

What is Computer Assisted Spine Surgery?

Specialized software creates a virtual, 3-D model of the patient's spine, essentially a digital roadmap for the surgeon to follow. During surgery, the surgeon matches the patient's actual spine to the computer's virtual model displayed on the monitor. Much like a GPS system in an automobile, the surgeon is then able to track in real-time the position of surgical instruments and implants in relation to the patient's true anatomy. For this reason, CAS may also be referred to as surgical navigation.

What Makes up a Computer Assisted Surgery System?

Stryker's surgical navigation system consists of a computer with navigation software, an infrared navigation camera and an array of Smart Instruments (embedded with light emitting diodes (LEDs)).

References

- Tjardes T, Shafizadeh S, Rixen D, Paffrath T, Bouillon B, Steinhausen ES, Baethis H. Image-guided spine surgery: state of the art and future directions. Eur Spine J. 2010 Jan;19(1):25-45
- Gebhard FT, Kraus MD, Schneider E, Liener UC, Kinzl L, Arand M. Does computer-assisted spine surgery reduce intra-operative radiation doses? Spine. 2006 Aug 1;31(17):2024-7; discussion 2028.

Patient education is important prior to any surgery. A patient who is well informed of their spinal surgery procedure, and has an understanding of what to expect, is more likely to be satisfied with their clinical outcome. To assist the patient in their patient education, Stryker has provided this educational brochure. This brochure was created to inform on a very basic level.

The information presented in this brochure is for educational purposes only. Stryker is not dispensing medical advice. Please speak to your doctor to decide if spinal surgery is right for you. Only your doctor can make the medical judgment regarding which products and treatments are right for your own individual condition.

As with any surgery, spinal procedures carry certain risks. Your surgeon will explain all the possible complications of the surgery, as well as side effects. Each spinal surgery patient will experience a different post-operative activity level, depending upon their own individual clinical factors. Your doctor will help counsel you about how to best maintain your activities in order to recover properly from your surgery. Such activities include not engaging in high-impact activities that could de-stabilize any instrumentation that may have been implanted.

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Patient Guide to Computer Assisted **Spine Surgery**



Computer assisted surgery (CAS) is leading-edge medical technology and its use in spine procedures is rapidly expanding. It provides surgeons the ability to operate with better visualization and more accuracy than ever before.



What Happens During Surgery?

Prior to surgery, the patient undergoes a CT scan, and these images are downloaded into the navigation computer. The software uses these images to build the virtual, 3-D model of the spine. In a process called registration, the surgeon uses Smart Instruments to match pre-defined points on the 3-D computer model to the patient's true anatomy. The computer uses these points to correlate the position of the patient in real-time with the computer generated 3-D model to create a digital map of the spine.

Rather than sending the patient for a pre-operative CT, your surgeon may utilize a 3-D intraoperative imaging device to obtain the images and automatically register the patient's anatomy.

Once registration is complete, the navigation camera tracks the movement and position of Smart Instruments in the surgical field and real time images of the instruments are displayed on the 3-D model. The surgeon is then able to see the exact position of the instruments, aiding in surgical precision and helping to avoid potential damage to surrounding tissue and structures. In spinal fusions, the surgeon may also use the 3-D model to plan the position, length and diameter of pedicle screws, and then navigate instruments to ensure the screws are implanted exactly as planned.

Potential Benefits of Computer Assisted Spine Surgery

- Enables minimally invasive procedures by offering the surgeon enhanced visualization of the anatomy, especially when smaller incisions are used¹
- Provides your surgeon with comprehensive data about your anatomy to pre-plan for surgery and determine pedicle screw length, diameter and position; saving valuable time and uncertainty in the OR
- CAS provides the surgeon with real-time feedback and the ability to correct potential implant misalignment during surgery
- CAS aides in the reduction of radiation exposure in the operating room by lessening the amount of X-ray images needed throughout the procedure²

During conventional spine surgery, surgeons may take multiple X-ray images to verify the location of instruments and placement of implants throughout the procedure. By eliminating the need for these repetitive X-ray images, computer assisted spine surgery helps reduce radiation exposure to both the patient and medical staff.

Common Conditions

Surgical navigation may be used to help implant pedicle screws during spinal fusion procedures to treat spinal instability caused by:

- Degenerative disc disease
- Deformity (such as scoliosis or kyphosis)
- Spinal stenosis
- Spondylolisthesis
- Fractures
- Tumor
- Infection

Remember, even if your doctor recommends spine surgery, the final decision is yours. As with any surgery, spinal procedures carry certain risks. Talk to your doctor about the type of surgery appropriate for you and the associated risks.