

## *Editorial*

# 80th anniversary of the founding of the JOA

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The first departments of orthopedic surgery to be established in Japan were opened at Tokyo University and Kyoto University in 1906, a century ago. Twenty years later, in 1926, the Japanese Orthopaedic Association (JOA) was officially founded. To commemorate both the centennial and the 80th anniversary, the JOA organized memorial symposia and panel discussions at its annual congress held in Yokohama in May this year under the presidency of Professor Kozo Nakamura of Tokyo University. I had the honor of delivering one of the memorial lectures, speaking on how orthopedic studies in Japan have changed and developed in response to trends in social conditions throughout the last 100 years.

A vast number of records have accumulated as a result of these annual congresses during the last century. Analyzing these records, I was interested to discover that major historical changes in the field of orthopedics in Japan have taken place about every 20 years. For instance, during the first 20 years from 1906 to 1925, before the JOA had been founded, five more universities, in addition to the original two, opened orthopedic departments. Therefore, orthopedic surgeons from the seven departments had to present papers on orthopedic topics such as fracture, developmental dysplasia of the hip (DDH), club foot, spinal deformities, osteomyelitis, bone and joint tuberculosis, rickets, and poliomyelitis at the annual congress of the Japan Surgical Society, which had been founded in 1899.

The second 20-year period was from 1926, when the JOA was founded, to 1945 when World War II came to an end. During this period, nine more universities in Japan had opened orthopedic departments; and at JOA annual congresses, scientific papers specific to orthopedics — covering areas such as epiphyseopathy, bone

deformities, arthroscopy, wry neck, surgery of the spinal cord, amputation and prostheses, and sports injuries — were presented in addition to the aforementioned topics. As such, the independence of the JOA from the Japan Surgical Society reflected great credit on Japanese orthopedic surgeons at that time. After 1940, war wounds were frequently the main theme of JOA annual congresses; and owing to the ravages of the war within Japan, the annual congress, in fact, had to be suspended in 1944 and 1945.

The third 20-year period was from 1946 to 1965, which was the first 20 years after the war, when Japanese orthopedic surgeons started working again amid the ruins of the war to reorganize their research and clinical activities; and 31 more universities opened orthopedic departments. At JOA congresses, in addition to the main topics noted above, bone grafting, arthroplasty, rheumatoid arthritis, low back pain, osteoarthritis, hand surgery, bone tumors, cervical spondylosis, Perthes disease, gait analysis, osteoporosis, and cerebral palsy were intensively discussed. One of the characteristics of Japanese orthopedic surgery during this period was that orthopedics largely expanded the medical fields it encompassed. In 1955, for the first time after the war, Prof. Junghans from Germany was invited to give a special lecture on the spine at the JOA annual congress, and thereafter leading world authorities on orthopedics were invited almost every year to give lectures. Thus, during the first 20 years after the war, Japanese orthopedic surgeons made strenuous efforts to gain information about many fields from developed western countries in order to reorganize their research systems and clinical activities throughout Japan. As a result, many local orthopedic societies were founded all over the country, and related societies such as the Japanese Society for Traumatology and Occupational Medicine (1953), the Japanese Society for Surgery of the Hand (1957), the Japan Society of Plastic and Reconstructive Surgery (1957), the Japanese

Rheumatism Association (1957), the Japanese Teratology Society (1961), and the Japanese Association of Rehabilitation Medicine (1963) were successively founded.

The fourth 20-year period was from 1966 to 1985. During this period, the interest of Japanese orthopedic surgeons showed a remarkable switch, focusing on not only the treatment of orthopedic conditions but also their genesis and etiology. Accordingly, nearly 30 research societies were founded, covering almost all fields related to orthopedics. Although this rash of new research societies initially appeared insupportable, orthopedic science in Japan rapidly attained a high level as a result and eventually surpassed the standards of developed western countries in several fields.

For example, Dr. Y. Yasuda found the existence of the piezoelectric phenomenon in bone for the first time in the world in 1953. The theory was accepted worldwide during the 1970s, and it was applied clinically for retarded fracture healing after the 1980s. The arthroscope, which was first applied clinically in 1959 by Dr. M. Watanabe, became widely used all over the world after the 1970s. Rotational osteotomy of the acetabulum, first described by Prof. A. Nishio in 1956, was also popularized after 1968 by Prof. H. Tagawa as an important surgical method for treating osteoarthritis of the hip. Furthermore, Prof. S. Tamai succeeded in the replantation of an amputated finger for the first time in the world in 1965, Dr. Y. Kirita devised the surgical technique of simultaneous multilevel wide laminectomy of the cervical spine in 1970, which provided a world breakthrough in the surgical treatment of cervical spondylosis over the world, Prof. Y. Sugioka in 1973 reported rotational osteotomy of the femoral head for treatment of avascular necrosis, and that same year Dr. K. Ishida introduced measures for early postnatal prevention of DDH, whose incidence subsequently fell dramatically in Japan as a result. During this period also, various joint prostheses were introduced into Japan, and limb salvage in cases of malignant bone and soft tissue tumors became frequently successful due to modern chemotherapy and bone allograft techniques.

The fifth and most recent 20-year period was from 1986 to 2005, during which the JOA began to organize its congresses on four dates, one for each orthopedic subspecialty: the general congress in spring, the tumor congress in summer, the basic orthopedic congress in autumn, and the meeting to discuss systemic bone disease in winter. In addition, the many research societies mentioned above accelerated the subspecialization of orthopedic science. This subspecialization naturally promoted each research society to include many basic scientists who possessed new knowledge and techno-

logical know-how. As a result, interdisciplinary research systems were organized in Japan to study the etiology of orthopedic conditions and new methods for treating them.

Another notable development was the need for the JOA congress to be organized along international standards because not only invited speakers but also many ordinary orthopedic surgeons from abroad began to attend the congresses. For this purpose, English sessions were organized, and the number of international symposia increased rapidly after 1990, perhaps reflecting the fact that, by that time, Japanese orthopedic specialists were playing a leading scientific role on the world stage.

A further development has been the introduction of sociological viewpoints into the program of the JOA congress. For example, topics that have been presented annually at the congress have included medical ethics, emergency medical care systems, medicolegal problems, the work environment of clinicians, sports and health, prevention of aging, and nursing insurance. This means that the JOA congress not only provides a platform for the presentation of scientific papers but also plays an important role in making clinicians more aware of issues related to the general public.

Since the beginning of the twenty-first century, some new trends have been observed in Japanese orthopedic studies with regard to both clinical work and basic research. Some new clinical themes are now being intensively studied, including application of various spinal instruments and the use of artificial bone in spinal surgery, tissue transplantation and the use of biomaterials for limb salvage in the surgical treatment of malignant bone and soft tissue tumors that have been successfully controlled by chemotherapy, introduction of new biological drugs produced on the basis of information from chemical markers for osteoporosis and rheumatoid arthritis, invention of joint prostheses with much longer functional lives than those used currently, and development of surgical techniques for application under arthroscopic guidance in various locations. All of these surgical procedures rely on computer guidance based on computed tomography and magnetic resonance imaging to various degrees, with the aim of making surgery as minimally invasive as possible. On the other hand, in basic orthopedic research, three-dimensional biomechanical analysis of locomotor tissue as well as biochemical analysis of cytokine and gene function have become important; tissue engineering technology is now being applied for the regeneration of bone, cartilage, muscle, spinal cord, and nerve tissue; molecular biological techniques are being used to develop new forms of chemotherapy for malignant bone and soft tissue tumors; and nanotechnology is being applied to

produce new biomaterials that can be used to replace diseased tissue. Thus, biomechanics, gene technology, tissue engineering, molecular biology, and biomaterials science are now being employed in an interdisciplinary way to study the etiology of orthopedic conditions and to develop new treatments for them. At first, the rapid

subspecialization of orthopedic science that began to occur in Japan 20 years ago appeared insane. However, from a retrospective viewpoint, it is now evident that this phenomenon led to the efficient reorganization and development of world-class expertise in the field of orthopedic research in this country.