

Abstract #228.docx

THE FEASIBILITY OF MULTIPLE SCREW FIXATION IN C2

INTRODUCTION/AIM

The purpose of this study was to investigate the feasibility of achieving multiple segmental screw fixation in C2.

METHODS

First, we conducted computer simulation to evaluate the anatomical feasibility of placing both pedicle and laminar screws on the same side. We used 1.0-mm interval CT scans with 100 patients (50 men; 50 women) and screw trajectory simulation software. Second, the feasibility of screw-rod assembly was investigated using 4 sawbone models and 2 cadavers. Finally we report our experience of surgery in 10 patients.

RESULTS

CT simulation demonstrated that both pedicle and laminar screws could be placed: bilaterally in 85 patients; both screws on one side, but only one screw contralaterally in 11 patients; and only 1 screw on each side in 4 patients. Screw-rod assembly of multiple fixation points was achieved in all specimens while evaluating 4 sawbone models, 2 cadavers, and 10 patients. There were no complications related to multiple screw fixation in C2.

DISCUSSION

Multiple C2 fixation may be useful in osteoporotic cases, limiting the number of fusion levels, or where subaxial lateral mass fixation is suboptimal. The use of a third or a fourth rod connecting C2 laminar with upper cervical or thoracic laminar screws can be used to augment long cervico-thoracic arthrodesis where lateral mass and pedicle screw fixation may be tenuous.

CONCLUSIONS

Our results suggest that C2 can accommodate 3 or 4 screws in 96% of cases and screw-rod assembly will be feasible in most circumstances.