new hand and foot techniques, the Hwarang also incorporated into their art certain Buddhist exercises in intense concentration, in order to achieve a harmonious integration of mind and body. Modern Taekwondo owes much to the valorous Hwarang Do. The ethical spirit traces directly to the five-pointed code of conduct of the Hwarang, which emphasized the virtues of fidelity, courage, patriotism, obedience to lawful authority and a deep and
abiding respect for all life. To consider Taekwondo as simply a sport, or just another means to get in shape, is to deny the proud heritage of almost 2,000 years. The combined thought and experience of centuries has produced our modern art, which continues to draw strength and stability from the past.

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The word “Taekwondo” is derived from the Korean word “Tae” means “to kick”; “Kwon” implies “punching” and “Do” means “method.” Thus taekwondo is the technique of self defense that involves the skillful application of techniques that include punching; jumping kicks, blocks, actions with hands and feet. Taekwondo is a form of martial art that has evolved by combining many different styles of martial arts that existed in Korea. Plyometrics are training techniques used by athletes in all types of sports to increase strength and explosiveness.

1 Plyometrics consists of a rapid stretching of a muscle (eccentric action) immediately followed by a concentric or shortening action of the same muscle and connective tissue.2 Researchers have shown that polymeric training, when used with a periodized strength-training program, can contribute to improvements in vertical jump performance, acceleration, leg strength, muscular power, increased joint awareness, and overall proprioception.3 Agility is the ability to maintain or control body position while quickly changing direction during a series of movements.4 Agility training is thought to be a re-enforcement of motor programming through neuromuscular conditioning and neural adaptation of muscle spindle, Golgi-tendon organs, and joint proprioceptors.5-6 Performance is often dependent upon the athlete’s jumping ability during offensive and defensive skills.8 Jump performances appears to be contingent on the quantity and efficiency in which force is produced at the hip, knee and ankle joints, explosive strength of the legs and hips should result in a higher vertical jump. The most common sports in which one’s vertical jump is measured are track and
field, basketball, football and volley ball, taekwondo. Although polymeric training has been shown to increase performance variables, little scientific information is available to determine the effect of polymeric training on taekwondo players and if polymeric training actually enhances agility, vertical jump height and peak torque ratio in taekwondo players. Therefore, the purpose of this study was to determine the effect of a 6-week polymeric training program on agility, vertical jump height and peak torque ratio of Indian taekwondo players.

**GENERAL RULES FOR CLASS AND DOJANG**

- During class, proper respect and discipline shall be maintained at all times and Taekwondo ritual should be followed in a uniform manner.
- When a Master Instructor or Grandmaster enters the Do Jang the Instructor on the floor or the highest ranking student in the class should call the class to attention and have the class bow. After the proper respect has been paid, the class should return immediately to training.
- When a student must leave the Do Jang during training, he should first receive permission from the instructor, unless other instructions were given at the start of the class.
- There should be an absence of unnecessary noise in the Do Jang. Students should remain silent.
- Students seated on the sidelines should remain still so as not to disturb those on the floor.
- Students are prohibited from chewing gum in the Do Jang.
- While training, one should esteem and pay respect to one's instructors, senior students, and opponents. One should not lose prudence, self-control, patience or composition. Before and after exercises or contests, the participants should turn around, adjust their Do Boks, and make a correct salutation to their opponent or instructor.
- While seated on the floor, students should keep a proper posture conducive to health. Hands should be placed on the knees, the back should be straight, and legs should be crossed in front with the feet tucked beneath the thighs.
- Students should exercise care to keep their Do Bok clean and pressed at all times. It is important to give a good impression of our art and a neat appearance is important in this respect. A high degree of cleanliness should
also be maintained among students. Students should take care to pay respect to their bodies and keep themselves clean. Fingernails and toenails should be clipped and kept short to prevent injury to other students.

- Jewelry must also be removed prior to training. This protects the jewelry from being damaged, and protects other students from potential injury.
- In order to promote improvement in skill one must learn the basic actions and practice them constantly until they are perfected. 13 January 2010
- Concentration and work must also be expended by the students to master the various forms in order to promote themselves. Through forms and basic actions, precise and accurate techniques will result. It should be remembered that all Taekwondo techniques depend on basic actions and forms.
- When you see the Master Instructor you must bow whether you are in or outside of the dojang. If you are sitting, stretching, etc and the Master walks onto the training floor, you must stand up and bow. Do not just nod, wave, etc. When the instructor calls you, answer "yes sir" and run. Always answer. With, “yes sir” or "no sir."
- When you see a higher belt, you should also bow. It is a courtesy to bow to a same or lower belt.
- In class, you should always maintain a good attitude toward your practice. That means being serious and respectful of your instructor and the other students. During practice, students should observe decorum and orderliness.
- When instructors from another school visit your school, show them the respect they deserve. That means bowing and helping them in any way you can.
- A dedicated student doesn't end his/her training after class, but helps the instructor in demonstrations, tournaments, school activities, and in school maintenance. Be proud of your school and help keep it a clean and orderly place to practice.
- No smoking, eating or cell-phone usage by spectators is allowed inside the dojang.
- Spectators and parents are not allowed to speak to students while they are training.
- Parents are requested to bring in school report cards of their children to the Master Instructor.
• Students are not allowed to train with another Master Instructor from a different school unless prior permission is received.
• All training equipment must be purchased from the dojang, or inspected by the Master Instructor prior to use. The Master Instructor reserves the right to disallow the use of any equipment not obtained through the dojang.
• Street shoes must be removed and stored in the shoe racks prior to walking on the training mat.

USE OF TAEKWONDO OUTSIDE THE DOJANG

The journey of Taekwondo training is not exclusive to the dojang. Students are encouraged to stretch, practice their techniques, and meditate outside of the dojang. Training outdoors in nature is one of the most enjoyable experiences a Taekwondo practitioner can have. Understand that learning Taekwondo is a special gift. Showing off, goofing around or using Taekwondo techniques in a negative or malicious manner are against the spirit of Taekwondo, and are not permitted. These actions may result in demotion/revocation of belt rank or expulsion from the dojang.

1.10 BELT ORDER AND MEANINGS

WHITE - Signifies innocence, as that of the beginning student who has no previous knowledge of Tae Kwon-Do.

YELLOW - Signifies Earth, from which a plant sprouts and takes root as Tae Kwon-Do foundation is being laid.

GREEN - Signifies the plant's growth as Tae Kwon-Do skills begin to develop.

BLUE - Signifies the heaven towards which the plant matures into a towering tree as training in Tae Kwon-Do progresses

RED - Signifies danger, cautioning the student to exercise control, and warning the opponent to stay away.

BLACK- Opposite to white, therefore, signifying the maturity and proficiency in Tae Kwando. Also indicates the wearer's imperviousness to darkness and fear.

International Tae Kwon-Do Oath

As a student of Tae Kwon-Do: I shall observe the tenets of Tae Kwon-Do I shall respect the instructor and seniors I shall never misuse Tae Kwon-Do I shall be a champion of freedom and justice I shall build a more peaceful world.
Tae Kwon-Do Oath

As a student of Tae Kwon-Do I do solemnly pledge to abide by the rules and regulations of the Tae Kwon-Do Association, to strive always to be modest, courteous and respectful to all members, in particular my seniors, to put the art into use only for self defense or in defense of the weak and never to abuse my knowledge of the art.

Rules and Regulations

1. All students must complete and sign the relevant application forms prior to commencing training.
2. All students must be in possession of a TAGB membership and record card after their first four weeks of training.
3. Subscriptions to be paid in the first week of every month. Failure to do so will incur a penalty fee.
4. The buildup of arrears is not accepted.
5. One month's prior notice must be given for adjustment of fees owing to holidays etc.
6. Any student not attending lessons and not paying fees for a continuous period of two months or more shall pay a re-enrolment fee before being allowed to re-commence training.
7. No smoking, eating, drinking or wearing of jewelery, rings etc. in the dojang.
8. Whilst wearing a doo NO SMOKING is permitted regardless of the place. (defang, tournament, demonstration etc.)
9. When eating or drinking whilst wearing a doo your belt must be removed.
10. After the first grading a doo must be worn during training in the dojang, wearing tracksuits or outside clothes is not permitted, unless prior permission has been obtained from the instructor.
11. The most senior member present will commence training sessions promptly until the instructor arrives.
12. Misuse of the Art will result in disciplinary action.
13. Grading will depend on attendance and the instructors discretion as well as technical ability.
14. No student may officially change schools without completing a transfer form and obtaining prior permission from both instructors concerned
15. All students should be in possession of a Students Handbook from the TAGB after their first grading.

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TAE KWON-DO OATH

As a student of Tae Kwon-Do I do solemnly pledge to abide by the rules and regulations of the Tae Kwon-Do Association, to strive always to be modest, courteous and respectful to all members, in particular my seniors, to put the art into use only for self defense or in defense of the weak and never to abuse my knowledge of the art.

TAEKWONDO TRAINING SESSIONS

Every Training Session At MatsutatsuOyma Taekwondo Sport Center Follows The Same Basic Format. This Format Is A Traditional Curriculum That Has Been Found To Provide Students With Optimum Advancement And Provide A Stimulating Variety Of Class Activities.

SAFETY

Every effort is made to assure the safety of all students. Techniques and exercises are introduced in such a way that the student’s progress is smooth, swift and secure from one level to the next. Absolutely no effort is made to force any student so far past his/her physical limits that health or safety is endangered. Rather, through a gradual process of conditioning, the individual’s stamina and strength is increased so that s/he will be able to handle new movements and greater exertion without undue strain. With perseverance and hard work, everyone improves at his or her own rate.

1.11 SELF - DEFENSE

Every person wants to feel safe. Every person wants to be able to protect him or herself and loved ones. For this reason, many people turn to martial arts. Taekwondo offers a person all the tools and techniques needed to adequately protect themselves if needed. In addition to blocking, kicking and striking techniques, students will learn grabs, throws, and techniques to free themselves from an attacker.

10 January 2010
MEDITATION

We practice meditation in order to focus our energies and attention to the training at hand. This is the time to clear one’s mind of all the responsibilities, worries and troubles of the outside world and focus on training.

MEDITATION TECHNIQUES

To start, sit on the floor with your legs crossed, back straight, eyes closed, and backs of your hands on your knees. Breathe in and out through the nose in long, deep breaths. As you breathe in, do not expand the chest; rather, fill your stomach, pushing it forward. As you breathe out, pull your stomach back toward your spine. Imagine your bellybutton traveling forward and backward, away, then toward your spine.

TEN POINTS TO BECOMING A GOOD STUDENT

1. Never tire of learning; a student must always be eager to learn and ask questions. A good student can learn anywhere, anytime. This is the secret of knowledge.
2. A good student must be willing to sacrifice for his art and his instructor. Many students feel that their training is a commodity bought with monthly fees, and are unwilling to take part in any demonstrations, teaching or work around the Defang. An instructor can afford to lose this type of student.
3. Always set a good example to lower ranking students. It is only natural that they attempt to emulate their seniors.
4. Always be loyal and never criticise the instructor, Tae Kwon-Do or the teaching methods.
5. If an instructor teaches a technique, practice it and attempt to utilize it.
6. Remember that a student’s conduct outside the Doan reflects on the art and the instructor.
7. If a student adopts a technique from another Defang and the instructor disapproves of it, the student must discard it immediately, or train in the Defang where it was learnt.
8. Never be disrespectful to the instructor. Although a student is allowed to disagree with the instructor, he must first follow the instruction, then discuss the matter later.
9. Always arrive before training is due to start, and ensure that you have a good attendance record. 10. Never break a trust

Factors affecting physical fitness

1. Regular exercise
2. Amount of training
3. Rest and relaxation
4. Stress and tension
5. Age 6. Gender
6. Illness
7. Postural deformities
8. Heredity
9. Environment
10. Standard of living
11. Diet
12. Drugs
13. Lifestyles,

1.12 Health related physical fitness

The better living in day today life, Health related physical fitness is very important for each person. Health is the level of functional or metabolic efficiency of a living being. In humans, it is the general condition of a person’s mind, body and spirit, usually to be free from illness, injury or pain. The world health organization (WHO) defined health as “a resource for everyday life, not the objective of living. Health is a positive concept emphasizing social and personal resources as well as physical capacities.” The maintence and promotion of health is achieved through different combination of physical, mental and social well being, together sometimes referred to as the “health triangle” systematic activities to prevent or cure health problems and promote good health in humans are delivered by health care providers. The term healthy is also widely used in the context of many types of non living organizations and their impacts for the benefit of humans, such as in the sense of healthy communities, healthy cities or healthy environments. Participating in sports improves your health in many ways. To be a good athlete, you must take care of yourself. Physical fitness is two types health related and skill related. To develop this
fitness program proper planning and disciplined timetable along with proper diet is required.

**Meaning of Physical Fitness**

Most authors define ‘physical fitness’ as the capability to carry out every day activities without extra fatigue and with enough energy in reserve for emergencies. Emphatically this definition is not enough for a modern way of life. By such a definition almost anyone can classify himself as physically fit. Satchel (1977) According to Clarke (1971) Physical exercises and enjoy leisure time pursuits and to meet unforeseen emergencies of energy and alertness, without undue fatigue and lack of energy is the ability to carry out daily tasks. 5 Fitness is a broad term indicating dynamic qualities that allow satisfying the needs related to mental, emotional balance, special consciousness and adoptability spiritual and oral fear and organic health are steady with heredity. Physical fitness means that organic system of the body is healthy and function efficiently vigorous tasks and leisure activities beyond muscular strength and stamina. Physical fitness implies efficient performance in exercises Bucher and Prentice (1985).

**Importance of physical fitness.**

Physical fitness is very significant for leading a happy and well balanced life. Everyone wants to maintain one’s Physical fitness, one can perform work easily. Physical fitness is important in the daily activities of walking, running, lifting and carrying. Physical fitness also improves posture and personal appearance. Physical fitness maintains muscular tissues, decreases the risk of injury and reduces lower back pain. They also assert that muscular problems usually arise due to lack of physical fitness. Research studies in the field of physical education indicate that the children who establish Physical fitness in early life are likely to remain active in future.

Factors affecting physical fitness

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10. Environment  
11. Standard of living  
12. Diet  
13. Drugs  
14. Lifestyles

The main aim of physical education is not to develop star athletes, winning team of expert performance but a national strength with character values and physical fitness. It aims to develop youth into citizen who have the capacity to enjoy vigor and interesting life. Mathews (1967) According to Falls, (1971) “Physical fitness is a main objective of physical education program and the program is directed toward achieving the objectives through precise development exercises as well as games and activities that help to improve physical fitness”. Harrison Clark (1971) opines “Neuromuscular coordination of individual which include his ability to learn new skill finally to reach competency in physical activities in essential to all phase of physical education”.

**Physical Exercise and Physical Fitness**

Exercise means to an art, energetic and lengthy life, inactivity will kill you. Many people say that exercise makes them feel better and more relaxed number of studies has shown that people develop psychologically as well as physically as a result of running program. There is a lot of circumstantial proof to suggest that this relaxing effect is caused by the release of endorphin, morphine – like substances which occur naturally in our brain. “If you make a savings in exercise it makes you conscious of other reasonable health habits. You are not about to waste your savings” Morehouse and Brass (1975)

According to Lumpkin (1986) “Exercise means using or exerting body play” refers to the resultant action or what the participants do during physical exertion. “Games” range from diversions to competition with important outcomes governed by rules. Freedom from work or duties describe “Leisure” which may or may not be used
for physical activity similarly “Recreation” refers recharge one’s strength and spirits after toil again with or without activity. “Sport” encompasses all these diversions and physical activities that are doing for pleasure and success”.

**How Diet Affects Health?**

Healthy diet comprises of minimally processed food items, and is dense in natural nutrients, rich in fiber and vitamin content. This diet, when eaten in moderation at fixed hours in a day, sustains growth, helps in wear and tear of body cells, maintains the body functions and promotes longevity. Balanced diet provides adequate nutritional needs and allows for unexpected energy demands providing a cushion as and when needed. Deficiency of nutrients in diet lead to malnutrition whereas, excessive fat intake results in overeating or obesity. Eating and drinking are paramount to maintaining life, but unfortunately, are also linked with multitude of potential fatal health risks. These risks are not to be taken lightly, as evident by the current increase in obesity Related diseases in the developed world. World Health Organization (WHO) defines obesity as a condition in which excess body fat has accumulated to such an extent that normal physiology of the body is adversely affected.

The body weight is also expressed in terms of Body Mass Index (BMI); this is the ratio of weight in kilograms to the square of height in meters. The BMI is used to label a person’s body.

Weight as underweight (BMI less than 18.5), normal weight (BMI 18.5–24.9), overweight (BMI 25–29.9), or obese (BMI greater than 30). Being overweight/obese can lead to a range

Parle Malinda et al. Int. Res. J. Pharm. 2013, 4 (11)Page 2 of diseases such as hypertension, dyslipidemia, gall bladder disease, sleep apnea, osteoarthritis, rheumatoid arthritis, lower back pain, diabetes mellitus and indigestion. Obesity greatly increases the risk for bladder cancer, colorectal cancer and coronary artery disease. Central obesity/tummy bulging has been associated with metabolic syndrome like Type 2.

Diabetes, high triglyceride levels, high cholesterol levels, and insulin resistance the condition is strongly atherogenic and predisposes to an elevated risk of diabetes and cardiovascular
Diseases. Gout is a fall out of higher intake of added sugars, sweetened drinks or Purina-rich foods (e.g. red meats, sweetbreads, vegetables like asparagus, broccoli or artichokes) resulting in higher blood levels of uric acid, or hyperglycemia. Potential food allergens (including dairy products, wheat, corn, preservatives, and food additives) and Refined foods (such as white breads, pastas) should be eliminated from diet. In general, meat or seafood consumption (high-purine foods) increases the risk of gout Attacks, while dairy food consumption seemed to reduce the risk. Breakfast skipping for reducing body weight or attaining slim figure by girls particularly has resulted in Unpredicted weight changes. The prevalence of obesity in Punjabi community is found to be higher in middle aged women particularly compared to South Indian women owing to their food habits. Furthermore, higher incidence of Type 2 Diabetes and Cardiovascular diseases is observed in urban population as compared to rural population owing to junk food consumption and stressed life in urban areas.

**Fitness Education**

The degree to which a person's ability to function effectively in the treatment of the condition that is characterized. Exercise is a personal thing. It refers to the ability of each person to live efficiently within his potentialities. Falls (1980) Physical activities help a man achieve high degree of physical conditioning. In schools there is a compulsory physical activities program for all boys and girls, so it would be exciting to find out which of the components have better physical fitness. There are many physical fitness tests to evaluate the ability of the students to carry out daily tasks without unnecessary fatigue.

**Physical Exercise and Physical Fitness**

Exercise means to an art, energetic and lengthy life, inactivity will kill you. Many people say that exercise makes them feel better and more relaxed number of studies has shown that people develop psychologically as well as physically as a result of running program. There is a lot of circumstantial proof to suggest that this relaxing effect is caused by the release of endorphin, morphine – like substances which occur naturally in our brain. “If you make a savings in exercise it makes you conscious of other reasonable health habits. You are not about to waste your savings” Morehouse and Brass (1975) According to Lumpkin (1986) “Exercise means using or exerting body play” refers to the resultant action or what the participants do during
physical exertion. 7 “Games” range from diversions to competition with important outcomes governed by rules. Freedom from work or duties describe “Leisure” which may or may not be used for physical activity similarly “Recreation” refers recharge one’s strength and spirits after toil again with or without activity. “Sport” encompasses all these diversions and physical activities that are doing for pleasure and success”.

**Types of Physical fitness**

As the sense of duty increased at the end of a century ago, it was clear that a number of specific parts of the human impact on the level of general fitness. Quality of physical classified among Health-related physical fitness motor quality and fitness for a particular.

**Health Related component of Physical Fitness**

1. Cardiovascular Endurance
2. Muscular Strength
3. Muscular Endurance
4. Neuromuscular Co-ordination
5. Body Composition
6. Suppleness Flexibility

Ability to perform activities of daily living without undue fatigue, health-related quality of early contracts with health-related components of fitness are diseases. The run Hypo muscle strength, muscle strength, cardiovascular endurance is to provide a low-risk, suppleness flexibility, neuromuscular co-ordination and body composition.

**Muscular strength**

Muscle strength is the ability of a muscle to a maximum force against resistance. Muscle strength is the power of maximum contraction of the muscles (Kansal D. K. 2008).

Muscular strength is your strength and muscle can apply against resistance for a short duration, anaerobic means without oxygen. Resist the combination of external such as free weights or household items and the weight of your own body. Physiologically, muscular strength is your body's ability to supply ATP (Triphosphate...
Tri-Phosphate) to your muscle fibers for labor in times of short stories, which range from 0 to about 15 seconds.

The importance of muscular strength: the strength of the muscles may be subjective, a major reason why muscle strength is important for your Daily Living efficient functions. DLAs the most significant reason why they have no ability to sections 6 of fitness are important. At least, to be physically fit to exercise the basic power of the muscles needed for effective Daily Living Activities. While DLAs vary from man to man, you might also consider activities such as push-ups, pull-ups.

Although each of the 6 of stability depend on one another, poor muscle strength can also affects the quality of Aerobic endurance and muscular injury. You can use all kinds of training to better match the power of your muscles. If your strength is you're the weakest of the 6 of physical fitness you need to start weight training.

Muscle strength in a short period of time through wind energy in the muscles of your body has the ability to produce extreme amounts of force. Provides short-term bursts of energy, wind energy & does not require oxygen. Wind energy is an alternative energy comes from the burning of carbohydrates and a short rest, after which time the system needs to fill in a few minutes, can continue. Wind energy, low-impact sports such as tennis and golf are used for everything from weight lifting and sprinting. When energy is needed to supplement the fast wind energy is used in aerobic workouts centered.

Improved muscle strength or muscle building muscle and connective tissue, enlarging the cell size and density is formed. One side of their aesthetic value, big muscles and connective tissue injury and long-term weight control have been less than helpful. Muscle tissue burns more calories than fat, even when the rest.

**Tips for Building Muscular Strength.**

1. Focus on your exercises. Concentrate on activities that work precise muscle groups & use a program that divides the routine into precise muscles groups each day more willingly than a full body workout.

2. Lift weights slowly & concentrate on using the best technique rather than the most weight. Your workout needs to be well-organized first.

3. Lactic acid control. Anaerobic activities create lactic acid build-up in muscle, which can guide to muscle soreness and cramping. Doing some light post cardio workout & stretching before and after workouts can assist remove the lactic acid.
4. Gradual development is important. It is more essential to get the proper technique first than look to maximize the weight you can lift. Development of the stress placed on a muscle is essential for continued gains in muscle strength. Averaging 3 sets of 6 – 8 repetitions is an excellent way to increase muscle strength.

5. Warming up. A warming up set or light cardiac activity can help to prepare the body & mind for a complex workout without injury.

6. Recovery. With more complex workouts & more damage to the muscles as a result, 1 or 2 days of recovery time is necessary. Permitting the muscle to recover fully will also help avoid overtraining injuries.

7. The muscular strength is normally measured with respect to individual muscles group which are acting together. It is produced by four types of muscle contraction. 1) Isotonic muscular strength, 2) Isometric muscular strength, 3) Isokinetic muscular strength and 4) Eccentric muscular strength.

8. Isotonic muscular strength: It is the maximal force used to execute a complex movement by isotonic contraction. It is also known as concentric muscle action or dynamic contraction.

9. Isometric muscular strength: It can be simply understand by its name only that there is no visible change in muscle’s length.

10. Isokinetic muscular strength: It’s a maximal force production by a subject with constant speed as well as range of motion. A good example of this type of strength is the strength used in arm stroke for free style swimming.

11. Eccentric muscular strength: In this type the center of movement is different. The development of active tension during lengthening of a muscle due to some external force in muscular contraction is known as eccentric muscular strength.

- **Muscular endurance**

  The muscular endurance is the 2nd essential factor of health related physical fitness. This term is synonymous with stamina.

  The muscular endurance or stamina allows executing sustained work by muscles over a period of time. The muscular endurance may define as, The ability of a muscle to maintain a certain level of tension or to repeat identical movements or
pressures over the maximal period of time with one’s maximal effort (Kensal D. K. 2008).

Muscular endurance is an important health-related unit of physical fitness. While muscular strength is defined as the ability/capacity of a muscle group to exert a maximal force against resistance, 1 time through a full range of motion; muscular endurance is may defined as one’s ability to execute many repetitions with a sub-maximum resistance over a given period of time.

You have the ability to oppose fatigue when you hold a position or carry something for an extensive period of time. You also have the ability to repeat a movement without getting exhausted. Muscular endurance prevents unnecessary fatigue from work & other daily activities, and allows better success and enjoyment in athletic and recreational endeavors.

Muscle strength, muscle deals in the shortest time. Less than about 90 seconds, followed by muscle and muscle strength contracts anaerobic activities.

**Importance of Muscular Endurance**

Muscle strength and cardio-respiratory endurance is the link between muscle strength. In order to be fit cardio-respiratory, muscular strength you need to show.

Physiologically while the muscular strength is about type of II, Fast-twitch muscle fibers, muscle strength, and I deal with a particular type of slow twitch muscle fibers need. Your body contains around 15 minutes & seconds in the air over the body, but the two under the age of 90 to strengthen your Type I muscle fibers.

Muscle endurance is evaluated Amount of energy and time and again, that we can build the muscles as well keep the job. Muscular endurance is important to daily activities, which often involve low impact movement. It is all the work of the prime, since especially anaerobic weight lifting repetitions to intense Aerobic activities such as running. Muscular endurance join both energy Aerobic and anaerobic.

**Tips for Muscular Endurance**

- Gradual development. Like muscular strength, muscle endurance is increased all the way through overload. Overworking the muscle with a lighter weight but more repetitions is the best way to develop muscular endurance.
- Averaging 3 sets of 10 to 15 repetitions is a best way to build endurance.
- Keep in mind that a spotter should still be needed for the final 1/2 repetitions to get the best benefit.
Recovery. Rest & recovery is necessary for your muscles but falling the time between sets is a way to force the muscle to have faster recovery rate.

As per the content of the definition, muscular endurance divided into 2 types as follows: 1) Static or Isometric Muscular Endurance and 2) Dynamic or Isotonic Muscular Endurance.

Static or Isometric Muscular Endurance: When the person sustains a certain amount of tension over the period of maximum time as per his stamina, it’s known as Static or Isometric Muscular Endurance.

Dynamic or Isotonic Muscular Endurance: When the person is required to repeat identical muscular movements or pressures through a selected distance for the maximal number of times, it’s known as Dynamic or Isotonic Muscular Endurance.

Muscular Strength and Endurance Activities in Brief

Tension of muscle strength and power to overcome the opponent is capable of muscles. A muscle muscle strength and power to create and maintain a long time. These tension in his wrinkles and strengthen bones and muscle strength and push, lift, pull or carry heavy shopping bags to summon the patience to work muscles.

- **Muscular strength and endurance activities in practice:**

  - With one’s own weight (rope skipping, climbing, push-ups, etc.)
  
  - A partner in weight (wheelbarrow races, tug-of-war, wrestling with a friend, etc.)
  
  - With activities such as throwing a ball, paddling, rowing, weights in a gymnasium, carrying things, etc.
  
  - When a muscle strength and endurance activities, one must put the following in mind:
  
    - With a need to develop the senses - If you are new to this kind of activities away from an unwanted muscle soreness and injuries is to start slowly with lighter resistance.
  
    - There are a lot of muscle strength without using weights of stone steps - the strength to lift weights it is not mandatory. Examples such as push-ups, climbing, handstands include activities such as body weight, elastic tubing and
bands, as well as a very simple machine that can muscle strength training and other.

- Body weight or resistance and strength of developing serious adverse childhood and it is possible to grow cartilage and bone damage.
- If there is a doubt, it's like a PE teacher, physical trainer, doctor, always and a good idea to consult an expert.

**Cardiovascular Endurance**

Cardiovascular endurance is the ability of the lungs, heart, blood vessels to deliver a sufficient amount of oxygen to the cells to meet the demands of the body for a long time.

Cardiovascular exercise, or cardio-respiratory exercise or "cardio" is synonymous with the heart that lasts longer than 90 seconds in the air is physical activity. If you need to know to understand the word, is cardio respiratory-related heart and lung. Cardiovascular endurance is very important because a good health. During exercise, this may be obvious, but there is more. Take your time to show the highest level of cardiovascular endurance exercise you do throughout the rest of it is more efficient when you have the heart, lungs and blood vessels to the computer. The less stress you avoid disease and live a long life and let the sound of your heart and lungs around the clock to keep the material.

- **Flexibility**

It would bend a joint or group of joints without causing injury to achieve a range of motion. Flexibility is the ability of the joints to move through a full range of motion. This bending, twisting, lunging, stretching and is very useful for all activities that will entail.
There are some activities that build flexibility follows: mild stretching of muscles, such as gymnastics and karate, yoga and muscle strength or the strength of any such game. If you work flexibility is important to keep in mind that:

- One must be patient. It takes a long time to see significant development disorder, usually several days or sometimes months.
- Never stretch to the point where you feel pain and movement should always be put in areas outside the bouncy or jerkiness.
- You should never push yourself to copy someone who is flexible than.
- You should stretch regularly.
- A good idea to start exercises for flexibility at a young age.
- Perform stretching when muscles and joints are warm.

It is also essential to know that flexibility exercises are different between boys and girls, and also during the major phases of growth of life.

- Neuromuscular Co-ordination

Nervous integration of a muscle or group of muscles to perform a specific task efficiently recruit relates to the ability of the nervous system. It operates at two levels of neural integration as:

1) Intra-Muscular Coordination,
2) Inter-Muscular Coordination.

Nervous coordination and smooth and precise movements to work together to create a non-serious motor system is the ability of the brain and nervous system.

The co-ordination activities include following:

- Adaptation.
- Balance.
- Coupling.
- Differentiation.
- Orientation.
- Rhythm.
- Reaction.
Body Composition Physical exercise:

It is a specific term and often improves or maintain physical fitness goal, structured, repetitive and purposeful physical activity, including planned.

Physical fitness

It is based on the daily tasks of living, a degree of protection against chronic diseases and well-being that provides the basis for participation in the game is a physiological condition.

Health:

It's an overall physical, mental and social well-being is a mirror image. It is more than an absence of disease. Health is a characteristic that is not steady in time & can vary along a variety from near ill health to optimal physiological functioning

Physical Activity and Fitness

Main Descriptors Physical activity that a person gets the "dose" "FITT" principle is dependent upon factors that may include: Frequency: 1 times the amount of physical activity that engages

Intensity: how hard is the physical activity?

Duration: the duration of the physical activity session.

8 Type: the particular mode of exercise in which 1 engages

These factors, physical activity, "dose" can handle differ. This amount is often spoken of in terms of the cost of energy. If a physical activity difficult, reduce the amount of time required to burn a set amount of calories, which can cost a high proportion of calories can appreciate that.

Need for Fitness Education

The degree to which a person's ability to function effectively in the treatment of the condition that is characterized. Exercise is a personal thing. It refers to the ability of each person to live efficiently within his potentialities. Falls (1980)

Physical activities help a man achieve high degree of physical conditioning. In schools there is a compulsory physical activities program for all boys and girls, so it would be exciting to find out which of the components have better physical fitness.
There are many physical fitness tests to evaluate the ability of the students to carry out daily tasks without unnecessary fatigue.

**Physical Fitness in Ancient India**

The reflective tradition of physical fitness in India could be traced back to thousands of years. It has been closely related with the religious practices, traditions & culture of India. The then Indian Physical Education was nothing but contributing to physical fitness. The physical fitness program was in the type of physical activities like Yogasanas, Pranayama, Dand-Baithak, Mallkhamb, Lei, Lathe, Calisthenics, Combative, Dumbbells and the games like, Khabaddi, Kho-kho and Atya-patya have been in trend from time immortal, but the names of the inventor and the dates of their origin are not clearly known. Yet we are aware of the fact that a scientific system of Physical fitness program was in existence in India and it was practiced by the people from time of yore. These physical fitness programs were planned and practiced in ashrams and the temples. The age of oral Vedas have also sounded that the strength as 1 unit of the physical fitness program. This could be reviewed in the following words “Barona Via Prithivi Testate, Balkan Pasture” (The world stands protected by strength, worship strength). Medical authorities of ancient India, such as charaka and suhsruta, suggested physical exercise (Vietnam), oil bath & message for preserving and restoring health. Suhsruta defined Vyayam as movements of the body that produced sufficiently dynamic circulation of the blood and rapid respiration to fatigue the individual. Charaka suggested various exercises to area of disease reduce weight and activate digestion and delay the advancement of old age. Van Daley and Benett (1971) Dance requires a great contact of physical fitness. It has a systematic history in India and is closely associated with religion. A figure dancing girl of bronze found in the ancient city of Mohenjo-Daro shows the antiquity of the art and the early literature reveals the people’s dancing love and important role played in their religion. In fact, Shiva- one of the trinity of Hindu God was known as ‘the Lord of Dance’. The growth of physical fitness and motor skills was incorporated in the vocational aims of particular groups of people especially that of the Kshatriyas. Dancing girls were also trained to give face to religious concepts and to provide recreation for spectators. The great epics the ‘Mahabarata’ and ‘Ramayana’ have considered physical fitness as a very important factor in all welfare. It was promoted through involvement of Indigenous system of physical activities. Tirunarayanan and
Hariharasarma (1985) The great Nalanda&Takshashila Universities famous in Ancient and Medieval India had physical fitness program for 12,000 students at one time in the form of Indigenous activities and gymnastics of Indian origin.

**Physical Fitness in Pre-independent India**

The responsibility of education in the year 1833 was in the hands of British and hence they never paid any interest to the inclusion of physical fitness system in the school education program. Kamlesh and Sangral (1991) The Indian independence war of 1857 had suppressed the physical fitness program of Indigenous physical activities and it was replaced by Westernized type because the whole country was under the control of the British. The fire of patriotism was injected into the minds of strong Indians to refuse the physical fitness program of Westernized system of physical activities, but in vain. Then rulers themselves were lovers of gymnasium. They patronized some wrestlers – to develop strength and Mallkhamb to develop flexibility as components of physical fitness. Tirunarayanan&Hariharasarma (1985). In 1870, the education was made a state subject keeping the supervisory power at the centre. Even then, physical fitness program was given no room in the school programs. Kamalesh&Sangral (1991). The foreign rulers had the attraction of promoting Western games in schools and colleges and thus degraded the indigenous physical activities. To give more impetus, Britain had introduced in India, the gymnastics system of Maclaren’s adopted from the German system, Swedish drill, military drill as adapted by Ling system, Marching & rhythmic exercises adapted from the Danish system & the modern British games like Football, Cricket, Hockey and so forth, to aim at fulfilling the desired components of physical fitness. Tirunarayana&Hariharasarma (1985). The excellent development of physical fitness program in pre-independence days in India goes to YMCA College of physical education founded in 1920 by Mr. H. C. Buck at Madras (Chennai). The arrangement of physical fitness components such as strength, endurance, flexibility, speed, agility and so forth, were found a place in the games of Volleyball & Basketball introduced in India by YMCA with the influence of America. Afterwards several institutions, namely, Government College of Physical Education, Hyderabad (1931), Christian College of Physical Education, 12 Luck now (1932), Training Institute of Physical Education, Kandivali (Mumbai) (1938) sprang up basically to serve the cause of the physical fitness program in India. The Olympic movement in India resorted to
promote participation in high level competition and also to create a interest of participation in games and sports among mass. It was in the year of 1920 that 6 competitors were sent as a Indian team for the first time to represent in Athletics and wrestling in the world Olympic Games held at Antwerp (Belgium) after having made them physically fit and also fit in the skills for the high level performance. With a view to feed players and athletes for the high level competitions, many physical fitness training programs were launched in order to develop strength, endurance and agility.

1.14 Motor Components of Physical Fitness

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<thead>
<tr>
<th>Strength</th>
<th>Endurance</th>
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<td></td>
<td>Co-ordination</td>
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<tr>
<td>Flexibility</td>
<td>Speed</td>
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Motor fitness, strength, speed, endurance, flexibility and integration. The primary components of a successful sports and motor skills are related to performance.

- **Endurance**: Oxygen and nutrients to the tissues and the ability to deliver an extended period of time to avoid waste. Long runs and swims are methods for measuring this component.
- **Strength**: Time upper body Strength is the ability of a muscle to exert force for a short period, for example, measured by various weight-lifting exercises.
- **Speed**: The quickness of movement of limbs whether it is the leg or arm.
- **Flexibility**: The ability to achieve an extended range of motion without too much fat or muscle tissue.
- **Co-ordination**: The ability to integrate the above listed component so that effective movements are achieved.
Specific physical fitness

Specific or work quality is oriented to a person's ability to perform the specific task with reasonable efficiency for example in sports or profession. Specific training can prepare either an athlete or a worker in their particular field.

Game

Example of athletic training would be training for a 400m sprint in which case a runner performs at ultimate throughout a short distance. In the case of sprinting, the athlete must be trained to run with locomotive throughout the race. In a marathon which covers a long distance the athlete must be trained to work constantly for long period.

Profession

Work plays a central role in the lives of people, since most employees spend at least eight hours a day at work, either on a farm, in the office, factory, etc. Labor power, however, is to become a reality only by its exercise; it’s just a job but a human muscle, a certain amount of nerves, the brain will die sets itself in action, and the need to restore."

1.13-NEED OK THE STUDY:

As we know research is doors of knowledge as we completed the research in different sector our country we get develop we are lacking behind in sports so according to my opinion much more research is needed in the sport, as we are plying taekwondo from many years but yet we are not qulifai for the Olympic match of taekwondo what can be the reason that our country is not qualifying in the taekwondo in Olympic. The intention behind doing the research is flowing.

1.14- OBJECTIVES OF RESEARCH:

1. To improve the skill of taekwondo of Aurangabad district player of taekwondo.
2. It will help to improve taekwondo skill of taekwondo player.
3. It research will improve their speed, balance, stamina.
4. It will open new exercise for taekwondo and beneficial for taekwondo player.

5. To find the effect of training program on school student of taekwondo players . Aurangabad.

6. To find the new way of training to improve the taekwondo skill school student of taekwondo players.

7. To find the new way of training to improve the taekwondo skill school student of taekwondo players.

**1.16 Training for Health and Fitness**

*(Resistance Training Benefits Everyone)*

As we age we tend to lose lean muscle mass, which is a condition known as sarcopenia. Resistance training helps maintain and combat the loss of muscle mass by increasing muscular fitness. This form of training can also prevent osteoporosis by augmenting bone mineral density. What’s more? Regular resistance training can decrease the risk of heart disease by lowering body fat, decreasing blood pressure, improving cholesterol, and lowering the stress placed on the heart while lifting a particular load. Improving muscular fitness is very important for enhancing quality of life.

**MUSCULAR STRENGTH**

Muscular strength is the ability of a muscle or muscle group to exert a maximal external force. • Load: 60-70% 1RM for novice to intermediate; 80-100% for advanced • Volume: 1-3 sets of 8-12 repetitions for novice to intermediate; 2-6 sets of 1-8 repetitions for advanced • Rest period: 2-3 min for higher intense exercises that use heavier loads; 1-2 minutes between the lower intense exercises with light loads

**MUSCULAR POWER**

Power is defined as the optimal amount of work performed in a given time period. Muscular power is the highest power output attainable during a particular movement, and is required in activities of daily living, sport, and work. For optimal improvements in muscular power, a light load of 0 to 60% of 1RM should be used for 3-6 repetitions over one to three sets per exercise. Exercises; 0-60% 1RM for lower body exercises • Volume: 1-3 sets of 3-6 repetitions per exercise • Rest period: 2-3
min for higher intense exercises that use heavier loads; 1-2 minutes between the lower intense exercises with light loads

**MUSCULAR HYPERTROPHY**

Muscular hypertrophy is the enhancement of muscle size. • Load: 70-85% 1RM for novice to intermediate; 70-100% for advanced • Volume: 1-3 sets of 8-12 repetitions for novice to intermediate; 3-6 sets of 1-12 repetitions for advanced • Rest period: 2-3 min for higher intense exercises that use heavier loads; 1-2 minutes between the lower intense exercises with light loads.

**MUSCULAR ENDURANCE**

Local muscular endurance is the ability of a muscle or a muscle group to repeatedly exert a sub maximal resistance. • Load: lower than 70% of 1RM • Volume: 2-4 sets of 10-25 repetitions • Rest period: 30 seconds to 1-minute between each set

**FREQUENCY**

For all the above, it is recommended that novice individuals train the entire body 2-3 days per week. Intermediate individuals should train 3 days if using a total-body workouts or 4 days if using an upper/lower body split routine, training each major muscle group twice per week. Advanced lifters can train 4-6 days per week, training each major muscle group once to twice per week. At this level, muscle group split routines of one to three muscle groups trained per workout are common since this would allow a higher volume per muscle group. Elite weightlifters and bodybuilders may benefit from using very high frequencies such as, two workouts per day for 4-5 days per week.

**OVERTRAINING**

To reduce the risk of overtraining, a dramatic increase in volume should be avoided. It is recommended that a 2-10% increase in the load be applied when the individual can comfortably perform the current workload for one to two repetitions over the desired number on two consecutive training sessions.

**Physical Activity, Quality of Life, Fitness and Life expectancy**

People of all size and ages, ethnicities and abilities can benefit from some forms of habitual physical activity. Scientific researchers have confirmed that regularly physical activity can help to produce endorphins in the brain, which can
promote feeling of well-being and help traduce symptoms of anxiety and depression. In older adults, regular physical activity can help reduce the risk of falls, back pains, arthritis, can increase stamina and energy, and improve Balance and posture. Research demonstrates the importance of avoiding inactive lifestyle by all humans. Life style choice can make a big impact on mortality as participating in physical activity scientific research estimate that an individual who participate in physical activity for seven (7) hours week has 40% less chance of premature death compared to one who engages in physical activity for 30 minutes or less per week. See Fig IV in appendix.

Health, Fitness and Correlate of Physical Activity

Beyond the physical benefits of regular physical activity, research has revealed that there are also strong correlation between physical activity, and various aspects of life. Engaging in regular physical activity may affect crime prevention, academic performance, quality of life and life expectancy, health care, cost and the work environment.

Physical Activity, Health, Fitness and Academic Performance among Youths

In Nigeria youths are becoming more inactive due to the introduction of technology. With the increase use of video games, films and television, the decline of opportunities for games and physical activities in schools, and concerns for safety outside home, youths find themselves living sedentary lifestyles. During the transition from secondary school age thigh school adolescents, physical fitness, aerobic fitness, and participation in regular activity is steadily declining. This is especially demonstrated in early maturing females, and Overweight youth. Bausch, (2010), stated that population wide adolescents studies have Indicated that females are less active than males and that black youths are less physically Active than white young adults. Research has demonstrated that appositive correlation exists Between physical activity and academic performance in adolescent students. Students who are Physical inactive are more prone to academic failure, more absence in school, lower grades and test scores, and less ability to pay attention in class (Centers for Disease Control and Prevention (CDC); 2009).
1.17 Morning activity:

Apart from eating, nothing. Training session timing: At the time you find your body is awake the most — no earlier than late morning. If you have a day job, then train late afternoon, preferably when the gym is really quiet. It takes too much effort to walk around people and you don't want your cortisol levels raised because some destined-to-stay-a-geek kind of person is getting in your way. Having to grunt "hello" too many times can interfere with recovery.

Post-training shower:

Now go and chill in that shower or bath until you feel recovered. Forget about the world water shortage.

Post-training activity:

Preferably lie around the pool in the warm sun. If that’s not possible, maybe because you live in a cold climate, go chill in a warm room.

Afternoon activities:

Apart from a massage or a stroll along the beach or poolside, nothing.

Bedtime:

Early. Preferably about 8:30pm. You should be smashed

Editor's note:

"Smashed" is, I take it, Australian for "wiped out," not inebriated] by then anyway.

Training Tips Clothing:

Never strip down too much in training. You don't want to see your muscles and think, "Gee, aren't I getting big?" Until you can see the muscle mass bulging out of your baggy training gear, keep training!

Between sets:

Sit down, do nothing, go nowhere. If need be, take your own chair to the gym. You aren't getting up until it's time to do your next set!

Training partner:

Get someone bigger than you, preferably a sadist. Nutritional Schedule

Pre-training nutrition rule:
Never train on an empty stomach except possibly for squat days. If you haven't eaten for longer than ninety minutes, you can't train. Go eat, then look to train.

**During training nutrition:**

If you're doing squats or similar and/or if you just had a big meal shortly before training, sip a weak solution crabs/amino drink. If you're not doing squats and if you're feeling even the slightest bit hungry, sip a protein drink during training.

**The Life of Do-San**

A Chang-ho was a Korean independence activist born in South Pyongyang-do on November 9, 1876. He is also referred to as Do-San, his popular pen name. At the age of 18 in 1894 he became a member of the Tonguing Hyophoe “Independence Association” which promoted independence from Japan but they were interrupted when the group’s leader was forced into exile into the United States. This strengthened his belief that they had themselves to blame for their failures and victory would only come from within. It was in 1899 that he established the Chemokine (gradual process) School in Pyongyang which reflected his philosophy of evolutionary social changes through education. A Chang-ho was one of the first Koreans to immigrate to the United States when he arrived in September 1902 with his wife. It was then he decided to call himself Do-San meaning island mountain. While living in San Francisco, he initiated a social reform movement and organized the San Francisco Social Meeting which was desperately needed by the Korean American society. He also organized what is known as Kungminhoe (Korean National Association) which inspired national independence for Korean immigrants. In 1906 he returned to Korea and organized an underground independence group called Shimming-Hoe (New People’s Association) which was to promote Korean independence by cultivating nationalism. In 1908 he founded the Tae-Song (large achievement) School in Pyongyang. At this time the Japanese were in the process of removing education for Koreans to ensure illiteracy and create a class of slaves. The Shimming-Hoe had grown in size and was considered a threat by the Japanese occupiers. In December 1910, the Japanese fabricated an plot to assassinate the Japanese Governor General Terauchi. Over 600 Christians and all of Shimming-Hoe leaders were arrested, with over 105 brought to trial following torture. Pressure was felt from the world community that most of the defendants had to be set free after it
was alleged that the plot was an obvious fabrication. After the passage of an Education Act in 1911 the Japanese occupiers started to close all Korean schools and as a result the Tae-Song School was closed in 1913 and by 1914 all Korean schools had been shut down.

**Muscle Strength, Power & Speed**

Taekwondo is characterized by fast and high kicks which require high level of strength and speed [8]. Neuron-muscular units controlling the lower limbs are crucial in explosive kicking, jumping and maintaining stances [22]. Many studies investigated the ejects of typical TKD training on muscle strength [4,16,23,24] but no consensus is present about the eject of typical TKD training on deferent strength forms (i.e., maximal, endurance, isokinetic, and explosive strengths). To the best of our knowledge, only one study [16] has investigated the ejects of low frequency TKD training on speed and agility measured by the 50 m shuttle run test (10 ×5-m). Kim et al. [26] found no sign cant improvements in speed and agility. Ėse endings may be the results of the low number of training sessions’ or non-su cient stimulus eliciting speed and agility improvements. Future studies in that regard are warranted. A few studies have reported that typical TKD training could improve muscle strength [13,27]. Recently Fong and Tsang [28] have explored the relationship between TKD training duration (i.e., number of hours spent training per week) and lower limb muscle strength in adolescents. Is kinetic concentric knee and ankle muscle strengths were measured in 20 TKD practitioners at two di"erent speeds (60 and 240°/second). Authors found that the duration of TKD training was signi cantly correlated with the peak torque of the knee extensors and #exors, but only at 240°/second angular speed. Ėis supports therefore the notion that the more time one spends in TKD training the greater muscle strength one could gain and that any subsequent improvements in knee muscle strength is velocity septic. While these previous studies have reported biennial ejects of typical TKD training on muscle strength, some other studies have shown the absence of muscle strength improvement aver typical TKD training. Kim et al. [26] reported that there was no eject of low frequency TKD training on muscle endurance or maximal muscle strength. Ėere was even a muscle strength deceit between the dominant and non-dominant leg for the heavyweight category (~ 80 kg) aver Taekwondo training [29]. Again, as mentioned before, the issue with the latter study is the low frequency of the TKD sessions, leading to inconclusive results. Ėere fore,
coaches should emphasize a complementary training to the typical TKD to improve muscle strength and explosively, if the TKD training is of relatively low frequency. For high frequency TKD training the adjunction of muscle strengthening sessions still has to be experimented. Haddad et al. [30] have investigated the ejects of polymeric and septic exercises during high-intensity interval training during a 4-month training program, on strength, power, and speed in young TKD athletes. €eye concluded that the use of polymeric exercises during high-intensity interval training can be useful to improve strength, power and speed in these athletes. the 4-week of resistance training sessions.

Total et al. [8] analyzed the eject of resistance training with elastic bands on striking force of some TKD skills (i.e., Paling chagrin, Dolly chagrin & Napery chagrin) during 6-weeks-long training period. It was established that resistance training sessions conducted with elastic bands had ejects on their striking force. Furthermore, authors have shown that training sessions held with elastic bands having 14.5 kg resistance force were more elective in comparison with the training sessions using elastic bands with 7.25 kg resistance as well as sessions with no elastic bands at all [8]. Based on these endings, it would be highly advisable to experiment the use of elastic bands with different elasticity varying according to each TKD technique to aim increasing the impact of strike techniques during TKD matches. €e elasticity of bands may vary depending on the face or torso level where the technical strikes are delivered. €e technical TKD trainings using elastic bands might therefore increase the strength impact of the strike due to being in line with kinetic and kinematical chain (i.e., hip, knee and ankle movement). TKD training conducted with elastic bands is therefore biennial to increase the strike’s force of TKD athletes allowing them also to increase their technical strike speed, because elite athletes must be able to reveal great striking forces [9]. €e application of technical strikes should be performed at maximum speed and force. Indeed, the resistance training sessions performed with maximal strength increased the speed as well as the explosive force of TKD athletes [32]. Recovery intervals, intensity, volume or duration and frequency seem to be one of important variables associated with resistance training prescriptions. Based on hormonal responses [33], phosphocreatine resynthesis [34], jump performance [35], strength restoration [36], and sprint time [37] and other measures, the adult resistance training literature recommend 2-5 min of recovery between resistances.
Min following 10 maximal repetitions using either 60°s-1 or 300°s-1 angular is kinetic speeds (Isok60 and Isok300). Therefore, inter-set recovery period has to be tailored according to the athletes’ age. Based on this and previous researches [39-41], it is recommended that a rest interval of less than 1-2 min may be necessary to induce fatigue by decreasing force, work or power in youth following a set of potentiating two or more minutes following a set of maximal intensity higher velocity resisted contractions in youth TKD athletes.