New Options in Spine Surgery—Judgment Is as Important as Ever

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This month's issue of *The American Journal of Orthopedics* includes excellent spine articles that merit comments. Brandoff and colleagues have written a nice review of bone grafts and graft substitutes in spine surgery. I cannot agree more with the authors' statement that autologous bone graft is still the gold standard today. In choosing among bone grafts for spinal fusion, the surgeon should consider host factors (age, comorbidities, revision surgery, smoking, etc), anterior versus posterior fusion, and the use of concomitant instrumentation. For anterior cervical fusion, the use of cortico-cancellous allograft with rigid plating gives a high fusion rate, and off-label use of other synthetic grafts and bone morphogenetic protein (BMP) has not improved the fusion rate or the outcome. However, anterior lumbar interbody fusion (ALIF) with on-label use of BMP gives a high fusion rate as long as the fixation device is well placed and rigid. Posterior lumbar interbody fusion is frequently performed with a cage device and off-label use of BMP, but caution should be used as complications such as osteolysis, radiculitis, and heterotopic bone formation have been reported. Posterolateral fusion of the lumbar spine should be performed with autologous bone (either local or iliac crest bone); meticulous preparation of the transverse processes, facet joints, and lateral gutter is as important as, if not more so than, the choice of graft material. If the amount of autograft is insufficient, bone graft extenders such as allograft chips, calcium phosphate ceramic, or demineralized bone graft matrix (DBM) can help fuse the spine. In a compromised host such as a diabetic smoker undergoing multilevel revision fusion, use of BMP may help enhance the fusion rate. Routine use of BMP or synthetic bone grafts without evidence of greater efficacy in the literature should be discouraged.

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Khan and colleagues describe a suture anchoring technique for posterior cervical laminoplasty that is simple and effective. Cervical laminoplasty is finally gaining popularity in the States even though the technique has been used for more than 30 years in Japan and Asia. For myelopathic patients undergoing multilevel decompression for cervical stenosis, cervical laminoplasty is simpler and associated with fewer morbidities than multilevel corpectomies. In recent years, laminoplasty miniplates have been introduced to improve construct rigidity, making postoperative bracing unnecessary. This allows for earlier restoration of range of motion and rehabilitation.

Xu and colleagues report on the use of pedicle screw instrumentation of the cervical spine. I agree with the authors' statement that routine use of pedicle screws from C3 to C6 is not justified because of potential complications. Lateral mass screw fixation is biomechanically and clinically acceptable, and pedicle screws could be used in unusual circumstances, such as when the lateral mass is destroyed or osteoporotic.

Spinal stenosis is a well-known entity that primarily affects elderly patients who have degenerative arthritis of the spine. Tuthill and Clifford have reviewed the imaging findings of central- and lateral-recess stenosis of the lumbar spine. Foraminal stenosis of the lumbar spine is frequently overlooked, and parasagittal magnetic resonance images and sagittal reconstruction computed tomography images should be carefully examined in addition to the axial images in order to assess

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the foramina. Congenital stenosis of the lumbar spine frequently presents in the adult in the fourth and fifth decades with low back pain and radicular symptoms. Shortened pedicle, multilevel canal stenosis, and degenerative discs at multiple levels are some of the imaging findings of congenital stenosis.

Spine surgery, like other areas of orthopedics, has been advancing at a rapid pace, as illustrated by the articles in this issue, with newer biological materials for fusion, novel surgical techniques, and new and more accurate imaging modalities. Appropriate selection of newer devices and materials based on biological, biomechanical, and patient factors is paramount. Without the knowledge in these areas, the surgeon frequently chooses inappropriate treatment devices or materials and also "overkills" by combining different modalities. For example, in performing a posterolateral fusion of the lumbar spine, some surgeons use a combination of synthetic bone grafts, BMP, bone marrow aspirate, and demineralized bone matrix that costs huge health-care dollars, whereas iliac crest bone graft or simple local bone with DBM graft extender with meticulous preparation of graft beds is sufficient in many cases. New advances in medicine may help improve the patient's outcome, but new is not necessarily better. The surgeon should select new modalities based on cost and learning curve but mostly on potential benefit to the patient.