

16. Narayan P, Haid RW, Subach BR, Comey CH, Rodts GE (2002) Effect of spinal disease on successful arthrodesis in lumbar pedicle screw fixation. *J Neurosurg* 97(3 Suppl):277–280
17. Polly DW Jr, Santos ER, Mehbod AA (2005) Surgical treatment for the painful motion segment: Matching technology with the indications: Posterior lumbar fusion. *Spine* 30:S44–51
18. Ponnappan RK, Serhan H, Zarda B, Patel R, Albert T, Vaccaro AR (2009) Biomechanical evaluation and comparison of polyetheretherketone rod system to traditional titanium rod fixation. *Spine J* 9:263–267
19. Sagomonyants KB, Jarman-Smith ML, Devine JN, Aronow MS, Gronowicz GA (2008) The in vitro response of human osteoblasts to polyetheretherketone (PEEK) substrates compared to commercially pure titanium. *Biomaterials* 29:1563–1572
20. Sarbello JF, Lipman AJ, Hong J, Lawrence J, Bessey JT, Ponnappan RK, Vaccaro AR (2010) Patient perception of outcomes following failed spinal instrumentation with polyetheretherketone rods and titanium rods. *Spine* 35:E843–848, Phila Pa 1976
21. Smit TH, Muller R, van Dijk M, Wuisman PI (2003) Changes in bone architecture during spinal fusion: Three years follow-up and the role of cage stiffness. *Spine* 28:1802–1808, discussion 1809
22. Toth JM, Wang M, Estes BT, Scifert JL, Seim HB 3rd, Turner AS (2006) Polyetheretherketone as a biomaterial for spinal applications. *Biomaterials* 27:324–334
23. Toyone T, Takahashi K, Kitahara H, Yamagata M, Murakami M, Moriya H (1993) Visualisation of symptomatic nerve roots. Prospective study of contrast-enhanced MRI in patients with lumbar disc herniation. *J Bone Joint Surg Br* 75:529–533
24. Turner JL, Paller DJ, Murrell CB (2010) The mechanical effect of commercially pure titanium and polyetheretherketone rods on spinal implants at the operative and adjacent levels. *Spine* 35:E1076–1082, Phila Pa 1976
25. Wedemeyer M, Parent S, Mahar A, Odell T, Swimmer T, Newton P (2007) Titanium versus stainless steel for anterior spinal fusions: An analysis of rod stress as a predictor of rod breakage during physiologic loading in a bovine model. *Spine* 32:42–48, Phila Pa 1976
26. Zhou ZJ, Zhao FD, Fang XQ, Zhao X, Fan SW (2011) Meta-analysis of instrumented posterior interbody fusion versus instrumented posterolateral fusion in the lumbar spine. *J Neurosurg Spine* 15:295–310

Comment

Transpedicle screw and rod instrumentation has become the preferred technique for performing stabilization and fusion in the treatment of degenerative lumbar spine disease. The authors now have added a relevant and well-done study to this field of spinal surgical management. In their series, 41 patients suffering from lumbar degenerative disease were treated using either a polyetheretherketone (PEEK) or titanium alloy rod system for single level posterior fusion. Meanwhile, it was demonstrated that PEEK rods have a similar high fusion and low reoperation rate when compared to previous instrumentation modalities (1,3). Furthermore, PEEK rods confer similar clinical efficacy as titanium alloy constructs and their semirigid properties, combined with their radiolucency, suggest that PEEK rods have even some advantages over titanium alloy rods for application in posterior lumbosacral instrumentation. However, the biomechanical effects of implantation of stabilization systems limit the range of motion and produce an unforeseeable nonphysiological stress on the operated functional spinal unit when compared to the nonoperated and intact spine. Additionally, the centre of rotation and stress distribution might differ according to the design and material of the implants used (2). Therefore, the indication for the necessity of spinal instrumentation and fusion should be assessed with scrutiny and the potential biomechanical effects of current materials and systems applied should be carefully considered before final clinical implementation.

References

1. Bruner HJ, Guan Y, Yoganandan N, Pintar FA, Maiman DJ, Slivka MA (2010) Biomechanics of polyaryletherketone rod composites and titanium rods for posterior lumbosacral instrumentation. Presented at the 2010 Joint Spine Section Meeting. Laboratory investigation. *J Neurosurg Spine* 13:766–772
 2. Jahng TA, Kim YE, Moon KY (2013) Comparison of the biomechanical effect of pedicle-based dynamic stabilization: a study using finite element analysis. *Spine J* 13:85–94
 3. Ormond DR, Albert L Jr, Das K (2012) Polyetheretherketone (PEEK) rods in lumbar spine degenerative disease: a case series. *J Spinal Disord Tech* Oct 16. [Epub ahead of print]
- Markus F. Oertel
Bern, Switzerland