Case Study

Resolution of Urinary Incontinence Following Chiropractic Biophysics Protocol to Reduce Vertebral Subluxations

Abstract

Objective: To document the effectiveness of chiropractic and structural rehabilitation on a patient with urinary incontinence and vertebral subluxations.

Clinical Feature: A 63 year old female presented with a recent history of urinary incontinence and pain. The problem started before seeking chiropractic care. Radiographs revealed a kyphotic/hypolordic cervical spine, laterally translated cervical spine, anterior head carriage along with a laterally translated lumbar spine and vertebral subluxations.

Intervention and Outcome: The patient was managed for twenty two visits over 54 days. Care included chiropractic adjustments, postural correction exercises, spinal traction, cryotherapy and stretching. Static posture and x-ray radiographs were used to determine what exercises and traction were needed following Chiropractic Biophysics (CBP) protocol. X-ray radiographs, motion palpation and static palpation were used to determine the location of chiropractic adjustments. Throughout care there was a complete resolution of urinary incontinence, correction of spinal alignment closer to the accepted normal value and almost a complete resolution of pain.

Conclusions: This case shows improvement in subject and objective measurements after conservative chiropractic care. Chiropractic adjustments along with spinal correction exercises following CBP protocol may benefit patients experiencing urinary incontinence.

Key Words: Chiropractic, Urinary Incontinence, Chiropractic Biophysics, Subluxation, Traction

Introduction

Urinary incontinence is a relatively common condition where the bladder empties involuntarily. This can be due to many reasons including too much stress on the bladder, weak pelvic muscles, or neurological loss/interference. The International Continence Society defines urinary continence as the complaint of any involuntary leakage of urine.¹ This condition affects approximately 13 million American, 85% being women. It is estimated that 50% or more of elderly persons living at home or in a long-term care facility are incontinent.

The cost of caring for urinary incontinence is high. A total of 16.4 billion dollars is spent every year on incontinence related care; 11.2 billion going to community-based programs or at home while 5.2 billion is spent in long term care facilities.² A major problem for management of this condition is the low attendance to health promotion clinics for treatment.³

Treatment of urinary incontinence in the medical profession can be achieved surgically, pharmacologically, or by physically training the bladder. A common surgery for stress urinary incontinence is by inserting a piece of vaginal tape across the urethra, commonly called transobturator vaginal sling. This operation is usually an outpatient procedure but still carries all the risks of any surgery including infection, unsightly scars and even death.

Specific complications include urinary tract infection, lower urinary tract symptoms, voiding difficulty and retention.⁴ One study showed that sling revision/removal had to be done on
3.7% of the patients, mostly due to mesh erosion. OnabotulinumtoxinA (aka BOTOX®) 100 micrograms have been shown to help urinary incontinence of up to 62.8% but carry the risks of adverse effects, mainly of the urinary tract as well as residual urine left in the bladder. Many of these drugs have not undergone extensive testing and the side-effects are still unknown.

Urinary incontinence is a major problem in the elderly. Zhang, Haselden and Tepe present a study showing improvement in 13 patients using conservative chiropractic treatment. These patients had their nightly urinary frequency decreased from 3.8 to 1.2 times a night without any other physical therapy or medication. Their ages ranged from 42 to 86 years old (65.7 ± 12.9 years).

Three patients experienced improved bladder control in as little as two adjustments. Two female patients fully regained bladder control and no longer needed pads. Many studies exist with children regaining bladder control after chiropractic intervention, including one of a five year old boy following lumbar surgery. This child fully regained bowel and bladder function initially and after reoccurrence through chiropractic care.

A retrospective case series featuring 21 patients between the ages of 13 and 90 years old also showed promise. Although many modalities were used including chiropractic, all patients showed improvement of their urinary incontinence that persisted over time.

**Case Report**

**History**

The patient, 5’3” tall and 135 pounds, presented to the office with neck pain, mid back tightness and low back pain making it difficult for the patient to stand. The patient was under previous chiropractic care for her current conditions. Her vitals were within normal limits and she takes a beta blocker daily. She also took the medication Toviaz® for her overactive bladder. This medication was then changed to a generic due to previous chiropractic care.

The patient’s static posture was assessed using a visual postural assessment and x-rays. The postural distortions were described using translations (T) and rotations (R) of the Cartesian coordinate system where positive on the x axis is to the left, positive on the y axis is vertical and positive on the z axis is anterior. There are a possible 6 rotations and 6 translations of each region of the body including the cervical, thoracic and lumbar regions.

Radiographs were taken with the patient standing in a normal neutral, upright posture and analyzed using software called Posture Ray® that measures the angles between each segment of the spine as well as the gross measurement of the region that was x-rayed. The radiographs showed that the absolute rotational angle of measurement from C2 to T1 was 6.9 degrees compared to the normal cervical absolute rotational angle of measurement of 42 degrees. Studies have shown that a clinically normal cervical lordosis is between 31 and 40 degrees.

Patients with a kyphotic or straight neck were shown to be 18 times more likely to present with cervicogenic symptoms. The lateral translation of the thorax from horizontal or midline was the most significant finding in the lumbar spine. Normal for this line is straight horizontal or zero millimeters (mm) from midline. The pretreatment radiograph showed her thorax relative to her sacrum at 46.8mm. Upon chiropractic examination there were subluxations found at C5-C7, T3-T9 and L4-L5.

**Intervention**

Upon the following visit to the office, the patient was briefed on the findings of the x-rays and the suggested interventions. The patient agreed to the first stage of initial recommended treatment of 12-15 visits of spinal adjustments at three times per week or until subjective complaints resolved or were lowered into the mild category. Each visit, if needed would include flexion distraction lumbar decompression, electronic muscle stimulation, cryotherapy, and myofascial release on the indicated areas.

Axial cervical decompression traction is a technique where a force is applied vertically (toward the patient’s head) on the cervical spine in an attempt to rehydrate the intervertebral disc and help to open up the intervertebral foramen. One study shows success in managing cervical pain with radicular symptoms from a disc herniation and foraminal narrowing using cervical Cox flexion-distraction. Flexion distraction lumbar decompression traction is a modality where the patient lies face down on a specific table. Their legs are strapped down to a movable part of the table. The patient’s spine is moved in certain directions to help decrease pressure and move fluids into the disc. Cadaver studies have shown that distraction can predictably decrease the pressure on the disc and the nucleus pulposus.

Electrical muscle stimulation is a physiotherapy modality where multiple electrodes are placed on the patient at the site of pain. An electrical current is produced through the electrodes to elicit a muscle contraction to decrease pain and remove edema. There have been good results with electrical muscle stimulation and aiding in the management of pain in the low back. Cryotherapy in this instance is the application of an ice pack to the designated area. Myofascial release technique is where the doctor applies pressure to a certain area of muscle. The patient is then moved in certain range of motion while pressure is still being applied to that muscle. This is supposed to help stretch the fascia surrounding the muscle to decrease pain, reduced edema and increase range of motion. One study suggests that chronic pain and persistent chiropractic subluxations can be a result of restricted fascia.

A second stage of care was added to include exercises to reduce the findings in the cervical and lumbar spinal regions that were observed on the radiographs. This included correction of the cervical spine kyphosis/hypolordosis, anterior head translation and lateral translation of the cervical
spine along with the lateral spine translation as seen on the radiographs. This management is done to minimize misalignment and therefore minimize degeneration and maladaptation to the spine.

According to Wolff’s Law, bone will become distorted directly according to the amount of stress applied to it.\(^{16}\) Therefore, any misalignment of the spine will cause abnormal loading on that area of the vertebrae. This will cause vertebral degeneration and/or bony proliferation at the area of misalignment. This abnormal loading has been shown to cause bony proliferation in the lab as well.\(^{17}\) The intervention period was brief due to the small amount of time the patient was spending in the area.

Each visit started with subjective data collected from the patient along with objective data collected by the chiropractor. The chiropractor then assessed the previous examination, posture, x-ray findings, regional mobility and musculature before adjusting. Adjustments were done to the cervical spine using diversified full spine adjustments, thoracic spine was mobilized by adjusting the spine anterior to posterior, and the lumbar spine was mobilized by side posture technique.

Myofascial release was performed on the indicated areas to decrease myospasm, edema, pain, and to facilitate the healing process. Proprioceptive neuromusculature facilitation stretching was also performed. Cryotherapy was performed for 10 minutes as well as intersegmental traction with myofascial release and vibration was performed for 10 minutes. Electrical muscle stimulation was performed for 10 minutes. Patient then preformed cervical axial distraction to decrease the axial load on the spine.

Starting on the second visit, exercises were added. The exercises consisted of three sets of neck extension exercises using a Theraband, isometric/isotonic neck and head retraction exercises and isometric/isotonic neck translation exercises were performed for fifteen repetitions over five minutes. The patient was standing with the Theraband behind their head while translating their head posterior (Figure 1). The patient followed those up with chiropractic biophysics extension traction and/or cervical translation traction to improve biomechanics, function and decrease the future risk of osteoarthritis and degenerative joint disease.

Lumbar core stability exercises on a Theraball, abdominal core stability exercises on a Theraball, and lumbar translation exercises using a Theraband were all then preformed for three sets of fifteen repetitions over five minutes. Lumbar core stability exercises consisted of lying face down while having the Theraball on the patient’s abdomen (Figure 2). The patient then gently raised her thorax up in the air while keeping her feet on the ground.

Figure 2. Lumbar core stability exercises on a Theraball.

Abdominal core stability exercises were laying face up with the Theraball across their back while gently bringing their chest toward their pelvis.

Figure 3. Abdominal core stability exercises on a Theraball.

Lumbar translation exercises consisted of the patient sitting on a stool and grasping a Theraband in front of her thorax. She then gently translated her thorax in the proper direction without rotating her body (Figure 4).

Figure 4. Lumbar translation exercises on a Theraband.
This was followed by chiropractic biophysics lateral lumbar translation traction to reduce the patient’s lateral translation. The patient was strapped into the Universal Traction System® with their pelvis stabilized and thorax strapped to the system to reach the desired traction (Figure 5).

**Outcome**

The patient underwent care over twenty two visits over fifty four days. The results were a complete resolution of neck and low back pain while the mid-back pain persisted at 1/10. The most significant finding however, was a complete resolution of her urinary incontinence. Medication seemed to provide relief but she discontinued use after noticing unwanted side effects. The patient stated that her bowls were functioning normally even after discontinued use of the medication. The numeric results of her changes in spinal structure are demonstrated in tables below. (Refer to Tables 1-3) The most significant changes were her ARA of her cervical lordosis progressed closer to a normal value, starting at -6.9 degrees and ending at -11 degrees (-42 degrees are being normal). She also made progress on her lateral lumbar translation that started at 46.8mm from horizontal ended at 6.4mm from horizontal (an 8.3% change with 0.0mm being normal).

**Discussion**

The patient’s symptoms were consistent with urinary incontinence. As waste is filtered through the kidneys, it flows through the ureters and into the urinary bladder. Urinary waste is held here until stretch receptors in the bladder and posterior urethra signal to the brain the bladder is getting full. The micturation reflex is a cycle of an increase in pressure, a period of sustained pressure, and then a return of pressure to the resting tone of bladder. This reflex can be resisted initially by sympathetic tone from spinal nerve roots of T11-L2 or L3 through the hypogastric plexus and nerves to the bladder. One study shows that bladder emptying by stimulation of the deep perineal nerve afferents was twice as effective at emptying the bladder when compared to distension-evoked bladder contractions. The neurological interference in this case could have been caused by a chiropractic subluxation of the lumbar spine. This subluxation, or misalignment of the juxtaposition of a joint, can cause neurological interference. When there is a loss of a spinal curve or an improper translation, the vertebrae are not lined up correctly and therefore cause a subluxation.

With a loss of a cervical lordosis the spinal canal lengthens. This also happens when there is a lateral translation of the lumbar spine. This lengthening of the spinal canal could cause some traction on the spinal cord and could apply tension to the nerve roots exiting at the lumbar spine. Breig suggests that tension on the nervous system can have an impact on spinal cord abnormalities and function. He also states that the side of ipsilateral bending undergoes compressive forces and the side of contralateral bending is subject to tension.

Another study suggests that mechanical cord tension can result in cerebrospinal fluid (CSF) stasis, causing a disruption in the central nervous system’s metabolism resulting in dysfunction of the central nervous system. This neurological tension and CSF stasis can interfere with neurological impulses to the bladder. The restoration of those neurological impulses could have been achieved by the correction of the cervical lordosis and lumbar lateral translation. This correction in posture closer to the normal accepted value has been thought to restore the spinal canal to its proper length and therefore decrease the stress on the tissues and spinal cord, resulting in a better
functioning nervous system. 26-28

Conclusion

This case report provides evidence that chiropractic care following chiropractic biophysics protocol may indeed help patients with neurological problems, including urinary incontinence. Reduction of global spinal misalignment can restore the spinal canal closer to its proper length and reduce stress on the spinal cord, removing global subluxations as well as intersegmental subluxations and restoring optimal neurological function.

References

### Table 1

<table>
<thead>
<tr>
<th>Global Analysis</th>
<th>Normal Values</th>
<th>Xray 1 Values</th>
<th>Versus Normal</th>
<th>Xray 2 Values</th>
<th>Versus Normal</th>
<th>% Change</th>
<th>Xray 1 to 2</th>
<th>Translation per Segment</th>
<th>Xray 1 Values</th>
<th>Xray 2 Values</th>
<th>% Change</th>
<th>Xray 1 to 2</th>
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<td>-27.2°</td>
<td>6.2%</td>
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<td>1.0%</td>
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<td>160.0%</td>
<td>500.0%</td>
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<td>76.2%</td>
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<td>57.5%</td>
<td>38.2%</td>
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</table>

**ARA = Relative Rotational Angle**  
*Values in Red Exceed Established Normal*  

### Table 1

<table>
<thead>
<tr>
<th>Global Analysis</th>
<th>Normal Values</th>
<th>Xray 1 Values</th>
<th>Versus Normal</th>
<th>Xray 2 Values</th>
<th>Versus Normal</th>
<th>% Change</th>
<th>Xray 1 to 2</th>
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<td>ARA C2-C7</td>
<td>-42.0°</td>
<td>-6.9°</td>
<td>83.6%</td>
<td>-11.0°</td>
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<td>13.3 mm</td>
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<td>33.1%</td>
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**ARA = Absolute Rotational Angle of Measurement**
Table 2

<table>
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<th>Global Analysis</th>
<th>Normal Values</th>
<th>Xray 1 Values</th>
<th>Difference From Normal</th>
<th>Xray 2 Values</th>
<th>Difference From Normal</th>
<th>% Change: Xray 1 to 2</th>
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<td>1.8°</td>
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<td>CDA C2-T8</td>
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<tr>
<td>CDA C2-T6</td>
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<td>8.6 mm</td>
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<td>10.3%</td>
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CDA = Cervico-dorsal Angle and is a measure of the mid cervical angle
RZA = Rotation Angle relative to true vertical of the lower cervical and upper thoracic spine

1: AP Cervical 1/30/2013

2: AP Cervical 3/20/2013
<table>
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<tr>
<th>Global Analysis</th>
<th>Normal Values</th>
<th>Xray 1 Values</th>
<th>Difference From Normal</th>
<th>Xray 2 Values</th>
<th>Difference From Normal</th>
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<td>1.2 mm</td>
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<tr>
<td>LS Angle T12-L5</td>
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<td>LD Angle T12-L5</td>
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<td>10.6°</td>
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</table>

* Accounting for magnification

HB Angle = the angle formed by a line across the sacral base relative to horizontal.
LS Angle = Lumbo-sacral angle
LD Angle = Lumbar-Coral angle

Table 3