THE COMPARISON OF SHORT-LEVER, MECHANICAL FORCE ADJUSTMENTS VERSUS HIGH-VELOCITY, LOW-AMPLITUDE ADJUSTMENTS IN THE TREATMENT OF LUMBAR DISC HERNIATION

A LITERATURE REVIEW

SEPTEMBER 26, 2000
KATHLEEN M. NASH
9393

ABSTRACT

Lumbar disc herniation is a condition that effects thousands of people each year. Polkinghorn et al describe it's incidence as, "one of the most frequent symptomatic reasons for patient visits to primary care physicians, second only to the common cold" (1) and Bergmann et al have stated that, "almost 80% of adults will suffer from lower back pain at some point during their lives" (3).

The lumbar disc herniation can have several etiological factors associated with it's presence varying from episodes of repetitive microtrauma (bending and twisting maneuvers) to incidents of injury and blunt, physical trauma. Most health care professionals agree that intervertebral disc syndrome results from, "...minor discal injuries in the form of circumferential annular tears initally leading to deformation and bulging of collagen bundles and eventually to inner annular tears"(1). These tears to the annular fibers can continue until there is a displacement of the nuclear material located at the innermost portion of the intervertebral disc and the result is the aforementioned herniation.

Although studies have demonstrated that a disc herniation in any part of the vertebral column is not necessarily associated with symptomatic factors, clinical features that can be associated with a disc herniation of the lumbar spine include the following: discogenic leg pain, ipsilateral foot drop, atrophy of the muscle fibers in the related area, a reduction of the reflexes of the lower extremities, and dermatomal sensory loss. These symptoms can easily explain why the majority of cases treated by chiropractic physicians consist of disorders relating to the lower back. Studies indicate that, "53% of all visits to chiropractors are for low back pain" and "...spinal manipulation is the most frequently used conservative treatment for low back pain" (5).

STATEMENT OF THE PROBLEM

The problem that will be addressed in this literature review are the benefits or setbacks of the use of short-lever, mechanical assisted adjustment techniques such as Activator Methods Chiropractic Technique to the more widely used High-Velocity, Low-Amplitude chiropractic adjustment for the treatment and symptomatic relief of lumbar disc herniation. The effectiveness of both techniques to this clinical picture have been reported in prior literature, but patients are seldom informed on the use of different techniques for the same problem, contraindications to HVLA adjustments, and alternative methods of chiropractic treatment for those conditions that are best suited for conservative care of the acute or chronic low back pain patient.

PURPOSE OF THIS STUDY

The purpose of this paper is to offer a review of the literature concerning the use of short-lever, mechanical force, manually assisted adjustment techniques applied to a chiropractic condition more traditionally treated through high-velocity, low-amplitude adjustments.

CHAPTER ONE: THE PROBLEM

INTRODUCTION

In the clinical setting, no problem presents itself more often to the chiropractic physician than the incidence of low back pain. It is a problem that affects a wide variety of patients, covering various spectrums of age, causes, and degrees of severity. The extent of low back pain can be far reaching and create a dizzying array of symptomotology ranging from localized pain in certain directions of motion to a more serious clinical picture of sensory and motor loss of the lower extremity, either reduced or exaggerated deep tendon reflexes, and a complete disability to the patient culminating in a loss of their livlihood and a decreased quality of existence.

In many instances the causation of the symptomotology of low back pain is the result of the lumbar disc herniation or "bulge". Depending upon the location of the herniation, the adjacent nerve root can either be compressed, facilitated, or be missed entirely. Complications of the compressed or facilitated nerve root are certainly more serious for the patient and require immediate intervention. In past years, the focus of the chiropractic adjustment to a herniated segment was to alleviate the 'compressed nerve root'. In recent years it has been discovered that the compression of a nerve root, by an intervertebral disc or another related structure, is a relatively isolated event, occuring in approximately 10% of cases regarding herniation. The more likely outcome of a disc herniation is the facilitated nerve root, with it's hyperirriatated symptomotology including the incidence of low back pain and sciatica.

BACKGROUND

In the last few years, the medical community has acknowledged the importance of conservative treatment, namely spinal manipulation, in the treatment of lumbar disc herniation and lumbalgia in general. A recent study found that, "15% of those [lumbar disc herniations] treated surgically experienced serious relapse within 4 years"(3). It was also stated that:

> "in the treatment of lower back pain, skill in providing nonsurgical care is important because the majority of lower back symptoms do not involve any type of neurological compromise and therefore do not require surgical intervention"(3).

Conservative treatment by the medical community does not necessarily involve chiropractic adjustments exclusively and can also have the inclusion of "bedrest, back-school programs and the use of non-steroidal anti-imflammatory drugs"(3) and this differentiation must be noted.

CHAPTER TWO: METHODOLOGY

OVERVIEW OF THE CHAPTER

This chapter will outline the methodology utilized in reviewing and gathering the literature for this proposal.

DESCRIPTION OF THE METHODOLOGY

Literature for this paper compared and contrasted the efficacy of high velocity adjustments to lower force short-lever adjustments on lumbar disc herniation and associated lumbalgia. A computerized search was conducted using various websites at the Logan College of Chiropractic library, including PubMed, Medline, ChiroAccess, and ChiroWeb. The preliminary computer search using ChiroAccess and ChiroWeb generated a link to the Activator Methods Website resulting in approximately 5 abstracts dealing with lumbar symptomotology. From these 5 abstracts only 2 were used based on their relavency to the topic of the proposal.

An extensive search was incorporated from the PubMed website. The initial topic of 'Lumbar Disc/Chiropractic/Activator Technique" produced approximately 40 articles, of which the same two as previously mentioned from other websites was applicable. A wider search of 'Lumbar Disc/Chiropractic' genereated approximately 200 abstracts ranging from composition of disc material to various pathologies and associated treatments. From these only 3 were used, but many more were read.

CHAPTER THREE: REVIEW OF LITERATURE

Low back pain and the associated herniated disc of the lumbar spine are commonly featured in health care periodicals, especially regarding it's conservative treatment. Among the most well-known methods of conservative care for this ailment are chiropractic adjustments, but what is less well known are the varying techniques of chiropractic that can be applied to this condition. This chapter concerns itself with the proper diagnosis of a lumbar disc herniation and with two techniques, the Diversified chiropractic adjustment and Activator Methods Chiropractic Technique, each lending different qualities and protocols to the resolvement of this condition.

DIAGNOSIS

Intervertebral disc syndrome has been described as, "a common cause of mechanical back pain and sciatica"(1) A herniated intervertebral disc is the result of the tearing of the annular fibers that surround the gelatinous material known as the nucleus pulposus:

> "Studies have shown that minor discal injuries in the form of circumferential annular tears initially lead to deformation and bulging of collagen bundles and eventually in inner annular tears. This suggests that discrete outer annular tears have a role in the formation of concentric clefts, rim lesions and subsequent radial tears that allow for nuclear displacement"(1).

Clinical symptoms differ in severity dependant upon the degree of tearing of these fibers, their anatomical location, and the presence of extruding material and it's relation to a spinal nerve or the spinal canal itself. However, these structures do not have to be compressed in order to be

compromised as "it was demonstrated that nucleus pulposus in contact with nerve roots causes a number of alterations in the nerve root function also without mechanical compression"(2). The patient typically presents with radicular symptomotology including but not limited to: pain following a dermatomal distribution, flaccid paralysis, hyporeflexia, and paresthesia. Jonsson et al reported that, "researchers demonstrated a difference in degree of pain and neurologic disturbance related to the type of herniation"(2). There are also several orthopedic tests which can reproduce the patient's chief complaint and indication herniation. An incomplete list of such tests include Legsegue's Test, Straight Leg Raise, Well Leg Raise, Kemp's, Bechterew's, and Milgram's Test.

TREATMENT WITH DIVERSIFIED TECHNIQUE

The Diversified approach to the lumbar disc herniation is centered around the high-velocity, low-amplitude thrust and line of drive so commonly associated with this technique. The patient can be placed in either a prone or side posture position, but increased effectiveness and comfort levels for both the doctor and the patient coincides with the side posture set-ups. However, in regard to the side posture adjustments, Polkinghorn and Colloca noted that "others...have found it to be lacking in scientific evidence of safety and contraindicated in certain conditions, including particular types of intervertebral disc lesions"(1). They also stated that, "Complications arising from manipulative treatment of disc lesions are by far the most prevalent cause of malpratice suits against chiropractors, and aggravation of disc problems have, on occasion, been related to the use of side-posture manipulation"(1).

There are several possibilities that outline why side-posture adjusting may be contraindicated with a herniation of disc material, usually citing the torsional forces applied to the disc during the maneuver. In fact, "several sources have indicated that the disc resists torsional loading in axial rotation, and when combined with lateral bending and lumbar flexion, as is the case with the side-posture setup and thrust, the likelihood of discal injury may increase"(1)

TREATMENT WITH ACTIVATOR METHODS CHIROPRACTIC TECHNIQUE

In comparison, the Activator Methods technique incorportates the use of instrumentation in the treatment of the lumbar disc herniation. The patient remains in the prone position and the use of an Activator Adjusting Instrument (AAI) is employed. The method is considered a mechanical-force, manually assisted (MFMA) short-lever adjusting procedure and effectively eliminates the need for torsional forces during the adjustment. In fact, during adjustments with the AAI "are performed with the patient in a neutral prone position and there is a conclusive lack of joint prestress placed upon the articular segments before the adjustive thrust. This imposes less mechanical strain on the involved IVD's and may, therefore, provide for a safer adjustment than does side-posture manipulation"(1) The technique has also shown to incorporate as much force as a Diversified side-posture adjustment as "the AAI thrust was found to produce reflex responses of similar magnitude but of shorter time than those with diversified manipulation"(1).

SUMMARY

Although it has been shown that conservative care is among the best methods employed for the treatment of herniated lumbar discs, there is still debate on both the safety and necessity of high-velocity, low-amplitude procedures, especially in the side posture position for this condition. The Activator Methods Chiropractic Technique offers a safer alternative to the HVLA adjustment, effectively eliminating the major contraindication associated with the more high velocity diversified technique.

REFERENCES

1. Polkinghorn BS, and Colloca CJ. Treatment of symptomatic lumbar disc herniation using activator methods chiropractic technique. Journal of Manipulative and Physiological Therapies. 1998; Mar-Apr; 21(3): 187-96.

2. Jonsson B, Johnsson R, and Stromqvist B. Contained and Noncontained Lumbar Disc Herniation in the Same Patient. Spine. 1998; Vol. 23, Number 2, pp 277-280.

3. Bergmann TF, and Jongeward BV. Manipulative therapy in lower back pain with leg pain and neurological deficit. Journal of Manipulative and Physiological Therapies. 1998 May; 21(4): 288-94.

4. Polkinghorn BS. Treatment of cervical disc protrusions via instrumental chiropractic adjustment. Journal of Manipulative and Physiological Therapies. 1998 February, 21 (2): 114-18.

5. Gemmell HA and Jacobson BH. The Immediate Effect of Activator vs. Meric Adjustment on Acute Low Back Pain: A Randomized Controlled Trial. Journal of Manipulative and Physiological Therapies. 1995 September, 18(7): 453-56.

6. Barrale R, Diamond R, Filson RM, Whittmer M. Two Side-Posture Adjustments for Treatment of Lumbar Disc Syndrome. Chiropractic Technique 1991; 3:169-73.