

The *da Vinci*® Surgical System

The *da Vinci* Surgical System is a sophisticated robotic platform designed to enable complex surgery using a minimally invasive approach. The *da Vinci* System consists of an ergonomic surgeon's console, a patient-side cart with four interactive robotic arms, a high-performance vision system and proprietary *EndoWrist*® instruments. Powered by state-of-the-art robotic technology, the *da Vinci* System is designed to scale, filter and seamlessly translate the surgeon's hand movements into more precise movements of the *EndoWrist* instruments. The net result is an intuitive interface with breakthrough surgical capabilities.

The *da Vinci* Surgical System's main features include *Intuitive*® motion, high-resolution 3D vision and innovative *EndoWrist* instrumentation. *Intuitive* motion refers to the System's interface, which helps make *da Vinci* surgery look and feel like traditional "open" surgery. But this is where the similarities end.

The *da Vinci* System's high-resolution 3D stereo viewer is designed to provide surgeons with an immersive experience. Unlike conventional approaches, the target anatomy appears at high magnification, in brilliant color and with natural depth of field. To perform a procedure, the surgeon uses the console's master controls to maneuver the patient-side cart's four robotic arms, which securely hold the patented *EndoWrist* instruments and high-magnification endoscopic camera. The *EndoWrist* instruments' jointed-wrist design exceeds the natural range of motion of the human hand; motion scaling and tremor reduction further interpret and refine the surgeon's hand movements. A final hallmark of the *da Vinci* System is its fail-safe design, incorporating multiple, redundant safety features designed to minimize opportunities for human error when compared with traditional approaches.

The *da Vinci* System is a remarkable improvement over conventional laparoscopy, in which the surgeon operates while standing, using hand-held, long-shafted instruments, which have no wrists. With conventional laparoscopy, the surgeon must look up and away from the instruments, to a nearby 2D video monitor to see an image of the target anatomy. The surgeon must also rely on his/her patient-side assistant to position the camera correctly. In contrast, the *da Vinci* System's ergonomic design allows the surgeon to operate from a comfortable, seated position at the console, with eyes and hands positioned in line with the instruments. To move the instruments or to reposition the camera, the surgeon simply moves his/her hands.

By providing surgeons with superior visualization, enhanced dexterity, greater precision and ergonomic comfort, the *da Vinci* Surgical System makes it possible for more surgeons to perform minimally invasive procedures involving complex dissection or reconstruction. This ultimately raises the standard of care for complex surgeries, translating into numerous potential patient benefits.

For the patient, a *da Vinci* procedure can offer all the potential benefits of a minimally invasive procedure, including less pain, less blood loss and less need for blood transfusions. Moreover, the *da Vinci* System can enable a shorter hospital stay, a quicker recovery and faster return to normal daily activities. Clinical studies also suggest that the *da Vinci* System may help surgeons provide better clinical outcomes than conventional technologies allow – for example, better cancer control and a lower incidence of impotence and incontinence with *da Vinci* Prostatectomy.¹

While clinical studies support the use of the da Vinci® System as an effective tool for minimally invasive surgery, individual results may vary.

¹ Cancer control is defined in part by margin rates and PSA test scores. The following studies provide support for these claims: Ahlering TE, Woo D, Eichel L, Lee DI, Edwards R, Skarecky DW. Robot-assisted versus open radical prostatectomy: a comparison of one surgeon's outcomes. *Urology*. 2004 May;63(5):819-22. Menon M, Tewari A, Peabody JO, Shrivastava A, Kaul S, Bhandari A, Hemal AK. Vattikuti Institute prostatectomy, a technique of robotic radical prostatectomy for management of localized carcinoma of the prostate: experience of over 1100 cases. *Urol Clin North Am*. 2004 Nov;31(4):701-17. Tewari A, Srivastava A, Menon M; Members of the VIP Team. A prospective comparison of radical retropubic and robot-assisted prostatectomy: experience in one institution. *BJU Int*. 2003 Aug;92(3):205-10.