THE RESULT OF CHIROPRACTIC

BIOPHYSICS TECHNIQUE

ON THE CERVICAL CURVE

A LITERATURE REVIEW

by:

Jennifer Bett

Advisor: Dr. Copeland
ABSTRACT

Dr. Harrison, the founder of Chiropractic Biophysics Technique states that the cervical spine curve can be classified into three major categories, including first harmonic, second harmonic, and third harmonic. According to Harrison, these three groups can then be broken down into eight different variants, the ideal being a 42 degree lordosis. Adverse symptoms and effects of an abnormal cervical curve can range from early degeneration to chronic pain and even autonomic dysfunction. Utilizing Chiropractic Biophysics technique, or CBP as it is known, the patient’s treatment is classified into categories by a combination of x-ray and posture screening findings. By using CBP technique, including mirror image adjustments, cervical traction and mirror image exercises, a Chiropractor may be able to help restore the ideal cervical curve while helping to restore normal physiology.
CHAPTER ONE

INTRODUCTION

Literature reviews have shown a wide range of normal when it comes to cervical spine curves. According to Yochum’s cervical lordosis measurement system, the normal lordotic curve ranges from a minimum angle of 35 degrees and maximum angle of 45 degrees with the average angle being 40 degrees (15). Another study shows the normal range anywhere from 16.5 to 66 degrees (17,3). Yet Harrison’s studies have revealed 40-45 degrees as being in the normal range. His system states that greater than 45 degrees is hyperlordotic and less than 40 degrees is hypolordotic. The radiographic mensuration utilized by CBP is the Ruth Jackson cervical stress line, which has shown to have less then a 10% error. This marking system consists of finding the angle of intersection of a tangential line drawn across the posterior vertebral margins of C2-C7. Harrison’s studies have also revealed the ideal cervical angle being a 42-degree lordosis with the average population having a 34 degrees lordosis (9). Harrison is the founder of a categorical system for defining cervical curves. According to his system the cervical curve can be categorized into one of the following groups as shown below. Numbers 1-4 are first harmonic (one apex), 5-6 are second harmonic (containing a kyphosis and lordosis) and number 7 is third harmonic (kyphosis between 2 areas of lordosis) (8,5).

1. normal lordotic curve
2. hypolordotic
3. military
4. kyphotic
5. kyphotic “S”
6. lordotic “S”
7. Double “S”

Abnormal cervical curves are seen very frequently in the average population, the most common being the hypolordotic curve. The cause of these abnormal curves can vary from congenital to trauma, and can be associated with various health problems. Some of these curves can be progressive in nature and even lead to an early rate of degeneration. Today, Chiropractic Biophysics Technique is being utilized in the treatment of abnormal cervical curves to help in their restoration. This is being accomplished by using three protocols. Before treatment the cervical curve is evaluated by two-dimensional x-ray findings and three-dimensional posture screenings. This protocol consists of: the CBP adjustment based on individualized posture, cervical traction to help restore the curve, and personalized exercises given to the patient to help maintain and restore the cervical curve. The CBP protocol designed by Harrison has shown to help biomechanics of the cervical curve.

**BACKGROUND**

Chiropractic Biophysics Technique has been shown to be very critical in helping restore and maintain the cervical spine lordosis. CBP plays a major role in cervical curve restoration because it can help restore proper biomechanics to the body. The technique
reduces postural abnormalities therefore stabilizing and redistributing abnormal stresses that could result in premature degeneration (17). This process then helps the body to work at its optimal potential, and reach maximum health. Chiropractic Biophysics has been proven to work by measurement changes shown in the pre and post x-ray measurements.

PROBLEM

The problem is that there is greater amplitude of research regarding the topic of the cervical curve variations and Chiropractic Biophysics Technique, but there is not a lot of information on the combination of CBP’s effect on the cervical curve.

PURPOSE

The purpose of this paper is to review the literature regarding CBP’s conservative treatment and management of abnormal cervical curves, as well as variations and causes of an abnormal cervical spine. The goal is to show that Chiropractic Biophysics Technique can be utilized to help in the restoration of the cervical spine curve. It is not the intent of this paper to discuss all other techniques that can be used regarding the same problem.
LIMITATIONS/IMPORTANCE/DEFINITIONS

The importance of this project is to tell others about the benefits of Chiropractic Biophysics Technique.

DEFINITIONS

*Cervical Lordosis* – forward curvature of the spine, or anterior convexity

*Cervical Kyphosis* – backward curvature of the spine, or convexity to the posterior

*Key Vertebrae* – where the traction wedge should be placed in cervical spine when doing cervical traction
CHAPTER TWO

METHODOLOGY

A literature search was conducted on November 15, 1997 at Logan College of Chiropractic. Utilizing a computer search, along with the author names Harrison, Mertz, Troyanovich, Nikitow, and Pettibon, 13 sources were found and located. Of these, 2 were used in this paper. Utilizing Med-Line and the key words Chiropractic Biophysics, Troyanovich, Harrison, cervical spine curve and cervical spine tractioning, 22 articles were related to this topic and then located. Of these, 3 were used in this paper as references. Using the internet and the Welcome to PubMed program, I used the key words Chiropractic Biophysics, cervical spine curve and cervical spine tractioning, I found 26 sources, not including the cervical spine tractioning which I decided was not relevant. Of these, I found 7 articles, which were useful, but 6 had previously been found by using the Med-Line source. I recently received reference sources from a Chiropractor in St. Peters Missouri, which attended a CBP seminar. He told me about 8 sources, 7 of which I found at Logan. In August 1997, I attended a Waiting List Practice seminar in Chicago in which I was given 3 articles related to CBP and the cervical spine curve. Lastly, I used Yochum’s Essentials of Skeletal Radiology textbook to learn about the cervical spine curve and mensuration technique. After reviewing many of these textbooks and articles only 18 were selected as being relevant to the objective of this paper.
CHAPTER THREE

LITERATURE REVIEW

Chiropractic Biophysics Technique, or CBP as it is commonly called was founded by Donald D. Harrison M.S. D.C. in 1980. Harrison is a Western States graduate and taught Pettibon technique for Dr. Burl Pettibon from 1977 to 1980, until he founded Chiropractic Biophysics Technique (2).

Chiropractic Biophysics is based on the orthogonal Cartesian system. This system is composed of three axes (X, Y, and Z), and is the most common three dimensional system used in physics and math. The Cartesian system, designed by White, Panjabi and Brand explains how a vertebrae or motions of the body can move or be positioned. There are two basic movement patterns, translation and rotation (4). Translation can be described as moving the vertebrae or spinal segment in the direction of the axis. Rotation can be described as the vertebrae, or spinal segment revolving, or rotating around the axis. The first to categorize human posture according to the Cartesian system was Donald Harrison (7).

The goal of CBP is to restore the normal alignment of the human structure because abnormal posture leads to subluxation, and eventually abnormal function and pathology. "Global subluxations are said to be the major cause of the traditional segmental
subluxations that have been classically described by Chiropractors taking measurements from radiographs or through palpatory procedures” (2). Abnormal posture over a long period of time has been shown to cause degenerative changes to the entire spine of up to 350% above normal (6). Studies show that posture is constant in an individual for up to two years, “any postural changes observed during that time are due either to external factors for which a cause may need to be sought, or to therapeutic influences (8).” In delivering a chiropractic adjustment, CJ Mertz D.C. claims “without changing the posture dooms the effort to failure because the tissue is adapted to its malposition” (12). This is why CBP bases their technique off posture.

Chiropractic Biophysics posture assessment utilizes a global posture analysis, both in the anterior-posterior and lateral views. The posture analysis compares the skull to the thoracic cage, the thoracic cage to the pelvis, and the pelvis to the feet. Posture is evaluated after instructing the patient to nod their head a couple of times and then returning to neutral while having their eyes closed (8). The Doctor then compares five reference points. The points are the following: In the A-P view, compare the mid foot point to the pubic symphysis to the episternal notch to the frenulum and finally to the glabella. In the lateral view, compare the lateral malleolus to the lateral tibial condyle to the greater trochanter to the AC joint and finally to the EAM. The posture can then be categorized or listed into shifts, rotation, and lateral flexions.

A typical Chiropractic Biophysics protocol consists of an initial history and consultation followed by an orthopedic and neurological exam. Precise evaluation and
consideration is then applied to a three dimensional posture analysis, bilateral weight scale assessment, and two dimensional x-ray evaluation (17). The patient’s treatment is then determined due to a combination of findings from their x-ray analysis, posture analysis, degree of degeneration, history, neurological, orthopedic exam and specific problem (2). The cervical x-rays, which are considered of primary importance in a CBP practitioner’s office, utilizes Ruth Jackson’s cervical stress lines (11). Studies have shown that intra-and interexaminer reliability is moderate to high using this system (10), other studies call it “highly reliable” (18), yet none of the fifteen chiropractic colleges are teaching this system (13). The accuracy of this system is very critical because radiographs as well as posture analysis are essential in determining a treatment protocol and will eventually determine the treatment results (16).

A typical CBP treatment protocol may consist of acute or chronic treatment procedures, depending on the individual case or rehabilitative/corrective regimes of care (2 & 17). If the patient is considered in the acute phase, their treatment consists of Diversified type adjustment, ice packs and possibly other modalities in order to control pain. After a few weeks the patient will then move into the rehabilitative/corrective regimen of care. This phase is critically based on the individual’s specific postural distortion and x-ray analysis findings (17). The goal with the rehabilitative care is the correction and restoration of normal three dimensional posture (2, 17). This correction regimen includes the use of a Chiropractic Biophysics drop table, mirror image exercises to work on the musculoskeletal aspect, and cervical traction. A study involving the “mirror image” exercises revealed that 59% of the participating subjects had “significant
long-term relief by performing postural exercises for the conditions.” (17). The exercises may help hold the posture. The cervical (extension) traction’s purpose, “is to provide long-duration deformation forces to those soft tissues that have adapted to a patient’s globally subluxated posture” (17). The Doctor must be aware that there can be serious cervical extension contraindications.

There are two types of CBP tables commonly used; these include the Turbo or Omni, which both have a pelvic and a cervical drop piece. The headpiece on the Turbo table moves in order to accommodate a three dimensional cervical distortion. In a typical CBP adjustment, the patient’s posture is analyzed, and the patient is put into the exact mirror image on the drop table. CBP correction uses the exact inverse of the subluxation, which is called “mirror image” or three-dimensional adjusting. A stress is applied to the abnormal posture (stressing it into the normal posture) followed by a fast force which is the adjustment (17). The force is directed into the segment based on the patient’s cervical curve and posture (17). The procedure can be accomplished by “toggle” maneuvers, Harrison’s Cervical Instrument, drop pieces, or Diversified adjustments (17). For example, if the patient has a right pelvic shift and a right high shoulder, one example of correction would be: the patient’s body placed into a left pelvic shift with his right shoulder distracted down and placed under his thigh, in order to lower it. The doctor will then apply specific body drops, depending on the treatment plan. The patient’s cervical curve will then be adjusted in the supine position with an anterior to posterior drop at the patient’s key vertebrae, depending on the type of cervical curve. According to one study the key vertebrae, or apex of the curve carries the most tension and compression in the
spine (5). The patient will then be placed in side posture to receive an upper cervical “toggle” adjustment. If the patient has a left head shift, the left side is placed up and the drop adjustment is performed on the atlas. The patient’s posture is then re-evaluated to look for posture corrections after the adjustment. The patient may then use cervical traction depending on the cervical sagittal curve, and its key vertebrae according to Harrison’s cervical spine categorizes. The cervical spine tractioning originally starts at about three minutes, and patient’s can work up to longer time periods with increasing weight. Harrison claims that a cervical spine lordosis is the desired clinical outcome, because “Alfred Breig, leading neuro-surgeon, has shown that loss of curve stretches the spinal cord 5-7 cm, and produces pathological tension (6).” The Bagnall study also shows that a cervical spine lordosis is developed and maintained during fetal life, “…any alterations from a normal cervical lordotic configuration are caused by micro or macro traumas after birth” (9). Yet we are still being taught that A-P curves are formed during infancy when children learn to hold their head upright. This is why many CBP practitioners are now trying to restore and correct cervical spinal curves, with much success (4).

Harrison’s cervical spine categories are defined below (5-8):

Figure 6. Cervical curve configurations classified as harmonic shapes. In physics, deflections of a vibrating string can be classified into harmonic configurations. Such a classification system can be applied to lateral cervical curves. In A, B, C or D, the first harmonic shape of normal lordosis, hypolordosis, mild and kyphosis are illustrated. In E and F, the second harmonic shapes are illustrated. In G, a third harmonic shape is depicted. The results of the control and experimental groups were classified this way in this study.
FIRST HARMONIC

Normal lordotic curve—normal equilibrium therefore weight distributed evenly

Hypolordotic—a decreased angle

Military—straightening of the cervical spine, a loss of lordosis or no convexity

Kyphotic—a reversal of the cervical lordotic curve, weight distributed to the anterior

The first four comprise 44.4% of cervical curves (6).

The most frequently occurring variants (6).

Hyperlordotic—an increased angle, may be caused by posterior muscle spasm (3), this is a rarely seen variant, and it is not part of Harrison’s classification system.

The key vertebrae for the entire group is C5.

SECOND HARMONIC

Kyphotic “S”—the cervical curve starting in a kyphosis, and then turning into a lordosis

Lordotic “S”—the cervical curve starting in lordosis, and then turning into a kyphosis

Together, these two variants comprise 15.6% of cervical curves (6).

The key vertebrae for the Kyphotic “S” group is C3.

The key vertebrae for the Lordotic “S” group is C6.

THIRD HARMONIC

Double “S”—Starting lordotic, turning kyphotic, and then returning to a lordotic curve.

Studies show that 20.8% of a sample population have the Double “S” (3).

The key vertebrae for the Double “S” group is C5.
According to Harrison’s research, all variants except hyperlordosis, hypolordosis and normal have an increased rate of degenerative spurring, yet Dr. Mertz’s studies reveal the military and kyphotic groups (second harmonic) show two times more spurring than the first harmonic group (6), yet some researchers still believe that cervical spine curves are not related to degeneration (1). According to a study performed by Dr. C.J. Mertz, a hyperlordotic curve degenerates 130% greater than normal, hypolordotic 157%, military 223%, kyphotic 260%, lordotic “S” 333%, kyphotic “S” 355%, and double “S” 350% greater than a normal curve. “The proposed reason that CBP works is both neurological and neuromusculoligamentous”(17). “The proposed rationale is that reduction of the adverse gravitational loading that could be expected as a result of postural abnormalities will minimize aberrant stresses and strains on the neuromuscular tissues, resulting in improved neuromusculoskeletal health and, it is speculated, visceral health as well (17)”.

Harrison claims that the degree of cervical curve is directly related to health. Abnormal cervical curves can be asymptomatic or symptomatic, such as pain or immobility.
“...straightened or reversed cervical spine configuration were associated with tension headaches and migraines respectively (9).” Compressive vertebral injury has also been shown to result by reversal of the cervical curve (14). Studies show that the cause of abnormal cervical curves can include elementary trauma, muscle spasm, congenital problems, osteoporosis, acquired disease improperly treated fractures, etc. Some researchers claim that in asymptomatic patients, (9,4) cervical variants, especially the kyphotic cervical curve angulation can be normal, but according to Harrison, as already stated, the ideal cervical curve is a 42 degree normal with the average being 34 degrees. This belief that variants of cervical curve are normal may be the reason why many Chiropractors have not attempted to regain the ideal cervical curve, but many CBP technique practitioners are now successfully restoring these curves (4). The correction of the spinal biomechanics will help normalize forces therefore decreasing deforming forces on the spine (3).

Utilizing CBP, Harrison has shown that cervical curves can be altered or re-established toward normal by utilizing a spinal reconstruction program consisting of manual prone adjustment while the patient is in the static resting position (8). This program can also consist of cervical traction in office and at home as well as “mirror image” exercises. “In one experimental design study published in 1994, patient’s receiving specific CBP spinal adjustments and extension traction were shown to have reduced global subluxations of the cervical lordosis by an average of 13.2 degrees versus no change in control subjects (17), “and found that 75% of the kyphotic subjects had a return to lordosis in three months of daily care...” (9). Other studies show that CBP drop
table technique as well as diversified adjusting and cervical compression traction help re-establish the cervical lordosis (8).

Chiropractic Biophysics technique has been shown to help alter the cervical curve. As of today many practitioners still believe that cervical curve variations can be normal, but Harrison’s research has shown that anything other than a 42 degree lordosis is abnormal. By helping to reestablish the cervical curve, the body is allowed to work at its optimal potential.
APPENDICES

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