



Sports and Science

New training systems scientifically developed for individual athletes improve the performance of athletes

The Olympics will be held this year.

This summer, Athens will be the center of world attention.

Japanese expect Japanese athletes to perform well, especially swimmers.

Japan used to be a swimming powerhouse though has not been one for many years now. Although Daichi Suzuki won the gold medal at the Seoul Olympics in backstroke and others have won medals before, Japanese swimming has not captured the attention of people worldwide for a long time.

However, this year's Olympics should showcase some great Japanese swimmers.

Breaststroke specialist Kosuke Kitajima and some other Japanese swimmers are expected to win medals.

We asked veteran Daichi Suzuki how Japanese swimming has changed over the years.

Expectations for Japanese swimmers

Performances of Japanese swimmers have been remarkable lately.

Japanese swimmers won four medals (silver or bronze) at the Sydney Olympics, and

they won six medals at the Barcelona World Swimming Championships held last August. The most standout achievement at the championships was winning the bronze medal in the men's 400 meter medley relay for the first time. Although

it was the result of the Australian team being disqualified in the preliminaries, it was still a first in Japanese swimming history. People in Japan now expect a lot from their team at the Athens Olympics. The swimmer who is attracting the most attention these days is Kosuke Kitajima, who set two new world records and won two gold medals at the championships. He is still in great condition and the subject of media attention with hopes high for a memorable performance in Athens.

Athletes that are reviving Japanese swimming

Japanese competitiveness in swimming did not develop along a straight trajectory.

Before WW II, swimming was Japan's specialty. Japan won five gold medals at the Los Angeles Olympics in 1932 and

Kosuke Kitajima holds the world record for the 100 and 200-meter breaststroke (as of February 2004).



four at the Berlin Olympics in 1936. Japanese swimmers were regular members on the podium until the Rome Olympics in 1960.

However, at the Tokyo Olympics in 1964, Japanese swimmers only won one bronze medal. These results were devastating and Japanese swimming went into a long decline. Japanese swimmers have won only six medals since through the Atlanta Olympics in 1996.

During this period, Daichi Suzuki made a big splash by winning a gold medal in the 100-meter backstroke at the Seoul Olympics in 1988.

Mr. Suzuki outdistanced his competitors by using the so-called “Vassallo” technique (diving for a long distance after starting). His gold medal was very special and made Japanese people exuberant because Japan had not won any medals

in swimming at the previous three Olympics.

Training programs catered to the individual

Mr. Suzuki’s performance was supported by advanced training methods.

In the past, all Japanese swimmers training for the Olympics lived and trained together. Coaches often told athletes to train themselves as hard as possible and to overcome physical pain with a strong fighting spirit.

However, foreign countries came up with more effective training methods while Japan was still trying to win by spiritual power. These new training methods were catered to each individual athlete and developed based on scientific analysis.

Each person has a different type of body, muscles, and oxygen exchange capacity. There should be adequate training programs that suit each individual’s characteristics.

According to Mr. Suzuki, there are many different coaching methods in the US as compared to the Japanese method of teaching everyone the same way. Some US coaches let athletes swim as they like and maximize their strong points while others fine tune technique. As a result, the US has a strong team with various types of swimmers. He also says that former Japanese training methods were responsible for creating many average athletes, but few stellar ones.

At the Olympics, differences in training methods lead to great differences in performance.

Mr. Suzuki and his coach concentrated on mastering the unconventional “Vassallo” technique. The “Vassallo” technique was considered to be unorthodox because diving for a long time places a burden on the respiratory and circulatory systems and reduces endurance, even

though it increases swimming speed. Nevertheless, they thought it would be effective. Before the final at the Seoul Olympics, they analyzed competitors’ heat results and conditions and boldly decided to increase the diving distance. As a result, he won the gold medal. There is no doubt that his individually catered training program was key to his gold medal winning performance.

Science to support sports

Mr. Suzuki’s training was indirectly supported by scientific analyzing methods. For example, there is a device called a lactate analyzer that measures lactic acid content in muscles. Lactic acid content increases when muscles are tired. Measuring the content helps to determine the perfect amount of exercise and rest and also to establish guidelines for training.



Profile

● Daichi Suzuki

Born in 1967. Won the gold medal in the 100-meter backstroke at the Seoul Olympics in 1988 when he was a student of Juntendo University. Coached Harvard University’s swimming team. Currently, he is an instructor of Juntendo University’s School of Sports and Health Science and coach of the university’s swimming team. He is also a JOC athlete committee member and Olympians Association of Japan director. www.daichi55.com

Improved training environments enhance athletic ability

Swimming pools with running currents are very important for training. In this type of pool, maximum oxygen intake, which greatly influences athletic performance, can be measured while staying in one position.

During a race, athletes fully exert all of their muscles for more than one minute. The high endurance required to sustain this effort depends on adequate oxygen intake.

Maximum oxygen intake (VO₂ MAX) is measured to evaluate each athlete's oxygen intake capacity. Swimming pools with currents allow measurements to be conducted while athletes are actually swimming.

Mr. Suzuki and his coach used these advanced scientific methods, established training programs that best suited him, and systematically implemented a weight training regimen in order to improve muscle strength.

Mr. Suzuki says "Only a few athletes had implemented a weight training regimen at that time. Coaches of some teams simply demanded athletes to swim, swim, and then swim some more."

He was the first swimmer in Japan to use scientifically devised training methods. His excellent performance at the Seoul Olympics showcased the possibilities of

using new types of training programs.

Over the course of the past 16 years, personal scientific training methods have become standard.

Mr. Suzuki said, "Until 1996, all swimmers lived and trained together leading up to the Olympics. Yet at the Sydney Olympics, athletes trained by themselves. This led to better performances."

Changes in athletes' environment

There are other factors that are advantageous to today's athletes.

First of all, many companies financially back athletes. They sponsor athletes to improve their corporate image and some companies even offer training facilities.

Mr. Suzuki said, "When I was a university student and graduate school student, I drove over an hour on the highway to a swimming pool to train. I envy today's athletes because they can train under much better conditions (laugh)."

Another factor is people's improved interest in sports. Lifestyles of top athletes have become the subject of media coverage because people are interested in them.

Mr. Suzuki said, "It is huge that today's athletes can choose by themselves how to train and live."

The first WOA director from Asia

Mr. Suzuki was selected as one of nine directors of the World Olympians Association last November. He received the second highest number of votes among 24 candidates. He is the first director of the association from Asia.

He said, "All the directors selected are national heroes and legends. It is a great honor to be a part of this group. I

Mr. Suzuki working hard in his university office. During the interview, many students came to his office to meet him.



would like to work hard so that Japan will gain a greater voice in the sporting world."

WOA is an international organization that consists of Olympians. They are all ex-athletes with Olympic experience though their nationality, age, and the Olympic events they participated may be different. The main goals of the organization are to increase the recognition of WOA and invigorate the sporting world.

Mr. Suzuki said, "Sports move people and even motivate them to live. We should not forget that sports have that strong an impact on society."

Life after winning a gold medal

Mr. Suzuki has more dreams.

He said, "What interests me the most now is how we can provide jobs for athletes after their retirement. I was lucky to become a coach and instructor at this university but I know many ex-athletes suffer because they are unable to find a suitable job. Without job opportunities, fewer and fewer people will continue their sport careers or be interested in becoming a hard-training athlete."

As a college instructor, coach, and WOA director, Mr. Suzuki has a very busy life.

He said, "I would like to mix my own experiences with new theories and technology and apply them to actual training for athletes. I should also show people that my life really began after winning a gold medal."

Olympic gold medals won by Japanese swimmers

1928 Amsterdam	200-meter breaststroke	Yoshiyuki Tsuruta
1932 Los Angeles	100-meter freestyle	Yasuji Miyazaki
	1,500-meter freestyle	Kusuo Kitamura
	100-meter backstroke	Masaji Kiyokawa
	200-meter breaststroke	Yoshiyuki Tsuruta
	800-meter relay	Men's team
1936 Berlin	1,500-meter freestyle	Noboru Terada
	200-meter freestyle	Tetsuo Hamuro
	800-meter relay	Men's team
	200-meter breaststroke (women)	Hideko Maehata
1956 Melbourne	200-meter breaststroke	Masaru Furukawa
1972 Munich	100-meter breaststroke	Nobutaka Taguchi
	100-meter butterfly (women)	Mayumi Aoki
1988 Seoul	100-meter backstroke	Daichi Suzuki
1992 Barcelona	200-meter breaststroke (women)	Kyoko Iwasaki

A laboratory that can create hypoxic conditions similar to those found at an altitude of 5,000 meters. A study to learn about the influences of training at high altitudes is conducted.

Actively supporting athletes by applying the most advanced science

Japan Institute of Sports Sciences

The Japan Institute of Sports Sciences supports athletes by utilizing the latest technology and the results are attracting people's attention.



"Double the medal take by the 2012 Olympics"

Using this phrase as a slogan, the Ministry of Education (currently the Ministry of Education, Culture, Sports, Science and Technology) declared its intention to promote sports in 2000.

Japan took 3.5 percent of the medals at the Montreal Olympics in 1976 when Japan had a strong volleyball team. However, they only took 1.7 percent at the Atlanta Olympics in 1996. Even at the Sydney Olympics where swimmers did very well, the rate was lower than 2.0 percent. Japan has about 2.0 percent of the world's population and though Japan boasts the world's second largest econo-



Mr. Toshio Asami,
the head of the Japan Institute of Sports Sciences

my, it can still be considered to be a developing nation with respect to sports, because its medal acquisition rate is lower than its percentage of the world population.

The "Japan Institute of Sports Sciences" (Kita-ku, Tokyo) was established to change this situation. The institute thoroughly supports the strengthening and training of national team athletes from scientific, medical, and information-oriented perspectives.

The training site is as large as a soccer field. There is a seven-story building with a basement. In this building, there are special swimming pools for training and synchronized swimming; training areas for wrestling, fencing, boxing, weight lifting, and gymnastics; a gym with two basketball courts; and weight training equipment.

Most ordinary exercising facilities have these features, though the institute provides much more. There are 80 accommodation rooms on the fifth and sixth

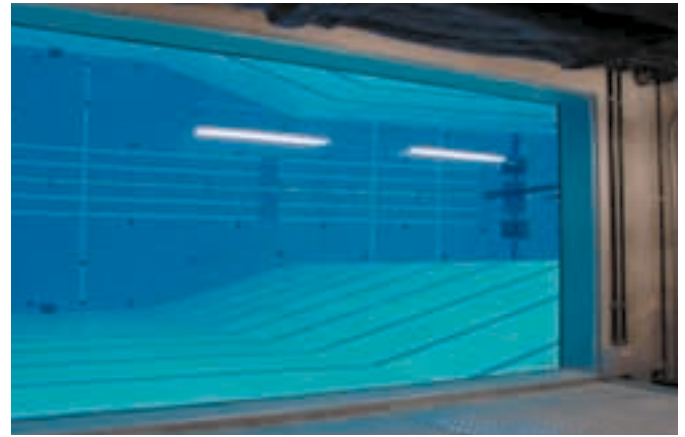
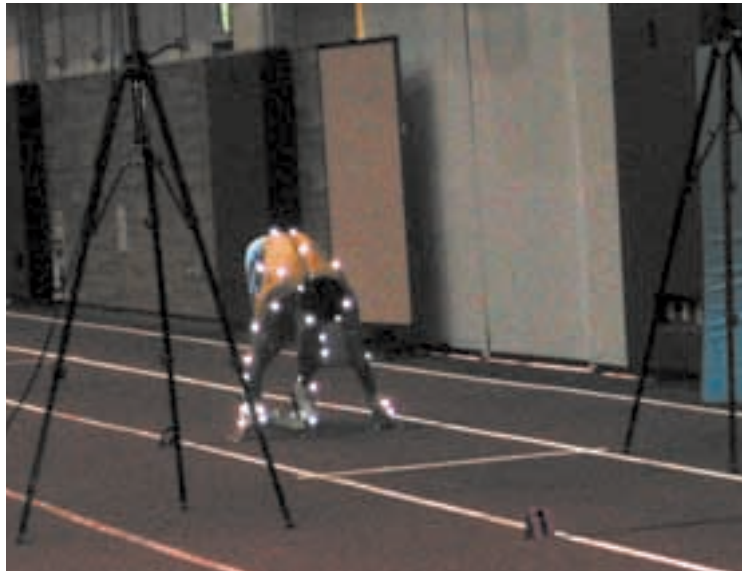
floors, 72 of which can be set at hypoxic conditions similar to those found at an altitude of 3,000 meters. The training gym also can be set at hypoxic conditions similar to those found at an altitude of



Japan Institute of Sports Sciences in Tokyo

3,500 meters. In short, athletes can experience training at high altitudes without having to actually travel to higher altitudes.

There are even more great features. The Department of Sports Science has instruments to measure the functions of the respiratory and circulatory systems as well as the muscular and nervous systems. The department also has a temperature/humidity laboratory where people can learn about changes in their bodies



B	A	
G	E	C
	F	D



Caption ▼

A
One side of the swimming pool for synchronized swimming is made of reinforced glass enabling observation of athletes in the water. A coach was very excited to see this and said, "This is exactly what I wanted."

B
Sensors are placed on an athlete's body to record his motions. The athlete's data can be analyzed and compared with data for other athlete's or his own best results to find their best possible form.

C
The institute has a physician, orthopedist, and dentist. It also has blood/urine testing equipment as well as x-ray and electrocardiogram systems in order to accurately evaluate athletes' physical conditions and give precise advice.

D
Video editing and analyzing laboratory. In addition to editing of video pictures, games recorded on-site or broadcasted at BS/CS TV programs are analyzed to improve athletes' performance.

E
A large treadmill with a 3x4 meter running space. It can be used for cycling training as well because speeds can be set up to 60 km/h. Experiments with more than one athlete can be carried out.

F
An MRI system is used to measure cross-section areas of athletes' muscles, etc.

G
Fitness checking. Body structure, physical makeup, aerobic/anaerobic capacities, and muscle strength can be measured.

at high-temperature/humidity conditions, an image recording/analyzing device to record athletes' fine movements with a high-speed camera, and instruments to analyze blood and evaluate immune functions.

The institute can be thought of as a facility that strengthens athletes at the cellular level.

With x-ray, CT, and MRI systems, the institute functions as a cutting-edge sports medical facility. It also can collect images and numeric data of athletes all over the world and analyze it. The institute has everything that is necessary to win except for the athletes themselves.

Mr. Toshio Asami, the head of the Japan Institute of Sports Sciences, said, "People wanted a facility like this even at the Tokyo Olympics. However, people in Japan did not prioritize sports so it took a

long time to make scientific approaches to sports."

The establishment of a national sports facility has long been needed to enhance the international competitiveness of Japan's athletes. All countries known as "sports powers" have national facilities that function as a base of sports medicine and science. Daichi Suzuki said, "All countries that have these types of facilities have successfully improved their athletes' abilities."

Mr. Asami also said, "We work behind the scenes. I want athletes and their coaches to use the facility effectively and achieve great results. We will do everything to help them."

The breaststroker Kosuke Kitajima mainly trains here when in Japan. Hopefully many great athletes will train and be nurtured here in the years to come.