

True MIS cervical pedicle screw placement – first clinical impressions of a market-ready platform using iCT navigation.

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**BACKGROUND**

Intraoperative navigation facilitated the use of cervical pedicle screw (CPS) in dorsal instrumented fusion-surgery on a regular basis. We have experienced a paradigm shift; away from the use of lateral mass screws (LMS) towards CPS implantation. Although, minimally invasive surgical (MIS) procedures have also become standard throughout the thoracolumbar spine, MIS CPS placement is not enjoying nearly as much popularity.

**RESEARCH QUESTION**

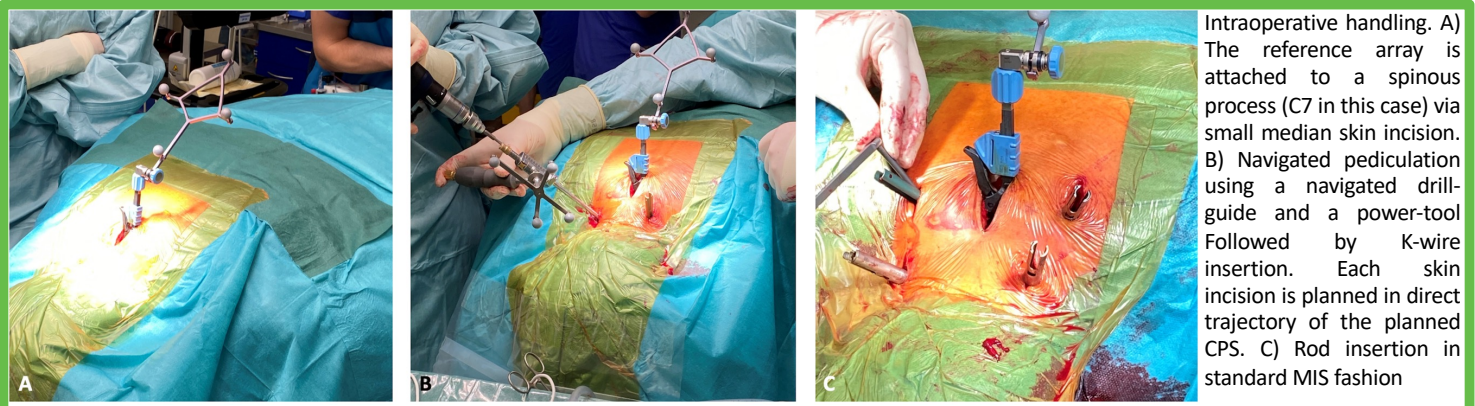
Our study reports on workflow and initial outcomes using a new exclusively minimally invasive surgery (MIS) approach for cervical pedicle screw (CPS) insertion.

**STUDY DESIGN**

Ten patients were treated with MIS dorsal instrumented fusion of the c-spine between January and July 2023 and retrospectively assessed.

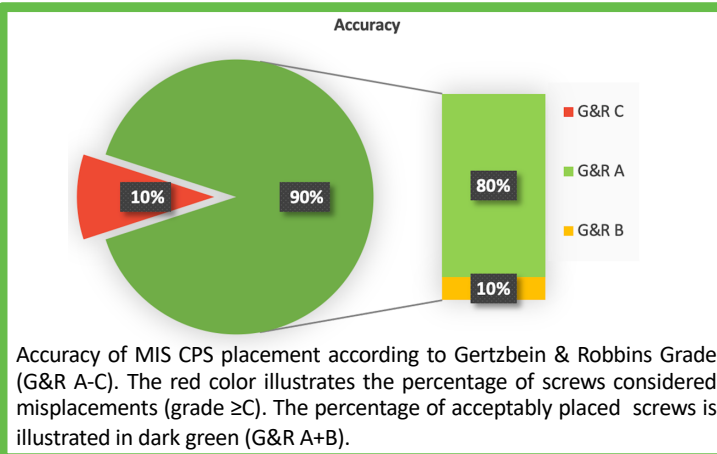
**METHODS**

In total, 40 CPS were percutaneously implanted, making use of intra-operative CT guided navigation. A modified Gertzbein&Robbins classification was used to assess accuracy. We also report on adverse events and other patient-related data.

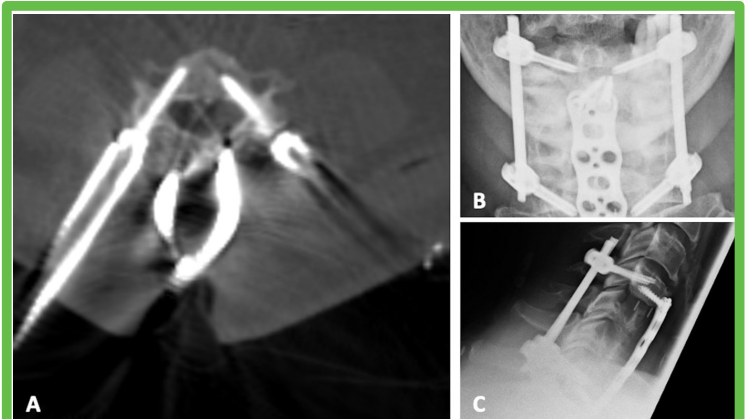


**RESULTS**

An accuracy of 90% acceptable screw placement was observed. Eighty percent of CPS were on perfect trajectory. Ten percent caused minor pedicle perforation. No screw was intra/postoperatively revised since they were not associated with inferior biomechanics or neurological deterioration. We found two pedicle screws breaching the transverse foramen without contact to the vertebral arteries.



Accuracy of MIS CPS placement according to Gertzbein & Robbins Grade (G&R A-C). The red color illustrates the percentage of screws considered misplacements (grade  $\geq C$ ). The percentage of acceptably placed screws is illustrated in dark green (G&R A+B).



A) Accuracy of screw placement is usually assessed intraoperatively before rods are implanted. In this case at level C4. The reference was also attached to the spinous process of C4. B) and C) Are examples of post operative radiographs of a patient that received MIS dorsal fixation due to poor bone quality following ventral 2-level corpectomy in a case of degenerative cervical myelopathy.

**DISCUSSION**

In a small series of patients MIS CPS placement yielded results comparable to open surgical screw placement using intraoperative navigation. For selected cases, MIS approach for CPS placement appears feasible and safe.

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