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Editorial

From the Editor-in-Chief: Featured Articles in the March 2025 Issue

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In this editorial, we highlight the most notable research articles featured in the March 2025 issue of *Neurospine*. This issue includes 2 exceptional papers from the SMISS (Society for Minimally Invasive Spine Surgery) special feature and 4 distinguished articles from regular submissions.

Article 1: "Distinct Recovery Patterns After Transforaminal Lumbar Interbody Fusion: Comparing Minimally Invasive and Open Approaches Using Mixed-Effects Segmented Regression"

This study[1] presents a comparative analysis of recovery trajectories following minimally invasive (MIS) and open transforaminal lumbar interbody fusion (TLIF) in 324 patients. Employing segmented regression with mixed-effects modeling, the authors delineate 4 distinct recovery phases. Their findings indicate that MIS-TLIF results in significantly lower disability exacerbation during the first 2 postoperative weeks and achieves a stable back pain plateau approximately 4 weeks earlier than open TLIF. Despite comparable baseline demographics, these results underscore the early postoperative advantages of MIS-TLIF.

Article 2: "Far-Lateral Transforaminal Unilateral Biportal Endoscopic Lumbar Discectomy for Upper Lumbar Disc Herniations"

This study[2] evaluates the efficacy of far-lateral transforaminal unilateral biportal endoscopic (UBE) discectomy for upper lumbar disc herniations. Among 27 patients (mean age 54.0 years) treated at L1–2 (9.7%), L2–3 (33.3%), and L3–4 (55.6%), substantial postoperative improvements were observed across all clinical outcome measures. The Oswestry Disability Index significantly declined from 36.3 preoperatively to 3.7 at final follow-up, with immediate pain relief noted in visual analogue scale scores for back and leg pain. With a mean follow-up of 27.7 months, the findings suggest that UBE is a viable alternative for treating upper lumbar disc herniations.

Article 3: "Impact of Paraspinal Muscle Degeneration on Surgical Outcomes and Radiographical Sagittal Alignment in Adult Spinal Deformity: A Multicenter Study"

This multicenter study[3] investigates the influence of paraspinal muscle fat infiltration on surgical outcomes in adult spinal deformity correction. Among 454 patients, those exhibiting significant fat infiltration had greater preoperative sagittal imbalance, required more extensive surgical corrections, and experienced higher rates of distal junctional kyphosis, despite propensity score matching. While both cohorts maintained improved spinopelvic

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alignment at 2-year follow-up, the fat infiltration group demonstrated a significantly greater pelvic tilt reduction. These findings suggest that preoperative muscle quality assessment and targeted rehabilitation strategies may optimize long-term surgical outcomes in spinal deformity correction.

Article 4: "Open Versus Minimally Invasive Spine Surgery in the Treatment of Single-Level Degenerative Lumbar Spondylolisthesis: An AO Spine Global Cross-Sectional Study"

This global cross-sectional study[4] analyzes treatment preferences for L4–5 degenerative lumbar spondylolisthesis among 479 AO Spine surgeons. Open surgery remained the preferred technique in all clinical scenarios (58.8%, 57.3%, and 42.4%), particularly in cases involving complex stenosis patterns. However, minimally invasive surgery (MIS) was favored by 38.8% of surgeons when treating unilateral foraminal stenosis. Notably, surgical preferences varied significantly based on geographic region, surgeon age, and fellowship training—with younger, fellowship-trained surgeons demonstrating a stronger inclination toward MIS techniques. These findings highlight the need for standardized guidelines to address global variations in degenerative spondylolisthesis management.

Article 5: "Does Vertebral Cement Augmentation Reduce Postoperative Proximal Junction Complications in Spinal Deformity Corrective Surgery: A Systematic Review and Meta-analysis"

This meta-analysis[5] synthesizes data from 7 studies (333 vertebral cement augmentation [VCA] cases, 827 controls) to assess the effectiveness of VCA in preventing proximal junction complications following adult spinal deformity correction. Despite VCA patients being older and having lower bone density, they demonstrated a 36% reduction in proximal junctional failure and a 71% reduction in revision surgery rates compared to non-VCA controls. While proximal junctional kyphosis incidence did not differ significantly between groups, rare complications—including pulmonary cement embolism and spinal canal leakage—were reported. These results support the targeted use of VCA, particularly in elderly and osteoporotic patients undergoing deformity correction surgery.

Article 6: "Comparative Analysis of Romosozumab Versus Vertebroplasty With Denosumab: Efficacy, Safety, and Secondary Bone Mineral Density Outcomes"

This study[6] compares romosozumab plus denosumab (42 patients) vs. vertebroplasty plus denosumab (44 patients) in osteoporotic vertebral compression fractures (VCF). At 12 months, the romosozumab group exhibited superior pain relief (Numerical Rating Scale score reduction: 4.90 vs. 4.27) and greater lumbar bone mineral density improvement (0.8 vs. 0.5), while achieving comparable vertebral compression ratio and Cobb angle correction. Additionally, major osteoporotic fracture rates were significantly lower in the romosozumab group (7.1% vs. 25.0%), with no significant differences in cardiovascular event incidence. These findings suggest that romosozumab offers a promising nonsurgical alternative for osteoporotic VCF treatment.

- **Conflict of Interest:** The author has nothing to disclose.

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