

Education methods of Brazilian jiu-jitsu with biomechanics

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Abstract. Jiu-jitsu is a martial art that can be used by men and women of all ages in the world and is trained by many people. Jiu-Jitsu (guidance), the ancestor of Jiu-Jitsu, is the technique used by Samurai at the last moment. They demonstrate that drinking is inefficient when losing weapons at close range and enemy opponents. Berries and clicks are more effective for survival. Jiu-Jitsu, now famous around the world, was shown in Brazil by Mitsuyo Maeda (Conde Koma) in Japan. Brazilian Jiu-Jitsu moves to a position that is advantageous for his bare hands and uses opponents and cooks to control the opponent. Brazilian Jiu-Jitsu has the advantage that small people can beat large ones. Adjust the ground technology such as moderating, strangling, and clicking to use the technology more efficiently than defeat with power. It has been established that jiu-jitsu can be useful for martial arts and self-defense techniques as time goes by, but few papers have spelled it out, especially in Korea. Also, many Jiu-Jitsu stands in Korea and claim that the best way of raising their organization is the best, and many Jiu-Jitsu practitioners in South Korea teach from the Jiu-Jitsu teaching method. Was given a one-sided training. Therefore, in this paper, we grasped the vitality principle of Jiu-Jitsu and examined the appropriate training method.

Keywords. BJJ - Biomechanic - education - Easy physics - how to teach

1. Introduction

Brazilian Jiu-Jitsu points out that “small people can win.” For that reason, Brazilian Jiu-Jitsu adjusts so many grounding techniques, such as articulation, strangling, and clicking, and is notable for defeating with power. When looking at the main techniques of Jiu-Jitsu, most of them use leverage (leverage). It was a very useful martial art as a self-defense technique, and Jiu-jitsu in its early days was loyal to its role as a self-defense technique, such as observing the haiku that adjusted the distance. After that, Brazilian Jiu-Jitsu was extended not only to the role of silk self-defense but also to the category of sports and lifestyle education. At this time, biomechanic plays a very important role. It is said that mechanics is applied directly as a branch of the basic department to induce functional recovery from musculo-skeletal problems and treat injuries. Familiarity with dynamic knowledge can thus greatly help in “how to treat, diagnose and prevent orthopedic and sports injuries”. All postures of a person will be produced by force, that is, as a result of physical and external forces. To be clear, all human movements are the result of the combination of physical and external forces. First, from a human point of view, posture and movement are mostly caused by muscles but help to maintain the movement

and posture of toughness, cartilage, and other soft tissues and nodes. And the typical external force applied to a person is gravity. Healthy people do not easily feel the power of gravity, but certain patients may feel the force of gravity very large. It is a study that analyzes mechanics and forces acting on things. Therefore, biomechanics is the question of applying these dynamic principles to human and animal tissues, and is generally based on the functions of the musculo-skeletal system. Of course, we know that vital principles are being used in assessment and treatment in the fields of orthopedic surgery and spot treatment. Many people use their biomechanics when they do jiu-jitsu, but it is not possible to see who explains this in Korea's dojo. Although I am the youngest jiu-jitsu black-belt in Korea at present, I have never been able to be explained the technical principles of jiu-jitsu. Jiu-jitsu works on four principles, first of all, to keep one's balance. The second is the use of one's own body to destabilize others. The third is to take advantage of the balance of others and occupy a favorable situation. Fourth, it will create a specific structure and produce maximum breach with minimal force. Therefore, the above-mentioned paper describes the most efficient way of performing jiu-jitsu vigorously based on the four principles.

2. Material & methods

The author approached this paper to search for an important nurturing circle in the Korean Jiu-Jitsu world. During more than 10 years of training, the author felt that there was a lack of roots in the education system for the period in which it interacted and interacted with many Jiu-jitsu teachers and supervisors. Although the breeding method found by the instructor through their own is important, there is a large difference in the breeding methods of the instructor. I have used up to now. It is presumed that only the method of education based on Korean Jiu-jitsu teachers is pursued, and no scientific approach is taken. I devoted a thousand hours to jiu-jitsu for over 10 years, No attempt was made in Korea to analyze jiu-jitsu scientifically. Therefore, the scientific analysis I am trying to do is without pre-history, While interacting with many instructors, I analyzed the materials they provided. and rather than using a new method of analysis, the basic terms and reminders used in the production of Want to use kinematics, kinematics. Prior to that, I had a lot of effort to interact with famous Jiu-Jitsu players for accurate analysis and to unravel their technical results scientifically. With the consent of the leaders around the Korean lacquer, it is familiar with the practices, they practice and has achieved outstanding results, especially at the recent Olympics in Indonesia. Through exchanges between Korean Jiu-Jitsu players and managers, I exchanged a lot of time to derive their own results as vital results. It was a time of patience as a researcher visiting an unknown primitive tribe.

3. Results

To keep one's balance combined with a specific structure and produce maximum breach with minimal force

Jiu-jitsu is roughly divided into two postures. It can be classified into a top posture

that controls the opponent above and a guide posture that controls the opponent from below. Since most of the ground is placed on the ground in the sitting position, the guard position, there is almost no possibility of losing the balance in which gravity works normally. Most people who lose their balance are in the top position. Those who are in a top position to get in and out of their opponents should take incredible moves. In the process, those with the top position lose their balance and take an unfavorable position. The person who takes the posture of the main top uses the upper part a lot because of the cracking of the guard, it is clear that flexion, extension, left lateral bending, right lateral bending, left rotation, and right rotation is often used in this process. It was In general, think that a vigorous attack is effective for an attack, but as a result of analyzing the movements of the world's highest level Jiu-Jitsu players, this showed the opposite result.

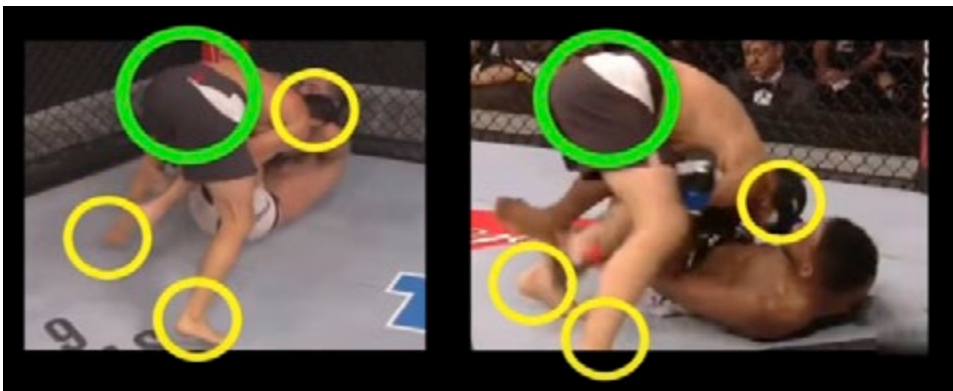


Fig 1. world top class top player's position to keep one's balance

Global Jiu-Jitsu players have been found to have a large triangular posture, with their hips raised high and their heads and legs firmly attached to their opponents and the ground, in order not to lose balance in common. The triangular posture raises the buttocks and exerts powerful force by attaching the head, which is the heaviest part of a person, to the opponent. By using the force of gravity. It helps you to use the power of the person above to a minimum. Use of human muscle areas that are not the most muscled areas as supports will help to efficiently utilize the muscles. In a biomechanical way is defined as the amount of force distributed over a particular area, usually expressed in lb / in^2 or even N / cm^2 . In terms of this definition of force, force and area are in opposition to each other: when one of the two elements is added, the other must be reduced to maintain the same force. For example, the force can be applied by applying the force or decreasing the applied floor area. An external force acting on an object or a difficult load. For example, a heavy box placed on a table provides an external force or load to the table, and the muscles that lift something in your hand also provide a load to the bone. Moreover, the impact applied to the thigh is also considered as a load. The load can act directly on a particular point or at a point away from the point of action. When a load is applied to an object, the object will have a force that acts against the external load. The force of this part is distributed on the surface of the object, and it is defined as the force received by the unit area as well as the pressure. Partial resistance and resi-

stance to external load are called mechanical stress. Then, a shape in which an external load is applied to an object may occur, and such a change in shape or the length of an object is defined as mechanical strain. The triangular posture aligns the head and waist, which is the center of a person, in a straight line, and maintains a stable center of gravity in terms of the person's structure. Also, by exerting the maximum load at the point of contact, the movement of the opponent is blocked and the balance of the attacker is maximized.



Fig 2. create a specific structure and produce maximum breach with minimal force.

The upper posture represents a typical posture for maximizing the result with the minimum force. To bend the structure of the bent arm instead of supporting it with force Support. The other person puts a load on one foot between the feet. Using the maximum muscles of the lower body, the muscles of the lower back, and the muscles of the lower back, which are the maximum muscles of a person at the same time, by simply turning, the opponent's unreasonable power is protected with a minimum amount of force. In biomechanics way, it is use of torque and leverage, The load may be applied to the object at a certain distance from the point where the rotation can occur, but this distance is the lever arm of the load. This situation allows movements to occur around the point of rotation. Motion depends on the magnitude of the applied load and the distance between the load and the axle. Then, it is a value ($M = F \times d$) obtained by multiplying the moment of force and the magnitude of the force acting perpendicularly on the lever arm by the distance to the axis ($M = F \times d$). Alternatively, it is expressed in N-m. As shown in the above equation, the greater the applied force or the longer the arm of weight, the greater the force moment of the point of rotation. Under the condition of maintaining the leverage of the lever, a small force (E) applied to a relatively long ream (dE) is a large force (R) applied to the end of a short ream (DR). The torque makes the same torque. And in the opposite case, make the same torque (3-12, B). The rate of leverage is primarily measured in terms of mechanical advantage, which is the ratio of mechanical advantage (MA) to Himpal (dE, effort arm) and weight am (DR) length, $MA = dE / dR$. Humpal is the distance between the axis and the applied force, and the

weight arm is the distance between the axis and the load. If it is larger than the Himpar weight arm, the strength advantage is greater than 1. And if it is smaller than the Himpar weight arm, the strength advantage is one less. The lever is used for its strength advantage, but other consequences of the lever are also important. If Himpar is shorter than this resistance arm ($MA < 1$), the load is applied farther and faster than the point where the force is applied, but this effect may outweigh the advantage of force. it can. Most people's levers are shorter than heavy arms. For example, the biceps acting on the (elbow joint) are located here, and this biceps brachii stops near the axis of the node and the load (forearm and hand). It is far away from. On the contrary, the point of action of the brachioradialis is located at the wrist. Due to the anatomical arrangement of the two muscles described above, the biceps brachii has speed and distance advantages over the brachial radius, and conversely, the brachial radius has strength advantages. This kind of example is not an exception when it comes to humans, and in a general situation, multiple forces and multiple resistance forces (loads) are linked together. is there. In other words, human force is not the only link between muscle force and load. The force acting on the nodal axis is also very important



Fig 3. The use of one's body to destabilize opponent

Next is seeing an ensemble of the use of one's own body to destabilize others and to take advantage of the balance of others and occupy a favorable situation. The upper one reverses the power of the other party to break the balance and shows the appearance of a tree. A person standing on top is trying to push and push the opponent underneath using gravity and their own weight. Under this disadvantage, the person underneath may hit his arm against the hip, the opponent's largest muscles and move in the forward, causing the head, the heaviest part of the person, to move forward. opponent lost its balance. As an eye of biomechanics, Power moves things. Positional kinematics is the

depiction and study of the movement of objects. The location movement describes the movement from the viewpoint of translational motion (translation (linear motion)) and rotational motion rotation (angular motion)). Movement is generally described in four reminders: time, displacement, velocity, and acceleration. The momentum of an object in a forward movement or a rotational movement is a value obtained by multiplying not only the force (torque) but also the speed over a unit time. When two objects collide, the combined momentum after the collision is the value of momentum before the collision, and this principle is called the law of conservation of momentum. Simply put, the change in the momentum of the first thing has the same magnitude as the change in the momentum of the second thing, but in the opposite direction. In addition to impulse and force (torque), it is a value that takes time and has the meaning of momentum. If the applied force is large or applied for a long time, momentum will occur. And if you need to absorb or reduce the momentum of a relatively large amount of time, you can move it with a little less force.



Fig 4. Take advantage of an opponent's loss of balance

Behind your opponent with Jiu-Jitsu is the same as taking the best offensive stance.

Behind a human being, the sense of being blind is enough to prevent the opponent from attacking, and the attacker can look forward and attack all the places where human vulnerability is present. Typical attack points include the large arteries of the neck, shoulders, and nodes of the upper body, wrists, fingers, knees, and ankles of the lower body, and toes. In this position opponent can get a lot of damages, especially tensile stress. Tensile stress is a stress that often arises from living tissue, which occurs in all tendons when muscles contract and when the ligament is under tension. The toughness

resists and provides knot stability. Most toughness and damage occur as a result of tensile stresses above the degree of living tissue. However, in many cases, clinics apply tension loading to renal stretching to increase muscle and connective tissue length. A lot of stress also occurs in human organizations. When the quadriceps of the thighs contract, stress is exerted on the femoral surge node and also on all heavily loaded nodes. And many injuries such as bruises occur as a result of stress

4. Discussion

I found that many people were using brilliantly energetic movements without even knowing it. However, many Korean Jiu-Jitsu federations stood up, and the leaders began to ignore others because they thought that their training method was the best. After all, the training method of Korean Jiu-Jitsu was chaotic, but nobody tried to make it scientific or what training method was most appropriate. Through a basic analysis of vital energy, the training method of dizziness Korean Jiu-Jitsu was organized in a little bit, which revealed well-developed physical formulas and formulas and the biomechanics. Based on this, I think it will be an index to create a better breeding method. Based on this paper, I hope that more people will make a scientific approach to Jiu-Jitsu, and it is important to note that it is the first Jiu-Jitsu paper made in Korea.

5. Conclusions

Korean Jiu-Jitsu has a very short history, Of course, there are many pieces of evidence about Jiu-Jitsu's effectiveness, but the training situation of Korean Jiu-Jitsu is organized without indiscriminateness so that the leader thinks he is right. Athletes who have won the Olympic gold medal in Korea have never received any decent academic training from the coach or instructor. The author has seen a lot of troubles due to the training method of Jiu-Jitsu, who has been practicing Jiu-Jitsu for more than 10 years. I think that this is a result of many Jiu-Jitsu federations in Korea only cling to its experience only. I'd hope that my paper would be a breeze try to approach Jiu-Jitsu scientifically in Korea, also cool down jiu-jitsu education conflicts in Korea

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