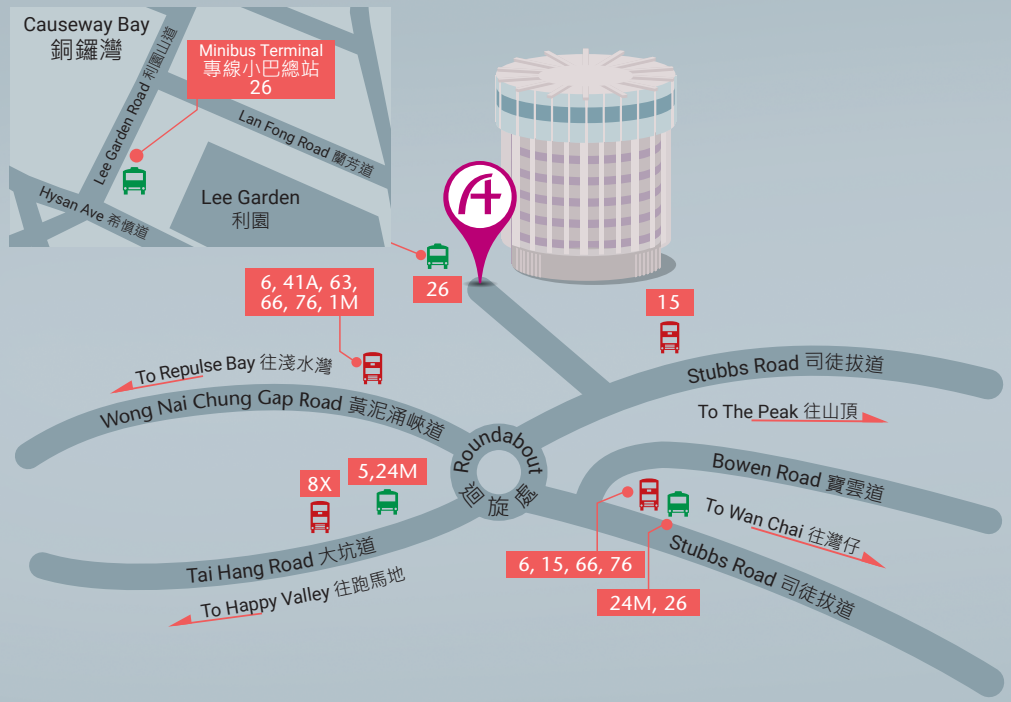
MAP 路線圖



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Robotic Surgery Center
機械臂外科中心

Elevating Surgical Excellence Through Cutting-Edge Robotics

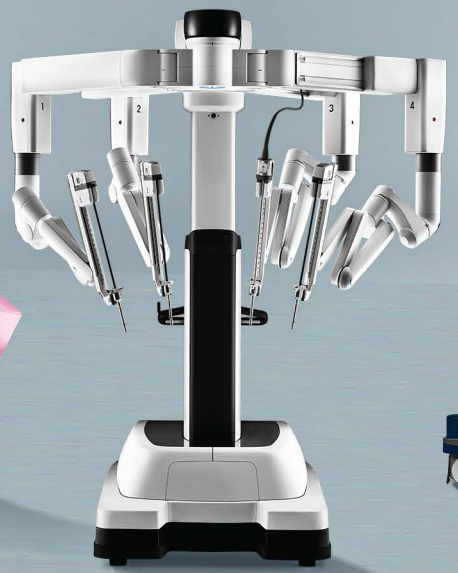
先進機械臂技術 成就卓越醫療

Precision medicine is becoming the prevailing trend. As medical technology continues to advance, patients have more treatment options, and the safety and post-operative recovery have also seen significant improvements. In recent years, the technology and application of robotic-assisted surgery have become increasingly widespread. Robotic-assisted surgery is a method that utilizes a robotic system to assist in surgical procedures, combining the expertise of the surgeon with the flexibility of the robotic arm system to improve the precision of the surgery.

Through the assistance of the robotic arm, surgeons can perform extremely delicate surgical operations and execute some more challenging procedures. At the same time, it reduces surgical trauma and bleeding, shortens the patient's recovery time, and enhances the effectiveness of the surgery.

精準治療成大勢所趨，隨著醫療科技日益進步，患者有更多治療選擇，安全性及術後復原亦取得極大改善。近年機械臂手術的技術和應用愈趨廣泛，機械臂手術是一種利用機器人系統輔助外科手術的方法，結合外科醫生的專業與機械人手臂系統的靈活性，提高手術的精準度。

透過機械臂輔助，外科醫生能夠進行極細微的手術操作，執行一些難度較高的手術。同時減少手術創傷和出血，縮短患者復原時間，提升手術成效。

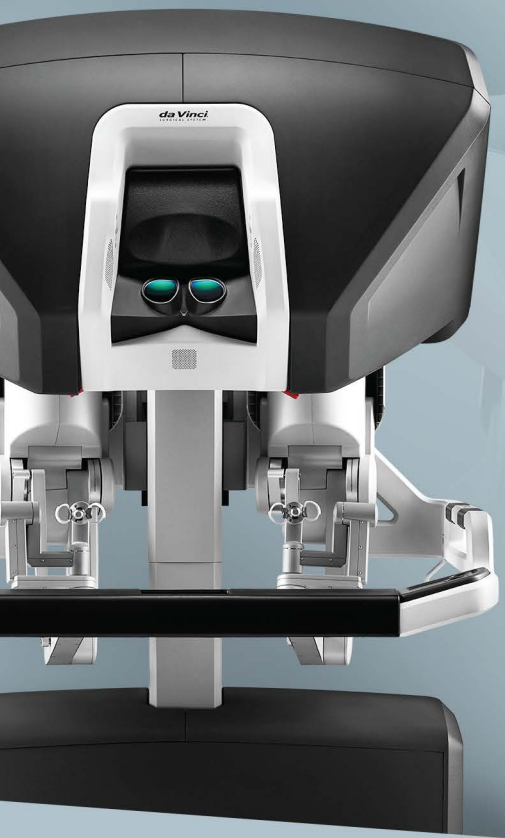


7 Advantages of Robotic-Assisted Surgery

- Decreased Intraoperative Bleeding
- Fast Recovery
- Improved Surgical Precision
- Lower Infection Risk
- Reduced Pain
- Reduced Risk of Complications
- Shorter Hospital Stay

機械臂手術的7大優點

- 減少術中出血機會
- 術後復原更快
- 提高手術的精準度
- 感染風險較低
- 減少疼痛
- 減少出現併發症的機會
- 縮短住院時間



Pioneering Robotic Surgical Solutions

Hong Kong Adventist Hospital - Stubbs Road has been at the forefront of medical innovation, committed to leveraging advanced medical technology to continuously explore ways to enhance patient care and treatment outcomes.

In 2024, we established the Robotic Surgery Center, introducing the latest robotic systems, including the first robotic arm surgical system in Hong Kong applicable to the entire spine, a brand-new robotic arm system for total knee replacement, as well as the 4th generation - Da Vinci Xi – Robotic Surgical System. These systems can be widely applied in neurosurgery, orthopedics, urology, general surgery, and otorhinolaryngology, providing robotic-assisted surgical services for various diseases and conditions, such as robotic-assisted spine surgery, robotic-assisted joint replacement, and complex tumor resection surgeries.

In the future, we will also actively explore the application of these advanced technologies in other specialized surgeries, leading the way in innovative medical practices and driving healthcare excellence.

機械臂手術 推動醫療卓越

香港港安醫院—司徒拔道走在醫療創新的前沿，致力善用高端醫療科技儀器，不斷尋找提升病人護理和治療效果的方法。我們於2024年成立了機械臂外科中心，引入了最新的機械臂系統，包括全港首部可應用於全脊椎的機械臂手術系統、全新的全膝關節置換術機械臂以及第四代達文西機械臂手術系統。這些系統能夠廣泛應用於神經外科、骨科、泌尿外科、外科和耳鼻喉科等領域，為各種疾病和病情提供適合的機械臂輔助手術服務，例如機械臂輔助脊椎手術、機械臂輔助關節置換手術和腫瘤切除等複雜手術。

未來，我們還將積極探索其他專科手術上的應用，帶領先進技術並推動醫療卓越。

Commitment to Safety and Excellence

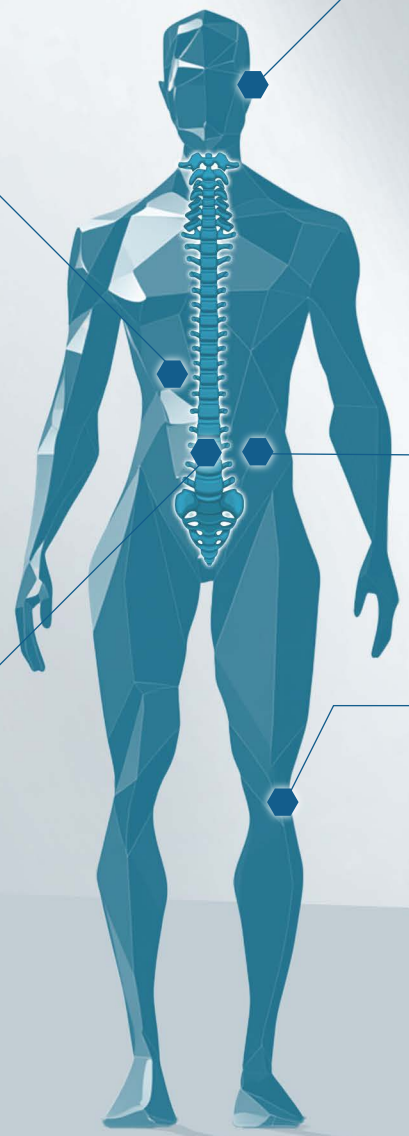
The Robotic Surgery Center team is composed of multi-disciplinary healthcare professionals, to ensure patient safety, our surgeons undergo rigorous training and certification and obtain clinical privileges for robotic-assisted surgery before being authorized to operate the robotic systems.

對安全與卓越的承諾

機械臂外科手術中心團隊由多個跨專科領域的醫護人員組成，為確保病人安全，我們的外科醫生均接受嚴格的培訓和資格認證，並獲得機械臂輔助手術臨床權限，方可被授權操作機械臂手術。

Wide Range of Robotic Surgical Applications in Different Medical Specialties

機械臂手術在不同專科上的應用



General Surgery
外科

- Bile Duct Cancer 膽管癌
- Pancreatic Cancer 胰臟癌
- Colorectal Cancer 大腸癌
- Rectal Prolapse 直腸脫肛
- Hernia Surgery 疝氣 (小腸氣)
- Stomach Cancer 胃癌
- Liver Cancer 肝癌
- Tumor Resection 腫瘤切除

Neurosurgery/Orthopedics
神經外科/骨科

- Lumbar Fusion Surgery 腰椎融合術
- Spinal fixation Surgery 脊椎固定術

Otorhinolaryngology
耳鼻喉科

- Oral and Pharyngeal Tumors 口腔及咽喉腫瘤
- Salivary Gland Tumor Resection, Neck Lymph Node Resection, or Neck Cyst Removal 切除唾液腺腫瘤、頸部淋巴結、或頸部囊腫
- Tonsillectomy 扁桃腺切除

Urology
泌尿外科

- Kidney Cancer 腎癌
- Prostate Cancer 前列腺癌
- Pyeloplasty 腎盂成形術

Orthopedics
骨科

- Hip Replacement 髖關節置換
- Knee Replacement 膝關節置換

Introducing Hong Kong's First Robotic Arm Surgical System that can be applied to the Entire Spine

Common Spine Problems

If there is a problem with the spine, such as intervertebral disc herniation, spinal stenosis, and intervertebral disc degeneration, it can affect various parts of the body. Relevant research shows that up to 80% of adults experience back pain, and spinal disease is one of the common reasons for seeking medical attention. For example, approximately 3 million Americans suffer from a herniated disc each year, while spinal stenosis affects approximately 200,000 Americans. These spinal problems often cause chronic pain, limited mobility, numbness, and weakness, making basic daily activities difficult and affecting the quality of life.

Application of the Robotic Arm Surgical System

Our hospital has introduced Hong Kong's first robotic arm surgical system, ExcelsiusGPS® that can be applied to the entire spine. Robotic arm navigation is mainly used for spinal fixation in spine surgery, such as inserting pedicle screws or fusion devices in the lumbar spine. The system can also be used for cervical spine surgery. Since the bones of the cervical spine are relatively thinner and have lower tolerance for deviation, the assistance of robotic arms can effectively improve the accuracy of surgery.

In robotic arm surgery, doctors can also utilize a computer navigation system to assist in completing the surgery, less use of X-rays will result in lower radiation exposure for both patients and medical staff. Before the surgery, the doctor can pre-plan the positioning of the screws and the ideal screw sizes, which will improve the stability after implantation. Compared with relying solely on X-rays and doctors' clinical judgment in the past, preoperative planning and accuracy of robotic arm surgeries have been greatly improved.

Advantages of the Entire Spine Robotic Arm Surgical System

- Fast Recovery
- Less Pain
- Less Blood Loss
- Reduced Damage to Surrounding Soft Tissues and Muscles
- Shorter Surgical Duration
- Smaller Incision Size

引入全港首部可應用於全脊椎的機械臂手術系統

常見的脊椎問題

若脊椎出現問題，如椎間盤突出、椎管狹窄和椎間盤退化，身體各個地方都可能受影響。有關研究顯示，多達80%的成年人曾經歷背痛，而脊椎疾病更是導致求診就醫的常見原因之一。例如，每年約有300萬美國人患有椎間盤突出，而椎管狹窄則影響約20萬名美國人。這些脊椎問題通常會造成慢性疼痛、活動能力受限制、出現麻痺、乏力，使日常基本活動變得困難，影響生活質素。

機械臂系統的應用

本院引入全港首部可應用於全脊椎的機械臂手術系統ExcelsiusGPS®。機械臂導航主要用於脊椎手術的脊椎固定術，例如在腰椎打入椎弓螺釘或放入融合器，系統更可應用於頸椎手術。由於頸椎的骨相對較細、偏差容忍度偏低，機械臂的輔助便能有效提高手術的精準度。

在機械臂手術中，醫生亦可透過加入電腦導航系統協助完成手術，用較少X光，無論對病人、醫護人員而言，所接收的輻射會較少。進行手術前，醫生能預先規劃螺絲擺放的位置和最理想的螺絲尺寸，植入後的穩定性能做得更好。相比以前單憑X光及醫生臨床判斷，機械臂手術的術前規劃及準確度大大提升。

全脊椎的機械臂手術系統優點

- 術後復原更快
- 減少痛楚
- 流血量減少
- 減低對周邊軟組織和肌肉的傷害
- 手術時間較短
- 傷口較細

Robotic Knee Replacement Surgery System Increases Accuracy of Surgery and Improve Postoperative Outcome

Recent Situation

Bone and muscle loss is a common problem in the aging population, and it often leads to knee joint pains. Many patients with this problem have to replace their knee joints by undergoing knee replacement surgery. Knee replacement surgery is one of the procedures with the longest waiting times in public hospitals. As of June 30, 2024, there were a total of 33,951 cases waiting for this surgery, with an average waiting time of approximately 4 years. Through professional diagnosis by orthopedic surgeon, advanced techniques and materials can be used to replace the joint with an artificial one, relieving the patient's pain and restoring their daily functional ability.

Knee Joint Degeneration

Once the knee develops a pathological condition, the joint space narrows, and the articular cartilage is worn down and damaged, leading to pain and even deformity. The common causes include osteoarthritis, rheumatoid arthritis, post-traumatic arthritis, and osteonecrosis etc.

If the joint disease becomes severe, and conservative treatment is ineffective, the orthopedist will select the most appropriate knee replacement based on the patient's knee joint condition. The affected bone is removed, and it is replaced with metal. The cartilage portion is substituted with high-molecular-weight polyethylene, eliminating the direct friction of the metal surfaces.

全膝關節置換術 機械臂提高手術精準度 提升術後康復效果

現況

香港人口老化，隨着年齡增長會加速骨質和肌肉流失，不少人面對關節痛需要換膝關節進行置換手術。膝關節置換手術是公立醫院輪候時間最長的手術之一，截至2024年6月30日個案共有33,951宗，輪候時間約4年。經由骨科醫生專業診斷下，可運用先進的技術及物料，為患者置換人工關節，以減輕患者疼痛並恢復其日常活動的能力。

Normal joint space
Healthy articular cartilage
正常關節間隙
關節面軟骨健康

Narrowed joint space
Worn articular cartilage
關節間隙變窄
關節面軟骨磨損

膝關節病變

一旦膝關節出現病變，關節間隙變窄、關節面軟骨磨損破壞導致疼痛甚至變形，常見的原因有退化性關節炎、類風濕關節炎、創傷性關節炎、骨壞死等。

若果關節病變嚴重，在保守治療無效的情形下，骨科醫生會依患者的膝關節狀況選擇最適合的膝關節置換，將受病變影響的骨骼移除，並以金屬取代，軟骨部分則由高分子聚乙烯替換，免除金屬面的直接摩擦。

Advantages of Robotic-Assisted Total Knee Replacement

After the professional diagnosis and selection of the appropriate artificial joint for the patient, orthopedic surgeon will perform joint replacement surgery to implant the artificial joint to patient's body. The ROSA® Robotic System provides stable, precise, and highly reproducible cutting, which can help the orthopedic surgeon to perform the surgery more accurately. Moreover, robotic system allows adjustment and personalization of bone cut and artificial joint position, which effectively reduce soft tissue damage and promoting postoperative pain relief, thereby improving surgical outcomes.

- Decreases Postoperative Pain
- Helps in a Faster Return to Daily Life
- Reduces Complications/Blood Loss
- Shortens Hospital Stay

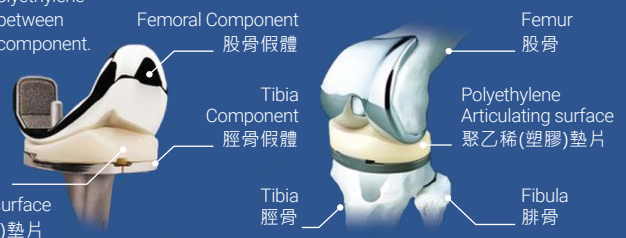
Our hospital has collaborated with Zimmer Biomet to establish the first 'ROSA Robotics Surgery Center of Excellence' in the Greater China region. This center will provide a training base for orthopedic surgeons in Greater China and the Asia-Pacific region, focusing on robotic-assisted joint replacement surgeries. It will facilitate relevant training and academic exchanges, contributing to the popularization and development of robotic joint surgeries.

機械臂全膝關節置換術的優點

通過專業診斷，挑選適合患者的人工關節後，骨科專科醫生會進行關節置換手術，將人工關節置入病人體內。而ROSA®機械臂系統提供穩定、精確的切割，有助骨科醫生更精確地執行手術。同時，機械臂系統可以對切骨及人工關節位置作出調整，從而減少軟組織的損害，進而促進術後疼痛的減緩，提升康復效果。

- 減低術後痛楚
- 幫助快速回到日常生活
- 減少併發症/失血量
- 縮短住院時間

Total knee replacement implant with a polyethylene articulating surface (plastic tray) placed between the metal femoral component and tibial component.
人工膝關節由三個主要部份組成，包括金屬股骨假體及股骨假體，中間的為聚乙稀(塑膠)墊片。



本院與捷邁邦美合作，成立大中華區首個「ROSA機械臂手術卓越發展中心」。該中心將為大中華區及亞太地區的骨科醫生提供機械臂關節置換手術的訓練基地，進行相關的培訓及學術交流，為機械臂關節手術的普及化及發展作出貢獻。

The Da Vinci Xi Robotic Surgical System Offers Precise Tumor Removal

第四代達文西機械臂手術系統精準切除腫瘤

The fourth generation of the Da Vinci Xi Robotic Surgical System is an advanced minimally invasive surgical system, with over 12 million procedures performed worldwide using this technology. The Da Vinci Xi Surgical System is utilized across numerous medical disciplines, particularly in addressing cancers such as stomach cancer, liver cancer, and pancreatic cancer.

第四代達文西機械臂手術系統是一部更先進的微創手術系統，全球使用達文西機械臂完成的手術已高達1200萬宗。這套系統可用於執行各種專科手術，尤其在治療癌症方面，如胃癌、肝癌和胰臟癌等。

Prostate Cancer 前列腺癌

Today, robotic prostatectomy is widely used, and in the United States, it has become more common than conventional open surgery. With the assistance of the Da Vinci Surgical System, doctors carefully remove the prostate gland and pelvic lymph nodes using high-definition 3D images while preserving important nerves and blood vessels. This precision enhances patient safety and post-surgery outcomes.

目前，許多地區已廣泛使用機械臂進行前列腺切除手術。在美國，每年通過機械臂處理的前列腺癌病例數已超越傳統開放式手術。醫生透過立體且清晰的影像，使用微創方式小心地移除前列腺，保留重要的神經與血管，從而提升手術的精細度，病人的安全和術後效果亦因此提升。

Colorectal Cancer 大腸癌

The robotic surgical system is capable of addressing complicated rectal cancer cases while minimizing side effects, such as impotence, by preserving the pelvic nerve plexus. This system also allows surgeons to operate deeper into the pelvis to effectively remove hard-to-reach tumors while preserving anal muscle function, thus exempting patients from the need for a permanent stoma.

機械臂系統同時能處理較複雜的直腸癌病例，並能避免因觸及神經而引起的副作用，例如影響盆腔神經的功能。該系統還可以讓醫生深入盆腔清除腫瘤，同時保留肛門肌肉的功能，避免進行永久造口手術。

Stomach Cancer 胃癌

Since the gastric lymph nodes are in close proximity to the aorta, the surgery is generally performed through an open abdominal approach. However, surgeons can also utilize a robotic-assisted system to perform the procedure more efficiently and effectively in removing the potentially infected lymph nodes, while avoiding damage to the nearby major blood vessels.

由於胃部淋巴結緊靠主動脈，手術一般以剖腹方式進行。不過，外科醫生亦可透過機械臂系統輔助進行手術，更快速有效地清除有機會受感染的淋巴，同時避免傷及附近的大血管。

Liver Cancer 肝癌

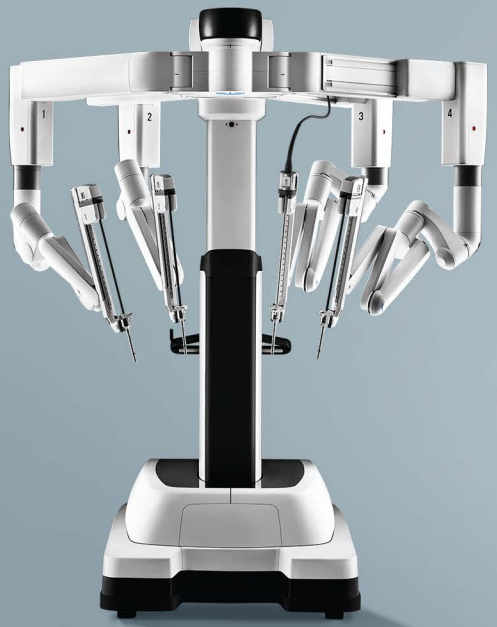
The liver is densely vascularized and closely connected to the bile ducts. The robotic-assisted system can provide a three-dimensional, clear, and magnified real-time image, as well as the ability to filter out any tremor from the surgeon's hands, further improving the precision and safety of the surgical procedure.

肝臟滿佈血管，且連接膽管。機械臂系統能提供立體、清晰、能放大的即時影像，加上能濾除醫生手部震顫，進一步提高手術的精確度，提高安全性。

Pancreatic Cancer 胰臟癌

The robotic-assisted system allows the surgeon to clearly visualize the internal conditions, perform complex procedures within the cavity from different angles, and conveniently dissect tissues in difficult positions or angles, while avoiding damage to nearby major blood vessels. This results in a faster recovery for the patient.

機械臂系統輔助可讓外科醫生清晰了解腔內情況，從不同的角度在腔內進行複雜的手術，方便剝離刁鑽位置或角度的組織，同時避免傷及附近的主要血管，病人亦可較快復原。



The Advantages of the Da Vinci Xi Robotic Surgical System 第四代達文西機械臂的優點	Urology - Prostate Cancer 泌尿科 - 前列腺癌	Colorectal Cancer 大腸癌	Stomach Cancer 胃癌	Liver Cancer 肝癌	Pancreatic Cancer 胰臟癌
Shorter Hospital Stay and Faster Recovery 住院期間縮短，康復較快	✓	✓	✓	✓	✓
Smaller Incisions 傷口較小	✓	✓	✓	✓	✓
Less Pain and Lower Chance of Infection 疼痛減少，感染機率降低	✓	✓	✓	✓	✓
Less Blood Loss 出血量少	✓	✓	✓	✓	✓
Helps to Avoid Injury to the Muscles and Fascia 避免傷及肌肉與筋膜		✓	✓	✓	✓
Less Burden on the Respiratory System 減低呼吸系統負擔				✓	
Less Delay between Surgery and Subsequent Chemotherapy and Electrotherapy 避免延誤隨後的化療和電療					✓
Less Laparotomy-Related, Long Term Complications Resulting, such as Incisional Hernia, Adhesion and Blockage of Intestines 減低因剖腹手術導致長遠併發症， 如切口疝、小腸氣、腸黏連、腸塞等					✓
Preserving Anal Muscle Function 保留肛門肌肉的功能		✓			
Minimized Delays in Subsequent Treatment 減少後續治療的時間延誤	✓	✓	✓	✓	✓
Fewer Laparotomy-related Complications 減少開腹手術所引發的併發症	✓	✓	✓	✓	✓

Patient Sharing
病友分享

Recovery of the Robotic -Assisted Spinal Fusion Surgery Patient
機械臂脊椎融合術康復者

Mr. Oliver Kadhim

Mr. Oliver Kadhim, in his early 40s, had been suffering from right lower back and leg pain, numbness, and aching for the past two years. At times, he could barely walk for more than a minute, which significantly impacted his work. He had tried acupuncture therapy and epidural steroid injections, but without much success. Considering he had four young children to care for, he ultimately decided to undergo surgical treatment. After examination, the doctors diagnosed him with a herniated disc at the L5 level, which was compressing the L5 nerve. They recommended an L5/S1 fusion surgery.

In March 2024, Mr. Kadhim underwent robotic-assisted surgery. He was able to get up and walk just a few hours after the procedure and was discharged the next day. Within 3-4 weeks of the surgery, he had made substantial progress in his recovery and was able to resume his normal exercise routine. The robotic-assisted spinal fusion surgery has allowed him to regain his mobility and quality of life, enabling him to better care for his family.

Mr. Oliver Kadhim 現年40多歲。兩年前開始右下背及腿部出現痛楚飽受麻木和酸痛的困擾，嚴重時甚至無法走路超過1分鐘，工作也受到影響。他曾嘗試針灸療法和硬膜外藥物注射，但效果不佳。考慮到他有4個小孩需要照顧，他最終決定接受手術治療。經檢查後，醫生確診他患有椎間盤突出，壓迫到L5神經，需要進行L5/S1融合手術。

2024年3月，他接受了機械臂輔助的手術，術後數小時即可下床行走，翌日出院。術後約3至4周，他初步恢復。現時已可以恢復平常的運動。機械臂輔助手術令他重拾健康生活，能夠更妥善地照顧他的家人。

Recovery of the Robotic -Assisted Knee Replacement Surgery Patient
機械臂全膝關節置換術康復者

林女士 Ms. Lam

Ms. Lam, a woman in her early 60s, had been suffering from severe left knee pain and swelling for around 7 years. While traveling abroad, she returned to Hong Kong and consulted multiple orthopedic specialists, who diagnosed her with a torn meniscus after an MRI scan. Though doctors recommended surgery, Ms. Lam was hesitant and opted for anti-inflammatory and pain medications instead. However, the following summer, her condition worsened, and during a trip to the mountainous city of Chongqing, her knee pain became unbearable, leaving her unable to fully extend her leg. Deciding to address the issue, Ms. Lam underwent a robotic-assisted total knee replacement surgery, which took approximately 1.5 hours. Just 2 hours after the surgery, she was able to walk with the help of a walker, without any pain. By the third day, Ms. Lam could walk and climb stairs independently, and the entire hospitalization and recovery process took only 5 days. Pleasantly surprised by her rapid recovery, Ms. Lam was able to resume her traveling and exercise habits, thanks to the robotic-assisted approach and her diligent rehabilitation.

林女士現年60多歲。大約7年前，她突然出現左膝關節疼痛和腫脹的問題，感覺像「拗柴」一樣。當時她正外遊，回港後四出求醫，尋求多位骨科醫生的建議。有醫生建議她進行磁力共振檢查，診斷出她有半月板撕裂的問題。醫生曾經建議她接受手術治療，但林女士對手術感到猶豫，因此只服用消炎止痛藥來緩解膝關節的疼痛。直到翌年夏天，林女士的膝關節疼痛加劇，步行一段時間便需要休息。年底時她前往重慶旅遊，當地以「山城」聞名，需要大量步行，回港後膝關節疼痛更加嚴重，下肢無法伸直。林女士再次求醫，決定接受全新的機械臂全膝關節置換術。整個手術歷時約一個半小時，術後約兩小時即可在推架的幫助下步行，沒有疼痛。術後第3天，她已可以自行步行和上落樓梯。從入院、出院、康復只用了5天時間。林女士笑言沒有想到自己可以如此快速地恢復，可以繼續旅行和運動的習慣。