

A retrospective file review on the effectiveness of Advanced Orthogonal Technique in patients with low back pain.

Introduction

In a recent systematic review of the literature on the use of spinal manipulative therapy (SMT) for patients with low back pain (LBP), Goertz and colleagues (1) pointed out that no clear “gold standard” medical approach to treatment exists despite the burden of low back pain despite a lifetime prevalence ranging from 11% to 84%. Direct and indirect costs have been positively correlated with disease severity, disease duration, and female gender (2) and a median cost per quality-adjusted life year have been placed at \$13, 015 (1,3).

Chiropractic SMT is commonly used to treat low back pain. A review by Khorsan and colleagues found that the most common patient-based outcomes assessments instruments utilized in published chiropractic studies were the Oswestry Pain/Disability Index, Visual Analog Scale, and Short Form 36 (4). The review by Goertz and colleagues (1) examined all LBP clinical trials using high-velocity, low amplitude (HVLA) SMTs with the patient-centered outcomes visual analogue scale, numerical pain rating scale, Roland-Morris Disability Questionnaire, and the Oswestry Low Back Pain Disability Index. The authors found a small but consistent treatment effect at least as large as that seen in other conservative methods of care.

With on-going health reform in the United States and other countries, it is incumbent upon all healthcare providers to follow the principles and practice of evidence-informed practice (1, 2, 3, 4, 5). The use of outcome measures to determine quality, satisfaction, efficacy, and effectiveness now serve as essential elements for health care decisions at the healthcare systems level and the formulation of health policy as well as evidence-informed

practice for the individual practitioner (6). The challenge for the attending clinician in the care of patients with low back pain is to translate the existing sources of synthesized and quality-assessed evidence as discussed above into practice. Towards this end and in the interest of evidence-informed practice, we performed a retrospective file review to examine the possible effectiveness of chiropractic SMT utilizing the Advanced Orthogonal Technique (7) in patients with LBP using the validated patient-centered outcomes measures.

Methods

Our study received Institutional Review Board (IRB) approval from the IRB Board of Life Chiropractic College-West (Hayward, CA, USA).

A retrospective analysis of adult patient files presenting with a chief complaint of LBP at a multiple-practitioner chiropractic clinic in a period of 1 year was performed. Inclusion criteria for file review was: (a) the patient presented with a chief complaint of LBP; (b) the patient underwent a diagnostic work-up including a history and physical examination to screen for comorbidities and signs and symptoms indicative of a contraindication to chiropractic SMT; (c) the patient received consistent chiropractic care using the Advanced Orthogonal Technique and (d) the patient completed baseline and comparative outcome measures using the Revised Oswestry Low Back Pain Questionnaire (RODQ) (8), the Quadruple Visual Analog Scale (QVAS) (9) and the RAND SF-36 (10) questionnaires. The file review was performed by one of the clinicians/principal investigator with data compiled into an Excel spreadsheet (Excel, Microsoft Corp). In addition to patient demographics (i.e., age, gender), we examined the patients' response to care using the aforementioned outcomes measures. Categorical data were analyzed using descriptive statistics (i.e., frequency distributions and percentages). Baseline and

comparative measures were analyzed using paired t-test (Excel, Microsoft Corp, Redmond, WA, USA).

Results

Our file review revealed 21 files satisfying our inclusion criteria for review. The gender distribution of the patients was 12 females and 9 males. Their average age was 50.76 years (median= 53 years, mode = 51, age range=19-82 years). Comparative measurements with the RODQ and QVAS were performed, on average, after two weeks of care (mean days = 19.05) and an average number of visits of 5.47 (median =6; range= 2-9). With respect to the use of the RODQ questionnaire, baseline mean scoring for the cohort was 41.33. Comparative testing following a trial of chiropractic care resulted in a decrease in the mean score of 20.74. Paired t-test analysis using Excel (Excel, Microsoft Corp) found the decrease from baseline to comparative as statistically significant ($t_{\text{calc}}=6.56$; $df=20$; $t_{\text{crit}} = 2.09$). A scoring in the QVAS is categorized as "low-intensity" pain if the score is 50 or less and "high-intensity" pain if a score of 51 or higher is obtained. The baseline mean QVAS score for our cohort was 62.65 for our cohort with a comparative measure mean scoring of 35.48. Our findings indicate that chiropractic care resulted in a decrease in LBP pain intensity with paired t-test analysis (Excel, Microsoft Corp, Redmond, WA) indicating the mean decrease in pain scoring as statistically significant ($t_{\text{calc}}=4.52$; $df=20$; $t_{\text{crit}} = 2.09$).

With respect to the RAND SF-36, we examined the 8 domains of functional health status - physical functioning, role limitations due to physical functioning, role limitations due physical health, role limitations due to emotional health, energy/fatigue, emotional well being, social functioning, pain and general health. The baseline and comparative mean scoring for each domain as well as the paired t-test analysis are summarized in Table 1. Our review found an

increase in scoring in all domains from baseline to comparative testing with chiropractic care using the RAND SF-36. The increase in each domain scoring was statistically significant as determined by paired t-testing (Excel, Microsoft Corp, Redmond, WA) and interpreted as an improvement in the specific functional health status examined.

Discussion

To begin and to provide further context to our discussions, we performed a systematic review of the literature on publications describing the use of upper cervical technique in the chiropractic care of patients with headaches. Pubmed [1984-2012], MANTIS [1984-2012] and Index to Chiropractic Literature [1984-2012] were consulted with the search terms “chiropractic”, “low back pain” and “upper cervical technique”, “international upper cervical chiropractic association”, “atlas orthogonal chiropractic”, “Blair technique”, “Palmer upper cervical specific technique”, “national upper cervical chiropractic association” or “NUCCA Technique”, “toggle recoil” and “advanced orthogonal technique.” Inclusion criteria for our review included: (1) a primary investigation report (i.e., case reports, case series, case control, randomized, controlled trials, and survey or surveillance studies); (2) published in the English language and (3) chiropractic care specified the use of an upper cervical SMT technique. Our systematic review found no published articles describing the chiropractic care of patients with LBP utilizing an upper cervical SMT technique. This is not surprising given that over a decade ago, Cooperstein and colleague (12) found that upper cervical technique were not well represented in the chiropractic care of patients with LBP. In rating specific chiropractic technique procedures used in the treatment of common low back conditions, Gatterman and colleagues (13) found the three rated least effective were upper cervical technique, non-thrust reflex/low force, and lower extremity adjusting based on the published literature. Research on

the clinical effectiveness of the Advanced Orthogonal SMT Technique is at its infancy. Our study begins to address the lack of literature base for upper cervical techniques (and specifically Advanced Orthogonal Technique) in the care of patients with LBP. Advanced Orthogonal Technique utilizes spinographic/radiographic analysis consisting of a lateral view, a horizontal view (modified submentovertex projection), a frontal view (modified Towne's projection), and an axial view (modified A-P open mouth) of the cranium and cervical spine. Rotational and translational misalignment of the atlas with respect to the skull is measured, as well as any abnormal positioning of the cervical spine. The measurements are assessed using digital analysis software, and are used to define misalignment of the occipito-atlanto-axial complex around the z-axis, as well as misalignment of the atlanto-axial joint around the y-axis. Chiropractic SMT is performed utilizing a table-mounted percussion instrument that delivers a specific vectored, low force, low velocity impulse to the atlas vertebra based on the radiographic analysis. The patient is placed in a side-lying position the percussion instrument consists of a metal stylus is placed at the level of the atlas transverse process, approximately 1/8" above the patient's skin. A mechanical impulse is imparted to the stylus, which transmits a compressional wave through the skin towards the atlas vertebra.

Several notable findings are revealed in our retrospective file review. To date, this is the first publication describing the use of Advanced Orthogonal Technique in the chiropractic care of patients with LBP and the most comprehensive in use of reliable and validated outcome measures among upper cervical techniques. The concurrent use of the RODQ, QVAS and SF-36 found good correlation with respect to decrease in LBP intensity, improvement in health-related quality of life measures as measured by SF-36 and improvements in activities of daily living as measured by the RODQ. This is congruent with previous findings that examined and found the

Roland Morris Disability Questionnaire, the Oswestry Disability Index, the Disability Rating Index, and Physical Functioning scale of the SF-36 and the Numerical Pain Rating Scale and VAS) as appropriate for measuring changes in functional status and pain in patients with LBP (14).

Despite the possible effectiveness of chiropractic care using Advanced Orthogonal Technique as demonstrated in our file review, we caution the reader and acknowledge the limitations of our study. Inherent in all retrospective studies, significant bias exists (i.e., selection bias and misclassification bias). Furthermore, as with all retrospective studies, we relied heavily on good record keeping. No assurances can be made that this was maintained at all times throughout the care of the patients (15). Despite these limitations, our retrospective study demonstrated the advantage of performing retrospective studies in terms of cost effectiveness and the demonstrable utility of patient-centered outcome measures in clinical practice.

Conclusion

Our retrospective file review demonstrated the possible effectiveness of Advanced Orthogonal Technique in addressing patients with a chief complaint of LBP as measured by the revised Oswestry for LBP, QVAS and RAND SF-36 questionnaires. We encourage continued research with this technique utilizing a prospective cohort design or in randomized controlled clinical trial.

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Table

Domain	Mean (Baseline)	Mean (Comparative)	Normative Values (11)	Δ (↑)	t_{cal}	t_{crit}
Physical functioning	60.95	73.57	84.2	12.62	-3.57	2.09
Role limitations due physical health,	25.00	63.09	81.0	38.09	-4.26	2.09
Role limitations due to emotional health,	57.13	84.12	81.3	26.99	-3.07	2.09
Energy/fatigue,	33.57	60.00	60.9	26.43	-4.45	2.09
Emotional well being,	61.00	77.33	74.7	16.33	-3.38	2.09
Social functioning,	61.30	75.59	83.3	14.29	-2.57	2.09
Pain	41.54	57.38	75.2	15.84	-3.59	2.09
General Health	59.28	72.5	72.00	13.22	-3.37	2.09
Change in Health Status	37.14	75.0	-----	37.86	-6.40	2.09

Table 1. Baseline and comparative scoring with the SF-36 in patients receiving Advanced Orthogonal SMT.

	Baseline Measures			Comparative Measures			Paired t-test
Domain	Mean	Median	Mode	Mean	Median	Mode	
physical functioning,	60.95			73.57			
role limitations due physical health,							
role limitations due to emotional health,							
energy/fatigue,							
emotional well being,							
social functioning,							
pain							
general health							

Table 2. Baseline and comparative scoring using the RAND SF-36questionnaire