TSUKI - basic yet powerful

(ベーシックでありながらパワフル)

Tsuki is a fundamental technique in Karate which in simple terms is a punch using the knuckles. However, Tsuki (突き) in Japanese refers to a thrusting strike. The term Tsuki is derived from the verb tsuku meaning "to thrust". Many traditional Japanese masters teach that Tsuki is not merely a 'punch'; rather, "tsuki is tsuki - a THRUST" ①. Proper execution of a Tsuki involves a straight-line path, a rotating fist at the end of the movement, and a straight wrist and aligned knuckles to prevent injury. In this way we can see the immense power of karate tsukiwaza and their relationship to self-defense as opposed to 'fighting'/'dueling'.

One of the important characteristics of Shorinjiryu style of karate is the use of the vertical punch, tate ken. This makes the style distinct from many others, but the vertical punch is not unique only to Shorinjiryu style. It appears across the world in many styles of martial arts such as Wing Chun, Krav Maga, Isshinryu Karate, Bruce Lee's Jeet Kune Do, and even ancient styles such as Pankration, an ancient Greek sport that combined wrestling and boxing ②. Bare-knuckle fighters in 18th century Europe and America also relied on the vertical punch for its effectiveness ③. Its widespread use across time, cultures, and regions signifies that the vertical punch must work, and rather than a stylistic preference, it is a biomechanically well-grounded way of delivering a punch.

The vertical punch offers several crucial advantages compared to the horizontal punch, like energy transfer, stability and power. These advantages are backed by scientific studies in anatomy and biomechanics. When the arm is extended in a vertical alignment, the forearm bones, the ulna and radius, line up directly with the wrist and knuckles, creating a nearly straight path for energy to flow from the body to the target. In contrast, a horizontal punch forces the ulna and radius to cross over each other, creating a slight torsion, and this would cause slight energy loss. The vertical alignment allows energy to be delivered more efficiently and with greater impact.

Scientific studies of the skeleton and muscle functions reveal that the structural alignment of bones and joints reduces the strain on muscles and connective tissue while maximizing the transfer of kinetic energy. Biomechanical studies of striking can confirm this. In one analysis of elite boxers, straight punches were shown to generate forces strong enough to place around 17 Nm of torque into the wrist on contact, a level that often leads to injury if the wrist is not aligned properly ④. The vertical punch minimizes this risk by channeling force in a straight line from shoulder to wrist rather than allowing torque to twist the wrist. Studies also show that in a neutral (thumbs up) wrist orientation, roughly 80% of the axial force passes through the strongest parts of the wrist joint, mainly the radiolunate and radioscaphoid facets, while a horizontal position shifts stress to the weaker ulnar side, increasing risk of strain and fracture ⑤.

Alignment of the bones also plays a critical role in stability. When the wrist is vertical or slightly tilted, the flexor carpi radialis muscle, which is the wrist flexor on the thumb side of the forearm that flexes the wrist and pulls it slightly toward the radius, engages in a way that directs energy through the index and middle fingers and then through the first two knuckles, which when used to punch can handle the pressure of impact. By contrast, in a horizontal punch, the flexor carpi ulnaris muscle, which is the wrist flexor on the pinky side of the forearm that pulls the wrist slightly towards the ulna, is primarily responsible for

stabilizing the wrist, but it is less equipped to handle strong forces compared to the flexors and extensors engaged vertically. The vertical position makes sure that the wrist stays stable under high impact, while a horizontal punch would then require greater effort from surrounding muscles, making it less efficient. There is injury data to support this as well. Fractures of the fourth and fifth metacarpals, also known as the "boxer's fracture," ⑥ occur more often in horizontal punches, since impact forces are mainly directed through the ring and little fingers. The vertical punch, by contrast, directs energy through the index and middle metacarpals, which are the strongest bones in the hand.

Beyond alignment of the bones, there are additional factors that go into executing an effective punch. When combined with the correct hip-heel turning and engagement of the legs and core, we can channel energy from the whole body into a punch and this forms a foundation for generating power and speed for every strike. Martial arts instructors routinely stress the importance of this in every technique because putting the whole body behind a technique rather than just the arms helps generate more power. No matter your rank or how long you've been training, hip-heel turning is something you have to keep practicing to make sure your techniques are effective, and over time, with enough repetition, it becomes second nature. One important lesson to remember is that the hand comes before the hip. This means that we punch first, with the hip following right after so that the power generated from the hips can back up the arm. If the hip comes first, then the energy and power will already be gone before the hand even gets to the target.

The biomechanical superiority of the vertical punch is evident through multiple factors. The alignment of the forearm bones, the engagement of stabilizing muscles, and the distribution of force through the strongest hand structures all support what traditional martial artists have known for centuries: the vertical punch is an exceptionally effective technique whose advantages can only be manifested with proper execution. This correlation of traditional knowledge and modern science demonstrates why tsuki remains basic in its principles yet powerful in its application.

References

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