

Minimally Invasive Spine & Joint Center of Taichung Tzu Chi Hospital

By Lai Ting-Han, Hsieh Ming-Jin
Review and Revision / Dr. Chang Chien-Chun, Director of Minimally
Invasive Spine & Joint Center of Taichung Tzu Chi Hospital





The fully equipped, multifunctional gym provides patients with supplementary therapies.

Taichung Tzu Chi Hospital has established a Minimally Invasive Spine & Joint Center. Dr. Chang Chien-Chun, Director of the Center, points out that, in addition to the treatment of common orthopedic diseases, the center mainly focuses on difficult spinal surgery. “Difficult” is defined as follows: the patient is aged 65 or above, suffers from at least two of three chronic diseases, and requires wide-angle scoliosis corrective surgery, kyphosis corrective surgery, revision spine surgery, cervical kyphosis surgery, and revision cervical spine surgery.



Medical team of Taichung Tzu Chi Hospital Minimally Invasive Spine & Joint Center (from left to right): Ms. Chiu Yu-Chiao (NP), Ms. Hung Cheng-Min (NP), Ms. Lin Yi-Ching (dedicated RN), Ms. Lin Pin-Hsien (NP), Director Chang Chien-Chun, Dr. Hsieh Shang-Lin, Ms. Lin Huan-Ju (dedicated RN), Ms. Pan Tao-Yin (Secretary), Lien Shih-Yao (NP)



The Minimally Invasive Spine & Joint Center of Taichung Tzu Chi Hospital relies on inter-divisional teams and advanced medical equipment to provide solutions for difficult spinal surgeries.

Difficulty 1

How can the risk of complex surgery be reduced?

The fact that the names of spinal surgical sites are so hard to remember epitomizes the difficulty of clinical practices in this area. Even more important are the challenges that test the abilities and skills of doctors. From a clinical perspective, this can be explained as follows: Spinal surgery tends to be complicated by factors such as complex patient conditions



A nurse practitioner changes the wound dressing and provides proper post-surgery care.

and special physical conditions (e.g., scoliosis with Cobb angles greater than 40 degrees). Due to the relatively high risk of surgical complications, these surgeries require the use of the most advanced technologies and equipment to guarantee patient safety and ensure achievement of the expected results.

Severe, wide-angle scoliosis affects the physical structure, causes lung and heart compression, and increases the burden on the respiratory and circulatory system. Traditional surgery techniques are associated with high risks due to relatively long operation times, comparatively large surgical wounds, and substantial bleeding. Dr. Chang Chien-Chun points out that we are fortunate to have new technologies such as computer-assisted navigation systems at our disposal which allow one-time corrective surgeries with a reduced burden on the patient's body.

Difficulty 2

How to enhance the efficacy of surgeries in senior patients

In addition, age is another challenge. Despite the prolongation of the average human life expectancy, the lifespan of the human skeleton and organs has seen no significant changes. In other words, a large number of seniors have entered the stage of “maintenance & repair”, but “old age” is also a key factor affecting the

efficacy of medical intervention.

Dr. Chang Chien-Chun firmly believes that we must rely on innovative technologies and equipment and standardization of outpatient, surgery, and hospitalization procedures and the quality of such procedures by professional teams to gain the ability to provide more effective medical services for seniors and successfully treat patients afflicted by complex spinal diseases. Starting from the inauguration of the center, Dr. Chang has requested the implementation of three essential procedures, namely detailed pre-surgery assessment, precise in-surgery navigation, and meticulous post-surgery tracking to effectively mitigate risks and enhance the quality and safety of surgeries.



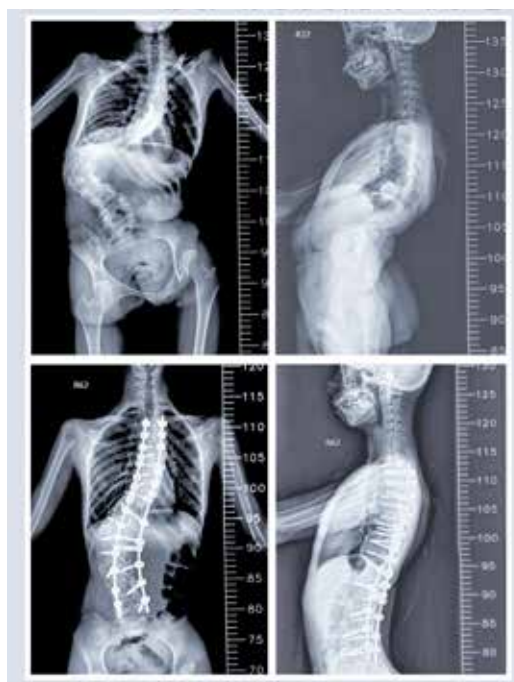
A nurse practitioner offers health education on important reminders for spinal patient self-care.

Integrated therapies & Care by Inter-divisional Professional Teams

The team led by Director Chang Chien-Chun, which consists of two attending physicians, four nurse practitioners, two dedicated RNs, and one executive secretary, is responsible for the provision of one-stop services including outpatient consultations in cooperation with the divisions of orthopedics, rehabilitation, pain management, neurosurgery, and Chinese medicine. During the surgery stage, the team relies on novel equipment such as the most advanced computerized 3D spinal navigation system (also known as “O arm” system), 4th generation spinal endoscopy equipment, robotic knee replacement equipment (Rosa Knee), dedicated operating beds for spinal surgery, 4k imaging equipment, and spinal grinding drill technology from Japan. These facilities and technologies are utilized for real-time scanning of patient spine positions and precise display of 3D structures to give physicians a firm grasp of accurate positioning during the surgery process and prevent damage to nerves and muscle tissue. Patient safety is guaranteed through standardization of all procedures before, during, and after surgeries. The provision of one-stop services allows the

integration and optimization of teams, facilitates the implementation of a sound group consultation system, and promotes the follow-up launch of an integrated care model through enlistment of specialized cardiology and thoracic critical care teams in accordance with actual needs.

Standardized operating procedures as promoted by Dr. Chang Chien-Chun encompass all pre-, in-, and post-surgery stages including pre-surgery assessment through imaging examinations for formulation of surgery plans; rigorous in-surgery controls to confirm that all advanced equipment operations are



Minimally invasive, computerized navigation, corrective spine surgery is capable of treating scoliosis with Cobb angles greater than 40 degrees

carried out in accordance with applicable procedures; meticulous post-surgery tracking of the patient recovery progress. This can be illustrated by the example of scoliosis corrective surgery. Prior to this surgery, the team formulates a functional rehabilitation plan in consultation with the divisions of orthopedics and rehabilitation. During surgery, a neurosurgeon monitors neurological reactions to guarantee surgical safety. After surgery,



Surgical treatment of L4-L5 lumbar spondylolisthesis



Robotic knee replacement (Rosa Knee)

ongoing tracking of patient progress is implemented to facilitate provision of rehabilitation therapies as required.

For complicated cases with simultaneous heart and lung conditions, the team launches an integrated care mechanism, enlisting cardiologists and pulmonologists for joint discussions to facilitate the adoption of ideal therapies for patients. Director Chang stresses that perfect teamwork is highly conducive to reducing surgery risks, enhancing therapeutic effects, and ensuring the provision of comprehensive healthcare services. The improvement of therapeutic effects after complete standardization of all procedures is reflected in relevant statistics: no serious complications were observed in any of the 60 difficult surgeries conducted by the center in the period from September 2022 to October 2023, which in turn signifies increased patient safety and satisfaction.

Personalized, patient-centered therapy and exercise prescription

“Do I really have no choice but to undergo surgery once I seek medical advice at the Minimally Invasive Spine & Joint Center” some patients wonder anxiously and with concern. Director Chang stresses that surgery is not always necessary, and that the final judgment depends on the severity of the disease.



Minimally invasive spinal surgery is widely applied in the treatment of various spinal diseases. Physicians select the surgery method best suited to the patient's needs based on a comprehensive assessment of disease complexity. The image shows Dr. Hsieh Shang-Lin performing ACL reconstruction surgery.

In addition to the provision of integrated medical services, the Center has concluded an MOU with the Department of Sports and Leisure, National Chin-Yi University of Technology. The goal is to provide patients who do not require surgery with a comprehensive exercise therapy plan in a multifunctional sports classroom by harnessing the Center's medical resources. The multifunctional sports classroom is available for specially designed one-on-one therapy plans on a reservation basis. Upon consultation,



Minimally invasive spinal surgery contributes to mitigating the risks of spinal infection or nerve damage. The image shows Director Chang Chien performing endoscopic spine surgery.

assessment, and scheduling of examination items by a physician, two doctors and physical therapists plan a graded exercise prescription in line with patient conditions. This prescription resembles a personalized exercise rehabilitation. Needless to say, it is not only available for patients who do not require surgery. Patients who underwent surgery at Taichung Tzu Chi Hospital or other hospitals who make appointments for consultations are also eligible to use these facilities.

When rehabilitation and maintenance therapies have reached a certain extent, surgery can not only correct the patient's

spine structure but also greatly improve his/her life quality. Director Chang shares the example of a patient whose ODI (Oswestry Disability Index) value was significantly decreased from 36.7 to 16.3 only one month after scoliosis corrective surgery. He points out that the quality of services provided by the Center have earned high praise, which is reflected in the patient satisfaction rate of 97%. All patients express high

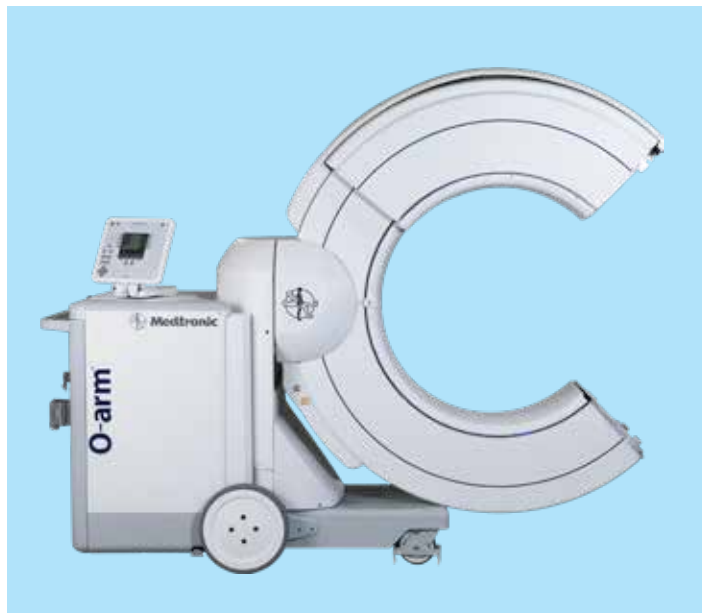
trust in the professionalism and doctor-patient communication skills of our staff members. On top of that, patients can discuss with their physician during consultations, in consideration of their insurance coverage, which items should be covered by NHI (National Health Insurance) and which items should be self-paid since certain surgery services do not fall within the insurance payment categories. The hospital also offers spinal



Rosa Knee Robotic knee replacement equipment allows simulation of knee tightness at any time and offers doctors the best solution for knee arthroplasty.

surgery subsidies in line with patient conditions to make therapies available for a rising number of underprivileged patients.

In addition to the provision of medical services, the Minimally Invasive Spine & Joint Center has also acquired a SNQ certificate to further enhance its service quality. Furthermore, the Center espouses the spirit of giving back to society in deep gratitude. We not only offer high-quality medical services to local residents but also focus on the training of spinal surgery talent and enhancement of healthcare standards in Taiwan. The



The O arm spinal navigation system which offers 3D image navigation and image guidance is widely applied in spinal surgeries.



Center also features the first Computerized Navigation Demonstration Center in the Asia-Pacific Region, which welcomes physicians to gain a deeper understanding of navigated spinal surgery, and an International Training Center for Minimally Invasive Spinal Endoscopy, which offers training courses on related technologies. In the future, we will persist in our efforts to boost academic exchanges, pass on knowledge and experiences, and foster professional development in the field of spinal medicine.



In addition to the provision of integrated medical services, the Minimally Invasive Spine & Joint Center is actively committed to training new talent. The image shows Director Chang Chien-Chun (left) guiding a team of co-workers in suture training.



During a case meeting, physicians, physical therapists, and gym trainers jointly discuss the planning of a graded exercise prescription and personalized exercise rehabilitation therapy for a patient.