Robotic Assisted Screw Placement with Cirq Robotic Arm

Pojskić et al. (2021), in JCM

Products
Cirq, Spine Curvature Correction, S&T Navigation

Hospital / Authors
Department of Neurosurgery, University of Marburg, Marburg, Germany

Pojskić, M.; Bopp, M.; Nimsky, C.; Carl, B.; Saβ, B.

Clinical Background
Image-guided navigation in combination with robotics is increasingly being used in spinal surgeries. Surgeons are assisted by robotic spine systems and use them to deploy and maintain a preoperatively planned trajectory. This study presents an initial clinical assessment of thoracolumbar pedicle screw placement using the Brainlab Cirq robotic arm.

Aim of Study
The aim of study was to analyze initial clinical data on the use of Cirq and compare it with existing data on competitor products based on completed studies and existing literature.

N = 12 patients / 70 thoracolumbar screws, single center prospective case series, 2 surgeons

Results
- 97.1% clinically acceptable screws
- 94.3% Gertzbein Robbins A or B screws
- Mean time per screw was 08:27 ± 06:54 min. From the first 7 surgeries to the latter 6 the mean time per screw significantly decreased (16:03min ± 09:32 min → 04:35min ± 02:11 min)
- Mean entry point deviation was 1.9 ± 1.23 mm
- 60% of all cases were metastasis or spondylodiscitis and thus inherently complex
- Skiving or an unstable reference array on tumorous spinous processes might have caused the need for screw revision

Summary
- Even with a high number of complex indications, Cirq has proven to be **a safe and effective device for accurate pedicle screw placement**
- Significantly decreased mean time per screw throughout the course of the surgeries **indicates a steep learning curve**
- Results are **comparable to the state of the art** in robotic assisted spine surgery

Source: Pojskić et al. (2021): DOI 10.3390/jcm10245725, in *JCM*, 10(24)