Post-Operative Changes in Cervical Screw Orientation: Descriptive Analysis of 77 Rotational Plates

Gil Kimchi and Vincent C. Traynelis

INTRODUCTION

Rotational dynamic plates are commonly utilized in anterior cervical fusion procedures, with screw insertion trajectories determined at the surgeon's discretion. However, the changes in screw-plate angle over time and their relationship with the initial angle of screw insertion remain unexplored.

OBJECTIVES

This study aims to (1) describe the longitudinal post-operative changes in cervical screw angles during the early post-operative period, and (2) investigate the implications of these changes on early radiographic outcomes.

METHODS

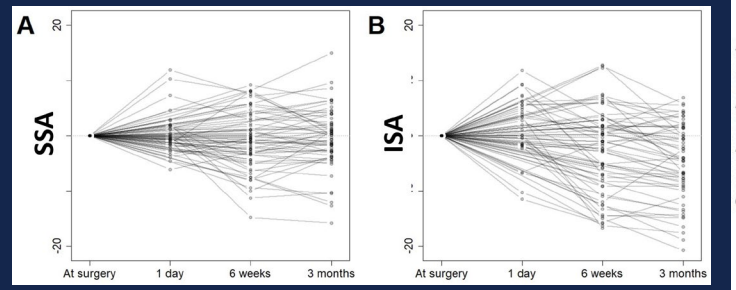
We conducted a retrospective review of 77 semi-constrained rotational dynamic plates implanted by a single surgeon over a 33-month period for 1 and 2-level anterior cervical discectomy and fusion (ACDF) procedures. Radiographic follow-up was obtained at baseline, 1 week, 6 weeks, and 3 months post-surgery. Measurements of the screw-plate angle, segmental lordosis, C2-C7 sagittal vertical axis, and graft subsidence were performed on each radiograph.

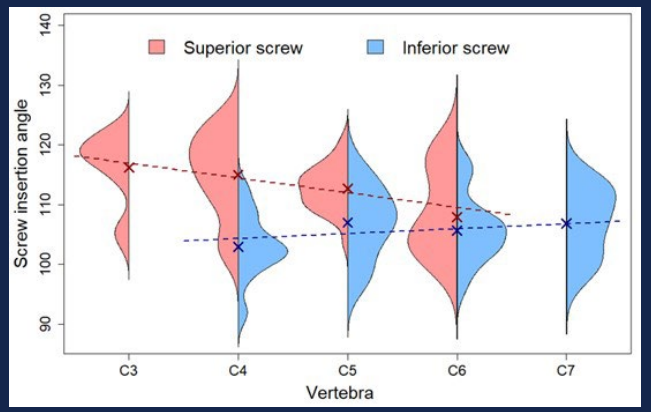
RESULTS

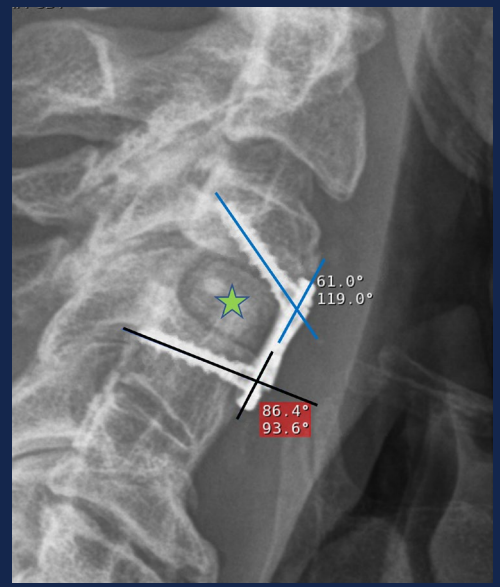
The mean upper and lower screw insertion angles were 113.8° ± 6.2° and 106.1° ± 5.7°, respectively. The lower screw angle (LSA) demonstrated a significant negative correlation with the 3-month change in screw-plate angle (β -0.524, 95% CI -0.971, -0.239, p = 0.002), while the upper screw angle (USA) did not (β -0.160, 95% CI -0.422, -0.168, p = 0.388). The change in segmental lordosis was significantly associated with the 3-month change in LSA (r = 0.345, p = 0.016), but not with the change in USA. No association was found between the 3-month angle change and graft subsidence for either screw.

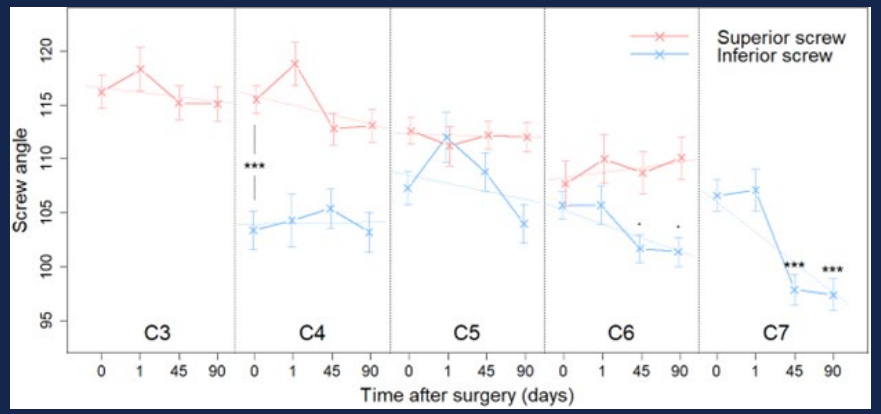
CONCLUSIONS

Screw-plate angles in ACDF procedures with rotational dynamic plates exhibit significant variation during the early post-operative period. Obtuse screw insertion trajectories correlate with a decrease in screw-plate angle over time. Although changes in screw angle correspond with alterations in segmental lordosis, they are not associated with the magnitude of graft subsidence.









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