Facet Arthroplasty and Anterior Disc Replacement Combination Restores Normal Segmental Biomechanics and Addresses Several Clinical Issues
†Goel VK, †Kiapour A, †Hoy RW *Chee H, *Fellenz F; †Engineering Center for Orthopaedic Research Excellence, University of Toledo, Toledo, OH; †Facet Solutions, Inc. Logan, Utah; Spinal Kinetics, Inc. Sunnyvale, CA

INTRODUCTION

➢ The incidence of facet arthrosis as a contraindication to total disc replacement (TDR) can be as high as 97%1,2.
➢ Posterior element pain after single and two level TDR has been reported at rates of 28% and 60%, respectively3.
➢ Combining a TDR with a facet replacement may broaden the indications for both of these devices, potentially offering many patients with pathology in both the anterior and posterior columns a treatment option that maintains motion.
➢ The aim of this study was to use a finite element (FE) simulation to characterize the biomechanical compatibility of the Anatomic Facet Replacement System (AFRS™ Facet Solutions, Inc., Logan, UT) and the M6 Total Disc Replacement (Spinal Kinetics, Inc., Sunnyvale, CA).

RESULTS

➢ The combination disc replacement with facet replacement (360 Arthroplasty) model predicted ranges of motion and moment-displacement curves that were very similar to the predictions of the intact simulation (Figure 2).
➢ The predicted center of rotation (COR) locations for the Intact and 360 Arthroplasty models were within two standard deviations of in vivo COR locations reported in the literature4 (Figure 4).
➢ The addition of the facet replacement device did not significantly alter the predicted stresses in the metallic endplate or polymeric core components of the disc replacement device (Figure 3).

DISCUSSION

➢ The FE model predictions suggest that this specific combination of devices restores normal segmental biomechanics.
➢ Additionally the impact of the facet replacement on the disc replacement’s survivorship should be minimal as the stresses in the endplate and core disc components saw little change with the addition of the facet device.

Acknowledgement: Work supported in part by a grant from Facet Solutions, Inc, Logan, UT