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# CASE STUDY

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## Resolution of Neck Pain and Upper Extremity Paresthesia in a 28-year-old Male Following Blair Upper Cervical Chiropractic Care to Reduce Vertebral Subluxation: A Case Study & Review of the Literature

*Charmaine Herman, D.C.<sup>1</sup> & Miracle Pitts, D.C.<sup>2</sup>*

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### ABSTRACT

**Objective:** To evaluate and discuss the effects of upper cervical chiropractic care on a 28-year-old male patient with neck pain and upper extremity paresthesia.

**Clinical Features:** The patient is a 28-year-old male that presented to the office with neck pain and associated right hand paresthesia. The patient presented to the office 5 months after the initial onset of symptoms.

**Intervention & Outcomes:** A case history and chiropractic examination was performed and it was determined that the patient had a subluxation of the C1 (atlas) vertebra, as well as the C2 and C5 vertebra on a subsequent visit. The patient received chiropractic care following the Blair Upper Cervical protocol. The care went for nine visits over the course of 1.5 months. At each visit, he was checked for vertebral subluxation via Blair Upper Cervical protocol and was adjusted a total of 7 times. The patient reported resolution of both the neck pain and hand paresthesia at the eighth visit.

**Conclusion:** This case study demonstrates successful management of a 28-year-old male patient suffering from neck pain and paresthesia, who was managed with specific Blair upper cervical protocol. Further research with regards to how specific Blair upper cervical protocol may benefit patients is suggested.

**Key Words:** *Chiropractic, Blair, cervical, neck, subluxation, upper cervical, tingling, paresthesia, adjustment, neck pain*

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### Introduction

Neck pain is a common complaint, with a point prevalence of nearly 13%, and lifetime prevalence of nearly 50%, affecting anywhere from 30% to 50% of adults in the general population in any given year.<sup>1,2</sup> As much as 25% of the average chiropractic practice records neck pain as the reason for an initial consultation.<sup>3</sup>

Neck pain causes considerable personal suffering due to pain, disability, and impaired quality of both work and life, which can be a big socioeconomic burden on patients, as well as society.<sup>4</sup> Neck pain is usually first experienced during childhood or adolescence, and runs an episodic course over a person's lifetime.<sup>5</sup> In fact, it has been hypothesized that the

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1. Private Practice of Chiropractic, Alpharetta, GA
  2. Private Practice of Chiropractic, Trussville, AL

basis of neck pain in adulthood may be formed at an early age.<sup>6</sup> The 2009 National Health Interview Survey indicated that as much as 15% of adults reported having neck pain in a three month period, with prevalence higher in women, in high-income countries compared to middle- and low-income, and in urban areas compared to rural.<sup>5,7</sup> Neck pain is also more prevalent among those performing repetitive static work, physically demanding work, those with previous neck trauma, and those suffering from comorbidities such as depression, low back pain, and headache.<sup>8</sup> In 1996, it was found that society lost nearly \$686 million in productivity each year in the United States.<sup>5</sup>

The International Association for the Study of Pain (IASP) defines neck pain as, “pain perceived anywhere in the posterior aspect of the spine, from the superior nuchal line down to the first thoracic spinous process”. This definition is based on the patient’s notion of pain, and it must be located posteriorly, because pain on the anterior aspect is classified as throat pain, rather than neck pain.<sup>9</sup> In accordance with the Neck Pain Task Force (NPTF), neck pain is classified as either interfering neck pain, or non-interfering neck pain. Interfering neck pain is defined as “a condition which prompts the person to consider action; usually because of neck pain severity, duration, or because it interferes with the ability to function.”<sup>10</sup>

There is much speculation about the cause of neck pain. While some argue that all neck pain has a local, pathological cause, others believe that neck pain is a nonorganic problem with psychological roots. Some authors categorize neck pain based on triggering factors, such as sports-related neck pain, whiplash-associated neck pain, occupational-related neck pain, and non-specific neck pain.<sup>9</sup> Other sources state that majority of neck pain complaints are from an unknown etiology, and therefore, are considered idiopathic.<sup>9,11</sup>

## Review of Literature

There are several treatment options for neck pain that can alleviate the symptoms. Traditional medical treatment can include pharmacologic treatment; however they only temporarily treat the symptoms, and not the root cause of the neck pain. A study done on 58 patients with non-specific neck pain displayed immediate pain relief with a local injection to the musculotendinous junction on the cleido-occipital head of the sternocleidomastoid (SCM) muscle. The patients were contacted 12 months following the anesthetic injections in order to record the most accurate results of the treatment. About 75% of the patients achieved immediate pain relief after the injection, but only 71% of the patients achieved current or long-term pain relief after the injections.<sup>12</sup>

A study by Rubinstein et al was conducted to determine the effectiveness of chiropractic in patients that presented with neck pain. The study consisted of 529 patients with non-specific neck pain and 79 chiropractors. The chosen chiropractors were allowed to use any technique and/or mobilization method of their choice for this study. Disability was measured periodically throughout treatment using the Neck Disability Index form. A self-administered questionnaire was given both prior to treatment and at the end of the treatment care plan to assess pain, perceived recovery, and treatment satisfaction. Results found that many of the

patients responded quickly to treatment, with 48% recovered by the fourth visit, and 65% recovered by the third month.<sup>13</sup>

A study to review the effectiveness of upper cervical technique in sixty-six cases between August 1, 2004 and July 31, 2005 was conducted. The study used Atlas (C1) laterality, which is defined as the side of the acute angle and magnitude away from 90 degrees of the angle formed by the atlas plane line and the central skull line, as a reference point. The study suggests that a better outcome should occur when the first chiropractic atlas adjustment changes the atlas laterality by more than 30% towards the orthogonal position. The Neck Disability Index (NDI) and an 11-point verbal numeric pain rating scale was used to determine the patient’s perceived disability that results from their neck pain. The sixty-six cases were divided into two groups: those with <30% change (Group 1) in laterality and those with >30% change (Group 2) in laterality. Data revealed only 13 cases in Group 1, and 53 cases in Group 2; However, on average, there was a 59.2% improvement in NDI scores with a time of 13.6 days, 5.7 office visits, and 2.7 C1 adjustments. The average pre-adjustment Numeric Pain Rating Scale (NRS) was 5.89 and the post-care NRS was 1.76, a 70.1% improvement. The average percentage of correction for C1 laterality was 48%. The data from this study indicates that chiropractic care through upper cervical technique is effective in patients with neck pain.<sup>14</sup>

A study by Roberts and Wolfe was conducted to evaluate the effectiveness of chiropractic care in the case of a 6-year-old female who presented with the complaint of neck pain, as well as headaches, hand, leg, and foot pain. The female sustained the injury in the schoolyard, after being pushed into a slide and hitting her head. Following the initial physical examination and radiographic imaging, adjustments were indicated and performed per Activator protocol at C5, C7, T1, and T6. After nine adjustments, the patient reported that she had no complaints of neck pain. The patient was re-evaluated at that time, and no adjustments were needed.<sup>15</sup>

A study by Wells and Williams was conducted to review the effectiveness of upper cervical chiropractic care on a patient with Ankylosing Spondylitis presenting with neck pain and stiffness. The patient had specific upper cervical radiographs taken, and was only adjusted when in “pattern”. Pattern is defined as radiographs indicating subluxation, thermographic scan indicating the presence of interference, and leg length inequalities. The patient received several Knee Chest technique adjustments before transferring treatment facilities, where the technique of the new chiropractor was Blair Upper Cervical. The patient only needed one adjustment over the course of four months. The patient displayed improved cervical range of motion, reduced pattern of paraspinal thermography, and positive improvements in the neck pain and stiffness.<sup>16</sup>

## Case Report

### *Clinical History*

A 28-year-old male, experiencing neck pain and hand paresthesia, presented into the office and reported the neck pain initially started 5 months prior, but could not remember

any mechanism of injury. He also reported that he could not remember a date of onset or a mechanism of injury for the hand tingling. The patient had not previously seen any other health care provider for the neck pain or tingling in his hands.

The patient described the neck pain as a dull, achy feeling in the lower neck region. He ranked the neck pain severity as a 2 out of 10 on the verbal pain scale, where 0 is no pain and 10 is the worst pain ever experience. The patient also described the hand tingling as a pins and needle feeling into his hands, especially the right hand. There was no pain associated with the hand tingling. The patient stated that neither the neck pain nor the hand tingling disturbed any activities of daily living; however, he did report that the pain prevented him from “working out as long as he used to”. The patient was taking no medication for either condition.

#### *Chiropractic Physical Examination*

At the initial visit, a detailed case history was taken, as well as a thorough examination that included vitals, orthopedic and neurological exams, cervical static and motion palpation, and range of motion tests in both the cervical and lumbar region. His initial exam revealed negative results in cerebellar and cranial nerve testing, as well as negative results in both cervical and lumbar range of motion (ROM). Foraminal Compression, George’s Maneuver, and Shoulder Depression were negative. Positive findings included a high right shoulder on postural analysis, as well as restricted right rotation and tenderness near C4 and C5 during cervical palpation. Cervical sensation testing revealed hyperesthesia in the fourth and fifth digits on the right.

#### *Thermography Scan*

Cervical thermographic scanning was used to provide primary information to determine whether treatment should or should not occur.<sup>17</sup> This is determined by whether or not the patient is in “pattern”, which is established by gathering three independent thermographic readings taken over a 24 hour-7 day period which all show a repeatable swing on the graph.<sup>18</sup> The thermography scan of the cervical spine revealed a static asymmetrical heat pattern consistent with segmental joint subluxation.

#### *Leg Length inequality (LLI) procedure*

Leg length inequality was determined according to the Blair upper cervical technique protocol by performing prone, Derefield, and Modified Prill leg checks.<sup>18</sup> Upon the prone leg check, the patient presented with a short left leg that measured ½ inch short. The Derefield leg check was performed, and upon knee flexion, it was observed that the left short leg lengthened (+D). The Vertical Prill leg check was performed for the level of C1, and the left leg shortened. The Rotational (Radial) Modified Prill Leg check was performed for the level of C2, and the left leg shortened. The Medial Modified Prill Leg check was performed for the level of C3, and the left leg shortened. The Lateral Modified Prill Leg check was performed for the level of C4, and the left leg shortened. Along with the positive Vertical Prill leg check finding, the patient also displayed palpatory tenderness, decreased mobility, and hypertonicity at the spinal level of C1.

#### *Radiographic Imaging*

Radiologic imaging was obtained per Blair Upper Cervical technique protocol. The following views were taken: Base Posterior, Anterior-Posterior Open Mouth (APOM), Neutral Lateral Cervical, Right and Left Lateral Stereoscopic views, Right Oblique Protracto view, and a Left Oblique Protracto view. The neutral lateral cervical and protracto views are available at the end of the text (Figures 1-3). All views were taken with the patient in a seated, weight-bearing position. Head clamps were used to keep the patient immobile and to maintain correct posture during the exposure.

#### *Radiographic Analysis*

The patient’s radiographs were analyzed per Blair Upper Cervical technique procedure. The patient exhibited a loss of a cervical curve (Figure 1). Stage 1 cervical spine degeneration inclusive of moderate disc degeneration at the fifth and sixth cervical vertebrae was noted. There was anterior osteophytic deposits/spurring at C4 through C6 as well as some posterior encroachment into the neural canal at C4 and C5 indicated. The C4 cervical vertebrae displayed left rotation, and C7 appears to be rotated to the left. The Blair Upper Cervical radiographs do not use line analysis to diagnose upper cervical spinal misalignment, but rather to view the cervical articulations for potential juxtaposition. This is done to rule out any error that may occur with the line analysis technique due to spinal asymmetry.<sup>19</sup>

#### *Chiropractic Care*

After the initial examination and x-rays were performed, the patient was placed in a side-posture position on a chiropractic table with a cervical drop headpiece. The patient was given a Blair adjustment on the C1 vertebra with an ASL (anterior-superior left) listing. The ASL atlas adjustment was performed by placing the patient on his right side and the doctor’s contact hand, specifically the pisiform, was placed on the left transverse process of atlas. The doctor stood in front of the patient, and a quick thrust was made with a 180 degree counterclockwise torque.<sup>20,21</sup> Following Blair protocol, the patient was placed in a resting room for 30 minutes after the adjustment. The success of the adjustment was determined by a post-adjustment thermographic scan, which revealed some dynamic symmetry.

All consecutive visits began with a thermal scan, palpation, and checking for leg length inequality. In accordance with Blair upper cervical technique protocol, the patient was only adjusted when his presenting thermal asymmetry (“pattern”) returned and leg length inequality was also present.<sup>20</sup>

The patient returned four days after his first adjustment with the constant complaint of neck pain and associated hand tingling that was a 2 out of 10 in intensity on a verbal pain scale. His thermography scan and leg checks were found to be in “pattern”. The leg check revealed a ¼ inch right short leg that was present with the Modified Prill leg check, along with palpatory tenderness, decreased mobility, and hypertonicity, which indicated subluxation at spinal levels C1 and C5. The patient was given another ASL adjustment to the C1 vertebra and C5 was also adjusted using Blair Upper Cervical

technique. The patient was rested in a recliner for 30 minutes, and a post-adjustment thermographic scan was taken. Post-thermography scan revealed some dynamic symmetry.

At the patient's sixth visit, the patient stated that he was feeling good with only some neck stiffness, but no pain. He also revealed that the tingling in his fingers only occurs rarely. His thermography scan and leg length revealed that he was in "pattern", and a C1 subluxation was adjusted using the ASL-ASR adjustment. The patient rested for 30 minutes, and his post-thermographic scan revealed dynamic heat symmetry.

At the seventh visit, the patient reported no neck pain or hand tingling. The patient's care was continued on a frequency of once per week to evaluate and monitor progress. He was evaluated with Blair Upper Cervical technique protocol for necessity of adjustment and his symptoms were monitored at every evaluation.

### Discussion

Research suggests that approximately two thirds of the adult population are affected by neck pain at some time in their lives, and about 52% of pediatric patients reported musculoskeletal symptoms over a one-year period, with neck pain being the most common.<sup>22,23</sup> Several studies state successes in reducing the frequency and severity of patient reported neck pain after upper cervical care. An upper cervical study of a forty-year-old woman with Meniere disease related improvement in neck pain after three months of chiropractic care.<sup>24</sup> A low-velocity, low-amplitude manipulation case of 83-year-old female reported complete resolution of neck pain in thirteen months.<sup>25</sup> A Grostic case documents symptom improvement in neck pain associated with Thoracic Outlet Syndrome.<sup>26</sup>

Neck pain is the second most prevalent chief complaint reported by patients seeking chiropractic care, and it follows only low back pain as the most common reason for provision of manipulative therapy.<sup>27</sup> Chiropractors commonly use spinal manipulative therapy for the treatment of musculoskeletal problems, such as neck pain.<sup>28</sup> A study was conducted to report the relative effectiveness of cervical spine manipulation versus other non-mobilization interventions in 5 randomized clinical trials. The effects of manipulation in combination with a muscle relaxant against those of a muscle relaxant alone were assessed in 2 randomized clinical trial among patients with subacute and chronic neck pain. The results showed a greater proportion of the manipulated groups had improvement in pain 3 weeks following initiation of treatment.<sup>27</sup> Other methods of treatment for neck pain include massage, herbal therapy, acupuncture, and homeopathy.<sup>29</sup>

The justification in using upper cervical specific chiropractic care in this case is to treat the patient's upper cervical subluxation, which was suspected following thermography, palpation, leg length inequality checks, and specific Blair cervical radiographs. The Blair Upper Cervical technique is a system that utilizes radiographic analysis to determine spinal misalignment, based on the premise that naturally occurring asymmetry in the cervical spine leads to error in size comparison of left and right spinal structures. The technique was developed by William G. Blair, who theorized that the

misalignment of a joint occurs at the articulation; therefore, the misalignment should be visualized via diagnostic imaging.<sup>30</sup> Specific adjustments were developed to return the atlas to its proper position, thus reducing the upper cervical vertebral subluxation.<sup>20</sup>

### Conclusion

Case studies do not form high levels of scientific data, and cannot provide definitive insight into any general conclusions due to its limitations. However, the patient reported resolution of neck pain and hand tingling following Blair upper cervical chiropractic care. This case report outlines subluxation-based chiropractic care of a 28-year-old male who was experiencing neck pain with associated hand tingling. Further research is needed to determine the relationship and effect the vertebral subluxation has on neck pain and its associated factors.

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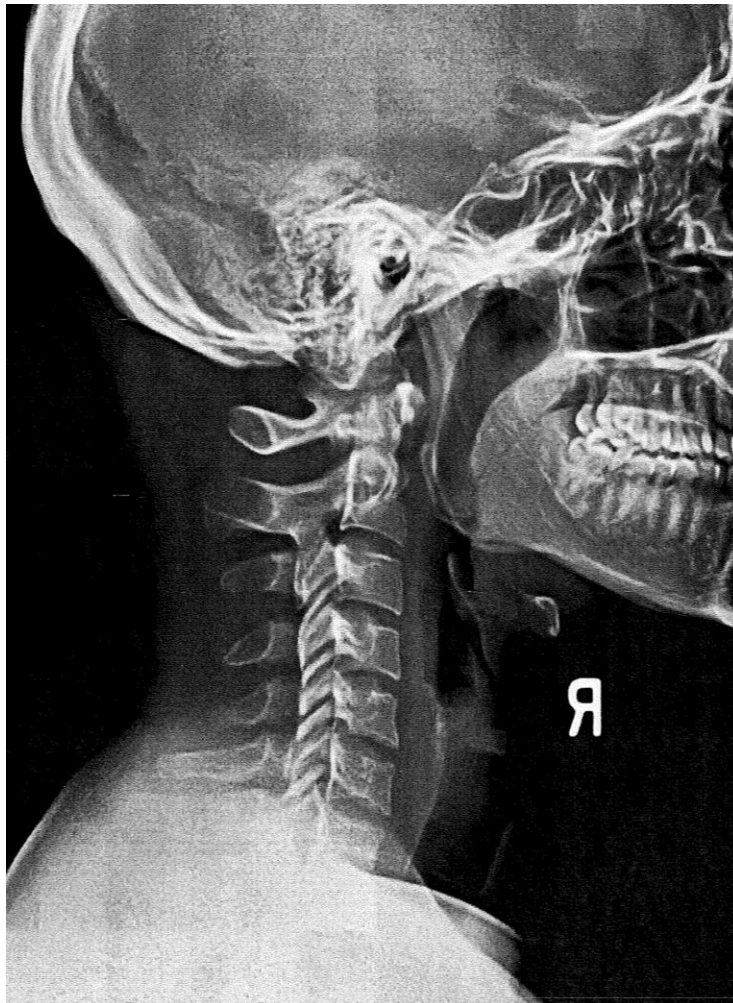
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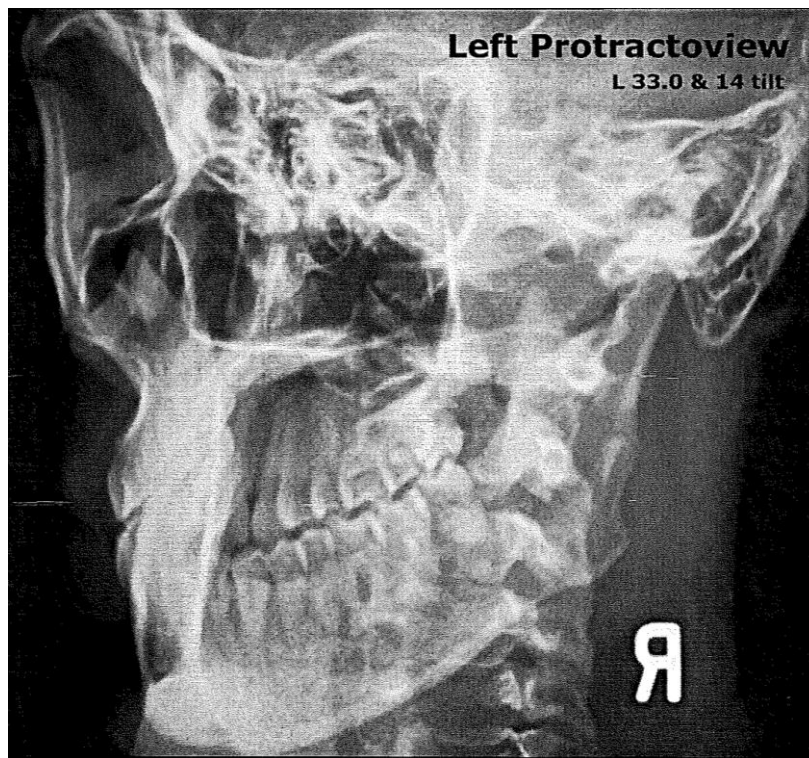
## Tables and Figures

Visit Number	Thermography Pattern Present	Leg Length Inequality	Derefield Leg Check	Modified Prill Vertical Leg Check	Adjustment Given
1	Yes	½"	Yes	Yes	Blair
2	Yes	¼"	Yes	Yes	Blair
3	No	0	No	No	None Given
4	Yes	½"	Yes	Yes	Blair
5	Yes	½"	Yes	Yes	Blair
6	Yes	0	No	Yes	Blair
7	Yes	¼"	No	Yes	Blair
8	No	0	No	No	None Given
9	No	0	No	No	None Given

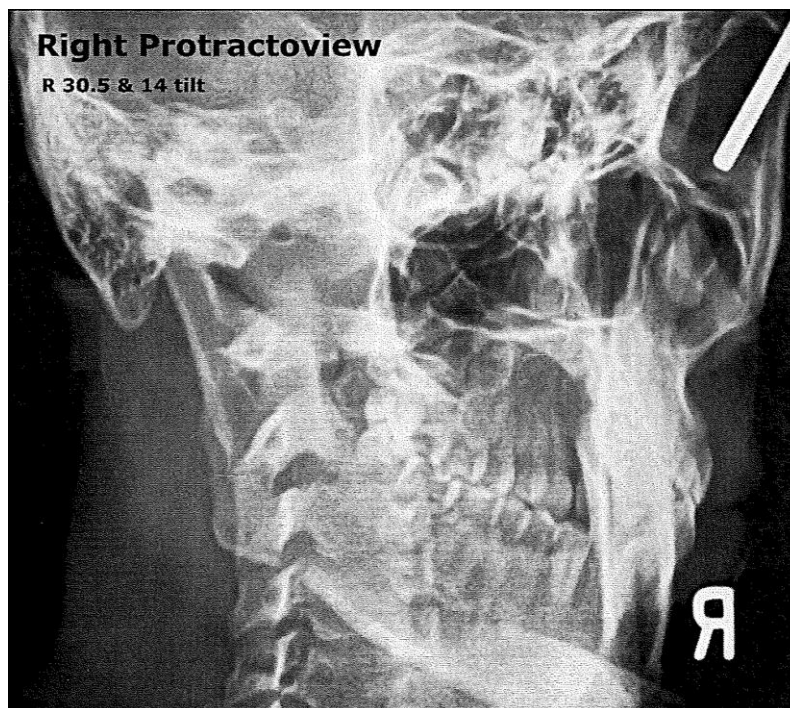
**Table 1:** Case management patient examination results for each visit



**Figure 1:** This is a Neutral Lateral Cervical radiographic image of the patient



**Figure 2:** This is a Left Protracto radiographic image of the patient



**Figure 3:** This is a Right Protracto radiographic image of the patient