Case Study

Correction of Cervical Kyphosis & Health Concerns Following a Single Adjustment Utilizing the Pierce Chiropractic Technique

Abstract

Objective: To report immediate reduction of cervical kyphosis utilizing the Pierce Results System™ of chiropractic for correction of vertebral subluxation following one adjustment.

Clinical Features: A 36 year old male presented with a chief complaint of left upper thoracic pain radiating into the right shoulder and arm. Other symptoms included cervicalgia, lumbago, asthma, bilateral forehead twitch, sinus congestion, asthma, allergies, and chronically sprained ankles. The lateral cervical radiograph revealed a cervical kyphosis measuring -45cm radius using an AcuArc ruler. Videofluoroscopy revealed multiple levels of abnormal spinal biomechanics. These findings are all indicative of vertebral subluxation.

Intervention and Outcomes: Strict adherence to the Pierce Results System™ protocol using infrared thermography, plain film radiography, and videofluoroscopy determined vertebral subluxations in the cervical, thoracic, lumbar, sacral, and pelvic regions. Conservative full spine chiropractic care was delivered on a Zenith 230 Hilo (60 stationary) table with the Pierce 3-D headpiece. One hour after the first adjustment, a new plain film lateral cervical radiograph revealed the cervical curve had been restored to +55cm lordosis, a correction of 48%. After seven visits, the cervical lordosis revealed a +23cm, a total correction of 82%. As noted were improvements in thermography readings and subjective complaints.

Conclusions: This case study lends evidence to support the contention that spinal correction can be achieved through reduction of vertebral subluxation. Additional research is needed to further explore the effectiveness of the Pierce Technique in correction of subluxation.

Key Words: Pierce Results System, chiropractic, cervical kyphosis, vertebral subluxation, videofluoroscopy, kinesiopathology, thoracic pain, neck pain

Introduction

The normal structural alignment and biomechanics of the spine in relation to the nervous system and health has been the foundation of the chiropractic profession since its discovery in 1895. Normal alignment of the spine from anterior to posterior (A-P) is vertically straight and the lateral alignment presents with four curves; two anterior (lordotic) curves, including the cervical and lumbar regions, and two posterior (kyphotic) curves, including the thoracic and sacral regions.¹²
According to the Pierce Results System,™ a cervical kyphosis is a common result of vertebral subluxation complex (VSC) and is defined by any cervical spine that falls below the military (straight) neck measurement of +/- 500cm.² The implications of this abnormal structural finding are best described by Harrison DD, et al:

*Kyphosis is associated with adverse tension in the central nervous system and is associated with an increased incidence of spinal stenosis. A kyphotic deformity implies increased loading on the vertebral bodies and discs and may be associated with anterior head translation, which requires increased extensor muscle effort to maintain equilibrium. It was determined that patients with cervical kyphosis after injury have a significantly higher incidence of degenerative changes and poor results from treatment, suggesting that abnormal loading of the tissues after trauma may account for these results. Also, clinicians have argued that kyphosis may be associated with a variety of autonomic symptoms.*³

There is an increased awareness in the surgical community regarding the importance of restoring a normal cervical lordosis as part of effective spinal surgery procedures. The patients who have their cervical lordosis restored during spinal surgical procedures tend to have a much better outcome than those patients in which spinal structure was not taken into account. It is well understood that any decrease in the normal lordotic curvature can increase the load to supporting tissues, thus increasing the rate of spinal degeneration. Therefore, cervical lordosis is essential for optimal motion and alignment of the functional vertebral segment.⁴⁻⁶

Giuliano et al showed that 98% of sub acute post-traumatic subjects presented with loss of normal cervical motion and hypolordosis. This study also notes the prevalence of cervical spine trauma related to rapid acceleration-deceleration injuries in low-impact motor vehicle collisions,⁷ which is important due to the history of the patient in our case study.

Although there is evidence supporting the improvement of cervical lordosis by use of traction and weighting, there are few other chiropractic techniques supported by the literature that show improvement of spinal structure through the correction of vertebral subluxation.¹¹ This case study of a patient with cervical kyphosis reviews the outcome of the Pierce Results System™, delivered by Level 4 Certified Practitioners, in the analysis and correction of VSC in order to restore proper spinal structure and function. The Pierce Results System™ utilizes the most advanced technologies of thermal infrared imaging, plain film radiography, and videofluoroscopy, in combination with specific hand, instrument, and pressure adjustments to provide efficient, and cost effective chiropractic care to patients.²

**Case Report**

**History**

A 36 year old male patient presented to the office with a primary complaint of constant left upper thoracic and left shoulder pain rated a 7/10 for five months duration. The pain radiated into the left arm and elbow. Constant cervicalgia had also been present for five months duration rated 7/10. Low back pain occurred approximately one time per year and reached an intensity of 9/10. The review of systems revealed a bilateral forehead twitch, sinus congestion and allergies rated an 8/10 discomfort level for 20 years, asthma rated a 2/10 discomfort level for 15 years, and chronically sprained ankles.

The patient revealed a history of significant trauma including two motor vehicle collisions, a “face plant” while water skiing, and football trauma during his years as an athlete. He had surgically excised adenoids and tonsils. The only medication used was Claritin to manage allergies and sinus congestion.

The patient’s quality of life revealed restless sleeping patterns, constant pain during activities of daily living, and prohibited recreational activities due to his pain complaints.

**Examination**

Infrared thermography was acquired first by using a Titron C-5000 instrument in conjunction with the Platinum System infrared thermography camera. The initial readings revealed two severe hyperthermic zones greater than 0.8°C in the cervical and upper thoracic regions. There were also two severe hypothermic zones greater than 0.8°C in the upper lumbar and sacral regions (Figure 1).

![Figure 1. Initial Thermography Scan](https://via.placeholder.com/150)

The palpatory exam revealed pain, edema, vertebral fixation, taut and tender muscle fibers, leg length inequality, and pelvic obliquity in the cervical, thoracic, and lumbar regions. Each of these findings are indicative of vertebral subluxation and prompted further analysis using plain film static radiography and video fluoroscopy.

A lateral cervical static radiograph revealed the patient
had a 45 cm cervical curve (Figure 2) using the AcuArc measurement tool (Figure 1), indicating a cervical kyphosis. An atlas angle of 23° was also noted, which is not normal for a patient with cervical kyphosis. An anterior to posterior (AP) lumbosacral radiograph revealed a posterior-inferior and externally (PIEX) rotated ilium on the left. (Figure 3) The presence of left lumbar body rotation at vertebral levels L3, L4, and L5 was later confirmed with videofluoroscopy.

The videofluoroscopic examination revealed a number of vertebral levels with inter-segmental kinesiopathology, referred to as “locking” in the “Results System™”. At C1, there was a major flexion lock indicating that the atlas did not approximate to the occiput when the patient tucked the chin and proceeded with cervical flexion.

When cervical extension was analyzed (initiated by mandibular protrusion and proceeding with extension), extension locks at C5, C6, C7, and T1 were present, meaning those vertebrae did not approximate (close down on) the vertebra below. At vertebral levels T1-T4 right rotation locks were present or right spinous rotation with an absence of spinous motion to the left when the patient rotated his head to the right. In the AP lumbosacral analysis, there was a decrease in coupled motion (lateral flexion and ipsilateral spinous rotation) at vertebral levels L3-L5 when the patient laterally flexed to the left. This is correlated with the static film findings of left vertebral body rotation at levels L3-L5 and the PIEX ilium on the left.

The above examination findings are indicative of kinesiopathological components in the earliest VSC model proposed by Faye.™

**Intervention**

By adhering to the guidelines of the Pierce Results System,™ hand, instrument, and pressure adjustments are all used to reduce and correct the vertebral subluxations. The patient was seen 12 times over a three month time frame.

To address the cervical extension locks, the doctor used a maneuver known as a “toggle-set” which does not utilize recoil as in traditional toggle adjustments. For this adjustment, the patient was placed prone on a Zenith 230 Hilo drop table with the Pierce 3-D head piece in neutral (model 60 stationary) and the cervical and thoracic drop pieces were elevated. The doctor used the medial aspect of the base of the fifth digit to contact the most posterior and inferior aspect of the vertebral spinous process. The doctor’s supporting hand was placed over the lateral aspect of the contact hand and a posterior to anterior (P-A) and inferior to superior (I-S) high velocity, low amplitude thrust was delivered, allowing the table to drop. Vertebral levels C5, C6, C7, and T1 were all addressed in this manner on the first visit.

The right thoracic rotation at T1-T4 was also addressed with a toggle-set adjustment on the first visit, but the patient position and doctor’s contact were slightly different. For this procedure, the patient was lying on his left side on the table with the doctor standing in front of him and the thoracic piece elevated. The doctor then reached over the patient to contact the right side of the vertebral spinous process with his thumb and used his opposite palm to provide the lateral to medial adjustment and drop the table.

The left PIEX ilium was adjusted as two separate components and only the PI was addressed on the first visit. To do this, the patient was placed supine, so his pubic bone was directly over the pelvic drop piece. The patient’s left leg was extended, while his right knee was flexed to 90° and the plantar surface of his foot rested on the table. The doctor stood on the right side of the patient (opposite to the PIEX ilium) and used his left thenar eminence to contact the patient’s left pubic tubercle. Then an anterior to posterior (A-P) and superior to inferior (S-I) adjustment was delivered, allowing the table to drop.
The EX component of the PIEX ilium was addressed on the third visit by having the patient lie prone on the table so his sacrum was directly over the pelvic drop piece. The doctor stood on the right side of the patient and used his left thumb to contact the patient’s sacrum halfway between the S2 tubercle and left posterior superior iliac spine (PSIS). Again, with the pelvic piece raised, the doctor used his right palm over his left thumb contact and delivered a P-A adjustment, which allowed the table to drop.

These maneuvers are all considered hand adjustments in the Results System™ protocol and are utilized sparingly throughout care. More often, instrument and pressure adjusting were used by the doctor during visits to facilitate VSC correction where a hand adjustment may have already been delivered. These are outlined in the Discussion section.

**Outcome**

Just one hour after the patient's first adjustment, there was a reduction in symptomatology and he stated he felt better than he had in the previous 5 months when the chief complaint began. This prompted the doctor to take a second lateral cervical radiograph that revealed a +55cm cervical lordosis (Figure 4) compared to the initial -45cm kyphotic measurement. Then on the seventh visit, a complete re-examination was given. This time, the lateral cervical film revealed a +23cm lordotic measurement (Figure 5), which is an 82% cervical correction. This is nearly a complete restoration of the normal cervical lordosis, which is +17cm according to the Results System™. The AP lumbopelvic film also revealed an 80% correction from the initial PIEX pelvic listing and a decrease in the lumbar body rotation from L3-L5. (Figure 6)

Figure 4. Lateral Cervical taken one hour post adjustment

Over the course of 12 visits, each thermography reading showed a decrease in the hyperthermic and hypothermic zones. By the re-examination on the seventh visit, the infrared thermography only revealed one moderate hyperthermic zone in the lumbar region and all other readings had been reduced to mild temperature differences. (Figure 7)

Figure 5. Lateral Cervical taken at re-examination, 30 days later

The patient reported a 60% improvement or greater in all subjective complaints including left upper thoracic pain, left arm and shoulder pain, neck pain, forehead twitch, and low back pain. The patient reported his asthma as “resolved.” Some low back pain still persisted in a seated position and left arm pain was present only during activity. On the seventh visit re-examination, videofluoroscopy still revealed locked segments including a C1 flexion, C2 extension and left rotation, C6 extension, C7-T4 right rotation, T1 and T2 extension, and L3-L5 left lateral bending. These fluoroscopy findings, along with the improvement in thermography readings provided evidence for the patient to maintain care, but at the reduced rate of once every three weeks.

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Figure 6. A-P Lumbosacral radiograph taken at re-examination, 30days later
Discussion

According to Pierce, the main goal of the chiropractor utilizing the Results System™ is to correct VSC and as a result spinal function and structure will be restored. The chiropractic literature reveals an understanding of altered spinal curves and the correlation of that altered structure with the health of an individual. Walter V. Pierce was the first to develop and illustrate the complete normal spine model of both structure and motion, thus illuminating the presence of VSC. The Pierce Results System™ is uniquely positioned to analyze structure and function of the spine by combining the use of static radiographs and videofluoroscopy. It is able to compare spinal structure and function to the health of the autonomic nervous system by utilizing infrared thermal pattern analysis.

In the Pierce Results System™ the cervical curve is measured on the lateral cervical x-ray by using an AcuArc ruler. (Figure 8) The measurements indicate the radius of an arc and range from 17 cm (representing the smallest arc) to 500 cm (representing the largest arc or a straight line). Positive numbers indicate a lordotic measurement, whereas negative numbers indicate a kyphotic measurement. Therefore, a +17 cm arc is a representation of the normal lordotic cervical curve, a +/-500 cm indicates a straight or “military” neck, and a -17 cm indicates a perfectly reversed cervical kyphosis.

Acquired or congenital malformation that may prevent the patient from achieving the above criteria always need to be ruled out. In this case study, no malformations were detected that would lead the doctor to believe that a normal cervical curve could not be obtained.

In a perfectly compensated kyphotic neck, the cervical curve will measure -17 cm and the atlas will begin to tilt inferiorly up to -12°. The case study presented here demonstrated a -45 cm curve and an atlas angle of 23° indicating that both lower and upper cervical spine needed to be addressed. In these cases, according to Pierce, the lower cervical always needs to be corrected before addressing the upper cervical spine.

As mentioned before, Pierce was not only interested in the structure of the spine, but also the proper inter-segmental motion of the spine within that structure. To analyze this motion, he and Continental X-Ray developed a videofluoroscopy unit that was designed specifically for chiropractors to analyze spinal kinesiology.

Among radiologists with a very heterogeneous training background in fluoroscopic analysis, inter-examiner interpretation reliability was gauged to be “fair” to “moderate.” When experienced examiners were used to detect presence or absence of fixation in the cervical spine, there was a 94% agreement rate. Therefore, videofluoroscopy proves to be an extremely valuable tool when evaluating spinal kinesiology compared to traditional motion palpation, which showed sensitivity as low as 55% when evaluating a C5/C6 congenital block vertebra.

Radiation exposure always comes into question when addressing videofluoroscopy. However, Bull et al showed that patient skin entrance exposure is significantly less during a five second fluoroscopic scan compared to three lateral plain film x-rays including neutral, flexion and extension views. The information obtained from a videofluoroscopic scan not only provides for the evaluation of inter-segmental kinesiology, but can also serve as an outcome assessment for the reduction and correction of vertebral subluxations through proper delivery of adjustments.

The Results System™ utilizes three categories of adjusting. The “toggle-set” hand adjustments were described above. Instrument and pressure adjusting are also an integral part of this system, especially on the visits after a hand adjustment was delivered and the delivery of continual hand adjusting may actually hinder the progress of VSC correction. The decision of when to use heavy handed
adjustments verses light force instrument and pressure adjustments is determined by changes in the thermography reading on each visit.

Instrument adjusting requires a S.M.A.R.T. Adjuster SA201 or the VF AdjusterTM by Sigma Instruments Inc., which are low force pulsating tools. (Figure 9) The ability to set force, frequency, and pre-load allows the doctor to deliver the most precise adjustments at the proper levels of VSC. This tool also comes with adjustable pieces that are specific to the vertebral level and line of correction.

Figure 9. Variable Frequency Adjuster™

Flexion/extension and rotation adjustments can be delivered with the patient prone or seated, which allows optimal comfort for the doctor and patient. The general guidelines for utilizing this tool are to keep the force low (5-15 lbs.) and the frequency high (16 Hz) when addressing the cranial and upper cervical regions. To address lower areas in the spine, the force may be increased to 20-30 lbs. and the frequency decreased to 5-12 Hz. This instrument should never be used without confirmation of a vertebral subluxation through videofluoroscopy.

Pressure adjusting is based on the Nimmo-Receptor Tonus technique and utilizes ischemic compression to remove myofascial trigger points that may be exacerbating the VSC. This technique is well summarized in Jaszewski and is the adjustment that is utilized the most out of all three categories.9

Conclusion

This case study of a 36 year old male with dramatic improvement of cervical lordosis and thermography readings coupled with reduced pain, muscle twitching and asthma provides evidence that spinal structural correction can be achieved through the analysis and correction of VSC by utilizing the most advanced and effective technology. There is evidence in the literature that spinal structural changes are attainable,11 but no studies were found that demonstrated an immediate restoration of cervical curvature following one adjustment.

Larger scale studies are needed to further explore the Pierce Results System™ Technique in the correction of VSC and restoration of normal spinal structure and function.

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References

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