

Subaxial Cervical Pedicle Screw Fixation. Is it a reasonable alternative? John M. Duff MD, FACS Centre Hospitalier Universitaire Vaudois, Lausanne, Switzerland

#### Introduction

Subaxial pedicle screw fixation techniques are described using anatomic landmarks and with image guidance. While biomechanically superior to lateral mass screws, there are reservations regarding safety. Standard cervical screws are 3.5 to 4 mm in diameter, and cervical pedicle width is 4.9 to 6.5mm.

We review our experience of nineteen patients in whom image guided subaxial pedicle screws have been placed, with CT verified placement accuracy, and complications.



subaxial pedicle screws

# Methods

Retrospective 5 year review yielded 19 patients who had undergone subaxial cervical pedicle screw placement either alone or as part of a hybrid construct. Typical indications include poor quality bone, lateral mass or pedicle fracture, or the need for three column fixation. We limited our review to C3 to C6 pedicle placements to assess vertebral artery risk. Additionally, the C7 pedicle is often instrumented freehand.

All placements were image guided using stereotactic techniques.

Screw placements were verified with post-operative CT.

Axial CT subaxial pedicle screws



## Results

Out of 131 patients undergoing posterior cervical instrumentation over the study period, 19 patients had a total of 42 pedicle screws placed from C3 to C6 using image guidance.

Screw placements were classified as follows. Type 1 with bone surrounding the entire screw, type 1a where the screw thread breeches the pedicle wall, type 2 where the inner diameter of the screw breeches the pedicle wall, type 3 where there is a neurovascular injury. In our study there were 13 type 1 placements, 11 type 1a placements, 18 type 2 placements, and no type 3 placements. Measurements were taken using reconstructed CT images along the axis of each screw, looking down the "barrel" of the pedicle.

No clinical complications were noted.

## Conclusions

Image guided cervical subaxial pedicle screw technique appears to be safe.

True accuracy can be measured by manipulating CT images along the axis of the pedicle.

Cervical pedicle screws are an alternative to lateral mass screw fixation



transmuscular trajectory

## **Learning Objectives**

Cervical subaxial pedicle screw placement is a viable alternative to standard lateral mass screw placement, and has biomechanical advantages.

The technique appears to be safe, although numbers are limited.

Accuracy of placement is best measured by manipulating CT images

#### References

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