

O-8-1

A Comparative C2 Screw Placement Accuracy Analysis: Navigation vs. Fluoroscopy

Jula Gierse¹, Eric Mandelka¹, Benno Bullert¹, Paul Alfred Gruetzner¹, Sven Yves Vetter¹

¹BG Klinik Ludwigshafen, Trauma and Orthopaedic Surgery, Ludwigshafen, Germany

Introduction: Operative treatment of instable atlantoaxial injuries is challenging due to inherent neurovascular risks. While studies have shown that navigation offers advantages in terms screw placement accuracy, data on traumatic atlantoaxial injuries specifically is scarce (Chachan et al. 2018; Uehara et al. 2017). This study aims to compare C2 screw placement using intraoperative navigation vs. fluoroscopic guidance in treating traumatic instabilities.

Methods: This retrospective analysis focused on operatively treated traumatic atlantoaxial injuries with dorsal stabilization of C1 and C2. Patients were divided into two groups: Group 1 (intraoperative navigation) and Group 2 (3D assisted fluoroscopic guidance). Screw position was analyzed in postoperative CTs and was rated according to Bredow classification scale.

Results: 102 navigated and 54 3D assisted fluoroscopy guided screws were included in this study. 92.59% of the C2 screws were placed accurately using 3D assisted fluoroscopic guidance, while 99.02% of the navigated C2 screws did not show any relevant perforations. Statistical analysis showed a significant difference between the groups regarding accuracy rates ($P=0.049^*$). Screw diameter/ pedicle width ratios were also significantly different at 0.60 (3D assisted fluoroscopy) vs. 0.82 (intraoperative navigation) ($P<0.001^{**}$).

Discussion: The results of this study show that intraoperative navigation enables more accurate placement of C2 screws in the treatment of traumatic atlantoaxial injuries. At the same time, larger screws are selected in the navigation group, which could lead to an increase in biochemical stability (Viezens et al. 2021).

Fig. 1

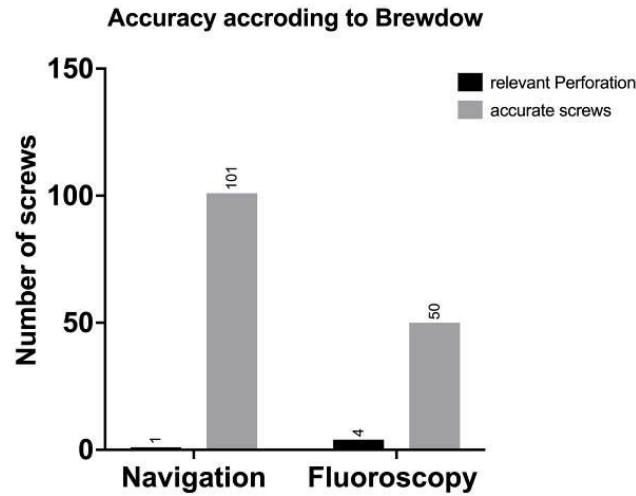


Fig. 2

