A case of osteopathic manipulation utilized for low back pain associated with supernumerary lumbar vertebrae

Dana “Dane” Klein, DO, PGY-4, NMM+1 Resident; G. Nathan Nakken, DO, Attending Physician
Midwestern University – Glendale, AZ 85308. Author for correspondence: dklein@midwestern.edu

Abstract
Introduction Low back pain (LBP) in the general adult population has a lifetime prevalence of >90%. Pain associated with lumbosacral transitional vertebrae (LSTV) has an estimated prevalence of 4-50%. The prevalence of LBP associated with supernumerary lumbar vertebrae is unknown.

Case description A 90-year-old female triathlete experienced LBP that persisted since 2001, beginning after riding in an amusement park "caged single-banked bungee". Prior MRI reported the presence of 6 lumbar vertebrae and L-4-L5 disc herniation. Self-treatment with anti-inflammatory and gabapentin-somatope-his symptoms and allowed for continued competition. However, her symptoms escalated in 2018 to intolerable 4/10 pain, forcing her to cease training. On presentation, her exam revealed bilateral lumbosacral and sacroiliac joint tenderness, thoracic demodulation, lumbar leuкоevocosis, right-off-lateral sacral tension, and left posterior innominate rotation. CT scan revealed 6 vertebrae bearing lumbar vertebrae with mild degenerative disc disease at L-4L5 and L-5-S1. Counterstrain, balanced ligamentous tension, and muscle energy of the thoracic, lumbar, and sacral spine and pelvic complemented by abdominal core strengthening gradually reduced her LBP to 3/10 over the course of 3 clinic visits.

Discussion: Osteopathic manipulation helped stabilize the patient's congenital anomaly and decreased low LBP by >90%, allowing for return to triathlon training. 6 lumbar vertebrae in the presence of 12 thoracic and 5 fused sacral vertebrae lengthen the vertebral column, permitting increased spinal mobility, but the formal pseudoclassification eludes lumbosacral stability. Literature has associated LSTV with LBP, and several case reports demonstrate treatment with mobilization techniques. However, there are few reports examining supernumerary vertebrae, none of which assess related LBP or potential manipulative treatments.

Conclusion: The study is limited by the absence of goniometer-measured lumbosacral range of motion pre- and post-treatment. Additional research is needed to assess the prevalence and pathophysiologic significance of LBP resulting from supernumerary vertebrae and potential for treatment with osteopathic manipulation.

Introduction
The number of vertebral segments is a heritable trait that may evolve over time via phylogenesis. 9 The rare incidence of congenital spinal anomalies is caused by sporadic mutations of the Hox genes, with inactivation of the Hox-4-11 gene resulting in supernumerary lumbar vertebrae. 9 The presence of an extra vertebral segment within the lumbosacral space lengthens the spinal column and likewise improves proximal mobility at the thoraco-lumbar junction. However, this results in reduced distal lumbar mobility due to formation of a pseudarticulation at the lumbosacral junction. 

The transverse processes of the caudal-most lumbar vertebra may partially or completely fuse with the sacral ala, called sacralization. 9 A similar process may occur in which the cephalad-most sacral segment fuses with the lumbosacral transverse processes, called cloacalization (see Figure 3). The pseudarticulations formed between the lumbal and sacral spine may over time develop spinochondral changes that initiate localized inflammation and pain. 9 Implantation by the lumbosacral osteoarthritic pseudarticulation of the terminal lumbar nerve roots in this anomaly predisposes to pain, disc herniation, and nerve impingement.9 (see figure 1) Case reports demonstrate improved low back pain associated with transitional lumbar vertebrae after treatment with manual manipulation. 10,11 In contrast, we present the case of a patient possessing a congenital variation with a supernumerary (6) lumbar vertebrae (see figure 2) in the presence of other typical regional vertebral numbers (7 cephalic, 5 thoracic, 5 fused sacral, 5 fused coccygeal). 9 We hypothesize the use of osteopathic manipulation in combination with abnormal core strengthening is an effective treatment for low back pain associated with supernumerary lumbar vertebrae.

Case description
A 90-year-old African-American female triathlete presented to the OMM Clinic with complaints of worsening low back pain ongoing since 2003. The low back pain originally began after riding in a "caged single-banked bungee" at an amusement park. Shortly after, the patient had an MRI that noted the presence of 6 lumbar vertebrae with herniation of the L-6-L1 disc. The patient underwent physical therapy and learned self-stretch to manage symptoms, which permitted continued triathlon competition.

In early-2016 the patient’s low back pain increased to the point she could no longer ride a bicycle and ended her triathlon career. 6 The patient had a MRI that noted the presence of 6 lumbar vertebrae with herniation of the L-6-L1 disc. The patient underwent physical therapy and learned self-stretch to manage symptoms, which permitted continued triathlon competition.

She was instructed in abdominal core strengthening including eccentric, anti-backs, and pelvic clock exercises.

References