HIGH-VELOCITY LOW-AMPLITUDE SPINAL MANIPULATION FOR SYMPTOMATIC LUMBAR DISK DISEASE: A SYSTEMATIC REVIEW OF THE LITERATURE

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ABSTRACT

Objective: The aim of the study was to review the evidence for high-velocity low-amplitude spinal manipulation (HVLASM) for symptomatic lumbar disk disease (SLDD).

Methods: A systematic review of the literature was performed. The Cochrane Central Register of Controlled Trials, Medline, Cumulative Index to Nursing and Allied Health Literature, and Mantis were searched. Evidence-based operational definitions of SLDD, HVLASM, and outcomes measures were established. Articles were assessed using these inclusion criteria: (1) published in English, (2) measured at least one outcome in subjects with SLDD undergoing HVLASM, (3) descriptions were sufficiently clear to meet all 3 categories of our operational definitions. Articles that met the inclusion criteria were assessed by 2 independent reviewers and assigned quality ratings based on previously published guidelines.

Results: Sixteen studies met the inclusion criteria, representing 203 total subjects. Of these, 172 subjects received HVLASM as active treatment, and 31 received other treatments as comparison subjects. Improvements in patient-based and physiological outcomes were reported among subjects receiving HVLASM; however, no conclusions regarding safety and effectiveness could be drawn from this review because the overall body of evidence uncovered was lacking in quality and quantity.

Conclusion: HVLASM for SLDD has been reasonably described in the literature; however, the evidence is limited, and definitive conclusions on safety and effectiveness cannot be made at this time. The reviewed evidence supports the hypothesis that HVLASM may be effective in the treatment of SLDD and does not support the hypothesis that HVLASM is inherently unsafe in SLDD cases. It appears that patients with lumbar disk pathology do undergo manipulative treatment in practice. Consequently, this should be an area of research importance. More high-quality clinical trials using valid and reliable diagnostic criteria and outcomes measures are needed. (J Manipulative Physiol Ther 2005;28:429-442)

Key Indexing Terms: *Manipulation; Lumbar; Intervertebral Disk; Treatment Outcome; Chiropractic*

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Chiropractors commonly manage patients with low-back pain (LBP).[1-3] Although chiropractors may use a variety of therapeutic interventions, high-velocity low-amplitude spinal manipulation (HVLASM) is perhaps the most commonly used chiropractic treatment.[4,5] It has been reported that chiropractors perform more than 90% of the spinal manipulation in the United States.[6]

Lumbar intervertebral disk disease is a well-known cause of LBP; yet, its diagnosis and management are controversial.[7-9] This is largely because the current understanding of lumbar disk pain pathogenesis is incomplete and often controversial,[9] and current clinical examination methods and diagnostic testing are neither highly sensitive nor specific.[8,10] Furthermore, it has been shown that 20% to 76% of asymptomatic adults exhibit structural abnormalities of the lumbar disks upon mag-

Table 1. *Inclusion criteria and operational definitions*

Symptomatic lumbar disc disease *(I and II required)*		
I: Pathology: HD with or without nerve root displacement, or IDD as demonstrated on MRI, CT, myelography, epidurography, and/or discography		
II: Symptomatology: (must meet all minimum or prefered criteria for 1 condition)		
HD with nerve root displacement Minimum (1 and 2 required)	HD without nerve root displacement Minimum (1 and 2 required)	IDD Minimum (1 and 2 required)
1. History LBP with radiation of P to the lower extremity 2. Clinical examination 2 or more of the following: - "Positive" straight leg raise - "Positive" well leg raise - Antalgic list - Limitation in lumbar range of motion - Deficit in motor strength, deep tendon reflexes, sensation	1. History LBP with or without radiation of P to the lower extremity 2. Clinical examination 1 or more of the following: - Antalgic - Limitation in lumbar range of motion	1. History LBP with or without radiation of P to the lower extremity 2. Examination 1 or more of the following: - "Positive" discogram - Repetitive motion demonstrates centralization or peripheralization of P - P reproduced by hand-held vibrator applied to spine
Preferred (1 and 2 required)	Preferred (*1 and 2 required*)	Preferred (1 and 2 required)
1. History LBP with radiation of P to the lower extremity And 1 or more of the following: - P increased by sitting/flexing/spinal loading - Numbness/paresthesia below knee - Correlating subjective weakness 2. Clinical examination 3 or more of the following: - Straight leg raise reproduces lower extremity P with or without LBP - Well leg raise reproduces contralateral lower extremity P with or without LBP - Repetitive motion demonstrates centralization and/or peripheralization of P - Antalgic list - Limitation in lumbar range of motion - Correlating deficit in motor strength, deep tendon reflexes, or sensation	1. History LBP with or without radiation of P to the lower extremity And 1 or more of the following: - P increased by sitting/flexing/spinal loading - Lower extremity numbness and/or paresthesia 2. Clinical examination 2 or more of the following: - Repetitive motion demonstrates centralization and/or peripheralization of P - Antalgic list - Limitation in lumbar range of motion	1. History LBP with or without radiation of P to lower extremity 2. Examination Provocation discography reproduces concordant P at involved level only and reveals abnormal radiographic image of nucleus
HVLA manipulation (I, II, and III required)		
I: A manual procedure involving the application of a high-velocity, low-amplitude thrust to a given functional spinal unit. This thrust causes grade V joint motion into the paraphysiological space and typically results in an audible cavitation.		
II: The procedure was not administered under any form of anesthesia.		
III: Adjunctive therapies did not include spinal injections or acupuncture.		
Outcomes measures (I or II required)		
I: Patient-based: 1 or more of the following: P intensity scales (eg, VAS, NRS) Patient report of P status Disability instruments (eg, Oswestry, Roland Morris)		
II: Intermediate: Measures of anatomic or physiologic parameters via imaging, electrodiagnostic studies, etc		

CI, computed tomography; *HD*, herniated disc; *IDD*, internal disc disruption; *MRI*, magnetic resonance imaging; *NRS*, numerical rating scale; *P*, pain; *VAS*, visual analog scale.

netic resonance imaging (MRI).[10-15] Recently, the term symptomatic lumbar disk disease (SLDD) has been used to differentiate between incidental structural abnormalities and those that are thought to be responsible for a patient's pain.[16-18]

The role of HVLASM in the treatment of SLDD—particularly herniated disk (HD) and internal disk disruption (IDD)—is of significant controversy. It has alternately been suggested that, in such cases, HVLASM can be safe, effective, and indicated,[19,20] or dangerous, ineffective, and