Hypermobility accelerates adjacent-segment disease after ACDF?

To The Editor: We read with great interest the article by McDonald et al. (McDonald CP, Chang V, McDonald M, et al: Three-dimensional motion analysis of the cervical spine for comparison of anterior cervical decompression and fusion versus artificial disc replacement in 17 patients. Clinical article. J Neurosurg Spine 20:245–255, March 2014). The authors compared data of 7 patients who underwent cervical arthroplasty with those of 10 patients who underwent anterior cervical discectomy and fusion (ACDF) and concluded that after surgery there was increased motion at nonoperative segments in ACDF-treated patients. Although the result appears to corroborate most surgeons’ inference, there are several caveats.

First, these two groups of patients are not similar. Their cervical spines had variable degeneration. For example, the arthroplasty-treated patient whose images are shown in Fig. 3 had significant spondylosis and anterior osteophytes in both the cranial and caudal adjacent levels. On the other hand, the ACDF-treated patient whose images are shown in Fig. 4 had little spondylotic changes throughout the entire cervical spine. Several studies have demonstrated the differences of cervical arthroplasty among patients with and without spondylosis. In non-randomized studies, mildly different indications for arthroplasty could cause variable outcomes. The “less motion” detected in every other level of the cervical discs among the arthroplasty group compared to the ACDF group of this study, as demonstrated in Figs. 5–10, can be attributed to the spondylosis per se, rather than the effect of the artificial disc.

Second, the postoperative motion of adjacent segments after anterior cervical discectomy should be compared to the preoperative condition in the same patient. Comparing two patients who have undergone different procedures inadvertently allows for confounding results. Ideally, the mean difference between pre- and postoperative segmental motion of each patient in the ACDF group could be compared to that of the arthroplasty group.

The authors are commended for shedding light on the change in physiological motion after cervical discectomy. The true incidence and cause of adjacent-segment disease after cervical discectomy is still uncertain. Furthermore, whether artificial disc replacement can overcome adjacent-segment disease remains controversial, despite many randomized control trials having been published.

Motion analysis of the cervical spine in healthy, ACDF-treated, and arthroplasty-treated individuals might provide insight into future spine care.

Disclosure
The authors report no conflict of interest.

References

RESPONSE: We would first like to thank Dr. Wu and colleagues for their interest in and comments on our article. With regard to heterogeneity between the artificial disc (AD) and ACDF cohorts, we appreciate our colleagues’ observations on the figures illustrating the differing levels of spondylodiscitis between two patients. However, we feel that it is difficult to make generalizations on the two patient cohorts based on these two isolated examples that were presented. Given that our inclusion criteria for this study were patients who had single-level disease only, we would submit that the patients in our study, on the whole, would have less overall spondylotic change. In addition, the fact that the average age of the two cohorts is similar (48 ± 10.8 years and 47 ± 7.0 years for the ACDF and AD groups, respectively) would also suggest relatively similar amounts of degeneration between cohorts. Consequently, there is insufficient evidence in this study to support or refute the notion that changes in adjacent-segment motion after surgery are due to baseline differences in spondylodiscitis between the ACDF and AD groups. We would also submit that the best way to remove this confounding factor would have been randomization during the initial enrollment into the study.

We agree with Dr. Wu and colleagues’ second point regarding a comparison of preoperative and postoperative motion of adjacent segments after both ACDF and AD. Such comparisons as well as long-term follow-up with motion analysis would also give insight into both the overall degenerative process as well as any potential effects as a result of either an ACDF or AD. In addition, an age-matched nonoperative group would prove beneficial as well. Given the literature available, which illustrates largely equivocal rates of radiographic and clinical adjacent-segment pathology, the possibility remains that any motion changes perceived between ACDF and AD at adjacent segments may in fact not be part of the root cause of cervical spondylotic processes. Given that we are utilizing a state-of-the-art motion analysis technique with high in vivo accuracy, we are confident that we are in a position to study spondylotic processes of the cervical spine.

References

Validating the Thoracolumbar Injury Classification and Severity Score

To The Editor: We read with interest the article by Joaquim et al.1 (Joaquim AF, Ghizoni E, Tedeschi H, et al: Clinical results of patients with thoracolumbar spine

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