

BACKGROUND

C1-2 instability is a unique problem in spine surgery and frequently affects the pediatric population. C1-2 transarticular screw placement is an effective method of surgically treating this instability. It is particularly attractive because the screws do not necessarily require linking into a larger construct. Intraoperative fluoroscopy is frequently used to achieve satisfactory screw placement, with stereotactic image guidance sparsely reported in literature. Stereotactic guidance may be preferable to placement under fluoroscopy in certain cases with aberrant bony or vertebral artery anatomy.

PURPOSE

The purpose of this study was to assess safety and efficacy of stereotactic-image guided C1-2 transarticular screw placement in the pediatric population

METHODS

- We retrospectively assessed all patients undergoing C1-2 trans-articular screw placement using stereotactic image guidance
- Data collected from 2020-2021

Surgical technique

- Prone position
- Mayfield head holder with double attachment for reference frame
- Intraoperative 360 degree fluoroscopy for registration
- Navigated cannulation of bone and screw placement



Fig 1: Preop CT scan of representative case: 10 year old girl with Down Syndrome and prior atlantoaxial wiring

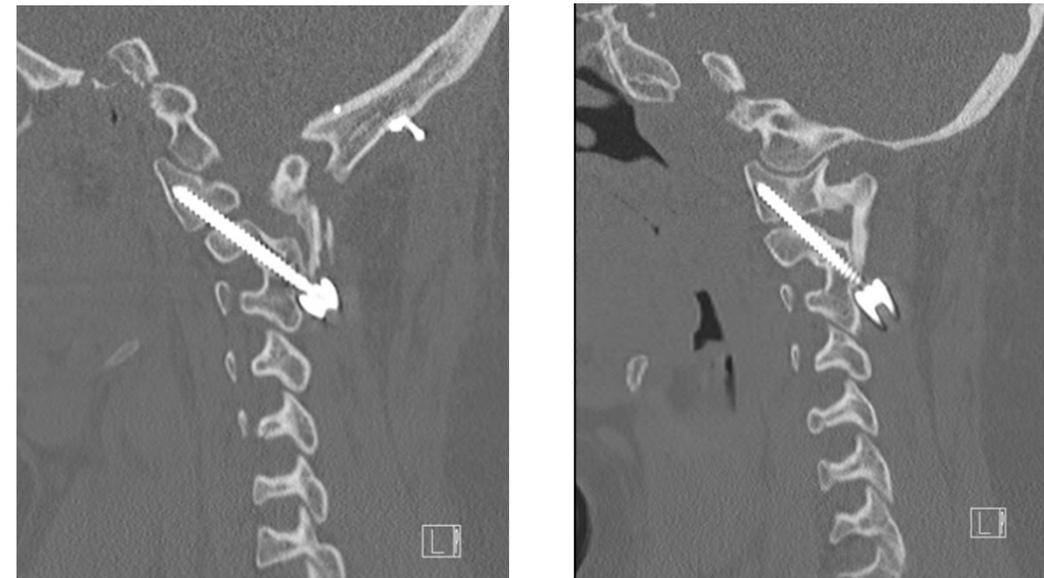


Fig 2: Postoperative CT scan demonstrating accurate C1-2 transarticular screw placement with evidence of posterior bony growth

RESULTS

- 6 patients met criteria for inclusion
- Total of 10 screws placed
- 2 screws not placed due to unfavorable trajectory despite use of navigation
- No complications, all screws in satisfactory position
- All with resolution of spinal instability
- All with evidence of bony fusion at follow up

CONCLUSION

Stereotactic image-guided placement of C1-2 transarticular screws in pediatric patients appears to be both safe and effective. This technique is particularly helpful in small patients or patients with congenitally aberrant anatomy