## Robotics in the outpatient endoscopic spine surgery arena

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The role of robotics is becoming more prominent as surgical procedure and in the spine it has become more complex. Accuracy of hardware placement is becoming more important even for experienced surgeons. Robotics is playing a greater role for not only improving results, but for patient safety. It has the added benefit of minimizing radiation, improving the accuracy of placement of endoscopic trajectories, and allowing for safer application of minimally invasive surgical approaches. It is well recognized that intra-operative and immediate post-operative imaging is helpful in MIS spine surgery, especially for percutaneous screw placement and guidance for tubes and implants. Radiation Safety is also enhanced due to the adoption of image guidance and dependence on floroscopy for needle and cannula placement. While known traditional fusion procedures such as minimally invasive placement of surgical hardware such as pedicle screw placement, implantation of stabilization devices that already can be accomplished under open and fluoroscopic guidance, the development of robotics to better standardize cannula and endoscopic placement for endoscopic surgery will also have great impact on the development and standardization of the various approaches by different key opinion leaders. Yeung's inside-out philosophy and Technique with Endoscopic trajectories aided by Artificial Intelligence programmed into the Robot will be featured here to Illustrate cannula placement for the various target points for endoscopic decompression. Industry developments helping endoscopic procedures: Intra-operative CT scans from a rapid portable CT scanner (O-arm, Airo) is aided by a robotic arm providing image guidance through navigation which will shorten the learning curve for novice and less experienced surgeons. It will also help decrease radiation exposure. It can help with instrument placement for surgical trajectories. The Orion Surgical suite brings all the components together. To conclude, Robotic techniques are evolving rapidly, and offer significant advantages to surgeons by precise reproducible cannula placement in minimally invasive approaches.

### Speaker Biography

Anthony T Yeung specializes in diagnosing and treating the patho-anatomy of back pain and sciatica from painful degenerative conditions of the lumbar spine, particularly discogenic pain from toxic annular tears, disc herniations, lumbar spondylosis and foraminal stenosis. His Endoscopic procedures are over 10,000 since 1991 are effective in relieving both back and leg pain, by visualizing, decompressing, and ablating the pain generator with an endoscope. He is the developer of the Yeung Endoscopic Spine System, and has interest in developing a robotic and image guidance system to facilitate his technique for spine surgeons in training.

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