The Efficacy of Chiropractic Adjusting versus Physical Therapy Protocols for the Treatment of Upper-Crossed Syndrome

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Abstract

The purpose of this study was to compare the efficacy of physical therapy protocols for upper-crossed syndrome and chiropractic adjusting protocols. Both methods have documentation to show their effectiveness at treating the underlying dysfunction of upper crossed, however no data existed comparing the two treatments. The study was divided into two groups, one for adjusting, and the other for physical therapy. Each group had passed the designated inclusion criteria, and had at least 10 people that had been screened for physical signs of upper-crossed syndrome in the form of posture, muscle testing, functional screens, and self report neck pain Oswestries. Each group received two weeks of care in the form of diversified adjusting or physical therapy home exercises and stretches. After the two weeks of trial care, each group was reassessed and compared to pre-care status. This study found that both groups responded to treatment, but the physical therapy group had a more significant positive outcome. This is important to note because both approaches have something to offer independently, and yet more significant results were found with a strictly muscle approach. This might mean that the chiropractic profession might need to embrace a more diversified treatment repertoire.

Introduction

Muscle imbalance plays a key role in the generation of many musculoskeletal complaints seen in the clinical setting. In fact muscle imbalance usually precedes recurrent joint dysfunction (1). Muscle imbalance is a situation in which some muscles become hypertonic and overly contracted, while other muscles become weak and inhibited. Muscle imbalance manifests in altered or impaired functioning of the local joint segment as well as the global kinetic chain. This impairment alters joint mechanics, leading to unequal distribution of pressure within the joint. In addition a change in range of motion causes other joints to become hypermobile in order to maintain compensatory movement. The body adapts to a stress or strain on the musculoskeletal system through compensation. This muscular adaptation can become programmed as a new movement pattern known as an engram. This programming is stored in the central nervous system (5). These imbalances typically occur due to the effects of gravity, repetitive tasks, and prolonged stressful postures. (2). According to Janda, muscle imbalances occur between

the postural musculature and the phasic musculature. In his model he proposed that the postural muscles (the muscles that oppose gravity) tend to become over-contracted and tight, while the phasic muscles (the muscles of movement) tended to become weak and inhibited (3). He reasoned that it was a sedentary lifestyle that precipitated the imbalance, through overuse of postural muscles, and disuse of phasic muscles (4). In addition to the natural stress response, Sherrington's law of reciprocal inhibition also must be considered in imbalance chronicity. This is due to the fact that postural and phasic muscles tend to be paired antagonists. As a result hypertonic muscles mechanically limit the range of motion of their paired antagonists, but they also inhibit their actions as well (4). The above pathology leads to symptomatic states of pain and inflammation (4). In addition it leads to weakness, in-coordination, atrophy, and loss of flexibility (2).

In 1979, Janda identified crossed syndromes of muscle imbalance for the upper and lower extremities based on research and clinical observations.

> The upper crossed syndrome is defined as tightness of the upper trapezius, pectoralis major, suboccipitals, and levator scapulae, and weakness of the rhomboids, serratus anterior, middle and lower trapezius, and the deep neck flexors, especially the scalene muscles (5).

The term "Upper Crossed" came from the fact that the weakened and shortened muscles are connected, they form a cross. Janda also documented functional deficits in upper crossed patients in the form of impaired scapulohumeral rhythm, difficulties with neck flexion, scapular fixation during lowering from a push up, and inhibited diaphragm (6). Neck, shoulder blade pain, and TMJ difficulties are associated symptoms of upper crossed syndrome.

However the most common symptom is headaches due to the aberrant movement pattern. Aberrant movement leads to a loss of mechanoreception at the level of the cord. This results in increased nociceptive input into the spinal cord, leading to dorsal horn sensitization. The increase in firing of c fibers in the dorsal horn leads to spillover of neurotransmitters into the internuncial pool leading to a central excitatory state (7). In addition the suboccipital tightness over time leads to myogenic referred pain which can cause headaches. Alix and Bates stated that head aches were responsible for more than 156 million full-time work days lost yearly, and an estimated cost of $25 billion dollars in lost productivity a year, and was the most common reason for taking over the counter analgesics (8).

Christiansen outlined a means for screening for upper crossed syndrome through posture and muscle testing (9).

> The ideal standing position viewed from the side is a plumb line passing through the earlobe, midway through the shoulder joint, midway through the trunk, through the greater trochanter, slightly anterior to the midpoint of the knee, and slightly anterior to the lateral malleoli. From the back, the plumb line should dissect the body through the midline with the alignment of the symmetrical body parts on each side. The head is neutral, the shoulders and hips are even, and the feet are rotated slightly outward (10).

He noted that the stereotypical muscle imbalances of upper crossed lead to associated postural findings of forward shoulders, increased kyphosis of the thoracic spine, anterior head carriage, and a loss of the cervical lordosis. He also stated that muscle testing was imperative to proper diagnosis. Once muscle testing was performed, tight muscle could be targeted for stretching, while weak muscles could be strengthened through targeted exercise (9). Several studies have documented a relationship between neck and shoulder problems with postural abnormalities, muscle imbalances, and abnormal movement

patterns (11-13). Another such study was done comparing the sternocleidomastoid in the various treatments. We will also use some of the same physical therapies used in this study (24). The treatments to follow in this study will include the use of post-isometric muscle stretching which has been shown to prove great success (25).

> This technique was applied to tight, tender muscles that are commonly associated with musculoskeletal pain and was systematically tested on 351 muscle groups 244 patients. The method produced immediate pain relief in 94%, lasting pain relief in 63%, as well as lasting relief of point tenderness in 23% of the sites treated (25).

The posture of upper crossed produces overstress of the cervical cranial junction, as well as C4/5, and T4 segments (5). These segments become restricted over time. As a result, there is a loss of mechanoreception, and increase in nociceptive drive. As a result a central excitatory state is created. This provides grounds for the usefulness of the chiropractic adjustment at such segments. There are many studies to support the use of adjusting in people with head aches and joint restriction (14-16). However Liebenson reports that "chiropractors or myofascial specialists who concentrate exclusively on passive intervention (i.e. spinal adjustments, trigger point therapy) to treat a specific pain generator (joint or soft tissue) are also placing patients at risk for deconditioning." (2) After muscle imbalances have been corrected, normal movements needs to be practiced to re-program a normal engram (17). This provides the basis for physical therapy in rehabilitation of upper crossed syndrome. Furthermore it has been shown that home exercises can be effective in reducing symptom and improving function in patients with shoulder pain (18). The shoulder pain in the article was very similar to the findings associated with upper crossed.

Rehabilitation has been proven to be effective in the treatment of pain. It has been shown that with active physical therapy methods, a decrease in pain intensity can be observed (19, 20). In this research article, it was shown that there was a significant decrease in low back pain symptoms with active physical therapy methods versus passive physical therapy methods. People with back pain have had better success when treatment was in adjunct to rehabilitation (20).

Using a questionnaire (oswestery) will allow the group to measure the significance of the treatments. A research study was done that showed the effectiveness of a questionnaire to be sure that it would pose as a justifiable tool (21).

As we may know, manipulation has been used to treat spinal for some time however this research is to show the difference in physical therapy modalities versus manipulation.

> When appropriately selected using the ''clinical prediction rule'' (see discussion relating to Flynn et al., 2002 in Liebenson's response above), patients show a very high positive response to manipulation (up to 95% success rate) (22).

The article also gives a criteria as to the predictors to whome would benefit from manipulation. There was also another research study that showed the effectiveness of manipulation to neck pain (23). There was also a study done on the physical therapy aspect of treating neck pain that was shown to be effective (27,30).

Materials:

- Oswestery survey
- Wall angel instructions sheet
- Deep neck flexor instruction sheet
- Inclusion/exclusion questionnaire
- Gross Postural assessment sheet

- Logan Chiropractic Health Centers Neck Disability Index Questionnaire
- Appendix E-Consent Form
- Chiropractic table
- Flat adjusting table

Methods

A total of thirty Logan students are to be recruited to partake in "The Efficacy of Rehabilitation versus Manipulation in Upper Cross Syndrome Patients". ~~Upon~~ the ~~arrival of~~ students ~~to the location of experimental conduction~~, ~~they are to be~~ were randomly assigned to either the "manipulation group" or the "physical therapy group". Upon designation into specific groups, all students are to be both instructed of the mechanics of wall angels, as well as asked to perform them. Wall angels are to be demonstrated as a screening utensil to determine the eligibility of students to partake in the project. Wall angels were instructed to be performed 2 minutes for every hour of sitting, for physical therapy group.

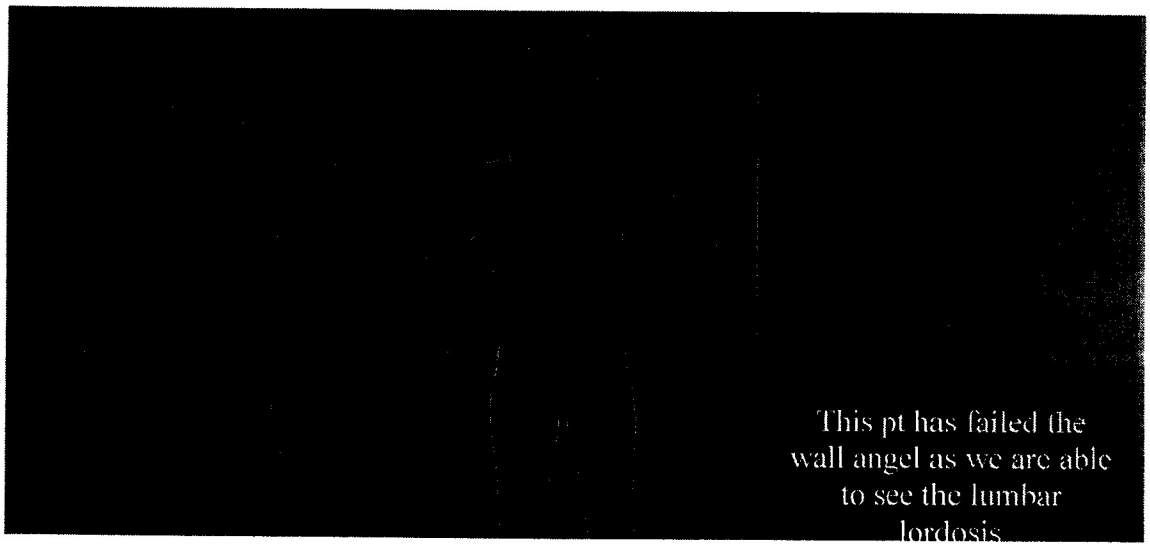
The physical therapy group is to be instructed on the performance of deep neck flexor exercises. Exercises were instructed to be performed three times a day.

On the initial day of experimental conduction both groups are to complete: A Neck Disability Index Questionnaire, Inclusion/Exclusion Questionnaire as well as the Appendix E-Consent form. Once students are designated to their specific group, gross postural assessment of initial biomechanical status is to be recorded prior to care.

Students assigned to the Physical Therapy module are to receive PIR of the Levator Scapulae, upper trapezius, pectoralis and scalenes twice a week for two weeks. The participants are to be instructed to wear comfortable loose fitting clothes. The students assigned to the manipulation group are to receive diversified manipulations to

the thoracic spine, cervical spine and first rib. Manipulations are to be performed twice a week for two weeks.

Following the two week experimental phase, both groups are to be re-united to perform a re-evaluation. Upon arrival of participants, each individual is to complete both the Neck Disability Index Questionnaire as well as the Inclusion/exclusion Questionnaire. The final visit consisted of a physical examination of the individual's gross posture, coupled with palpation of the pectoralis, upper trapezius muscles, suboccipitals and levator scapulae. The above are to be palpated in order to detect any hypertonicity. All patients are then to conduct wall angel screening tests in order to analyze any demonstrated weakness of the middle/lower trapezius. We will also use the wall angel screening as an inclusion/exclusion test.



The patient is to have their back against the wall. The whole spine must be touching the wall. This also includes rocking the pelvis anteriorly to allow the lumbar spine to touch as well. Keeping this posture, the patient is then instructed to start with their elbows at 90 degrees against the wall. The arms are raised above the head in an attempt to maintain

the starting posture. If the patient cannot maintain the original posture, they have failed the test and are included in the study. If the patient is able to perform the wall angel, they are excluded from the study.

All information is to be carefully recorded in order to accurately contrast and conclude results.

Data

See attached appendix

Discussion

"The Efficacy of Rehabilitation versus Manipulation in Upper Cross Syndrome Patients", revolved around the prospect of contrasting which treatment method would provide the best clinical outcomes for individuals with upper cross syndrome. The two specific treatments compared were specific diversified adjustments to Post Isometric Release.

Upper Cross Syndrome is a classic musculoskeletal condition which definitely falls within the realm of both chiropractic care and concern. This study emphasizes great importance for it reiterates the need for management via chiropractic care. Effective management through chiropractic care is fundamental in order for chiropractors to highlight their role in the community as musculoskeletal specialists.

A total of thirty Logan students ~~are to be~~ were recruited to partake in "The Efficacy of Rehabilitation versus Manipulation in Upper Cross Syndrome Patients". Upon the arrival

of students to the location of experimental conduction, they ~~are to be~~ were randomly assigned to either the "manipulation group" or the "physical therapy group".

Based on the initial information assessed from both the "physical therapy and the manipulation group" all individuals failed to successfully pass the wall angel test. Based on these results all thirty individuals were ~~successfully suitable~~ eligible to ~~partake~~ Participate in the research project.

Upon assessment of the research candidates partaking in the physical therapy category, all individuals failed to pass the wall angel screen. When collecting numerical data via the Neck Disability Index Questionnaire, it is noted that a score of one represents an individual who experiences no pain. A score of six is to represent an individual in severe pain who is also unable to perform tasks. Based on careful analysis of the data obtained regarding the Neck Disability Index Questionnaire for the **physical therapy** group prior to care the following was obtained:

Level of pain	**1**	**2**	**3**	**4**	**5**	**6**
Prior to care	68	34	9	2	1	0
Following care	86	22	7	3	0	0

The above chart depicts the number of times in which an individual chose a specific depiction of pain on a scale of one to six. The numbers correspond to multiple choice answers given on the questionnaire. The numbers also represent general pain and pain with work/activity. The number 1 represent no pain while resting or with work, whereas number 6 represents extreme pain with resting and with work. The data shows a significant increase in the amount of times a "no pain" answer was chosen. There is a

shift in all answers towards "no pain" as well. There were also decreases in answers which included pain, answers 2-6.

Adjusting Module:

Level of Pain	**1**	**2**	**3**	**4**	**5**	**6**
Prior to care	79	42	10	2	0	0
Following care	90	30	10	0	0	0

Upon gathering participants on day one of the experiment, muscle tone of the: Pectoralis, Upper trapezius, suboccipitals and levator scapulae were palpated to detect hypertonicity. Following the two week trial of care participants were re-evaluated in order to examine musculature. The following information was gathered regarding the

Physical therapy module:

	Pectoralis	**Upper Trapezius**	**Suboccipitals**	**Levator scapulae**
Hypertonicity Prior to care	50%	92%	67%	33%
Hypertonicity following care	58%	58%	50%	17%

According to the numerical data obtained, the hypertonicity of musculature involving upper cross syndrome was greatly improved following care in all muscles tested except for the pectoralis. An 8% increase in hypertonicity was demonstrated

within this muscle. The discrepancy regarding this category could be attributed to inter examiner reliability.

Upon gathering participants on day one of the experiment, muscle tone of the: Pectoralis, Upper trapezius, suboccipitals and levator scapulae were palpated to detect hypertonicity. Following the two week trial of care participants were re-evaluated in order to examine musculature. The following information was gathered regarding the **Manipulation Module:**

	Pectoralis	**Upper Trapezius**	**Suboccipitals**	**Levator scapulae**
Hypertonicity Prior to care	62%	100%	77%	46%
H. After Care	54%	23%	69%	23%

According to the data obtained, a significant improvement was observed within the upper trapezius. An improvement of 77% was noted following a manipulation. All muscle groups exhibited a decease in hypertonicity following a manipulation.

In contrasting data collected from both the Physical therapy group as well as the Manipulation group, numerical data support the concept that physical therapy/PIR treatment prove to be more beneficial regarding the treatment of upper cross syndrome. Numerical outliers may be attributed to inter-examiner reliability as well as participant negligence.

Conclusion:

Manipulative therapy as well as physical therapy was shown to improve upper-crossed syndrome patients. A larger scale study should be performed to truly get significant results, however this study has been able to shed light on upper-crossed patients. There is minimal research done on patients with upper-crossed syndrome, however further research will show the effectiveness of manipulation, physical therapy or both. Furthering the research on the said topic could show very promising success on these patients who have sought failed treatments.

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