INTRODUCTION:

Anterior cervical plating in conjunction with an interbody cage/spacer provides enhanced stability and increased fusion rates compared to interbody cage/spacer alone. Integrated interbody cervical spine fusion implants combine the functionality of an interbody spacer with the mechanical benefits of an anterior cervical plate, while theoretically minimizing soft tissue irritation, the risk of adjacent level ossification, and dysphagia due to their no-profile design. Purpose: to evaluate the stability afforded by a lag-design integrated interbody fusion device (PEEK-Optima® cage with screws) (STALIF C®, Centinel Spine, Inc., West Chester, PA) in comparison to the anterior plate and PEEK-Optima® cage in a 2-level construct.

We hypothesized the integrated interbody fusion device will have comparable biomechanical stability to traditional plating + spacers in a two-level fusion construct.

MATERIALS & METHODS

Specimens: Six C3-C7 human cervical spine specimens (36.8±9.2 yrs).

Experimental Setup

- Specimens were tested in flexion-extension, lateral bending, axial rotation to ±1.5 Nm (Fig 1)
- Follower load technique used to apply compressive preload during flexion-extension (Fig 2)
- 3-D motion of each vertebral body was tracked using optoelectronic motion sensors
- Fluoroscopic imaging was used to document implant position

DISCUSSION

- Single level ACDF using the STALIF C® integrated cage significantly reduced motion compared to intact (p<0.01).
- When comparing the 1-level STALIF C® integrated fusion cage vs. plate & spacer, the average difference in motion was 1.1 degrees for all modes.
- When comparing the 2-level STALIF C® integrated fusion cages vs. plate & spacers, the average difference in motion was 2 degrees for all modes of motion.
- This supports the hypothesis that the effectiveness of the integrated interbody fusion device would be biomechanically comparable to the traditional spacer-anterior plate in a 2-level fusion construct.
- Lag screws provide visible apposition across the bone-implant interface contributing to improve fixation stability of the device.

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