

## The ikyoku system of university orthopedic surgery departments: an in-hospital organizational system unique to Japan—its significance for advancement of basic medical science related to orthopedic surgery

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The ikyoku is an organizational system employed at departments of university hospitals, and the kouza is an academic teaching unit at a university's school of medicine. In Japan, ikyoku and kouza are usually synonymous and are staffed and operated by the same personnel. The ikyoku system was instituted in the 1870s, when modern medicine was introduced to Japan, and has continued to the present despite various criticisms. This system has various merits in terms of its functions in education, research, and clinical practice, and in fact has supported medical care in Japan over the years. In the Department of Orthopedic Surgery of our university, many dedicated orthopedic surgeons work in kouza, providing medical care and engaging in research and medical education, and their efforts have continued to build on established traditions and achievements.

A few years ago, a new system for the clinical training of residents was implemented by the Japanese government, and this has resulted in erosion of the ikyoku–kouza system due to decreases in both ikyoku–kouza staff and also physicians serving underpopulated areas, with a converse increase of medical residents in urban areas. As a result, the working environment for physicians in local hospitals has worsened in many communities. Many of these physicians have left such hospitals, causing further loss of provincial medical services.

In the new system, training is not required in departments of orthopedic surgery and traumatology, and therefore, medical residents are increasingly becoming untrained in primary care of motor-system diseases and

injuries of extremities. This situation has led to a decrease in orthopedic surgery residents and, in turn, a decrease of orthopedic surgeons working at universities. In order to become good clinicians, physicians need to be able to investigate why and how diseases and pathologies encountered in clinical practice occur. To achieve this, physicians must have an interest in basic and clinical research or must conduct their own research and investigations. Universities have provided opportunities for such basic and clinical research to cover areas of routine medical care. We believe that the ikyoku–kouza system has always played an important role in training competent clinicians, who therefore have a deeper understanding of scientific methods, have scientifically inquiring minds, and are able to conduct university research in cooperation with other clinicians. The basic problem with the current medical resident training system is that it focuses on short-term residency training and does not consider long-term training programs in education and research.

In the late twentieth century, basic research in orthopedic surgery made great strides due to dramatic advances in molecular and cellular biology. Achievements in basic research led to clarification of the pathogenesis of intractable orthopedic diseases and to major changes in their treatment. In Japan, the Annual Research Meeting of Japanese Orthopaedic Association was established in 1986 for workers in both basic and specialized fields in order to promote basic medical science related to orthopedic surgery. This society provides a forum for open discussion in which there are no boundaries between basic medical science and clinical medicine. The excellent foresight in establishing this academic society led the world in research achievements. However, some of the recent results obtained in basic research related to orthopedic surgery are highly specialized, and therefore, some content of such

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research is suitable for discussion among a small number of specialists only. My main focus in basic research is to simplify explanations of complex and mysterious biological phenomena, much like the approach used to elucidate the double-helix structure of DNA by Watson and Crick in the 1950s. If a simple truth governing a seemingly complicated biological phenomenon can be revealed, it may facilitate optimal treatment for some diseases. We believe this is an important goal for specialists trained in basic medical science relevant to orthopedic surgery.

We consider that researchers engaged in orthopedic surgical research at universities should be aware of problems and questions arising in routine medical care and

clinical practice, address them appropriately, and devise and conduct research projects capable of yielding useful information for diagnosis and optimal treatment. Another vital goal is to provide young and enthusiastic physicians who are training outside universities with opportunities for university research so they can resolve and overcome problems they encounter in clinical practice. Finally, to produce excellent future clinicians, it is imperative to provide guidance and education for young physicians. In this respect, the *ikyoku-kouza* system can still play a significant role in training clinicians who are able to competently fulfill their missions.