CERVICAL TRANSFACET VERSUS LATERAL MASS SCREWS: A BIOMECHANICAL COMPARISON
Klekamp JW, Ugbo JL, Heller JG, Hutton WC
Atlanta, Georgia

BACKGROUND: Posterior cervical fixation with lateral mass plates is an accepted adjunctive technique for cervical spine fusions. Altered anatomy due to congenital malformation, tumor, trauma, infection, or failed lateral mass fixation may limit traditional screw placement options. Transfacet screw placement, which has been extensively studied in the lumbar spine, may offer an alternative when posterior cervical fusion is required.

PURPOSE: To compare the pull-out strength of screws placed in the cervical lateral masses to that of screws placed across the facet joints.

MATERIAL/METHODS: Ten fresh human cadaveric cervical spines (ages between 69 and 91 years old) were harvested. On one side transfacet screws were placed at the C3/4, C5/6, and C7/T1 levels. On the contralateral side lateral mass screws were placed at he C3, C5, and C7 levels. The screw insertion technique at each level was randomized, right versus left. After screw placement each set of vertebral bodies were dissected and mounted in a custom jig for axial pull-out testing using a servo-hydraulic testing machine, yielding load-displacement curves for each screw.

RESULTS: The mean pull-out strength for the screws placed across the facets was 467 N (range 192-1176N). This compares with 360N (range 194-750N) for the lateral mass screws (p= 0.008). At each level transfacet screws exhibited greater pull-out resistance in comparison to the lateral mass placement, but the difference was most pronounced at the C7/T1 level (lateral mass = 373N, transfacet = 539N, p=0.042).

CONCLUSIONS: Cervical transfacet screw placement provides adequate purchase for posterior plate fixation. Its pull-out resistance is comparable to, if not greater than lateral mass placement. This type of placement, although technically difficult, may be an alternative to lateral mass screws in cases with unusual anatomy, ‘stripped’ screws or when additional intermediate points of fixation are desired.