Burst fractures


The study tested the hypothesis that a load-sharing score (LSS) of > 6 was correlated with neurological and/or ligamentous injury. The authors evaluated 44 patients with thoracolumbar burst fractures (between T-10 and L-2), classifying them according to the LSS, the status of the posterior ligamentous complex (PLC), and the neurological status. The PLC status was evaluated using MRI studies, as proposed by Haba et al.2 Radcliff et al. concluded that the LSS does not uniformly correlate with PLC injury, neurological status, or empirical clinical decision making.

In our opinion, the results of this study illustrated the great dilemma of the treatment of thoracolumbar fractures: how should we treat burst fractures without neurological deficits? In 1983, the separation of burst fractures as stable or unstable by McAfee et al.3 based on the absence or presence of posterior column disruption was among the first modern attempts to answer this question. Since then, other systems such as the LSS proposed by McCormack et al.4 have also tried to solve this clinical dilemma by trying to classify the severity of burst fractures, none with widespread success. Even comparative clinical trials have obtained conflicting results about conservative versus surgical treatment of these fractures.6,10

More recently, the use of MRI findings for evaluation of the PLC status has been proposed in a substantial number of papers as a new alternative for evaluating stability of these essentially complex injuries.7–9 However, although much has been clarified, as far as we know there is only sparse clinical evidence of the relevance of the PLC evaluation based on MRI findings.1 Like that reported in Radcliff et al., Dr. Vaccaro and colleagues have been involved in many significant and relevant studies trying to solve this problem and better understand the “clinical behavior” of thoracolumbar burst fractures. So far, the results of this and other studies illustrate how difficult it is to define rigid criteria to classify and propose treatment for thoracolumbar burst fractures. The role of MRI findings regarding the PLC status in the management of burst fractures requires future investigation to assess its clinical reliability and validity.

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References

We thank Drs. Joaquim and Patel for their insightful comments. The purpose of this study was to evaluate commonly used but unvalidated factors that are used as criteria to guide surgical decision making for patients with thoracolumbar burst fractures. Our data suggest that PLC injury is a distinct parameter from bony comminution measured by the LSS. Therefore, when clinically warranted, surgeons should directly assess the PLC integrity with MRI instead of by inference from the LSS. Furthermore, it is important to remember that the LSS was developed to predict success of short-segment fixation, not to guide decision making regarding the need for surgery.

However, as Drs. Joaquim and Patel point out, the underlying evidence supporting the prognostic significance of PLC injury is weak. Additionally, we agree that although PLC injury has been anatomically classified as complete or incomplete, the prognostic significance of these somewhat arbitrary categories has not been definitively characterized. For these reasons, PLC injury was only one variable examined in this study; we would place much more emphasis on the relatively low reliability of the load-sharing classification and the lack of concordance between the LSS and the decision to operate.

Further research is necessary to determine the precise relationship between PLC injury and prognosis of nonsurgically treated thoracolumbar burst fractures. Ultimately, improved understanding of the interaction between vertebral body comminution and ligamentous injury will improve communication between caregivers as well as patient outcomes.

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Artifact reduction

To The Editor: I was interested to review the article by Antosh et al.1 (Antosh IJ, DeVine JG, Carpenter CT, et al: Magnetic resonance imaging evaluation of adjacent segments after cervical disc arthroplasty: magnet strength and its effect on image quality. Clinical article. J Neurosurg Spine 13:722–726, 2010). The principal finding in this study—that ferromagnetic artifact at adjacent segments after total disc arthroplasty (TDA) in the cervical spine in 6 patients was significantly reduced with low field strength (0.2-T) open-bore MRI scanners—confirms our previous findings obtained using a 0.3-T scanner in 40 patients after lumbar TDA.2 This, of course, is relative to images obtained with conventional high field strength (1.5-T) closed-bore scanners. Therefore, when the load-sharing classification and the lack of concordance between the LSS and the decision to operate. Further research is necessary to determine the precise relationship between PLC injury and prognosis of nonsurgically treated thoracolumbar burst fractures. Ultimately, improved understanding of the interaction between vertebral body comminution and ligamentous injury will improve communication between caregivers as well as patient outcomes.


The principal finding in this study—that ferromagnetic artifact at adjacent segments after total disc arthroplasty (TDA) in the cervical spine in 6 patients was significantly reduced with low field strength (0.2-T) open-bore MRI scanners—confirms our previous findings obtained using a 0.3-T scanner in 40 patients after lumbar TDA.2 This, of course, is relative to images obtained with conventional high field strength (1.5-T) closed-bore scanners. I would like to comment on 2 observations made by Antosh et al. in their analysis.

1) The authors attribute artifact reduction solely to the lower field strength inherent in open-bore scanners.1 Indeed, Antosh et al. ultimately concluded that MRI can be used to evaluate adjacent segments solely if “magnet strength is addressed.” While this assumption appears entirely intuitive, it should be noted—as we previously stressed in our article—that artifact reduction could also be related to the perpendicular orientation of the main magnetic field inherent in open-bore scanners.2 For example, Suh et al.3 showed that ferromagnetic artifact could be minimized with fusion devices by positioning patients so that the long axis of the implant was aligned parallel to the main magnetic field.

2) Notwithstanding whichever of the 2 mechanisms prevails in establishing significantly less artifact with low field strength open-bore scanners, we showed in our article that relatively simple modifications to MRI parameter settings can be made on conventional high field strength (1.5-T) closed-bore scanners that minimize metal artifact and enhance imaging of adjacent segments with TDA devices. Indeed, such modifications effectively matched appearances to those obtained with low field strength (0.3-T) open-bore scanners.2 To achieve this, key parameter modifications were required in the receive bandwidth, the strength of the frequency encoding gradient, as well as in the echo train length, while the use of higher specification focused gradients was specifically avoided.2 All parameter settings were fully documented in Table 1 of our manuscript to aid others in obtaining superior images in their units.2 Note, however, that such settings strictly only apply to the TDA and MRI scanner models used in all our patients; they can only be used as a guide when using other TDA/scanner combinations.

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