

## Karate Speed

Copyright © Patrick M. Hickey 1995

Speed is an integral part of karate. Without speed, it is nearly impossible to practice effective karate. Hence, an important way to improve the effectiveness of karate is to increase speed. Before considering how to improve speed, a few basic questions need to be answered:

- How fast does my karate need to be?
- How fast am I now?
- What must I do to become faster?
- What do I do with my new speed?

How fast is necessary in karate? There are different ways to measure physical speed. Movement time or velocity measures the time it takes to go from one point to another. The instantaneous change in speed called acceleration measures the rate that speed increases or decreases. This also affects the force of a blow. Not all increases in speed deal with movements. For example, there is reaction time. How quickly one responds to a stimuli. Each karate-ka should consider how THE different factors THAT affect speed are used, decide which factors should have what priority, and in what circumstances. Different karate athletes may require different types of speed training depending on circumstances, genetics, psychic make-up and overall fitness.

If speed is to improve, you must know how to go about improving speed. Before beginning to train to increase speed, determine a “starting point” to use as a baseline upon which to compare the effects of training. In determining this baseline, strengths and weaknesses are also identified. Examine these strengths and weaknesses relative to karate. Order the weaknesses by priority and formulate a training program to correct these weaknesses increasing speed. Once the program is implemented monitor for results, fine tuning where necessary. With success, the new found skills are put into practice.

Physical speed does have a limit which is set genetically by the amount of fast twitch and slow twitch fibers in the body. While training affects the relative size of such muscles and recent studies show that some muscle fiber can change with training, genetics does control the parameters of speed. Given this, the question is how can we fine tune what we are born with.

Ways to Improve Speed: There are generally nine ways to go about improving speed:

- Increase the acceleration of techniques to cover distance more quickly
- Increase the attack distance covering a longer distance in the same amount of time
- Reduce the attack distance through superior strategy and timing
- Increase terminal velocity to cover a given distance more quickly
- Improve reaction time to allow quicker starts
- Increase the attack rate, the number of techniques per second
- Improve neuromuscular skill to perform techniques more efficiently
- Improve anaerobic endurance to maintain speed longer
- Faking can slow down the reactions of your opponent

We will be considering further the factors which affect speed in the next article.

## Gaining Speed

Copyright © Patrick M. Hickey 1995

**Tools Needed:** The tools to use to gain speed are the brain, central nervous system, the neuromuscular, and the leverage systems. The brain and central nervous system can be trained to provide faster communication and control. The neuromuscular and the leverage systems must be bio-mechanically trained. A high level of cardiovascular/respiratory fitness is needed with the body's fuel supply systems providing energy quickly and efficiently. Sound nutrition gives high energy intake necessary for high energy expenditure, fluid replacement, growth and repair of the body, and sound gaining of body weight/muscle.

**Elements of a Training Program:** Your karate speed training program should include five elements: body control, power, strength, endurance, and high speed action. Body control is the ability to move quickly in a variety of ways. Agility drills with sports specific karate movement should be designed with your strengths and weaknesses in mind. Power and strength are two different things. Power includes weight acceleration and speed. The faster the action the greater the force and impact. For training to be effective, you must train to strengthen your structural weaknesses. A general level of acceptable strength should be maintained through a properly designed strength program. For example, acceptable levels of general strength could include Olympic lifts such as the jerk at 1.3 times body weight, the clean at 1.3, dead lift at 1.9, bench press at 1.4, and squats at 1.9 times body weight. Endurance training includes training for both aerobic and anaerobic endurance. Interval training and circuits can be utilized using karate specific activities. Finally, high speed training methods that exceed maximum speed by 10-20% can be used to increase speed and distance.

Whatever training program is designed, remember to include a warm-up to increase body temperature, circulation, muscle elasticity and to get in the proper psychological frame of mind for training. Warm ups increase the range of motion and help prevent injury. Exercises used should especially strengthen the hamstrings, quadriceps, hip, groin, calf, Achilles and soleus as well as increase flexibility.

**Basic Conditioning:** Some level of muscle strength, endurance (both aerobic and anaerobic) and body control is needed to maintain a level of fitness necessary to compete in karate and to withstand the rigors of karate competition. Activities such as jogging, jump rope, speed bag, shadow boxing, and juggling and weight training help provide a strong base. Running and sports (especially soccer, basketball, and racquetball) provide for aerobic endurance, motor/votor/coordination skills and hand-eye or foot-eye coordination. These are helpful skills for karate competitors.

**Specificity:** Whenever possible, train using karate specific exercises. That is, exercises which as much as possible duplicate the effort and mechanical motions used in karate. We discussed evaluating the skills used in karate and determining strengths and weaknesses. When doing so, consider the frequency of the action, its difficulty, and its critical need in competition.

**Physiology:** Muscle fiber can vary from muscle to muscle. Fast twitch muscle fibers are white and they fire more quickly but fatigue rapidly. Because they have a poorer blood supply, causing a rapid fatiguing, they are only good for short bursts of all out anaerobic effort. Slow twitch muscle fibers are red, contract slowly, and are highly fatigue resistant. The rich supply of blood allows the removal of fatigue products and the constant use of oxygen makes them responsible for aerobic activity. There are also FOG fast twitch muscle fiber which are red and do not fatigue as rapidly as slow twitch, but more so then fast twitch. Explosive types of speed training will increase the thickness and contraction speed of the fast twitch muscle fiber. Training exercises should include form, plyometrics, ballistics, sprint loading, and over-speed training.

**Form and Speed:** By eliminating errors/faulty habits in your technique and working bilateral you can enhance form and increase the speed of technique. This type of training requires using highly specific kumite drills with the full range of motion and power/strength demands for competition. The body's movements must be mechanically sound with good rhythm, bounce, relaxation and smoothness. Common errors in form include holding the hands too low or too far forward, or having the hands outside of the elbows. Other errors include body lean, incorrect head alignment, upper arm and neck/facial tension. Dynamic form factors often overlooked in karate include common errors such as limited foot bounce and unnecessary pounding into the ground, incorrect knee-leg action, and over or under striding. Drills that can help solve these problems include butt kickers, Wall slide, pawing, start and stop drills and quick feet drills.

Fatigue caused by low endurance can cause poor form. Endurance will not help you move faster, but it will help you to move faster longer and to accelerate as fast as possible at all times. Excellent aerobic and anaerobic endurance permits a minimum rest to regain high speed, allows you to reach maximum speed quicker, and to hold maximum speed for a longer time. To accomplish this, anaerobic interval training with of a strong aerobic base is paramount.

**Power and Strength:** High levels of power output for peak performance is a definite advantage. Power requires strength and speed. A functional strength program for karate should include muscle endurance and speed endurance as well as over-speed

training. Functional strength and power requires explosive movements using medium to heavy resistance at 55-85% of maximum. Develop the legs and back with squats, dead lifts, leg presses, knee extension and flexion, and toe raises. Shoulders and arms include incline, bench, curls, lateral pull downs, presses, etc. All range of hip actions in all possible directions. Power output programs should include Olympic lifts such as the clean, jerk, and snatch. These train the body for peak performance by adding speed to strength. The amount of time force is applied is increased and more force is developed in a short period of time.

**Over-speed training:** Using speed that exceeds maximum speed by 10-20%. Over-speed training does not improve conditioning. It is used to develop faster and/or longer actions. Running down a 3% slope, or the use of surgical tubes are examples of this type of training. Over-speed training is better at the start of a workout after a proper warm-up and before becoming fatigued.

**Plyometrics:** Explosive hopping, jumping, bounding, leaping, skipping, ricocheting, swinging, twisting hitting, and kicking can be used for plyometrics bridging the gap between strength and power. Plyometric movements involve powerful muscular contractions caused by a rapid dynamic loading (stretching) of the muscles.

**Ballistics:** Ballistics movement is movement using high speed sending of energy away from the body and receiving of energy from an outside source. It is used for short bursts of speed, rapid changes in direction, explosive power at impact, and instantaneous power reception at impact. The three parts of ballistic movements are power delivery, impact, and flow. Medicine ball throws and catches are examples of ballistic training.

**Sprint Loading:** In running sports sprinters run uphill, up stadium stairs, with weighted sleds, etc. Concentration is on the start and the sprint itself. This is called loading. Sprint loading can be beneficial in karate by developing powerful swift attacks and effective defends.

**Faking and Speed:** While not part of speed training, faking can alter the mental state of your opponent slowing down his reactions. Faking neutralizes the opponent by slowing down his movement, breaking his concentration, altering the his center of gravity destroying zanshin, delaying commitment and placing doubt in his mind. Tactics used can change the direction of the movement from the defender away from your intended move or draw the defender closer to so that the fake is more effective. Faking will first neutralize the opponent so you can attack effectively.

**Other Training:** Because speed has physical limits, it is also necessary to look at methods that enable us to utilize speed efficiently. High speed action in the karate match requires immediate reaction to a situation. Action that is so fast that to think interferes with performance. When training for high speed action, there are five things that help us utilize speed efficiently.

- Controlling awareness of the field of vision in the karate match. Everything in the visual field should be seen. Use "open focus" and peripheral vision reacting to and not dwelling on the movement of the opponent.
- Using the brain to process information without being interrupted. A "flow" state produces high levels of performance and does not permit dwelling on errors which only produces more errors and slows reflexes.
- Adapting to high speed movement. Develop a sensation that moving fast is not fast at all. Exercises used should improve the "flow" state and explore the relationship between cognitive and motor programming, and apply the neuromuscular and rhythm training required in karate.<sup>1</sup>
- Motorvator games help train the brain and neuromuscular system. Such games can make structural and functional changes in the nervous system which may help you move faster.
- Train the recessive, non-dominant side. The nearer the skill is equal on both sides, the higher the level of synchrony and coordination in the nervous system.

---

<sup>1</sup>Dance instructors that understand the cognitive and motor programming in karate and who apply the neuromuscular and rhythm training used in karate may be helpful.

Nutrition and Speed Training Programs  
Copyright © Patrick M. Hickey 1995

This article completes our comments about speed training. The last two items are nutrition and the how the training program should be designed.

**Nutrition:** Critical periods for nutrition are maintenance during training, pre-event nutrition, support during competition and training, and post-event or post training nutrition. The body requires carbohydrates, protein, fat, and minerals and vitamins in order to operate at the optimal efficiency. For optimal functioning, 60-65% of calories should come from carbohydrates, 12-15% from protein, and 24-30% from fat. Eating a variety of foods from the four major food -- groups milk and milk products, meat and other high protein foods, fruits and vegetables, and cereal and grain foods permits the body to receive important nutrients. Water, the single largest component of the body, is also a nutrient.

Carbohydrates are an especially important source of energy used in the muscles. Carbohydrates are found in glucose and circulate in the blood. Carbohydrates in the form of glycogen is stored in the muscles and liver. Fatigue occurs when glycogen becomes depleted. Chronic fatigue could be caused by glycogen depletion from inadequate food consumption. That is, not eating the right diet. Dietary management of a high carbohydrates sports diet will get the maximum benefit from training.

**Weight control:** Weight or at least your height/weight index in relation to your body type and percentage of body fat need to be in line for you to perform at your maximum speed. To gain weight 3500 calories per pound of muscle is needed. If you consume these calories without exercising, the weight gain will not be muscle. To loose weight you need to use 3500 more calories decrease caloric intake. The best method for adjusting weight is a combination of both -- burn up calories by exercise and reduce caloric intake. Compare your height/weight index and fat percentage with other successful karate competitors of the same body type to determine where you should be.

**Pre-event nutrition:** Before the event the pre-event meal is used to provide energy and water to support the body. Food consumed should be high in carbohydrates with minimal bulk. Salt content should be low to avoid excessive water loss through urine, and adequate fluids assure hydration. Consume a light meal 2-3 hours before competition, a heavy meal 3-4 hours before. Use foods that empty relatively rapidly from the stomach. Gas producing and bulky foods should be avoided as well as spicy foods. Alcohol, milk, and milk products should be restricted.

**Events and Practices:** During prolong events and practices it is important to manage fluids. Failure to replace fluids can cause early fatigue and reduce performance. Loss of 2% of body weight impairs thermo-regulatory ability, 3% reduces muscle endurance time, and over 6% can cause severe heat cramps, heat exhaustion, heat stroke, coma and death. Fluids used for replacement should be cold and in small quantities 8 oz/hour of heavy exchange. Too much sugar (glucose and fructose) can slow down the emptying of the stomach and thus the replacement of the fluids. Water is the best source of fluid replacement but some sports drinks with small quantities of easily digestible and absorbed carbohydrates can be useful. Electrolytes Salt tablets compound dehydration by speeding up the loss of water. Supplementary minerals don't help because exercise doesn't increase by exercise. Use of proteins can hamper performance by worsening dehydration and causing gastrointestinal disturbances - especially from powders and tablets.

**Post event nutrition:** After an event, it is a good idea to eat a high carbohydrate meal as soon as possible to replenish the body quickly.

Proper design of a training program is important to get the best preparation from your training. The below chart gives some idea of what a training program should consider and how it should be ordered. It is not important to include everything in the training program each day. As the season changes, different parts of the training program will receive emphasis. Your coach, if properly trained and certified, will be able to assist in adjusting the training program to meet your various needs.

<b>Order of a Training Program</b>	
Warm Ups	Include flexibility
Over-speed training	While you are un-fatigued
Scrimmage	While you are still un-fatigued - less apt to be injured and more likely to execute skills at high speed under game conditions
Drills	For the purpose of skill development
Calisthenics	Improve general conditioning
Wind sprints	Anaerobic

Strength/Power training	Weight training, plyometrics or spring loading - most fatigued use as the last item.
Cool Down	

Some seasonal adjustment should be considered in your training program. For example, during the pre-season the training session should follow the below pattern: stretching and general warm-up, overspend training, form training, speed endurance training, circuit training, strength/power training, plyometrics and a warm down. During the in season consider number of sessions per week and time spent per session as well as the emphasis of the different parts of the training program . Especially increase the speed training and anaerobic recovery training. Use maintenance loads for strength training. Compete frequently. During peak season, high intensity practices concentrating on speed are a must. Taper off a few days before competition to allow the body to heal up.

To compete in karate, you must be able to generate high levels of power output for peak performance to get a definite advantage. Power Output is how fast you can do it. You must work to be fast. Actual participation in the sport should not be overlooked. Work also to eliminate faulty habits - good karate technique is a must. List out your common errors in form and work to correct them. Also work on rhythm, bounce, relaxation, smoothness and mechanically sound body movements. Drills used must be highly karate competition specific, use the same range of motions and similar strength/power demands. Faking, adaptation to high speed movement, etc. are other methods which will help you to increase speed. Finally, organize both your training program and your nutrition program to develop a finely tuned weapon better trained than your opponent. Remember, if you do not train properly, what is to prevent your opponent from becoming better prepared.