

“Hakkeyoi! Nokotta, nokotta!”

There is a really cheerful and pleasant ring to this shout. Any Japanese would probably know what this is. Yes, it is a *gyoji* (sumo wrestling referee) in a professional sumo match encouraging wrestlers to continue fighting.

I still clearly remember the day my grandfather took me to my first grand sumo tournament when I was a child. We went in a Daihatsu Midget driven by an electrician who often visited our house. At that time, the *yokozuna* wrestlers were Taiho and Kashiwado. I was overwhelmed by everything around me, including the imposing build of sumo wrestlers, the low voice they let out when they rose to charge, and the sound as their bodies clash. I also remember how everyone was glued to the TV during the NHK (Japan Broadcasting Corporation) live broadcasting of grand sumo tournaments. I am sure that many Japanese had imitated *yokozuna* and *ozeki* wrestlers by testing your strengths against one another.

Indeed, when I recently researched sumo wrestling to write an article for this journal, I was surprised to find that many papers had been submitted on the topic by universities and research institutes from various academic fields. For example, subjects include “Sumo and culture and arts,” “Classical sumo in the Edo period,” and the “Current circumstances of sumo and its internationalization based on the history of culture.” There was also a paper that focused on the stylishness of sumo wrestlers as viewed from the aesthetics of regular citizens while looking at the wrestlers’ topknot haircut, Japanese clothes, and Japanese sandals with leather soles. When searching for papers, phrases related to

sumo are more common and familiar compared to engineering terminology. Examples include “Sumo wrestlers and sports nutrition science” and “Superstitious behavior to bring good luck and *chankonabe* (a type of dish for sumo wrestlers) ingredients.” For those who are interested, these are recommended reads if you need a change of air.

Now let us look at sumo from a slightly different perspective and analyze it from the field of sports science. I realized that most of the papers discuss the rationality of sumo techniques from the academic perspective of sports biomechanics in many education and physical education faculties in universities. I had never heard of the term “sports biomechanics” before, but it is defined as “a branch of learning to understand the mechanism of physical movements during sports activities by applying the basic knowledge of mechanics, physiology, anatomy, and kinematics,” and there are abundant research results in this discipline. Today, doing high-altitude training is widely popular among the world’s top-notch athletes, and many of you probably know that this is the result of researches in normal-pressure, low-oxygen training. In 1991, when the Third IAAF World Championships in Athletics was held in Tokyo, Hiromi Taniguchi became the first Japanese athlete to obtain a gold medal in the marathon event. According to experts in sports science, this outstanding achievement was due to the contributions of Japanese researchers who emphasized the importance of taking scientific measures in order to become the champion in a summer marathon and established close connections between athletes and sports biomechanics as soon as it was decided that the Championships would take place in Japan. A quarter century ago, researchers analyzed and assessed the body temperature of prominent Japanese athletes as well as the amount of sweat produced

A Talk of Sumo Wrestling

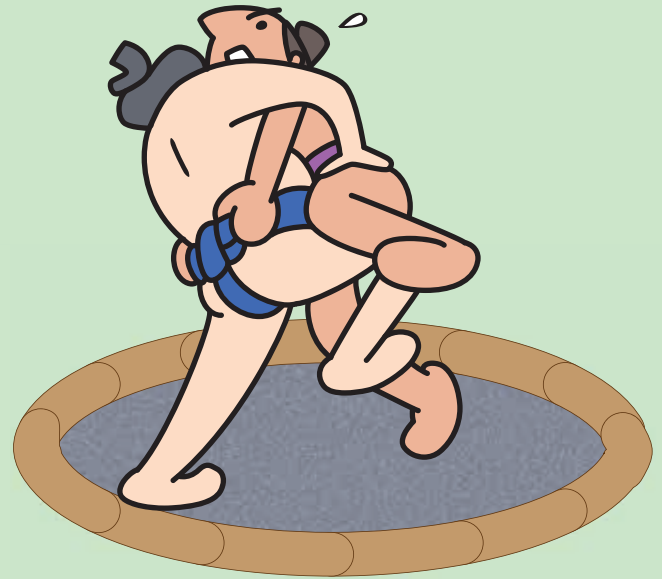
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Triple attack force-out



Inner thigh throw

and their water intake while they were training in order to work out a scenario for winning. Taniguchi himself showed his gratitude for this scientific support immediately after he crossed the finish line. Japan has an extremely high standard of research in this field. Japanese researchers analyzed the movements of the world's top athletes, including the former American sprinter Carl Lewis, and were the first to put forward a guideline for strengthening muscles to move the entire legs quickly. Researches in improving walking ability developed from these efforts, enabling even elderly people and those with low physical strength to learn how to use their body rationally and effectively. This is a truly encouraging research. The Prince Chichibu Memorial Sports Medicine and Science Award recognizes excellent research results in Japan. Together with the enthusiasm shown by the Japan Sports Association, we can place our great hopes on the development of the sports community going forward and support its future efforts.

However, I digress. Let us return to the topic of sumo. In sumo, there are 82 winning techniques, and many of the frequently used techniques are basic moves or throws centered on frontal force-out, frontal push-out, and slap down. There are also techniques such as triple attack force-out and inner thigh throw, which are used once every several years, and several techniques that are so rare that they have never been used in a match before. It seems that sumo wrestlers who include magnificent and speedy techniques in their strategy and beautifully combine many techniques upon charging are the ones who score many points. A powerful charge is also an important factor for winning. An analysis of the movement of sumo wrestlers in their charge indicates that the highest speed ever recorded by Hakuho, who has won more

tournament championships than Taiho, is 4.0 m/s, equivalent to the speed of Usain Bolt, who holds the world record in 100-meter sprint. Incidentally, the speed of sumo wrestlers in university sumo clubs is only about 2.0 m/s. Among the sumo wrestlers who have been analyzed in the past three decades, Hakuho is the fastest, followed by Chiyonofuji. Furthermore, the impact of Hakuho's charge is equivalent to approximately 600 kg, which is 1.35 times the average of professional sumo wrestlers. This means that past *yokozuna* wrestlers had a tremendous power of destruction and flexibility in terms of sport biomechanics.

Methods of training unique to sumo include *shiko* (stamping the ground), *koshiwari* (keeping one's body down), and *teppo* (slamming one's hands against a wooden pillar). Currently, researchers are submitting proposals to make sumo training efficient based on sports biomechanics by studying how these methods increase the flexibility, strength and durability of sumo wrestlers. In addition, managing the balance between agility and heavy weight is also an important factor. Even though nationally licensed dietitians are scientifically involved in many sports, there is virtually none in the sumo community. This may be somewhat related to the fact that sumo has traditionally been closed to women and many of the nationally licensed dietitians are women.

Toshiko Tamura, a female writer from the prewar period, composed a haiku (short poem) "I am in love with/A sumo wrestler called Ryogoku/As the spring draws to an end." As this poem shows, even if present-day sumo wrestlers are being subjected to scientific research, if we obtain a deeper knowledge of sumo wrestlers who continue to preserve sumo culture and devote themselves to training, we can still look forward to interesting sumo matches.