

Single vertebral manipulative therapy (Kitchener's Technique): a new technique for treatment of acute and subacute spinal root compression

Abstract

Introduction: Spinal Root Compression Syndromes (SRCS) are common, costly, and significant cause of long-term sick leave and work loss. There is No consensus on the best approach. One intervention often used is manipulative therapy.

Objective: The aim of this study was to determine if Single Vertebral Manipulative Therapy (Kitchener's Technique) (SVMT) is effective in alleviating pain levels and regaining physical functioning in comparison to standard medical care (SMC), among 18-55-year-old active working personnel.

Methods: Prospective, longitudinal, 2-arm controlled study comparing SMC plus SVMT (32 patients) with only SMC (21 patients). The primary outcome measures were changes in root-related pain on the numerical rating scale and physical functioning at 6 weeks on the Roland-Morris Disability Questionnaire and back pain functional scale (BPFS).

Results: Mean Roland-Morris Disability Questionnaire scores decreased in both groups during the course of the study, but adjusted mean scores were significantly better in the SMC plus SVMT group than in the SMC group at both week 2 ($P<0.001$) and week 6 ($P=0.001$). Mean numerical rating scale pain scores were also significantly better in the group that received SVMT. Adjusted mean back pain functional scale scores were significantly higher (improved) in the SMC plus SVMT group than in the SMC group at both week 2 ($P<0.001$) and week 6 ($P=0.001$).

Conclusion: Results suggest that SVMT in conjunction with SMC offers a significant advantage for decreasing pain and improving physical functioning when compared with only SMC, for patients aged 18-55 years with SRCS.

Keywords: low back pain, Kitchner technique, root compression syndromes, SVMT, root pain, sciatica, single vertebral manipulative technique

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Introduction

Spinal Root Compression Syndromes (SRCS) are costly, common, and significant explanation for prolonged leave and loss of working hours.^{1,2} There is No consensus on the simplest approach. One intervention often used is manipulative therapy.^{3,21}

Spinal Root Compression Syndromes (SRCS) is the severest form of low back pain. Low back pain is the common disabling symptoms among working adults, lifetime incidence in united states (USA) 75% to 85%.⁴ Financial cost effects of low back pain are very high especially in developed countries. In USA, the direct cost is 40 billion dollars, with indirect costs lost wages and productivity, legal and insurance overhead, and impact on family over 100 billion dollars.⁵ Important acute care costs result from over-utilization of workup tools and treatment modalities, and inappropriate activity restrictions. The small numbers of persons who become chronically disabled consume 80% of the cost.⁵

In a clinical study, clinicians recommend massage therapy for 65% of patients; therapeutic ultrasonography for 55% recommended; and prescribed or performed spinal manipulation for only 22%; other study showed, 38% of patients with spine disorders were referred to a physiotherapy for exercise therapy, or other interventions. Other

noninvasive interventions are also used, including psychotherapy, back schools, Yoga, and multidisciplinary therapy.^{2,3}

Spinal manipulation

The Agency for Health Care Policy and Research (AHCPR) noted that nonsteroidal anti-inflammatory compounds and muscle relaxants were effective for the pain component of low back problems.⁶ Spinal manipulation was found to be effective for both pain control and functional recovery and was recommended for uncomplicated acute LBP within the first month of symptoms. Many studies support spinal manipulation for acute LBP, resulting in both short-term benefits⁷⁻¹⁰ and long-term benefits of 1 to 3 years.¹¹⁻¹⁴

Many systematic reviews discussed trials on efficacy of spinal manipulation; and other systematic reviews focused on harms related to spinal manipulation.¹⁵⁻¹⁸ For acute low back pain, a higher-quality Cochrane review found spinal manipulation to be slightly to moderately superior to sham manipulation for short-term pain relief during a meta-regression analysis. However, this estimate is entirely deducted from a lower-quality trial of patients with acute or subacute sacroiliac pain. For chronic low back pain, the Cochrane review found spinal manipulation moderately superior to sham manipulation. Against sham manipulation, differences in short- and long-term pain

averaged 10 and 19 points on a 100-point visual analogue scale, and differences for short-term function averaged 3.3 points on the RDQ. There have been no differences between manipulation and standard medical care or analgesics, physiotherapy or exercises, and back school. Evidence was insufficient to conclude that effectiveness of spinal manipulation depends on many variables such as the presence or absence of radiating pain (SRCS), and the profession and quality of training of the manipulator. Some systematic reviews consistently found that serious adverse events after spinal manipulation (such as worsening lumbar disc herniation or the cauda equina syndrome) were very rare.¹⁵⁻¹⁸ One systematic review found no serious complications reported in greater than 70 controlled discussed trials.¹⁸ Including data from observational studies, the occurrence of a real serious side effect was found in not more than 1 per 1 million patients.¹⁵⁻¹⁸

Current evidence from randomized controlled trials confirms that manipulative therapy is effective as other conservative treatments of LBP, if it is not more effective, but still its appropriate role in the healthcare delivery system has not been established. The manipulative procedure used in this study, referred to as Single Vertebral Manipulative Therapy, involves specific application of force to one vertebra thought to restore mechanical and neurological function of the spine, and release the root entrapment and/or compression.^{19,20}

Single Vertebral Manipulative Therapy (Kitchener’s Technique) (SVMT) (Kitchener 2016): is a newly developed chiropractic therapeutic technique by the author; it depends on moving one vertebra at a time, giving more appropriate control to the intervention process.²¹

Objective

The aim of this study was to determine if Single Vertebral Manipulative Therapy (Kitchener’s Technique) (SVMT) is effective in alleviating pain levels and regaining physical functioning in comparison to standard medical care (SMC), among 18-55-year-old active working personnel.

Methods

Prospective, longitudinal, 2-arm controlled study comparing 2 groups

Group I: includes 32 patients managed by both SMC plus the new technique SVMT

Group II: includes 21 patients managed by only SMC.

The primary outcome measures were changes in root-related pain on the numerical rating scale and physical functioning at 6 weeks on the Roland-Morris Disability Questionnaire and back pain functional scale (BPFS).

Single vertebral manipulative therapy (Kitchener’s Technique) (SVMT):

Technique description:

Moving one single vertebra, at a time, by hand to

- 1) Make negative pressure in the annulus fibrous in-between vertebrae.
- 2) Release compressed root
- 3) Re-align vertebrae
- 4) Re-position facet articulations
- 5) Opposition of any fractured pars intervertebralis, in cases of spondylo-lithesis with fractured pars

In the new technique, we use only the bare hands for manipulation, as we move single vertebra at a time, gently and with precision.

In difficult and very obese patients, technique is done under direct visual monitoring using C-arm. Also, for training of new staff, we use C-arm to enrich fine sensory discrimination of trainees.

Results

Mean Roland-Morris Disability Questionnaire scores¹⁹ decreased in both groups during the course of the study, but adjusted mean scores were significantly better in the plus SVMT group than in the SMC group at both week 2 (P<0.001) (Table 1) and week 6 (P=0.001) (Table 2). Patients in Group I. showed a good deal of improvement after the first SVMT session even before starting their prescribed medicines; that improvement lasts as shown in the second visit 2 weeks later. A few patients complain of return of some symptoms and needed another SVMT session, but only 2 patients needed one more session in the third visit (6%). On the other hand, patients of Group II. Showed mild improvement after 2 weeks of taking their prescribed medicines and complete rest; on the third visit many patients asked for more vigorous treatment modality or even surgery if there are no alternatives (Table 3 & 4).

Table 1 Roland-Morris Disability Questionnaire scores Paired Samples Test

Control Group	Paired differences				t	df	Sig. (2-tailed)	
	Mean	Std. deviation	Std. error mean	95% Confidence interval of the difference				
				Lower				Upper
Pre pain Post pain	15.05	3.663	0.819	13.336	16.764	18.374	31	P<0 .001

Table 2 Roland-Morris Disability Questionnaire scores Paired Samples Test after 6 weeks

Control Group	Paired differences				t	df	Sig. (2-tailed)	
	Mean	Std. deviation	Std. error mean	95% Confidence interval of the difference				
				Lower				Upper
Pre pain	13.730	3.365	0.846	11.525	14.237	19.438	31	P<0 .001

Table 3 Roland-Morris Disability Questionnaire scores Paired Samples Test

Control Group	Paired differences					t	df	Sig. (2-tailed)
	Mean	Std. deviation	Std. Error Mean	95% Confidence interval of the difference				
				Lower	Upper			
Pre pain Post pain	6.941	27.245	6.608	-7.067-	20.949	1.05	20	P= 0.309

Table 4 Roland-Morris Disability Questionnaire scores Paired Samples Test after 6 weeks

Control Group	Paired differences					t	df	Sig. (2-tailed)
	Mean	Std. deviation	Std. Error mean	95% Confidence interval of the difference				
				Lower	Upper			
Pre pain Post pain	6.761	23.529	6.374	-5.067	22.326	1.070	20	P= 0.318

Mean Back Pain Functional Scale numerical rating scale (20) pain scores were also significantly better in the group that received SVMT. Adjusted mean back pain functional scale scores were significantly higher (improved) in the SMC plus SVMT group than in the SMC group at both week 2 (P<0.001) (Table 5) and week 6 (P=0.001) (Table 6) most of Group I. patients regain their functionality shortly after the

first SVMT session, as they stated, and shown by results in Table 1 and the remainder returned soon after, their improved functionality lasted and even become better. On the other hand, patients of Group II. complained of inability to do their everyday life activity (Table 7 & 8). Basic data are presented in Table 9.

Table 5 Back Pain Functional scale scores Paired Samples Test

Intervention Group	Paired differences					t	df	Sig. (2-tailed)
	Mean	Std. deviation	Std. error mean	95% Confidence interval of the difference				
				Lower	Upper			
PRE & POST FUNCTION	41.000-	23.542	5.264	-52.018-	-29.982-	-7.789-	31	P<.001

Table 6 Back Pain Functional scale scores Paired Samples Test after 6 weeks

Intervention Group	Paired differences					t	df	Sig. (2-tailed)
	Mean	Std. deviation	Std. error mean	95% Confidence interval of the difference				
				Lower	Upper			
Pre & Post Function	43.000-	20.439	5.062	-54.106-	27.758-	-7.932-	31	P<.001

Table 7 Back Pain Functional scale scores Paired Samples Test

Control Group	Paired differences					t	df	Sig. (2-tailed)
	Mean	Std. deviation	Std. error mean	95% Confidence interval of the difference				
				Lower	Upper			
pre function - post function	3.235-	6.833	1.657	-6.749-	0.278	-1.952-	20	P= .269

Table 8 Back Pain Functional scale scores Paired Samples Test after 6 weeks

Control Group	Paired differences					t	df	Sig. (2-tailed)
	Mean	Std. deviation	Std. error mean	95% Confidence interval of the difference				
				Lower	Upper			
Pre pain Post pain	4.613-	7.104	1.310	--8.237-	0.357	-1.891-	20	P= .332

Table 9 Basic data

	Control G	Treatment G
No. of subjects	21	32
Age Range	21-53	18-55
Mean	42.09	39.34
SD	8.97	10.46
Gender F/M	12/9	18/14
Duration of symptoms	6	9
Less than 2 Ws	8	12
From 2-4 Ws	7	11
More than 4 Ws		
Co-pathologies		
DM	2	3
HTN	5	6
IHD	1	0
SMC	Muscle Relaxant NSAI VITAMIN B COMPLEX	Muscle Relaxant NSAI VITAMIN B COMPLEX

No, number; SD, standard deviation; F/M, females/male; Ws, weeks; DM, diabetes; HTN, hypertension; IHD, ischemic heart disease

Discussion

Results of this study showed that all the patients clinically improved but only patients of Group I who received single vertebral manipulative technique sessions, their improvement reached a statistical significance, and their improvements stand time. Low back pain is the common disabling symptoms among working adults, and Spinal Root Compression Syndromes (SRCS) is the severest form of low back pain.

The Agency for Health Care Policy and Research noted that nonsteroidal anti-inflammatory compounds and muscle relaxants were effective for the pain component of low back problems, so all groups in this study received that combination of medicines.⁶ Spinal manipulation was found to be effective for both pain control and functional recovery and was recommended for uncomplicated acute LBP within the first month of symptoms.⁶ In the present study, patients were suffering from complicated low back pain as they have SRCS. SVMT was designed to release root compression and alleviate pain of SRCS; and results indicated success of the technique as regards that point, represented in Mean Roland-Morris Disability Questionnaire scores (19) decreased in both groups during the course of the study, but adjusted mean scores were significantly better in the SMC plus SVMT group than in the SMC group at both week 2 ($P < 0.001$) and week 6 ($P = 0.001$); and Mean Back Pain Functional Scale numerical rating scale (20) pain scores were also significantly better in the group that received SVMT. Adjusted mean back pain functional scale scores were significantly higher (improved) in the SMC plus SVMT group than in the SMC group at both week 2 ($P < 0.001$) and week 6 ($P = 0.001$).²¹

Prescription of medications at the beginning of study were unified for both groups to minimize the possibility of influencing the study results. By lengthening the care phase to 6 weeks to provide care more in line with practice standards, study design guaranteed real life practice experience. Limitations of this clinical study is mainly the inability for blinding as one group takes only medicines and

home training but the other, in addition, received a few sessions of intervention.

Conclusion

Results suggest that SVMT in conjunction with SMC offers a significant advantage for decreasing pain and improving physical functioning when compared with only SMC, for patients aged 18-55 years with SRCS.

Recommendations & further research

More studies are needed before using the SVMT on larger scale, also, with larger population and prolonged follow up. In further studies, SVMT (Kitchener's technique) must be compared to surgical procedures aiming to release root compression, as SVMT proved to be effective in releasing root compression.

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Conflict of interest statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Declaration

This study was approved by the Egyptian General Organization for Teaching Hospitals and Institutes (GOTHI) Research and Ethics Committee and conducted in accordance with the ethical standards of the 1975 Declaration of Helsinki and the 1999 National Institutes of Health Human Subjects Policies and Guidance; and adopted by the Egyptian Supreme Council of medical trials regulation and human rights.

The patients/participants provided their written informed consent to participate in this study. Inclusion of identifiable human data: No potentially identifiable human images or data is presented in this study.

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