Meet the Professor

Prof. Guixing Qiu: think one more step ahead, move one more step forward

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Two locks block the door to success. When you find and think about the problems, “think one step ahead,” you will have the key for the first lock; when you study and solve the problems, “move one step forward,” you will have the key for the second lock.

Many people began to know about Prof. Guixing Qiu from the Peking Union Medical College (PUMC) classification, which was the third major classification of adolescent idiopathic scoliosis (AIS) after King classification and Lenke classification. PUMC classification has reduced the rate of treatment failure for AIS from 13.2% to 2.7%. From floating an idea of figuring out a successful solution, it had taken ten years for Prof. Qiu.

Prof. Qiu became an academician of the Chinese Academy of Engineering in 2007. He has continued driving to and from the workplace, and he joked that it is helpful to prevent Alzheimer’s disease. He is still living with his wife at the PUMC’s family dormitory building, and books fully occupy his room. He is still enthusiastic about the latest electronic products, but he believes “people must not become slaves of high technology, they must be masters.”

A good surgeon should “dare to solve problems.” Now more than 70 years old, he still has a lot of problems to be solved—finding the fundamental causes of idiopathic scoliosis, publishing an English-language journal of orthopedics in China, pushing for medical schools to enroll only the best students, narrowing the gaps in medical services between eastern and western regions, providing free healthcare to residents at poverty-stricken regions. Some of these problems have been resolved, and some are still being resolved.

Prof. Yu Zhao, at the PUMC, has been a student of Prof. Qiu for 20 years, said the most impressive quality of his teacher is that he has never stopped thinking and working.

When “impossible” becomes a reality

The 77-year-old Prof. Qiu has made many achievements that had seemed impossible. Among them is setting up the Chinese Orthopedic Association (COA) Annual Meeting and developing it into the world’s second-largest academic conference on orthopedics. When he raised the initiative of “catching up with the American Academy of Orthopedic Surgeons (AAOS) Annual Meeting” in 2005, many people thought it was a mission “impossible.” Why? “At that time, the Orthopedics Branch (later known as COA) under the Chinese Medical Association had only 900 registered members, and its annual congress could draw no more than 1,000 participants. For the AAOS, its annual congress is attended by more than 30,000 surgeons, which was 30 times more than us!” Yu Zhao explained.

In the face of the huge gap, Guixing Qiu has made solid progress in the right direction. Like China’s opening-up policies, his approach can be described as “going out and bringing in.”

Since he became the chairman of the Orthopedics Branch under the Chinese Medical Association (CMA) in 2000, Guixing Qiu has introduced a series of “going out” steps—pushing the Orthopedics Branch to join the “Bone and Joint Decade 2000–2010”, joining a couple of international organizations like the Societe Internationale de Chirurgie Orthopedique et deTraumatologie (SICOT) and the Asia Pacific Orthopedic Association (APOA), participating in international academic conferences organized by AAOS, Japanese Orthopedic Association (JOA), Australian Orthopedic Association (AOA), Hong Kong Orthopedic Association (HKOA), and Korean Orthopedic Association (KOA). It is easy to list these activities, but it is different when you try to build ties with them (Figure 1).

In the early years, the Taiwan issue had been a big obstacle for orthopedic surgeons from mainland China to attend international conferences. Since AAOS had allowed doctors from Taiwan Province to appear at its annual congress’s opening ceremony as a delegation of a “country,” surgeons from mainland China once dropped out in protest of the arrangement, but with small impact. For some time, Taiwan had a seat at APOA, while mainland China had no
presence. To solve this problem, Prof. Qiu held multiple negotiations with officials at AAOS and APOA. In the beginning, they did not understand Qiu’s request, saying politics should not be involved at academic conferences. After repeated negotiations, they began to be aware that “Two Chinas” was a serious political issue. Finally, they took away Taiwan’s flags and raised China’s five-star red flags.

The step of “going out” is getting firmer, while the timing of “bringing in” is getting matured.

In his opinion, to enhance the influence of China’s orthopedics in the international community, we should bring foreign experts into China and build a platform of academic exchange that is centered on mainland China and covers Hong Kong, Macau, Taiwan, and the rest of the world. He hoped the Orthopedics Branch’s Annual Meeting could be such a platform. At that time, the so-called annual meetings of the branches of CMA were held every four years to elect new chairpersons and vice-chairpersons, with less attention on academic exchanges. In 2005, Guixing Qiu proposed a bold reform plan to rename the Orthopedics Branch into COA and hold academic meetings annually. These annual meetings would not have any election process and instead focused on academic exchange. Thanks to the support of CMA and after more than one year of preparations, the first COA Academic Conference opened in Beijing in November 2006. Surprisingly, the conference attracted more than 5,000 orthopedic surgeons and representatives from medical device makers and pharmaceutical companies around the world (Figure 2).

When the COA was set up, Prof. Qiu has stressed the international principle of “exchange on an equal basis”—when we get something, we offer the same in return. “In the past, we invited foreign experts to attend a conference in China, and we provided business-class air tickets to them; however, when we were invited to academic conferences in foreign countries, we were rarely provided with free tickets and accommodation. That seemed we are inferior to foreigners.” Yu Zhao said that Prof. Qiu’s proposal of equality-based exchange means that he had been aware long ago that COA Annual Meeting would eventually develop into a large event.

The situation has been developing in the right direction, indeed. The COA Annual Meeting grew bigger between 2007 and 2009, and the number of participants in the fifth COA Annual Meeting in 2010 hit 15,000, with more than 10,000 registered participants. Today COA has become the world’s second-largest academic conference on orthopedics. “As the COA Annual Meeting has become more influential, many foreign experts were asking to attend the event, and they said we don’t have to provide air tickets or accommodation.” said Yu Zhao.

Thanks to the persistent efforts made by Prof. Qiu, what was once considered “impossible” has become a reality (Figure 3).

Figure 1 The “Bone and Joint Decade 2000–2010” held a meeting in Berlin, Germany, in 2003. Guixing Qiu made a work report on behalf of the Chinese delegation, and his work report was rated in fifth place among all 54 countries. In the picture, Prof. Qiu stands in the fourth on the left of the front line.
“If you are afraid of hardship, do not get started.”

“If you are afraid of hardship, trouble, and responsibility, you should not get started in the first place.” That has always been his attitude toward work.

When he became the chief of the Department of Orthopedics at PUMCH in 1995, Guixing Qiu set the goal of vigorously developing spine surgery while giving some attention to joint and trauma treatments. At that time, the department only had 41 beds, and the number was too small to realize the goal.

To increase beds, Guixing Qiu made several applications and finally got 10 beds, but these beds were spread at five wards, with two beds in each ward. Some doctors complained that the arrangement would bring a lot of troubles to them, but Guixing Qiu accepted the arrangement happily, saying more beds meant more chances for training students and performing more surgeries. A little more trouble was not a big deal.

In 2002, the Post and Telecommunication Hospital merged into PUMCH, resulting in 30 beds available. These beds carried higher charges because they were equipped with better facilities. Other departments did not want to accept these beds because they were worried that they could not bring in enough patients and meet the revenue target. Prof. Qiu, however, made a bold decision to accept these beds and set up the PUMCH Orthopedic Trauma Center in 2003. He said, “as the chief of the department, I could not just think about myself. I have to develop the department and try to seize every opportunity. If I had not gotten these ten beds, I would not be able to establish the second ward; if I had not taken the VIP ward, there wouldn’t be a trauma center.”

“An individual’s power is limited, and the department will be stronger only after all doctors get more competent.” To cultivate talents, Prof. Qiu has created many opportunities for doctors to pursue further study abroad and even took 50,000 yuan from the limited budget for scientific research to fund staff training programs. The department has cultivated eight high-skilled surgeons, and they can all take charge of a department. To obtain more financial support, Prof. Qiu has crafted plans to lead his team members to apply for various government funds. According to Prof. Jianguo Zhang, executive deputy chief of the Orthopedics Department, his department was the first at the PUMCH to apply for the Industrial Fund from the Ministry of Health and was one of the first recipients (Figure 4).
The Orthopedics Department of PUMCH has developed into a well-established medical center with a primary focus on spine surgery and also offering services in joint surgery, geriatric trauma surgery, sports medicine, bone tumors, podiatric surgery, and minimally invasive surgery. With three wards and 132 beds, the department was recognized as “national key discipline” in 2007. It has undertaken 86 scientific research programs commissioned by the Beijing Municipal Commission of Science and Technology and the National Natural Science Foundation of China, with joint funding of 43.8 million yuan.

Prof. Qiu stepped down as head of the PUMC’s orthopedics department several years ago, but he has spared no effort to advance the development of orthopedics. Many years ago, he had thought about publishing an English journal of orthopedics, and that dream is finally about to come true—the first issue of the Bone & Joint Investigation (BJI) will be published soon.

“I think that foreign countries actually use many of our research achievements. Take the 863 Program and the 973 Program; for example, we have made big investments to fund these plans, but our research findings were all published in foreign journals. Chinese researchers have little awareness of translational medicine, but our foreign counterparts have a strong awareness, and that’s why so many original innovations come from foreign countries.” Prof. Qiu supplied a set of data to support his argument. Between 1979 and 1983, Chinese scientists issued 101 articles in global top academic journals including Science, Cell and Nature; 20 years later, however, only the research results in five articles had been applied in clinical practices, with a translation rate of only 5%, among which the only one was clinically effective.

“An article is an article. It can be called an innovation only after it is ‘translated.’”

As editor-in-chief of BJI, Prof. Qiu said the journal aims to encourage medical staff to do more research work and, more importantly, to retain more research achievements within China and provide greater help to Chinese patients.

Bring Chinese classification for worldwide application

Correcting spinal deformity is one of the most challenging techniques in spinal surgery. An orthopedist once said that “I dare not perform two surgeries: one is for scoliosis and the other is for conditions in pelvis and sacrum. The former may cause paralysis, and the latter may lead to death.” “Compared to the surgery of correcting spinal deformity itself, it’s even tougher to determine when surgery should be performed and which procedure should be chosen.” said Prof. Qiu, adding that the classification of spinal deformity and the classification-based treatment plan are crucial to the success of the surgery.

American surgeon King made the first meaningful classification of idiopathic scoliosis in 1983. This classification, however, was based on plane orthopedics and had only five types. Many surgeries performed based on this classification were unsuccessful, and patients had to undergo a second surgery due to aggravated deformity. In 2001 Dr. Lawrence G. Lenke proposed a new 3D classification with 42 types, which was quite complicated and did not include the twisted spine. Orthopedists worldwide have referred to these two classifications as guidelines for treating idiopathic scoliosis.

“The records of the successful surgical treatment for idiopathic scoliosis based on the King classification and the Lenke classification were only 400 plus and 300 plus cases, respectively; in contrast, our department has performed AIS surgeries in more than 3,000 patients. Always wondering, why not develop a Chinese classification?” said Prof. Qiu.

Yu Zhao recalled that “when I came to the work at the hospital, Prof. Qiu gave us the assignment to write a review article on orthopedic classifications and compare their advantages and disadvantages. Prof. Qiu was very farsighted, and he had an idea of creating a new classification a long time ago.”

After that, Prof. Qiu collaborated with his colleagues and students to build China’s first database about scoliosis. They collected 3,000 patient cases and selected 1,245 complete cases for thorough study. Three important rules on spinal deformity were identified: the number of bent spines the most important; 3D deformities at distinct parts have different characteristics, and the flexibility of the bent spines...
is also very important. Based on these discoveries, a new classification—PUMC classification—was released in 2001.

Different from the international conventional practice of spinal classification, the “PUMC Classification” firstly classified AIS into three types based on the number of bent spines and then into 15 subtypes (initially 13 subtypes, modified as 15 subtypes 2019) according to the 3D characteristics of the deformed spines. It is well recognized that the “PUMC Classification” is simple, practical, and easy to be remembered; it also has corresponding recommended surgical approaches and is more convenient for clinical application.

Clinical verification by orthopedists worldwide also suggested that “PUMC Classification” had a much lower rate of failure than the “King Classification,” down to 2.7% from 13.2%. The “PUMC Classification” was first published in SPINE, the world’s top orthopedic journal, in 2005 (Figure 5).

It is worth mentioning that Prof. Qiu did not name the new classification after himself but after the PUMC. He was the one who proposed the new classification, but it was the outcome of joint efforts made by several generations of orthopedists at PUMC.

To promote the clinical application of the “PUMC Classification,” Prof. Qiu devised a new ruler to measure the size of scoliosis, and the ruler has become an often-used tool for spine surgeons. He also performed surgery demonstrations and produced compact discs to be distributed to surgeons nationwide. Presently, the “PUMC Classification” has been adopted by many hospitals in mainland China, Taiwan Province, and Macau SAR, and thousands of AIS patients have received help from this new classification.

In early 2006, the “Research on Idiopathic Scoliosis” was awarded the 2nd prize of the National Science & Technology Progress Award. The third edition of Spine Surgery, edited by Edward C. Benzel, also made a special introduction to the three major classifications (King, Lenke, and PUMC) of AIS (Figure 6).

After years of practical applications, Prof. Qiu’s team has continued to change the “PUMC Classification” to make it easier to be remembered and used in clinical settings. In 2019 a clinical study about the modified PUMC Classification was published in The Spine Journal (Figure 7).

“Medical science should be an elite education.”

Prof. Qiu’s pursuit of a medical career has much to do with his farsighted elder uncle.

Born as the first son to a rural family in Wuxi, a city in southern Jiangsu province, eastern China, in 1942, Guixing
Qiu was adopted by his elder uncle in the early years. His uncle was an accountant and attached significant importance to education. In 1960, 18-year-old Qiu stood out to be admitted to the PUMC for an eight-year program, and only 60 students nationwide were enrolled. The news overjoyed his uncle.

Guixing Qiu, however, was mixed with happiness and worry. “My uncle was the only breadwinner in the family, and he earned about 40 yuan a month. Tuition fees for eight years would be a huge burden for him, let alone he was more than 50 years old at that time.” At this decisive intersection for his life, Prof. Qiu was hesitant. But his uncle believed that going to the university would make an enormous difference to his life in the future; he would rather not eat to support Qiu’s study.

It is fair to say that the eight-year study at the PUMC has laid the foundation for Qiu’s principles and foresight as a doctor.

Prof. Qiu said that the PUMC eight-year program is a form of future-oriented and advanced medical education. The program matched the Chinese government’s initiative of popularizing and enhancing medical education—we can popularize medical education by launching five-year or six-year medical programs and enhance medical education by adopting eight-year programs. “Some medical schools have misunderstood eight-year programs, and they thought that graduates of these programs should be able to perform surgeries.”

“The eight-year programs are meant to solidify students’ academic foundation.” Prof. Qiu stressed, “Medical science is an extremely complicated discipline. A true doctor must be able to perform surgeries and summarize experiences and lessons to find the reasons behind success and failure. Therefore, doctors should have solid and extensive knowledge about natural science and have the mind and approach to explore life science. These fundamental skills cannot be acquired after you are out of campus. If you do not
get them, you are more likely to end up as a surgery artisan.”

Prof. Qiu is quite worried about the falling academic performance of students enrolled in medical colleges in recent years. “Medical services are a matter of life or death, and not everybody can enter this trade. If excellent students did not do medicine, patients would be less confident about doctors, and relations between doctors and patients would deteriorate. That is a vicious cycle.”

To this day, Prof. Qiu still clearly remembers that Qiaozhi Lin, the founder of modern obstetrics and gynecology in China, bent down to listen to the fetal heart rate on the pregnant woman’s stomach. He also still exclaimed at Weiran Wu, one of the most distinguished surgeons in China, being serious and careful towards every surgical operation. “He operated at clear anatomical layers, with little bleeding, which looked just like a fine work of art.” Said Prof. Qiu.

When Prof. Qiu served as a resident, he assessed all blood, urine, and excrement samples by himself and practiced on himself how to draw blood and insert the gastric tube. Prof. Qiu pointed out that “You must first experience patients’ pains to think about how to reduce their pains and be a good doctor. I was very careless in the past, but after I came to study at the PUMC and later worked in PUMCH, I became aware that a good doctor must be very careful and serious because life allows no room for carelessness.”

In recent years, Prof. Qiu has been vigorously calling for medical education to return to elite education. “When I talk about elite education, I’m not saying that doctors should be paid higher. I mean that excellent talents should be picked to become doctors. Doctors are supposed to save patients’ life. They must have not only extraordinary skills but a prominent level of medical ethics.”

“If every doctor can participate in public-benefit activities once every year.”

Prof. Qiu was elected into the Chinese Academy of Engineering in 2007. “What has changed to you after that?” He thought for a minute and replied, “Now I have a broader field of vision. As an academician, I have to look beyond what I’m doing now and look further.” His attention has shifted to “how to address the shortage of medical resources at impoverished regions” and “how to narrow the gap in healthcare services between eastern and western regions in China.”

The Bethune Charitable Foundation was set up in 2015, and Prof. Qiu was elected the first chairperson. That role has allowed him to address such problems and increased his sense of commitment to public welfare and charity. In the past four years, he has organized a series of doctor training and patient education programs and mobilized orthopedists to perform free surgeries (including expenses for treatment, care, accommodation, and transport subsidies) for poor patients struggling with the spine scoliosis. “Charity activities can give doctors a direct experience of people’s sufferings so that they can realize their strong responsibility as medical staff and the importance of benevolence. That’s very meaningful.” Prof. Qiu said (Figure 9).

When discussing treatment plans, Prof. Qiu has asked the same question numerous times to his students, also to himself, “assume that the patient was your father or mother, what would you do?” He believes that doctors must have extraordinary skills, but medical ethics is even more important. Yu Zhao has deep feelings about that belief. “Prof. Qiu has taught us an important principle—transpositional consideration or consider a problem from the patients’ perspective. For instance, a patient can be treated with cheaper made-in-China devices, but you choose imported devices instead and offer him a 200,000-yuan treatment plan. His family has already been desperately poor due to the illness, and your plan is pushing the family to the brink of devastation.”

In addition to active participation in charity work, Prof. Qiu has also guided an increased amount of doctors to join the volunteer team. As the deputy secretary-general of the...
Bethune Charitable Foundation, Yu Zhao revealed that many experts are unpaid for participating in their charity activities, and sometimes four or five doctors grouped to provide free medical services. Prof. Qiu said, “If every doctor can join charity activities once a year, millions of doctors in China can treat millions of poor patients, and their joint contributions would bring huge benefits for the mass public.”

“If I had not provided free medical services, I might never be able to understand the desperation in the eyes of patients who can’t afford 100,000 yuan of medical cost or the staggering old ladies who use tree branch as a crutch”, said Yangyufan Wang, an orthopedic doctor at the Department of Bone and Joint Surgery and Sports Medicine of Xuzhou Central Hospital. Yu Zhao also revealed that four years of volunteer work had offered him “a sense of inner peace.”

Besides, Prof. Qiu has also been committed to “academic poverty alleviation.” As the founder of COA, he has set up a COA scholarship, with 10 recipients each year at a province. The recipients can attend not only important academic conferences for free but also get free accommodation and transport subsidies during the conferences. This scholarship is of great significance to reduce the gap in health care between the eastern and western provinces. “When these doctors become more capable, local citizens do not have to go to large cities when they are sick.”

Yu Zhao said, “Public benefits brought by these little charity activities may be unable to be measured by money, but in my eyes, Prof. Qiu has always been doing whatever he can to serve the people.”

“Something that stays in your mind will someday spring up in your life.” When Prof. Qiu has something in mind, he finds a way to get it done.

Profile (Figure 10)

Guixing Qiu, Academician of Chinese Academy of Engineering.

Prof. Guixing Qiu is a senior surgeon, doctoral tutor, and State Council Special Allowance Expert in Peking Union Medical College Hospital (PUMCH). He received his M.D degree in Peking Union Medical College (PUMC) (eight-year program) in 1968. Currently, he also serves as the president of Norman Bethune Public Welfare Foundation, director of Beijing Key Laboratory of Bone Deformity Genetic Research, chairman of the Medical Consumables and Devices Technology Special Committee and the Medical Additive Manufacturing Special Committee under China Association of Medical Equipment, and executive director of Beijing Medical Doctor Association and chairman of the Orthopedic Branch of the association. He is the editor-in-chief of the Chinese Journal of Bone and Joint Surgery, editor-in-chief of the Chinese Journal of Joint Surgery (Electronic Version), and vice-chairman and deputy editor-in-chief of the Medical Reference. He is also the chair of the Chinese Branch of the Société Internationale de Chirurgie Orthopédique et de Traumatologie (SICOT) and the honorary fellow of Hong Kong College of Orthopedic Surgeons.

His previous titles included member of the 11th National Committee of the Chinese People’s Political Consultative Conference, vice director of the 6th Science and Technology Committee of the Ministry of education, vice director of the Learning Style Construction Committee of the 6th Science and Technology Committee of the Ministry of Education, executive director of the Chinese Medical Association (CMA), chairman of the Orthopedic Branch of CMA, standing committee member and deputy director of the Health Division of the Chinese Academy of Engineering, chairman and executive director of Beijing Medical Association and chairman of its Orthopedic Branch, vice president of the Orthopedics Branch of the Chinese Medical Doctor Association, director of the Department of Surgery and Orthopedics Department of PUMCH.

He has been committed to the clinical and basic research on spine and joint surgeries, especially the comprehensive research of spinal deformities. He proposed the PUMC Classification of idiopathic scoliosis, which was published in Spine. He, for the first, found the most important pathogenic gene of congenital scoliosis, and the innovative
etiological finding was published in *New England Medical Journal*. The modified PUMC Classification was published in the *Spine Journal* in 2019.

As a principal investigator, he has led the implementation of more than 20 scientific research projects at the provincial and ministerial levels (including those supported by the National Natural Science Foundation of China). He has edited 35 monographs (e.g., *Orthopedic Surgery*) and published more than 700 articles and comments. He actively advocates the standardization of orthopedic diagnosis and treatment and has been involved in the development of a number of guidelines (including the *Standard Operating Procedures in Orthopedic Surgeries*).

He is the winner of the National Science and Technology Award (second grade) (2 prizes), Natural Science Prize of the Ministry of Education (first grade), Beijing Science and Technology Award (second grade), Chinese Medical Science and Technology Award (second grade), National Science and Technology Progress Award (third grade), National Education Commission Pride (third grade), and Ministry of Health Pride (second grade).

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**Footnote**

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