METHODOLOGY FOR DEVELOPING STRIKE POWER IN YOUNG TAEKWONDO PEOPLE

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Abstract: This article talks about the importance of increasing the speed of kicking techniques, what factors influence the speed of kicks in the human body and ways to achieve high results.

Key words: speed, kicks, technique, frequency, exercises, muscle work, taekwondo, kinetics of kicks

МЕТОДИКА РАЗВИТИЯ МОЩНОСТИ УДАРА У ЮНЫХ ТАЭКВОНДОИСТОВ

Аннотация: в данной статье говорится о важности повышения скорости техники ударов ногами, о том, какие факторы влияют на скорость ударов ногами в организме человека и о путях достижения высоких результатов.

Ключевые слова: скорость, удары ногами, техника, частота, упражнения, работа мышц, таэквондо, кинетика ударов ногами.

INTRODUCTION

There are various forms of martial arts practiced throughout the world, each with its own philosophy and style.1–3 Tae Kwon Do (TKD) is a popular Korean martial art and the most commonly practiced one in the Ukrain.

In Taekwondo, like any martial arts, fast reactions are essential for success in competitions. The quicker athletes react, the more time they have to accomplish their strategy. Therefore, Taekwondo athletes should not only use those techniques that allow them to react fast but also the techniques where they need the least time to reach the opponent [1]. The more intense the athlete ―throws‖ punches during sparring, the more likely for participant to win the match due to points scored for the punches. That is why in this type of martial arts the velocity of implementation of fight technique is so much appreciated. But in order to be able to improve your own indicator, you must understand from the inside out what affects the velocity of the muscles, how they must be developed to achieve the desired results.

MAIN PART

What affects the velocity of the muscle

Muscle contraction is a vital function of the body associated with defensive, respiratory, nutritional, sexual, excretory and other physiological processes. All types of voluntary movements - walking, facial expressions, eyeball movements, swallowing, breathing, etc. are carried out due to skeletal muscles [1].

Myofibril is a fundamental contractile structure that has the property of contracting under the influence of an impulse. Myofibril consists of the protein bands Myosin and Actin. Actin is able to be drawn through the threads of Myosin by means of a banal chemical reaction. So, by means of nerve cells an electric signal enters the muscles.

As a result of the activation of the neuromuscular synapse on the postsynaptic membrane, an exciting postsynaptic potential arises, which generates the development of an action potential in the region surrounding the postsynaptic membrane.

In vivo, muscle arousal and contraction are caused by nerve impulses entering the muscle fibers from the nerve centers [2].

The time from the moment of excitation of the muscle fiber (muscle) to the beginning of its contraction is called the latent period of contraction.

Two types of muscle contractions are distinguished: single and tetanic.

A single muscle contraction is observed upon receipt of a short series of nerve impulses of motor neurons to the muscle. It can be caused by exposing the muscle to a very short (about 1 ms) electrical stimulus.

A tetanus is a contraction of a muscle that occurs as a result of summing up contractions of its motor units caused by the arrival of many nerve impulses to them from motor neurons that innervate this muscle.

The "bristly" protein is Myosin, it is partially located inside Actin, the muscle is in a relaxed state. As soon as the signal appears, the actin threads begin, move inward, the muscle contracts.

Tropomyosin is also a protein that blocks the engagement of myosin bridges with actin in a relaxed muscle state. As soon as a nerve impulse is fed through the motor neuron to the muscle, the charge polarity of the membrane of the muscle cell changes, as a result of which the sarcoplasm of the cell is saturated with calcium ions (Ca ++), which are released from special stores along each myofibril.

The tropomyosin filament, in the presence of calcium ions, instantly deepens between actin filaments, and the myosin bridges are able to engage with actin - muscle contraction becomes possible.

However, after Ca ++ enters the cell, it immediately returns to its storage and muscle relaxation occurs. Only with constant impulses emanating from the nervous system can we maintain a long-term contraction [3].

Thus, from the foregoing, we can conclude that the strength and velocity of contraction depends on what strength and intensity an electrical impulse is supplied to your muscles. The stronger the signal, the more calcium ions are released from storage and the better the chemical reactions. The higher the signal intensity, the more often the storage with calcium ions opens, therefore, the bridges between actin and myosin move faster. The central nervous system is the first factor in the strength and velocity of muscles.

The second factor is muscle size, the more myofibrils, the faster and stronger the muscle.

And the last factor affecting the velocity and strength of muscles is the ligaments and tendons. Thick elastic tendons can withstand a sharp contraction of a large number of muscle fibers at the same time and not break.

Kinematics and kinetics of certain taekwon-do kicks

For sportsmen to be capable of implementing the kick with desired velocity and power, the technique of it should be executed in right and appropriate manner.

Right execution of leg technique:

Side Kick

The athlete adopts the L-stance forearm guarding block (in Taekwon-do terminology referred to as niunja sogi palmok debi maki) with the right foot moved forward. According to

taekwondo rules (Choi, 1995) in this stance 70% of the body weight should rest on the back foot and 30% on the front one. Both feet should be slightly pointed inwards and the toes of the foot at the front should be lined up with the heel of the back foot. Both knees are slightly bent.

The athlete moves the back foot forward in the direction of the intended impact. This results in a slight rise of the COG. The hands are held up in a guard. When the feet have touched the ground, the ankle joint tenses and the athlete energetically pushes the right foot off the ground.

As a result of the right foot take-off the force pushes the foot upwards. Further movement is facilitated by the muscles of the lower limb taking control over the movement. Thus, the knee and hip joints are extended.

The kicking foot is extended in the ankle joint. The athlete has had to balance his/her body in such a way so as to make sure that the foot planted on the ground has remained the only point of his/her body being in contact with the ground. Total time of kick execution (from the starting posture to the final phase) produced an average time of t=0.71 s [6].

Axe Kick

For an axe kick to be effective, all movements of the kicking leg need to have minimal execution time. Thus the dynamic posture kinematics of the kick should minimize the moment of inertia of the kicking leg during the power load phase. The power of the axe kick is directly determined by the velocity of the kicking foot, as it drives downward toward its target. Thus the degree of extension of the kicking leg and its angular velocity should maximize the velocity of the kicking foot.

Based on these aspects, Woo et al. reported that front axe kick has maximum kicking height compared to other variations of the kick. Yu et al measured total action time as 0.66 sec for the front axis kick [7].

Methods to achieve a better result

An important role is played by the genetic predisposition and physiological structure of the muscles and tendons of a person. Nevertheless, there are a number of techniques and exercises that allow everyone to improve the velocity indicators of strokes of both legs and arms.

The ―pushing out‖ and the reverse action of it, ―pulling out‖ of the limb is worked out first, as it returns the hand to its original position by means of rapid muscle contraction.

Directly the impact itself from the beginning to the penetration of the target is practiced in several stages. Here it is desirable to have a partner with a boxing paw. During operation, we practice single straight and lateral from the combat stance on the paw. We twist the body with the push of the foot, throwing out the

hand as quickly as possible, and do not forget the skill of "pulling out".

The partner holds the paw under a direct or side impact at a distance where the striker can get it without a step, a short period of time, then removes the paw strictly back. Begin with a time interval of 2 seconds and gradually reduce, bringing the velocity of impact to the maximum possible. The partner holds his paw in the reach of the striker, but at the time of the strike he reacts to the lead, removing the paw. The batter's task is to strike so quickly that the partner with the paw does not have time to remove it without losing the force of the blow [4].

Also, from a more traditional arsenal of exercises, those that are responsible for flexion-extension of the elbow joint, the work of the shoulder joint and hand: push-ups, pull-ups, bench press and in the upright position, imitation of strokes, shadow boxing‖ will be relevant. Each of the above exercises must be performed in 3-6 approaches about 15-30 times (1-2 minutes / round). It is advisable to use weights / dumbbells when running over the air and in the paws.

CONCLUSION

The velocity is greatly affected by exercises performed at a torn pace. That is why effective exercises for developing the velocity of the legs are those that contain a sharp breakdown: shuttle running, working on the "ladder", performing various tasks on the toes of tennis players.

Equally important are traditional squats and jumps, work on rubber, static exercises against the wall (if possible with weighting materials). Torn running very beneficially affects both the velocity of the legs and the overall endurance of the athlete and the development of the correct pace of breathing during the fight.

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